Defence Construction Canada

# Water Use License Amendment and Renewal PIN-2, Cape Young Landfill Monitoring

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**Statement of Qualifications and Limitations**



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# 1. Post Construction Monitoring Program

## 1.1 Introduction

PIN-2, Cape Young, is located on the mainland of Nunavut along the coast of Dolphin and Union Strait, approximately 150 kilometres (km) north of Kugluktuk (formerly Coppermine). The nearest community with an aircraft charter base and a full range of commercial and public services is Cambridge Bay, 465 km to the east. For ease of discussion, the overall site has been broken into three areas: the Station Area, encompassing the majority of the former site infrastructure, including the airstrip and several landfills; the Beach Area, on the shore of Dolphin and Union Strait; and the Station South Area, which includes two landfills, located south of the intersection of the main station access road and the Harding River Road.

## 1.2 Background

PIN-2 was an auxiliary site within the original DEW Line system. The station was constructed in the 1950s as part of the Distant Early Warning (DEW) Line and operated until the early 1990s when the DEW Line system was replaced by the more modern North Warning System (NWS). The PIN-2 DEW Line station was decommissioned in the summer of 1993. A NWS short range radar (SRR) site was established approximately 8 km southwest of the DEW Line site.

Site investigations were completed at PIN-2 in 1990, 1992, 1993, and 2004 as part of an assessment of the environmental status of DEW Line installations. The engineering component of the assessment was completed by AECOM and the environmental component by the Environmental Sciences Group (ESG). Input on traditional land use was provided by Nunavut Tunngavik Incorporated (NTI). Design requirements for landfill closure were based on the geophysical and geotechnical investigations completed by AECOM and EBA Engineering Consultants Ltd. (EBA), and the environmental data provided by ESG.

The cleanup at PIN-2 included the closure and remediation of the existing landfills. A new landfill for the disposal of non-hazardous wastes generated from demolition and collection of site debris was constructed, as well as a new DCC Tier II Disposal Facility that was constructed for disposal of Tier II contaminated soil. The existing and new landfills, as shown on the overall site plan, Figure PIN-2.1, include:

- Airstrip Landfill
- USAF Landfill
- Station West Landfill
- Tier II Disposal Facility
- Airstrip South Landfill
- Pallet Line West Landfill
- Non-Hazardous Waste Landfill
- South Landfill-East
- South Borrow Landfill

In accordance with the NTI-DND Cooperation Agreement, landfill monitoring is carried out following cleanup of the site. The landfills where monitoring is required are listed above and identified in Figure PIN-2.1, and are described in further detail below. The monitoring schedule for the PIN-2 site is provided in Table 1.1.

**Table 1.1: Monitoring Schedule – PIN-2 Cape Young**

| No. Of Years After Construction | Monitoring Event Number | Year |
|---|---|---|
| ***Prior to and during** | ***Baseline** | ***1990, 1992, 1993, 2004 & 2009-2011** |
| ***1** | ***1** | ***2012** |
| 2 | 2 | 2013 |
| 3 | 3 | 2014 |
| 4 | 4 | 2015 |
| 5 | 5 | 2016 |
| 7 | 6 | 2018 |
| 10 | 7 | 2021 |
| 15 | 8 | 2026 |
| 25 | 9 | 2036 |

* Monitoring events completed by DEW Line Clean-up project team

The Department of National Defence (DND), in cooperation with Nunavut Tunngavik Incorporated (NTI), developed a landfill monitoring plan to address post closure monitoring requirements for the landfills at the DEW Line Sites (Appendix B). Defence Construction Canada (DCC) is managing the cleanup and monitoring programs on behalf of DND.

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 and thermal monitoring of landfills at the DEW Line sites under DND's jurisdiction.

## 1.3 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. The general components of the landfill monitoring program at PIN-2 include:

- Visual inspection
- Surface and shallow depth soil sampling and analyses
- Groundwater sampling and analyses
- Ground temperature monitoring

The requirements for landfill monitoring, as outlined in Environmental Provisions of the NTI-DND Agreement, are summarized in Table 1.2. Detailed landfill monitoring requirements are described in the Landfill Monitoring Plan - Part B - Nunavut Settlement Region.

**Table 1.2: General Landfill Monitoring Requirements**

| Landfill Classification | Visual Inspection | Groundwater Sampling | Soil Sampling | Thermal Monitoring |
|---|---|---|---|---|
| Existing Landfill, High Potential Environmental Risk (Class A) | Not required, as landfill to be excavated. | | | |

| Landfill Classification | Visual Inspection | Groundwater Sampling | Soil Sampling | Thermal Monitoring |
|---|---|---|---|---|
| Existing Landfills, Moderate Potential Environmental Risk (Class B) | √ | √ | √ | √ |
| Existing Landfills, Low Potential Environmental Risk (Class C) | √ | | √ | |
| New Landfill, Non-Hazardous Waste Landfill | √ | √ | √ | |
| New Landfill, Tier II Disposal Facility | √ | √ | √ | √ |

A summary of these requirements, as related to the specific landfills at PIN-2, is provided in Table 1.3. The rationale for the monitoring requirement is provided in the landfill-specific sections.

**Table 1.3: PIN-2 Cape Young Landfill Monitoring Requirements**

| Landfill Designation | Visual Inspection | Groundwater Sampling | Soil Sampling | Thermal Monitoring |
|---|---|---|---|---|
| Airstrip Landfill | √ | | √ | |
| USAF Landfill | √ | | √ | |
| Station West Landfill | √ | | √ | |
| Tier II Disposal Facility | √ | √ | √ | √ |
| Airstrip South Landfill | √ | | √ | |
| Pallet Line West Landfill | √ | | √ | |
| Non-Hazardous Waste Landfill | √ | √ | √ | |
| South Landfill-East | √ | | √ | |
| South Borrow Landfill | √ | | √ | |

### 1.3.1 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. Documented observations include evidence of settlement, ponding, frost action, erosion, and lateral movement, as well as sloughing of berms, and thermal contraction cracks. Documentation of observations is supported using hand drawn sketches, as applicable. Photographic Records are provided to document the general condition of the landfill and to substantiate all recorded observations.

### 1.3.2 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 2004.

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 background values to evaluate any potential changes in environmental conditions.

As part of the baseline sampling program, soil samples are collected in areas up-gradient and down-gradient of each landfill. Up-gradient samples are targeted to areas near the landfill, but not influenced by migration of contaminants through the landfill. Up-gradient samples are meant to be representative of contaminant input conditions to the landfill and serve as the primary basis upon which to compare the down-gradient contaminant concentrations.

Down-gradient 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, either historically or recently, 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. The soil, thus, retains information regarding the historical input of contaminants.

Analytical results of soil samples collected down-gradient of a landfill are compared to contaminant concentrations of samples collected up-gradient. Down-gradient samples are also compared to overall site background contaminant levels because they help in establishing a more broad level of naturally occurring contaminant concentrations that can be found at the site, particularly where different soil or rock types are present. Contaminant concentrations in down-gradient samples that are significantly higher than background or up-gradient concentrations, particularly where there have been changes over time; provide evidence of contaminants having migrated to, and 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, zinc, and mercury
- PCBs (polychlorinated biphenyls – Total Aroclors)
- TPH (Total Petroleum Hydrocarbons) – as represented by the sum of F1 (nC6 to nC10), F2 (nC10 to nC16), and F3 (nC16 to nC34), as defined by the CCME Tier I Method – Rev 5, Analyses of Total Petroleum Hydrocarbons in soil

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. Analytical results are presented under the discussion for each landfill.

To provide a basis for evaluation with subsequent monitoring analytical results, simple statistical analyses were carried out to determine the arithmetic mean, standard deviation and 95% confidence interval for each inorganic parameter analyzed. In general, for samples in which the concentration was less than the MDL, one-half of the MDL was used in the statistical analyses. However, in cases where the majority of the analytical results fell below the MDL, the arithmetic mean is represented as less than the MDL. In cases where the contaminant was not detected, the chemical baseline is typically represented as a range over the different MDLs.

### 1.3.3 Groundwater Monitoring

During the construction phase, groundwater monitoring wells are installed at all existing landfills classified as moderate environmental risk (Class B landfills) and new landfills. No existing landfills at PIN-2 had monitoring wells installed, but wells were installed at the two new landfills constructed; the Non-Hazardous Waste Landfill, and the Tier II Disposal Facility. Surface and shallow depth soil samples are also collected adjacent to monitoring well locations. Analytical data from water samples collected from wells up and down-gradient are reviewed in conjunction with soil analytical data to evaluate potential impacts associated with the landfill. Baseline groundwater data exists from the site investigation at temporary wells, as well as the site clean-up period.

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

- Water elevation
- Total depth of water
- Height of well stick-up
- Depth to bottom of well
- Presence of hydrocarbons
- Hydrocarbon thickness (if appropriate)

Prior to sampling, monitoring wells are purged until groundwater parameters such as pH, temperature and conductivity stabilize. In the event of low recharge volumes, standing water may be sampled and specifically documented. Water samples are not filtered.

Following withdrawal of a water sample, other physical measurements recorded include:

- Colour, odour
- pH, conductivity, and temperature
- Groundwater samples are analyzed for the following parameters:
- Inorganic elements (total concentrations): arsenic, cadmium, chromium, cobalt, copper, lead, nickel, zinc, and mercury
- PCBs (polychlorinated biphenyls – total Aroclor)
- TPH (Total Petroleum Hydrocarbons) – C6 to C32

### 1.3.4 Thermal Monitoring

For Class B landfills and Tier II Disposal Facility where a component of the design includes the placement of sufficient fill to promote aggradation of permafrost through the landfill contents, geothermal modeling is conducted to determine the maximum depth of active layer at the landfill, and the amount of fill required on the landfill surface to avoid active layer penetration into the landfill contents following remediation. Geothermal modelling considers soil type, soil thermal properties, presence or absence of insulating cover (vegetation or snow drift), measured ground temperatures at the site or at nearby sites, measured air temperature and climatic data (1956 to 1990 climate normals data from Environment Canada for Cape Young, Nunavut), an estimated 1 in 100 warm year air temperature, an estimated ten consecutive 1 in 100 warm years, and an estimate of the effect of global warming (based on estimates of temperature change reported by the Panel on Energy Research and Development for Environment Canada – PERD – in 1998). At PIN-2, a typical active layer depth based on ten consecutive mean years of climatic data is 2.2 m for the Tier II Soil Disposal Facility. The predicted active layer depth for a 1 in 100 warm year

following ten mean years is 2.6 m and for ten consecutive 1 in 100 warm years is 2.8 m. The predictive active layer depth for the landfill after 100 years of global warming (using the best estimate approximation method as opposed to more conservative estimates) is 2.7 m. The active layer depth used for the Tier II Disposal Facility at PIN-2 is the resultant active layer depth from modeling 100 years of global warming plus one 1:100 warm year – a depth of 4.0 m. It is expected to take one year for the landfill contents to freeze back with this depth of cover fill.

During landfill construction, vertical thermistors were installed within the landfill to record ground temperatures. Measured ground temperatures will be compared to the active layer depth and freeze back time modeled during design. It is anticipated that all landfills where freeze back is an integral part of the design will reach thermal equilibrium within approximately five years following closure. If thermal equilibrium is not achieved within five years, it may be necessary to increase the term of the thermal monitoring.

## 1.4 Frequency

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

### 1.4.1 Phase I

Phase I involves monitoring of conditions to confirm that equilibrium is achieved. The frequency of monitoring events during Phase I 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 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 is 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, who successfully win the competitive tender.

### 1.4.2 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.

### 1.4.3 Phase III

Phase III involves the monitoring for long-term 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.

## 1.5 Review and Evaluation Process

An Environmental Working Group (EWG) was established to provide a technical report and to support the DLCU Steering Committee. This working group is comprised of qualified engineering and environmental

scientists with expertise in environmental remediation and clean up in northern climates. The EWG has four designated representatives, two from each of the Owner (DND) and the Inuit (through the NTI), respectively.

During the monitoring program, the EWG reviews the results of the monitoring program in accordance with the methodology as described previously. The results of the review and any recommendations regarding changes to the monitoring plan and/or remediation requirements are reported to the DND/NTI Steering Committee.

The requirement for further monitoring after 25 years is 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 is carried out jointly by the NTI and DND.

# 2. Detailed Landfill Monitoring Requirements

Site figures documenting the monitoring locations at each landfill are provided in Appendix A. The rationale for the monitoring requirements is provided in the landfill-specific sections. Table 3.1 provides the monitoring to be completed at each landfill and Table 3.2 provides the location of each landfill monitoring location at PIN-2.

