Environmental Compliance Report

Bakers Junction Waste Transfer Station

DWER Works Approval Number W6565/2021/1

19 April 2022

City of Albany 2022
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Quality Assurance

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Manager – Engineering & Sustainability	Executive Director Infrastructure Development & Environment

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0.1	[redacted] Manager – Engineering & Sustainability	Draft for internal review.	17/03/2022
1.0	[redacted], Manager – Engineering & Sustainability	Final document. Approved by Executive Director on 19/04/2022.	19/04/2022

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Glossary of terms and acronyms

AEP	Annual Exceedance Probability
CBD	Central Business District
DWER	Department of Water and Environmental Regulation
FOGO	Food organics and garden organics collected by local governments from households
Putrescible	The component of the waste stream likely to become putrid – including wastes that contain organic materials such as food wastes or wastes of animal or vegetable origin, which readily bio-degrade within the environment of a landfill
WMF	Waste Management Facility
WTS	Waste Transfer Station

1. Introduction

The City of Albany lodged a 'Works Approval' application with the Department of Water Environmental Regulation (DWER) on 1 April 2021, to receive, decontaminate and temporarily store food organics and garden organics (FOGO) at a specifically designed transfer station at the Bakers Junction Waste Management Facility (WMF).

Bakers Junction WMF is a Class II putrescible landfill located adjacent to Chester Pass Road, about 13km from the City of Albany CBD. The landfill is operated under DWER prescribed premises license L7048/1997/11. The WMF services regional properties mainly and has limited opening hours of Tuesday morning and all day Saturday.

The FOGO is to be stored at a specifically constructed transfer station on a bunded asphalt hardstand, with leachate directed to the site's existing leachate basin. This leachate basin is designed to capture any potential leachate / stormwater from the proposed FOGO Waste Transfer Station (WTS). The proposed WTS is located on the southern side of the Bakers Junction WMF and comprises 2,000 m^2 (refer Figure 1).

