Final

Proposed Plan for Inactive Landfill Number 4 (FGGM 95)

Fort George G. Meade
Fort Meade, Maryland

March 2021

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Prepared for:

US Army Corps of Engineers ®
Baltimore District

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Baltimore, MD 21201

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March 30, 2020

Environmental Division

Mr. Robert Stroud
NPL/BRAC/Federal Facilities Branch
U.S. Environmental Protection Agency
701 Mapes Road
Fort Meade, MD 20755

Dear Mr. Stroud:

Enclosed please find the *Final Proposed Plan (PP) for Inactive Landfill Number 4 (FGGM 95), Fort George G. Meade, Maryland*. Copies of the PP have been furnished to Elisabeth Green (MDE), Emily Cline (Baltimore District, USACE), Fran Coulters (U.S. Army Environmental Command), and the Fort George G. Meade Restoration Advisory Board.

Written correspondence should be addressed to Fort George G. Meade, Attention: IMME-PWE (George B. Knight), 4216 Roberts Ave, Suite 5115, Fort Meade, MD 20755-7068 or george.b.knight7.civ@mail.mil.

If you have any questions, please feel free to contact Erin Geiger at (301) 677-9168 or me at (301) 677-7999.

Sincerely,

George B. Knight, PG
Program Manager, Installation Restoration Program
Directorate of Public Works-Environmental Division

Enclosure

FINAL PROPOSED PLAN FOR INACTIVE LANDFILL NUMBER 4 (FGGM-95) FORT GEORGE G. MEADE, MARYLAND

March 2021

INTRODUCTION AND PURPOSE

This Proposed Plan (PP), which summarizes information found in detail in the **Remedial Investigation** (RI) / **Feasibility Study** (FS) (AECOM, 2020) for Inactive Landfill Number 4 (FGGM-95) at Fort George G. Meade (FGGM) as well as other reports that are available for review as part of the **Administrative Record** file for this site, provides information necessary to allow the public to participate with the United States (U.S.) Department of the Army (Army), the Lead Agency, and the U.S. Environmental Protection Agency (USEPA) Region III, the lead regulatory agency, in the remedy selection process for Inactive Landfill Number 4 (IAL4). The landfill is located along the southwestern border of Fort George G. Meade (FGGM), north of and adjacent to State Route 32 (Route 32) in Anne Arundel County, Maryland (**Figure 1**). IAL4 is currently wooded and the topography is hummocky. A steep slope on the southern edge of IAL4 forms the apron for Route 32 (**Figure 2**). IAL4 is approximately 2.4 acres in size and contains approximately 29,200 cubic yards of landfill waste.

The environmental cleanup activities at FGGM are conducted pursuant to the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)**, as amended, 42 U.S.C. §§ 9601 – 9675, and the **National Oil and Hazardous Substances Pollution Contingency Plan** (NCP) [40 Code of Federal Regulations (CFR) Part 300].

SITE HISTORY AND NATURE OF CONTAMINATION

The USEPA placed FGGM on the **National Priorities List** (NPL) on July 28, 1998, after an evaluation of contamination due to past storage and disposal of hazardous substances. IAL4 was used during the 1950s until the 1970s for the disposal of rubble. During the RI (AECOM, 2020), trenches were excavated to assess landfill material and confirm the landfill boundary. In the trenches where solid waste was identified, it consisted primarily of a mixture of household trash and construction debris/rubble, with some automotive debris. Based on LIDAR imagery of IAL4 and the surrounding area, linear features trending north-northeast to south-southwest were observed during the RI. These are interpreted to be manmade features. The northern and eastern extents of the linear features at IAL4 correspond with the change in elevation that drops off to a drainage swale. The southern extent of the linear features corresponds with a fence that prevents access to Route 32. The western extent of the linear features is obscured by the elevated dirt roadway. IAL4 was an active landfill but was not closed under Code of Maryland Regulation (COMAR) 26.04.07.21 because it was not a permitted facility.

The Army coordinates cleanup activities with the USEPA Region III, and, as appropriate, the other signatories of the FGGM Federal Facility Agreement (FFA). The signatories to the FFA are USEPA Region III, U.S. Department of the Army, U.S. Department of the Interior, and U.S. Architect of the Capitol. The Army also solicits input from the Maryland Department of the Environment (MDE). The FFA was signed by all parties involved in June 2009.

IMPORTANT DATES AND LOCATIONS

Meeting: April 22, 2021
The Army will hold a virtual meeting to explain the PP and all Response Actions evaluated in the FS on April 22, 2021. Oral and written comments will also be accepted at the meeting. The meeting will be held either virtually at 7 PM.

Public Comment Period:
April 1 – May 1, 2021
The Army will accept written comments on the PP during the public comment period.

The Administrative Record, containing information used for the selection of the Response Action, is available for public review at the following location:

Anne Arundel County Public Library
Odenton Regional Branch
1325 Annapolis Rd.
Odenton, Maryland 21113

Additional information is maintained at the following location:
Fort Meade Environmental Division Office
4216 Roberts Ave, Second Floor
Fort Meade, Maryland 20755

From 2016 to 2019, AECOM conducted an RI/FS (AECOM, 2020). The RI/FS identified the types, quantities, and locations of contaminants and developed alternatives to address the contamination. The RI/FS indicated the following contaminants must be managed:

- Arsenic, cobalt, and iron in groundwater, identified as Contaminants of Concern (COCs) at IAL4, pose an unacceptable risk assuming the shallow groundwater were to be used as drinking water by future potential hypothetical residents. Since the concentrations of these compounds that exceed an MCL or RSL only occur in one (arsenic and cobalt) or three (iron) monitoring wells, and the wells differ for each compound, there are no discernible plumes for these metals.
- Methane is a contaminant of concern. Out of the six locations were methane was detected in the subsurface, one location, exceeded the COMAR regulations of 5 percent.

WHAT ARE THE "CONTAMINANTS OF CONCERN"?

Arsenic: Arsenic, detected in onsite groundwater at concentrations ranging from non-detect (less than 2.0 µg/L) to 16.1 µg/L, is a semi-metal element that is odorless and tasteless. It enters drinking water supplies from natural deposits in the earth or from agricultural and industrial runoff into groundwater. According to information provided by the Agency for Toxic Substances and Disease Registry's (ATSDR's) Toxicological Profile, inorganic arsenic is a human carcinogen.

Cobalt: Cobalt, detected in onsite groundwater at concentrations ranging from non-detect (less than 0.5 µg/L) to 11.1 µg/L, is a natural element found throughout the environment and is used to make superalloys (alloys that maintain their strength at high temperatures approaching their melting points) and in pigment manufacture. According to information provided by ATSDR, cobalt is an essential element in humans, and is a constituent of vitamin B12. EPA has not classified cobalt for carcinogenicity.

Iron: Iron, detected in onsite groundwater at concentrations ranging from non-detect (less than 200 µg/L) to 72,900 µg/L, is an essential nutrient and according to information provided by ATSDR, and not considered to be carcinogenic. Iron is the 2nd most abundant metal in the Earth's crust and is mostly used to make steel.

Methane: Methane, detected in one soil gas sample at 21%, is the main constituent of natural gas and is formed by both geological and biological processes. Most methane is produced by methanogenesis, a form of anaerobic respiration. Methanogens occupy landfills and other soils, ruminants (for example cows or cattle), the guts of termites, and the anoxic sediments below the seafloor and the bottom of lakes.

