

REPORT

**Leachate Storage Pond (LP03), Shoal Bay Waste
Management Facility, Darwin, Northern Territory**
Manufacturers Data Report

Submitted to:

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1.0 INTRODUCTION AND BACKGROUND

The City of Darwin Council (Council) manages and operates the Shoal Bay Waste Management Facility (SBWMF), located in Darwin, Northern Territory. The SBWMF operates as the sole waste landfill for Darwin, Litchfield and Palmerston Councils and receives over 180,000 tons of waste materials per annum.

Council commissioned WSP Australia Pty Ltd (WSP Golder) as the Principal Consultant/Contractor (PC) to design and construct a 15ML, geosynthetic lined and covered leachate storage pond (LP03) at the SBWMF. The floating geosynthetic cover on LP03 was designed and installed by Fabtech Australia Pty Ltd as the nominated sub-consultant and geosynthetic installer, under the management and direction of the PC.

Existing ponds LP01 & LP02 receive and store untreated leachate from the landfill areas within SBWMF. The untreated leachate from LP01 & LP02 is pumped into the leachate treatment plant located to the West of these ponds. LP03 is intended to store treated leachate supplied from the leachate treatment plant. LP03 might also be used to store untreated leachate generated from the landfills if the demand for future storage capacity at the SBWMF increases.

This Manufacturers Data Report (MDR) presents a summary of the construction, geosynthetic lining works and the construction quality assurance (CQA) activities undertaken and associated with LP03. The MDR shall be read in conjunction with the Technical Specification and Design Drawings of LP03.

1.1 Location

LP03 is located within the boundaries of the SBWMF and to the north of the existing leachate ponds (LP01 & LP02), please see Figure 1 below.



Figure 1: LP03 Located to the north of the existing ponds.

1.2 Definitions

The key parties and terms referred to in this MDR are described in Table 1.

Table 1: Definitions

Party / Term	Description
Principal	City of Darwin
Contractor	WSP Australia Pty Ltd (WSP Golder). Company that was responsible for the construction of the Works including management of subcontractors.
Sub-Contractor (Civils)	East Arm Civils (EAC)
Geosynthetics Installer	Fabtech Australia
Site	Area of the North of the current Leachate Ponds located to the north of the Landfill Site, as shown on Drawing D002 and D003.
Landfill Site	Shoal Bay Waste Management Facility, Darwin, Northern Territory, as shown on Drawing D001.
Works	All works described in this MDR the Specification and Drawings.
Superintendent	Individual appointed by Principal to act as the Principal's Authorised Person.
Geotechnical Inspection and Testing Authority (GITA)	Was engaged by the Client to undertake inspection of Unit 1 Engineered Fill and Unit 2 Select Fill and inspection of Unit 10 BGM, Unit 11 Geonet and Unit 12 HDPE Geomembrane indicated in the Specification, and to provide an opinion on the compliance of the works with the Specification and Construction Quality Assurance (CQA) Plan. The GITA was on Site on a full-time basis when works for which they are engaged to inspect was being undertaken.
Geotechnical Testing Authority (GTA)	Coffey Testing, was engaged by the Contractor and approved by the Superintendent to undertake quality assurance testing of Unit 1 Engineered Fill, Unit 2 Select Fill, Unit 4 Subgrade Drainage Aggregate, Unit 5 Sump Drainage Aggregate and Unit 7 Riprap as indicated in the Specification.
NATA Laboratory	National Association of Testing Authorities (NATA) accredited geotechnical testing laboratory appointed by the Contractor and approved by the Superintendent to undertake independent testing of earthworks and construction materials for Unit 1 Engineered Fill, Unit 2 Select Fill, Unit 4 Subgrade Drainage Aggregate, Unit 5 Sump Drainage Aggregate and Unit 7 Riprap
Specification	Technical Specification, Design Drawings and any subsequent amendments.
Drawings	Design drawings issued for construction.

2.0 SUMMARY OF CONSTRUCTION ACTIVITIES

The work undertaken was for the construction of one 15 ML geosynthetic lined and covered leachate storage pond (LP03) at the SBWMF. Please see Table 2 below for a summary of the works completed. Construction photographs of the activities described below are presented in Appendix A.

