City of Darwin

Stage 2A Expansion - Construction Quality Assurance Plan

Shoal Bay Waste Management Facility

December 2024

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Stage 2A Expansion - Construction Quality Assurance Plan
Shoal Bay Waste Management Facility

City of Darwin

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WSP acknowledges that every project we work on takes place on First Peoples lands.
We recognise Aboriginal and Torres Strait Islander Peoples as the first scientists and engineers and pay our respects to Elders past and present.

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1 Introduction

The City of Darwin (CoD) (the Principal) will issue a Contract for the construction of the Stage 2A Expansion of the Stage 2 Inert Landfill at the Shoal Bay Waste Management Facility (SBWMF). WSP Australia Pty Ltd (WSP) has prepared a design for the construction of the Stage 2A Expansion as an asbestos landfill expansion.

The design is presented in Drawings (WSP Ref. PS138768-WSP-BNE-ENG-T-007 RevB) and the Technical Specification prepared for the works (WSP Ref. PS138768-WSP-BNE-ENG-REP-005 RevB). Where the Technical Specification (Specification) is referenced in this document, the reference includes both the Technical Specification and Drawings.

This document presents the Construction Quality Assurance (CQA) Plan for the proposed construction of Stage 2A. The key five roles responsible for the Construction Quality Assurance of the project are defined below in Table 1.1. A more extensive list of parties and term definitions can be found in the specification.

Table 1.1 Key parties and definitions

Party/Term	Description
Designer	WSP Australia Pty Ltd.
Environmental Auditor (Qualified Person)	The Qualified person approved by the NT EPA and commissioned by the Principal to oversee and approve that the WUC comply with the Specification in accordance with NT EPA *Guidelines for the sitting, design and management of solid waste disposal sites in the Northern Territory (January 2013).*
Construction Quality Assurance Inspector (CQAI)	A third party with experience with construction of the earthworks, geosynthetic liners, groundwater collection systems and leachate collection system, engaged by the Principal and approved by the Environmental Auditor to undertake inspection and testing for quality assurance of the WUC. The CQAI shall be on-site on a full-time basis when works for which it is engaged to inspect are being undertaken. The Contractor shall be responsible for the provision of information required by the Design and/or requested by the CQAI. The CQAI shall arrange independent testing at the expense of the Principal, of materials incorporated in the WUC using NATA accredited laboratories. The CQAI shall collate information provided by the Contractor to assess material and installation compliance with the requirements of this Technical Specification. The CQAI shall perform its duties on behalf of and in continuous liaison with the Environmental Auditor. The CQAI shall only approve Hold Points following authorization by the Environmental Auditor.
Geotechnical Testing Authority (GTA)	Party engaged by the Contractor and approved by the Superintendent to undertake quality assurance field and laboratory testing of earthworks and Gravel materials. The laboratory must be National Association of Testing Authorities (NATA) accredited.
Principal	City of Darwin
Superintendent	Person appointed by the Principal to administer the work.

2 Overview of the CQA plan

The aims of this CQA plan are to provide a summary of quality assurance requirements and responsibilities for the following components of the Works Under Contract (WUC):

- Subgrade construction.
- Groundwater drainage system.
- Other select fill layers on cell floors and walls.
- Geosynthetic liner installation.
- Leachate collection system installation.
- Stormwater infrastructure.
- Temporary sub-cell structure.
- Stormwater Chute.

The CQA Plan has been prepared primarily for use on site as a construction quality assurance document, but it will also be used by the appointed Environmental Auditor (the Auditor) as a checklist when conducting the construction audit. It is envisaged that this document will assist the project stakeholders to gather the supporting information to verify that the construction of the WUC has been performed in accordance with the approved design documents, and to documents where there are changes together with the approval of those changes.

Additional information is contained in the Technical Specification that is not addressed in this CQA Plan.

3 Structure of the CQA plan

The requirements for the Works in terms of (a) material properties, (b) Contractor testing and inspection frequencies, and (c) installation and construction methodologies, are described in the Technical Specifications. This CQA Plan describes the quality assurance procedures to be followed to enable the construction of the components of the Works to be completed in accordance with the Technical Specifications.