SUMMARY OF SITE RISKS

As part of the RI/FS (AECOM, 2020), a **Human Health Risk Assessment (HHRA)** and a **Baseline Ecological Risk Assessment (BERA)** were conducted to determine the current and future effects of contaminants on human health and the environment. The HHRA identified the following risk levels and chemicals causing the risk:

- The carcinogenic target risk level for groundwater (assuming potable use) was exceeded for the hypothetical future onsite resident (lifetime) due to arsenic.
- The non-carcinogenic target risk level for groundwater (assuming potable use) was exceeded for the hypothetical future onsite resident (child and adult) due to arsenic, cobalt, and iron.
- Methane detected at soil-gas point SG-01 exceeded the Code of Maryland Regulations (COMAR) lower explosive limit for methane of 5 percent by volume.

IAL4 is on property maintained by FGGM. Surrounding site usage is highway, former railroad, and administrative and storage facilities. At present, the planned future use of IAL4 is industrial (Atkins, 2013). Groundwater is currently not used for any purpose at IAL4. Downgradient of IAL4 is Route 32 and Tipton Airfield. Although the use of IAL4 for residential purposes is not a reasonably anticipated future land use and there are no plans to develop IAL4 for residential use, the hypothetical future residential land use scenario is used in the risk assessment to represent the most conservative conditions.

WHAT IS RISK AND HOW IS IT CALCULATED?

A Superfund human health risk assessment estimates "the baseline risk." This is an estimate of the likelihood of health problems occurring if no cleanup actions were taken at a site. To estimate the baseline risk at a Superfund site, EPA undertakes a four-step process:

Step 1 Hazard Identification: In this step, the contaminants of concern at the site in various media (i.e., soil, groundwater, surface water, and air) are identified based on such factors as toxicity, frequency of occurrence, fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

Step 2 Exposure Assessment: In this step, the different exposure pathways through which people might be exposed to the contaminants identified in the previous step, the concentrations that people might be exposed to, and the potential frequency and duration of exposure are evaluated. Using these factors, a reasonable maximum exposure scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated.

Step 3 Toxicity Assessment: In this step, the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response) are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other non-cancer health effects, such as changes in the normal functions of organs within the body (e.g., changes in the effectiveness of the immune system). Some chemicals are capable of causing both cancer and non-cancer health effects.

Step 4 Risk Characterization: This step summarizes and combines exposure information and toxicity assessments to provide a quantitative assessment of site risks. Exposures are evaluated based on the potential risk of developing cancer and the potential for non-cancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 1E-04 cancer risk means a one-in-ten-thousand excess cancer risk; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions explained in the Exposure Assessment. For non-cancer health effects, a hazard index (HI) is calculated. An HI of one or less indicates that no adverse non-cancer effects are anticipated to occur.

Human Health Risks

The statistical analysis of groundwater sampling data calculated the following **Exposure Point Concentrations** (EPC) and **risk**:

- Arsenic EPC in groundwater is 14.1 µg/L, which is associated with an excess lifetime cancer risk of $3X10^{-4}$ for hypothetical future residents and an excess lifetime non-cancer hazard quotient (HQ) of 2 for a potential future child resident. Arsenic was detected in 7 of the 16 samples collected in 2017.
- Cobalt EPC in groundwater is 10.6 µg/L, which is associated with an excess lifetime non-cancer HQ of 2 for a potential future child resident. Cobalt was detected in 12 of the 16 samples collected in 2017
- Iron EPC in groundwater is 44,900 µg/L, which is associated with an excess lifetime non-cancer HQ of

3 for a potential future child resident. Iron was detected in 10 of the 16 samples collected in 2017

In subsurface soil-gas, methane is a potential explosion hazard and thus poses a threat to human health. As presented in the RI/FS (AECOM, 2020), the HHRA determined that there are no risks to human health associated with soil, sediment, and surface water media at IAL4. Therefore, this PP focuses solely on risks associated with landfill contents, groundwater contamination in the Upper Patapsco Aquifer (UPA) and methane in soil-gas. The RI/FS identified potential future risk due to metals in groundwater. The metals in groundwater is likely attributable to landfill material, which can act as a reservoir for migration of contamination to ground water, therefore, the landfill material constitutes a principal threat.

Ecological Risks

The BERA concluded that potential ecological risks at IAL4 are low, and no further action to evaluate or address potential ecological impacts is recommended.

REMEDIAL ACTION OBJECTIVES

Based on the HHRRA and site conditions, the following remedial action objectives (RAOs) were established for landfill waste, groundwater, and soil- gas at IAL4:

- To prevent human contact with buried and surficial waste.
- To meet **Applicable or Relevant and Appropriate Requirements (ARARs)** and be protective of the hypothetical future resident, ingestion of shallow groundwater containing concentrations of arsenic above its target risk level;
- To meet ARARs and be protective of the hypothetical future child resident ingestion of shallow groundwater containing concentrations of arsenic, cobalt, and iron above their respective target risk levels; and
- To maintain the concentration of methane generated by IAL4 at less than the lower explosive limit for methane (5 percent by volume) at the property boundary in accordance with the COMAR 26.04.07.03B(9) regulation.

This proposed action will achieve the RAO for the landfill waste by either removing the landfill waste or covering the landfill waste and maintaining that cover. This proposed action will achieve the RAOs for the excess cancer risk associated with exposure to contaminated groundwater caused by IAL4 and achieve the RAOs for excess noncancer health effects associated with exposure to contaminated groundwater caused by IAL4 by restricting groundwater use. The proposed action will achieve the RAOs by reducing concentrations of methane in soil-gas at the property boundary to the COMAR 26.04.07.03B (9) guidelines of 5 percent by volume.

Site Cleanup Levels (SCLs) for groundwater will be Maximum Contaminant Levels (MCLs) (where they exist) in accordance with the requirements of CERCLA and identified ARARs. For COCs that do not have established MCLs, the SCL applied is the Tap Water Regional Screening Level (RSL) with an HQ of 1.0. The groundwater and soil gas SCLs are shown in **Table 1**.

Table 1
Site Cleanup Levels for Groundwater COCs and Soil Gas

COC	Site Cleanup Level (µg/L)
Arsenic	10 (MCL)
Cobalt	EPC of 6 (RSL)
Iron	EPC of 14,000 (RSL)
Methane	less than 5 percent by volume at the property boundary (COMAR 26.04.07.03B (9))

SUMMARY OF REMEDIAL ALTERNATIVES

- Remedial alternatives are discussed in detail in the RI/FS for IAL4 and summarized below. The alternatives are numbered in the same order as they were presented in the RI/FS (AECOM, 2020).
- **Common Elements**. Some of the alternatives include common components such as long-term monitoring (LTM) of soil-gas and groundwater. Several of the alternatives require institutional controls to limit the use of portions of the property or land use control (LUC) to prevent groundwater use for drinking water purposes. These resource use restrictions are discussed in each alternative as appropriate. The type of restriction and enforceability will be determined as part of the selected remedy in the **Record of Decision (ROD)**. Except for Alternative 2, consistent with expectations set out in the Superfund regulations, none of the alternatives rely exclusively on institutional controls or LUCs to achieve protectiveness. Monitoring to ensure the effectiveness of the remedy, including institutional controls or LUCs, are a component of each alternative except the “no-action” alternative.

Remedial Alternatives

Remedial Alternative 1: No Action.

Remedial Alternative 2: Land Use Controls (LUCs) and Long-Term Monitoring (LTM) of soil-gas and groundwater.