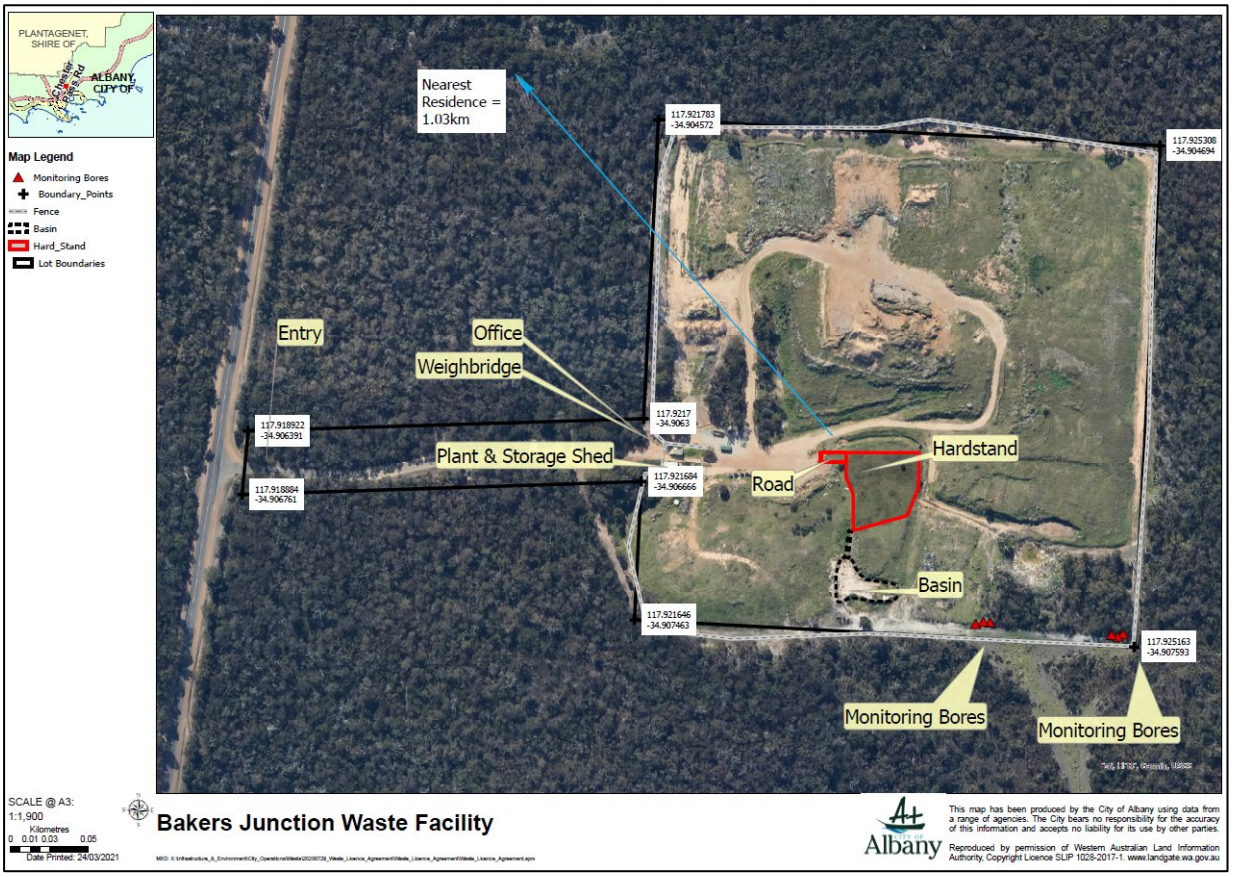


Figure 1: Proposed FOGO waste transfer station at Bakers Junction Waste Management Facility

In July 2021, the Department of Water and Environmental Regulation issued a Works approval number W6565/2021/1 for the receivals of FOGO at the Bakers Junction Waste Management Facility, limit of 4,500 tonnes per annual period.

Approvals were for a Category 62: Solid waste depot: premises on which waste is stored or sorted, pending final disposal or re-use.

1.1. Scope of Response

DWER has requested an Environmental Compliance Report. This report is in response to this request, which requires the works approval holder, within 30 calendar days of installation of an item of infrastructure, to:

- Undertake an audit of their compliance with the requirements of Condition 1.
- Prepare and submit to the CEO an Environmental Compliance Report on that compliance.

The Environmental Compliance for Stage 1 works covers:

- Hardstand
- Drainage infrastructure
- Detention basin

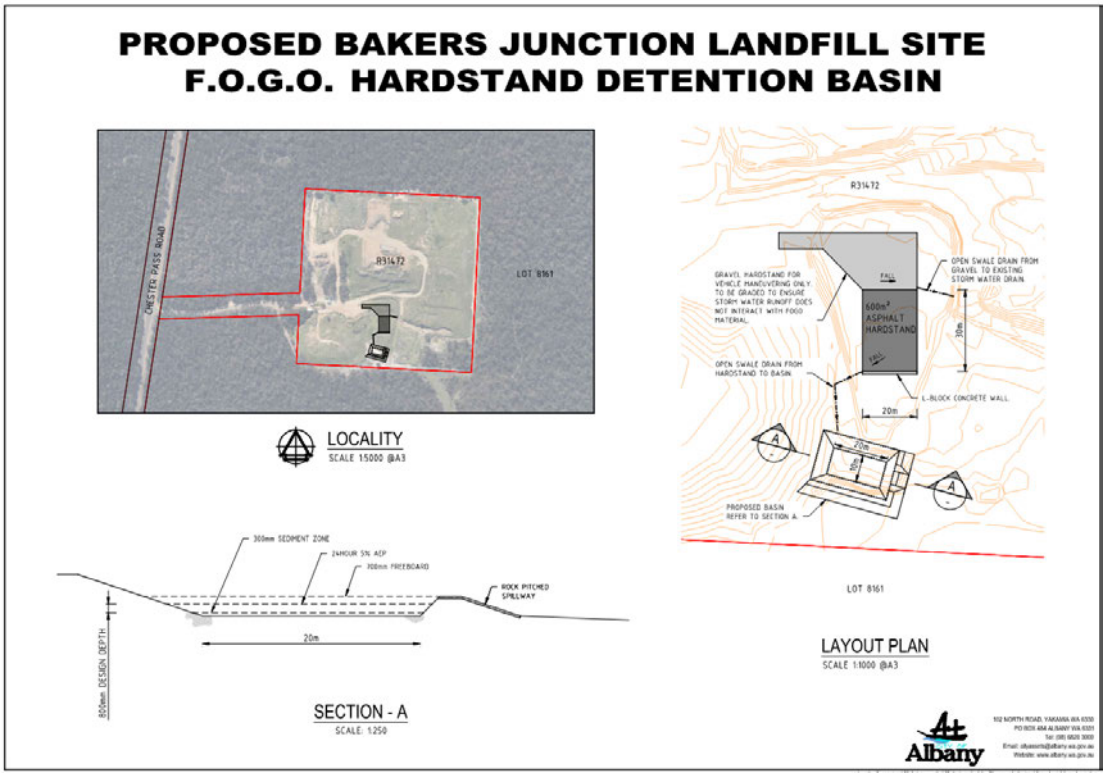


Figure 2: Hardstand and leachate basin original design

2. Infrastructure Works

As constructed plans for all elements are included in Appendix 1.