Independent testing is to be carried out to verify that the materials supplied to the Works, and the as-built Works, are in accordance with the Technical Specification. The requirements for independent testing of geosynthetic materials, including frequency of testing and test methods, are included in the Technical Specifications.

This CQA plan does not replace the Technical Specification. Should there be any discrepancy between the CQA and the Technical Specification, the Technical Specification takes precedence. Where additional information or clarification of requirements has been provided in the CQA plan, this shall form part of the requirements for the Works.

The CQA Plan has been subdivided into components representing the components of the Works. The CQA plan has the following key tables for each component:

- Defined procedures and responsibilities for each construction component.
- Defined quality assurance program activities and responsibilities to implement the CQA plan.
- Performance Indicators to be applied as part of the quality assurance program.

The party responsible for a particular procedure or activity may delegate this work to an onsite representative who may then inspect or assess the work as required. The delegated party must report back to the responsible party.

4 Hold points

The CQA plan includes a summary of the specified “Hold Points” that agree with the description and numbering of Hold Points in the Technical Specification. The Contractor is responsible for notifying the Superintendent when a Hold Point is reached and providing the required documentation for the Superintendent to assess the constructed elements related to the Hold Point against requirements of the design documents. The Superintendent shall obtain additional supporting information relating to the Hold Point from the CQAI and discuss the Hold Point and relevant documentation with the Auditor prior to release of each Hold Point, where required by this CQA Plan. Release of each Hold Point by the Superintendent or CQAI, based on agreement with the Auditor, is required prior to placement of overlying materials related to the Hold Point. The Contractor may elect to submit information for staged release of Hold Points as areas of work are completed.

For full details on each Hold Point, refer to the Technical Specification.

5 Management framework

5.1 Site management organisation and responsibilities

The roles and responsible organisations and individuals are as follows:

- The Principal is the City of Darwin (Council).
- The Superintendent will be appointed by the Principal.
- The Contractor shall be appointed by the Principal. The Contractor shall include Subcontractors, Installers and the Geotechnical Testing Authority (GTA). The Contractor will be responsible for the construction of Stage 2A and for implementation of the CQA procedures.
- Laboratory testing of earthworks materials shall be undertaken in a NATA accredited soils testing laboratory approved by the Superintendent.
- The CQAI role will be performed by an independent consultant approved by the Auditor and engaged by the Principal. The CQAI shall carry out independent quality assurance inspections and reporting, and arrange independent sampling and testing of the geosynthetic materials.
- Independent geosynthetics laboratory testing will be performed by an independent NATA accredited testing laboratory approved by the Auditor.
- The Designer is WSP Australia Pty Ltd.
- The Environmental Auditor is to be appointed by the Principal.

It is the Contractor's responsibility to source and supply materials in accordance with the material properties of the Technical Specification, unless the Principal advises otherwise.

Site meetings shall be held at least fortnightly and shall be attended by the Superintendent, Contractor and CQAI at minimum.

It is the Contractor's responsibility to request inspections by the CQAI when required. The Contractor's requests for release of Hold Points by the CQAI shall be submitted to the Auditor for approval. The Auditor shall decide whether a site visit by them is required in addition to the CQAI. The Auditor's decisions hold the highest precedence in regard to the acceptance of the works.

5.2 Monitoring, testing and inspection

The Contractor shall engage the GTA to carry out monitoring and inspection of earthworks and submit relevant documentation to the Superintendent and CQAI. The CQAI will carry out monitoring and inspection of the works including testing outlined in the Technical Specification under "Independent Testing" requirements for materials and in this CQA plan and provide relevant documentation and reports on the Works. Documentation of monitoring, testing and inspections will be issued to the Auditor.

5.3 Non-conformance rectification

Any non-conformance to the quality assurance activities and performance indicators listed shall be rectified and documented before the associated works are covered.

