Defence Construction Canada on behalf of the Department of National Defence

Water Use Licence Renewal
CAM-3, Shepherd Bay Landfill Monitoring Program

January 2016

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1.0 Post Construction Monitoring Program

1.1 Introduction

The CAM-3 Shepherd Bay DEW Line site is located on the southwest coast of the Boothia Peninsula in Nunavut at 68° 48' 38" north latitude and 96° 26' 01" west longitude. The site is approximately 80 kilometres south of the community of Taloyoak and about 7 kilometres inland from the shore of Shepherd Bay.

CAM-3 is a former auxiliary radar site of the DEW Line constructed in the 1950s. CAM-3 was refitted in 1989 to become a Long Range Radar (LRR) station within the North Warning System (NWS). The environmental clean-up and demolition of former DEW Line facilities not required for the operation of the LRR site commenced in 2002 and was completed during the summer of 2007. The clean-up included the closure and remediation of five existing landfills, the construction of a landfill for the disposal of non-hazardous wastes generated from demolition and site debris collection, and the construction of a Tier II Soil Disposal Facility for disposal of Tier II impacted soils. The landfills included in the CAM-3 long term monitoring program are shown on the overall site plan (Appendix A) and are listed below:

- Beach Landfill;
- Non-Hazardous Waste Landfill;
- Station Landfill;
- Tier II Soil Disposal Facility;
- Northeast Landfill;
- USAF Landfill; and
- NWS Landfill.

1.2 Background

There were two initial site assessments of CAM-3 carried out independently, with the first by UMA Engineering Ltd. (UMA) in association with Hardy BBT Ltd. and Jacques Whitford Group (Jacques) in 1990, and the second by the Environmental Sciences Group (ESG) in 1989 and 1990. In 2000 and 2001, the DEW Line Project conducted a detailed site investigation to delineate contamination identified in the assessments, and to collect additional geophysical, geotechnical, demolition, and debris information. Input on traditional land use was provided by Nunavut Tunngavik Incorporated (NTI) at that time. The requirements for landfill closure were based on the 2000 and 2001 site investigation data. Soil and groundwater sampling was completed as part of landfill baseline monitoring in 2006 and 2007, during site clean-up.

The Department of National Defence (DND), in cooperation with NTI, developed a landfill monitoring plan to address post closure monitoring requirements for the landfills at the DEW Line Sites (Appendix B).

Table 1 provides the remaining landfill monitoring schedule for the CAM-3 site.

Table 1 – Monitoring Schedule

No. of Years after Construction	Monitoring Event Number	Year
15	8	2022
25	9	2032

1.3 Objective

The objective of the landfill monitoring program is to collect sufficient information to assess the performance of the landfills from a geotechnical and environmental perspective. The landfill monitoring plan specifies the requirements for visual inspection, and chemical (soil and groundwater) and thermal monitoring of landfills at the former DEW Line sites under DND's jurisdiction.

2.0 Program Components

The post-construction landfill monitoring program consists of four main components to measure the performance of the landfills, depending on the remediation plan for each landfill. These components are visual, soil, groundwater and thermal monitoring. Details on each of the monitoring components are provided below.

2.1 Visual Monitoring

The physical condition of each landfill is inspected in accordance with the Visual Inspection Checklist provided in the Environmental Provisions of the NTI-DND Agreement. Photographic records are provided to document the general condition of the landfill and to substantiate all recorded observations. The physical integrity (stability) of the landfill is inspected and reported using hand-drawn or electronically generated (i.e., using GPS) sketches and the landfill stability report. The documented observations include but are not limited to:

- settlement
- erosion
- frost action

- animal burrows
- vegetation reestablishment on surface
- staining
- vegetation stress
- seepage points or ponded water
- debris exposure

2.2 Soil Monitoring

Background (naturally occurring) conditions refer to native soil geochemistry and represent soil quality from an area not impacted by site activities. Soil sampling to establish general site background conditions was conducted in 2000.

Baseline conditions refer to existing soil chemistry at the landfill area prior to and during remediation. The baseline landfill monitoring program consists of two phases: samples collected as part of the landfill assessment program which determined whether the landfill posed a potential environmental risk, and samples collected during the construction/closure of the landfill. The results of subsequent landfill monitoring events are compared to baseline and/or background values to evaluate any potential changes in environmental conditions.

As part of the baseline sampling program, soil samples were collected in areas upgradient and downgradient of each landfill. Upgradient samples are targeted to areas near the landfill, but not influenced by migration of contaminants through the landfill. Upgradient samples are meant to be representative of contaminant input conditions to the landfill and serve as the primary basis upon which to compare the downgradient contaminant concentrations.
Downgradient soil samples are collected at surface/shallow depths from designated areas at the toe of each landfill and from areas of preferential drainage. These soil samples are collected and analyzed to document whether there has been migration of contaminants from the landfill area. Although contaminants are primarily transported in water (surface and groundwater), they have a tendency to adsorb to soil particles the water is migrating through. Therefore the soil still retains information regarding the historical input of contaminants.

Analytical results of soil samples collected downgradient of landfills are compared to contaminant concentrations of samples collected upgradient of landfills. Downgradient samples are also compared to overall site background contaminant levels because they help in establishing a more broad level of contaminant concentrations that can be found at the site, particularly where different soil or rock types are present. Contaminant concentrations in downgradient samples that are significantly higher than background or upgradient concentrations, particularly where there have been changes over time; provide evidence of contaminants having migrated to, possibly beyond the soil sampling location. These data, in conjunction with other site-specific information, were used in the assessment of the

environmental status of the landfill and the determination of an appropriate remediation solution.

Samples collected during baseline and subsequent landfill monitoring are analyzed for the following parameters:

- Inorganic elements: arsenic, cadmium, chromium, cobalt, copper, lead, nickel, and zinc.
- TPH (Total Petroleum Hydrocarbons) – as represented by the sum of F1 (nC_6 to nC_{10}), F2 (nC_{10} to nC_{16}), and F3 (nC_{16} to nC_{34}), as defined by the CCME Tier I Reference Method for PHC in Soil. Analysis for the F4 fraction will also be performed.
- Polychlorinated biphenyls (PCB) are analyzed in soil only.

The requirement for the analyses of baseline samples is to provide record information on the environmental status of the landfill should potential problems be identified during the monitoring program.

In general, at least one monitoring well was installed upgradient and two to three wells were installed downgradient of the landfill during the construction phase. Using water elevation data from a minimum of three wells allows assessment of the hydraulic gradient and flow velocities. Review of analytical data from water samples collected from wells up and down-gradient allows evaluation of potential impacts associated with the landfill. Soil samples are collected from the toe of the landfill, generally from the same locations as the monitoring wells. Contamination in soil samples at the toe of the landfill reflects chronic input from water that may have infiltrated the landfill, and is an important consideration when evaluating the potential impacts of contaminated leachate.

2.2.1 Soil Sampling

The soil monitoring program has the following requirements:

- Soil samples are to be collected from 0 to 15 cm depth and at 40 to 50 cm depth, at the locations as indicated on the drawings. If the specified sampling depth cannot be achieved, a sample shall be collected at or near the zone of refusal.

- When collecting soil samples at monitoring well locations, the soil samples are to be collected within a 2-4 metre radius of the monitoring well. Samples are not to be collected immediately adjacent to the well.

- Soil samples are to be collected with contaminant free utensils and stored in contaminant free containers that are appropriate for subsequent analytical use. Sampling utensils are to be thoroughly cleaned between each sampling episode and rinsed with distilled water. Alternatively, single use sampling utensils may be used.

2.3 Water Monitoring

During the construction phase, permanent groundwater monitoring wells were installed at all existing landfills classified as a moderate environmental risk (Class B landfills) and at new landfills built to support site remediation. At CAM-3, this includes the existing USAF Landfill, the Non-Hazardous Waste Landfill (new), and the Tier II Disposal Facility (new). Groundwater monitoring wells were installed hydraulically upgradient and downgradient of the landfills. Surface and shallow depth soil samples are collected adjacent to monitoring well locations. Analytical data from water samples collected from wells up and downgradient are reviewed in conjunction with soil analytical data to evaluate potential impacts associated with the landfill.

For baseline and for future monitoring events, the following physical measurements are recorded prior to the collections of groundwater samples from a monitoring well:

- Water elevation.
- Total water depth.
- Height of well stick-up.
- Depth to bottom of well.
- Presence of hydrocarbons.
- Hydrocarbon thickness (if present in a measurable amount).

Groundwater samples are analyzed for the following parameters:

- Inorganic elements (total concentrations): arsenic, cadmium, chromium, cobalt, copper, lead, nickel and zinc.
- TPH (Total Petroleum Hydrocarbons) – F1 to F3 (C_6 to C_{34}) and F4.

2.3.1 Groundwater Sampling

The groundwater monitoring program has the following requirements:

- Monitoring wells are to be purged prior to sampling, maintaining a purge rate at 100 mL/min or less.
- Conductivity, pH, and temperature are to be monitored during purging. Groundwater samples are to be collected when values for these parameters have stabilized and at least one well volume has been purged.
- Final conductivity, pH, temperature and turbidity are to be recorded prior to collection of the groundwater sample.
- Sample bottles are to be filled during a single collection event.
- Groundwater samples are to be collected at the well locations as indicated on the figures.

2.4 Thermal Monitoring

Geothermal analysis was carried out as part of the design to predict the length of time required for permafrost aggradation through landfills requiring leachate containment, including the Tier II Soil Disposal Facility. These analyses also provided information on the long and short term thermal regime in the ground, and the depth of the active layer in the cover material.

A thermal monitoring system provides measurement of subsurface ground temperatures, which allows comparison to and verification of the predicted ground temperatures. The thermal monitoring system consists of installation of thermistor strings, with thermistor beads at selected intervals to provide ground temperature profiles at various locations within the landfill. The thermistor strings are attached to automated dataloggers that allow for remote data collection. In general, a minimum of three thermistors are installed at each landfill where permafrost aggradation through the landfill contents is an integral part of the design.

The following are the requirements of the thermal monitoring program:

- The data is to be retrieved from the ground temperature data using a personal computer equipped with the appropriate software and the programming file from the specific datalogger.
- The data is to be translated and view in the field to ensure completeness.
- Manual readings of the thermistor using a digital readout that is compatible with the thermistors or a multimeter and a switch box are to be collected.
- For the first monitoring event completed by the Consultant, the distance of the thermistor cable above ground is to be measured.
- A sketch to indicate the location of each cable is to be prepared.
- The datalogger memory will be reset memory to zero and restart readings. The system will be monitored using the personal computer to verify that thermistors are being measured.