Table 2: Works Summary

Works Part	Summary of work
Planning and Preparation	Prepared and implemented Works control measures: Workplace health, safety and environmental management planning. Construction programs. Construction management plans. Construction method statements. Supply and setup site management infrastructure, including access roads, signage, traffic management, Contractor's facilities, erosion and sediment control and surface water management.
Surface water diversion	Construction of the diversion drain along western toe of the pond to collect runoff from the catchment west of the pond and drain to the north around the pond. Construction of the swale drain along southern toe of pond to collect runoff from the catchment south of the pond and drain to the east around the pond.
Bulk Earthworks	Prepared subgrade surface: Cleared and grubbed work area, including removal of vegetation and topsoil. Stripped granular laterite soils and sand lenses to expose acceptable embankment foundation materials. Excavation to grades and levels indicated on the drawings. Proof rolling exposed surfaces prior to fill placement. Stockpiled excavated materials by material type for re-use. Constructed perimeter embankments and access ramps: Constructed access ramps as was approved by Superintendent with consideration of access track location. Constructed perimeter embankments with Unit 1 Engineered Fill in accordance with the Drawings. Proof rolled subgrade surface.
Groundwater Drainage System	Excavated groundwater drainage trenches to the lines and levels shown on the drawings. Construction of the groundwater drainage system: Placed Unit 9 Separation Geotextile, Unit 15 Groundwater Collection Pipe and Unit 4 Subgrade Drainage Aggregate in groundwater drainage trenches. Placed Unit 21 Geocomposite Drain on the internal excavated batters and tied into the groundwater drainage trenches. Construction of the gravel groundwater drainage blanket with Unit 9 Separation Geotextile and Unit 4 Subgrade Drainage Aggregate.
Emergency overflow system	Excavated trench for overflow weir box and Unit 19 Overflow Pipe. Constructed concrete overflow weir box, FRP Grate and Unit 19 Overflow Pipe connection. Backfilled pipe with Unit 6 Cement Stabilised Sand.
External batter protection	Placed Unit 3 Topsoil and Unit 14 Erosion Protection on areas indicated in the Drawings.
Secondary Liner	Construction of the pond liners: Placed 200 mm thick Unit 2 Select Fill, overlain by Unit 10 BGM, Unit 11 Geonet and Unit 12 HDPE Geomembrane.
Leakage Collection System	Installation of Unit 11 Geonet: Constructed Leakage collection sump and riser: Installed Unit 17 Riser Pipe with end caps.

Works Part	Summary of work
	Placed Unit 5 Sump Drainage Aggregate and Unit 13 Cushion Geotextile over the Unit 17 Riser Pipe in accordance with the Drawings.
Primary Liner	Installed Unit 12 HDPE Geomembrane.
Leachate Extraction Sump and Riser	Construction of the pond sumps and risers: Constructed concrete slabs and headwall for Unit 17 Riser Pipe placement at the crest of embankments. Placed Unit 13 Cushion Geotextile over Unit 12 HDPE Geomembrane on the internal batter and in the sump along the alignment of the Unit 17 Riser Pipe. Installed Unit 17 Riser Pipe with end caps. Placed Unit 5 Sump Drainage Aggregate over the Unit 17 Riser Pipe in accordance with the Drawings. Placed the riser pipe in the pre-cast concrete box.
Anchor Trench	Secured Unit 10 BGM, Unit 11 Geonet and Unit 12 HDPE Geomembrane in the anchor trenches. Backfilling of the anchor trenches using Unit 6 Cement Stabilised Sand.
External Spillway	Constructed the external spillway which included the spillway, chute, dissipation basin and channel. Constructed concrete slab. Placed Unit 7 Rip Rap over Unit 9 Separation Geotextile in the external spillway. Placed rock mattress as part of dissipation basin.
Leachate Inlet pipe	Installed the leachate inlet pipe: Constructed concrete footing and headwall for connection with leachate inlet pipe. Installed Unit 13 Cushion Geotextile. Installed the leachate inlet pipe with Stabilised sand cover.
Floating Cover	Install LLDPE Geomembrane and fix to headwalls.
Crest access	Constructed crest access: Place and compact Unit 8 Pavement Material. Installed post and chain marker fence.

2.1 Construction Program

Refer to Figure 2 and Figure 3 below for the timeline and sequence of construction. The construction program is also presented in Appendix B of this report.