The Contractor shall provide notification to the CQAI and Superintendent immediately upon becoming aware of any non-conformance. The Contractor shall forward a summary of any non-conformance and proposal for rectification to the

Superintendent and CQAI within 3 days of initial notification. The Superintendent and CQAI shall submit the summary to the Designer. The Designer shall assess the proposal and liaise with the Auditor regarding any design implications related to the proposal. The Contractor shall carry out rectification works in accordance with the procedure agreed with the Designer and Auditor, and submit a Corrective Action Report (see below) within 3 days of completing rectification works. Any non-conformance shall be documented, including the nature of the non-conformance and the mechanisms implemented to rectify the issue. The Contractor shall develop a Corrective Action Report, which shall be used to document any non-conformances. As a minimum, the Corrective Action Report shall report the type and extent of the non-conformance, the method of rectification of the non-conformance, the date of rectification and suggested measures to avoid a recurrence in the future. A non-conformance may lead to a design variation needing Auditor approval prior to rectification.

5.4 Modifications

If a modification is required to vary any aspects of the works from requirements described in the CQA plan or Technical Specification (including drawings), the Contractor shall notify the Superintendent and CQAI. The Superintendent and CQAI will notify the Designer and Auditor and discuss the nature of the modification and whether the modification is acceptable for the design. The Designer may be required to carry out an assessment to understand the impact of the modification on the design and inform decision-making relating to the modification. The Auditor may notify or seek approval from the NT EPA for the modification. The CQAI will document the discussions and conclusions in this process for inclusion in the construction report.

If the proposed modification is considered acceptable, the Superintendent or CQAI will notify the Contractor. The Contractor shall carry out works in accordance with the approved modification. The Contractor shall prepare a Corrective Action Report (refer to Technical Specification) documenting the modification.

5.5 Documentation and reporting framework

5.5.1 Documentation

The following documents concerning Quality Assurance performance will be produced for the Works:

- The CQA plan and any revisions.
- Monitoring, testing and inspection records and reports to demonstrate compliance with the Technical Specification. These records shall be prepared by the Contractor or the CQAI, as appropriate to the aspect of work. The records, or a summary of them, will be submitted to the Auditor.
- As-constructed survey plans to be provided by the Contractor.
- Audit Report will be produced by the Auditor for submission to the NT EPA.

Documentation related to quality assurance of the Works shall be prepared by the Contractor, and shall include documentation provided by the GTA, Installers, surveyor(s) and other subcontractors. The Contractors documentation must include as-constructed survey of the various stages of the works and laboratory certificates for all laboratory testing carried out. The Contractor shall submit documentation to the Superintendent and CQAI in a format agreed with the Superintendent and CQAI. The CQAI will submit documentation to the Auditor for assessment.

The CQAI will prepare documentation related to independent quality assurance and testing of the Works, and submit the documentation to the Auditor.

5.5.2 Daily reporting

The CQAI shall maintain daily reports of construction activities. These reports shall contain, at a minimum, the following information:

- Date, project name, location, weather and other information as appropriate.
- Description and locations of on-going construction.
- Equipment used.
- CQA testing performed.
- Description of materials received, areas tested, and materials and locations sampled.
- Description of areas requiring reconditioning and retesting, and procedures followed.
- Summary of Work area locations and conditions.
- Summary of site meetings held.
- Description of non-conformances with the Technical Specification (including drawings).

Photographs shall be taken with a date back camera to document observations, and provide representation of all elements of construction. The photographs will be captioned by the CQAI and included with the daily reports or compiled in a separate photograph album in chronological order.

6 Works components

6.1 Site preparation and construction of subgrade and perimeter embankments

6.1.1 Aim

Site preparation and construction of the subgrade and perimeter embankments meets the requirements specified in the Technical Specification.

6.1.2 Procedures

The following includes a list of procedures that require quality assurance measures for the construction of the subgrade in Stage 2A. The list includes the party responsible for performing each procedure.