2.5 Frequency

The landfill monitoring program consists of three phases, as described in detail below.

2.5.1 Phase I

Phase I involves monitoring of landfill conditions to confirm that equilibrium is achieved. The frequency of monitoring events during Phase I monitoring is dependent on the closure or remediation design at specific landfills. The five year term was selected on the basis that ground temperature thermal regimes at specific landfills will require three to five years to reach equilibrium.

An evaluation of all Phase I data is carried out at the end of five years to confirm that thermal and chemical equilibrium is achieved, and that no stability issues are identified. The Phase I monitoring program may be extended, if required, to provide sufficient data to establish equilibrium conditions.

The first year of the Phase I post construction monitoring was completed by the Environmental Sciences Group (ESG) of the Royal Military College of Canada, who are part of the DEW Line Clean-Up Project Team. Subsequent landfill monitoring events are carried out by independent contractors.

2.5.2 Phase II

Phase II monitoring is the verification of equilibrium conditions established in Phase I. The monitoring frequency in Phase II is downgraded from Phase I and will be carried out according to the following schedule: year 7, 10, 15 and 25. Year 25 marks the end of Phase II monitoring.

2.5.3 Phase III

Phase III involves the monitoring for longterm issues such as liner integrity, permafrost stability and significant storm events. At the end of the Phase II program, 25 years after construction, a re-evaluation of the landfill monitoring program will be carried out prior to initiating any Phase III program. The scope of the Phase III monitoring program is not included here, but is anticipated to be based on a 10 year monitoring interval.

2.6 Review and Evaluation Process

An Environmental Working Group (EWG) was established to provide technical recommendations and to support the DLCU Steering Committee.

This EWG is a joint group constructed in accordance with the DND-NTI Agreement to provide technical advice to the Steering Committee throughout the Phases of the project.

The EWG consists of four members, two of them are representatives of DND (qualified engineering and environmental scientists with expertise in environmental remediation in northern climates), and the other two members represent NTI.

During the monitoring program, the EWG reviews the monitoring reports in accordance with the methodology as described previously. The EWG recommendations regarding changes to the monitoring plan and/or remediation requirements will be reported to the DND/NTI Steering Committee for decision making.

The requirement for further monitoring after 25 years will be evaluated. Monitoring may be terminated if the performance of the landfill was satisfactory over the period of monitoring from an environmental, geotechnical and thermal perspective, as appropriate. The assessment of satisfactory performance will be carried out jointly by the NTI and DND.

3.0 Detailed Landfill Monitoring Requirements

The following sections provide a summary and the detailed monitoring requirements for each landfill at CAM-3.

Table 2 – CAM-3 Landfill Monitoring Requirements

Landfill Designation	Visual Inspection	Groundwater Sampling	Soil Sampling	Thermal Monitoring
Beach Landfill	√		√ x 2	
Non-Hazardous Waste Landfill	√	√	√ x 2	
Station Landfill	√		√ x 2	
Tier II Disposal Facility	√	√	√ x 2	√
Northeast Landfill	√		√ x 2	
USAF Landfill	√	√	√ x 2	√
NWS Landfill	√		√ x 2	

3.1 Beach Landfill

The Beach Landfill is located approximately 100 meters south of the beach POL tanks and 50 metres from the ocean. The landfill is within a flat disturbed area that was difficult to distinguish from the native granular deposits along the beach. Two anomalies were identified during geophysical surveys, covering an estimated area of 1,500 m2. The landfill was well covered with minimal debris visible at surface. No evidence of contaminant migration was detected. Type A (lubricating oil) hydrocarbon staining was identified within the landfill proximity.

Based on the evaluation of the landfill as a source of contamination, potential pathways and receptors, the Beach Landfill was classified as a low potential environmental risk. The landfill remediation included regrading and the placement of additional granular fill to direct flow around the sides of the landfill and the removal of contaminated soil.

The long term monitoring plan consists of visual monitoring and periodic collection of soil samples. Table 3 provides the coordinates of the monitoring stations at the Beach Landfill.

Table 3 – Beach Landfill Monitoring Stations

	Coordinates		Elevation
Landfill Designation/Monitoring Locations	**North (m)**	**East (m)**	**(masl)**
Beach Landfill			
C3-1 (soil)	10976.7	2707.8	
C3-2 (soil)	10997.2	2626.6	
C3-3 (soil)	11019.8	2663.9	

Note: Coordinates are referenced to the site grid and are approximate locations.

3.2 Non-Hazardous Waste Landfill

The Non-Hazardous Waste Landfill is located south of the existing Northeast Landfill, and to the north of the junction between the main station access road and the road to the beach area. The landfill was constructed for the disposal of non-hazardous wastes and debris generated and collected during site clean-up.

The design of this landfill includes perimeter berms, and the placement of a cover of compacted granular fill over the landfilled material. Three groundwater monitoring wells were installed at the landfill perimeter.

The long term monitoring plan consists of visual monitoring and periodic collection of soil and groundwater samples. Table 4 provides the coordinates of the monitoring stations at the Non-Hazardous Waste Landfill.

Table 4 - Non-Hazardous Waste Landfill Monitoring Stations

	Coordinates		Elevation
Landfill Designation/Monitoring Locations	**North (m)**	**East (m)**	**(masl)**
Non-Hazardous Waste Landfill			
MW-1 (soil and groundwater)	10721.1	10338.8	42.2
MW-2 (soil and groundwater)	10773.4	10285.6	39.2
MW-3 (soil and groundwater)	10741.2	10273.6	39.6

Note: Coordinates are referenced to the site grid and are approximate locations.

3.3 Station Landfill

The Station Landfill is located approximately 200 m southeast of the module train along a ridge on the south side of the access road between the station and airstrip. Geophysics identified five lobes of debris, for a combined area of 6,100 m2. The debris was primarily dumped and covered off the edge of the ridge, with some debris having been placed in separate piles away from the ridge and subsequently covered with fill. No evidence of contaminant migration was detected. Localized Tier II contamination was detected associated with surface debris.

Based on the evaluation of the landfill as a source of contamination, potential pathways and receptors, the Station Landfill was classified as a low potential environmental risk. The remediation of this landfill consisted of regrading with the placement of additional granular fill, and excavation of the Tier II soil. Three of the lobes in close proximity to one another were regraded as one continuous area, while the other two lobes were regraded separately.

The long term monitoring plan consists of visual monitoring and periodic collection of soil samples. Table 5 provides the coordinates of the monitoring stations at the Station Landfill.

Table 5 - Station Landfill Monitoring Stations

	Coordinates		Elevation
Landfill Designation/Monitoring Locations	**North (m)**	**East (m)**	**(masl)**
Station Landfill			
C3-4 (soil)	9840.14	10027.65	
C3-5 (soil)	9789.97	9928.20	
C3-6 (soil)	9762.22	9985.12	
C3-7 (soil)	9758.22	10050.71	
C3-8 (soil)	9711.38	10092.89	

Note: Coordinates are referenced to the site grid and are approximate locations.

3.4 Tier II Soil Disposal Facility

A Tier II Soil Disposal Facility was constructed at CAM-3 for the disposal of Tier II soil excavated during the clean-up. The Tier II facility is located along the south edge of the U-shaped ridge of the site, to the south of the airstrip and to the east of the Station Landfill.

The design of this landfill included a double containment system consisting of a liner system and the construction of saturated, low-permeability berms, followed by the placement of sufficient surface fill to promote freezing of landfill contents and containment berms. The liner was placed along the bottom of the landfill, along the berms, and over the top of the landfill contents and thermistors were installed within the landfill in the berms and the main body of the landfill. Four monitoring wells were installed at the landfill perimeter.

The long term monitoring plan consists of visual monitoring, periodic collection of soil and groundwater samples, and monitoring of subsurface ground temperatures in the berms and in the main body of the disposal facility. Table 6 provides the coordinates of the monitoring stations at the Tier II Disposal Facility.

Table 6 – Tier II Soil Disposal Facility Monitoring Stations

	Coordinates[1]		Elevation
Landfill Designation/Monitoring Locations	**North (m)**	**East (m)**	**(masl)**
Tier II Disposal Facility			
VT-5 (ground temperature)	9610.4	10348.5	43.7
VT-6 (ground temperature)	7615.4	10315.6	44.0
VT-7 (ground temperature)	9588.2	10307.0	43.1
VT-8 (ground temperature)	9583.7	10337.5	43.3
MW-4 (soil and groundwater)	9642.0	10333.7	41.8

MW-5 (soil and groundwater)	9563.7	10295.8	37.0
MW-6 (soil and groundwater)	9550.3	10322.7	36.9
MW-7 (soil and groundwater)	9560.2	10366.5	36.9

Note: Coordinates are referenced to the site grid and are approximate locations.

3.5 Northeast Landfill

The Northeast Landfill is located approximately 1 kilometre north of the module train. Geophysics identified 12 lobes of debris, for a combined area of 21,800 m2. The landfill is located along the crest of a former beach ridge, which slopes gently to the east and has a well-defined toe to the west; the east portion is relatively flat and the western portion slopes down to a wet low-lying area. Localized Tier I and Tier II contamination, and Type A (lubricating oil) soil contamination was identified at some of the lobes, however, the impacts were all associated with surface debris or staining. No evidence of contaminant migration was identified.

Based on the evaluation of the landfill as a source of contamination, potential pathways and receptors, the Northeast Landfill was classified as a low potential environmental risk. The landfill remediation included the removal of surface debris and localized contaminated areas, along with regrading and the placement of additional granular fill. Several of the lobes in close proximity to one another were regraded as one area.

The long term monitoring plan consists of visual monitoring and periodic collection of soil samples. Table 7 provides the coordinates of the monitoring stations at the Northeast Landfill.

Table 7 – Northeast Landfill Monitoring Stations

	Coordinates		Elevation
Landfill Designation/Monitoring Locations	**North (m)**	**East (m)**	**(masl)**
Northeast Landfill			
C3-9 (soil)	11247.6	10453.9	
C3-10 soil)	11279.8	10545.0	
C3-11 (soil)	11164.5	10538.3	
C3-12 (soil)	11055.4	10418.6	
C3-13 (soil)	10978.6	10340.0	
C3-14 (soil)	11065.7	10322.5	
C3-15 (soil)	11160.7	10331.6	
C3-16 (soil)	11256.1	10315.3	
C3-17 (soil)	11337.9	10375.9	
C3-18 (soil)	11423.6	10404.7	

Note: Coordinates are referenced to the site grid and are approximate locations.