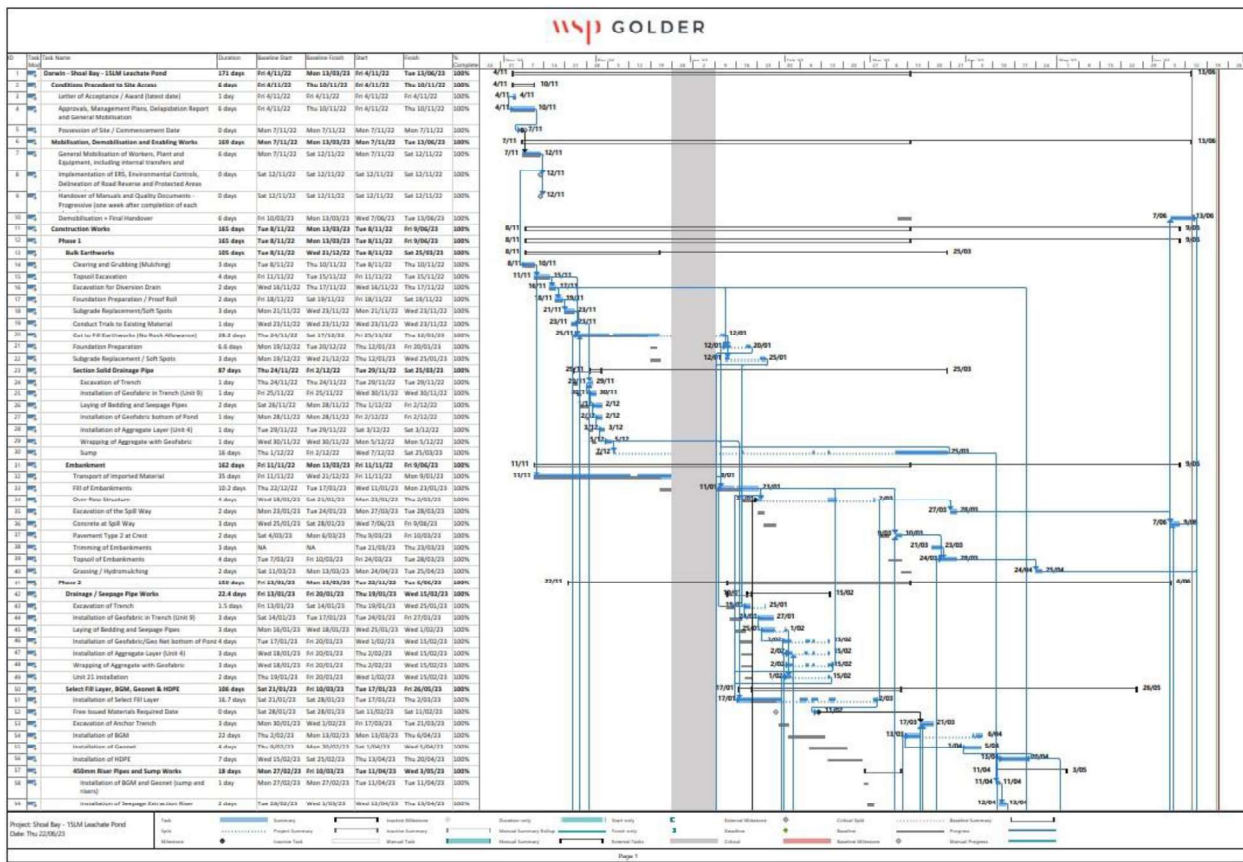


Figure 2: Construction Program of Works

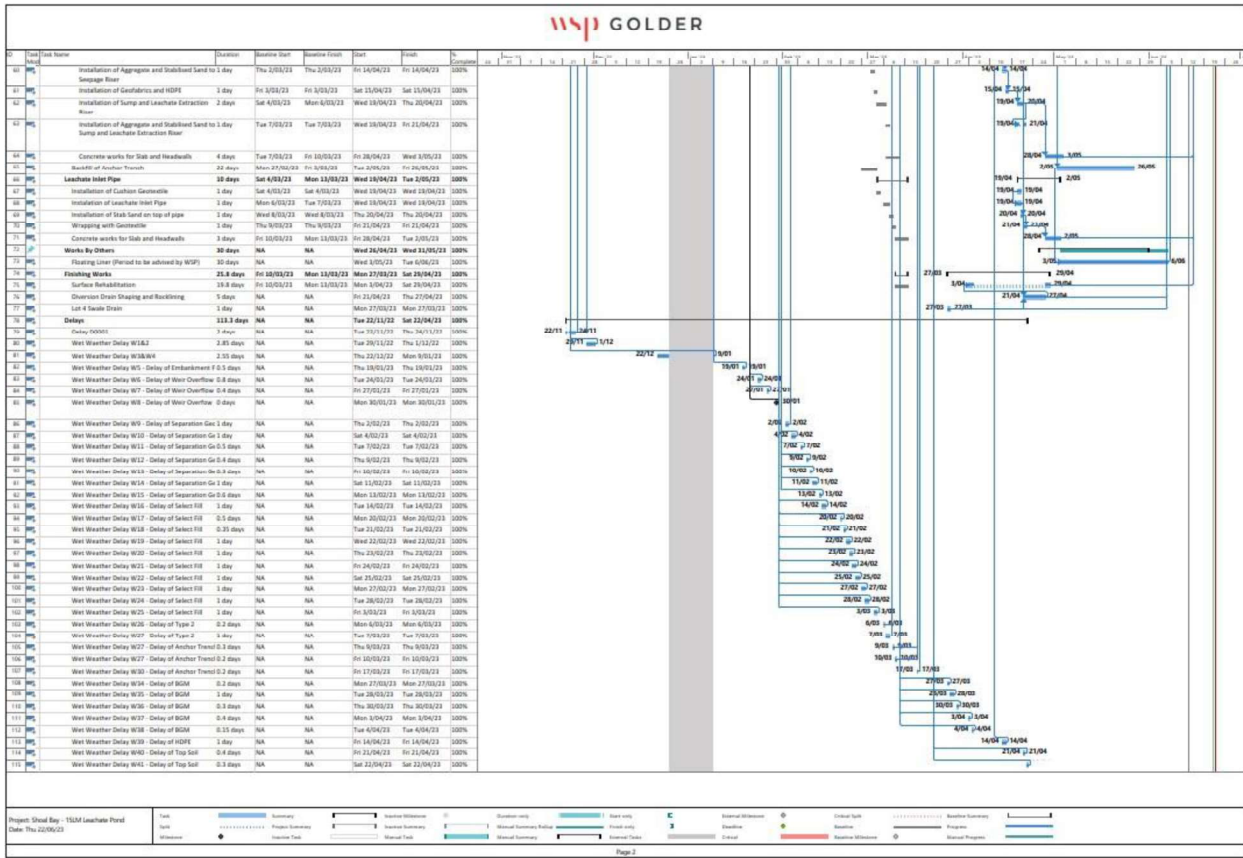


Figure 3: Construction Program of Works Continued

3.0 INSPECTION AND VERIFICATION PERSONNEL

The roles and responsibilities of the WSP Golder inspection and verification personnel involved with this project are set out in Table 3 below.

Table 3: Roles and Responsibilities

Role	Responsibilities
Project Manager	<ul style="list-style-type: none"> Overall authority and accountability for the attainment of the project quality and assignment of resources. Review this MDR completed by the CQA Engineer.
Site/Construction Manager	<ul style="list-style-type: none"> The Construction Manager was the Project Manager representative on site. Supported and facilitated the implementation of the quality management plan. Reviewed quality reports, request for information (RFIs), technical queries (TQs), non-conformance reports (NCRs), site inspection (SIs) and audit reports related to the project. The Construction Manager was involved in quality related investigations at times. Review this MDR completed by the CQA Engineer. Was on Site on a full-time basis till practical completion was reached.

Role	Responsibilities
CQA Engineer	<ul style="list-style-type: none"> ■ Had the responsibility on-site for implementing the quality management plan. ■ Monitoring of materials and work to be compliant. ■ Generated, managed, maintained and communicated ITPs. ■ Coordinated and organised relevant field testing or inspections by qualified personnel as was required under the construction specifications. ■ Performed hold point inspections as required under the construction specifications. ■ Inspected existing conditions prior to the start of the new work, performed in-process and follow-up inspections. ■ Was an authorised inspectorate or designate of ITRs and observed and documented nominated Hold and Witness Points as the work progressed. ■ Monitored and reported the correction of non-conformances, where it was