AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES	
J	1	2

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO.(If applicable)
0003	11-Aug-2016		

6. ISSUED BY	CODE N40192	7. ADMINISTERED BY (If other than item 6)	CODE
COMMANDING OFFICER - NAVFAC MARIANAS IPT MILCON PSC 455, BOX 195 FPO AP 96540-2937		**See Item 6**	

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)			
		X	9A. AMENDMENT OF SOLICITATION NO. N40192-16-R-1305
		X	9B. DATED (SEE ITEM 11) 24-Jun-2016
			10A. MOD. OF CONTRACT/ORDER NO.
			10B. DATED (SEE ITEM 13)
CODE	FACILITY CODE		

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

[X] The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer [X] is extended, [ ] is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods: (a) By completing Items 8 and 15, and returning 1 copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

[ ] A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

[ ] B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).

[ ] C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:

[ ] D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor [ ] is not, [ ] is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

FY16 MILCON P-635, Municipal Solid Waste Landfill Closure, Andersen Air Force Base, Guam

See Continuation Page.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) TEL: EMAIL:	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY (Signature of Contracting Officer)	16C. DATE SIGNED 11-Aug-2016

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION SF 30 - BLOCK 14 CONTINUATION PAGE

The following have been added by full text:
AMENDMENT 0003

A. In accordance with FAR 52.252-3 Alterations in Solicitation (APR 1984), portions of this solicitation are altered as follows:

1. Revise Paragraph 2.1b of RFP Part A SF1442 Section 00210 as follows:

" "Relevant" means sufficiently similar to the instant acquisition to provide indicators of expected performance. For example, construction similarity and complexity, contract type, and dollar value. The Government will only consider projects ~~for construction of a landfill closure capping system~~ **as defined in Factor 1, Experience**."

2. Revise Paragraph 2.3(d)(1)(a)(i) of RFP Part A SF1442 Section 00210 as follows:

"(i) Submit a minimum of three (3) and a maximum of five (5) construction projects for the Offeror that best demonstrates your experience on relevant projects that are similar in size, scope, and complexity to the RFP. For purposes of this evaluation, a relevant project is further defined as **construction of a minimum one (1) acre new municipal solid waste landfill, lateral expansion of a minimum one (1) acre existing municipal solid waste landfill, and/or** closure construction of a minimum one (1) acre municipal solid waste landfill**, all** in accordance with Resource Conservation and Recovery Act (RCRA) ~~Subpart C or D criteria~~ **Subtitle D, specifically 40 CFR Chapter 1, Subchapter 1, Part 258, Subparts C, D, and F**."

3. Revise Paragraph 2.3(d)(1)(a)(ii) of RFP Part A SF1442 Section 00210 as follows:

"(ii) Projects submitted for the Offeror shall be 100% completed within the past 10 years of the date of issuance of this RFP with construction costs of at least ~~$5~~**$1** million."

4. Revise Paragraph 2.3(d)(1)(b) of RFP Part A SF1442 Section 00210 as follows:

"The requirement for acceptability will be based upon the projects submitted by the Offeror in its proposal. The Offeror must have at least three (3) projects completed within the past 10 years of the date of issuance of this RFP with construction costs of at least ~~$5~~**$1** million that demonstrate relevant experience in **construction of a minimum one (1) acre new municipal solid waste landfill, lateral expansion of a minimum one (1) acre existing municipal solid waste landfill, and/or** closure construction of a minimum one (1) acre municipal solid waste landfill**, all** in accordance with Resource Conservation and Recovery Act (RCRA) ~~Subpart C or D criteria~~ **Subtitle D, specifically 40 CFR Chapter 1, Subchapter 1, Part 258, Subparts C, D, and F** similar in scope, size, and complexity to this project."

B. Notice 3 is provided in response to requests for information and is provided herein as Enclosure (1). Notice 3 is provided for INFORMATION ONLY. The solicitation remains unchanged unless it is amended in writing.

C. The date for receipt of proposals is extended from August 16, 2016 to August 23, 2016 at 4:30pm local time.

D. Offerors shall acknowledge this amendment in Block 19 of the Standard Form 1442 with their proposals.

(End of Summary of Changes)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND MARIANAS
PSC 455, BOX 195
FPO AP 96540-2937

11 August 2016

NOTICE 3
PRE-PROPOSAL REQUESTS FOR INFORMATION AND RESPONSES
SOLICITATION N40192-16-R-1305
FY16 MILCON P-635, MUNICIPAL SOLID WASTE LANDFILL CLOSURE
ANDERSEN AIR FORCE BASE, GUAM

QUESTION 19: Reference RFP Part A, Section 00210, Factor 1 Experience. Would NAVFAC consider reducing the required magnitude for past project experience? Given that projects similar to the scope of work have been completed on the mainland at a lower threshold we feel that by lowering the $5M requirement to $3M the offerors will successfully be able to submit extremely relevant past experience according to the scope of work required for this particular project.