Remedial Alternative 3: 2-foot Soil Cover, Long-Term Management (LTMgt) of the Cover, LUCs, and LTM of soil-gas and groundwater.

Remedial Alternative 4: Installation of an Impermeable Soil/Geosynthetic Cover across IAL4 in Accordance with COMAR 26.04.07.21, LTMgt of the Cover, further delineation of soil-gas, LUCs, and LTM of soil-gas and groundwater.

Remedial Alternative 5: Excavation with offsite disposal, backfill with clean fill, and installation of an impermeable cap over landfill waste remaining under the slope to Route 32, LTMgt of the Cover, LUCs, and LTM of groundwater.

- A total of five remedial alternatives (RAs) to address groundwater and soil-gas contamination, and the landfill at the Site were developed and evaluated in the RI/FS (AECOM, 2020) based upon the results of a preliminary technology evaluation and screening. Screening of remedial technologies was done in accordance with the requirements of CERCLA, and 40 CFR 258.56, which MDE also uses as a guide for implementation of corrective action measures at sanitary landfills. The RAs are described below with their respective estimated ***Capital Costs***, estimated cost for ***Operation and Maintenance*** (O&M) activities, and an estimate of the ***Present Worth Costs*** for the RA.
- Because some landfill waste may remain at IAL4 under all remedial alternatives (under Remedial Alternative 5 some landfill waste may remain under Route 32), none of the remedial alternatives presented in the subsequent sections of this PP will achieve unlimited use and unrestricted exposure (UU/UE) scenarios following remedy implementation; therefore, annual land use certifications/inspections and the CERCLA five-year review process will be used to document that the remedy remains protective for on-post and off-post areas. The Remedial Design would specify requirements to notify the USEPA should a change in land use occur or be planned.

Remedial Alternative 1: No Action

Estimated Capital Cost: $0
Estimated O&M Cost Over 30 Years: $0
Estimated Present Worth Cost: $0

Under RA 1, no remedial action of any kind would be implemented. This alternative would not adequately control the risks posed by exposure to soil-gas or groundwater or landfill waste; nor would it restore groundwater to its beneficial use at the Site. However, according to the NCP, the no action alternative must be evaluated to establish a baseline for comparison of the remaining alternatives, even though this alternative would not be a viable option at this Site.

Remedial Alternative 2: LUCs and LTM of Soil-Gas and Groundwater

Estimated Capital Cost: $31,700
Estimated O&M Cost Over 30 Years: $1,125,500
Estimated Present Worth Cost: $1,098,100

The four general categories of LUCs evaluated or already in use at FGGM and applicable to IAL4 which provide layers of protection, are as follow: governmental controls, proprietary controls, permitting, and informational devices, which assist with the management and implementation of on-post LUCs. These elements include requirements to obtain dig permits from the Directorate of Public Works for any intrusive activity at FGGM; Master Plan Regulations; FGGM Geographic Information System (GIS) Database; FGGM Access Restrictions; and Army Military Construction Program. These controls have been developed with consideration of all reasonably anticipated land uses at the FGGM. These LUCs would be formalized into a LUC Remedial Design for IAL4.

There are existing LUCs on FGGM that would be maintained and enhanced for IAL4. Existing LUCs consist of perimeter fencing along the installation controlling entry to the installation and an Excavation Permit Process administered by FGGM Directorate of Public Works that limit excavations at IAL4.

Additional fencing and signage around IAL4 will be installed.

LUCs would be implemented to prohibit residential development and shallow groundwater use on-post at the Site until COCs are at levels that would allow for beneficial reuse of groundwater as a drinking water source.

LTM of groundwater will include semi-annual collection of samples from the eight onsite monitoring wells and two downgradient monitoring wells, located on the southern side of Route 32. All monitoring wells will be sampled and analyzed for metals.

- For off-post LUCs, the Remedial Design would recommend off-post groundwater use provisions implemented by Anne Arundel County Health Department (County) to address arsenic, cobalt, and iron detected in the UPA at concentrations above their respective MCL or RSLs downgradient of IAL4. The extent of the downgradient exceedances will be confirmed during the Remedial Design phase. The type of controls would differ from the LUCs implemented on-post because the off-post area is not under FGGM jurisdiction.
- The County already has a restriction in place due to documented radium contamination in the shallow UPA in northern Anne Arundel County. “Since March 1, 2002, new and replacement wells in northern Anne Arundel County must be installed to a minimum well depth and meet drinking water standards for radium (AA County, 2020).” The Army would provide written reports to the County with sampling results of the LTM program. The monitoring reports would include updated GIS data layers with updated plume maps for contaminants detected during the LTM program.

LTM of methane will include the semi-annual collection of methane soil-gas samples from four soil gas monitoring points installed at the boundaries of IAL4.

Remedial Alternative 3: 2-foot Soil Cover, LTMgt of the cover, LUCs and LTM of Soil-Gas and Groundwater

Estimated Capital Cost: $1,501,800
Estimated O&M Cost Over 30 Years: $1,016,500
Estimated Present Worth Cost: $2,459,500

Alternative 3 provides for the restriction of use of groundwater and provides for monitoring of the potential physical hazard posed by the buried waste by placing a

2-foot soil cover over IAL4 and providing for LTMgt of the cover.

The current vegetation at IAL4 would be removed to install the cover. The cover would require LTMgt and maintenance, which would include occasional mowing and removal of trees and shrubs that could disrupt the cover. Repairs would be undertaken as necessary. This alternative would include annual inspections to document signs of erosion, subsidence, settling, and buried waste exposed at the ground surface. Alternative 3 would also include annual surficial waste removal, should waste be exposed at the ground surface due to erosional processes and weathering of the ground surface.

Similar to Alternative 2, Alternative 3 would also employ LUCs and LTM of soil-gas and groundwater.

Remedial Alternative 4: Installation of an Impermeable Cover in Accordance with COMAR 26.04.07.21, LTMgt of the cover, LUCs and LTM of Soil Gas and Groundwater

Estimated Capital Cost: $2,317,500
Estimated O&M Cost Over 30 Years: $1,016,500
Estimated Present Worth Cost: $3,272,400

Alternative 4 would involve removal of the current vegetation at IAL4 in order to install the cover, installation of an Impermeable Soil/Geosynthetic Cover across IAL4 in accordance with COMAR 26.04.07.21, LTMgt of the cover similar to what was described in Alternative 3, and LUCs and LTM of soil-gas and groundwater as described in Alternative 2.

The impermeable soil/geosynthetic cover would consist of an imported fill grading layer, a low permeability barrier layer, a granular or synthetic drainage layer, and an earthen soil layer, which will include a vegetated surface cover.

Similar to Alternative 3, Alternative 4 would employ LTMgt and maintenance of the cover. Similar to Alternative 2, Alternative 3 would employ LUCs and LTM of soil-gas and groundwater.

Remedial Alternative 5: Excavation with offsite disposal, backfill with clean fill, and installation of an impermeable cap over landfill waste remaining under the slope to Route 32, LTMgt of the Cover, LUCs and LTM of Soil Gas and Groundwater

Estimated Capital Cost: $6,100,100
Estimated O&M Cost Over 30 Years: $621,400
Estimated Present Worth Cost: $6,669,000

Alternative 5 consists of the excavation of landfill waste from IAL4, transportation to and disposal at permitted facilities. The current vegetation at IAL4 would be removed to excavate the waste. After removal of the landfill waste and affected soil, the area will be backfilled with clean fill and the surface will be vegetated. Any landfill waste remaining under the slope to Route 32 will be capped in accordance with COMAR 26.04.07.21, similar to alternative 4. LTMgt and LUCs would be required since landfill waste will remain. Additional components of this alternative include LTM of groundwater consistent with the description for Alternatives 2 and 3.