3.6 USAF Landfill

The USAF Landfill is located approximately 2.3 kilometres east and 1.4 kilometres north of the main station area on the southeast side of the Winter Water Lake Road. The landfill consisted largely of buried debris covering an area of 6,570 m². The landfill area is elevated approximately 1.0 to 2.5 metres above the surrounding tundra at its downgradient edge, and the mound extends out from a large beach ridge and road area. The landfill was covered with sand and gravel with a small amount of vegetation. Off the edge of the landfill, the terrain changes to a poorly drained tundra consisting of a thick organic mat overlying dense silt or clay. Tier II soil was identified on the landfill surface at several locations (generally associated with debris), and Type A (lubricating oil) contamination was also identified downgradient of the landfill. Some evidence of contaminant migration was detected; however, the data indicated that contaminant migration was due to surface rather subsurface transport.

Based on the evaluation of the landfill as a source of contamination, potential pathways and receptors, the USAF Landfill was classified as a moderate potential environmental risk. Remediation included the excavation of the Type A soil downgradient of the landfill, and the installation of a leachate contaminant system which would effectively encapsulate surficial Tier II soil. A modified leachate containment system was installed at the landfill perimeter during remediation, which addressed the surface contaminant migration potential, but accounted for the existing low permeability of the surrounding soil away from the landfill (i.e. clay). The landfill remediation also included the installation of four monitoring wells at the landfill perimeter and four thermistors within the landfill footprint to monitor freeze back conditions.

The long term monitoring plan consists of visual monitoring, periodic collection of soil and groundwater samples and downloading of ground temperature data. Table 8 provides the coordinates of the monitoring stations at the USAF Landfill.

Table 8 – USAF Landfill Monitoring Stations

	Coordinates		Elevation
Landfill Designation/Monitoring Locations	**North (m)**	**East (m)**	**(masl)**
USAF Landfill			
VT-1 (ground temperature)	11447.0	12226.9	48.8
VT-2 (ground temperature)	11412.9	12220.3	46.6
VT-3 (ground temperature)	11416.6	12289.8	46.4
VT-4 (ground temperature)	11422.1	12321.3	45.1
MW-12 (soil and groundwater)	11501.2	12196.3	44.9
MW-13 (soil and groundwater)	11366.9	12268.4	45.4
MW-14 (soil and groundwater)	11367.0	12348.0	42.6
MW-15 (soil and groundwater)	11451.4	12323.4	43.2

Note: Coordinates are referenced to the site grid and are approximate locations.

3.7 NWS Landfill

The NWS Landfill is located immediately adjacent to the northwest edge of the USAF Landfill and contains a limited amount of debris in an area of approximately 640 m2. At the time of investigation, the NWS Landfill area was covered with sand and gravel and was well graded. With the exception of a small amount of subsidence 0.3 metres deep in the geophysical survey, there is little visual evidence that there was a landfill in this area. Wet low-lying ground beyond the landfill comprises the native ground of the area. An erosion channel was noted running through the length of the landfill.

The landfill was classified as a low potential environmental risk, based on its evaluation as a source of contamination, pathways and receptors. The remediation of this landfill consisted of the placement of additional granular fill.

The long term monitoring plan consists of visual monitoring and periodic collection of soil samples. Table 9 provides the coordinates of the monitoring stations at the NWS Landfill.

Table 9 – NWS Landfill Monitoring Stations

	Coordinates		Elevation
Landfill Designation/Monitoring Locations	**North (m)**	**East (m)**	**(masl)**
NWS Landfill			-
C3-19 (soil)	11565.16	12313.12	
C3-20 soil)	11515.39	12360.93	
C3-21 (soil)	11498.15	12332.72	

Note: Coordinates are referenced to the site grid and are approximate locations.

Appendix A

CAM-3, Shepherd Bay Site Diagrams

LEGEND:

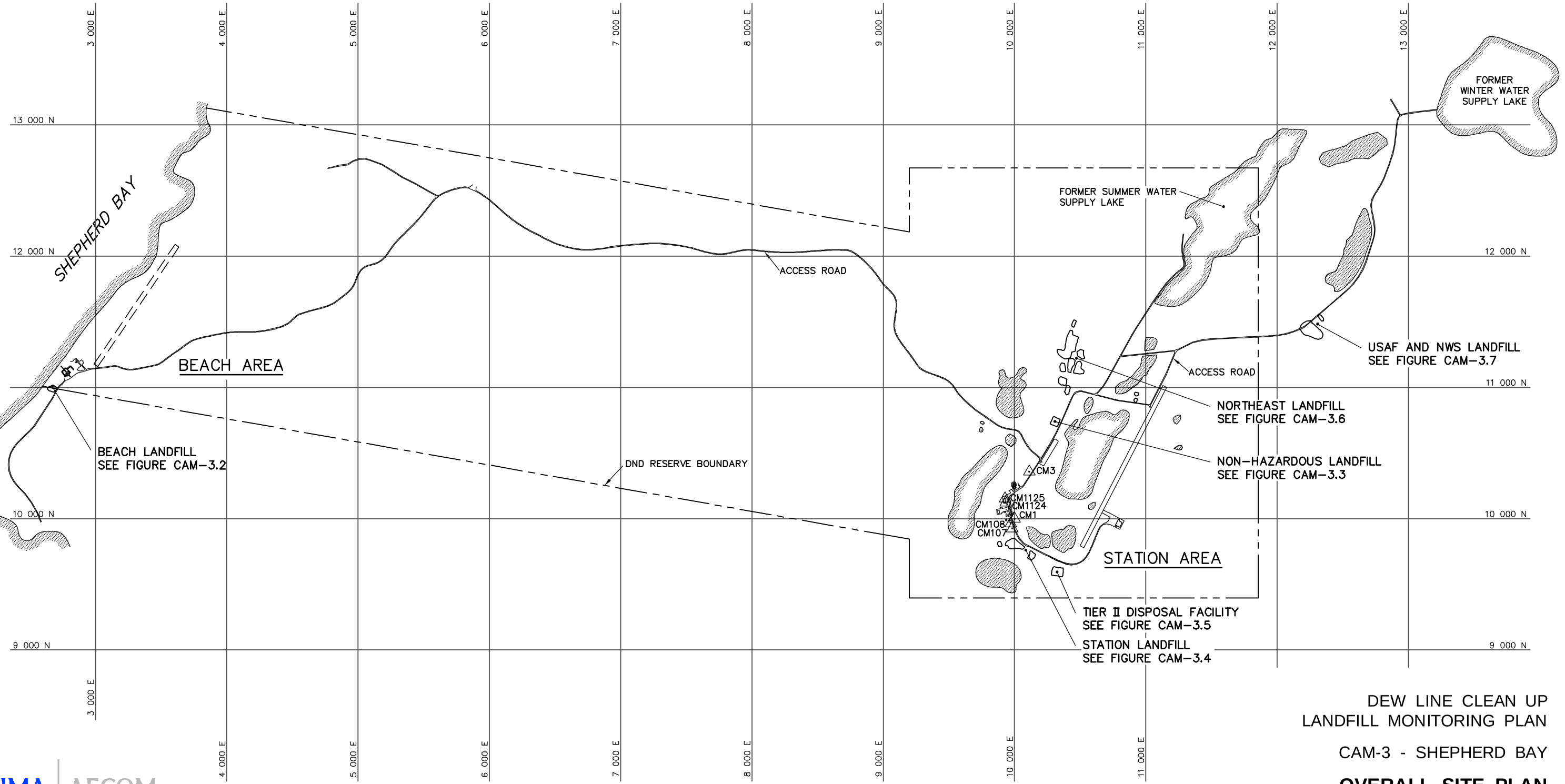
CM1 △ SURVEY CONTROL MONUMENT

SURVEY CONTROL MONUMENTS (LOCAL COORDINATES)				
NO.	COORDINATES		ELEV.	DESCRIPTION
	NORTHING	EASTING		
CM1	10 000.000	10 000.000	41.775	CAM-3 BASELINE
CM3	10 357.750	10 111.994	41.450	GSC MON. 749725
CM107	9 926.007	9 982.062	43.107	DMA MON. 11811
CM108	9 962.344	9 970.897	42.690	DMA RM. 11811
CM1124	10 121.226	9 933.143	43.418	TECSULT
CM1125	10 152.084	9 927.809	43.406	TECSULT

SURVEY CONTROL MONUMENTS (UTM COORDINATES)				
NO.	COORDINATES		ELEV.	DESCRIPTION
	NORTHING	EASTING		
X				
X				

0 300 600 900m

300 150 1:30000



DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

CAM-3 - SHEPHERD BAY

OVERALL SITE PLAN

FIGURE CAM-3.1

UMA | AECOM

DOS NAME: C3-RD01.DWG DMJ - 06/06/21

SHEPHERD BAY

N

95m 96m 97m 98m 99m

49 625 E 49 650 E 49 675 E 49 700 E 49 725 E 49 750 E 49 775 E 49 600 E

39 800 N 39 775 N 39 750 N 39 725 N

DND RESERVE BOUNDARY

ACCESS ROAD

C3-1 C3-2 C3-3

641 642 643 644 645 646

LEGEND:

130→ COORDINATE POINT

■ MONITORING SOIL SAMPLE LOCATION

COORDINATE POINTS			
NO.	COORDINATES		ELEV.
	NORTHING	EASTING	
641	39 773.8	49 696.0	99.9
642	39 747.5	49 676.6	99.7
643	39 755.9	49 644.2	98.6
644	39 764.1	49 633.5	98.0
645	39 771.4	49 632.2	97.8
646	39 791.3	49 669.3	98.9