Procedure		Responsibility
1	Prepare required Construction Management Plan that includes Method Statements to be reviewed by the Auditor.	Contractor
2	Clearing and grubbing of marked extents as approved by the Superintendent. **Hold Point 1, Hold Point 2**	Contractor
3	Construct the surface water drain at the western side of Stage 2A expansion and northern side of Stage 2A and connect to the sediment trap and level spreader.	Contractor
4	Survey the constructed surface water drain including sediment trap and level spreader.	Contractor
5	Excavate, prepare subgrade, process excavated and imported materials, and place Unit 1 Engineered Fill in the embankments to the design geometry (including elevations and grades) for subgrade and perimeter embankments. Includes stockpiling and processing of excavated materials by material type for re-use.	Contractor
6	Survey the constructed subgrade. **Hold Point 6**	Contractor

6.1.3 *Quality assurance program - inspection and monitoring*

The following quality assurance program will be conducted at the site. The results of these activities will be recorded by the responsible party and included in the Construction Report.

Activity		Frequency	Responsibility
1	Inspect and survey the excavated surface in areas where excavation is required to achieve the design subgrade surface. **Hold Point 6**	Prior to construction	Contractor
2	Test Unit 1 Engineered Fill for pre-construction requirements. **Hold Point 12**	Prior to construction	Contractor
3	Monitor placement and compaction of Unit 1 Engineered Fill in the embankments. **Continuous Inspection 6**	During Construction	CQAI
4	Test constructed Unit 1 Engineered Fill for as-built requirements. **Hold Point 15**	As per Technical Specifications	Contractor / GTA
5	Monitor the proof rolling of the top of subgrade surface. **Continuous Inspection 1**	During Construction	CQAI
6	Survey top of subgrade by licensed surveyor.	At completion of surface	Contractor
7	Review information on constructed subgrade surface.	At completion of surface	CQAI
8	Monitor construction of Unit 9 Topsoil and Unit 31 Erosion Protection on the external batters of perimeter embankments.	During Construction	CQAI

6.2 Groundwater drainage system

6.2.1 *Aim*

Construction of the groundwater drainage system meets the requirements specified in the Technical Specification.

6.2.2 *Procedures*

The following includes a list of procedures that require quality assurance measures for the construction of the groundwater drainage system in Stage 2A. The list includes the party responsible for performing each procedure.

Procedure		Responsibility
1	Supply of Unit 20 Groundwater Drainage Pipe and Unit 21 Groundwater Outlet Pipe.	Contractor
2	Approval of Unit 20 Groundwater Drainage Pipe and Unit 21 Groundwater Outlet Pipe. **Hold Point 9**	Superintendent
3	Supply of Unit 4 Groundwater Drainage Gravel.	Contractor
4	Approval of Unit 4 Groundwater Drainage Gravel. **Hold Point 7**	Superintendent
5	Place Unit 10 Filter Geotextiles over the excavated subgrade surface. Fill base of the cell with Unit 4 Groundwater Drainage Gravel to achieve the required thickness and maintain the design floor grade.	Contractor and Superintendent
6	Install and align Unit 20 Groundwater Drainage Pipe and Unit 21 Groundwater Outlet Pipe.	Contractor
7	Place Unit 4 Groundwater Drainage Gravel around and over Unit 20 Groundwater Drainage Pipes as required in the Technical Specification and shown on the Drawings. **Continuous Inspection 2**	Contractor

6.2.3 Quality assurance program – inspection and monitoring

The following quality assurance program will be conducted at the site. The results of these activities will be recorded by the responsible party and included in the Construction Report.