REVISED Answer 19: Minimum dollar value for projects submitted in Factor 1 Experience has been changed from $5 million to $1 million. Refer to RFP Amendment 0003.

QUESTION 24: Can the Government revise the requirements for the projects submitted under 'Factor 1-Experience' to large earthwork, utilities, and road/paving projects valued at $2.0M or more and allow firms to include a special consultant and/or subcontractor with landfill capping and venting experience on the Offeror's team? The required size of the mandatory project (minimum of $5M in value) is not a typical size for landfill capping projects, and landfill capping projects are not common at military installations. These requirements may limit competition and exclude firms that have demonstrated capability on similarly complex projects and who work successfully at military installations.

REVISED Answer 24: The definition of a relevant project has been revised to include new landfill construction and lateral expansion landfill projects. Refer to RFP Amendment 0003. Also see revised response to Question 19.

QUESTION 26: Reference RFP Part A, Section 00210, Factor 1 Experience. Due to the limited landfill work performed here on Guam, would the opening of a new sanitary landfill including the installation of a 4-layer geosynthetic lining be considered as a relevant project?

Answer 26: Yes. The definition of a relevant project has been revised to include new landfill construction and lateral expansion landfill projects. Refer to RFP Amendment 0003.

QUESTION 27: Reference Notice 2, Response to Question 17(b). Please provide the average leachate flow rate to be considered for determining the size of the temporary storage tank or sewage pump truck to be used.

Answer 27: Leachate generation is dependent on the weather and also dependent on whether the tank cleaning occurs before or after landfill capping is in place. Per the BOD Report from Black and Veatch (B&V) in Attachment 1 to this RFI notice, the leachate collection system was designed with the following parameters: the average daily flow is estimated to be 15 gpm, wet month maximum average flow is 55 gpm, and a peak flow for a maximum 24 hour rainfall of 20 inches is 250 gpm in a header pipe.

QUESTION 28: Reference RFP Part A, Section 00210, Factor 1 Experience. Meeting the minimum one (1) acre closure construction in accordance with the referenced criteria is appropriate however we request the construction cost be reduced to a minimum of $1M to demonstrate experience. Most closure construction projects in the U.S. are now done on a cell by cell basis in compliance with the RCRA criteria and the dollar values are predominantly less than the $5M minimum requirement of this RFP. Would the Government please consider reducing the $5M minimum construction requirement to a more appropriate level of say $1M?

Answer 28: See response to Question 19.

QUESTION 29: Reference Notice 2, Response to Question 17(b).
(a) How much leachate is produced each day or hour?
(b) We are assuming the tank presently holds leachate so it can be dumped at an acceptable rate over time. What is the current dump rate?
(c) Will we be expected to find an approved dumping facility to dump leachate during the cleaning process and repair process or are we dumping into a currently used system?
(d) What is the general make-up of the current leachate? Example; solids opposed to liquid.

Answer 29:
(a) See response to Question 27.
(b) Per the B&V BOD Report in Attachment 1 to this RFI notice, leachate collected in the tank is conveyed by a force main into the sanitary system. The tank is typically empty, except for approximately two feet to provide liquid coverage of the pump suction heads.
(c) Leachate generation and collection may bypass the tank, directly connect the tank inlet and outlet pipe to the force main and continue to pump the leachate to the GWA treatment tank provided the total suspended solids (TSS) in the leachate meets the treatment plant's operating permit requirements. Waste generated from the tank cleaning should be analyzed and properly disposed of by the contractor.
(d) Leachate samples (liquid phase) are conducted monthly and quarterly. Copies of the latest leachate sample analyses are in Attachments 2 and 3 to this RFI notice.

QUESTION 30: Reference Notice 2, Response to Question 17(b).
(a) What is the average chemical composition of the leachate?
(b) Are there solids in the tank currently that have to be disposed of?
(c) If solids are present, where will the solids be disposed at?
(d) Do we need to find a disposal facility?

Answer 30:
(a) See response to Question 29(d).
(b) Not certain at this time. See response to Question 29(c).
(c) See response to Question 29(c).
(d) Yes. See response to Question 29(c).