EVALUATION OF REMEDIAL ALTERNATIVES

The NCP requires the evaluation of remedial alternatives both individually and against one another using nine evaluation criteria, in order to select a remedy (40 CFR 300.430(e)(9)). These criteria are presented in **Table 2** below.

TABLE 2: EVALUATION CRITERIA FOR SUPERFUND REMEDIAL ALTERNATIVES

Threshold Criteria – Must be met for the RA to be eligible for selection as a remedial option.
1. Overall Protectiveness of Human Health and the Environment determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through treatment, engineering controls, or institutional controls.
2. Compliance with ARARs evaluates whether the alternative meets Federal and State environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.
Primary Balancing Criteria – Used to weigh major trade-offs among RAs
3. Long-term Effectiveness and Permanence considers the ability of an alternative to maintain protection of human health and the environment over time.
4. Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.
5. Short-term Effectiveness considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.
6. Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.
7. Cost includes estimated capital and annual O&M costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.
Modifying Criteria – May be considered to the extent that information is available prior to the start of the public comment period, but can be fully considered only after public comment is received on this PP.
8. State/Support Agency Acceptance considers whether the State agrees with the Army's analyses and recommendations, as described in the RI/FS and Proposed Plan.
9. Community Acceptance considers whether the local community agrees with the Army's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

Comparative Analysis of Remedial Alternatives

Nine criteria listed in **Table 2** are used to evaluate the different RAs individually and against each other in order to select a remedy. The "Detailed Analysis of Alternatives" can be found in the RI/FS (AECOM, 2020). **Table 3** presents a qualitative comparative analysis of the remedial alternatives, and **Table 4** presents a quantitative comparative analysis of the remedial alternatives, ranking the five alternatives.

1. Overall Protection of Human Health and the Environment

All remedial alternatives, except for Alternative 1 are protective of human health and the environment in the short-term and the long-term. Under Alternative 2, FGGM would become aware if groundwater or soil gas conditions change and require additional action to further protect human health and the environment. Alternatives 3 and 4 would ensure the continued management of buried waste at IAL4 via placement of a soil cover or an impermeable soil/geosynthetic cover, respectively. Alternative 3 would reduce the amount of leaching of contaminants from IAL4 to groundwater. Alternative 4 would ensure buried waste is not leaching contaminants to groundwater. This would be confirmed through routine LTM. LUCs would restrict groundwater use. Alternative 5 would remove all the landfill waste landfill waste except for what cannot be excavated under Route 32 thereby eliminating exposure to landfill material inside the FGGM fence line and eliminating future leaching of contaminants to groundwater. Under Alternatives 3, 4, and 5, residual COCs (arsenic, cobalt, and iron) in groundwater would be remediated through natural attenuation (dispersion, dilution, and sorption) over time. Under Alternative 5, the source of methane in soil gas would be removed and methane would be remediated, although, if landfill waste remains under Route 32, the waste can potentially generate methane.

2. Compliance with ARARs

Alternatives 1 and 2 fail to comply with the ARARs. Alternative 3 would require approval of a variance request for the cover design requirements specified in COMAR 26.04.07.21, which is an ARAR, unless the soil cover can prove to be as effective as a low-permeability geotextile membrane. Alternative 4 would include a cover system that is constructed in accordance with Maryland's cover design criteria promulgated under COMAR 26.04.07.21. Under Alternative 5, if any landfill waste remains under Route 32 it would need a COMAR 26.04.07.21 cover.

3. Long-Term Effectiveness and Permanence

Under Alternatives 1 and 2, there would be no long-term mechanism in place to control hazards associated with potential exposure to buried waste at IAL4. Neither Alternative 1 or 2 would actively reduce or eliminate groundwater or soil-gas COCs. Alternatives 3 and 4 are effective in the long-term because there are components of each alternative that eliminate hazards associated with buried waste that remains in place at IAL4. Both will reduce the amount of infiltration and leaching of rainwater to groundwater, thereby reducing COC concentrations in groundwater over time. Both would also provide a more complete control of soil-gas by containing soil-gas under a cover. However, in accordance with the NCP, there is an expectation that aquifers will be restored to their beneficial uses. Since alternative 5 is the removal of landfill waste and affected soil, it is the most effective in the long-term.

4. Reduction of Toxicity, Mobility, and Volume through Treatment

Alternatives 1 and 2 would not reduce the toxicity, mobility, or volume of impacted groundwater or soil gas at IAL4. Alternatives 3 and 4 would reduce the mobility of impacted soil-gas and groundwater through the installation of a cover. Under Alternatives1 through 4, buried waste would be left in place and not include active treatment to reduce the toxicity, mobility, or volume of buried waste or impacted media at the Site; however, under Alternatives 3 and 4, covering the landfill waste would reduce the infiltration of precipitation, thus reducing the quantity of affected water to the water table and reducing the mobility of affected groundwater. Alternative 5 would reduce the toxicity, mobility, or volume of buried waste or impacted media at IAL4 by removing all accessible landfill waste and affected soil.

5. Short-Term Effectiveness

Alternative 1 would have poor short-term effectiveness as it would not provide a mechanism to monitor and control buried waste hazards at IAL4. Alternatives 1 and 2 would not pose additional risks to the community, the workers, or the environment since they involve no intrusive remedial activities; however, they would not change the soil-gas or groundwater conditions. Alternatives 3 and 4 would introduce marginal short-term risks to the community and construction workers due to the construction of the soil covers. Alternatives 3 and 4 would require proper personal protective equipment selection, clothing, and engineering controls during implementation to address site risks during construction activities. Alternative 5 would introduce short-term risks to the community and construction workers due to the excavation and transportation of the landfill waste.

6. Implementability

Alternative 1 would be the most implementable because no action is required. However, Alternative 1 would not be a viable remedial alternative. The most readily implementable viable alternative would be Alternative 2 because it requires the least amount of work. Alternatives 3 and 4 would be less implementable because each

would require substantial coordination efforts to ensure a successful design and construction phase. Alternative 5 would be the least implementable because of the substantial coordination efforts between FGGM, the excavation and transportation companies, and the receiving facility.

7. Cost

Alternative 1 would not have any present-worth or capital costs since no actions would be undertaken. However, Alternative 1 would not be a viable remedial alternative. Based on the present worth estimates for the remedial alternatives, Alternative 5 (cost $6.7M) would be the most expensive followed by Alternative 4 (cost $3.3M) then Alternative 3 (cost $2.5M). Alternative 2 (cost $1.1M) would be the most cost effective but would require MDE to grant a variance for leaving the landfill uncovered.

8. State/Support Agency Acceptance

State approval of the preferred RA presented in this PP is expected. State approval will be further evaluated in the ROD following the public comment period.

9. Community Acceptance

Community acceptance of the preferred RA will be evaluated at the conclusion of the public comment period. Comments received will be addressed in the **Responsiveness Summary** prepared for the ROD.

SUMMARY OF THE PREFERRED REMEDIAL ALTERNATIVE FOR IAL4

- The preferred Remedial Alternative is number 5: Excavation of all accessible landfill waste, offsite disposal, backfill with clean fill, delineation of landfill waste under Route 32, and installation of an impermeable cap over landfill waste remaining under the slope to Route 32, LTMgt of the Cover, LUCs and LTM of Soil-Gas and Groundwater.