2.1. Hardstand

Design

600m^2 hardstand requirements:

(a) Constructed of asphalt with a minimum 2% fall that is capable of direction all water that has been in contact with FOGO waste materials to the leachate system.

(b) Designed and constructed to support, without sustained damage, the load of the material on it and any machinery used on the surface.

(c) All asphalt and foundation compaction to be completed with the specification listed in Schedule 1, Figure 2.
(d) Surface and bunding (including joining seals) to be constructed to achieve a permeability of 1 x 10^{-9} m/s or less to prevent any potential leachate surface run-off and seepage.

The design was based on 100mm top soil strip, 150mm gravel sub base, 200mm basecourse, primer seal and 30mm asphalt surfacing course.

As constructed

Construction works commenced end July 2021 with top soil stripping and surface preparation.

Figure 3: Top soil removal and laying of limestone sub base.

Limestone for use as sub base was delivered and placed in accordance with specifications. This layer was meant to be 150mm thick but due to poor ground conditions the as built thickness was on average 500mm thick and was laid and compacted in 150mm thick layers.

As the hardstand is above a landfill, there was considerable settlement in this area and a geo grid was used to ensure compaction requirements were met. This is a minor modification to the approved design. The grid used was Secugrid 40/40. See Appendix 3 for more information and Figure 4 for an installation photo.

Gravel basecourse was laid above the geo grid 200mm thick. Due to unseasonable bad weather, works stopped at the end of July 2021 and recommenced at end November 2021.

Figure 4: Installation of Geo Grid above limestone sub base.

Figure 5: Prepared hardstand prior to sealing

Sealing of the hardstand was completed in January 2022, including the installation of 1.6m high precast concrete bund wall. The hardstand was sealed with primer seal and 30mm asphalt surfacing course.

Access around the structure has been provided to enable maintenance and other activities to be undertaken. Pad has a fall into the lined drain.

Figure 6: Partially sealed hardstand with Bund wall.

Figure 7: Fully Sealed hardstand

2.2. Drainage Infrastructure

Design

Drainage from hardstand to detention basin

(a) A defined drainage channel is to be installed to direct all leachate surface run-off and seepage to the detention basin.
(b) The drainage channel is to be lined to achieve a permeability of $1/10^{-9}$ m/s or less.
(c) The drainage channel and associated infrastructure is to be designed to convey water from a 24-hour, rainfall event with an annual exceedance probability of 5% to the detention basin without overflow.
(d) All pipework, fittings and joints are to be constructed of impervious material and free from leans and defects (if applicable).

As constructed

The existing drainage channel has been dug out and realigned to ensure that only drainage from the hardstand will flow into the leachate pond. Lining using a geosynthetic clay liner was undertaken in accordance with manufacturer's recommendations – see Figure 8. For more information regarding the liner see detention basin section. A kerb has been installed to ensure water flow from sealed pad is directed to lined drainage channel.

Figure 8: lined drainage channel

2.3. Detention basin

Design

(a) The detention basin is to be designed to be able to store a 24-hour, rainfall event with an annual exceedance probability of 5% without utilizing freeboards capacity.
(b) Lined to achieve a permeability of 1 x 10^{-9} m/s or less.
(c) Must be free from leaks and defects.
(d) Must be provided with access points for the removal of wastewater where required to maintain basin freeboard.

As Constructed

The existing leachate basin has been reshaped and lined with ELCOSEAL geosynthetic GCL Clay Liners (X1000) which has a permeability of over 3 x 10^{-11}. ElcoSeal has bentonite impregnated longitudinal overlaps that allowed simple on-site joining. Anchor trenches were used at the top of the basin.

The City's operations team installed the liner and has used the liner in previous projects. The volume of the basin is 397kL compared to the 250kL plus 500mm freeboard required by the design.

