2019 Interim Action Work Plan: Underground Storage Tank Removal and Groundwater Monitoring

For the

Kotzebue Former IHS/BIA Hospital – School Pipeline Release
(ADEC File. No. 410.38.025)
Kotzebue, Alaska

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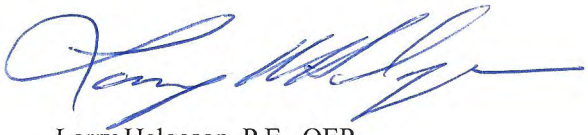

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TABLE OF CONTENTS

1.0 SITE DESCRIPTION AND BACKGROUND 1
1.1 Project Purpose and Objectives 1
1.2 Site Location 1
1.3 Background 2

2.0 CONTAMINANTS OF POTENTIAL CONCERN 3

3.0 SAMPLING PLAN 4
3.1 UST Removal and Cleaning 5
3.2 UST Assessment and Soil Sample Collection Methods 5
3.2.1 Field Screening Methods 6
3.2.2 Analytical Soil Sampling Methods 7
3.3 Landfarm Soil Treatment 8
3.3.1 Landfarm Construction 9
3.3.2 Landfarm Treatment 9
3.3.3 Landfarm Sampling Methods 9
3.4 Waste Characterization 10
3.5 Groundwater Sample Collection Methods 10
3.5.1 Groundwater Level Measurements and Flow Direction 10
3.5.2 Sample Equipment and Water Quality Parameter Collection 10
3.6 Decontamination Procedures 11

4.0 ANALYTICAL METHODS 11

5.0 FIELD QUALITY CONTROL MEASURES 12
5.1 Field Equipment Quality Control 12
5.2 Field and Laboratory Quality Control Samples 13

6.0 INVESTIGATIVE DERIVED WASTE MANAGEMENT 13

7.0 REPORTING 14

8.0 SCHEDULE 15

9.0 REFERENCES 16

TABLES

Table 1 - Proposed Field Screening and Laboratory Samples 8
Table 2 - List of Parameters 12
Table 3 - Field and Laboratory Quality Control Samples and Frequency 13
Table 4 – Proposed Project Schedule 15

FIGURES

Figure 1 – Vicinity Map
Figure 2 – Proposed Sampling Locations
Figure 3 – UST Excavation Site Plan
Figure 4 – Landfarm Schematic

APPENDICES

Appendix A – Landfarming Checklist
Appendix B – Resumes of QEP, QES, and ADEC UST Worker

ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
BIA	Bureau of Indian Affairs
BTEX	Aromatic Hydrocarbons (benzene, toluene, ethylbenzene, and xylenes)
COPC	Compounds of Potential Concern
cy	Cubic Yards
DoD	Department of Defense
DRO	Diesel Range Organics
DQO	Data Quality Objectives
EDB	Ethylene Dibromide
EPA	Environmental Protection Agency
GRO	Gasoline Range Organics
IDW	Investigation Derived Waste
IHS	Indian Health Service
KIC	Kikiktagruk Inupiat Corporation
LEL	Lower Explosive Limit
mg/kg	milligrams per kilogram
PAH	Polyaromatic hydrocarbon
PID	Photoionization Detector
PPE	Personal Protective Equipment
QC	Quality Control
QEP	Qualified Environmental Professional
QES	Qualified Environmental Sampler
RRO	Residual Range Organics
USS	United States Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compound

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This work plan outlines the proposed geophysical survey, underground storage tank (UST) system removal and groundwater monitoring activities at the Former Indian Health Service/Bureau of Indian Affairs (IHS/BIA) Hospital – School Pipeline (Subject Property) Release in Kotzebue, Alaska. The site is identified as Alaska Department of Environmental Conservation (ADEC) Contaminated Sites File No. 410.38.025.

Work is in accordance with the November 28, 2017 Task Order EC-02 under the Professional Services Contract from Maniilaq Association.

1.0 SITE DESCRIPTION AND BACKGROUND

The Subject Property is an active ADEC Contaminated Site and encompasses several lots in Kotzebue, Alaska. The following outlines the purpose of the monitoring and regulatory background, site location, and previous field activities.

1.1 Project Purpose and Objectives

The purpose of the project is to progress toward Cleanup Complete with Institutional Controls for the site. The project objectives include the following:

- demolition and removal of a UST system used by IHS, including the concrete fuel dispensing island, UST, and associated piping, including sampling and backfill;
- placement of soils generated during UST removal of contaminated soils into an existing KIC landfarm site on Base Road; and
- groundwater monitoring of existing wells.

1.2 Site Location

The ADEC Contaminated Site covers land in the area of the former IHS Hospital and BIA school. The source area consists of Tracts 1 and 4 of United States Survey (USS) 2083. The site is located in the northeast ¼ of the northwest ¼ of Section 3, Township 17 North, Range 18 West, Kateel River Meridian, Alaska (Kotzebue D-2 USGS Quadrangle). The Vicinity Map showing the general location of the Project Area is included as Figure 1.

The former Kotzebue hospital was located between Second Avenue and Third Avenue, southwest of the current elementary school. The tank farm serving the hospital was north along Second Avenue, near the intersection of Ocean Avenue.

The complete extent of contamination has not yet been determined and likely extends beyond the following parcels. As a result, the site is not just the original ten acres of land. The lots included in this assessment and their former uses are the following (WHPacific, 2015):

- Lot 3 – Former BIA school and small structures once part of the hospital; current residential
- Lot 4 – former hospital grounds (1928-1962); current pedestrian/public use, FRF Building (also known as the Ferguson Building)
- Lot 5 – former hospital grounds (1961-1996); current pedestrian/public use, fenced light industrial
- Tract 4A – former BIA fuel pipeline corridor to the 1961 hospital; current Kotzebue school complex

For the proposed field activities, the UST removal activities will be conducted near the dispenser and presumed UST location adjacent north of the FRF Building on Lot 5; and groundwater monitoring will take place on each of the lots and Tract 4A.

The landfarm property where the contaminated soil will be placed is owned by KIC. KIC will maintain and manage the landfarm while being treated. The location of the landfarm is shown on Figure 1.