appropriate. ■ Resolved quality matters and worked with the Project Engineer to resolve technical engineering and managed changes in design. ■ Provided technical knowledge of soil conditions and disseminate information gained from geotechnical investigation and analysis. ■ Issued quality reports, request for information (RFIs), technical queries (TQs), non-conformance reports (NCRs), site inspection (SIs) and audit reports reviewed by the Project/Construction Manager. ■ Was involved in all quality related investigations about the above. ■ Reported directly to the Construction Manager on all matters/issues concerning quality assurance. ■ Completed daily, weekly, and monthly quality reports. ■ Was on Site on a full-time basis till practical completion was reached.
Project Engineer	<ul style="list-style-type: none"> ■ The Project Engineer has liaised with the CQA Engineer and resolved technical engineering issues and managed change in design. ■ Had responsibility for communicating any changes to the site management team to ensure adherence with design. ■ Had responsibility for managing material selection for quality. ■ Coordinated and managed material procurement, handling and storage. ■ In liaison with the CQA Engineer organised conformance testing of procured materials in accordance with the quality management plan and the contract specifications. ■ Maintained the project Document Control registers and files, electronically and hard copies on site. ■ Filed of subcontractor or supplier quality management information. ■ Recorded and distributed minutes of quality management meetings. ■ Assisted in the distribution of relevant quality information. ■ Reported directly to the Construction Manager and has completed daily reports that was included in the Project Manager's weekly and monthly construction reports. ■ Was on Site on a full-time basis till practical completion was reached.
GITA	<ul style="list-style-type: none"> ■ Inspected Unit 10 BGM, Unit 11 Geonet and Unit 12 HDPE Geomembrane indicated in the Specification.