**Table 2.1 – PIN-2 Landfill Monitoring Requirements**

| Landfill Designation | Visual Inspection | Groundwater Sampling | Soil Sampling | Thermal Monitoring |
|---|---|---|---|---|
| Airstrip Landfill | √ | | √ | |
| USAF Landfill | √ | | √ | |
| Station West Landfill | √ | | √ | |
| Tier II Disposal Facility | √ | √ | √ | √ |
| Airstrip South Landfill | √ | | √ | |
| Pallet Line West Landfill | √ | | √ | |
| Non-Hazardous Waste Landfill | √ | √ | √ | |
| South Landfill-East | √ | | √ | |
| South Borrow Landfill | √ | | √ | |

**Table 2.2: Summary of Landfill Monitoring Installations/Sampling Locations PIN-2 Cape Young**

| | UTM Coordinates | | Elevation |
|---|---|---|---|
| **Landfill Designation/Monitoring Locations** | **North (m)** | **East (m)** | **(m.a.s.l.)** |
| **Airstrip Landfill** | | | |
| P2-21 (soil) | 7647259.4 | 502522.7 | - |
| P2-22 (soil) | 7647374.4 | 502534.4 | - |
| P2-23 (soil) | 7647376.1 | 502589.0 | - |
| P2-24 (soil) | 7647401.3 | 502630.7 | - |
| P2-25 (soil) | 7647373.2 | 502649.0 | - |
| P2-26 (soil) | 7647317.2 | 502639.7 | - |
| **USAF Landfill** | | | |
| P2-1 (soil) | 7646958.9 | 502197.6 | - |
| P2-2 (soil) | 7646923.4 | 502248.7 | - |
| P2-3 (soil) | 7646867.2 | 502251.9 | - |
| P2-4 (soil) | 7646896.5 | 502197.3 | - |
| **Station West Landfill** | | | |
| P2-5 (soil) | 7646879.8 | 502095.4 | - |
| P2-6 (soil) | 7646789.2 | 502096.1 | - |

| | UTM Coordinates | | Elevation |
|---|---|---|---|
| **Landfill Designation/Monitoring Locations** | **North (m)** | **East (m)** | **(m.a.s.l.)** |
| P2-7 (soil) | 7646762.2 | 502149.3 | - |
| P2-8 (soil) | 7646799.9 | 502200.8 | - |
| **Tier II Disposal Facility** | | | |
| MW-01 (soil and groundwater) | 7646319.6 | 502402.9 | 11.8 |
| MW-02 (soil and groundwater) | 7646239.7 | 502421.9 | 11.5 |
| MW-03 (soil and groundwater) | 7646236.8 | 502497.9 | 12.6 |
| MW-04 (soil and groundwater) | 7646319.8 | 502549.3 | 13.4 |
| VT-1 (temperature) | 7646281.0 | 502434.2 | 19.1 |
| VT-2 (temperature) | 7646274.2 | 502465.0 | 19.2 |
| VT-3 (temperature) | 7646307.5 | 502460.3 | 20.0 |
| VT-4 (temperature) | 7646284.2 | 502497.4 | 19.9 |
| **Airstrip South Landfill** | | | |
| P2-13 (soil) | 7646266.2 | 503171.4 | - |
| P2-14 (soil) | 7646247.1 | 503238.0 | - |
| P2-15 (soil) | 7646292.9 | 503248.6 | - |
| P2-16 (soil) | 7646337.3 | 503220.9 | - |
| **Pallet Line West Landfill** | | | |
| P2-9 (soil) | 7645741.6 | 502570.5 | - |
| P2-10 (soil) | 7645790.2 | 502630.3 | - |
| P2-11 (soil) | 7645843.2 | 502590.0 | - |
| P2-12 (soil) | 7645861.2 | 502537.2 | - |
| **Non-Hazardous Waste Landfill** | | | |
| MW-05 (soil and groundwater) | 7645229.3 | 503029.4 | 20.6 |
| MW-06 (soil and groundwater) | 7645297.0 | 503054.2 | 21.8 |
| MW-07 (soil and groundwater) | 7645272.0 | 503102.0 | 21.8 |
| MW-08 (soil and groundwater) | 7645223.0 | 503076.6 | 20.5 |
| **South Landfill – East** | | | |
| P2-17 (soil) | 7645060.0 | 503404.5 | - |
| P2-18 (soil) | 7645111.0 | 503473.2 | - |
| P2-19 (soil) | 7645086.7 | 503533.0 | - |
| P2-20 (soil) | 7645058.1 | 503557.1 | - |
| **South Borrow Landfill** | | | |
| P2-27 (soil) | 7643445.0 | 503881.5 | - |

| Landfill Designation/Monitoring Locations | UTM Coordinates | | Elevation |
|---|---|---|---|
| | North (m) | East (m) | (m.a.s.l.) |
| P2-28 (soil) | 7643474.1 | 503877.4 | - |
| P2-29 (soil) | 7643506.8 | 503910.6 | - |
| P2-30 (soil) | 7643476.5 | 504053.7 | - |

## 2.1 Airstrip Landfill

The Airstrip Landfill is located 600 m north of the station on the northwest side of the airstrip. It consists of two lobes, covering an area of approximately 8,800 square metres ($m^2$). The landfill soil is composed primarily of coarse-grained, gravel and cobbles. The material is angular and platy, derived from the limestone and dolomite of a bedrock-controlled ridge. During the assessment, no existing erosion was noted at the landfill.

Scattered surface debris consisting of wood, domestic debris, metal and partially buried barrels was observed at the landfill during assessment. Soil samples collected up- and down-gradient of the landfill during assessment showed slightly elevated inorganic elements. Three areas of soil contamination were identified during the assessment, one Type A area, one Tier I PCB/Type A, and one Tier II area contaminated with copper, lead, and zinc.

Based on an assessment of the Airstrip Landfill as a contaminant source, the potential for migration, and down-gradient receptors, the landfill was classified as a low potential environmental risk. The Tier II contamination was excavated, and the two remaining contaminated areas were included in the regraded areas. All visible debris was removed. The landfill was regraded with 0.6 m of Type 1 granular fill over 0.4 m of Type 2 granular fill.

The long term monitoring plan consists of visual monitoring and collection of soil samples. Approximate locations for the collection of soil samples are identified on Figure PIN-2.2.

## 2.2 USAF Landfill

The USAF Landfill is located approximately 500 m northwest of the main Station Area with a connecting road to the Station Area. The landfill is approximately 1,120 $m^2$, is elevated 0.5 m above the surrounding grade, and was constructed with a liner over the landfill surface during operation and closure. The landfill consists of two cells and is covered with gravel combined with sand. During assessment no surface staining was present, and soil sampling indicated one Tier II arsenic exceedance and one elevated arsenic sample was identified at the landfill. Both arsenic results are considered to be naturally occurring.

Surface runoff potential is low with slight troughs to the northeast and southwest. The surface of the landfill and the immediate surrounding area are relatively flat. Minor surface debris (wood, strapping, electrical plug box) thought to have been entrained in the gravel cover and the geomembrane liner was visible in some locations. The surface debris was removed prior to remediation.

Based on an assessment of the USAF Landfill as a contaminant source, the potential for migration, and down-gradient receptors, the landfill was classified as a low potential environmental risk. Accordingly, surface and partially exposed debris was removed, and the landfill was regraded with 0.75 m of Type 2 granular fill.

The long term monitoring plan consists of visual monitoring and collection of soil samples. Approximate locations for the collection of soil samples are identified on Figure PIN-2.3.

## 2.3 Station West Landfill

The Station West Landfill is located approximately 100 m southwest of the USAF Landfill, and covers an area of 1,050 $m^2$, as identified by geophysical survey. There is a minor trail heading southeast from the landfill, but no road exists that connects the landfill to the Station Area. The landfill consists of four lobes of buried debris with areas of partially exposed debris and some scattered surface debris. Soil staining was not identified at surface and PCB, hydrocarbon and inorganic element levels in down-gradient samples were all comparable to site background levels. Runoff from the landfill surface drains to the west into a low-lying vegetated area at the base of the landfill. The down-gradient vegetation was identified to be approximately 80%. The overall vegetation and habitat use of the area surrounding the landfill was estimated to be moderate.

Based on an assessment of the Station West Landfill as a contaminant source, the potential for migration, and down-gradient receptors, the landfill was classified as a low potential environmental risk. Accordingly, surface and partially exposed debris was removed, and the landfill was regraded with 0.75 m of Type 2 granular fill.

The long term monitoring plan consists of visual monitoring and collection of soil samples. Approximate locations for the collection of soil samples are identified on Figure PIN-2.3.

## 2.4 Tier II Disposal Facility

A Tier II Disposal Facility has been constructed at the PIN-2 site for the disposal of Tier II contaminated soil excavated during the clean-up. The facility is located 300 m southwest of the Station Area.

The Tier II Disposal Facility design is a double containment system. The landfill was constructed with the placement of low-permeability, saturated, compacted berms keyed into frozen/saturated ground below existing ground, the installation of a liner system over the berms and along the landfill base, and the placement of a surface liner system over the landfill contents with the placement of sufficient overlying granular fill to promote freeze back of landfill contents. Four groundwater monitoring wells were installed at the landfill perimeter, and four thermistors were installed within the landfill to monitor ground temperatures.

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. Locations for the collection of soil and groundwater samples and thermistors installations are identified on Figure PIN-2.4.

## 2.5 Airstrip South Landfill

The Airstrip South Landfill is located within a former borrow area southwest of the station and south of the airstrip. A geophysical survey identified an anomaly of buried debris 1,420 $m^2$ in size.

Historically, the ground has been quite wet in August and likely has standing water during spring runoff. The area west and north of the west toe of the landfill is partially vegetated. There was limited buried debris exposure consisting of a drum, wood, copper pipes, and domestic debris. A very small oil stain was noted at the landfill.

Soil sampling during assessment identified one Tier II copper area near a copper pipe on the surface of the landfill. Down-gradient of the landfill, one soil sample exceeded arsenic Tier II criteria. Elevated levels of PCB and TPH were noted down-gradient of the landfill. None of these incidents is thought to be an indicator of contaminant migration from the landfill.

The Airstrip South Landfill is classified as a low potential environmental risk. Contaminant source and pathways components were low due to the restricted potential for contaminant migration and low quantity of debris exposure.

The receptors component was also low, due to low receptor sensitivity proximal to the landfill area. Accordingly, the landfill was remediated by excavating the Tier II soils, removing the surface debris and regrading the landfill with 0.4 m of Type 1 granular fill over 0.4 m of Type 2 granular fill.

The long term monitoring plan will consist of visual monitoring and periodic collection of soil samples. Approximate locations for the collection of soil samples are identified of Figure PIN-2.5.

## 2.6 Pallet Line West Landfill

The Pallet Line West Landfill is located approximately 330 m southwest of the main pallet line for the Station. There is a trail from the southwest corner of the pallet line leading to the area. The pallet line itself is located along the Station Access Road, approximately 350 m south of the Station. The overall area is very cobbly, with shallow bedrock. Vegetation density is low to moderate and locally more developed near the landfill along the southwest perimeter of the area. Surface debris was common throughout the overall area during the assessment, and particularly near each of the landfill lobes.

The site assessment soil sampling identified three Tier II areas and one Tier I lead area and elevated levels of zinc. None of these incidents is thought to be an indicator of contaminant migration from the landfill.

The Pallet Line West Landfill is classified as a low potential environmental risk. Contaminant source was a high potential environmental risk due to presence of contaminated soil and surface debris. The pathways and receptors were low because of low potential for contaminant migration and lack of sensitive receptors nearby. Accordingly, the landfill was remediated by excavating the Tier II soils, removing the surface debris and regrading the landfill with 0.4 m of Type 1 granular fill over 0.4 m of Type 2 granular fill.

The long term monitoring plan will consist of visual monitoring and periodic collection of soil samples. Approximate locations for the collection of soil samples are identified of Figure PIN-2.6.

## 2.7 Non-Hazardous Waste Landfill

The Non-Hazardous Waste Landfill is a new landfill constructed for the disposal of non-hazardous wastes and debris generated and collected during clean-up activities. The landfill is located near the intersection of the main station access road and the Harding River Road.

The design of this landfill includes perimeter berms and placement of a top geomembrane and cover of compacted Type 2 granular fill over the landfilled material. Four groundwater monitoring wells were installed around the perimeter of the landfill.

The long term monitoring plan will consist of visual monitoring and periodic collection of soil and groundwater samples. Approximate locations for the collection of soil and groundwater samples are identified of Figure PIN-2.7.