QUESTION 31: Reference Notice 2, Response to Question 17(b).
(a) What is the chemical composition of the solids?
(b) Tank contractor has a 6000 gal SS tank mounted on a chassis. Will this work for a temporary tank? If so will the current pumping system be used for filling or will the contractor need to provide pumping capabilities?
(c) Will the tank be pumped into the current system and used as normal storage during construction or will the current system be shut down during construction?
(d) Does AAFB have a disposal facility for the leachate to use during repainting of the tank?

Answer 31:
(a) See response to Question 30(b).
(b) See response to Question 29(c).
(c) Pumping of leachate to the sanitary system from the tank may continue during construction of the capping system. However, leachate collection may be required to be diverted via appropriate piping and pumping directly into the sanitary system.
(d) See responses to Questions 29(c) and 30(d).

QUESTION 32: Since the interior of the leachate tank needs to cleaned and coated therefore the tank needs to be emptied.
(a) Who will be responsible for emptying the tank?
(b) If the contractor is responsible of emptying the tank what is the expected volume of the leachate?
(c) Is there a disposal area of the leachate inside the base free of charge? And provide location of the disposal area?

Answer 32:
(a) Contractor responsible for emptying the tank to include analyzing and properly disposing of the waste in the tank and waste generated from tank cleaning.
(b) Deferred.
(c) There is no available disposal area on base free of charge.

QUESTION 33: Reference RFP Part A, SF1442 Section 00010 Solicitation Contract Form SubCLIN 000102 and CLIN 0002 and RFP Part 2 Section 01 57 19.01 20, Paragraph 3.7.1.2.f. SubCLIN 000102 Base Bid MEC Clearance is for MEC Clearance to 36” depth. CLIN 0002 Option 1 MEC Secondary Soil Clearance is for clearance below 36” if required. Section 01 57 19.01 20 para 3.7.1 1.2.f requires that prior to re-using any material on site, MEC must be cleared for the 20mm TOI by spreading and clearing in 6” layers or mechanically screened to 0.75.”
(a) As the materials are to be reused on site, isn’t the contractor required to comply with Section 01 57 19.01 20 para 3.7.1.2.f and clear all materials for the 20mm TOI from the borrow pit regardless if above or below 36”?
(b) If so, why is there an Option on the bid form?

Answer 33:
(a) Yes, all fill material including fill to be put back and reused, has to be certified as clean by NTR regardless if it was taken within the first 36" or below.
(b) The first 36" excavation work is processed by 6" layers with no exceptions. Any discovery of MEC/MPPEH will cease all work and items will be removed by EOD. With Waiver in effect (Bid Option, excavation below 36"), during execution 6" layers will not be required. If MEC/MPPEH is discovered all work will be ceased again, MEC items again removed by EOD and then a determined exclusion zone (per NTR direction), including complete work plans and MEC procedures will be initiated before any work will resume. The resumed work will then follow the 20mm TOI process (basically 6" layers) until the next required depth or construction depth is met.

The thickness of the GCA section has been determined in accordance with the procedures of UFC 3-250-09FA Aggregate Surfaced Roads and Airfields Areas. It is understood that the maintenance road is intended to be used periodically by pneumatic-tired vehicles and will not be subjected to a high volume of vehicles and/or heavy vehicular weights.

The results of the exploratory borings indicate that the materials to be imported to MSW Cells 1 and 2 are classified as "gravelly sand". Laboratory testing has not been performed to determine the California Bearing Ratio (CBR) of these materials; however, these types of soils commonly have a CBR value ranging from 10-40. UFC 3-250-09FA, Figure 1, indicates that the proposed GCA design thickness of eight inches is adequate for subgrade soils with a CBR value on the order of three. This design thickness is consistent with the historical section that has been constructed at MSW Cells 1 and 2.

4.3 LEACHATE MANAGEMENT SYSTEM

The purpose of this Section is to provide an overview and evaluation of the leachate collection system and to provide recommendations for areas of improvement and maintenance. The existing leachate collection system was installed at MSW Cells 1 and 2 when the liner system was constructed in 1999 (Black & Veatch 1999). This system includes a leachate collection and removal system (LCRS) above the primary composite liner of the lining system and the leakage detection, collection, and removal system (LDCRS) in between the primary and secondary composite liners of the lining system (see As-Built Record Drawings C-8, C-10, C-21, C-22, C-35, S-10, M-2, and M-3 taken form Black and Veatch [1999] and included in Appendix F of the Closure Plan). Leachate from MSW Cells 1 and 2 collected by LCRS and LDCRS flows by gravity through a grid of slotted 6-inch HDPE collection lines placed in trenches filled with gravel to four leachate lines consisting of solid 6-inch HDPE pipes. These four leachate lines connect to four HDPE manholes and a 6-inch solid HDPE pipe header. From the southeastern manhole, leachate flows by gravity to the 250,000-gallon leachate storage tank. Within the tank, a level switch/alarm activates a pump that conveys the leachate through a force main to a Guam Waterworks Authority sanitary sewage collection system. The leachate mixes with the sanitary sewage and receives treatment at the Northern Wastewater Treatment Plant.