1.3 Background

Oil was first discovered in the Kotzebue Elementary School basement and are believed to be a combination of fuel storage tank releases, damaged fuel distribution line, fuel storage tank overfills and other sources (ADEC, 2015). In 1980 the ADEC became aware of the product release when fuel oil was being discharged from an oil-water separator located in the elementary school's basement. The ADEC estimated during the initial investigation that between 100,000 and 200,000 gallons of diesel fuel had been released. Between 1979 and 1980 an estimated 100,000 gallons of fuel was pumped from the basement, and an estimated 40,000 gallons of fuel was recovered by ADEC contractors and citizens from recovery wells during 1980 and 1984. (WHPacific, 2015)

In 1986 the ADEC's contractor evaluated the extent of contamination and decommissioning of the pipeline. ADEC's contractor installed 25 monitoring wells and nine recovery wells. Within a month, all of the wells had evidence of fuel present. The pipeline was also exposed to a depth of less than 3 feet below ground surface and approximately 200 to 300 gallons of diesel was drained from the pipeline. The pipeline was then abandoned in place. (WH Pacific, 2015)

In 1988 an oil sheen was observed on the beach of Kotzebue Sound off of Shore Avenue. Shannon & Wilson installed and operated an oil-recovery system in 1989 which included a 435-foot long fabric barrier to prevent migration, additional recovery/monitoring wells, and a 74-foot long oil recovery trench in Second Avenue, north of the former hospital. As much as 2 feet of

floating fuel was observed in several wells, but an estimated 5,000 to 7,000 gallons of fuel remained in the ground. The collection efforts ceased after 1990. (S&W, 2010)

A UST of unknown volume and condition was identified along the north side of the FRF Building in 1989. The presumed storage use of the tank was for vehicle fueling and was discontinued sometime prior to 1969. When sampled in 1989, the tank contained approximately 2 ½ inches of what appeared to be waste lubricating oil, floating on water. (S&W, 1990) The dispenser associated with this UST is still present.

In 2008, local residents notified the ADEC that a seasonal sheen was observed in Kotzebue Sound off of Shore Avenue. The ADEC contracted with Shannon & Wilson to collect pore water samples along the beach and install vapor probes near the elementary school. Pore-water samples indicate contamination is entering Kotzebue Sound. With the exception of a probe installed near the former hospital, soil vapor samples were below screening levels. Shannon & Wilson was also tasked with monitoring and recovery well and oil-recovery gallery decommissioning. Of the 64 wells installed in the late 1980s, only 15 were located and of those only three were in good working conditions. The 12 wells were decommissioned. The oil-recovery gallery was unable to be located but the sample collected from the vicinity exceeded DRO levels. (S&W, 2010)

In 2010 the ADOT&PF installed of a sheet pile wall along the Shore Avenue. The sheet piles were installed along the tideline to approximately 25 feet below mean sea level and extend approximately 6 feet above the ground surface. The impact of this wall and migration towards Kotzebue Sound is unknown. (S&W, 2010)

In 2014 and 2015 WH Pacific conducted site investigations at the site. This included installation of four test pits, 45 soil borings, and 10 monitoring wells in 2014 in the vicinity of the abandoned in-place pipeline and areas of known or former contamination; groundwater sampling in 2014 and 2015; and a shallow soil gas survey in 2015. The highest concentrations were generally along the former BIA pipeline corridor on Tract 4A, and in the right-of-way area northwest of Building 314 and the FRF Building. The shallow soil gas survey did not indicate detectable levels of contaminants of concern in the school's playground area. (WH Pacific, 2015)

The FRF Building is a light commercial office building on a steel pile foundation. There is approximately 4 feet of clear air space below the building and no basement. The building's population is approximately less than 70 adults; children are occasionally present. The hours of use are Monday through Friday from 8AM to 5PM.

2.0 CONTAMINANTS OF POTENTIAL CONCERN

The ADEC Contaminated Site's database identifies a historical spill of #1 diesel between 1950 and 1980 at the site that resulted in the estimated release of 100,000 to 200,000 gallons of fuel releases in an area of 10 or more acres. The source or sources are suspected to be a result of the

following: 1) ruptured tank at the bulk fuel farm in the 1950s; 2) former distribution line between the bulk tank farm and the school and former hospital; and 3) ASTs and USTs and associated pipeline at the school and former hospital. In 1989, chromatographic profiles from the samples of the contaminated material were consistent with No. 1 Fuel Oil. (S&W, 1990)

The constituents of potential concern (COPC) associated with the Former IHS/BIA Hospital-School Pipeline Release site as identified in previous investigations include the following petroleum-related compounds: gasoline range organics (GRO); diesel range organics (DRO); residual range organics (RRO); benzene, toluene, ethylbenzene, and xylenes (BTEX); and polyaromatic hydrocarbons (PAH) (WH Pacific, 2015).

In addition, this scope includes the removal of a former gasoline UST. Based on the ADEC's August 2017 *Field Sampling Guidance* the following COPCs apply to the area surrounding the UST: GRO, BTEX, PAH, volatile organic compound (VOC), ethylene dibromide (EDB), 1,2-dichloroethane (DCA) , and total lead. The suite of analyses for the soil, groundwater, and waste characterization samples collected as part of this work plan effort are outlined in Table 2 in Section 4.0.

Soil and groundwater samples collected during the field activities compared to the cleanup levels outlined in the following regulations:

- Soil: Method Two Under 40 Inch Zone Migration to Groundwater (landfarm soil) and Human Health and Inhalation levels (UST excavation soil) outlined in Tables B1 and B2 in 18 Alaska Administrative Code (AAC) 75.341, *Oil and Other Hazardous Substances Pollution Control* (September 29, 2018)
- Groundwater: Table C in 18 AAC 75.345, *Oil and Other Hazardous Substances Pollution Control* (September 29, 2018)
- Surface Water: Water Quality Standards table in 18 AAC 70.020, *Water Quality Standards* (April 6, 2018)
- Waste Characteristics: Table 1 Maximum Concentration of Contaminants for the Toxicity Characteristic in 40 CFR 261.24, *Identification and Listing of Hazardous Waste* (July 1, 2012)

3.0 SAMPLING PLAN

The field activities will include a UST site assessment on the north side of the FRF Building and groundwater monitoring of ten existing wells. Groundwater monitoring of the wells near the former IHS hospital (MW-1, MW-2, MW-7, MW-8, and MW-10) will be carried out concurrently with groundwater monitoring of the wells located near the former BIA school (MW-3 through MW-6, MW-9). The location of the UST and groundwater monitoring locations are shown on Figures 1 and 2.

Resumes of the Qualified Environmental Professionals (QEP), Qualified Environmental Sampler (QES), and ADEC Certified UST Worker that may conduct the sampling outlined in this work plan is included in Appendix B. In the event that different staff conducts the field work, the resumes of those staff will be included in the report.