Role	Responsibilities
	<ul style="list-style-type: none"> ■ Provided an opinion to the client on the compliance of the works with the Specification and Construction Quality Assurance (CQA) Plan. ■ The GITA was on Site on a full-time basis when works for which they are engaged to inspect was being undertaken.
GTA	<ul style="list-style-type: none"> ■ Coffey Testing Pty Ltd.

4.0 ISSUED FOR CONSTRUCTION DRAWINGS AND TECHNICAL SPECIFICATION

The pond construction was done according to and in line with the technical specification and drawings set out in Table 4 and Table 5 below. The documents are presented in Appendix C of this report.

Table 4: Specifications

Document No.	Title	Originator	Revision No.	Date of Issue
004-R	Shoal Bay Waste Management Facility – Leachate Storage Pond 3 – Technical Specification	WSP	0	24/11/2022
QA-MAN-005	QA QC Manual for the Installation of Geosynthetic Membranes	Fabtech	1	25/10/2021
-	Construction Methodology Statement (CMS)	Fabtech	A	02/03/2023

Table 5: Drawing Register

Drawing No.	Title	Originator	Revision No.	Date of Issue
001	Locality Plan and Drawing Index	WSP	0	24/11/2022
002	Existing Conditions Plan	WSP	0	24/11/2022
003	Earthworks Cut & Fill Plan	WSP	0	24/11/2022
004	Groundwater Drainage Plan	WSP	0	24/11/2022
005	General Arrangement Plan	WSP	0	24/11/2022
006	Long Sections – Leachate Storage Pond	WSP	0	24/11/2022
007	Long Sections – Spillway and Groundwater Drainage	WSP	0	24/11/2022
008	Typical Details - Embankment	WSP	0	24/11/2022
009	Plan and Details – Emergency Leachate Overflow System	WSP	0	24/11/2022
010	Typical Details – Liner and Drainage	WSP	0	24/11/2022
011	Plan and Sections – Sump and Riser Pipes	WSP	0	24/11/2022

Drawing No.	Title	Originator	Revision No.	Date of Issue
012	Typical Details – Sump and Riser Pipes	WSP	0	24/11/2022
013	Plan and Section – Stormwater Spillway	WSP	0	24/11/2022
014	Typical Details – Stormwater Spillway	WSP	0	24/11/2022
015	Plan and Typical Details – Inlet Pipe	WSP	0	24/11/2022
016	Plan, Section and Typical Details – Diversion Drain	WSP	0	24/11/2022
020	General Notes Sheet 1	WSP	0	23/03/2023
021	General Notes Sheet 2	WSP	0	23/03/2023
025	Plan and Sections – Sump and Riser Pipes – Structural	WSP	0	23/03/2023
026	Sections and Details – Sump and Riser Pipes – Structural Sheet 1	WSP	0	23/03/2023
027	Sections and Details – Sump and Riser Pipes – Structural Sheet 2	WSP	0	23/03/2023
028	Sections and Details – Sump and Riser Pipes – Structural Sheet 3	WSP	0	23/03/2023
030	Plan and Sections – Emergency Leachate Overflow System - Structural	WSP	0	23/03/2023
035	Plans – Inlet Pipe – Structural	WSP	0	23/03/2023
036	Sections and Details – Inlet Pipe – Structural	WSP	0	23/03/2023
040	Plan and Sections – Stormwater Spillway - Structural	WSP	0	23/03/2023
CD-2004-01	Assumed Pond Size and Sections	Fabtech	00	19/04/2023
CD-2004-02	Cover General Arrangement	Fabtech	00	19/04/2023
CD-2004-03	Cover GM Panel Layout	Fabtech	00	19/04/2023
CD-2004-04	Ancillaries Details	Fabtech	00	19/04/2023
CD-2004-05	Ancillaries Details	Fabtech	00	19/04/2023
CD-2004-06	Ancillaries Details	Fabtech	00	19/04/2023
CD-2004-07	Ancillaries Details	Fabtech	00	19/04/2023
CD-2004-08	Ancillaries Details	Fabtech	00	19/04/2023
CD-2004-09	Ancillaries Details	Fabtech	00	19/04/2023

Drawing No.	Title	Originator	Revision No.	Date of Issue
CD-2004-10	Ancillaries Details	Fabtech	00	19/04/2023
MD-2004-11	Access Hatch Manufacturing Drawing	Fabtech	00	28/02/2023
MD-2004-13	Access Hatch Manufacturing Drawing	Fabtech	00	28/02/2023

5.0 DESIGN CHANGE MANAGEMENT

5.1 Non – Conformance Reports (NCR)

A total of five non – conformances were raised for the works, all of them with potential design quality implications. NCRs were issued by the WSP Golder Project Manager to the WSP Golder Design Engineer. Concessions and corrective actions generated from NCRs were reviewed and accepted by the Design engineer. The NCRs are presented in Appendix D. The NCR register (NCR) is presented in Table 6 below.