0 5 10 15m

5 2.5 1:500

UMA | AECOM

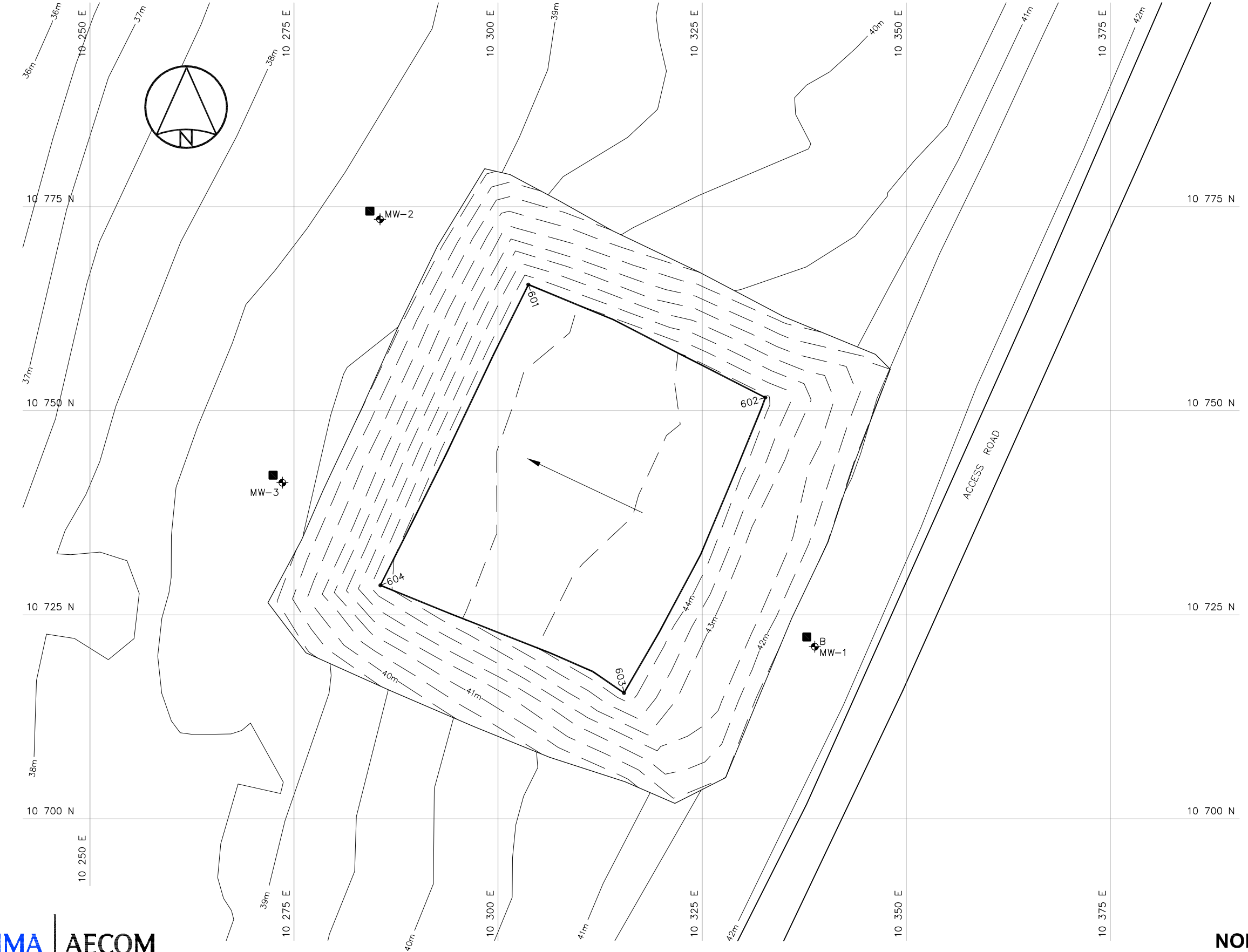
DWG NAME: C3-RD02.DWG DMJ – 06/06/21

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

CAM-3 - SHEPHERD BAY

BEACH LANDFILL

FIGURE CAM-3.2



LEGEND:

130-• COORDINATE POINT

MONITORING WELL LOCATION

MONITORING SOIL SAMPLE LOCATION

COORDINATE POINTS			
NO.	COORDINATES		ELEV.
	NORTHING	EASTING	
601	10 765.5	10 303.7	43.4
602	10 751.6	10 332.7	44.1
603	10 715.4	10 315.4	44.3
604	10 728.6	10 285.6	42.9

MONITORING WELLS			
NO.	COORDINATES		GROUND ELEV.
	NORTHING	EASTING	
MW-1	10 721.1	10 338.8	42.2
MW-2	10 773.5	10 285.5	39.2
MW-3	10 741.2	10 273.6	39.6

0 5 10 15m

5 2.5 1:500

UMA | AECOM

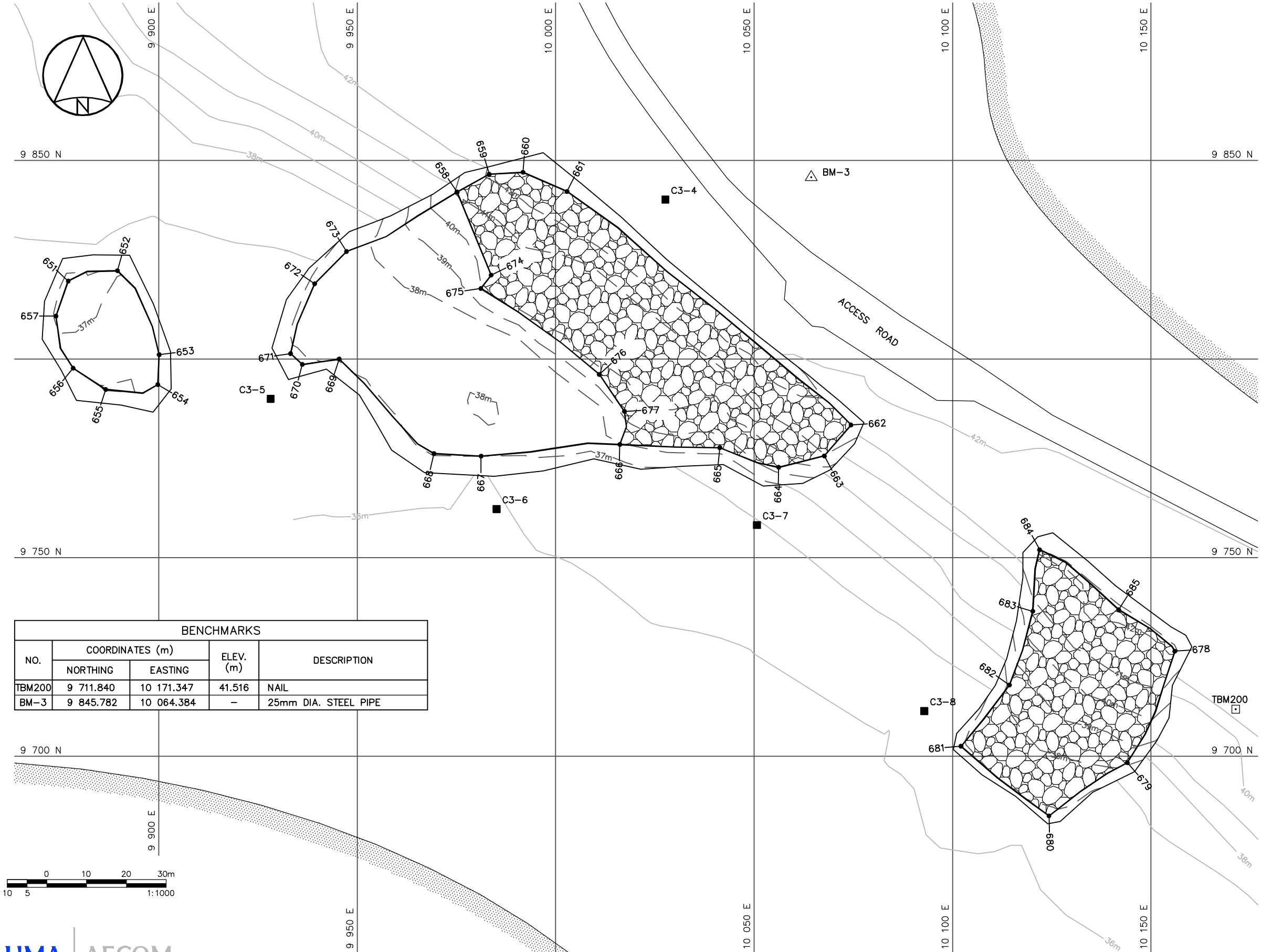
DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

CAM-3 - SHEPHERD BAY

NON-HAZARDOUS WASTE LANDFILL

FIGURE CAM-3.3

DOS NAME: C3-R003.DWG DMJ - 06/06/21



LEGEND:

- CM27△ SURVEY CONTROL MONUMENT
- TBM20⊡ TEMPORARY BENCHMARK
- 130–• COORDINATE POINT
- ■ MONITORING SOIL SAMPLE LOCATION

COORDINATE POINTS STATION AREA LANDFILL		
NO.	NORTHING	EASTING
651	9 819.7	9 877.2
652	9 822.2	9 889.6
653	9 801.1	9 900.1
654	9 793.6	9 899.8
655	9 792.4	9 886.6
656	9 797.7	9 878.5
657	9 810.8	9 874.1

COORDINATE POINTS STATION AREA LANDFILL		
NO.	NORTHING	EASTING
658	9 842.1	9 975.2
659	9 846.6	9 983.3
660	9 847.0	9 991.8
661	9 842.2	10 002.9
662	9 783.4	10 074.4
663	9 775.6	10 067.7
664	9 772.7	10 056.2
665	9 777.7	10 041.4
666	9 778.5	10 016.2
667	9 775.5	9 981.2
668	9 776.2	9 969.4
669	9 800.0	9 945.5
670	9 798.6	9 936.2
671	9 801.4	9 933.2
672	9 819.0	9 939.3
673	9 827.1	9 947.3
674	9 821.2	9 983.8
675	9 817.8	9 981.1
676	9 796.1	10 011.0
677	9 786.8	10 017.4

COORDINATE POINTS STATION AREA LANDFILL		
NO.	NORTHING	EASTING
678	9 726.5	10 156.0
679	9 698.4	10 144.0
680	9 685.0	10 124.3
681	9 702.5	10 102.1
682	9 718.0	10 114.3
683	9 736.5	10 120.2
684	9 752.0	10 121.9
685	9 736.9	10 141.9

BENCHMARKS				
NO.	COORDINATES (m)		ELEV. (m)	DESCRIPTION
	NORTHING	EASTING		
TBM200	9 711.840	10 171.347	41.516	NAIL
BM-3	9 845.782	10 064.384	–	25mm DIA. STEEL PIPE