3.1 UST Removal and Cleaning

The UST, dispenser, and associated piping will be removed by a contractor with oversight by an ADEC-certified UST worker and ADEC Qualified Environmental Professional. The ADEC UST registration and certification form (Form 18-0500) and Intent to Close (Form 18-504) will be provided to the ADEC Contaminated Sites project manager prior to field activities. Post closure reporting including the Notice of Post Closure (Form 18-0505) and Site Assessment and Release Investigation (Form 18-0508) will be provided to the ADEC; the schedule of these submittals is outlined in Section 8.0. All closure documentation will be retained for a minimum of three years after receiving confirmation of "corrective action complete" notice from the department. If the site assessment or release investigation identified contamination, these documents must be retained for a minimum of ten years.

Prior to removal, all electrical lines, if present, will be disconnected. The dispenser will be removed and the lines connecting the dispenser to the UST will be uncovered. The ADEC-certified UST worker will be present during the dispenser and pipe uncovering to collect samples at the locations outlined below. Any contents in the pipes will be containerized for disposal. After the lines have been disconnected from the UST and the top of the tank is exposed, one end of the tank will be slightly raised and any remaining fluids or sludge will be pumped out of the tank and containerized. The tank will then be cleaned and the contents containerized. The UST will be vented overnight following API 1604 procedures, and removed from the ground after the Lower Explosive Limit (LEL) is confirmed to be less than 10 percent. The cleaned UST(s) will be either disposed of at the local landfill or recycled.

3.2 UST Assessment and Soil Sample Collection Methods

Site assessment activities will be conducted for the UST, dispenser island, and piping removal. The approximate location of the presumed UST system north of the FRF Building is shown on Figure 3. In the event that contaminated soil is encountered during the site assessment field activities and there is evidence that the contaminated soil is a result of the UST (i.e., broken pipe, deteriorated tank), a release investigation will be conducted. Since the presumed UST is within an area that is likely to be impacted from a larger area of diesel contamination from the former pipeline, any removal activities will be limited to the material that is in direct contact with the UST and/or is generated from the removal of the presumed UST. It is not feasible to differentiate using field screening tools that will be used during the field activities to differentiate between the different sources.

Upon completion of the excavation, bottom and sidewall samples will be collected for further define the extent of contamination.

3.2.1 Field Screening Methods

During UST system removal activities, ambient air field screening tests (i.e. ambient air screened directly from the soil in excavator bucket) and field headspace samples using ADEC-approved methods will be collected and tested using a photoionization detector (PID). The field personnel will also inspect the area for indications of releases. The field screening results and site observations will be recorded in the field log book.

The ambient air field screening samples will be collected directly from the excavation or excavator equipment's bucket, as applicable. A minimum of one ambient air field screening sample will be collected for each 10 cubic yards of excavated soil, noting the ambient air field screening will not replace heated field headspace sampling (described below). The ambient air PID readings will only be used to guide segregation during the excavation. Soil will be segregated into separate stockpiles based on the PID readings or observations:

- Potentially Clean: low PID readings, no odor, or staining
- Contaminated: elevated PID readings, odor, or staining

Field headspace samples will be collected from the tank area, piping run, and dispenser with the sample numbers summarized in Table 1.

Based on site observations and historical samples collected from the general area, it is likely that the presumed UST system is within a larger area of contamination associated with other diesel-contaminant sources. If upon removal of the UST system contamination remains as indicated by field screening results, the excavation may be extended outward until a maximum of 185 cubic yards is removed or the excavation is within 5 feet from a structure or road. If the field screening samples suggest that one area of the excavation is more impacted than the others, the excavation will extend to remove the most highly impacted area first.

The field sampling for the release investigation/corrective action confirmation will follow the ADEC's August 2017 *Field Sampling Guide*, Tables 2A and 2B. The volumes and areas for this assessment will be based on the actual volumes and associated areas of impacted soil. The number and frequency of sampling to confirm that parts of the UST system in other areas of the project are clean will not be affected.

Field headspace samples will be collected from the excavation or stockpile. The soil from the excavation will be collected from the freshly exposed soil either from the excavation itself or the excavator bucket. In excavations where the soils have been exposed for less than one hour, samples will be collected from 2 to 6 inches below the surface; in areas that have been exposed for more than an hour, the samples will be collected from a depth of 6 to 12 inches below the surface. For stockpile sampling, the samples will be collected from a depth of at least 18 inches from the exposed surface of the stockpile, and sample locations will include soils from the base to the top of the stockpile. The locations of the field headspace samples will be noted by the

field personnel in the field notes, so analytical samples from the highest headspace samples can be collected upon completion of headspace readings.

The field headspace readings will be collected by filling re-sealable quart size bags approximately 1/3 to 1/2 full with soil. The bags will then be agitated before being allowed to develop for at least 10 minutes, but no longer than an hour. During this time the soils will be warmed to a minimum temperature of 40°F. After the samples have been warmed and allowed to develop, the probe of the PID will be inserted into the bag about one-half of the headspace depth and the highest displayed reading will be recorded in the field notes along with other pertinent information such as time of collection and reading, and the location of the sample.

3.2.2 Analytical Soil Sampling Methods

The soil laboratory samples will be collected from native soils, if present, and within two feet from the bottom of the tank or within two feet from the lowest point of the piping for the UST dispensing equipment. If groundwater is encountered, the soil samples will be collected from within the first six inches of the soil-water interface zone. If groundwater is not encountered at the base of the excavation, a test pit will be advanced an additional 5 feet to confirm if groundwater is present. If present, a soil sample will be collected from the soil-water interface zone.

Samples for volatile analysis will be collected from freshly exposed soils to prevent volatilization of the sample. In excavations where the soils have been exposed for less than one hour, samples will be collected from 2 to 6 inches below the surface; in areas that have been exposed for more than an hour, the samples will be collected from a depth of 6 to 12 inches below the surface in excavations. For stockpile analytical sampling, the samples will be collected from freshly exposed soil from the same depth as the field screening sample. Samples will be collected using clean spoons or disposable equipment and placed directly into clean laboratory-provided containers. Volatile samples will be collected first and preserved with 25-mL of methanol, per AK Methods. Samples will be collected from the most likely contaminated areas based on field screening data or from potential source areas (i.e. piping, fill, vents) and from within two feet of the former UST, vents, and piping, as practicable.

If contamination is not encountered, field screening and laboratory sample numbers will follow the March 2017 *Underground Storage Tank Procedures Manual* and UST Regulations (18 AAC 78, July 2017). Those numbers are summarized in Table 1 below. If impacted soil is encountered, the field screening and analytical sample numbers will be in general accordance with Table 2A and 2B of the August 2017 *Field Sampling Guidance,* and summarized under the release investigation column outlined below.