The quantity of leachate is expected to be reduced after the construction of the final landfill cap since the precipitation will be prevented from infiltrating through the MSW by the impervious cover. The leachate is expected to be reduced to the residual moisture remaining in the refuse historically disposed in the landfill. The existing leachate collection system will continue to operate during closure and post-closure activities. Any residual leachate will continue to be collected, conveyed to the leachate storage tank located southeast of the MSW Landfill, and transferred to the Northern Wastewater Treatment Plant using existing pumps.

The leachate system was evaluated for maintenance, repair, and potential upgrade. The capacity of the LCRS was found to be adequate for retaining and conveying the leachate; however, a number of areas for improvement and/or maintenance items were noted:

- To install a totalizing flow meter for recording leachate volume.
- Tank water level indictor requires maintenance.
- Discharge end of the tank overflow drain pipe needs to be moved to avoid rusting of electrical conduit and other hardware.
- Cathodic protection system needs to be repaired.
- Leachate tank rust removal and recoating.

4.3.1 Flow Meter

It is recommended that a flow meter be provided to measure the volume of leachate pumped into the sewer system. The pumps discharge into a common 4-inch PVC pipe above ground that rises vertically up the side of the tank, then goes horizontally along the outside of the tank.

It is recommended that a magnetic flow meter be installed in the vertical section of the common pipe from the discharge of the two leachate pumps, as shown on sheet E-100 in the landfill closure design drawings. There will be at least five straight pipe diameters in front of the meter and greater than one straight pipe diameters on the downstream side, as recommended by the manufacturer. The meter will display both instantaneous and totalized flow.

The electrical source for the meter will be the electrical junction box that currently supplies power for the leachate pumps and is located a few feet from the proposed flow meter location. A transformer will be provided to supply the correct voltage for the flow meter. Electrical details are included on sheet E-100 in the landfill closure design drawings.

4.3.2 Tank Level Indicator

Inspection of the tank has shown that the tank level indicator is not functioning. Repair of the indicator will involve repair/replacement of the float, cable, and indicator assembly to restore functionality.

4.3.3 Tank Overflow Pipe

The existing overflow pipe is constructed of 6-inch schedule 40 steel that is attached to pipe supports welded to the side of the tank. The pipe terminates approximately 2 to 3 feet above ground; the end of the pipe discharges between the two rectifiers that are part of the cathodic protection system. The overflow pipe outlet is located above two metal electrical conduits and discharges onto the horizontal surface of the concrete ring wall footing for the tank. The tank wall and electrical conduits have rusted surfaces near the pipe outlet likely due to flow splashing from the pipe. An electrical conduit associated with the rectifiers is currently clamped to the side of the overflow pipe.

Relocation of the pipe away from the rectifiers would require welding additional pipe supports to the side of the tank and reworking the electrical conduit and wiring that are currently attached to the pipe. It is instead recommended to extend the overflow pipe outlet so that it discharges to the ground away from the tank footing. This would be accomplished by welding a short extension to the existing pipe, as shown on sheet E-100 in the landfill closure design drawings. The welds and pipe extension would then be epoxy-lined and coated for corrosion protection in accordance with Specification Sections 099672, *Recoating Existing Steel Water Tank*, and 099674, *Coatings for Steel Water Tank*.

4.3.4 Cathodic Protection System

The cathodic protection system associated with the leachate tank includes one rectifier/anode system associated with the interior of the tank, and a second rectifier/anode system that protects the outside base of the tank.

The external bottom cathodic protection system consists of 10 horizontally-installed ribbon anode strips. The strips are resistance-welded to three equally-spaced conductor bars to aid in balancing current distribution to the tank bottom. There are power feed conductors attached to each conductor bar that are routed to a junction box adjacent to the rectifier mounted at the exterior of the tank shell. The anode strips are installed approximately one inch above the HDPE liner in the sand fill. Three dual reference electrodes are also installed approximately one inch above the HDPE liner for cathodic protection monitoring purposes. Test leads are routed from the reference electrodes to the junction box adjacent to

the rectifier. According to the cathodic protection operating log sheets dated January through March 2012, a manually-adjusted rectifier is supplied with 277 volts alternating current (VAC) power and is rated for maximum direct current (DC) outputs of 40 volts and 4 amperes.