UMA | AECOM

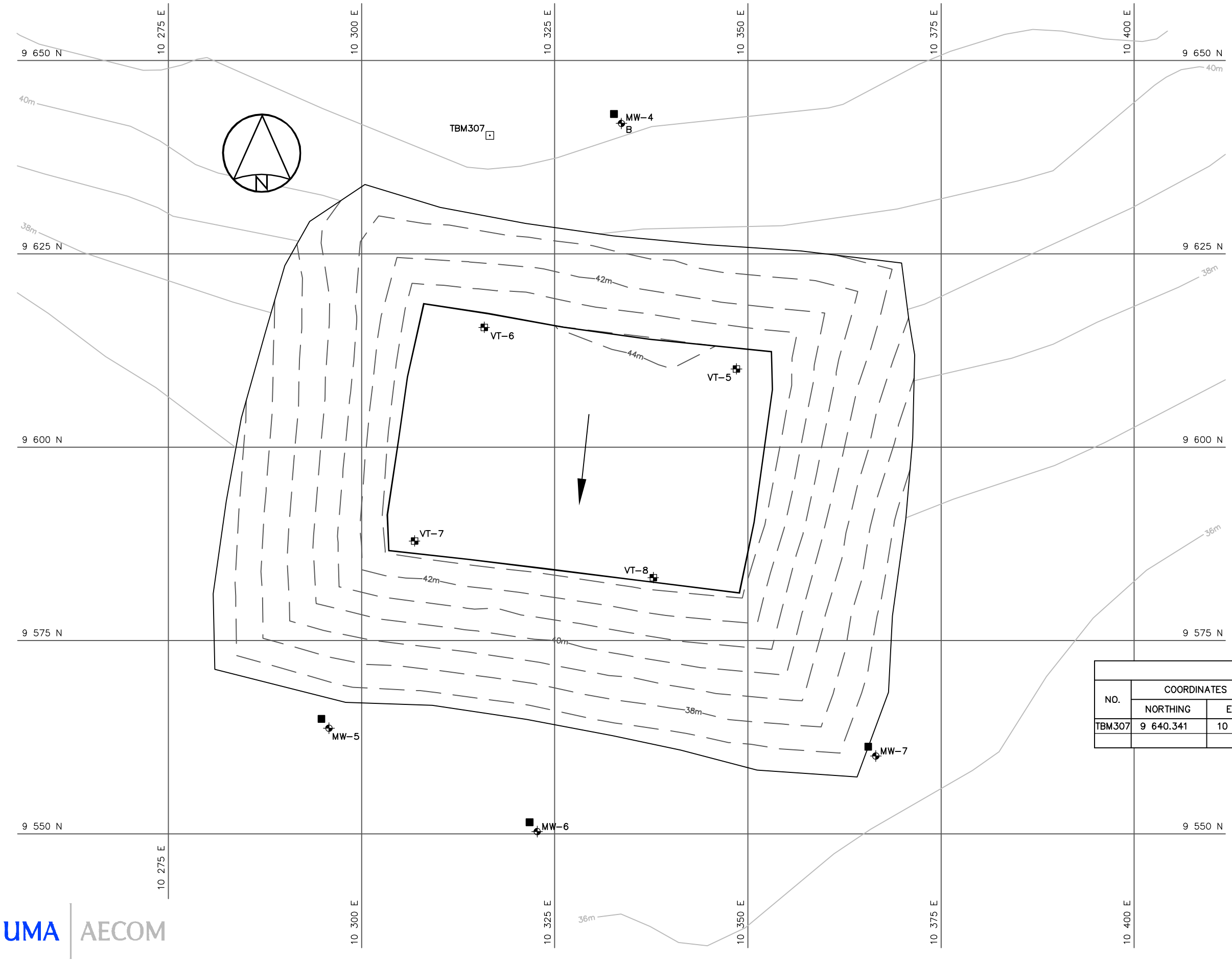
DWG NAME: C3-RD04.DWG DMJ – 06/06/21

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

CAM-3 - SHEPHERD BAY

STATION LANDFILL

FIGURE CAM-3.4



LEGEND:

- TBM20 ⊡ TEMPORARY BENCHMARK
- 130 COORDINATE POINT
- ⌖ MONITORING WELL LOCATION
- VT ⌖ VERTICAL THERMISTOR
- ■ MONITORING SOIL SAMPLE LOCATION

MONITORING WELLS			
NO.	COORDINATES		GROUND ELEV.
	NORTHING	EASTING	
MW-4	9 641.9	10 333.6	41.9
MW-5	9 563.7	10 295.8	37.0
MW-6	9 550.3	10 322.7	36.9
MW-7	9 560.1	10 366.6	36.9

THERMISTORS			
NO.	COORDINATES		GROUND ELEV.
	NORTHING	EASTING	
VT-5	9 610.1	10 348.5	44.2
VT-6	9 615.5	10 315.9	44.0
VT-7	9 587.9	10 306.9	43.3
VT-8	9 583.1	10 337.8	43.4

BENCHMARKS				
NO.	COORDINATES (m)		ELEV. (m)	DESCRIPTION
	NORTHING	EASTING		
TBM307	9 640.341	10 316.602	41.308	NAIL

0 5 10 15m
5 2.5 1:500

UMA | AECOM

DWG NAME: C3-RD04.DWG DMJ - 06/06/21

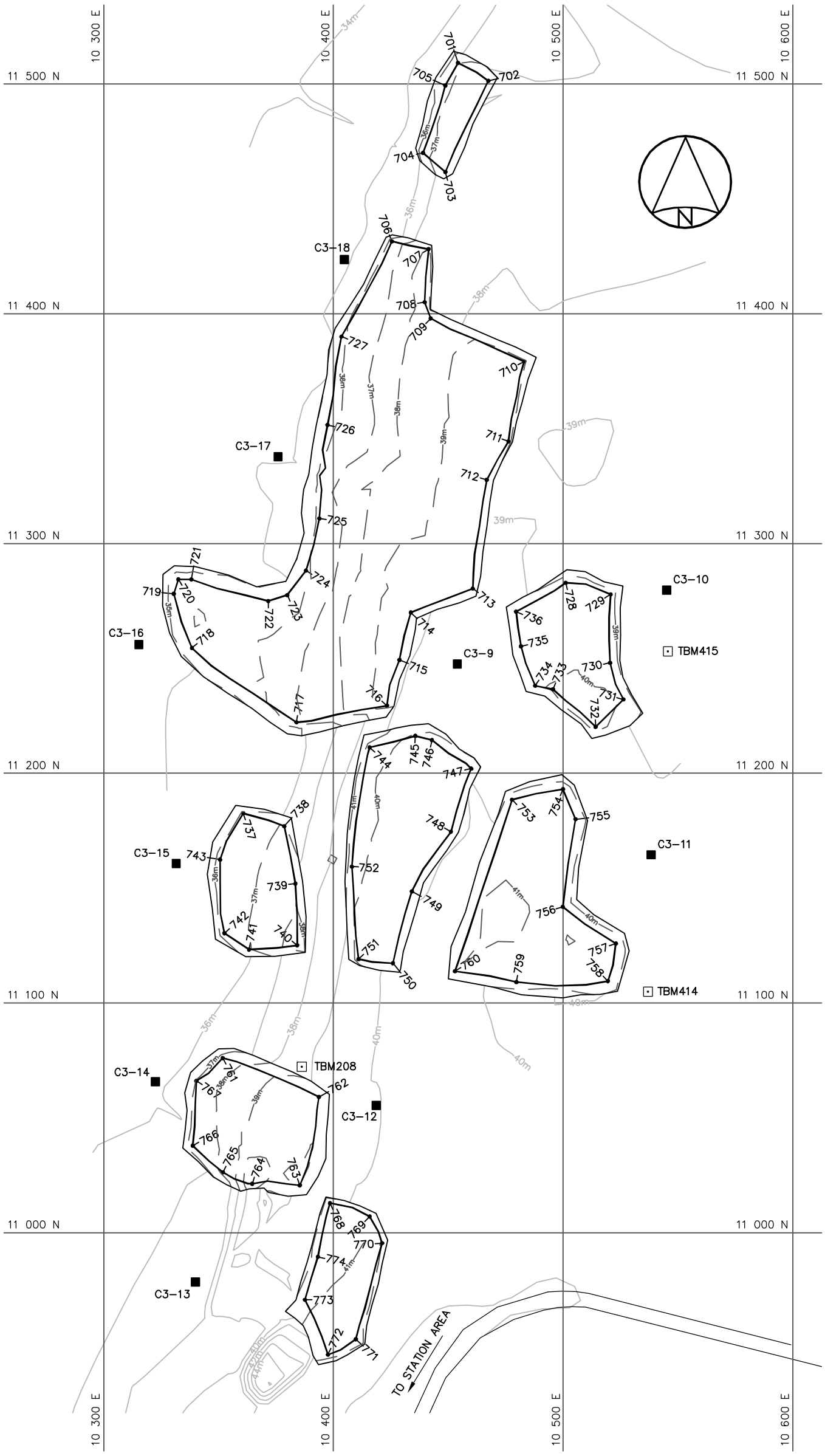
DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

CAM-3 - SHEPHERD BAY

TIER II DISPOSAL FACILITY

FIGURE CAM-3.5

COORDINATE POINTS NORTHEAST LANDFILL		
NO.	NORTHING	EASTING
701	11 509.2	10 454.2
702	11 501.4	10 467.4
703	11 461.8	10 448.7
704	11 470.1	10 439.0
705	11 499.4	10 448.7
706	11 431.6	10 425.4
707	11 428.2	10 441.4
708	11 405.0	10 439.7
709	11 398.0	10 442.3
710	11 379.3	10 483.0
711	11 344.4	10 476.2
712	11 327.8	10 466.7
713	11 280.4	10 460.6
714	11 270.0	10 433.7
715	11 249.3	10 428.7
716	11 229.4	10 423.3
717	11 222.2	10 383.9
718	11 254.5	10 338.4
719	11 278.2	10 330.5
720	11 284.4	10 332.5
721	11 284.4	10 338.1
722	11 275.0	10 371.6
723	11 277.6	10 379.9
724	11 288.2	10 388.0
725	11 310.9	10 393.9
726	11 351.6	10 397.4
727	11 390.1	10 403.5
728	11 283.0	10 501.1
729	11 277.9	10 520.7
730	11 248.1	10 520.4
731	11 232.2	10 526.2
732	11 220.2	10 514.1
733	11 236.6	10 495.5
734	11 238.1	10 487.8
735	11 255.3	10 481.6
736	11 270.4	10 479.5
737	11 182.6	10 360.7
738	11 177.0	10 378.6
739	11 152.0	10 383.4
740	11 125.1	10 384.2
741	11 123.3	10 363.3
742	11 130.4	10 352.6
743	11 162.4	10 350.7
744	11 211.3	10 415.7
745	11 216.3	10 435.6
746	11 214.4	10 442.8
747	11 202.1	10 460.0
748	11 174.5	10 451.1
749	11 148.6	10 434.1
750	11 117.3	10 425.9
751	11 119.1	10 410.9
752	11 159.4	10 408.0
753	11 188.5	10 477.7
754	11 193.1	10 499.9
755	11 180.0	10 505.4
756	11 141.9	10 499.8
757	11 125.9	10 522.9
758	11 109.5	10 519.5
759	11 109.2	10 479.6
760	11 113.8	10 452.9
761	11 076.0	10 351.8
762	11 059.1	10 393.7
763	11 020.6	10 385.4
764	11 021.3	10 364.7
765	11 026.3	10 351.9
766	11 037.9	10 338.8
767	11 066.1	10 340.4
768	11 012.9	10 398.5
769	11 007.1	10 415.8
770	10 995.5	10 421.2
771	10 953.6	10 409.7
772	10 946.9	10 397.6
773	10 970.8	10 387.6
774	10 989.5	10 393.2