The preferred RA is recommended because it would provide the best balance among the evaluation criteria for reducing human contact with landfill waste, reducing concentrations of arsenic, cobalt, and iron in UPA groundwater, and reducing human exposure to methane gas. The preferred RA was selected over other alternatives because it is expected to achieve substantial and long-term risk reduction through removal and offsite disposal and is expected to allow the property to achieve unlimited use and unrestricted exposure (UU/UE), except for the landfill waste under Route 32 that cannot be removed.

Based on the information available at this time, EPA and the State of Maryland believe the Preferred Alternative would be protective of human health and the environment, would comply with ARARs, and would utilize permanent solutions to the maximum extent practicable. Because it would remove the source materials constituting principal threats, thereby removing the source of soil-gas and groundwater contamination, the remedy also would meet the expectation that aquifers will be restored to their beneficial uses. The Preferred Alternative can, however, change in response to public comment or new information.

COMMUNITY PARTICIPATION

Public participation is an important component of remedy selection. The Army, USEPA, and MDE are soliciting input from the community on the preferred RA. The comment period extends from **April 1, 2021 to May 1, 2021** (30 days). This period includes a meeting (either in-person or virtual) at which the Army will present the PP as agreed to by the USEPA and MDE. The Army will accept both oral and written comments at this meeting and written comments following the meeting through **May 1, 2021**.

The **Restoration Advisory Board** (RAB) is a critical component of the FGGM Installation Restoration Program to keep the public informed about the environmental cleanup activities and to involve the public in decision-making. The RAB gives community members, particularly those who may be affected by the cleanup activities, and government representatives a chance to exchange information and participate in meaningful dialogue. IAL4 has previously been discussed with the RAB on November 19, 2015 as part of the commencement of the overall Performance Based Contract activities. The RAB has been updated regarding IAL4 periodically since that time, most recently during the November 21, 2019 RAB meeting where the Draft RI/FS for IAL4 was presented.

Public Comment Period

The Army is providing a 30-day comment period from **April 1, 2021 to May 1, 2021** to provide an opportunity for public involvement in the decision-making process for the proposed action. The public is encouraged to review and comment on this PP, as the final remedy selected for IAL4 can change as a result of public comments received. During the public comment period, the public is encouraged to review the following reports and other documents pertinent to IAL4 and the Superfund process: *Remedial Investigation/Feasibility Study for Inactive Landfill Number 4 (FGGM 95), Fort George G. Meade, MD* (AECOM, 2020). This information is available on the following website: https://home.army.mil/meade/index.php/my-fort/all-services/environmental and at the Anne Arundel County Odenton Regional Library located at 1325 Annapolis Road in Odenton, MD, and the Fort George G. Meade Environmental Division Office, located at 4216 Roberts Avenue, Second Floor, at Fort George G. Meade. To obtain further information, the following representatives may be contacted:

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Maryland Department of the Environment
Federal Facilities Division
1800 Washington Blvd. Suite 625
Baltimore, MD 21230-1719
(410) 537-3346
elisabeth.green@maryland.gov

Army's Review of Public Comments

The Army will review the public's comments as part of the process to reach a final decision on the remedial action to be taken. The Army's final choice of action will be communicated in a ROD. A Responsiveness Summary, documenting and responding to significant written and oral comments received from the public during the public comment period will be issued with the ROD. Once community response and input are received and the Army and USEPA sign the ROD, it will become part of the Administrative Record.

ACRONYMS AND ABBREVIATIONS

%	percent
µg/L	micrograms per liter
ARARs	Applicable or Relevant and Appropriate Requirements
Army	U.S. Department of the Army
ATSDR	Agency for Toxic Substances and Disease Registry'
BERA	Baseline Ecological Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended
CFR	Code of Federal Regulations
COMAR	Code of Maryland Regulations
EPC	Exposure Point Concentration
FFA	Federal Facility Agreement
FS	Feasibility Study
FGGM	Fort George G. Meade
FGGM-95	Inactive Landfill Number 4
ft	feet or foot
GIS	Geographic Information System
HHRA	Human Health Risk Assessment
HI	Hazard Index or Indices
HQ	Hazard Quotient
IAL4	Inactive Landfill Number 4
LTM	Long-Term Monitoring
LTMgt	Long-Term Management
LUC	Land Use Control
MCL	Maximum Contaminant Level
MDE	Maryland Department of the Environment
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
PP	Proposed Plan
RA	Remedial Alternative
RAB	Restoration Advisory Board
RAO	Remedial Action Objective
RI	Remedial Investigation
ROD	Record of Decision
RSL	Regional Screening Level
SCLs	Site Cleanup Levels
Route 32	State Route 32
UPA	Upper Patapsco Aquifer
U.S.	United States
USEPA	U.S. Environmental Protection Agency
UU/UE	unlimited use and unrestricted exposure

GLOSSARY OF TERMS

Administrative Record: This is the collection of documents (including plans, correspondence and reports) generated during site investigation and remedial activities that were referred to or relied upon to select the preferred Response Action. Information in the Administrative Record is available for public review. 40 CFR 300.800

Applicable or Relevant and Appropriate Requirements (ARARs): The federal and State statutory and regulatory environmental and facility siting requirements that a selected remedy must attain. These requirements may vary among sites and RAs. 40 CFR 300.5

Baseline Ecological Risk Assessment (BERA): The baseline ecological risk assessments identifies and characterizes the current and potential threats to the environment from a hazardous substance release

Capital Costs: This includes costs associated with construction, treatment equipment, site preparation, services, transportation, disposal, health and safety, installation and start-up, administration, legal support, engineering, and design associated with Response Actions.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): This federal law was passed in 1980, and has been subsequently amended, and is commonly referred to as the Superfund Program. It provides for emergency response, liability, cleanup, and compensation in connection with the cleanup of inactive hazardous waste disposal sites that endanger public health and safety or the environment.

Exposure Point Concentration (EPC): Is a conservative estimate of the average chemical concentration in an environmental medium. An exposure unit is the area throughout which a receptor moves and encounters an environmental medium for the duration of the exposure.

Feasibility Study (FS): This CERCLA document reviews the chemicals of concern at a site and evaluates multiple remedial technologies for use at the site. Finally, it identifies the most feasible Remedial Alternative.

Human Health Risk Assessment (HHRA): This assessment describes the formal step-by-step scientific process for quantifying health risks to human receptors (residents, workers, trespassers), thereby estimating the nature and probability of adverse health effects in humans who may be exposed to chemicals in contaminated environmental media under current or future scenarios. A risk assessment uses standardized tools, formats, and scientifically accepted assumptions.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP): These CERCLA regulations provide the federal government with the authority to respond to the problems of abandoned or uncontrolled hazardous substance disposal sites as well as to certain incidents involving hazardous wastes (e.g., spills).

National Priorities List (NPL): The list of contaminated sites that require cleanup under CERCLA and where CERCLA funds may be expended.

Operation and Maintenance (O&M) Costs: Annual post-construction costs necessary to ensure the continued effectiveness of a Response Action.

Present Worth Costs: Used to evaluate expenditures that occur over different time periods by discounting all future costs to a common base year. This allows the cost of the Response Actions to be compared on the basis of a single figure representing the amount of money that would be sufficient to cover capital and O&M costs associated with each Response Action over its planned life.