## 2.8 South Landfill-East

The South Landfill - East is located 1.7 km south-southeast of the main station, 50 m to the east of the Station Access Road, south of the intersection with the Harding River Road. During the assessment, two pieces of partially buried metal debris (one of which appeared to be a culvert) and some wood were noted in the southeastern section of the landfill. No exposed debris was noted in the central portion. Some partially exposed wood, a barrel, cans and metal strapping were observed at the western portion. Scattered surface debris noted in the overall landfill area consists of rusted tin cans, wood, metal strapping, and copper pipe. Surface cover consisted of gravelly sand. The

landfill surface was well vegetated and ground squirrel burrows were common throughout. Soil surrounding the landfill has been largely removed to bedrock. The overall size of the landfill is 1,690 $m^2$.

The landfill evaluation classified the landfill a low potential environmental risk. Contaminant source and pathway components had low quantities of surface debris, no surface contamination, and low potential for contaminant migration away from the landfill. The receptor component was moderately higher because of vegetation density surrounding the landfill area and because of burrowing animals in the vicinity. Remediation of the landfill consisted of removal of the surface debris and covering the landfill with 0.4 m of Type 1 granular fill over 0.4 m of Type 2 granular fill.

The long term monitoring plan consists of visual monitoring and the collection of soil samples. Approximate locations for the collection of soil samples are identified on Figure PIN-2.8.

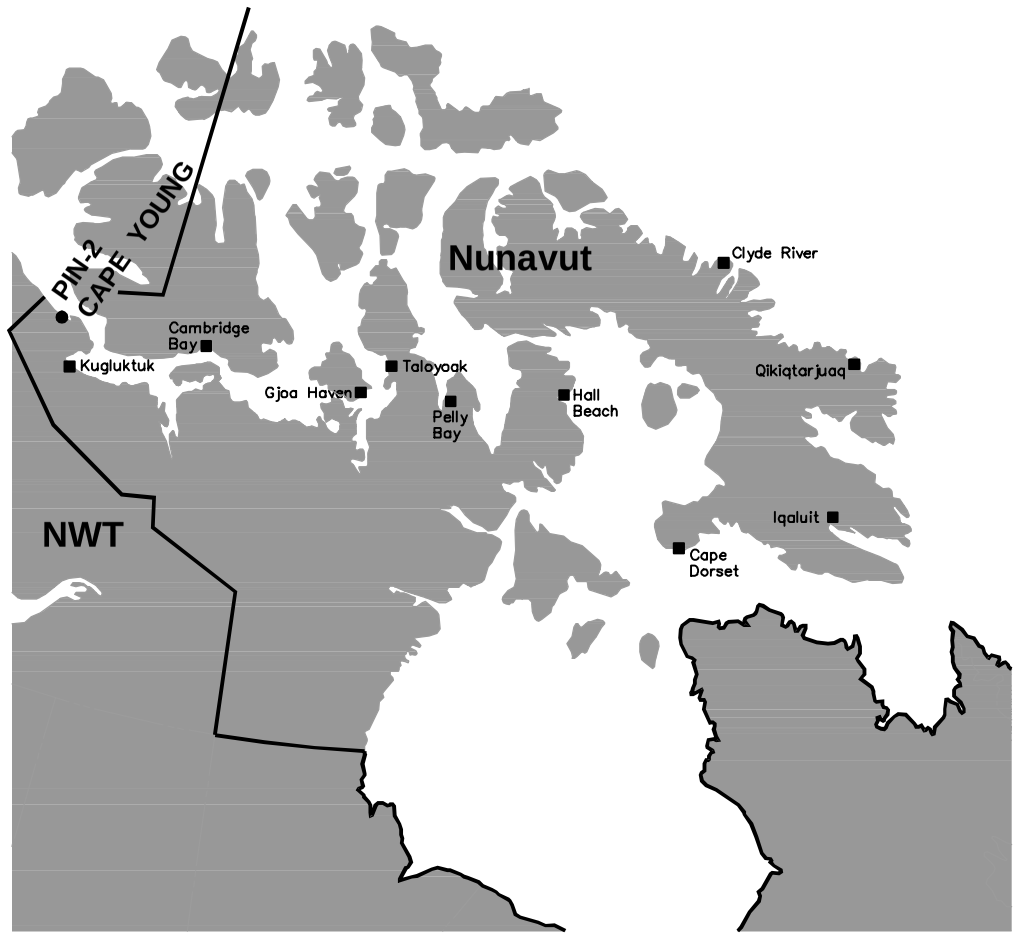
## 2.9 South Borrow Landfill

The South Borrow Landfill is located on the west side of the Station Access Road, at the northern tip of the South Borrow Area. Geophysical survey confirmed the presence of buried debris over an area of 1,060 $m^2$. The tundra down-gradient of the landfill was quite wet, with lush vegetation and a thick organic mat. There was standing water along the toe, particularly at the southwest and northwest corners. Debris exposure along the toe was common, with less exposure moving towards the centre and up-gradient edge.

Concentrations of copper and nickel down-gradient of the South Borrow Landfill were elevated above overall site background concentrations. However, the down-gradient terrain at this landfill is more vegetated and wet compared to other areas on site. A comparison of environmental data from other areas investigated nearby shows similarly elevated levels of copper and nickel. These levels have therefore been considered natural for this specific site area and not indicative of contaminant migration.

The landfill was classified as a low potential environmental risk. The receptor component of the scoring was the most significant because of lush vegetation down-gradient of the landfill. In addition, while the internal project team evaluated the elevated copper and nickel levels as naturally-occurring, the EWG scored the landfills as having evidence of contaminant migration. Based on the evaluation of the landfill as a low potential environmental risk, the landfill was covered with 0.4 m of Type 1 granular fill over 0.4 m of Type 2 granular fill.

The long term monitoring plan consists of visual monitoring and the collection of soil samples. Approximate locations for the collection of soil samples are identified on Figure PIN-2.9.

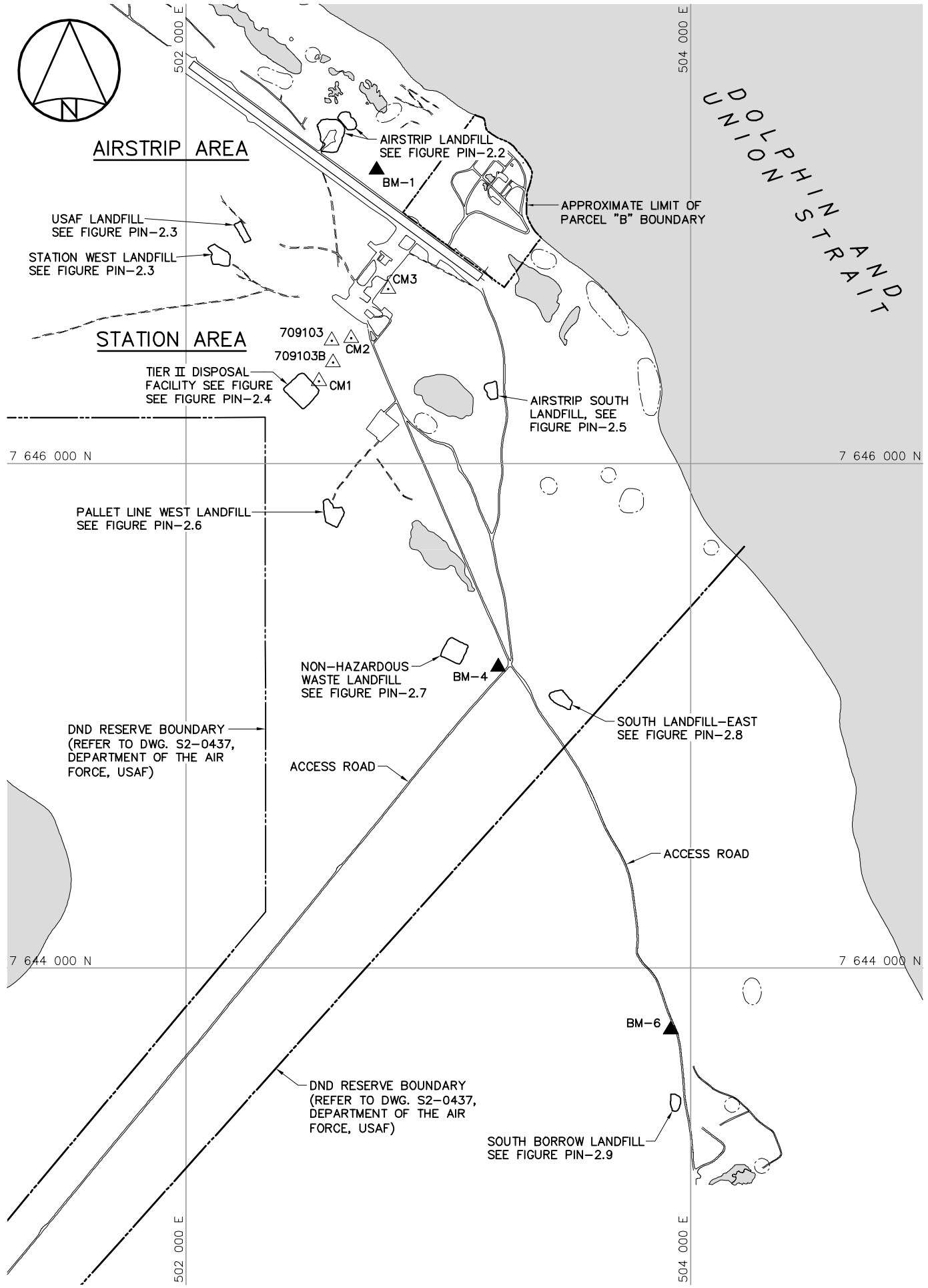



LOCATION OF CAPE YOUNG WITHIN NUNAVUT TERRITORY
SCALE: NTS

| SURVEY CONTROL MONUMENTS | | | | |
|---|---|---|---|---|
| NO. | UTM COORDINATES | | ELEV. | DESCRIPTION |
| | NORTHING | EASTING | | |
| CM1 | 7 646 327.029 | 502 525.754 | 13.804 | PIN-2 BASELINE STA. 0+00 |
| CM2 | 7 646 497.473 | 502 653.662 | 13.993 | PIN-2 BASELINE STA. 7+00 |
| CM3 | 7 646 692.507 | 502 799.974 | 14.534 | PIN-2 BASELINE STA. 15+00 |
| 709103 | 7 646 487.974 | 502 576.191 | 13.790 | GEODETIC BENCHMARK |
| 709103B | 7 646 400.920 | 502 581.212 | 13.954 | GEODETIC BENCHMARK |

NOTE: BASELINE STATIONS SHOWN ARE IN IMPERIAL UNITS.

| PERMANENT BENCHMARK (AS-BUILT) | | | | |
|---|---|---|---|---|
| NO. | UTM COORDINATES | | ELEV. | DESCRIPTION |
| | NORTHING | EASTING | | |
| BM-1 | 7 647 164.203 | 502 754.676 | 14.398 | 25mm DIA. STEEL PIPE |
| BM-4 | 7 645 194.471 | 503 236.108 | 17.189 | 25mm DIA. STEEL PIPE |
| BM-6 | 7 643 756.513 | 503 920.587 | 13.296 | 25mm DIA. STEEL PIPE |




GENERAL NOTES:

1. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 11N. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

- △CM1 — SURVEY CONTROL MONUMENT (5)
- ▲BM-1 — PERMANENT BENCHMARK LOCATION (3)
- ARCHAEOLOGICAL FEATURES
- APPROXIMATE LOCATION OF PROPERTY BOUNDARY
- BODY OF WATER