Table 1 - Proposed Field Screening and Laboratory Samples

	Number of Screening Samples		Number of Laboratory Samples	
By surface area (by sq ft or ln ft)	**Site Assessment 18 AAC 78.090**	**Suspect for Release Investigation^**	**Site Assessment 18 AAC 78.090**	**Release Investigation / Corrective Action^**
Tank Fill and Vent Lines^^	Minimum of 1 per 10 ln ft adjacent to and below all fill, supply or vent lines.	Minimum of 5 for each spot	One sample from the highest location.	Confirm any suspect location based on sample number listed below
Large Excavation (> 250 sq ft)	3 per tank plus additional from areas likely to be contaminated. (1 per 100 sq ft of bottom)	10 plus 1 per additional 100 sq ft	2 per tank plus 1 additional for each 250 sq. ft. or portion there of	2 samples for initial 250 sq ft, plus one sample for each additional 250 sq ft,
Small Excavation (< 250 sq.ft.) *****	same as above	<124 sq ft: 5 125-250: 1 per 25 sq ft	2 per tank	<50 sq ft: 1 51-250 sq ft: 2
Excavation sidewalls	1 per sidewall below the tank midline	In suspect area 1 per 10 sq ft, or portion thereof, with field screening sample collection focused on soil horizon(s) most likely to be contaminated	Some of the additional samples should be from sidewalls if that is the most likely location to have contamination	Minimum 1 per each sidewall plus one additional sample for each sidewall with areas over 250 total sq ft (depth and length)**
Dispenser^^	1 adjacent to and below each dispenser	Minimum of 5	1 per dispenser	Confirm any suspect location as above
Piping Runs/ Joints^^	1 per 10 ln.ft. adjacent to and below all fill, supply or vent lines; at at joints.	Minimum of 5	Minimum of 1 per sump	Confirm any suspect location as above
Stockpiled Clean Material and Post-Treatment (Landfarm) Confirmation Sampling	1 per 10 cy of soil	0-50 cy: 5 > 50 cy: 1 per 10 cy	2 samples plus 1 for each additional 50 cy	0-10 cy: 1 11-50 cy: 2 51-100 cy: 3 >100 cy: 3 samples plus 1 sample for each additional 200 cy

Notes:
* = Excavation pit dimensions are measured from the ground surface
** = for small excavations (< 100 sq. ft. total sidewalls) the total number of sidewall samples may be reduced to 2.
^ = Applies only to area where impacted soil was encountered
^^ = Sample to be collected within 2 feet below component
Sq ft = square feet
Ln ft = linear feet
Cy = cubic yards

Upon completion of the tank removal activities, the excavation will be backfilled with clean local borrow material from either the KIC or Drake Gravel Pit.

3.3 Landfarm Soil Treatment

If concentrations indicate that levels do not exceed Resource Conservation and Recovery Act (RCRA) maximum concentrations for the toxicity characteristic of total lead, the soil generated during the tank removal activities will be placed in a landfarm for treatment. Up to 185 cubic yards of petroleum-contaminated soil may be removed during the UST removal effort. That material may be transported to the KIC landfarm off of Base Road. The landfarm operations,

inspections, and maintenance are being assumed by KIC. Prior to transport of any soil or fluids from the project site, an ADEC *Transport, Treatment, and Disposal Approval Form* and laboratory analytical results will be provided to ADEC for their review and approval.

Contaminated soil generated during the UST removal will be placed in an off-site landfarm for treatment. Details on the landfarm construction, treatment, and sampling activities are outlined below.

3.3.1 Landfarm Construction

The soil will be placed in the KIC landfarm area off of Base Room. Since the new cell will be previously undeveloped land, baseline sampling is not required. The landspread cell will have a silt fence around the cell including between soils generated from another project, and a construction fence around the KIC landspread/landfarm area. A sign noting where the soil in each cell originated from and the date the soil was delivered to the cell will also be placed to demarcate the soil generated/treated from this project from other projects that will use the area for treatment. Based on previous site data, it is likely that the DRO levels will be greater than ADEC Maximum Allowable Concentration cleanup level. In addition, the soil will be in the cell for a minimum of two years. As a result, a 20-mil bottom liner will be placed on top of the cell; the liner will be continuous and there should be no seams that will require sealing in the field. Six to 12 inches of protective soil from either the KIC or Drake Construction Gravel Pit may also be placed on top of the liner to provide further protection. Lined berms will be placed around the landfarm to contain leachate that might be generated during rainfall events; this leachate will be pumped as needed and containerized for onsite treatment (see Section 6).

The completed Landfarming Checklist and plan view are provided in Appendix A and as Figure 4, respectively.

3.3.2 Landfarm Treatment

KIC will perform the landfarm treatment. After the landfarm is constructed, the contaminated soil will be placed in the landfarm and spread in a layer no thicker than 12 inches. Nutrients will be added to the soil towards the end of May on an annual basis and will be tilled bi-weekly during the summer months. Care will be taken to minimize contact with the base liner. During the winter, there will be no treatment activities and the landfarm area will be secured with snow fencing and a sign.

3.3.3 Landfarm Sampling Methods

After two years of treatment or the landfarm has been sufficiently tilled until levels appear to have been reduced, the landfarm will be sampled to assess the effectiveness of the treatment in reducing concentrations. The landfarm will be divided into a grid with a maximum spacing of 10 feet and headspace samples will be collected from the center of each grid. Based on the estimated maximum volume to be treated in the landfarm (up to 185 cubic yards), up to four analytical samples plus one duplicate may be collected from the soil samples with the highest headspace results and/or other indications of impact (i.e., odor, staining).

3.4 Waste Characterization

Contents from the UST will be characterized prior to shipping. Since the presumed UST was previously used for storage of leaded gasoline, a grab sample from the UST contents will be submitted to the laboratory. Depending on the off-site transportation schedule, this sample may be submitted for expedited turnaround.

3.5 Groundwater Sample Collection Methods

The following outline the groundwater level and flow direction measurements, sample collection equipment, sampling methods, and sample preservation and hold times. The locations of the monitoring wells to be sampled during this effort are shown on Figure 2.