The tank internal cathodic protection system consists of two concentric rings of high silicon chromium-bearing cast iron anodes suspended vertically from the tank roof. The outer ring consists of seven equally spaced anode strings each consisting of 3 anodes in series. The bottom anode of each string is suspended approximately 2.5 feet above the tank bottom. The inner ring consists of seven equally spaced anode strings each consisting of a single anode suspended approximately 2.5 feet above the tank bottom. Each ring of anode strings is connected through an American Wire Gauge (AWG) #8 header cable. Each of the two header cables is routed to a junction box adjacent to the rectifier mounted at the exterior of the tank shell. There is an adjustable resistor in the inner ring circuit in the junction box to aid in control of the current output to the inner ring anodes. There are four submersible reference electrodes installed for monitoring of cathodic protection. The reference electrode material is not identified. Two are mounted on the tank shell (EXX 1 and EXX4), one is suspended near the center of the tank (EXX3), and one is suspended between anodes 13 and 14 of the inner ring of anodes (EXX2). Test leads are routed from the reference electrodes to the junction box adjacent to the rectifier. A manually-adjusted rectifier is supplied with 120/277VAC power and is rated for maximum DC output of 12 volts and 4 amperes (A).

The existing impressed current systems are reported to be incapable of maintaining adequate levels of cathodic protection, based on the NAVFAC Cathodic Protection Report, dated November 19, 2008 (Attachment C). The report also states that the cathodic protection system associated with the tank interior was not functional. Based on recent correspondence with AAFB personnel, it appears that the system has not been repaired since the report was published.

4.3.4.1 CATHODIC PROTECTION SYSTEM REPAIR

The DC output of the external cathodic protection system rectifier was increased during the November 19, 2008 survey from 18.9V/0.52A to 36.6V/1.09A, the approximately maximum driving voltage available from the existing rectifier. It was reported that the increased output did not result in adequate improvement in cathodic protection levels on the tank bottom. The cathodic protection operating log from the beginning of 2012 shows the DC output of the rectifier at approximately 36V/0.8A, representing a decrease in current output of approximately 27 percent from the 2008 level.

Replacement of the external cathodic protection system cannot be completed without penetration of the HDPE liner placed below the tank bottom.

To make the internal cathodic protection system functional, it will be necessary to repair the rectifier and gaps in wiring to and from the electrodes to restore functionality.

4.3.5 Leachate Tank Rust Removal and Recoating

Visual observation shows that rust is present on the outside surface of the tank in several locations. The degree of corrosion is currently unknown and can only be evaluated and repaired by first removing the rust. The exterior surface of the tank should then be repainted after rust removal and repair is accomplished. The following procedures are recommended for the tank exterior:

4. Power-wash the tank to remove dirt, organic material, oil, and grease.
5. Sand blast rusted surfaces
6. Grind and wire brush remaining rusted areas to bare metal

7. Inspect tank for significant loss of metal. Where loss of metal is greater than 0.1 inches, or a leak is encountered, provide welded patch to provide additional strength
8. Prime and paint with epoxy primer and paint.

Specification Sections 099672, *Recoating Existing Steel Water Tank*, and 099674, *Coatings for Steel Water Tank*, provide detailed requirements for performing preparation and coating of the tank. Repainting of the tank is recommended at a frequency of once every 7 years.

4.3.6 HELP Modeling Summary

The purpose of this Section is to provide a summary of the HELP computer modeling conducted for the project. Modeling was performed using the HELP computer model to evaluate potential leachate generation after the closure of Cells 1 and 2 of the MSW Landfill. The HELP computer model was originally developed by the United States Army Corps of Engineers, Waterworks Experiment Station (Schroeder et al. 1994) to run on the DOS operating system. This evaluation used HELP Version 3.08 (Waterloo Hydrogeologic, Inc. [WHI] 2004). The performance of the following two landfill cover systems were modeled and compared using HELP: (1) the prescriptive earthen cover system stipulated in GSWDRR §23601 and 40 C.F.R. §258.60; and (2) an alternative cover system proposed for the MSW Cells 1 and 2 in the Closure Plan (PPDMS 2016b) and described in Section 4.2.4. The detailed methodology and results of this modeling are provided below and presented in Attachment D.