Table 6: NCR Register

NCR No.	Description	Date Raised	Action Taken
001	Site won material – Material not meeting requirements of the technical specification.	17-Mar-23	Use As Is
002	Unit 15 Ground Water Collection Pipe – Constructed works not meeting design levels.	12-Jan-23	Design Modification
003	Unit 21 Geocomposite Drain- TN220 – Material not meeting requirements of the technical specification.	1-Mar-23	Use As Is
004	Unit 11 Geonet– Material not meeting requirements of the technical specification.	17-Mar-23	Use As Is
005	Omitted as a modification to the erosion protection seed mix was not deemed a non-conformance.		
006	Unit 9 Separation Geotextile– Material not meeting requirements of the technical specification.	14-Apr-23	Use As Is

5.2 Documented Design Changes

A summary of the design changes is shown in Table 7 below and the documents accompanying the changes are presented in Appendix E.

Table 7: Design Changes

Description and Details	Status	Document
Unit 16 – Solid Drainage Pipe. Due to material shortage, use a DN120 SDR11 PN16 PE100 ENVIROPRESSURE pipe instead of the specified SDR13.6 DN110 Pipe.	Approved	Document No. EAC-TDF-FRM-4102

Description and Details	Status	Document
Reduce the depth of the groundwater drainage trench by 100 mm and widen the trench by 100 mm to maintain equivalent flow cross-sectional area and to maintain drainage grades consistent with the design.	Approved	NCR 002
Unit 14 – Erosion Protection. Alternative seed mix than what was specified due to adverse weather crop shortage & inferior seed quality in the US at the time. As a result, there was almost no Pensacola (<i>Paspalum notatum</i> Pensacola) seed imported into Australia along with low availability of couch.	Approved	Email dated 13/04/2023
Sub-contractor proposed to blend lot 1 outer embankment slope into southern diversion drain for constructability and maintenance.	Approved	Email dated 30/03/2023
Sub-contractor proposed change to diversion drain outlet. Remove 90-degree bend at outlet to prevent discharge against perimeter fence and to avoid erosion underneath the fence.	Approved	Email dated 26/04/2023

6.0 INSPECTION AND TESTING REQUIREMENTS

Project specific Inspection and Testing Plans (ITP) with supplementary Inspection and Test Records (ITR) were developed for the different stages pond construction and lining works. These documents were submitted for review and comments in accordance with the Quality Management Plan (QMP) and were approved by WSP prior to commencing the activities identified in each ITP. Table 8 provides a summary of the ITP register.

Table 8: WSP ITP Register.

Sr/ No	ITP No	Work Description	Performed By
01	PC-ITP-001	Clear Grub & Topsoil Strip	EAC
02	PC-ITP-002	Bulk Earth Work Excavation	EAC
03	PC-ITP-003	Subgrade Preparation & Inspection	EAC
04	PC-ITP-004	Embankment Construction	EAC
05	PC-ITP-005	Under Drainage & Secondary Liner	EAC
06	PC-ITP-006	Select Fill Placement & Liner Subgrade Preparation	EAC
07	PC-ITP-007	Geonet & Primary Liner	EAC
08	PC-ITP-008	Spillway Works	EAC
09	PC-ITP-009	Overflow Weir Box & Solid Overflow Pipe	EAC
10	PC-ITP-010	Leakage Extraction Pipe	EAC
11	PC-ITP-011	Sump & Leachate Extraction Pipe	EAC
12	PC-ITP-012	Leachate Inlet Pipe	EAC
13	PC-ITP-013	Southern Embankment Swale Drain	EAC
14	PC-ITP-014	Grassing, Hydro mulching of embankment	EAC
15	PC-ITP-015	Floating Cover Installation	Fabtech
16	PC-ITP-016	Finishing Works	EAC
17	PC-ITP-17	Anchor Trench	EAC

Completed WSP ITPS and ITRs are presented in Appendix F. A copy of the Civil Contractors MDR is presented in Appendix G, and the CQA data for the floating cover recorded by the Geosynthetics Installer is presented in Appendix H.

7.0 MATERIAL QUALITY ASSURANCE

7.1 Summary and Description of Materials

Materials used during the construction of LP03 are defined in Table 9 below.