Activity		Frequency	Responsibility
1	Inspect perforations in Unit 20 Groundwater Drainage Pipes and Unit 21 Groundwater Outlet Pipes, including inspection for absence of 'swarf'. **Hold Point 11**	Prior to installation	CQAI
2	Test Unit 4 Groundwater Drainage Gravel for pre-construction requirements.	As defined in Technical Specification	Contractor
3	Survey excavated subgrade level by licensed surveyor. **Hold Point 8**	As excavation is completed	Contractor
4	Inspect installed Unit 10 Filter Geotextile. **Continuous Inspection 2**	During construction	CQAI
5	Inspect installed Unit 4 Groundwater Drainage Gravel.	During construction	CQAI
6	Survey Unit 4 Groundwater Drainage Gravel by licensed surveyor. **Hold Point 10**	As gravel is installed.	Contractor
7	Inspect installed Unit 20 Groundwater Drainage Pipes and Unit 21 Groundwater Outlet Pipe.	During construction	CQAI
8	Survey crown of installed Unit 20 Groundwater Drainage Pipes and Unit 21 Groundwater Outlet Pipes by licensed surveyor.	As pipes installed	Contractor

Activity		Frequency	Responsibility
	Hold Point 11		
9	Monitor placement of Unit 10 Filter Geotextile over Unit 4 Groundwater Drainage Gravel. **Continuous Inspection 2**	As geotextile is installed	
10	Review information on constructed groundwater drainage system.	Upon Completion	CQAI

6.3 Select fill layers on cell floor and walls

6.3.1 Aim

Construction of the select fill and low permeability soil layers on the cell floors and walls meet requirements outlined in the Technical Specification.

6.3.2 Procedures

The following includes a list of procedures that require quality assurance measures for the construction of the select fill layers on the cell floors and walls in Stage 2A. The list includes the party responsible for performing each procedure.

Procedure		Responsibility
1	Source Unit 2 Select Fill and Unit 7 – Compaction Low Permeability Soil from excavation or import.	Contractor
2	Test samples of Unit 2 Select Fill and Unit 7 – Compaction Low Permeability Soil for compliance with the Technical Specification. **Continuous Inspection 3**	Contractor
3	Moisture condition, place and compact Unit 2 Select Fill and Unit 7 – Compaction Low Permeability Soil in layers in accordance with requirements of the Technical Specification. Material must be moisture conditioned, loaded, transported and placed in a manner such that the distribution and gradation of constructed material is free from lenses, pockets, streaks or layers and does not differ substantially in texture and gradation from the surrounding material within that zone. The integrity and moisture content of the constructed layer must be maintained until such time as it is covered with the Unit 11 GCL. **Continuous Inspection 4**	Contractor
4	The constructed Unit 2 Select Fill layer must achieve a minimum thickness of 500 mm. The thickness of the Unit 2 Select Fill shall be confirmed by survey performed by a licensed surveyor.	Contractor
5	The constructed Unit 7 – Compaction Low Permeability Soil must achieve a nominal thickness of 1 m as shown in the Drawings. The thickness shall be confirmed by survey performed by a licensed surveyor.	Contractor
6	Procure all Unit 2 Select Fill and Unit 7 – Compaction Low Permeability Soil materials testing and provide reports of all testing undertaken on the material as per the Technical Specification.	Contractor

Procedure		Responsibility
7	Source Unit 6 Pavement Material.	Contractor
8	Approval of Unit 6 Pavement Material. **Hold Point 46**	CQAI
9	Place Unit 6 Pavement Material as per the Design Drawings.	Contactor

6.3.3 *Quality assurance program - inspection and monitoring*

The following quality assurance program will be conducted at the site. The results of these activities will be recorded by the responsible party and issued to the Auditor.

Activity		Frequency	Responsibility
1	Test Unit 2 Select Fill and Unit 7 – Compaction Low Permeability Soil material for pre-construction parameters. **Hold Point 13 and 14**	As defined in Technical Specification	Contractor
2	Monitor placement and compaction of Unit 2 Select Fill and Unit 7 – Compaction Low Permeability Soil. Inspect constructed material to check for laminations or defects between layers. **Continuous Inspection 7 and 8**	During Construction	CQAI
3	Test constructed Unit 2 Select Fill and Unit 7 – Compaction Low Permeability Soil for as-built requirements, including field density testing. **Hold Point 16 and 17**	As defined in Technical Specification	Contractor
4	Survey constructed Unit 2 Select Fill and Unit 7 – Compaction Low Permeability Soil surface.	After sections of select fill completed	Contractor
5	Review test reports for conformance with the Technical Specification	As defined in Technical Specification	CQAI
6	Maintain integrity and moisture condition of the “as-built” Select Fill prior to placement of overlying GCL. **Continuous Inspection 4**	Progressively	Contractor
7	Monitor placement of Unit 6 Pavement Material.	During Construction	CQAI
8	Survey placed Unit 6 Pavement Material.	After Construction	Contractor

6.4 Geosynthetics

6.4.1 *Aim*

Geosynthetic layers are installed in accordance with the requirements of the Technical Specification.