3.5.1 Groundwater Level Measurements and Flow Direction

Prior to purging activities, depth to water and total well depths of each monitoring well will be measured from the top of casing. This location should be marked and at the highest point of the casing. An electronic water level meter will be used to measure the depth to water, depth to product (if applicable), and total well depth to the nearest 0.01 foot. The measurements will be recorded in the field notebook or log. The depths to water measurements will be used to determine the groundwater flow direction and gradient.

Due to the proximity to coastline, the monitoring wells may also be tidally influenced. The depths to water will also be measured (prior to purging activities) at high and low tide to determine the tidal influence, if any, on the water depths. If product is observed in the wells, the thickness of that product at high and low tide will be documented.

Improvements to the monitoring wells may be warranted during the sampling activities. These improvements may include marking all well caps/covers with bright paint for easy identification in future events. If there is indication of well jacking due to frost heaving or damage to the well that may warrant improvements and changes to the well casing, the improvements will be noted in the field notes. If monitoring wells are damaged and no longer functional, the wells may be decommissioned on future field efforts per the ADEC's September 2013 *Monitoring Well Guidance*. A separate work plan outlining the decommissioning activities will be provided to the ADEC.

Upon completion of any improvements and during the sampling activities, the wells will be surveyed for updated elevations. The updated groundwater elevation data will be used to generate groundwater contour lines and provided on the figures included in the monitoring report. The flow direction and gradient will be calculated after the monitoring event and included in the report.

3.5.2 Sample Equipment and Water Quality Parameter Collection

The monitoring wells will be purged using low-flow sampling methods per the Environmental Protection Agency's 2010 *Low Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells*. A decontaminated positive

displacement submersible pump and disposable tubing will be utilized to purge and collect the groundwater monitoring well samples.

The purging will be conducted to sustain a minimum drawdown (<0.1 m) during purging—typically achievable with a flow rate of approximately 0.1 gallon per minute. The pump will be placed in the top one foot of the water column. Field parameters will be measured at 3 to 5 minute intervals to evaluate the effectiveness of removing stagnant casing water. Water quality parameters will be considered stable when three successive readings for a minimum of three (or four if using temperature) parameters collected 3 to 5 minutes apart are within the following stabilization criteria:

- ± 3% for temperature (minimum of ± 0.2° C)
- ± 0.1 for pH
- ±3 % for conductivity
- ±10 mv for ORP
- ±10% for DO
- ± 10% for turbidity

The water will be collected directly into the laboratory-supplied sample containers. The sample containers will be filled in order of volatility: VOCs/DCA/BTEX, GRO, EDB, DRO, RRO, PAHs, PCBs, and metals.

3.6 Decontamination Procedures

Decontamination procedures will be implemented to minimize the potential for cross-contamination at the site. The pump, product level/water level meter and water quality instrument used for sampling will be decontaminated using water and Alconox, and rinsed using a combination of potable and deionized water. Disposable spoons will be used during the UST system removal sampling activities, therefore no decontamination will be required for the soil sampling activities.

4.0 ANALYTICAL METHODS

The samples will be submitted to SGS laboratory in Anchorage, Alaska for sample analysis. SGS is an ADEC Contaminated Sites certified laboratory and meets the requirements of the Department of Defense Environmental Accreditation Program (DoD ELAP). The environmental consultant will be responsible for managing the lab contract and ensuring the laboratory analysis is conducted in accordance with this Work Plan.

The presumed UST and dispenser north of the FRF Building is assumed to have contained gasoline and was no longer is use after the 1960s. Therefore, the source is suspected to be leaded gasoline and will be analyzed for the parameters as outlined by the ADEC's *Underground Storage Tanks Procedures Manual*. The contents of the UST will be tested for select parameters as requested by the waste transportation and disposal companies and identified below.

The parameters to be sampled for in the monitoring well locations are a continuation of the monitoring previously conducted for these sampling locations and additional analytes requested by the ADEC. If measurements taken during high and low tide indicate that the wells are influenced by the tide and hydrogeologically connected to surface water, additional analytical testing may be required.

These samples will be submitted for standard turnaround and analyzed for the list of parameters included on Table 2.

Table 2 - List of Parameters

Parameter and Method	UST and Dispenser North of FRF Building	UST Contents	Monitoring Wells	Monitoring Wells under tidal influence
GRO – AK 101	X		X	X
DRO – AK 102	X			
DRO/RRO – AK 102/103			X	X
BTEX – SW8260B		X		
VOCs (includes BTEX and 1,2-dichloroethane) – SW8260B	X		X	X
EDB – SW8260B SIM	X			
Total Metals – SW 6020				
Total Lead – SW 6020	X	X		
TCLP Lead – SW 6020	**			
PAHs – SW8270 SIMS	*		*	*
PCBs – SW8082			*	*
TAH – EPA 624				X
TAqH – EPA 625M				X
Flash Point		X		

Notes:
* - Analyze on 10 percent basis from most impacted sample(s).
** - Analyze if total lead concentrations exceed 400 mg/kg.

5.0 FIELD QUALITY CONTROL MEASURES

The data will undergo quality control review to confirm that the data accurately represents site conditions. The review will include field equipment and field quality control samples, laboratory quality control samples, data quality evaluations, and data assessment and qualifications.

5.1 Field Equipment Quality Control

Field equipment will be calibrated on a daily basis during field activities and on an as needed basis if problems arise in the field. The PID (MiniRae 2000 or 3000) will be calibrated and maintained per the manufacturer's recommendations. The PID will be first calibrated to the ambient air (i.e., fresh air calibration) to set a zero point for the sensor. After the fresh air calibration, a standard gas of 100 ppm isobutylene will be used to set the span calibration. The

cylinder or tedlar bag of isobutylene will be applied to the PID until the PID indicates the calibration is complete. The field personnel will check the PID upon completion of the calibration and occasionally throughout the field day to check the readings in comparison to the known isobutylene standard. Decontamination of the equipment that is in direct contact with the soil and/or groundwater samples will be conducted between samples.

5.2 Field and Laboratory Quality Control Samples

Field and laboratory quality control samples will be evaluated for the project data quality objectives (DQO). The following table outlines the Quality Control (QC) samples to be evaluated and the sampling frequency for this project.