Figure 9: Lined leachate pond

2.4. Changes

The above outlines changes to the original design. All changes referenced in the document are as follows:

a. Minor in nature and does not materially change or affect the infrastructure.
b. Does not increase risks to public health, public amenity or the environment.
c. Do not affect other conditions in the works approval which are still all satisfied.

2.5. Works still left to complete

The following works are still to be finished:

- Backfill behind the concrete bund wall.
- White lining on the sealed hardstand to create delivery lanes.
- Access road on the eastern side – this will allow maintenance of the leachate pond area and allow FOGO to be pushed off the hardstand into waiting vehicles. This is a change of scope, which will require a variation. The works involve the installation of 2.1/2.4m high precast concrete L beams. This does not affect the environmental aspects of the work and therefore deemed minimal in nature. Full details will be provided by a separate letter requesting approval of variation.

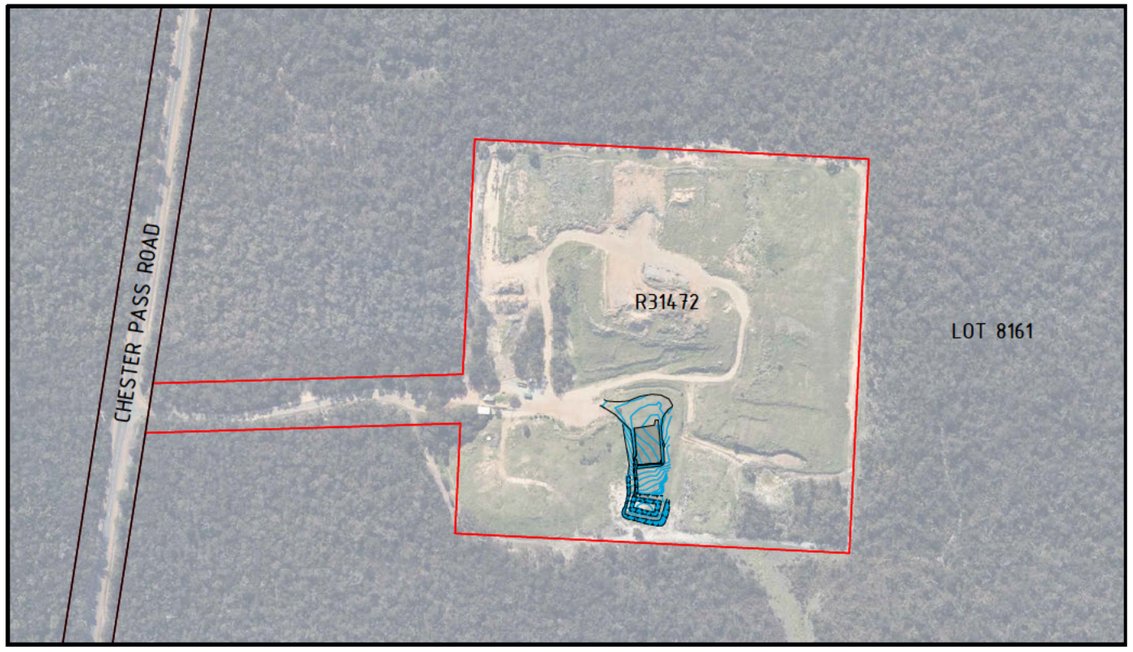
3. Certification

In accordance with condition 3, 4 and 5 of the Works Approval the following can be confirmed:

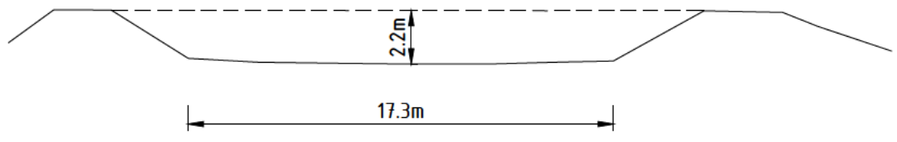
a. All works are certified by [redacted] – Manager Engineering and Sustainability at City of Albany – see signed drawing in Appendix 1. Works have been carried out in accordance with Section 2 with minor modification as outlined in the report.
b. There are no results of a liner integrity test as this type of liner does not require it. However, the installation was undertaken by experienced personnel and in accordance with manufacturer's requirements.
c. As constructed plan, including detailed levels for the infrastructure specified in condition 1 is included in Appendix 1.
d. Labelled photographic evidence is included in the body of section 2 of this report.
e. Departures from condition 1 of the Works Approval are outlined in the relevant sections in section 2 of this document including description and reason for the departure.
f. Signature on the as built drawing in Appendix 1 is an authorized person to represent the works approval holder and contains the printed name and position of that person.