6.4.2 Procedures

The geosynthetics include the following:

- Unit 10 Filter Geotextile
- Unit 11 Geosynthetic Clay Liner (GCL).
- Unit 12 Geocomposite Drain

The following includes a list of procedures that require quality assurance measures for the supply and installation of the geosynthetics in Stage 2A. The list includes the party responsible for performing each procedure.

Procedure		Responsibility
1	Supply, deliver, unload, store and handle the geosynthetics in accordance with the Technical Specification. **Hold Point 4, Hold Point 5**	Contractor
2	Provide Manufacturer Quality Control (MQC) test results, roll numbers and material property information to the Superintendent and CQAI in accordance with the Technical Specification.	Contractor
3	Provide the Geosynthetics Installer's personnel and the qualifications and experience of the proposed installation personnel. **Hold Point 20**	Contractor
4	Provide proposed panel layout drawings, suitable for use as construction drawings, to the Superintendent and CQAI for approval. **Hold Point 18**	Contractor
5	Assist with sampling rolls of geosynthetic materials delivered to site by the CQAI for independent testing of geosynthetics.	Contractor
6	Transport samples and undertake independent testing of geosynthetics.	CQAI
7	Prepare the respective surface for installation of the geosynthetics.	Contractor
8	Excavate and survey anchor trenches.	Contractor
9	Install, anchor, and join the geosynthetics, and carry out field testing of geosynthetics.	Contractor
10	Backfill and compact Unit 2 Select Fill in the anchor trenches in accordance with the Technical Specification. **Hold Point 19**	Contractor
11	Survey extent of Unit 10 Filter Geotextile, Unit 11 Geosynthetic Clay Liner (GCL), and Unit 12 Geocomposite Drain.	Contractor

6.4.3 *Quality assurance program – Inspection and monitoring*

The following quality assurance program will be conducted at the site. The results of these activities will be recorded by the responsible party and included in the Construction Report.

	Activity	Frequency	Responsibility
1	Inspect storage conditions of geosynthetic materials and inspect rolls for damage (without unwrapping rolls). **Hold Point 5**	Upon delivery of materials to site	CQAI
2	Review MQC test results provided by the Contractor. **Hold Point 21, Hold Point 23, Hold Point 25**	Prior to installation	CQAI
3	Review the proposed panel layout drawings provided by the Contractor.	Prior to installation	CQAI
4	Review the results of independent testing of the geosynthetics. **Hold Point 22, Hold Point 24, Hold Point 26**	Prior to installation	CQAI
5	Inspect the prepared surface and surface maintenance for installation of the geosynthetics.	Prior to installation	CQAI
6	Inspect the excavated anchor trenches, including alignment, distance from batter, depth, width and surface condition of base and walls of trenches.	Prior to GCL installation	CQAI
7	Survey base (each corner) and crest (both sides) of excavated anchor trenches.	Prior to GCL installation	Contractor
8	Monitor installation of Unit 11 GCL to ensure that: — GCL is installed in dry weather conditions, — GCL is installed on smooth, moist surface of the Select Fill, — GCL is installed correctly with the designated under-side (carrier geotextile) being placed on the select fill surface, — GCL anchored as required by Technical Specification — Deployed GCL panels are covered with Unit 12 Geocomposite Drain and Unit 5 Soil Protection Layer on the same day as GCL deployment, without hydration of the GCL prior to covering — Exposed edges of deployed GCL are protected from rainfall runoff with builder's plastic or similar, — GCL is weighted with sandbags to prevent wind uplift. **Continuous Inspection 11, Continuous Inspection 12, Continuous Inspection 13**	During installation of Unit 11 GCL	CQAI
9	Monitor installation of Unit 12 Geocomposite Drain to align with the requirements of the Technical Specification	During installation	CQAI
10	Survey extent of installed GCL and Geocomposite Drain	Prior to placement of overlying materials	Contractor
11	Monitor placement and compaction of Unit 2 Select Fill as backfill in anchor trenches, including positioning of geosynthetics against the walls and base of the trenches in accordance with the Technical Specification and Drawings and backfill to appropriate level to promote surface water drainage.	During Construction	CQAI