Table 3 - Field and Laboratory Quality Control Samples and Frequency

Field QC Samples	**Frequency/Number**
Trip Blank	Water: 1 per analysis per cooler for GRO, BTEX, VOCs or TAH. Soil: 1 per preservation method per set of 20 with a minimum of 1 per analysis and cooler.
Temperature Blank	1 per cooler
Field Duplicate	1 per 10 samples for each sample matrix for each target analyte with a minimum of 1 per sampling day
Laboratory QC Samples	**Frequency/Number**
Method Blank	1 per 20 samples
Laboratory Control Sample / Laboratory Control Sample Duplicate	1 per 20 samples
Matrix Spike/Matrix Spike Duplicate	1 per 20 samples
Surrogates	Every field sample and QC sample (organics only)

6.0 INVESTIGATIVE DERIVED WASTE MANAGEMENT

Investigation derived waste will include excavated soil, contents from the UST, purge/decontamination water, sampling disposables, and personal protective equipment (PPE). The ADEC's *Transport, Treatment, and Disposal Approval Form* and laboratory analytical results will be provided to ADEC prior to transport of any soil or fluids. Transportation off-site for treatment and/or disposal will be conducted once ADEC approval is received.

- Contaminated soils found on site treated locally in a landfarm and/or placed in supersacks or other suitable container and shipped to an off-site disposal facility. If the soil fails TCLP, the soil will be shipped offsite for disposal.

- If free product or a visible sheen is encountered in the groundwater during excavation, the product/sheen will be noted in the field notes and documented in photographs and left in place.
- Contents remaining in the UST and piping, fluids from the UST cleaning process, and purge/decontamination water will be containerized in drums and transported off-site for treatment.
- Leachate generated within the landfarm cell will be treated using a GAC filter and discharged back onto the landfarm cell.
- Investigation derived waste (IDW) will comprise of gloves, spoons, Ziplock bags, tubing from the groundwater monitoring, and other sampling disposables will be disposed of as solid waste at a permitted landfill.

7.0 REPORTING

After completion of the field activities, a report will be developed to document the results. The report will contain the following:

- site background
- description of field activities
- description of calibration procedures in the report and field notes
- discussion on the laboratory sample results
- data interpretation
- recommendations for changes in the water monitoring program (i.e., well repairs, discontinued monitoring, well replacement)
- recommendations for additional action or site closure (UST)
- summary table of soil and groundwater results
- figures of the sample locations
- field notes and logs
- photographs of the field activities including photos of the UST, piping, vents, excavation, dispenser island, soil stains, free product, and any other noteworthy observations
- ADEC *Laboratory Data Review Checklist* and a summary of the results of the review within the body of the report
- laboratory reports including the chain of custody paperwork
- waste manifests

8.0 SCHEDULE

The following schedule is proposed for the scope outlined in this work plan. TCC will notify the ADEC of the dates of the field activities at least two weeks in advance.

Table 4 – Proposed Project Schedule

Task	Date
Provide UST Registration and Certification Form, and Intent to Close Form	At least 15 Days prior to UST removal activities
Field Activities – UST Removal and Groundwater Sampling	Summer 2019, pending contractor availability
Receipt of analytical results	Two weeks from field activities
Provide Notice of Post-Closure Form	Within 30 days from UST Removal
Draft Report to Maniilaq Association	Three weeks from receipt of sampling results
Provide SARI Form and Report to ADEC	Within 120 days from field activities

9.0 REFERENCES

ADEC. 2018. Oil and Other Hazardous Substances Pollution Control, 18 AAC 75. September 29.

ADEC. 2018. Water Quality Standards, 18 AAC 70. April 6.

ADEC. 2017. Field Sampling Guidance. August.

ADEC. 2017. Underground Storage Tanks Procedures Manual. March 22.

ADEC. 2017. Underground Storage Tanks, 18 AAC 78. November 7.

ADEC. 2015. Cleaning up fuel contamination: Kotzebue's former Indian Health Service hospital and Bureau of Indian Affairs school. July.

EPA. 2012. Identification and Listing of Hazardous Waste, 40 CFR 261. July 1.

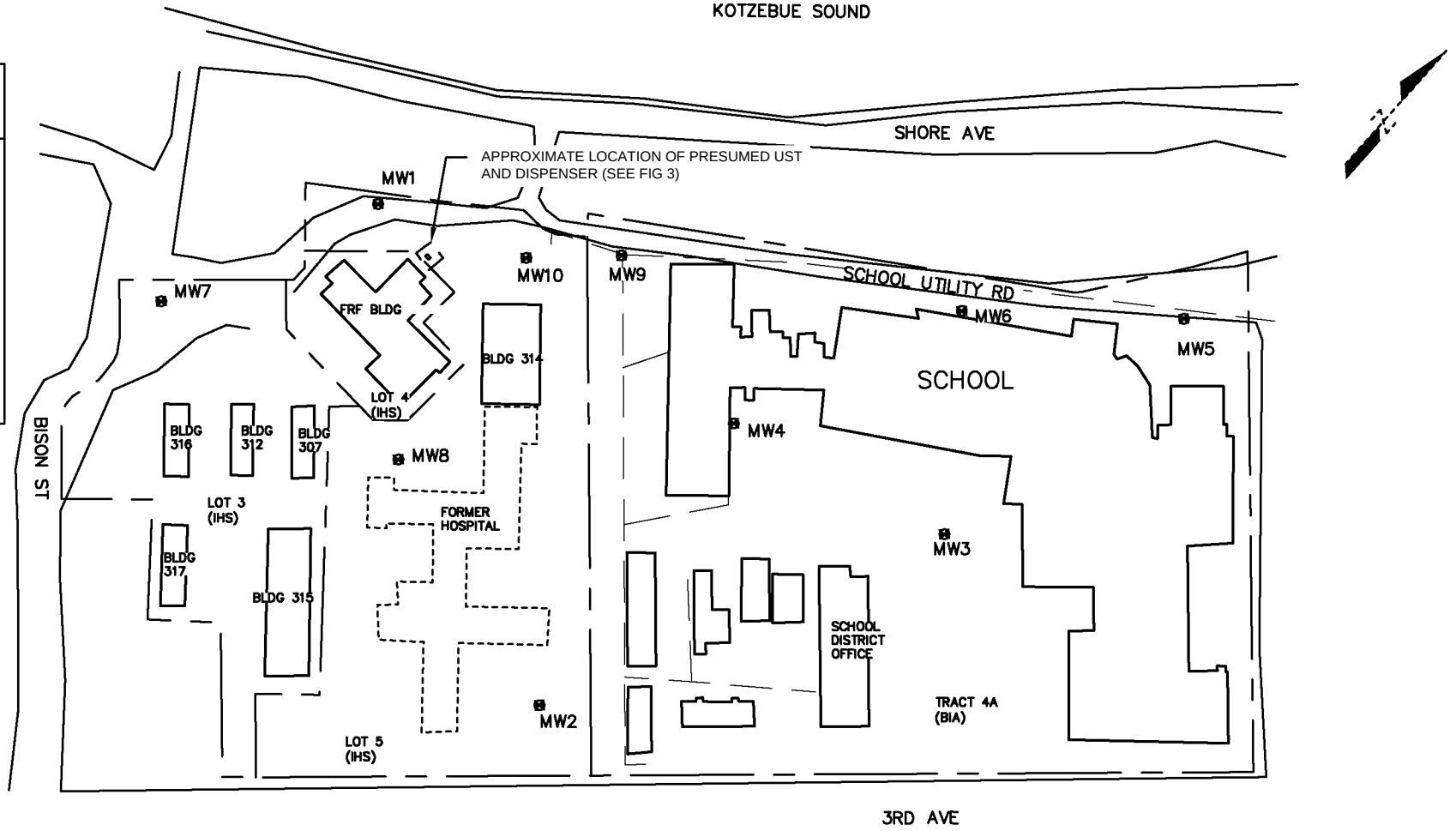
Shannon & Wilson. 1990. Phase II Recommendations & Recovery, 1989 Field Season, Underground Oil Spill, Kotzebue, Alaska. May.