**RECORD DRAWING**
NOT FOR CONSTRUCTION

0 200 400 m SCALE 1:20000

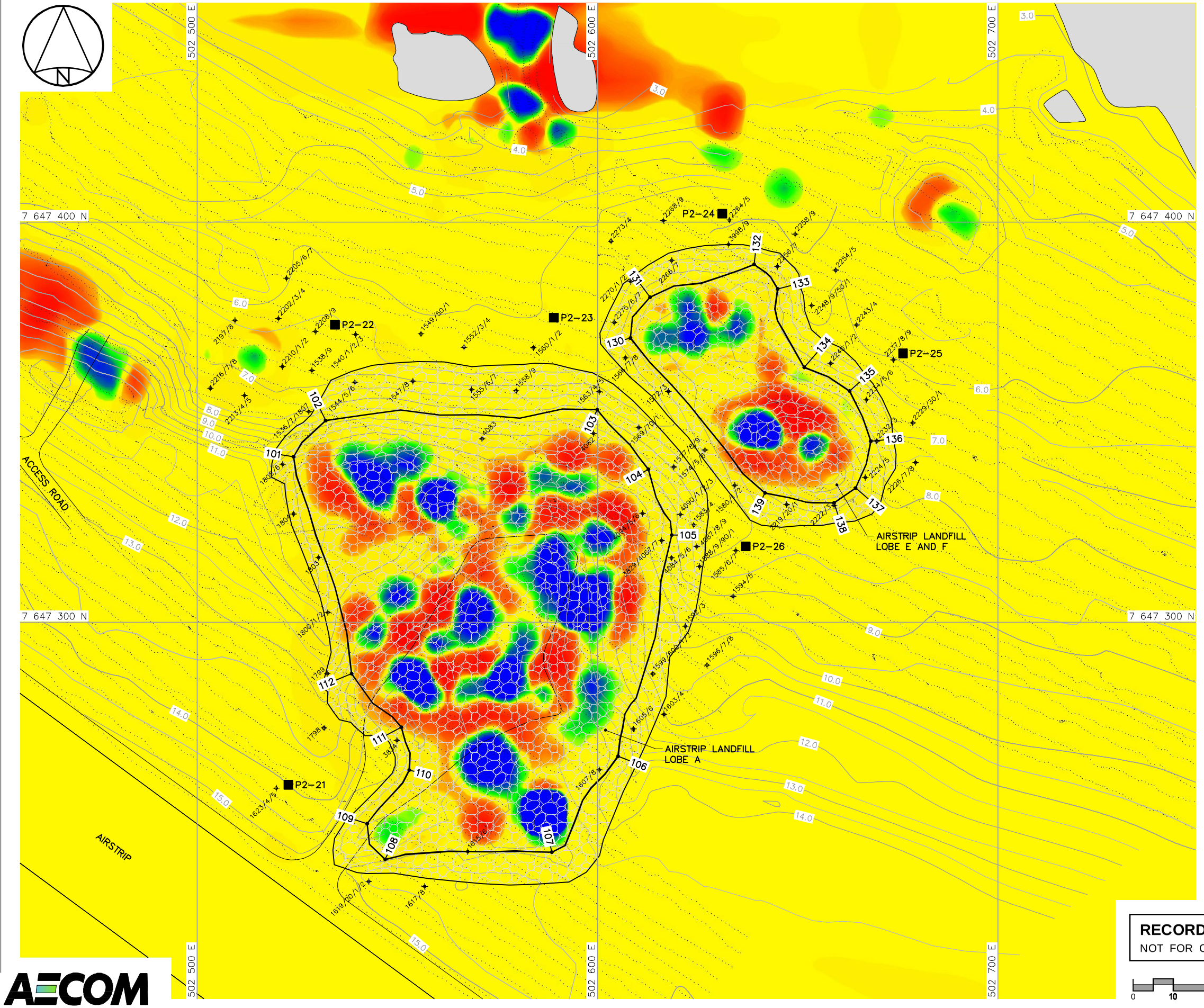
DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

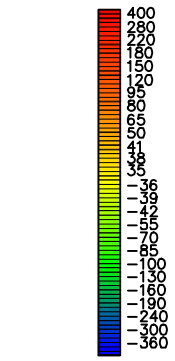
PIN-2 CAPE YOUNG

# LOCATION PLAN

FIGURE PIN-2.1

AECOM




GENERAL NOTES:

1. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 11N. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

- 101 — COORDINATE POINT
- ■ — MONITORING SOIL SAMPLE LOCATION (6)
- 2264 — SOIL SAMPLE TAG LOCATION
- BODY OF WATER

AIRSTRIP LANDFILL (LOBE A) REGRADED (AS-BUILT)

| NO. | UTM COORDINATES | | ELEV. |
|---|---|---|---|
| | NORTHING | EASTING | |
| 101 | 7 647 341.4 | 502 524.0 | 10.4 |
| 102 | 7 647 350.4 | 502 532.0 | 8.7 |
| 103 | 7 647 353.1 | 502 599.9 | 7.9 |
| 104 | 7 647 338.3 | 502 612.6 | 8.8 |
| 105 | 7 647 321.8 | 502 618.5 | 9.1 |
| 106 | 7 647 266.6 | 502 605.1 | 13.9 |
| 107 | 7 647 242.6 | 502 588.5 | 15.1 |
| 108 | 7 647 240.8 | 502 546.9 | 15.1 |
| 109 | 7 647 249.7 | 502 542.4 | 16.0 |
| 110 | 7 647 263.1 | 502 552.9 | 15.8 |
| 111 | 7 647 273.8 | 502 550.9 | 15.8 |
| 112 | 7 647 287.2 | 502 538.5 | 13.9 |

AIRSTRIP LANDFILL (LOBES E & F) REGRADED (AS-BUILT)

| NO. | UTM COORDINATES | | ELEV. |
|---|---|---|---|
| | NORTHING | EASTING | |
| 130 | 7 647 371.1 | 502 608.2 | 7.4 |
| 131 | 7 647 381.2 | 502 613.1 | 7.4 |
| 132 | 7 647 389.5 | 502 639.1 | 6.8 |
| 133 | 7 647 383.3 | 502 644.9 | 7.0 |
| 134 | 7 647 363.7 | 502 651.6 | 7.5 |
| 135 | 7 647 357.8 | 502 663.0 | 7.6 |
| 136 | 7 647 345.3 | 502 668.2 | 8.2 |
| 137 | 7 647 333.6 | 502 664.4 | 9.2 |
| 138 | 7 647 329.9 | 502 659.0 | 9.2 |
| 139 | 7 647 332.4 | 502 641.8 | 9.0 |

**RECORD DRAWING**
NOT FOR CONSTRUCTION

0 10 20 m SCALE 1:1000

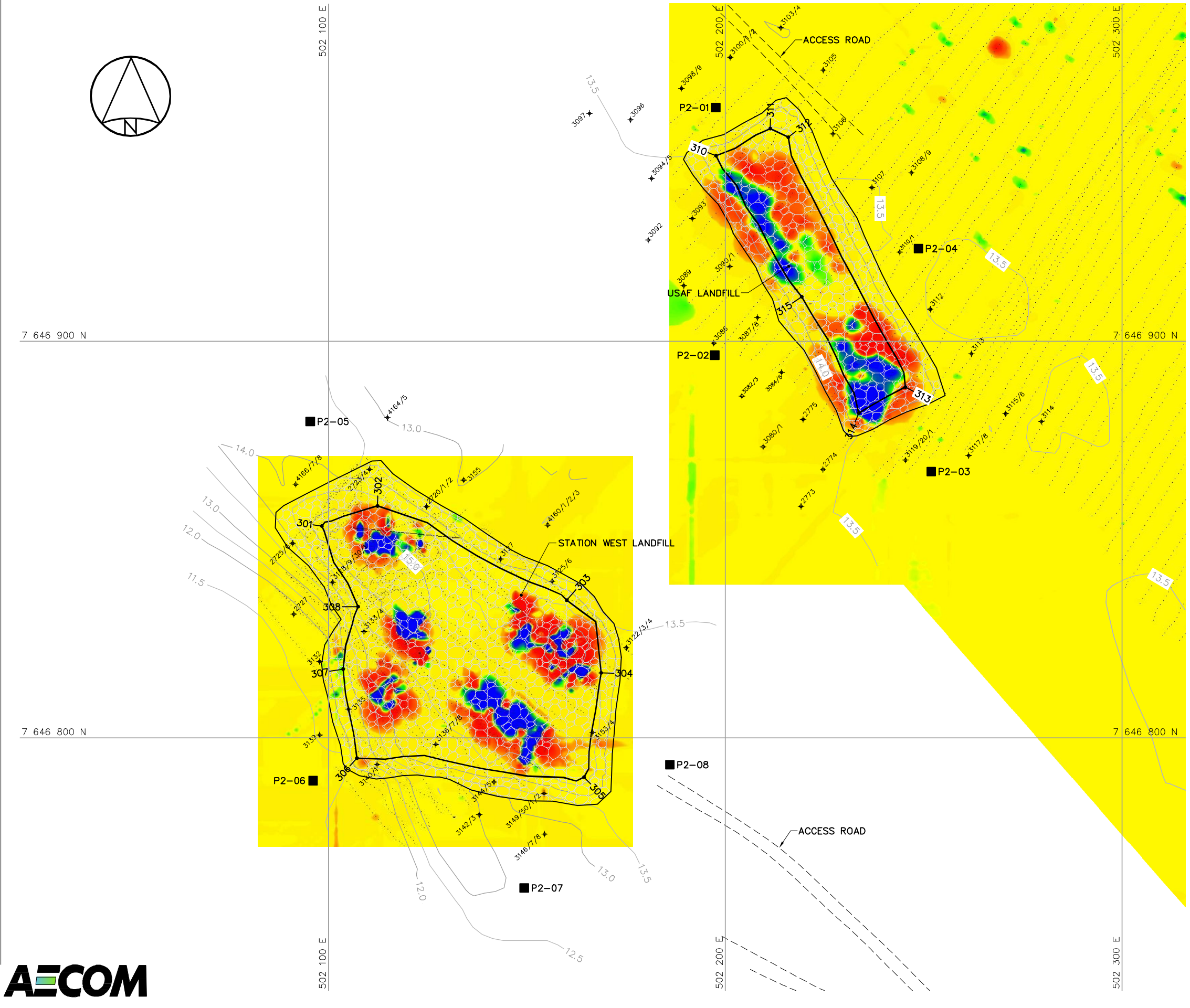
DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

# AIRSTRIP LANDFILL LOBES A, E, F

FIGURE PIN-2.2

AECOM




GENERAL NOTES:

1. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 11N. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

- 301 — COORDINATE POINT
- ■ — MONITORING SOIL SAMPLE LOCATION (8)
- 3107 — SOIL SAMPLE TAG LOCATION

| STATION WEST LANDFILL REGRADED (AS-BUILT) | | | |
|---|---|---|---|
| NO. | UTM COORDINATES | | ELEV. |
| | NORTHING | EASTING | |
| 301 | 7 646 853.4 | 502 098.3 | 15.4 |
| 302 | 7 646 858.5 | 502 112.4 | 14.7 |
| 303 | 7 646 834.7 | 502 160.0 | 14.4 |
| 304 | 7 646 816.4 | 502 168.7 | 14.5 |
| 305 | 7 646 790.1 | 502 164.4 | 14.7 |
| 306 | 7 646 794.9 | 502 107.2 | 12.3 |
| 307 | 7 646 817.4 | 502 103.7 | 12.8 |
| 308 | 7 646 833.1 | 502 107.5 | 14.6 |

| USAF LANDFILL REGRADED (AS-BUILT) | | | |
|---|---|---|---|
| NO. | UTM COORDINATES | | ELEV. |
| | NORTHING | EASTING | |
| 310 | 7 646 946.8 | 502 197.6 | 14.4 |
| 311 | 7 646 953.6 | 502 211.3 | 14.6 |
| 312 | 7 646 951.5 | 502 215.8 | 14.7 |
| 313 | 7 646 888.5 | 502 245.4 | 14.7 |
| 314 | 7 646 881.9 | 502 233.6 | 14.7 |
| 315 | 7 646 911.2 | 502 219.3 | 14.6 |

MAGNETIC GRADIENT (gammas/m)
400, 280, 220, 180, 150, 120, 95, 80, 65, 50, 41, 36, 33, −36, −39, −42, −55, −70, −85, −100, −130, −160, −190, −240, −300, −360