Principal Threats: Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of the alternatives using the nine remedy selection criteria. This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

Record of Decision (ROD): This is the document in which the remedial action for a CERCLA site is selected, and it is signed by the Army and the USEPA in consultation with the MDE. It describes the cleanup action or remedy selected for a site, the basis for selecting that remedy, public comments, responses to comments, and the estimated cost of the remedy.

Remedial Investigation (RI): An investigation under CERCLA that involves sampling environmental media such as air, soil, and water to determine the nature and extent of contamination at a site and the human health and environmental risks that result from the contamination present at a site.

Responsiveness Summary: A part of the ROD in which the Army documents and responds to written and oral comments received during the public comment period regarding the alternatives presented in the PP.

Restoration Advisory Board (RAB): The board provides a forum for exchange of information and partnership among citizens, the military installation, USEPA, and MDE. The RAB offers an opportunity for community members to provide input into the cleanup process.

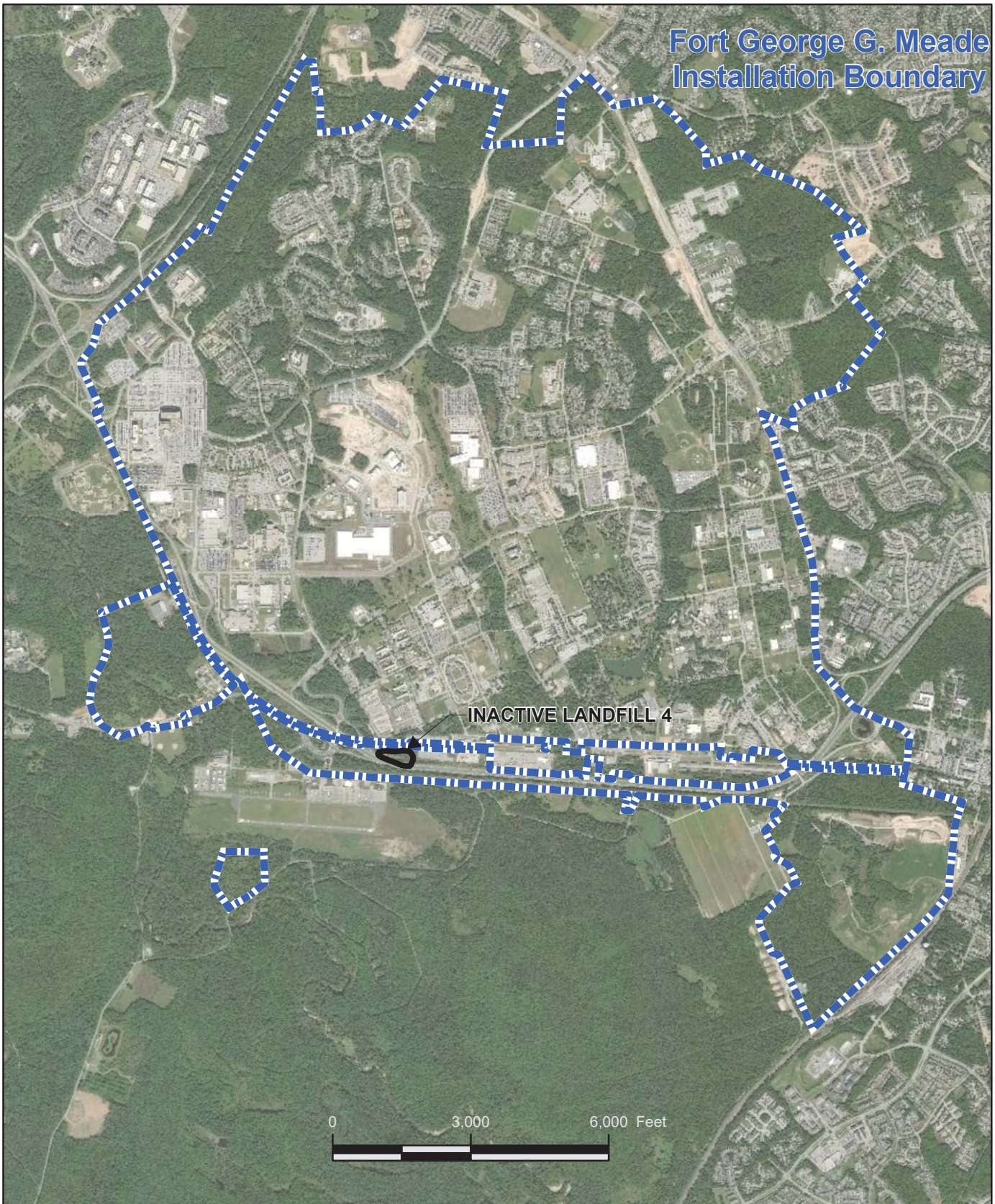
Risk: EPA considers risk to be the chance of harmful effects to human health or to ecological systems resulting from exposure to an environmental stressor. In general terms, risk depends on the following 3 factors: how much of a chemical is present in an environmental medium (e.g., soil, water, air), how much contact (exposure) a person or ecological receptor has with the contaminated environmental medium, and the inherent toxicity of the chemical. Please see the inset box “What is Risk and How is it Calculated” on page 2 for more information on risk.

REFERENCES

AECOM, 2020. Remedial Investigation/Feasibility Study for Inactive Landfill Number 4 (FGGM 95), Fort George G. Meade, MD. March 23, 2020.

Anne Arundel County, 2020. Radium in Well Water. https://aahealth.org/radium-in-well-water/. June 1, 2020.

ATKINS. 2013. Real Property Master Plan Update, Long Range Component, Fort Meade, Maryland. May 2013.