Shannon & Wilson. 2010. Site Characterization Report, Kotzebue City Oil Spill Area, Kotzebue, Alaska. January.

WHPacific. 2015. Draft 2015 Site Investigation Report. Former HIS/BIA Hospital – School Pipeline Release. December.

VICINITY MAP	IHS BIA PIPELINE OIL SPILL KOTZEBUE, AK	TCC-EMI JV	PREPARED: TRM DRAWN: TRM REVIEWED: SIM DATE: 7/11/18	FIGURE 1

Party Paying for Monitoring	
MW-1	IHS
MW-2	IHS
MW-3	BIA
MW-4	BIA
MW-5	BIA
MW-6	BIA
MW-7	IHS
MW-8	IHS
MW-9	BIA
MW-10	IHS

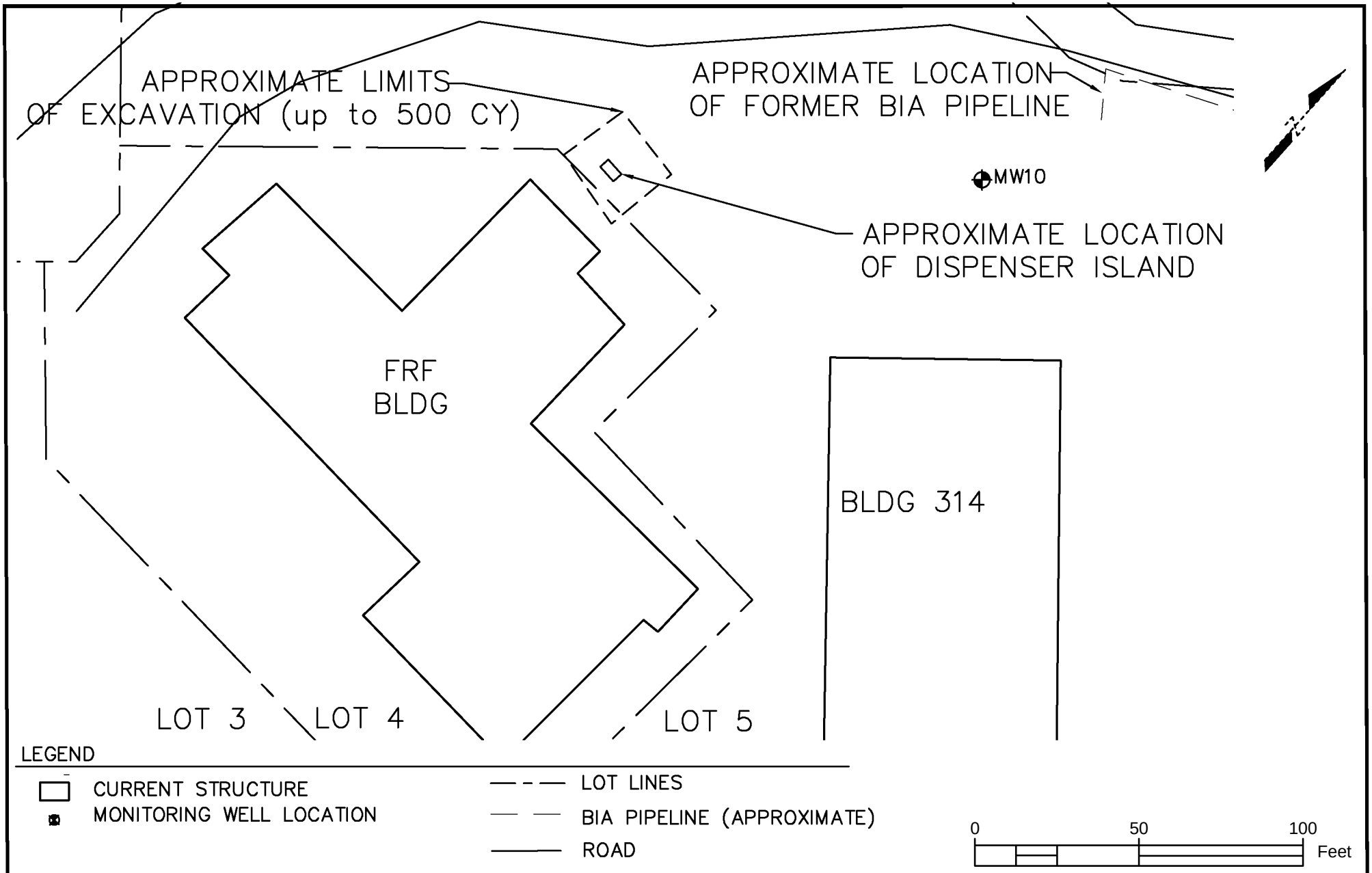


LEGEND

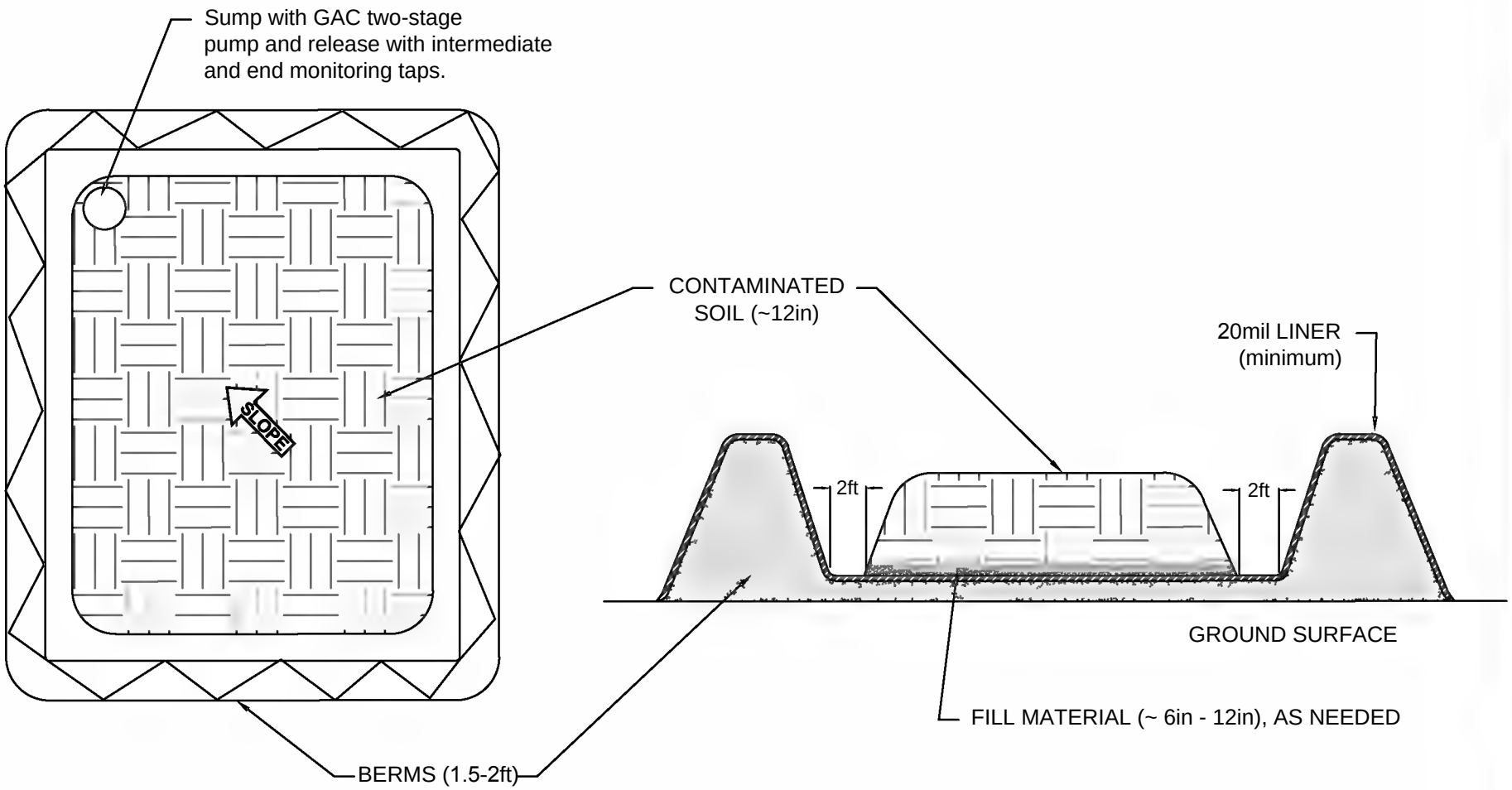
- FORMER STRUCTURE
- CURRENT STRUCTURE
- MONITORING WELL LOCATION
- LOT LINES
- BIA PIPELINE (APPROXIMATE)
- ROAD

0 200 400 Feet

PROPOSED SAMPLING LOCATIONS	IHS BIA PIPELINE OIL SPILL KOTZEBUE, AK	TCC-EMI JV	PREPARED: TRM DRAWN: TRM REVIEWED: SIM DATE: 10/4/18	FIGURE 2



UST EXCAVATION SITE PLAN	IHS BIA PIPELINE OIL SPILL KOTZEBUE, AK	TCC-EMI JV	PREPARED: TRM DRAWN: TRM REVIEWED: SIM DATE: 1/4/18	FIGURE 3



PLAN VIEW

CROSS-SECTION

LANDFARM SCHEMATIC	IHS BIA PIPELINE OIL SPILL KOTZEBUE, AK	TCC-EMI JV	PREPARED: TRM DRAWN: TRM REVIEWED: SIM DATE: 8/2/18	FIGURE 4

APPENDIX A

Landfarming Checklist

Attachment A-Landfarming Checklist

Project Name Kotzebue Former IHS-BIA Hospital-School Release - UST Removal Effort (410.38.025)

X Workplan with detailed specifications for the landfarming project (18 AAC 78.250(e)(3)).

X Adequate site characterization data that identifies contaminants of concern and target cleanup levels.

X Design plan that will provide prevention of contamination migration to previously unaffected areas unless otherwise approved by the department in a corrective action plan (18 AAC 78.250(e)(4)).