TEMPORARY BENCHMARKS				
NO.	COORDINATES (m)		ELEV. (m)	DESCRIPTION
	NORTHING	EASTING		
208	11 072.305	10 386.113	38.911	NAIL
414	11 104.981	10 536.900	40.119	2x2 WOODEN HUB
415	11 253.052	10 545.538	39.061	2x2 WOODEN HUB

LEGEND:

TBM20⊡ TEMPORARY BENCHMARK

130–• COORDINATE POINT

■ MONITORING SOIL SAMPLE LOCATION

0 20 40 60m

20 10 1:2000

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

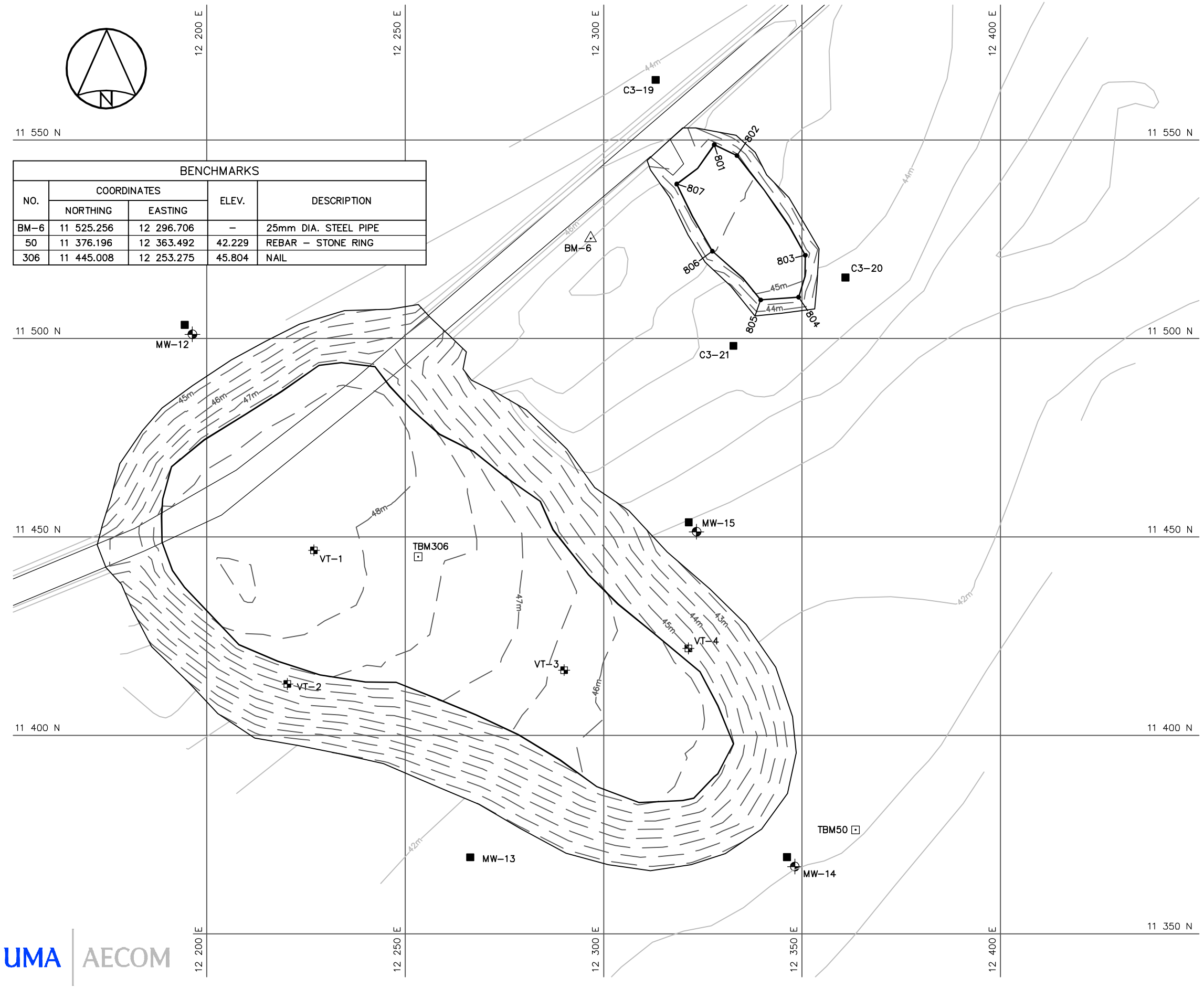
CAM-3 - SHEPHERD BAY

NORTHEAST LANDFILL

FIGURE CAM-3.6

UMA | AECOM

DOS NAME: C3-RD04.DWG DMJ – 06/06/21



BENCHMARKS				
NO.	COORDINATES		ELEV.	DESCRIPTION
	NORTHING	EASTING		
BM–6	11 525.256	12 296.706	–	25mm DIA. STEEL PIPE
50	11 376.196	12 363.492	42.229	REBAR – STONE RING
306	11 445.008	12 253.275	45.804	NAIL

LEGEND:

- CM27 △ SURVEY CONTROL MONUMENT
- TBM20 ⊡ TEMPORARY BENCHMARK
- 130 → COORDINATE POINT
- ⌖ MONITORING WELL LOCATION
- VT ✚ VERTICAL THERMISTOR
- ■ MONITORING SOIL SAMPLE LOCATION

COORDINATE POINTS NWS LANDFILL		
NO.	NORTHING	EASTING
801	11 548.8	12 327.9
802	11 546.1	12 333.6
803	11 521.0	12 350.8
804	11 510.4	12 349.2
805	11 509.7	12 339.6
806	11 522.0	12 327.4
807	11 538.9	12 318.4

MONITORING WELLS			
NO.	COORDINATES		GROUND ELEV.
	NORTHING	EASTING	
MW–12	11 501.1	12 196.4	44.9
MW–13	11 366.9	12 268.4	42.4
MW–14	11 367.0	12 348.2	42.2
MW–15	11 451.3	12 323.4	43.0

THERMISTORS			
NO.	COORDINATES		GROUND ELEV.
	NORTHING	EASTING	
VT–1	11 446.1	12 227.0	48.3
VT–2	11 413.0	12 220.3	46.7
VT–3	11 416.4	12 290.0	46.4
VT–4	11 421.9	12 321.4	45.1

0 10 20 30m
10 5 1:1000

UMA | AECOM

DGN NAME: C3-R004.DWG DMJ – 06/06/21

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

CAM-3 - SHEPHERD BAY

USAF AND NWS LANDFILLS

FIGURE CAM-3.7

Appendix B

DND/NTI Monitoring Agreement

AGREEMENT BETWEEN

Nunavut Tunngavik Incorporated

And

Her Majesty In The Right Of Canada,

Represented By

The Minister Of National Defence

With Respect To The Phase II Post-Clean-up Monitoring Of

Distant Early Warning Sites

Within The Nunavut Settlement Area

(NTI-DND Monitoring Agreement)

PREAMBLE

WHEREAS on September 1, 1998 under the NTI-DND Environmental Agreement DND and NTI entered into an agreement to establish a framework for the remediation and restoration of certain DEW Line sites in the Nunavut Settlement Area;

AND WHEREAS on August 30, 2001 under the NTI-DND Economic Agreement the Parties entered into an agreement to address the participation of Inuit in the clean up of those DEW Line sites in the Nunavut Settlement Area;

AND WHEREAS Section 20.2 of the NTI-DND Environmental Agreement requires that, following completion of the clean-up for a site, DND will commence a monitoring program in accordance with Appendix H of that Agreement;

AND WHEREAS the NTI-DND Economic Agreement sets forth an agreed-upon process for the issuing of contracts for the clean-up of DEW Line Sites, which the Parties wish to adapt for use in the issuance of contracts for the monitoring of DEW Line Sites following clean-up;

NOW THEREFORE, in consideration of the premises and mutual covenants contained herein, the Parties agree as follows:

1.0 DEFINITIONS

1.1 Unless otherwise required by the context, the word *work* herein has the same meaning as in the NTI-DND Economic Agreement and also includes all materials, equipment, goods, services, labour, matters and things done or furnished or required to be done or furnished to perform any DEW Line site monitoring activity.

1.2 **Monitoring Contract** means a contract issued by DND's contracting agent in accordance with this agreement for the conduct of all or part of the Phase II monitoring program for a DEW Line Site as required by Section 20 and Appendix H of the NTI-DND Environmental Agreement.

2.0 General

2.1 This Agreement constitutes the process to be determined by the Steering Committee pursuant to Section 8.3.11 of the NTI-DND Economic Agreement.

2.2 Upon completion of the remediation or restoration of the DEW Line sites in the Nunavut Settlement Area, DND shall issue Monitoring Contract(s) in accordance with this Agreement.

3.0 STEERING COMMITTEE AND CONTRACTING WORKING GROUP

3.1 Steering Committee

3.1.1 The Steering Committee, identified in Section 4.1 of the NTI-DND Economic Agreement, shall also perform the functions identified herein.

3.2 Contracting Working Group

3.2.1 The Contracting Working Group, identified in Section 4.2 of the NTI-DND Economic Agreement, shall also perform the functions identified herein.

a) make a recommendation to the Steering Committee on the Minimum Inuit Employment Content (MIEC) for Monitoring Contracts, under Section 5.8; and

b) make a recommendation to the Steering Committee on the Minimum Inuit Content for Contracting (MICC) for Monitoring Contracts, under Section 6.8.

4.0 MINIMUM INUIT EMPLOYMENT CONTENT FOR MONITORING CONTRACTS

4.1 A Minimum Inuit Employment Content (MIEC) shall be set for each Monitoring Contract issued at a Site.

4.2 The MIEC for a Monitoring Contract is the minimum level of Inuit employment that DND shall require the Contractor to achieve under a Monitoring Contract.