HELP is a quasi-two-dimensional hydrologic model of water movement across, into, through and out of landfills. The model accepts weather, soil and design data, and uses solution techniques to estimate the amount of runoff, evapotranspiration, drainage, leachate collection, and liner leakage that may be expected. Weather data used in the HELP model were taken from from the station located at AAFB, Guam. Table 2 summarizes the input parameters used for generating the weather data. Based on these input parameters, 30 years of synthetic weather data were generated that was used to run the models.

The model input layers for the prescriptive cover consisted of a six (6) inch erosion protection layer and an eighteen (18) inch earthen infiltration layer. The model input layers for landfill cover profile for the alternative cover design were based on the closure cover section shown on Figure 3 and discussed in Section 4.2.4. For each layer, a material/texture built-in within the HELP model database was selected and default properties (hydraulic conductivity, porosity, field capacity, and wilting point) corresponding to that material/texture were used to run the model. . Adjustments were made to the defaults where appropriate, based on the laboratory testing data obtained using site-specific samples.

The model input parameters are summarized in Table 3. For the HDPE/LLPDE liner, the pinhole density due to manufacturing defects was assumed to be two pinholes per hectare, which is typical of geomembranes (Schroeder et al. 1994). The installation defect density for the HDPE/LLDPE liner was assumed to be two holes (estimated area of 1 square centimeter) per hectare, which is representative of good installation quality per Schroeder et al. 1994. The placement quality of the HDPE/LLDPE liner was assumed to be good.

Table 2: Summary of Input Parameters for Generating Weather Data

Parameter	Input Value	Rationale
Location	AAFB, Guam	Location of available weather station closest to AAFB
Evaporative Zone Depth	6 and 10 inches [a]	For the prescriptive cover simulation, the evapotranspiration zone depth defaults to 6 inches since the 18-inch-thick infiltration layer

US Navy Laboratory

DZSP | 21

P.O. Box GH
Hagatna, Guam 96932
TEL (671) 349-9220 / FAX (671) 349-9106

Report Date: 8/1/16

TO: DZSP 21 Environmental, Compliance (AAFB)

ATTN: Brian S. Antolin

CC:

Attached are the analytical results for the samples listed below:

Laboratory ID	Sample ID
1601067-01	Tank Landfill Leachate

If you have any questions regarding this report, please contact our laboratory. When making inquiries, please reference the lab sample number which appears at the upper right corner of each page.

FOR Mila Pador
Laboratory QA Officer

Stacy E. Demaclid
Laboratory Manager

US Navy Laboratory

DZSP|21

Date of Report: 8/1/16

Customer ID:	Tank Landfill Leachate	Lab Sample Number:	1601067-01
Activity:	Monthly Landfill Leachate Monitoring (AAFB)	Date Sample Collected:	7/18/2016
Type of Sample:	Clean Water	Date Sample Received:	7/18/2016

Parameter Name	Analytical Method	Date Analyzed	Analyst	Result	Reporting Limit	Units	Notes
Wet Chemistry							
Ammonia as N	EPA 350.1	18-Jul-16	EMC	122000	1480	ug/L	
Biochemical Oxygen Demand	SM 5210 B	18-Jul-16	CSS	26.6	4.02	mg/L	
pH	SM 4500H B	18-Jul-16	JTC	7.4		Std Units	
Physical Parameters							
Total Suspended Solids	SM 2540 D	18-Jul-16	CSS	9.00	2.04	mg/L	

US Navy Fena Laboratory

DZSP | 21

Notes and Definitions

ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported

DZSP|21

CHAIN OF CUSTODY

DATE: July 18, 2016

COC #: 1601067

PAGE: 1 OF 1

US NAVY LABORATORY

CUSTOMER: DZSP-21 Environmental Compliance (AAFB)	ADDRESS: Bldg 21000, Bay 4 Upper Level, AAFB, Guam	PROJECT ABBREV:	Disposal Instructions:
		SAMPLED BY: RDC / JTC	Shipment Method:
POINT OF CONTACT: Brian Antolin	CONTACT NUMBER: (671) 366-4966	UNIT/COMPANY: DZSP-21/US Navy Laboratory	Waybill Number:

COMMENTS: Andersen Monthly Landfill Leachate

TURN AROUND TIME (TAT) URGENT (3 Days) [ ] RUSH (7 Days) [ ] ROUTINE (14 Days) [X]

CONTAINERS & PRESERVATIVES: field analysis; 1-1L glass amber, No preservative; 1-500ml poly, No preservative; share with TSS

SAMPLE INFORMATION / METHODS FOR ANALYSIS

No.	Sample ID / Description	Date Sampled	Time Sampled	Matrix	Composite (hr)	Grab	Sampler	pH	SM4500 H+B	BOD (5-Day)	SM5210 B	Total Suspended Solids	SM2540 D	Ammonia-N	EPA 350.1	QC (MS/MSD)	TOTAL BOTTLES
1	Tank Landfill Leachate	07-18-16	0946	CW		x	RDC/JTC		x		x		x		x		
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