Table 9: Works Materials

Unit	Description
Soil Materials	
Unit 1 Engineered Fill	Soil material with a minimum fines content of 30% and maximum particle size of 130 mm that is excavated, transported, moisture conditioned, compacted and tested according to the performance standards in the Specification.
Unit 2 Select Fill	Clay rich soil sourced by the Contactor with a minimum fines content of 30% and a maximum particle size of 37.5 mm that was excavated, transported, placed, moisture conditioned, compacted and tested according to the performance standards in the Specification.
Unit 3 Topsoil	Soil to establish and maintain grass cover that is placed according to the Specification.
Granular Materials	
Unit 4 Subgrade Drainage Aggregate	Low fines content aggregate.
Unit 5 Sump Drainage Aggregate	Low fines content aggregate.
Unit 6 Cement Stabilised Sand	5% cement stabilised sand pre-mixed at a concrete batch plant of type approved by the Superintendent.
Unit 7 Rip Rap	D50 of 100 mm for erosion protection.
Unit 8 Pavement Material	Recently quarried Type II Gravel in accordance with Northern Territory Government's Department of Infrastructure Technical Specification for Pavement Materials. The Unit 8 Pavement Material is to provide erosion protection and a surface for controlled traffic access on selected portions of the crests of the ponds, as indicated on the Drawings.
Geosynthetics	
Unit 9 Separation Geotextile	Medium to separate materials.
Unit 10 BGM	Bituminous Geomembrane liner (BGM)
Unit 11 Geonet	Continuous leakage collection layer installed across the pond footprint.
Unit 12 HDPE Geomembrane	2.0 mm thick High-Density Polyethylene (HDPE) geomembrane installed by the Geosynthetics Installer.
Unit 13 Cushion Geotextile	Medium to protect underlying/overlying geosynthetics materials.
Unit 21 Geocomposite Drain	Continuous groundwater seepage collection layer installed on the internal batters around the pond up to existing ground level

Unit	Description
Pipes	
Unit 15 Groundwater Collection Pipe	Perforated Nominal Diameter 90 mm pipe approved by the Superintendent, to be installed by the Pipe Installer. Used to collect and convey groundwater seepage.
Unit 16 Solid Drainage Pipe	Solid Nominal Diameter 110 mm pipe approved by the Superintendent, to be installed by the Pipe Installer. Used to convey groundwater seepage collected in the system to the outlet location.
Unit 17 Riser Pipe	Nominal Diameter 450 mm HDPE PE100 pipe to be installed by the Pipe Installer. Used for the seepage extraction and leachate extraction systems.
Unit 18 Leachate Inlet Pipe	Pipe installed above the liner system to allow leachate discharge into the pond (below the floating cover).
Other Materials	
Unit 14 – Erosion Protection	Hydro mulch mix placed on the outer batters of leachate storage pond, stormwater drains and disturbed areas agreed between the Principal and the Contractor.
Unit 19 Overflow Pipe	Solid Nominal Diameter 200 mm pipe approved by the Superintendent, to be installed by the Pipe Installer. Used to convey emergency overflow from the leachate storage
Unit 20 – Concrete	32 MPa concrete (with steel reinforcement where it was required).

7.2 Review and Approval of Construction Materials

As a hold point (HP2) to the respective construction activities, the material listed in Table 9 has been reviewed and approved by the Superintendent prior to delivery and prior to use on site. Records of review are presented in Appendix I.

8.0 HEALTH SAFETY AND ENVIRONMENT

Health and Safety on the project was managed by the project management/supervisory team supported by safety advisors. The contractor also had a HSE resource based on site to provide additional support in the field and to provide documentation.

8.1 Risk Management Process

Prior to the commencement of the project, a comprehensive desk top risk review was conducted by the project management/supervisory team supported by safety advisors. In addition to the desk top review a HazId Workshop was undertaken by the project management/supervisory team, safety advisors and the construction contractor engaged to complete the works. A further HazId Workshop was held prior to the commencement of the lining works with the lining contractor and the construction contractor.

This process ensured alignment with the risk management processes of all parties and led to the identification of the critical risks on the project including mobile plant/pedestrian interaction, lifting operations and fit for purpose plant and the competency of the operator.

Supporting these processes was the Take 5 process, which aided in effective decision making and ensured changes in conditions throughout were identified and risk controls implemented.

Minimum weekly site walkthroughs with the construction contractor and field inspections took place reviewing environmental and traffic controls, documentation compliance, in field behaviors and site conditions.

8.2 Permit to Work System

A documented "Permit to Work" (PTW) system was established providing a way of ensuring safety, environmental and cultural heritage clearances are obtained. Prior to any high-risk task being performed the scope of work was discussed with the Permit Recipient. The Work Method Statement (SWMS) for the task and the JSA were reviewed and collated into a work pack for the task, confirming hazards associated with the proposed task have been identified, assessed, and controlled.

14 Authority to Work, 10 Hot Work, 7 Lifting and 8 Ground Penetration Permits were issued and completed within accordance with the site standards and management protocols and closed out during the project.