X Workplan schedule for conducting field work, monitoring, corrective action performance, and submittal of interim and final corrective action reports (18 AAC 78.250(e)(1)).

X Site control plan (18 AAC 78.250(e)(8)).

NA Wastewater discharge permit for any discharge of regulated wastewater (18 AAC 72).

NA Project complies with air quality standards and requirements (18 AAC 78.250(e)(9) and 18 AAC 50).

NA Nondomestic wastewater system plan approval for the construction, alteration, installation, modification, or operation of any nondomestic wastewater treatment works or disposal system under 18 AAC 72.600 (18 AAC 78.250(e)(11) and 18 AAC 72).

X Project maintains appropriate separation distance from surface water, water supply wells, and groundwater (18 AAC 78.274(a)(2)).

NA If applicable, description of cultured microbes, any additives, breakdown products, and oxygen source with their rate of application and biodegration (18 AAC 78.250(e)(12)(E)).

X If landfarm is constructed off-site, department approval before moving contaminated soil to the treatment site (18 AAC 78.274(b)).

NA If applicable, compliance with the treatment facility requirements (18 AAC 78.273).

X Information submitted that addresses leachate (18 AAC 78.250(e)(12)(A)).

X Post-treatment sampling to ensure cleanup standards have been met (18 AAC 78.605(b)).

NA Cleanup standards achieved (18 AAC 78.600 - 18 AAC 78.625).

NA Treated soils returned to original site or disposed of properly in accordance with department approval (18 AAC 78.274(b)).

I certify that I have personally reviewed the above checklist and that all information noted is contained in the attached report.

Name Shayla Marshall Signature _____

Title Project Manager Date 8/3/2018

APPENDIX B

Resumes of QEP, QES, and ADEC UST Worker