RDelaCruz 7-18-16

Relinquished By:	Unit/Company:	Date:	Time:
RDelaCruz	US Navy Lab (DZSP)	07-18-16	11:00
Received By:	Unit/Company:	Date:	Time:
Relinquished By:	Unit/Company:	Date:	Time:
Received By (LAB): Mari Babauta	Unit/Company: Navy Lab	Date: 071816	Time: 1100

Laboratory Contact Information
Laboratory Manager: STACY DEMACLID - 349-9157
AA/Sample Custodian: MARI BABAUTA - 349-9220

LABORATORY NOTES:

Hrs. 2.5

US Navy Laboratory

DZSP | 21

P.O. Box GH
Hagatna, Guam 96932

TEL (671) 349-9220 / FAX (671) 349-9106

Report Date: 6/7/16

TO: DZSP 21 Environmental, Compliance (AAFB)

ATTN: Brian S. Antolin

CC:

Attached are the analytical results for the samples listed below:

Laboratory ID	Sample ID
1600712-01	Tank Landfill Leachate
1600712-02	Field Blank

If you have any questions regarding this report, please contact our laboratory. When making inquiries, please reference the lab sample number which appears at the upper right corner of each page.

For Mila Pador
Laboratory QA Officer

Stacy E. Demaclid
Laboratory Manager

US Navy Laboratory

DZSP|21

Date of Report: 6/7/16

Customer ID:	Tank Landfill Leachate	Lab Sample Number:	1600712-01
Activity:	Quarterly Landfill Leachate - AAFB (SUB)	Date Sample Collected:	5/9/2016
Type of Sample:	Clean Water	Date Sample Received:	5/9/2016

Parameter Name	Analytical Method	Date Analyzed	Analyst	Result	Reporting Limit	Units	Notes
Pesticides by EPA 8081							
alpha - BHC	EPA 8081A	18-May-16	EMX	ND	0.100	ug/L	
gamma-BHC	EPA 8081A	18-May-16	EMX	ND	0.100	ug/L	
beta-BHC	EPA 8081A	18-May-16	EMX	ND	0.100	ug/L	
Heptachlor	EPA 8081A	18-May-16	EMX	ND	0.100	ug/L	
delta-BHC	EPA 8081A	18-May-16	EMX	ND	0.100	ug/L	
Aldrin	EPA 8081A	18-May-16	EMX	ND	0.100	ug/L	
Heptachlor Epoxide	EPA 8081A	18-May-16	EMX	ND	0.100	ug/L	
Endosulfan I	EPA 8081A	18-May-16	EMX	ND	0.100	ug/L	
4,4′-DDE	EPA 8081A	18-May-16	EMX	ND	0.200	ug/L	
Dieldrin	EPA 8081A	18-May-16	EMX	ND	0.200	ug/L	
Endrin	EPA 8081A	18-May-16	EMX	ND	0.200	ug/L	
4,4′-DDD	EPA 8081A	18-May-16	EMX	ND	0.200	ug/L	
Endosulfan II	EPA 8081A	18-May-16	EMX	ND	0.200	ug/L	
4,4′-DDT	EPA 8081A	18-May-16	EMX	ND	0.200	ug/L	
Endrin aldehyde	EPA 8081A	18-May-16	EMX	ND	0.200	ug/L	
Endosulfan sulfate	EPA 8081A	18-May-16	EMX	ND	0.200	ug/L	
Methoxychlor	EPA 8081A	18-May-16	EMX	ND	1.00	ug/L	
Herbicides							
2,4-DB	EPA 8151A	17-May-16	EMX	ND	0.800	ug/L	
2,4-D	EPA 8151A	17-May-16	EMX	ND	0.800	ug/L	
2,4,5-TP (Silvex)	EPA 8151A	17-May-16	EMX	ND	0.800	ug/L	
2,4,5-T	EPA 8151A	17-May-16	EMX	ND	0.800	ug/L	
Dinoseb	EPA 8151A	17-May-16	EMX	ND	0.800	ug/L	
Dichloroprop	EPA 8151A	17-May-16	EMX	ND	0.800	ug/L	
Dicamba	EPA 8151A	17-May-16	EMX	ND	0.800	ug/L	
Dalapon	EPA 8151A	17-May-16	EMX	ND	0.800	ug/L	
MCPP	EPA 8151A	17-May-16	EMX	ND	80.0	ug/L	
MCPA	EPA 8151A	17-May-16	EMX	ND	80.0	ug/L	