Appendix 1 – As built plans

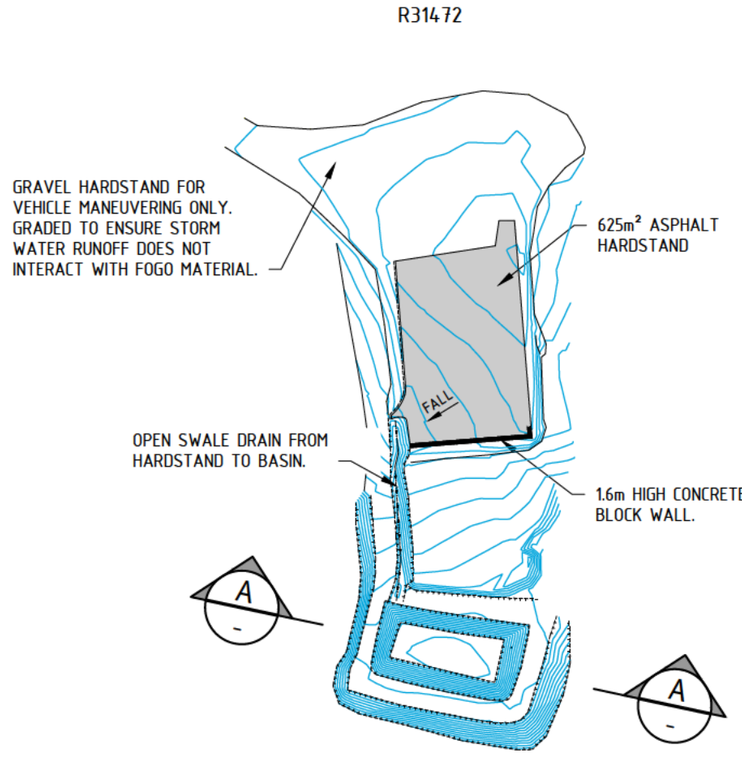
BAKERS JUNCTION LANDFILL SITE
F.O.G.O. HARDSTAND AND DETENTION BASIN
AS CONSTRUCTED SURVEY



LOCALITY
SCALE 1:5000 @A3



SECTION - A
SCALE: 1:250



LAYOUT PLAN
SCALE 1:1000 @A3

City of Albany
102 NORTH ROAD, YAKAMIA WA 6330
PO BOX 484 ALBANY WA 6331
Tel: (08) 6820 3000
Email: cityassets@albany.wa.gov.au
Website: www.albany.wa.gov.au

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Appendix 2 – Testing Reports

GREAT SOUTHERN GEOTECHNICS
CONSTRUCTION MATERIALS TESTING

5a 209 Chester Pass Rd, Milpara WA 6330
Phone: 0407 903 297
Email: Info@gsgeotechnics.com
WWW.GSGEOTECHNICS.COM

Client: Great Southern Sands
Project: Bakers Junction Tip
Section: FOGO Hardstand

Client Number: PO 61561
Date Sampled: 16/02/2020
Date Received: 16/02/2020

Field Nuclear Density Test Report

Test Method - AS 1289 Method 1.1, 2.1.1, 5.4.1, 5.8.1

Road	-	Material Description	Sandy GRAVEL
Layer Type	Basecourse		

Date NDM Tested	16/02/2020	Layer Depth (mm)	200	Preparation Method	AS1289.1.1
Date MC Tested	16/02/2022	Test Depth (mm)	150	Sampling Method	AS 1289.1.2.1 Proc 6.4

Test & Sample Locations - AS 1289 1 2 1, Site Selected by Client

Sample No.	5733G1								
Site No.	1								
Time Sampled	12:30								
Easting	6136911								
Northing	584353								
Offset From	-								

Determination of field density and field moisture content of a soil using a nuclear surface moisture - density gauge - direct transmission mode AS 1289 5 8 1,AS 1289 2 1 1

DT Test Depth (mm)	150								
Wet Density (t/m³)	2.49								
Field Moisture Content (%)	7.9								
Dry Density (t/m³)	2.31								

Determination of the dry density/moisture content relation of a soil using modified compactive effort - AS 1289 5 2 1,AS 1289 2 1 1