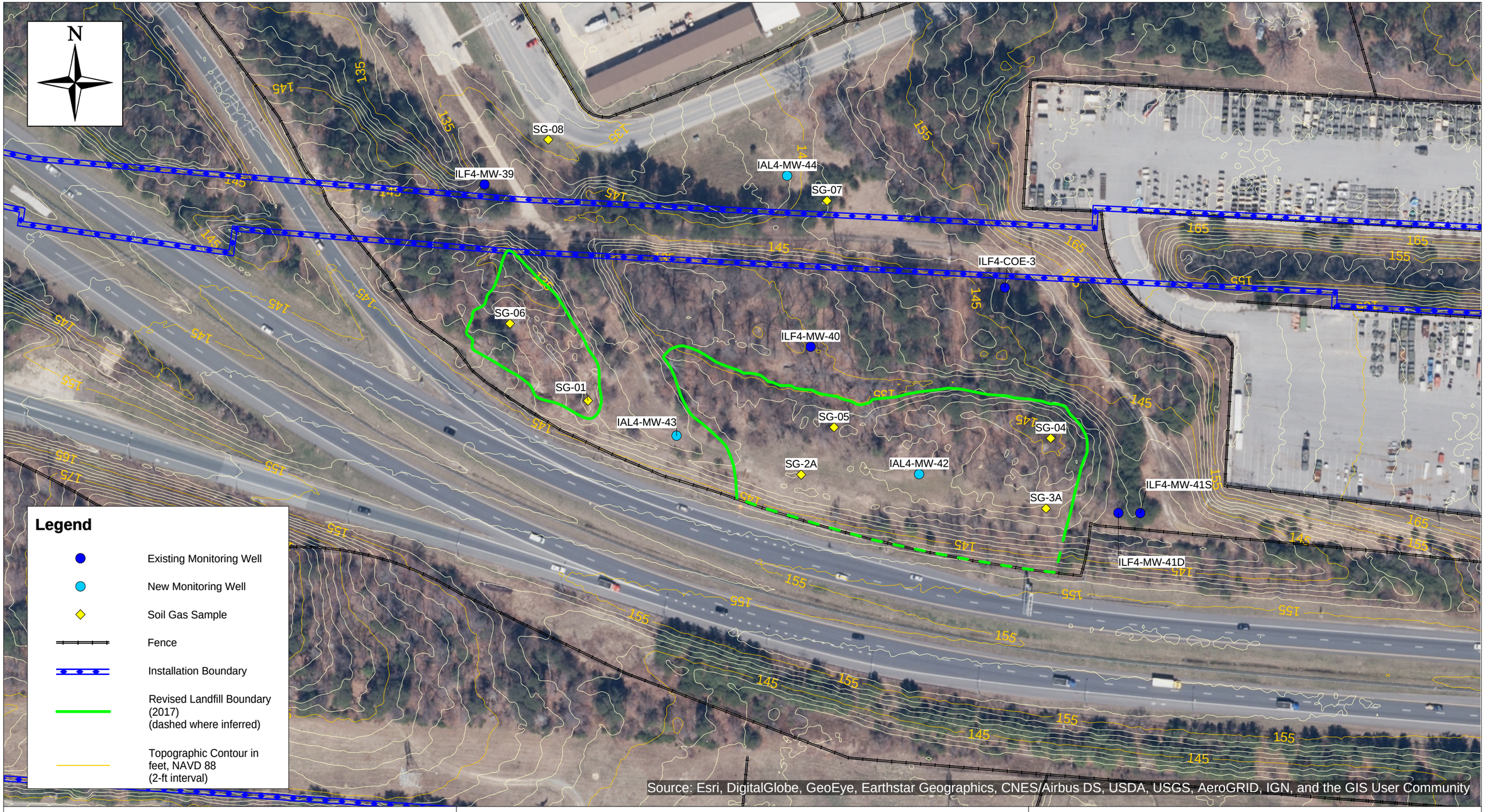
CLIENT	USACE, Baltimore District			
NOTES	Outlines of sites are arbitrary. Aerial Source: ESRI ArcGIS Online and data partners, 2015.			
REVISION NO	0	GIS BY	MS	9/12/2018
SCALE	1:36,000 (1 inch = 3,000 feet)	CHK BY	JK	9/12/2018
G:\Projects\Fort_Meade\PA_SI_New\Projects\InactiveLandfill4_Location_rev.mxd		PM	JK	9/12/2018

N

Location of Inactive Landfill Number 4 (FGGM 95), on Fort George G. Meade, Maryland

AECOM
12420 Milestone Center Drive
Germantown, MD 20876
301-820-3000

Figure 1



CLIENT	USACE, Baltimore District			
NOTES	Topographic Contours from MD iMAP 2011 LiDAR survey			
REVISION NO	0	FIG BY	DC	3/23/2020
SCALE	1" = 180'	CHK BY		
J:\Ft Meade\Data Management\Surfer\Plots\IAL4\ Figure 2_Sample Locations.srf		PM		

0 100 200 400 Feet

TITLE

Sample Locations and Surface Features on Inactive Landfill Number 4 Fort George G. Meade, Maryland

AECOM 12420 Milestone Center Drive Germantown, MD 20876

Figure 2

Table 3: Qualitative Comparative Analysis of Remedial Alternatives at Inactive Landfill Number 4 (FGGM 95), Fort George G. Meade, Maryland

Evaluation Criteria		Alternative 1 No Action	Alternative 2 LUCs and LTM of Groundwater and Soil Gas	Alternative 3 Installation of a Two-Foot Soil Cover, LUCs, Long-Term Maintenance of the Cover, and LTM of Groundwater and Soil Gas	Alternative 4 Installation of an Impermeable Soil/ Geosynthetic Cover, Further delineation of soil gas, LUCs, Long-Term Maintenance of the Cover, and LTM of Groundwater and Soil Gas	Alternative 5 Excavation and offsite disposal of trash, backfill excavation with clean soil, installation of an impermeable cap over trash remaining under the slope to Route 32, LUCs and LTM of the Cap
Threshold Criteria						
(1)	Overall protection of human health and the environment	• Provides no control of exposure to buried waste and impacted media at IAL4 and no reduction in risk to human health or the environment. • Does not meet the criteria for overall protection of human health or the environment.	• Not protective of human health and the environment; would not prohibit wildlife exposure to soil or sediment at IAL4 and would not restore the aquifer to beneficial use. • LUCs will prohibit uncontrolled excavation at the Site, the use of groundwater, or the development of the Site. • Maintains the integrity of habitat provided by the Site.	• Protective of human health but not the environment; would not prohibit wildlife exposure to sediment at IAL4. • Installing a two-foot soil cover would preclude exposure to waste beneath the landfill surface. LUCs will prohibit uncontrolled excavation at the Site, the use of groundwater, or the development of the Site. • Does not maintain integrity of habitat provided by the Site.	• Protective of human health and the environment. • Placement of an impermeable cap would preclude exposure to waste beneath the landfill surface and provide some additional protection to human and ecological receptors when compared to the two-foot soil cover as it would provide a thicker cover over the Site. • LUCs will prohibit uncontrolled excavation at the Site, the use of groundwater, or the development of the Site. • Does not pose an unacceptable risk to ecological receptors and the environment. • Does not maintain integrity of habitat provided by the Site.	• Protective of human health and the environment. • Excavation and offsite disposal would eliminate exposure to waste on FGGM. Placement of an impermeable cap would preclude exposure to waste beneath the slope to Route 32. • LUCs will prohibit uncontrolled excavation at the Site, the use of groundwater, or the development of the Site. • Does not pose an unacceptable risk to ecological receptors and the environment. • Does not maintain integrity of habitat provided by the Site.
(2)	Compliance with ARARs	• ARARs are not identified according to guidance from the USEPA Office of Solid Waste and Emergency Response (OSWER) Directive 9234.2.01/FS-4 ARARs Questions and Answers (USEPA 2004).	• Will not comply with the action specific ARAR associated with COMAR 26.04.07.21.	• Will not comply with the action specific ARAR associated with COMAR 26.04.07.21.	• Will comply with ARARs.	• Will comply with ARARs.
Balancing Criteria						
(3)	Long-term effectiveness and permanence	• Does not provide any controls for monitoring any reduction of concentrations over time, reduction of exposure, or long-term management measures. • All current and potential future risks would remain the same under this alternative.	• LTM tracks concentrations of constituents in groundwater and soil gas to ensure buried waste impact to these media does not migrate off the property boundary; however, it would not restore the aquifer to beneficial use. • LUCs implemented to restrict uncontrolled digging, prohibit groundwater use, and restrict future development of the Site.	• Monitoring and maintenance of the two-foot soil cover would assure the continued effectiveness of this remedy. •Installing a 2-ft soil cover would reduce the infiltration of rainwater to IAL4, thereby reducing the source of arsenic, cobalt, and iron from the landfill to groundwater and restore groundwater to beneficial use. • LTM tracks concentrations of constituents in groundwater and soil gas to ensure buried waste impact to these media does not migrate off the property boundary. • Annual inspection identifies whether buried waste has become exposed at the ground surface and eliminates the risk posed to human and ecological receptors. • LUCs implemented to restrict uncontrolled digging, prohibit groundwater use, and restrict future development of the Site.	• The impermeable cover will eliminate rainwater infiltration through the landfill to groundwater which will eliminate the leaching of arsenic, cobalt, and iron from the landfill and over time, restore the aquifer. • Monitoring and maintenance of the cap would assure the continued effectiveness of this remedy. • LTM tracks concentrations of constituents in groundwater and soil gas to ensure buried waste impact to these media does not migrate off the property boundary. • Annual inspection identifies whether buried waste has become exposed at the ground surface and eliminates the risk posed to human and ecological receptors. • LUCs implemented to restrict uncontrolled digging, prohibit groundwater use, and restrict future development of the Site.	• Removing the source through excavation will eliminate the source of arsenic, cobalt, and iron and over time the aquifer will be restored. • Monitoring and maintenance of the cap would assure the continued effectiveness of this remedy. • LTM tracks concentrations of constituents in groundwater to ensure buried waste impact to these media does not migrate off the property boundary. • Annual inspection identifies whether buried waste has become exposed at the ground surface and eliminates the risk posed to human and ecological receptors. • LUCs implemented to restrict uncontrolled digging, prohibit groundwater use, and restrict future development of the Site.