4.3 The MIEC shall be expressed as a percentage, and shall be calculated by dividing the total number of Inuit employed, in person-hours, by the total number of persons employed, in person-hours, for the term of the Monitoring Contract. The calculation shall include all on-site and off-site personnel employed by Contractors and Subcontractors under the contract. Off-site personnel shall include without limitation:

a) management and support personnel dedicated to the monitoring work;

b) project management personnel employed by the Contractor;

c) technical or drafting personnel;

d) expediting, shipping, payroll or accounting personnel; and

e) personnel performing laboratory work.

4.4 The calculation of the MIEC shall not include:

a) project management staff at DND's contracting agent;

b) DND employees; and

c) any consultants contracted by DND or DND's contracting agent for the provision of advice concerning the specifications of the monitoring contract, contract management or other advice.

4.5 Four months prior to the tendering of a Monitoring Contract, DND shall provide NTI with DND's estimates of the types and level of positions that will be required for the conduct of the monitoring of a Site, in person-hours, and broken out by Representative Occupational Grouping. The estimate shall be provided in the form attached as Annex A.1.

4.6 Within two months of the receipt of the information described in Section 4.5, NTI, in consultation with the Regional Inuit Associations (RIAs), shall provide DND with a projection of the level of Inuit employment for the monitoring of a Site. The projection will be provided in the form attached as Annex A.2 to this Agreement. NTI's projection will be based on an analysis, for each Representative Occupational Grouping, of the number of Inuit qualified for work on monitoring of the Sites in relation to the employment opportunities using, to the extent possible, relevant available information on Inuit qualifications and employment.

4.7 Within one month of receipt by DND of the projection under Section 4.6, the Contracting Working Group shall recommend a MIEC for the Monitoring Contract. In making the recommendation to the Steering Committee for the MIEC, the Contracting Working Group shall take into account, for each Representative Occupational Grouping, the following factors:

a) NTI's projection of Inuit employment;

b) Inuit employment achieved on other Monitoring Contracts for DND DEW Line Sites;

c) the results achieved by training and apprenticeship programs for Inuit labour, to date; and

d) the projected impact on the availability of Inuit labour of other projects being undertaken in Nunavut.

4.8 Where the Contracting Working Group, after a reasonable effort, is unable to reach agreement on the MIEC for the Monitoring Contract, either Party may refer the MIEC to the Steering Committee for resolution.

4.9 The Steering Committee shall meet as soon as practicable following a recommendation under Section 4.7 or a referral under Section 4.8 and shall decide on a MIEC no later than 4 months prior to the start date of the work under a Monitoring Contract.

4.10 The MIEC resulting from a decision of the Steering Committee shall be the MIEC required under Section 4.1.

4.11 The forms used to provide the information required under Section 4.5 and 4.6 may be modified upon the agreement of all members of the Contracting Working Group.

4.12 If intensification of the monitoring program for a Site is required, as provided for under Section 5.0, Appendix H of the NTI-DND Environmental Agreement, and this intensified program is carried out under the existing Monitoring Contract for the Site, the MIEC established for the Monitoring Contract shall apply to the intensified monitoring program.

4.13 If intensification of the monitoring program for a Site is required, as provided for under Section 5.0, Appendix H of the NTI-DND Environmental Agreement, and this intensified program is carried out under a new contract issued by DND's contracting agent, a MIEC shall be established for the contracting of the additional monitoring program requirements according to the procedures laid out in this Agreement.

4.14 If remedial action to address a problem at a Site is required, as provided for under Section 5.0, Appendix H of the NTI-DND Environmental Agreement, a MIEC shall be established for contracting of the remedial action according to the procedures laid out in this Agreement. In case of an emergency, DND and NTI shall make every effort to establish a MIEC within reasonable timelines to allow quick remedial action.

5.0 MINIMUM INUIT CONTENT FOR CONTRACTING

5.1 A Minimum Inuit Content for Contracting (MICC) shall be set for each Monitoring Contract issued at a Site.

5.2 The MICC for a Monitoring Contract is the minimum level of Inuit business participation that DND shall require the Contractor to achieve under a Monitoring Contract for contract disbursements, but not including personnel employed by Contractors and Subcontractors under the contract.

5.3 The Minimum Inuit Content for Contracting (MICC) for the monitoring of a Site shall be expressed as a percentage, and shall be calculated by dividing the total dollar value of Inuit contracting content for contract disbursements by the total dollar value of the contract disbursements. The total dollar value

of Inuit contracting content shall be calculated by adding the dollar value of all subcontracts for goods or services to be obtained through, or awarded to Inuit firms, including all labour costs. Where the Contractor is an Inuit firm, the total dollar value of Inuit contracting shall also include the Contractor's share of the Monitoring Contract, which is the total dollar value of the contract minus the dollar value of all subcontracts.

5.4 Four months prior to the tendering of a Monitoring Contract, DND shall provide NTI with an analysis of categories of contracting opportunities and an estimate of each category's percentage of total value of the Monitoring Contract. The analysis shall be provided in the form attached as Annex A.3.

5.5 Within two months of the receipt of the analysis required under Section 5.4, NTI, in consultation with the RIAs, shall provide to DND a list of Inuit firms that have declared themselves able to perform work under the Monitoring Contract, listed according to the categories of contracting opportunities identified under Section 5.4.

5.6 NTI shall request Inuit firms to provide corporate resumes to their RIAs that shall include information on relevant capacity and work experience. NTI shall deal with all information provided to it under this section as strictly confidential. DND shall treat all information provided to it by NTI under this section as commercial confidential information. DND shall not release such information unless prior approval is received from the Inuit firm, or DND is required to release such information under the provisions of the *Access to Information Act* and/or the *Privacy Act.*

5.7 Within one month of receipt of the list of Inuit firms required under Section 5.5, the Contracting Working Group shall recommend the MICC for a Monitoring Contract to the Steering Committee. This recommendation shall take into account the following factors:

a) Inuit firms' capacities;

b) historical data from prior Monitoring Contracts in Nunavut;

c) Site-specific characteristics; and

d) impact of other projects on the availability of Inuit firms.

5.8 In the event that the Contracting Working Group is unable to reach agreement on the MICC, as provided in Section 5.7, either Party may refer the matter to the Steering Committee.

5.9 The Steering Committee shall meet as soon as practicable following a recommendation under Section 5.7 or a referral under Section 5.8 and shall decide on the MICC no later than 4 months prior to the start date of the work under a Monitoring Contract.

5.10 The MICC resulting from a decision of the Steering Committee shall be the MICC required under Section 5.1.

5.11 The form used to provide the information required under Section 5.4 might be modified upon the agreement of all members of the Contracting Working Group.

5.12 If intensification of the monitoring program for a Site is required, as provided for under Section 5.0, Appendix H of the NTI-DND Environmental Agreement, and this intensified program is carried out under the existing monitoring contract for the Site, the MICC established for the monitoring contract shall apply to the intensified monitoring program.

5.13 If intensification of the monitoring program for a Site is required, as provided for under Section 5.0, Appendix H of the NTI-DND Environmental Agreement, and this intensified program is carried out under a new contract issued by DND's contracting agent, a MICC shall be established for the contracting of the additional monitoring program requirements according to the procedures laid out in this Agreement.

5.14 If remedial action to address a problem at a Site is required, as provided for under Section 5.0, Appendix H of the NTI-DND Environmental Agreement, a MICC shall be established for the contracting of the remedial action according to the procedures laid out in this Agreement. In case of an emergency, DND and NTI shall make every effort to establish a MICC within reasonable timelines to allow a quick remedial action.

6.0 CONTRACTOR'S INUIT PARTICIPATION PLAN

6.1 DND shall require all companies that submit a bid on a Monitoring Contract to provide a Contractor's Inuit Participation Plan (CIPP) that shall include:

a) a description of how the company intends to achieve the MIEC for the Monitoring Contract, including the number, percentage and types of positions that the company proposes to fill with Inuit, in relation to the total number of positions, and the number and percentage of person-hours proposed for these positions in relation to total person-hours;

b) a description of how the company intends to achieve the MICC for the Monitoring Contract, including, where possible the names, address and particulars of any actual or proposed Subcontractors; and documentation evidencing contracting arrangements with Subcontractors or the intention to enter into subcontracts with Inuit Subcontractors;

c) the CIPP will provide the information identified in subsections (a) and (b) above broken down on an annual basis over the life of the contract and also broken out into two categories – fieldwork and office/lab work.

6.2 DND shall require all companies that submit a bid on a Monitoring Contract to submit their CIPP in a separate envelope from their tender bid, to DND's contracting agent prior to the closing of bids.

6.3 For all bids for a Monitoring Contract for a site, DND or its contracting agent shall:

a) advise bidders that the envelope containing the CIPP shall be opened first; and

b) advise bidders that bids shall be opened only if the CIPP complies fully with the requirements contained in Section 6.1.

6.4 DND shall inform NTI of the proposed date for initiating the solicitation for the Monitoring Contract. NTI, through the RIAs, shall ensure that the following information is provided to DND's contracting agent three months prior to the date of the Contract solicitation:

a) information regarding Inuit who have indicated their interest in employment in monitoring activities, including information regarding their work experience and qualifications; and

b) information regarding Inuit firms which have indicated an interest in subcontracts for the work.

6.5 DND's contracting agent shall make the information provided to it under Section 6.4 available to bidders for use by them in the preparation of bids and in finding suitable Inuit labour and subcontractors.

7.0 SELECTION PROCESS FOR CONTRACTOR

7.1 Tender and Contract Documents

7.1.1 In all tender documents issued to companies that submit a bid on a Monitoring Contract, DND's contracting agent shall identify the following as criteria that a Contractor must comply with in a bid:

a) Minimum Inuit Employment Content (MIEC) for the Monitoring Contract established in accordance with Section 4.1;

b) Minimum Inuit Content for Contracting (MICC) for the Monitoring Contract established in accordance with Section 5.1; and

c) Submission of a Contractor's Inuit Participation Plan (CIPP) that fully complies with Section 6.1.

7.1.2 DND's contracting agent shall provide a copy of this Agreement in all tender documents issued to companies that submit a bid on a Monitoring Contract and shall advise such companies in the tender documents that compliance with the provisions of this Agreement by the Contractor and its Subcontractors is mandatory.

7.1.3 DND's contracting agent shall include as a term in all Monitoring Contracts that the Contractor will comply with this Agreement and a term that the Contractor will ensure that any Subcontractors will be bound by and comply with this Agreement, where applicable.