US Navy Laboratory

DZSP|21

Date of Report: 6/7/16

Customer ID:	Tank Landfill Leachate	Lab Sample Number:	1600712-01
Activity:	Quarterly Landfill Leachate - AAFB (SUB)	Date Sample Collected:	5/9/2016
Type of Sample:	Clean Water	Date Sample Received:	5/9/2016

Parameter Name	Analytical Method	Date Analyzed	Analyst	Result	Reporting Limit	Units	Notes
Volatile Organic Compounds (VOCs)							
Benzene	EPA 8260B	13-May-16	EMX	ND	1.00	ug/L	
Ethylbenzene	EPA 8260B	13-May-16	EMX	ND	1.00	ug/L	
Toluene	EPA 8260B	13-May-16	EMX	ND	1.00	ug/L	
Xylenes (total)	EPA 8260B	13-May-16	EMX	ND	2.00	ug/L	

US Navy Laboratory

DZSP|21

Date of Report: 6/7/16

Customer ID:	Field Blank	Lab Sample Number:	1600712-02
Activity:	Quarterly Landfill Leachate - AAFB (SUB)	Date Sample Collected:	5/9/2016
Type of Sample:	Clean Water	Date Sample Received:	5/9/2016

Parameter Name	Analytical Method	Date Analyzed	Analyst	Result	Reporting Limit	Units	Notes
Volatile Organic Compounds (VOCs)							
Benzene	EPA 8260B	13-May-16	EMX	ND	1.00	ug/L	
Ethylbenzene	EPA 8260B	13-May-16	EMX	ND	1.00	ug/L	
Toluene	EPA 8260B	13-May-16	EMX	ND	1.00	ug/L	
Xylenes (total)	EPA 8260B	13-May-16	EMX	ND	2.00	ug/L	

US Navy Laboratory

DZSP|21

Notes and Definitions

ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported

All analyses were subcontracted to EMAX Laboratories.

DZSP|21

CHAIN OF CUSTODY

DATE: May 09 2016

COC #: 1600712

PAGE: 1 OF 1

US NAVY LABORATORY

CUSTOMER: DZSP-21 Environmental Compliance (AAFB)	ADDRESS: Bldg 18001, Civil Engineering Squadron Andersen AFB, Guam	PROJECT ABBREV:	Disposal Instructions:
		SAMPLED BY: Ruben Dela Cruz / Vimen Duvall	Shipment Method:
POINT OF CONTACT: Brian Antolin	CONTACT NUMBER: (671) 366-4966	UNIT/COMPANY: DZSP-21/US Navy Laboratory	Waybill Number:

COMMENTS:

Andersen Quarterly Landfill Leachate
Second Quarter / Calendar Year 2016

TURN AROUND TIME (TAT) URGENT (3 Days) [ ] RUSH (7 Days) [ ] ROUTINE (14 Days) [x]

CONTAINERS & PRESERVATIVES: 2-1L glass amber, No preservative; 2-1L glass amber, No preservative; 9-40ml VOA vial, HCL 1:1

SAMPLE INFORMATION / METHODS FOR ANALYSIS

No.	Sample ID / Description	Date Sampled	Time Sampled	Matrix	Composite (hr)	Grab	Sampler	Pesticides EPA 8081A	Herbicides EPA 8151A	BTEX EPA 8260C	QC (MS/MSD)	TOTAL BOTTLES
1	Tank Landfill Leachate	05-09-16	1030	CW		x	RDC/VFD	x	x	x		10
2	Field Blank	050916	0840	CW		x	RDC/VFD			x		3
3												
4												
5												
6												
7												
8												
9												
10												

R dela Cruz 05-09-16

Relinquished By:	Unit/Company:	Date:	Time:
R dela Cruz	DZSP-21/US Navy Laboratory	May 09 2016	12:05
Received By:	Unit/Company:	Date:	Time:
Relinquished By:	Unit/Company:	Date:	Time:
Received By (LAB): Mari Babauta	Unit/Company: DZSP-21/US Navy Laboratory	Date: 05 09 16	Time: 1205

Laboratory Contact Information
Laboratory Manager: STACY DEMACLID - 349-9157
AA/Sample Custodian: MARI BABAUTA - 349-9220

LABORATORY NOTES:

Ship to: Emax Laboratories, Inc.
1835 W. 205th Street
Torrance, CA 9050
POC: Richard Beauvil
Tel: (310) 618-8889 Fax: (310) 618-0818