6.5 Leachate collection system

6.5.1 Aim

The leachate collection system is constructed in accordance with the requirements of the Technical Specification.

6.5.2 Procedures

The following includes a list of procedures that require quality assurance measures for the construction of the leachate collection system of Stage 2A. The list includes the party responsible for performing each procedure.

Procedure		Responsibility
1	Supply of Unit 22 Leachate Collection Pipe and Unit 23 Leachate Riser Pipe.	Contractor
2	Approval of Unit 22 Leachate Collection Pipe and Unit 23 Leachate Riser Pipe. **Hold Point 28, Hold Point 29**	CQAI
3	Supply of Unit 8 Leachate Drainage Gravel.	Contractor
4	Approval of Unit 8 Leachate Drainage Gravel.	CQAI
5	Join, install and align leachate pipes.	Contractor
6	Survey the crown of installed leachate pipes.	Contractor
7	Submit and gain approval from Superintendent for methodology to place Unit 5 Soil Protection Layer over the cell floors and on the cell walls. **Hold Point 31**	Contractor
8	Place and spread Unit 5 Soil Protection Layer over the cell floors and on the cell walls, as shown on the Drawings.	Contractor
9	Install gravel mounds wrapped in Filter Geotextile	Contractor
10	Survey the top of Unit 5 Soil Protection Layer by licensed surveyor.	Contractor

6.5.3 Quality assurance program - inspection and monitoring

The following quality assurance program will be conducted at the site. The results of these activities will be recorded by the responsible party and issued to the Auditor.

Activity		Frequency	Responsibility
1	Review MQC documentation prior to installation of any pipework. **Hold Point 30**	Prior to installation of pipework	CQAI
2	Inspect perforations in Unit 22 Leachate Collection Pipe and Unit 23 Leachate Riser Pipe, including inspection for absence of ‘swarf’. **Hold Point 28, Hold Point 29**	Before installation	CQAI
3	Test Unit 8 Leachate Drainage Gravel for pre-construction requirements.	As defined in Technical Specification	Contractor
4	Inspect Unit 8 Leachate Drainage Gravel.	Before construction	CQAI

Activity		Frequency	Responsibility
5	Monitor installation of the leachate collection pipes, including inspection of perforation alignments and absence of 'swarf'. **Continuous Inspection 15**	During construction	CQAI
6	Survey crown of installed leachate collection pipes.	During construction	Contractor
7	Monitor placement of Unit 8 Leachate Drainage Gravel around and over leachate pipes.	During construction	CQAI
8	Sample and test particle size distribution for "as-built" Unit 8 Leachate Drainage Gravel.	As defined in Technical Specification	CQAI

6.6 Stormwater erosion control

6.6.1 Aim

Erosion control for the stormwater drain is constructed in accordance with the requirements of the Technical Specification.

6.6.2 Procedures

The following includes a list of procedures that require quality assurance measures for the construction of erosion control for the stormwater drain. The list includes the party responsible for performing each procedure.