Maximum Dry Density (MDD) (t/m³)	2.15								
Adjusted MDD (t/m³)	2.20								
Optimum Moisture Content (OMC) (%)	11.0								
Adjusted OMC (%)	9.5								
(Wet) Oversize Retained 19.0mm (%)	12								
(Wet) Oversize Retained 37.5mm (%)	N/A								
(Dry) Oversize Retained 19.0mm (%)	12								
(Dry) Oversize Retained 37.5mm (%)	N/A								

Compaction Control - AS 1289 5 4 1

Dry Density Ratio (%)	105.0								
Moisture Ratio (%)	83.0								
Moisture Variation (%)	1.5								
Wet/Dry of OMC	Dry								

NATA
WORLD RECOGNISED ACCREDITATION

Comments:

Distribution: Laboratory File / Ben Hill
Document ID: WS_AS_FND_Rev6_Jun2020
Accredited for compliance with ISO/IEC 17025 - Testing - Accreditation No. 20092

Name:
Function:
Date:

Approved Signatory:

[redacted]

GREAT SOUTHERN GEOTECHNICS
CONSTRUCTION MATERIALS TESTING

5a 209 Chester Pass Rd, Milpara WA 6330
Phone: 0407 903 297
Email: Info@gsgeotechnics.com
WWW.GSGEOTECHNICS.COM

Client: Great Southern Sands
Project: Bakers Junction Tip
Section: FOGO Hardstand