Table 3: Qualitative Comparative Analysis of Remedial Alternatives at Inactive Landfill Number 4 (FGGM 95), Fort George G. Meade, Maryland

Evaluation Criteria		Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
		No Action	LUCs and LTM of Groundwater and Soil Gas	Installation of a Two-Foot Soil Cover, LUCs, Long-Term Maintenance of the Cover, and LTM of Groundwater and Soil Gas	Installation of an Impermeable Soil/ Geosynthetic Cover, Further delineation of soil gas, LUCs, Long-Term Maintenance of the Cover, and LTM of Groundwater and Soil Gas	Excavation and offsite disposal of trash, backfill excavation with clean soil, installation of an impermeable cap over trash remaining under the slope to Route 32, LUCs and LTM of the Cap
(4)	Reduction of mobility, toxicity, or volume of waste through treatment	• Does not employ any treatment that would reduce the toxicity, mobility, or volume of impacted groundwater, soil gas, or buried waste. • Does not meet this criterion.	• No treatment will be employed to reduce the toxicity or volume of buried waste. • Will not reduce the mobility of buried waste due to external physical processes such as erosion and weathering. • Will not reduce the toxicity or volume of impacted groundwater. • Will not reduce the toxicity 0r volume of impacted soil gas.	• No treatment will be employed to reduce the toxicity or volume of buried waste. • Installation of a soil cover will reduce the mobility of buried waste by limiting exposure to external physical processes such as erosion and weathering. • Installation of a soil cover will reduce the toxicity and volume of impacted groundwater by reducing the infiltration of rainwater to the water table. • Installation of a soil cover will reduce the toxicity and volume of impacted soil gas by increasing the distance from the gas forming compounds to the ground surface.	• No treatment will be employed to reduce the toxicity or volume of buried waste. • Installation of a cap will reduce the mobility of buried waste by limiting exposure to external physical processes such as erosion and weathering. • Installation of a cap will reduce the toxicity and volume of impacted groundwater by reducing the infiltration of rainwater to the water table. • Installation of a cap will reduce the toxicity and volume of impacted soil gas by increasing the distance from the gas forming compounds to the ground surface.	• No treatment will be employed to reduce the toxicity or volume of buried waste. • Installation of a cap will reduce the mobility of waste remaining by limiting exposure to external physical processes such as erosion and weathering. • Installation of a cap will reduce the toxicity and volume of impacted groundwater by reducing the infiltration of rainwater to the water table.
(5)	Short-term effectiveness	• Does not pose any additional risks to the community, the workers, or the environment since there are no remedial activities associated with this alternative.	• Poses no short term risks to the community or construction workers. • The habitat provided by the Site to ecological receptors would not be affected.	• Poses moderate short term risks to the community and construction workers during the installation of the cover due to increased traffic during construction and dust generation during removal of existing vegetation. No intrusive activities will be conducted that may expose uncharacterized waste to the community, workers, or ecological receptors. • The habitat provided by the Site to ecological receptors would be razed. • Requires a moderate amount of time and coordination of labor, materials, and resources for completion.	• Poses moderate short term risks to the community and construction workers during the installation of the cover due to increased traffic during construction and dust generation during removal of existing vegetation. No intrusive activities will be conducted that may expose uncharacterized waste to the community, workers, or ecological receptors. • The habitat provided by the Site to ecological receptors would be razed. • Requires a moderate amount of time and coordination of labor, materials, and resources for completion.	• Poses moderate short term risks to the community and construction workers during the installation of the cover due to increased traffic during construction and dust generation during removal of existing vegetation. No intrusive activities will be conducted that may expose uncharacterized waste to the community, workers, or ecological receptors. • The habitat provided by the Site to ecological receptors would be razed. • Requires a moderate amount of time and coordination of labor, materials, and resources for completion.
(6)	Implementability	• There are no implementability concerns posed by this option.	• Implementation would require coordination with the Army to enforce the LUCs.	• Logistical coordination with Post roadways would be required during transport of soil to be used for cover. • Implementation would require extensive stormwater and erosion controls.	• Logistical coordination with Post roadways would be required during transport of soil to be used for cover. • Implementation would require extensive stormwater and erosion controls.	• Logistical coordination with Post roadways would be required during transport of soil to be used for cover. • Implementation would require extensive stormwater and erosion controls.
(7)	Cost	• There are no present worth costs or capital costs.	• The project present worth cost to implement this alternative is $1.1M.	• The project present worth cost to implement this alternative is $2.5M.	• The project present worth cost to implement this alternative is $3.3M.	• The project present worth cost to implement this alternative is $6.7M.

Notes: ARARs - Applicable or Relevant and Appropriate Requirements COCs - Chemicals of Concern HHRA - Human Health Risk Assessment LTM - Long-term Monitoring
LUCs - Land Use Controls RGs - Remediation Goals In accordance with the NCP, there is an expectation that aquifers will be restored to their beneficial uses.

Table 4: Quantitative Comparative Analysis of Remedial Alternatives

Evaluation Criteria		Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
		No Action	LUCs and LTM of Groundwater and Soil Gas	Installation of a Two-Foot Soil Cover, LUCs, Long-Term Maintenance of the Cover, and LTM of Groundwater and Soil Gas	Installation of an Impermeable Soil/ Geosynthetic Cover, LUCs, Long-Term Maintenance of the Cover, and LTM of Groundwater and Soil Gas	Excavation, offsite disposal, installation of an impermeable cap over trash remaining under the slope to Route 32, LUCs and LTM of the Cap
Threshold Criteria						
(1)	Overall protection of human health and the environment	NO	YES	YES	YES	YES
(2)	Compliance with ARARs	NO	NO	NO	YES	YES
Balancing Criteria						
(3)	Long-term effectiveness and permanence	1	1	2	3	5
(4)	Reduction of mobility, toxicity, or volume of waste through treatment	1	1	2	2	4
(5)	Short-term effectiveness	5	5	3	3	2
(6)	Implementability	5	5	2	2	3
(7)	Cost	5	4	2	2	1
Modifying Criteria						
(8)	State acceptance	NS	NS	NS	NS	NS
(9)	Community acceptance	NS	NS	NS	NS	NS
Total Balancing Criteria Score		17	16	11	12	15

Notes: Criteria scored on a scale of 1 through 5, with 5 being the highest. ARARs - Applicable or Relevant and Appropriate Requirements
LTM - Long Term Monitoring. LUC - Land Use Control
NS - Not Scored In accordance with the NCP, there is an expectation that aquifers will be restored to their beneficial uses.