Procedure		Responsibility
1	Supply Unit 30 Rip Rap, Unit 9 Topsoil and Unit 31 Vegetation.	Contractor
2	Approval of Unit 30 Rip Rap and Unit 31 Vegetation. **Hold Point 41 and 44**	Superintendent
3	Place and anchor Unit 10 Filter Geotextile in excavated drain footprint which requires rip rap, as per Design Drawings.	Contractor
4	Place Unit 30 Rip Rap overlying Unit 10 Fiter Geotextile.	Contractor
5	Survey placed Unit 30 Rip Rap.	Contractor
6	Place minimum 150 mm of Unit 9 Topsoil in excavated drain footprint which requires vegetation, as per Design Drawings.	Contractor
7	Place Unit 31 Vegetation.	Contractor
8	Monitor Unit 31 Vegetation for an establishment period of 12 weeks. **Hold Point 38**	Contractor

6.6.3 Quality assurance program - inspection and monitoring

The following quality assurance program will be conducted at the site. The results of these activities will be recorded by the responsible party and issued to the Auditor.

Activity		Frequency	Responsibility
1	Measure Unit 30 Rip Rap as per the Technical Specification.	Before installation	CQAI
2	Approval of Unit 9 Topsoil as per the Technical Specification. **Hold Point 41**	As defined in Technical Specification	Contractor
3	Monitor installation of Unit 30 Rip Rap over Unit 10 Filter Geotextile.	During construction	CQAI
4	Monitor installation of Unit 31 Vegetation over Unit 9 Topsoil.	During construction	CQAI
5	Monitor establishment of Unit 31 Vegetation, for a period of 12 weeks. **Hold Point 42**	After construction	Contractor

6.7 Temporary sub-cell structure

6.7.1 Aim

The Temporary Sub-Cell Structure is constructed in accordance with the requirements of the Technical Specification.

6.7.2 Procedures

The following includes a list of procedures that require quality assurance measures for the construction of the Temporary Sub-Cell Structure of Stage 2A. The list includes the party responsible for performing each procedure.

Procedure		Responsibility
1	Procure polyethylene sheet	Contractor
2	Prepare ballast bags with Unit 8 Leachate Drainage Gravel.	Contractor
3	Install polyethylene sheet on the on the floor and batters to achieve design elevation and minimum overlap on floor with GCL. Place bentonite paste strip.	Contractor
4	Place ballast bags to the top of the polyethylene sheet to achieve design elevation.	Contractor

6.7.3 Quality assurance program - inspection and monitoring

The following quality assurance program will be conducted at the site. The results of these activities will be recorded by the responsible party and issued to the Auditor.

Activity		Frequency	Responsibility
1	Monitor installation of the polyethylene sheet and placement of ballast bags. **Hold Point 47**	During construction	CQAI

6.8 Stormwater chute

6.8.1 Aim

The stormwater chute in the perimeter embankment is constructed in accordance with the requirements of the Technical Specification.

6.8.2 Procedures

The following includes a list of procedures that require quality assurance measures for the construction of the stormwater chute of Stage 2A. The list includes the party responsible for performing each procedure.

Procedure		Responsibility
2	Shape chute as per design levels.	Contractor
3	Supply Unit 34 Concrete	Contractor
4	Approval of Unit 34 Concrete.	Superintendent
5	Construction concrete chute.	Contractor
6	Supply Unit 30 Rip Rap	Contractor
7	Approval of Unit 30 Rip Rap	Superintendent
8	Place and anchor Unit 10 Filter Geotextile in excavated chute footprint which requires rip rap, as per Design Drawings.	Contractor
9	Place Unit 30 Rip Rap overlying Unit 10 Fiter Geotextile.	Superintendent

6.8.3 Quality assurance program - inspection and monitoring

The following quality assurance program will be conducted at the site. The results of these activities will be recorded by the responsible party and issued to the Auditor.

Activity		Frequency	Responsibility
1	Check concrete dimensions and reinforcement prior to concrete pour.	Before installation	CQAI
2	Measure Unit 30 Rip Rap as per the Technical Specification.	Before installation	CQAI
3	Monitor construction of concrete chute.	During construction	CQAI
4	Monitor installation of Unit 30 Rip Rap over Unit 10 Filter Geotextile.	During construction	CQAI
5	Approval of Stormwater Chute. **Hold Point 48**	After construction	Superintendent