Client Number: PO 61561
Date Sampled: 16/02/2020
Date Received: 16/02/2020

Dry Density & Moisture Content Relation of Soil Test Report

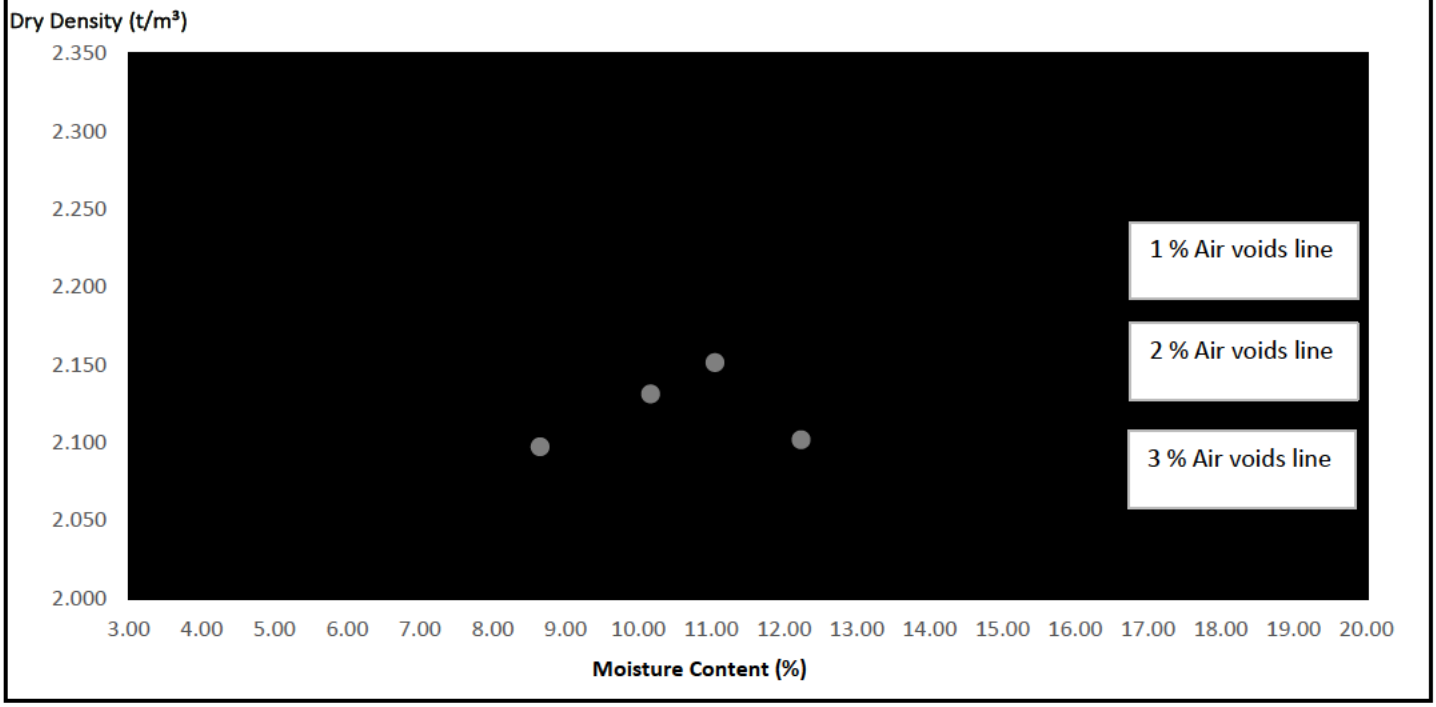
Test Method - AS 1289.5.2.1: Modified

Road	-	Test Depth (mm)	150	Preparation Method	AS1289.1.1
Layer Type	Basecourse	Layer Depth (mm)	200	Sampling Method	AS 1289.1.2.1 Proc 6.4

Sample No.	5733G1	Material Description	Sandy GRAVEL			Curing Period Water
						2 hrs
Easting	6136911	Northing	584353	Offset From	-	Stabiliser Curing Time
						N/A hrs
Retained 19.0mm (%)	12	Liquid Limit Method	Visual/Tactile assessment by competent technician			Stabiliser Added
Retained 37.5mm (%)	N/A					N/A %

Moisture Content (%) AS 1289.2.1.1	8.7	10.2	11.1	12.2	
Dry Density (t/m³)	2.10	2.13	2.15	2.10	

Dry Density / Moisture Content Relationship



Maximum Dry Density (t/m³)	2.15	Optimum Moisture Content (%)	11.0

NATA
WORLD RECOGNISED ACCREDITATION

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Name:
Function:
Date:

Approved Signatory:

[redacted]

Appendix 3 – Geo grid technical specification

TECHNICAL DATA SHEET:

ELCOSEAL

Geosynthetic Clay Liners

ELCOSEAL Geosynthetic Clay Liners (GCLs) are used as a lining system in landfills and waste containment structures, and for liquid containment in effluent ponds, wetlands and canals.

Australian made ELCOSEAL GCLs consist of a layer of bentonite bonded between two layers of woven and nonwoven geotextiles. The needle-punching process reinforces the bentonite layer with thousands of fibres, maximising the product's internal resistance. An additional heat treating process called "thermal locking" secures the needle-punched fibres, further improving strength and performance.

ELCOSEAL GCLs have been used in environmental, civil and landfill liner applications since 1996. They have an unmatched sealing capability and are cheaper to install than natural clay layers. When hydrated, the sodium bentonite layer forms a barrier that prevents contamination of surrounding groundwater.

ELCOSEAL GCLs can replace thick, compacted clay layers in composite landfill liners and caps, thanks to the fast swelling sodium bentonite clay liner. This creates a highly effective containment barrier for landfill final cover systems and base landfill liner systems. ELCOSEAL GCLs can self-heal around holes or punctures so there is less chance of leaks due to installation damage.

SUGGESTED SECTOR APPLICATIONS

Roads | Rail | Coastal | Waste | Mining | Civic & Landscaping | Ports & Aviation | Water | Primary Industries | Sports & Recreation | Slopes & Walls | Building

GEOFABRICS®
Smarter Infrastructure

ELCOSEAL GEOSYNTHETIC CLAY LINERS

The values published in this leaflet are to the best of our knowledge true and correct. The product specification may change at any time without prior notice. No warranty is expressed or implied. Manufactured by Geofabrics Australasia Pty Ltd to the ISO 9001:2015 Quality Management System Standard.