7.2 Selection Process

7.2.1 The process for the selection of the Contractor shall follow the Treasury Board of Canada Contracting Policy, along with the following specific procedures, whereby DND's contracting agent shall:

a) open the envelopes containing the bidder's CIPP before opening any other part of any bid;

b) with respect to each bidder's CIPP, make a determination as to whether the CIPP meets the criteria set forth in Subsections 6.1 (a) to (c), and open only those bids that in DND's contracting agent's determination meet those criteria;

c) if DND's contracting agent determines that none of the bids meets the criteria set forth in Subsections 6.1 (a) to (c), refer the matter to the Steering Committee, which shall determine if the MIEC and/or MICC should be revised;

d) identify the lowest priced of the bids opened under Subsection b) and determine whether the price is acceptable to DND; and

e) if the bid meets the criteria set forth in Subsections 6.1 (a) to (c) and the price is acceptable to DND, issue a contract, otherwise a contract shall not be awarded.

7.2.2 Monitoring Contracts issued by DND's contracting agent shall have duration of not more than five years. The maximum length of the contracts issued by DND's contracting agent may be lengthened by the Steering Committee with due regard to the objectives of the NTI-DND Environmental Agreement and the NTI-DND Economic Agreement.

7.2.3 DND's contracting agent shall provide the Steering Committee with a copy of the CIPP within fifteen (15) days of the Monitoring Contract Award. DND's contracting agent shall not release commercial confidential

information to the Steering Committee without written permission from the Contractor.

7.2.4 Contracting opportunities for Monitoring Contracts will be posted in northern newspapers in advance of bid solicitation, and notice will be sent by mail or fax to firms on the Inuit Firm Registry that have declared experience in environmental and geotechnical monitoring. The list of the firms receiving this information will be reviewed, in advance, by NTI.

8.0 SELECTION PROCESS FOR INUIT SUBCONTRACTORS

8.1 DND's contracting agent shall require Contractors, or any Subcontractors, in subcontracting work under a Monitoring Contract, to invite Inuit firms listed in the Registry that may be capable of performing the proposed subcontracting work, to bid on the proposed subcontracting work.

8.2 DND and its contracting agent and Contractors shall be held blameless if Inuit firms that do not appear in the Registry are not solicited under Section 8.1.

8.3 Nothing in Section 8.1 shall prevent a Contractor or Subcontractor from seeking bids from firms not listed in the Registry.

8.4 All contract documents issued by DND's contracting agent shall require Contractors and Subcontractors, in subcontracting work under a Monitoring Contract, to:

a) include in bid invitations only employment and skills requirements that are essential to the monitoring of a Site;

b) provide Inuit firms with a minimum of 15 days to respond to a bid invitation, but in no event shall an Inuit firm have less time to respond than firms not listed in the Registry; and

c) enter into a contract with an Inuit firm if that Inuit firm's bid meets the Contractor's or Subcontractor's requirements, including such criteria as technical compliance and price, if the Contractor or Subcontractor enters into a subcontract for the Work.

8.5 All contract documents issued by DND's contracting agent shall require Contractors and Subcontractors, in subcontracting Work under a Monitoring Contract, to take the following steps in the event that they reject a bid from an Inuit firm on grounds that it contains minor variances which cause it to be considered not technically compliant or not competitive:

a) provide the Inuit firm that submitted the bid with a written statement of the variances and the grounds for rejection;

b) provide the Inuit firm that submitted the bid the opportunity to revise its bid to address the stated variances and submit another bid within 7 calendar days of the date on which it was notified that the bid was rejected; and

c) enter into a subcontract with the Inuit firm if the new bid meets the Contractor's or Subcontractor's requirements and is less than or equal to the lowest priced bid from non Inuit firms which meet the Contractor's or Subcontractor's requirements; otherwise the contract may be awarded to a firm not listed in the Registry.

8.6 DND's contracting agent shall, where a bid has been rejected under Section 8.5, require the Contractor or Subcontractor, upon receiving a request in writing, to provide the Inuit firm within thirty (30) calendar days with written reasons why the bid was rejected. Subject to the approval of the Inuit firm, a copy of the reasons shall also be provided to NTI.

9.0 TRAINING

9.1 The NTI training plan, prepared by NTI in accordance with Section 10.0 of the NTI-DND Economic Agreement, shall include an analysis of training needs and resources, and a detailed plan and schedule for design, delivery and evaluation of training courses necessary to build the capacity of Inuit to participate in Monitoring Contracts and to achieve representative levels of Inuit employment.

10.0 REPORTING

10.1 DND shall provide to NTI, by March of each year that this Agreement is in effect, a report covering annual and cumulative results by type and level of employment, for each Monitoring Contract, including:

a) the total number of person-hours worked by all employees;

b) the total number of person-hours worked by Inuit employees;

c) the percentage of total person-hours worked by Inuit; and

d) a list of all contracts for goods, services and labour awarded to Inuit firms and to non-Inuit firms during the year and the dollar value of each of those contracts.

11.0 ENFORCEMENT

11.1 In accordance with the CIPP for the Monitoring Contract, DND's contracting agent will require the Contractor to confirm in a report that the MIEC and MICC planned in the approved CIPP will be achieved for each stage (i.e. field work and office/laboratory work) prior to commencing work on that phase of the Contract.

11.2 DND shall advise NTI within five (5) business days of any deviations by the Contractor below the required levels of MIEC and MICC in the approved CIPP for the contract. Either Party may request a meeting of the Steering Committee following such a report.

11.3 If the Contractor is unable to meet the CIPP for that phase of the Work under the Contract, the Steering Committee, within one week of receiving notice by DND's contracting agent, shall convene to make a determination as to whether the Contractor is using its best efforts to comply with the MIEC or MICC. The Contractor shall then be required to demonstrate to the satisfaction of the Steering Committee that it has made best efforts to comply with the MIEC or MICC, and that fault for the failure to comply with the MIEC or MICC cannot reasonably be placed on the Contractor.

11.4 Where the Steering Committee in a determination made under Section 11.3 that fault can reasonably be placed on the Contractor for this failure, the Steering Committee shall so advise DND's contracting agent of their determination. The Steering Committee may make recommendations on remedial measures to be applied, and DND's contracting agent may, after considering any recommendations by the Steering Committee, apply remedial measures at its sole discretion. DND's contracting agent shall report to the Steering Committee as soon as practicable on the results of the remedial measures applied. Remedial measures shall, to the extent possible, be designed to correct the Contractor's failure to achieve the MICC and/or MIEC, and to provide a disincentive for future failures. DND's contracting agent shall consider the following measures and inform the Steering Committee of the actions taken. Measures may include:

a) requiring the Contractor to undertake additional measures to achieve the MIEC or MICC for the Monitoring Contract;

b) providing the Contractor with information about specific Inuit or Inuit firms who are known to be available and qualified for employment by the Contractor, and advising the Contractor that further enforcement steps may be taken if the MIEC or MICC are not met;

c) withholding progress payments;

d) issuing a stop work order;

e) charging the Contractor for damages related to a stop work order; or

f) terminating the Contract.

11.5 Where the Steering Committee determines that the Contractor made best efforts to achieve the MIEC and MICC through its currently approved CIPP, and that fault cannot reasonably be placed on the Contractor for failing to meet the MIEC or MICC, the Steering Committee shall adjust the MIEC or

MICC.

11.6 Following an adjustment to the MIEC or MICC under Section 11.5, DND's contracting agent shall thereafter continue to monitor and report on the Contractor's performance as provided for in Section 10.1.

12.0 Incorporation of Sections from the NTI-DND Economic Agreement

12.1 Section 13.0 and Sections 15.0 through 24.0 of the NTI-DND Economic Agreement are incorporated by reference here and apply to this Agreement to the same extent as if fully set forth herein.

IN WITNESS HEREOF, the Parties have executed this Agreement

NUNAVUT TUNNGAVIK INCORPORATED

First Vice President

This 11th day of Oct. 2005

DEPARTMENT OF NATIONAL DEFENCE

Assistant Deputy Minister
(Infrastructure and Environment)

This 12 day of August, 2005

ANNEX A: REPORTS

A.1 Format for DND Work Force Estimate (Section 4.5)

Site: Region:								
Occupational Group	**Projected Personnel Requirements**							
	Year 1		**Year 2**		**Year 3**		**Contract Total**	
	Positions	PersonHours	Positions	PersonHours	Positions	PersonHours	Positions	PersonHours
Project Manager								
Project Coordinator/engineering								
Geotechnical Engineer								
Environmental Technician								
Environmental Assistant								
Survey Technician								
Drafting								
Bear Monitor								
Other								
Other								
Total:								

Note: The specific Representative Occupational Groupings included in this form may be changed, under Section 4.12, by mutual consent of the Contracting Working Group to reflect variations among Sites. DND's work force estimate may include additional categories of work not listed, as required.

A.2 Format for NTI Inuit Labour Projection (Section 4.6)

Site: Region:														
Positions Identified	**Projected Personnel Requirements (person hours)**							**Projected Inuit Employment (person hours)**						
	Year 1		**Year 2**		**Year 3**		**Overall**	**Year 1**		**Year 2**		**Year 3**		**Overall**
	Pos.	**Person Hours**	**Pos.**	**Person Hours**	**Pos.**	**Person Hours**	**Person Hours**	**Pos.**	**Person Hours**	**Pos.**	**Person Hours**	**Pos.**	**Person Hours**	**Person Hours**
Project Manager														
Project Coordinator/engineering														
Geotechnical Engineer														
Environmental Technician														
Environmental Assistant														
Survey Technician														
Drafting														
Bear Monitor														
Other														
Other														
Total Positions														
Projected Inuit Employment									%		%		%	%

Note: The specific Representative Occupational Groupings included in this form may be changed, under Section 4.12, by mutual consent of the Contracting Working Group to reflect variations among Sites.

A.3 DND: Analysis of Contracting Opportunities (Section 5.4)

Site: Region:	
Description	***% of Total Contract Disbursements***
Contract Disbursements (not including personnel)	
Camp Costs (including mobilization and demobilization)	%
Commercial Accommodations	%
Commercial Travel Costs	%
Charter Aircraft Costs	%
Quad and Equipment Rentals	%
Laboratory Costs	
Miscellaneous Costs	%
Other	%
Total	**100%**

Note: The specific Contracting Opportunities included in this form may be changed, under Section 5.12, by mutual consent of the Contracting Working Group to reflect variations among Sites. DND's analysis of contracting opportunities may include other contracting opportunities not listed, as required.