8.3 Induction and Training Records

In the early works at the commencement of the project, until a WSP construction zone was established, WSP and contractors integrated into Veolia's induction and permitting systems. In total 114 workers were inducted onto the project. That included 37 inductions delivered face to face and 77 inducted via a site-specific online induction developed in conjunction with Sine Pro. Both the face to face and online inductions has a questionnaire to check for understanding and acknowledgement. Copies of qualifications, competencies and VOC's were requested and maintained to ensure the worker was qualified for the task.

The need for additional controls to ensure individuals were fit for duty was identified. All workers were required to be drug and alcohol free while on site and passive alcohol testing was conducted daily. A total of 1247 passive alcohol tests and 8 random drug tests were conducted.

Daily site sign in via the online Sine Pro app outlined conditions of entry, emergency evacuation muster point, stop work authority, as well as a tool to communicate additional information such as changes to site conditions.

8.4 Mobile Plant Mobilization

A number of the critical risks identified on the project related to the operation of heavy mobile plant and equipment. These risks were mitigated through the verification of competency process conducted on all plant operators to ensure plant and or equipment was not only being operated by ticketed personnel, but these personnel had been deemed competent.

Before the plant or equipment was allowed on site a pre-mobilization inspection and supporting documentation was undertaken to ensure that it was safe for use, fit for purpose, licensed, or registered as required and compliant with applicable legislative and other requirements. Plant pre-start checks were conducted by the operators prior to commencing works for the day. Throughout the project 37 mobile plant and heavy vehicles were utilized on site.

Two environmental incidents occurred due to hydraulic hose failure on mobile plant while working on site.

8.5 HSE Consultation and Communication

Regular and open communication was identified as a critical success factor for HSE on the project. This was achieved through daily pre-start meetings, involving all work teams. The daily pre-start meetings provided a forum to discuss the scope of work for the day, relevant critical hazards associated with this work and what controls are required to be in place. All relevant hazards and controls were documented on a JSEA and acknowledged by all in attendance. The JSEA was then used for any visitors attending the site to inform them

of the day's works and what the identified hazards were. They too would then acknowledge by signing onto the JSEA.

Both WSP and the construction contractor held regular Toolbox Meetings to inform the work group of items such as workplace procedures, relevant industry news or incidents and emergency response drills. A combined 24 Toolbox meetings were delivered during the project.

To provide workers and visitors to the site with relevant safety information a safety notice board was established in the lunchroom. The safety notice board had information such as WSP HSEQ Policy, Emergency Contact Numbers, Site Evacuation and Emergency Procedures, Site Muster Point, Traffic Control Plan and other industry news.

Table 10: Project H&S Statistics.

Metric	Unit	Total
Site Construction Hours Direct	Hrs	7,524
Site Construction Hours Indirect	Hrs	20,268
Take 5	-	169
Authority to Work Permit	-	14
Hot Works Permit	-	10
Lifting Operations Permit	-	7
Ground Penetration Permit	-	8
Veolia Permit	-	2
Total Permits	-	39
Project Inductions Completed	-	114
Passive Alcohol Testing	-	1247
Random Drug Testing	-	8
Plant Premobilisations	-	37
Field Inspections	-	19
Toolbox Meetings	-	24
Site Walkthrough with Contractor	-	34
Lost Day Injuries	LDI	0
Medically Treated Injuries	MTI	0
First Aid Incident	FAI	0
Restricted Workday Injury	RWDI	0
Environment Incident	ENV	2
No injury Incident	INC	0
Total Incidents	-	2

9.0 PROJECT CLOSE OUT

The construction of the pond was done in line with and according to the specifications and design drawings attached to this MDR. We trust this document meets all requirements, however if you require further information, please do not hesitate to contact the undersigned.

Signature Page

Louie Hogewind
Construction Manager

Glen Fuller
Project Manager

PM:LH/GJF/pm;lh:gjf

[https://wsonline.sharepoint.com/sites/au-ps132636/shared documents/6. deliverables/028_mdr/ps132636_028_reva_manufacturers report.docx](https://wsonline.sharepoint.com/sites/au-ps132636/shared%20documents/6.%20deliverables/028_mdr/ps132636_028_reva_manufacturers%20report.docx)

APPENDIX A

Construction Photographs

(To be provided)

APPENDIX B

Construction Program

APPENDIX C

**Issued for Construction
Specification and Drawings**

APPENDIX D

Non-Conformance Reports

APPENDIX E

Design Change Documents

APPENDIX F

**Completed WSP ITPs and ITRs
Records**

(To be provided)

APPENDIX G

**EAC Materials Data Report
(MDR)**

APPENDIX H

**Construction Quality Assurance -
Floating Cover**

(To be provided)

APPENDIX I

Record of Review - Materials

wsp **GOLDER**

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