**RECORD DRAWING**
NOT FOR CONSTRUCTION

0 10 20 m SCALE 1:1000

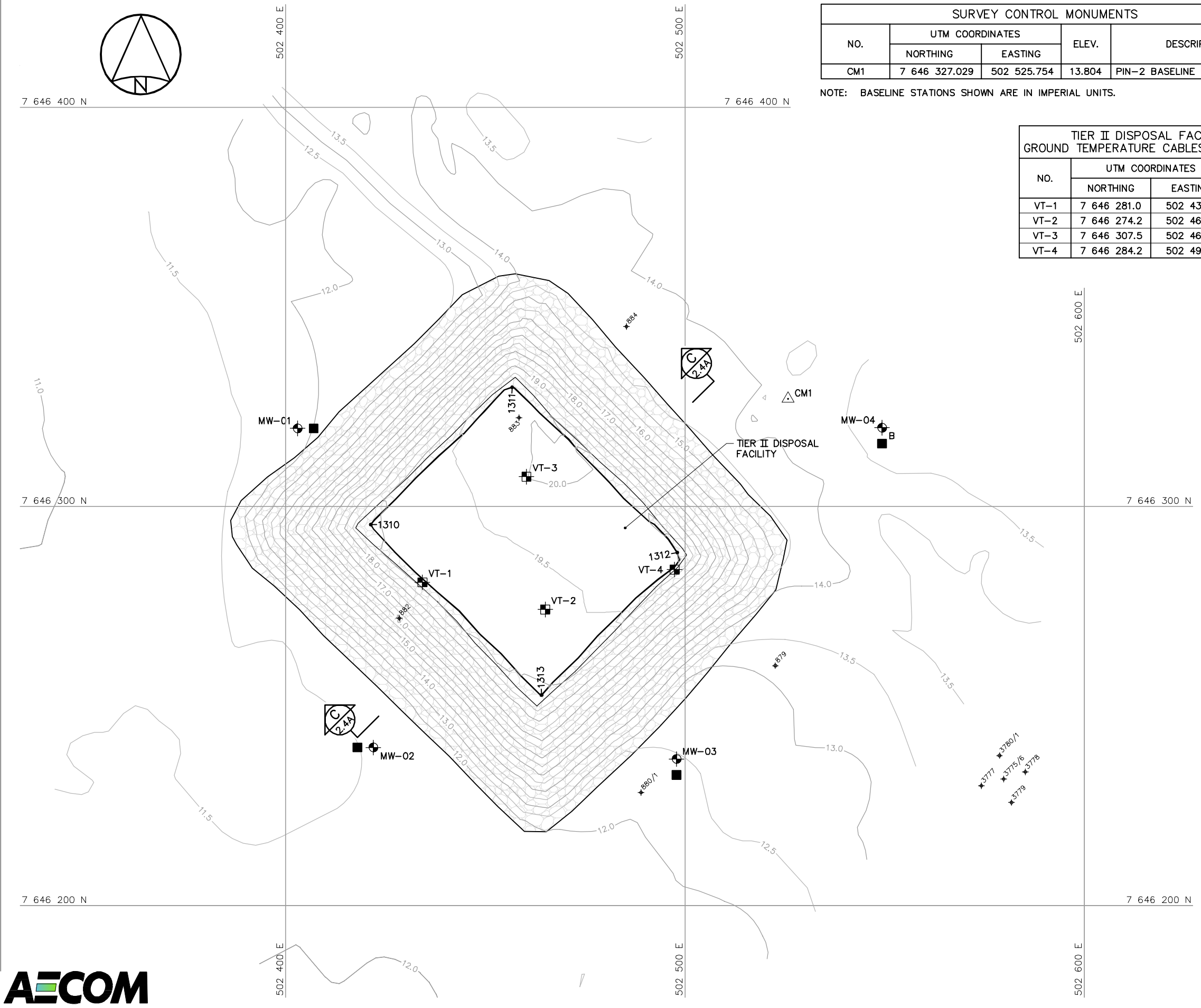
DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

# STATION WEST LANDFILL AND USAF LANDFILL

FIGURE PIN-2.3

AECOM




| SURVEY CONTROL MONUMENTS | | | | |
|---|---|---|---|---|
| NO. | UTM COORDINATES | | ELEV. | DESCRIPTION |
| | NORTHING | EASTING | | |
| CM1 | 7 646 327.029 | 502 525.754 | 13.804 | PIN-2 BASELINE STA. 0+00 |

NOTE: BASELINE STATIONS SHOWN ARE IN IMPERIAL UNITS.

| TIER II DISPOSAL FACILITY GROUND TEMPERATURE CABLES (AS-BUILT) | | | |
|---|---|---|---|
| NO. | UTM COORDINATES | | ELEV. |
| | NORTHING | EASTING | |
| VT-1 | 7 646 281.0 | 502 434.2 | 19.1 |
| VT-2 | 7 646 274.2 | 502 465.0 | 19.2 |
| VT-3 | 7 646 307.5 | 502 460.3 | 20.0 |
| VT-4 | 7 646 284.2 | 502 497.4 | 19.9 |

GENERAL NOTES:

1. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 11N. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

- 1310 — COORDINATE POINT
- MONITORING WELL LOCATION (3)
- B — BACKGROUND MONITORING WELL LOCATION (1)
- GROUND TEMPERATURE CABLE LOCATION (4)
- MONITORING SOIL SAMPLE LOCATION (4)
- 884 — SOIL SAMPLE TAG LOCATION

| TIER II DISPOSAL FACILITY MONITORING WELLS (AS-BUILT) | | | |
|---|---|---|---|
| NO. | UTM COORDINATES | | ELEV. |
| | NORTHING | EASTING | |
| MW-01 | 7 646 319.6 | 502 402.9 | 11.8 |
| MW-02 | 7 646 239.7 | 502 421.9 | 11.5 |
| MW-03 | 7 646 236.8 | 502 497.9 | 12.6 |
| MW-04 | 7 646 319.8 | 502 549.3 | 13.4 |

| TIER II DISPOSAL FACILITY FINAL GRADING (AS-BUILT) | | | |
|---|---|---|---|
| NO. | UTM COORDINATES | | ELEV. |
| | NORTHING | EASTING | |
| 1310 | 7 646 295.5 | 502 421.3 | 18.9 |
| 1311 | 7 646 329.9 | 502 456.7 | 19.8 |
| 1312 | 7 646 288.5 | 502 498.0 | 20.0 |
| 1313 | 7 646 252.8 | 502 464.0 | 18.9 |

NOTE:
COORDINATE POINTS AND ELEVATIONS PROVIDED ARE TO THE FINAL GRADE OF TYPE 2 GRANULAR FILL PRIOR TO THE PLACEMENT OF TYPE 1 GRANULAR FILL ON SIDE SLOPES.

**RECORD DRAWING**
NOT FOR CONSTRUCTION

0 10 20 m SCALE 1:1000

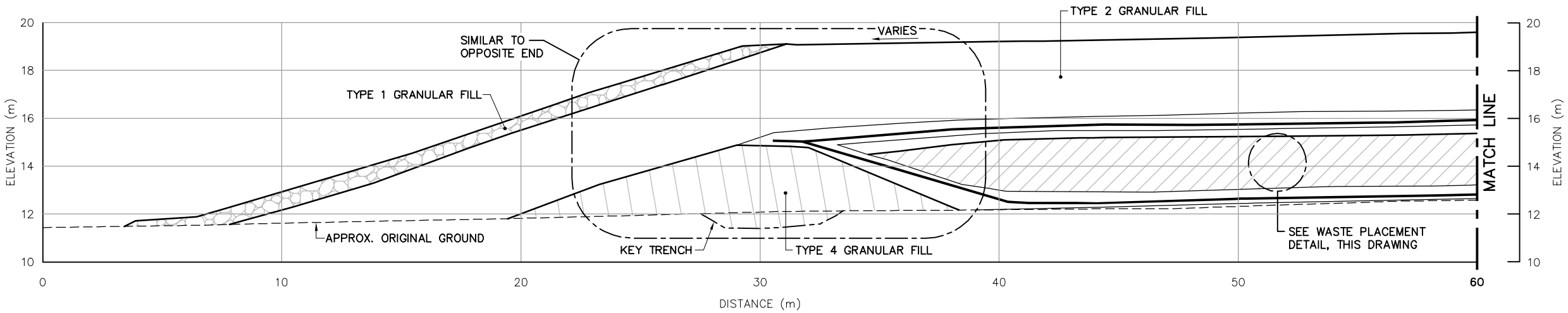
DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

# TIER II DISPOSAL FACILITY

FIGURE PIN-2.4

AECOM

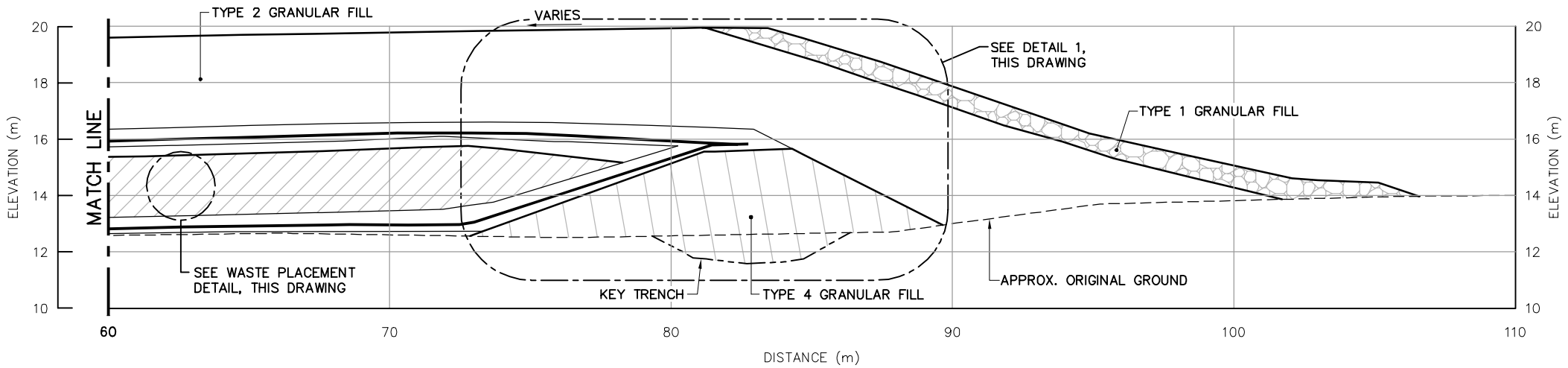



GENERAL NOTES:

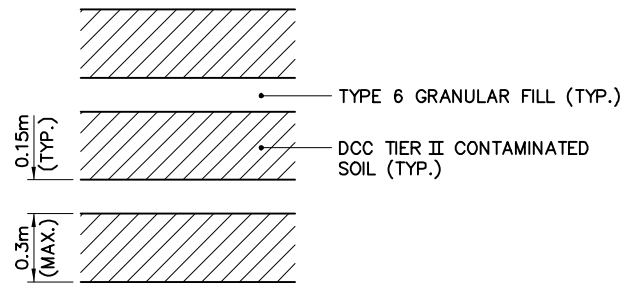
1. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
3. KEY TRENCH WAS EXCAVATED TO SOUND BEDROCK (APPROX. 0.6–1.0m). EXCAVATION DEPTH WAS FIELD CONFIRMED BY THE SITE ENGINEER.

LEGEND:

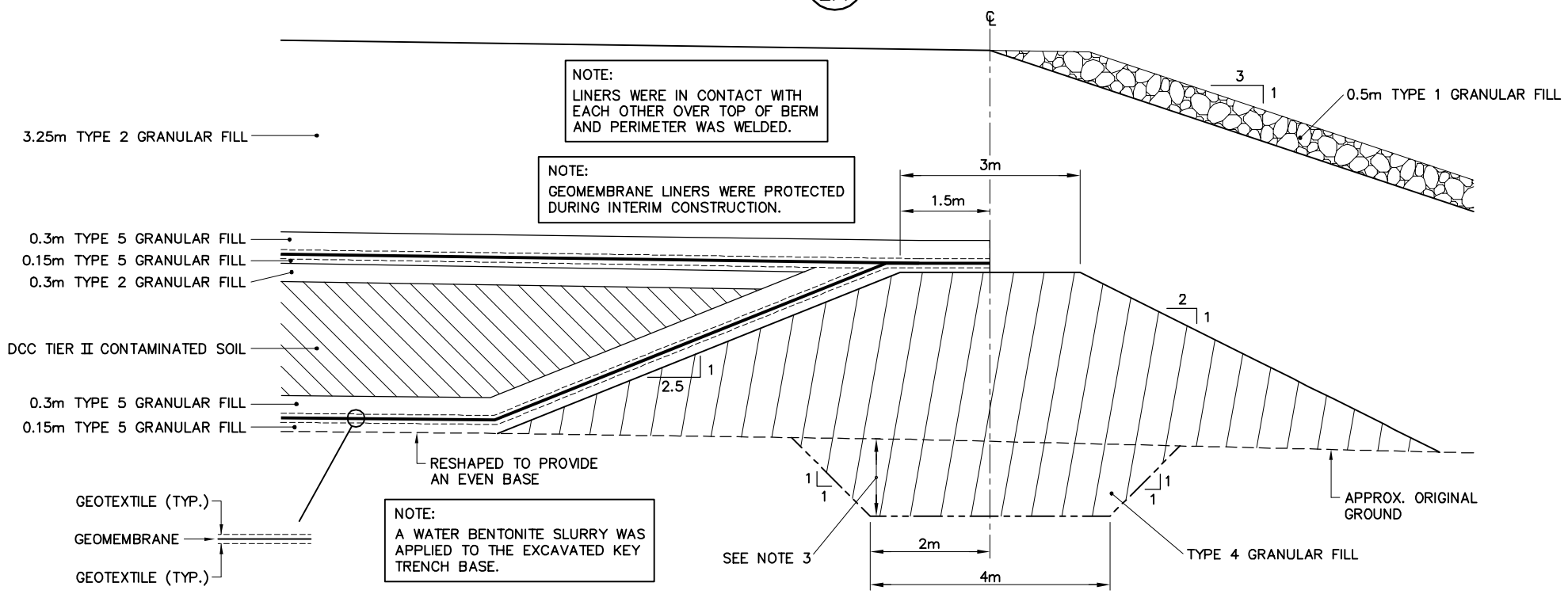
GENERATED BASED ON AS–BUILT SURVEY INFORMATION




SECTION C 2.4




WASTE PLACEMENT DETAIL
SCALE: NTS




DETAIL 1 2.4A
SCALE: NTS

**RECORD DRAWING**
NOT FOR CONSTRUCTION

0 2 4 m SCALE 1:200

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

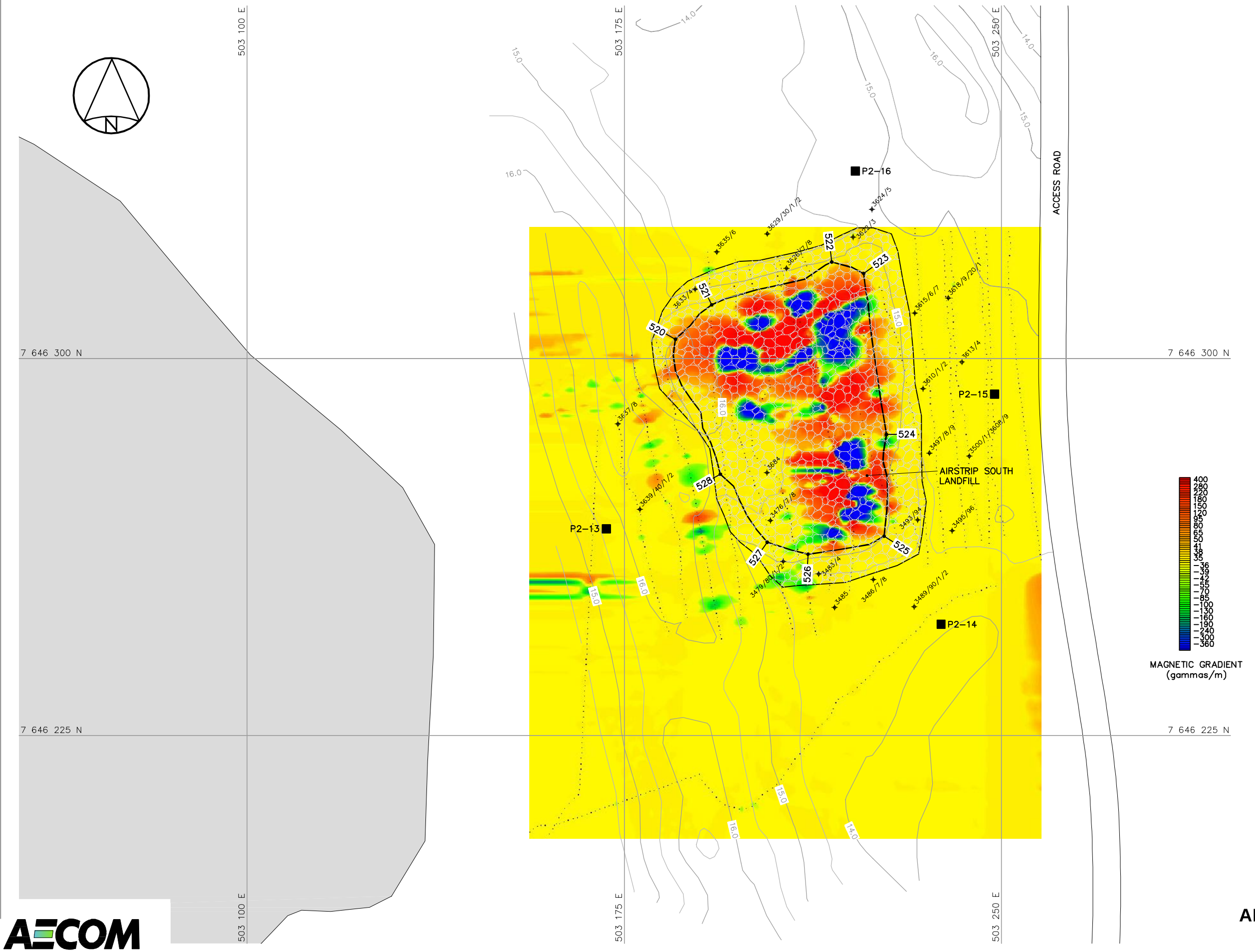
PIN-2 CAPE YOUNG

# TIER II DISPOSAL FACILITY CROSS SECTION AND DETAILS

FIGURE PIN-2.4A

AECOM

Sheet Size: 11 x 17 (432mm x 279mm)
PLOT: December 3, 2012 4:20:42 PM
Saved by: Cech, Ione
AECOM FILE NO.: PIN-2.5 Baseline LF MON.dwg




GENERAL NOTES:

1. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 11N. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

- 520 — COORDINATE POINT
- ■ — MONITORING SOIL SAMPLE LOCATION (4)
- 3497 — SOIL SAMPLE TAG LOCATION
- BODY OF WATER

400 280 220 180 150 120 95 80 65 50 41 33 35 −36 −39 −42 −55 −55 −70 −85 −100 −130 −160 −190 −240 −300 −360

MAGNETIC GRADIENT (gammas/m)

AIRSTRIP SOUTH LANDFILL REGRADED (AS–BUILT)

| NO. | UTM COORDINATES | | ELEV. |
|---|---|---|---|
| | NORTHING | EASTING | |
| 520 | 7 646 303.9 | 503 185.2 | 16.0 |
| 521 | 7 646 310.7 | 503 192.4 | 15.6 |
| 522 | 7 646 319.2 | 503 216.2 | 15.1 |
| 523 | 7 646 316.9 | 503 222.6 | 15.4 |
| 524 | 7 646 284.9 | 503 227.1 | 15.3 |
| 525 | 7 646 264.7 | 503 226.6 | 15.0 |
| 526 | 7 646 261.1 | 503 211.5 | 15.1 |
| 527 | 7 646 263.5 | 503 203.4 | 15.3 |
| 528 | 7 646 277.0 | 503 194.1 | 15.8 |

**RECORD DRAWING**
NOT FOR CONSTRUCTION

0 7.5 15 m SCALE 1:750

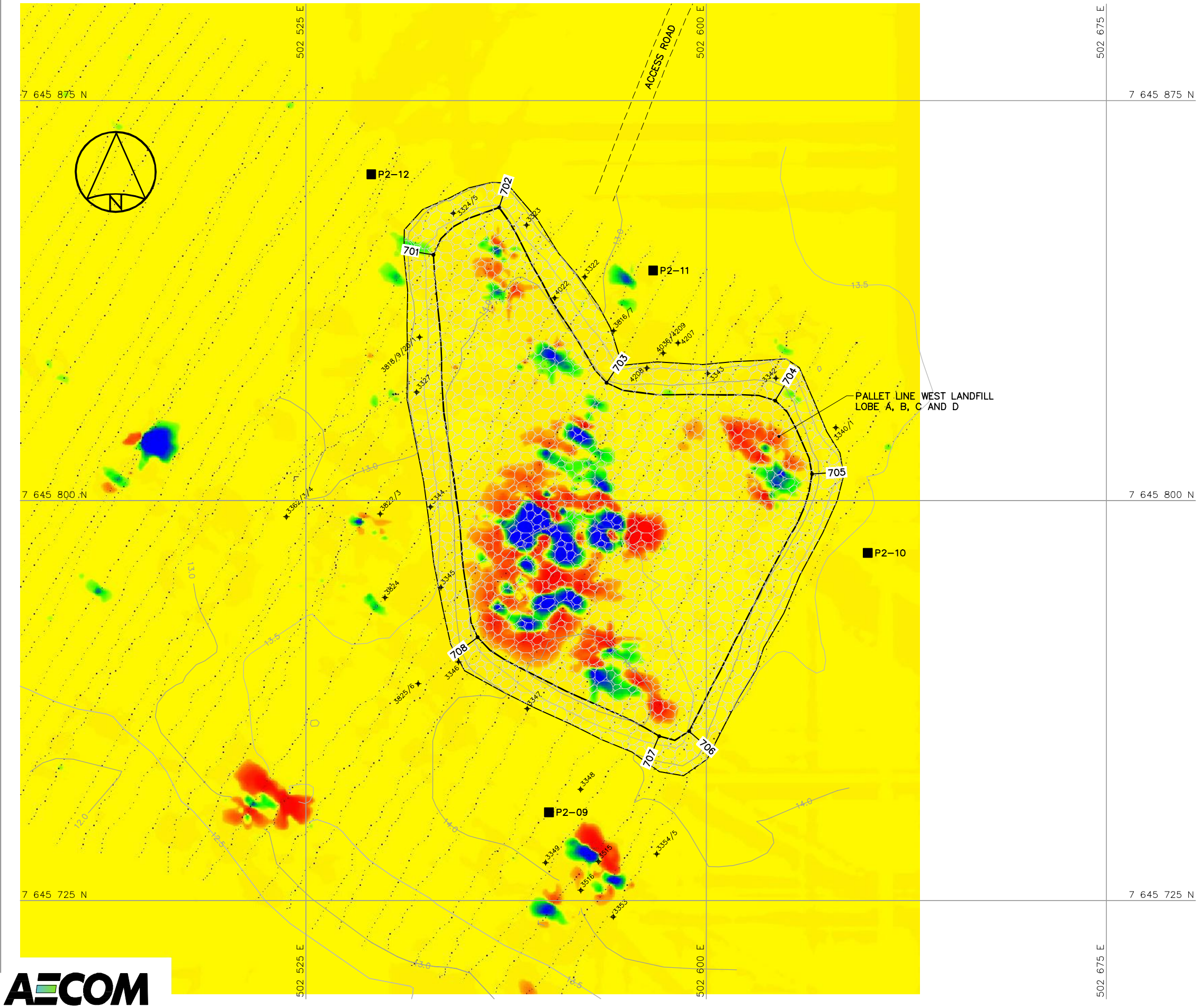
DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

# AIRSTRIP SOUTH LANDFILL

FIGURE PIN-2.5

AECOM




GENERAL NOTES:

1. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 11N. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

- 701 — COORDINATE POINT
- ■ — MONITORING SOIL SAMPLE LOCATION (4)
- 3343 — SOIL SAMPLE TAG LOCATION

400 280 220 180 150 120 95 80 65 50 41 35 −36 −39 −42 −55 −70 −85 −100 −130 −160 −190 −240 −300 −360

MAGNETIC GRADIENT (gammas/m)

PALLET LINE WEST LANDFILL (LOBES A,B,C,D) REGRADED (AS–BUILT)

| NO. | UTM COORDINATES | | ELEV. |
|---|---|---|---|
| | NORTHING | EASTING | |
| 701 | 7 645 846.1 | 502 548.8 | 13.6 |
| 702 | 7 645 855.0 | 502 561.2 | 13.6 |
| 703 | 7 645 822.1 | 502 581.3 | 14.0 |
| 704 | 7 645 818.8 | 502 612.9 | 14.4 |
| 705 | 7 645 805.0 | 502 619.8 | 14.1 |
| 706 | 7 645 756.8 | 502 596.8 | 14.5 |
| 707 | 7 645 755.9 | 502 591.2 | 14.8 |
| 708 | 7 645 774.4 | 502 557.1 | 14.7 |