PROPERTY		TEST METHOD	MQC[1] REQUENCY	UNITS	ELCOSEAL® GRADE			
					X800	X1000	X2000	X3000
GCL Hydraulic Properties								
Hydraulic Conductivity, k	MaxArv[2]	ASTM D5887	40,000 m²	m/s	3.5×10^{-11}	2.8×10^{-11}	3×10^{-11}	2.4×10^{-11}
	Typical[3]				2.5×10^{-11}	1.9×10^{-11}	2.4×10^{-11}	1.7×10^{-11}
Bentonite Characteristics								
Swell Index	Typical	ASTM D5890	40,000 m²	mL/2g	≥ 24	≥ 24	≥ 24	≥ 24
Fluid Loss	Typical	ASTM D5891	40,000 m²	mL	≤ 15	≤ 15	≤ 15	≤ 15
GCL Components - Mass								
Cover Nonwoven Geotextile Mass per Unit Area	MARV[4]	AS 3706.1	10,000 m²	g/m²	220	220	220	260
	Typical				250	250	250	300
Bentonite Mass per Unit Area @ 0% Moisture Content	MARV	ASTM D5993	2,500 m²	g/m²	3,700	4,000	3,700	4,250
	Typical				4,100	4,500	4,250	4,700
Carrier / Composite Geotextile Mass per Unit Area	MARV	AS 3706.1	70,000 m²	g/m²	110	110	320	350
	Typical				110	110	360	380
Geotextile Configuration (Carrier / Cover)					W / NW[5]	W / NW	W+NW / NW	W+NW / NW
GCL - Mass								
GCL Total Mass per Unit Area @ 0% Moisture Content	MARV	ASTM D5993	2,500 m²	g/m²	4,030	4,330	4,240	4,860
	Typical				4,460	4,860	4,860	5,380
GCL - Strength Properties								
Strip Tensile Strength (MD)[6]	MARV	ASTM D6768	10,000 m²	kN/m	7	8	12	12
	Typical				10	11	15	16
CBR Strength	MARV	AS 3706.4	25,000 m²	N	1,400	1,600	3,500	4,100
	Typical				2,000	2,100	4,100	5,300
CBR Elongation	MARV	AS 3706.4	25,000 m²	%	10	15	30	30
	Typical				30	40	80	80
GCL - Shear Strength Properties								
Hydrated Peak Internal Shear Strength @ 10kPa Normal Stress	Typical[7]	ASTM D6243	Periodic	kPa	30	30	35	40
Hydrated Peak Internal Shear Strength @ 30kPa Normal Stress	Typical	ASTM D6243	Periodic	kPa	50	50	60	70
GCL Longitudinal Edge Treatment								
Bentonite Impregnation - Width ≥ 300 mm - Typical				-	√	√	√	√
Edge Sealing Performance	Typical[7]	ASTM STP 1308 (Mod.)10,11	Periodic	m/s	2.5×10^{-11}	1.9×10^{-11}	2.4×10^{-11}	1.7×10^{-11}
GCL Roll Dimensions								
Standard Roll Dimensions (Width x Length)				m	4.7 x 45	4.7 x 35	4.7 x 30	4.7 x 30
Typical Roll Mass (standard roll length). Note: Longer custom roll lengths are available to suit project requirements.			(Weighed every roll)	kg	1,395	1,050	960	950
GCL Spreader Bar Requirement				-	Heavy-Duty[8]	Heavy-Duty[8]	Standard[9]	Standard[9]

1. **MQC** = Manufacturing Quality Control – an ongoing system that monitors and tests materials during manufacture to ensure compliance with certification documents and contract specifications.
2. **MaxARV** = Maximum Average Roll Value – a MaxARV is defined as the Mean or Typical values plus 2 standard deviations. Mathematically, it is implied that 97.5% of the results of the tested specimens will be less than the MaxARV. A MaxARV provides a confidence level of 97.5%. **NOTE** – in reference to GCL Permeability, **LOWER IS BETTER**.
3. **Typical** = A typical value is the arithmetic mean of a set of results. This implies that 50% of the tested specimens will typically exceed this value and 50% will typically not meet this value.
4. **MARV** = Minimum Average Roll Value – a MARV is defined as the Mean or Typical values less 2 standard deviations. Mathematically, it is implied that 97.5% of the results of the tested specimens will exceed the MARV. A MARV provides a confidence level of 97.5%.
5. **W**= Woven, **NW**= Nonwoven.
6. **MD** = Roll Machine Direction.
7. **Peak Value** reported at 10kPa or 30kPa normal stress. [The reported values are not intended to replace site specific internal shear or interface friction testing required for design].
8. **Heavy-Duty WLL** (Working Load Limit) = 1,400kg.
9. **Standard WLL** (Working Load Limit) = 1,000kg.
10. **Reference** - Daniel, D.E. Trautwein, S.J. and Goswami, P.K. 1997. Measurement of Hydraulic Properties of Geosynthetic Clay Liners Using a Flow Box, Testing and Acceptance Criteria for Geosynthetic Clay Liners, ASTM STP 1308, p. 196-207.
11. **Modification Reference** - Kendall, P.M., Austin, R. A. 2014. Investigation of GCL Overlap Techniques Using a Large Scale Flow Box, 7th International Congress on Environmental Geotechnics, 3B-3, p. 746-753.