**RECORD DRAWING**
NOT FOR CONSTRUCTION

0 7.5 15 m SCALE 1:750

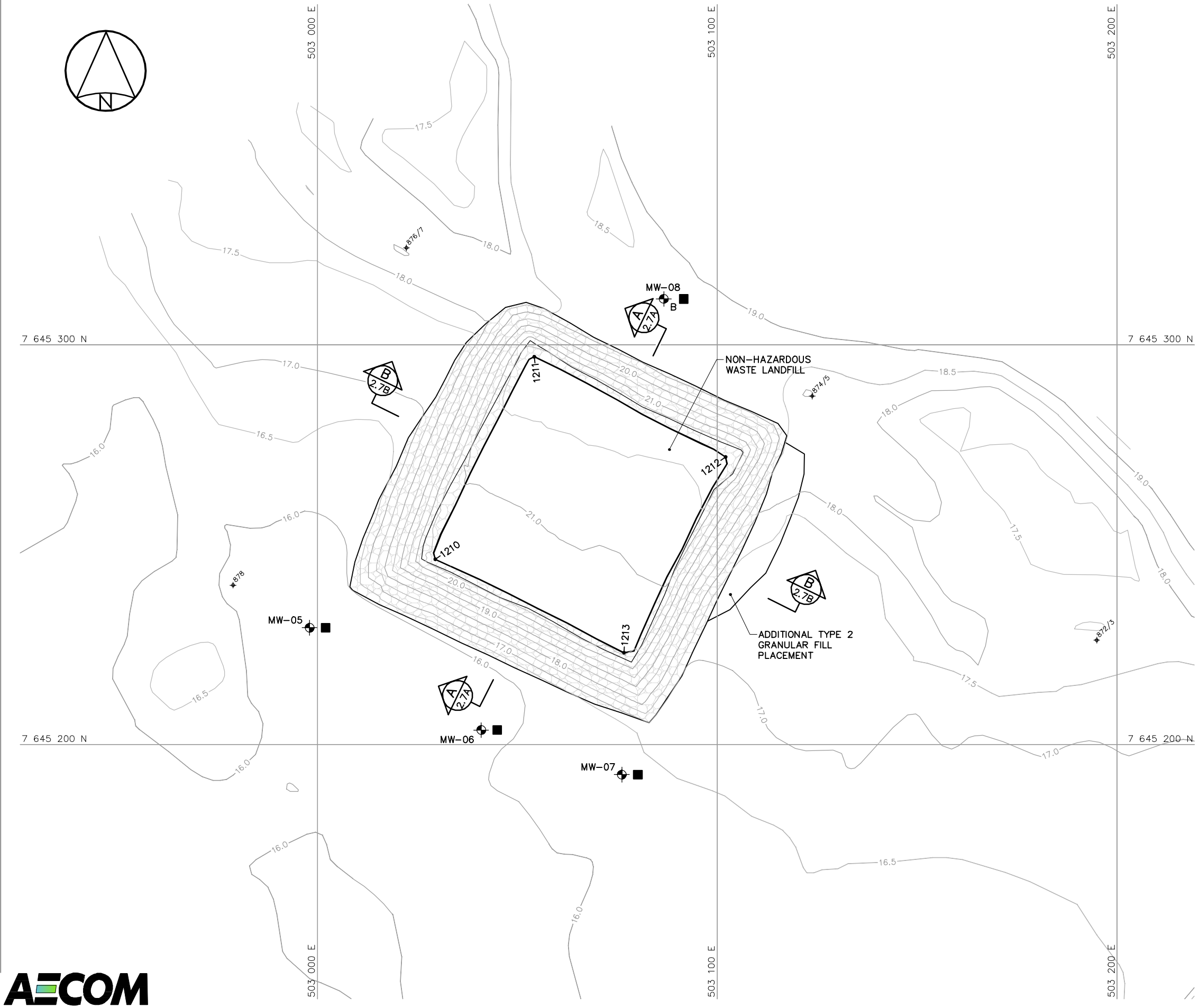
DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

# PALLET LINE WEST LANDFILL LOBES A, B, C, D

FIGURE PIN-2.6

AECOM




GENERAL NOTES:

1. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 11N. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

- 1210 — COORDINATE POINT
- MONITORING WELL LOCATION (3)
- B — BACKGROUND MONITORING WELL LOCATION (1)
- MONITORING SOIL SAMPLE LOCATION (4)
- 874 — SOIL SAMPLE TAG LOCATION

| NON-HAZARDOUS WASTE LANDFILL MONITORING WELLS (AS-BUILT) | | | |
|---|---|---|---|
| NO. | UTM COORDINATES | | ELEV. |
| | NORTHING | EASTING | |
| MW-05 | 7 645 229.3 | 502 998.0 | 15.9 |
| MW-06 | 7 645 203.7 | 503 040.9 | 16.0 |
| MW-07 | 7 645 192.5 | 503 076.1 | 16.4 |
| MW-08 | 7 645 311.5 | 503 086.6 | 18.9 |

| NON-HAZARDOUS WASTE LANDFILL FINAL GRADING (AS-BUILT) | | | |
|---|---|---|---|
| NO. | UTM COORDINATES | | ELEV. |
| | NORTHING | EASTING | |
| 1210 | 7 645 246.4 | 503 029.4 | 20.6 |
| 1211 | 7 645 297.0 | 503 054.2 | 21.8 |
| 1212 | 7 645 272.0 | 503 102.0 | 21.8 |
| 1213 | 7 645 223.0 | 503 076.6 | 20.5 |

NOTE:
COORDINATE POINTS AND ELEVATIONS PROVIDED ARE TO THE FINAL GRADE OF TYPE 2 GRANULAR FILL PRIOR TO THE PLACEMENT OF TYPE 1 GRANULAR FILL ON SIDE SLOPES.

**RECORD DRAWING**
NOT FOR CONSTRUCTION

0 10 20 m SCALE 1:1000

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

# NON-HAZARDOUS WASTE LANDFILL

FIGURE PIN-2.7

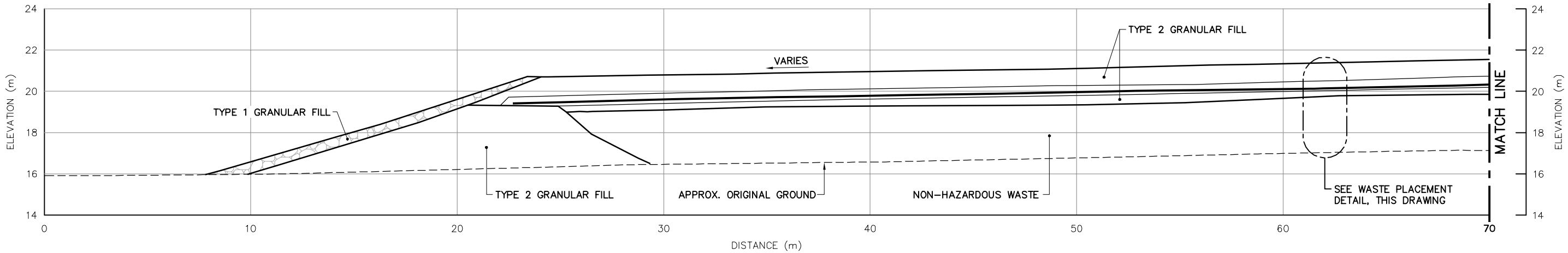
AECOM

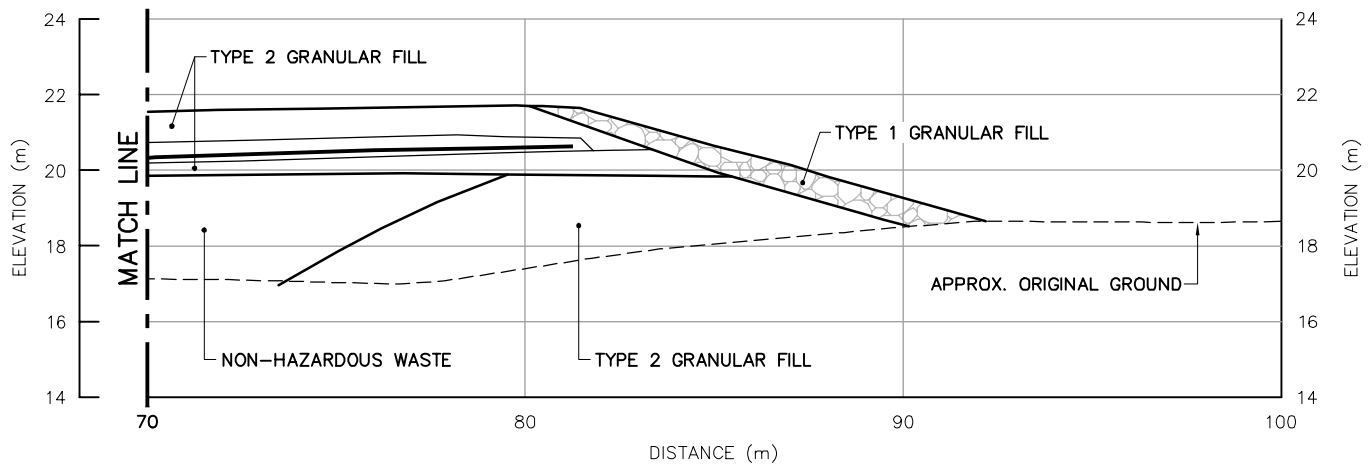
GENERAL NOTES:

1. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

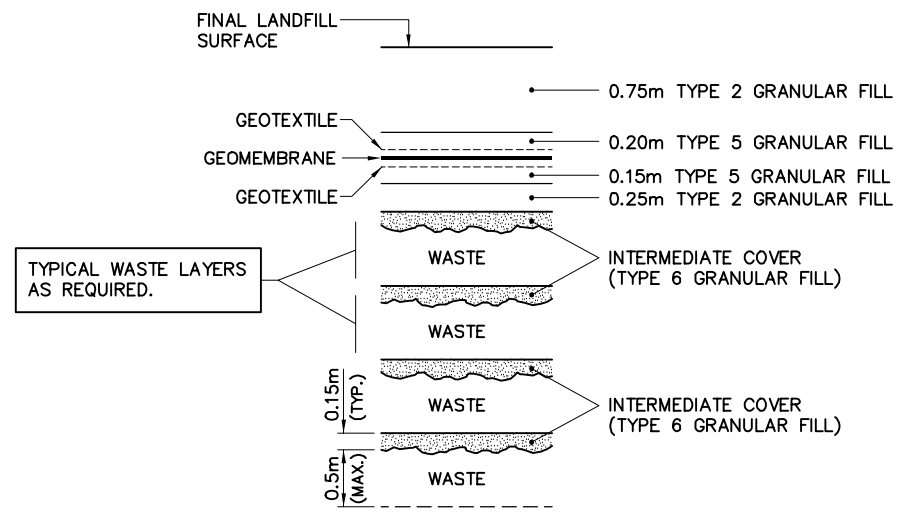
LEGEND:

GENERATED BASED ON AS-BUILT SURVEY INFORMATION




SECTION A 2.7




WASTE PLACEMENT DETAIL
SCALE: NTS

**RECORD DRAWING**
NOT FOR CONSTRUCTION

0 2 4 m SCALE 1:200

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

# NON-HAZARDOUS WASTE LANDFILL CROSS SECTION AND DETAIL

FIGURE PIN-2.7A

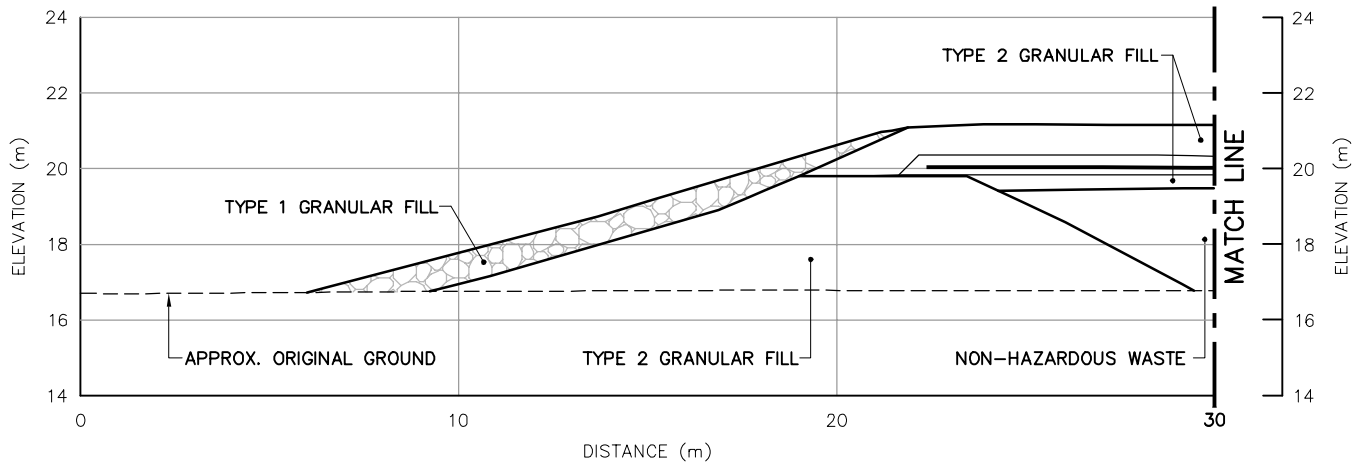
AECOM

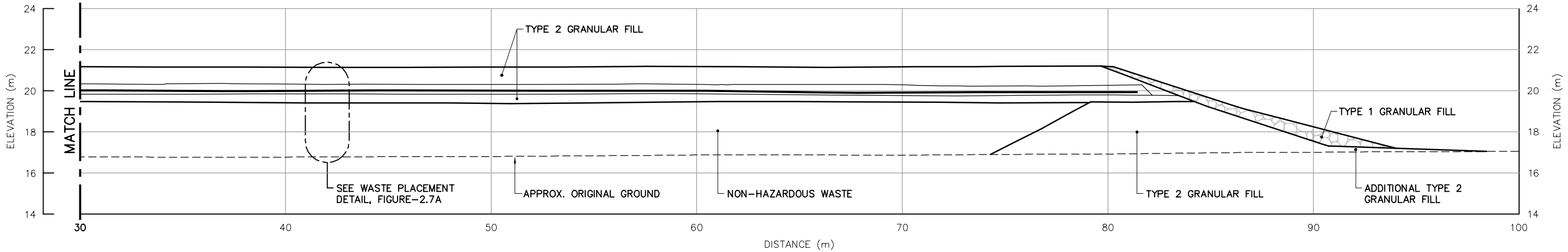
GENERAL NOTES:

1. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

——— GENERATED BASED ON AS-BUILT SURVEY INFORMATION




SECTION B 2.7

**RECORD DRAWING**
NOT FOR CONSTRUCTION

0 2 4 m SCALE 1:200

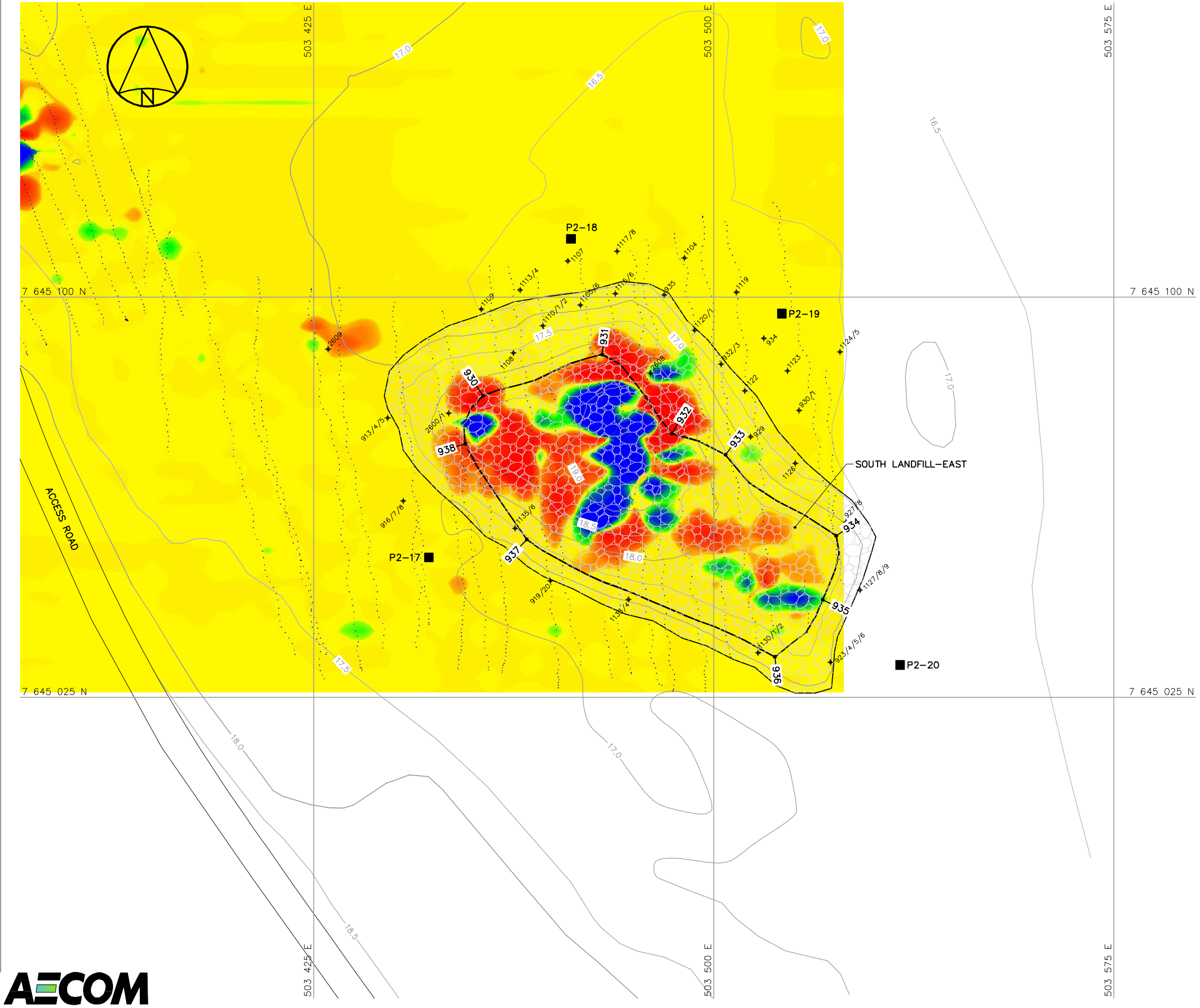
DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

# NON-HAZARDOUS WASTE LANDFILL CROSS SECTION

FIGURE PIN-2.7B

AECOM

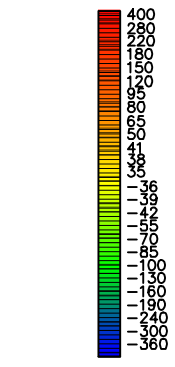



GENERAL NOTES:

1. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 11N. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

- 930 — COORDINATE POINT
- ■ — MONITORING SOIL SAMPLE LOCATION (4)
- 1122 — SOIL SAMPLE TAG LOCATION




MAGNETIC GRADIENT (gammas/m)

SOUTH LANDFILL–EAST REGRADED (AS–BUILT)

| NO. | UTM COORDINATES | | ELEV. |
|---|---|---|---|
| | NORTHING | EASTING | |
| 930 | 7 645 081.6 | 503 456.7 | 18.3 |
| 931 | 7 645 089.3 | 503 479.0 | 18.4 |
| 932 | 7 645 074.5 | 503 492.1 | 18.7 |
| 933 | 7 645 070.5 | 503 502.1 | 17.6 |
| 934 | 7 645 055.3 | 503 522.9 | 17.4 |
| 935 | 7 645 043.3 | 503 520.4 | 17.7 |
| 936 | 7 645 032.6 | 503 511.4 | 17.3 |
| 937 | 7 645 054.6 | 503 464.9 | 17.4 |
| 938 | 7 645 072.6 | 503 453.4 | 18.5 |

**RECORD DRAWING**
NOT FOR CONSTRUCTION

0 7.5 15 m SCALE 1:750

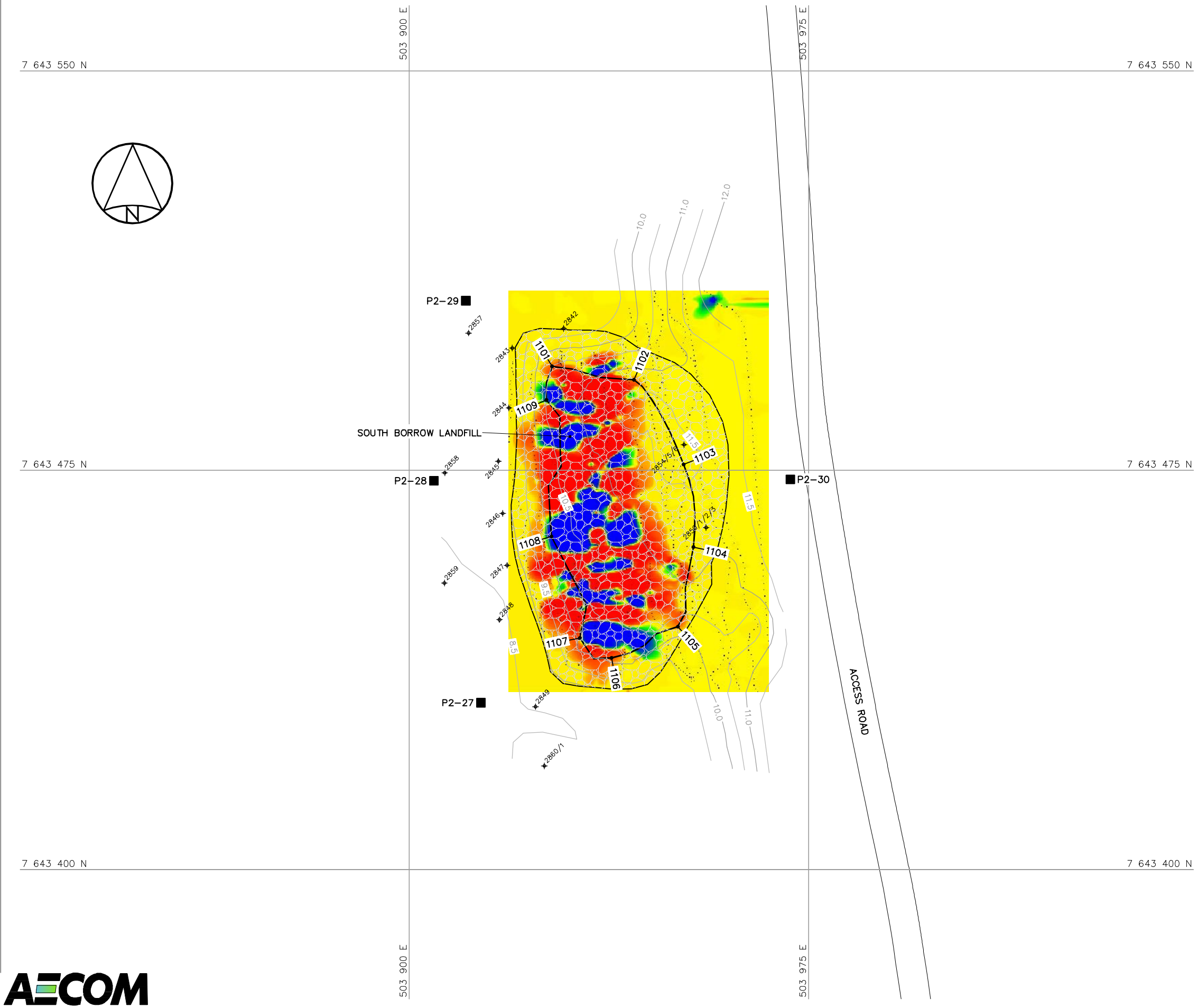
DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

# SOUTH LANDFILL - EAST

FIGURE PIN-2.8

AECOM




GENERAL NOTES:

1. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 11N. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

- 1101 — COORDINATE POINT
- ■ — MONITORING SOIL SAMPLE LOCATION (4)
- 2842 — SOIL SAMPLE TAG LOCATION




MAGNETIC GRADIENT (gammas/m)

SOUTH BORROW LANDFILL REGRADED (AS-BUILT)

| NO. | UTM COORDINATES | | ELEV. |
|---|---|---|---|
| | NORTHING | EASTING | |
| 1101 | 7 643 494.5 | 503 926.8 | 10.5 |
| 1102 | 7 643 492.0 | 503 942.2 | 11.3 |
| 1103 | 7 643 476.1 | 503 951.5 | 11.6 |
| 1104 | 7 643 460.6 | 503 953.4 | 11.3 |
| 1105 | 7 643 445.7 | 503 950.4 | 10.3 |
| 1106 | 7 643 439.8 | 503 938.0 | 10.1 |
| 1107 | 7 643 443.5 | 503 932.0 | 10.0 |
| 1108 | 7 643 462.6 | 503 926.7 | 10.1 |
| 1109 | 7 643 488.2 | 503 925.7 | 10.5 |

**RECORD DRAWING**
NOT FOR CONSTRUCTION

0 7.5 15 m SCALE 1:750

AECOM

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

**SOUTH BORROW LANDFILL**

FIGURE PIN-2.9