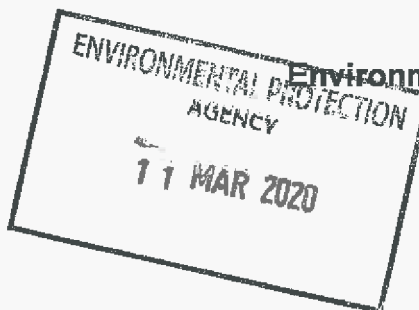




Comhairle Contae an Chabháin
Cavan County Council



Environmental Protection Agency
PO Box 3000
Johnstown Castle Estate
County Wexford
09th March 2020

**Re: Kingscourt Landfill Reg. No. H0016-01
Appeal of Conditions of Proposed Decision**

In relation to the proposed decision issued by the Agency pertaining to a Certificate of Authorisation for Kingscourt Historical Landfill, the following refers:

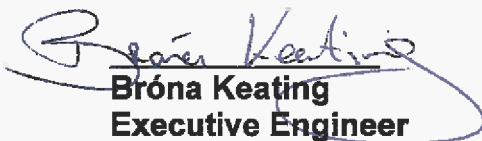
Cavan County Council hereby request an appeal of the proposed decision issued by the Agency as it is considered inapplicable to the current status of the site.

The proposed authorisation implies that the site has not yet been remediated and outlines various requirements pertaining to such remediation works. All remediation works have in fact been completed on this site; the works were carried out in accordance with the Risk Assessment Reports which were submitted to the EPA in 2014.

A validation report was also submitted to the agency as part of the authorisation assessment outlining and depicting the works that were completed. As a result, Cavan County Council appeal all conditions contained within this authorisation.

Enclosed please find a copy of the validation report outlining the completed remediation works.

Yours sincerely,


Bróna Keating
Executive Engineer
Cavan County Council

Cavan County Council
Courthouse
Farnham Street
Cavan H12 R6V2

T: 049 437 8300

E: info@cavancoco.ie

Comhairle Contae an Chabháin

E: eolas@cavancoco.ie

W: www.cavancoco.ie



Designated Public Official
under Regulation of Lobbying Act 2015

CAVAN COUNTY COUNCIL



KINGSCOURT HISTORICAL LANDFILL RESTORATION PROJECT

VALIDATION REPORT

OCTOBER 2016



1. INTRODUCTION:

Cavan County Council have applied to the Environmental Protection Agency for a Certificate of Authorisation in respect of Kingscourt Historical Landfill, Dunaree, Kingscourt, Co. Cavan under the Waste Management (Certification of historic unlicensed waste disposal and recovery activity) Regulations 2008. This has been given the reference H0016-01 by the Agency.

The site itself is located on Rocks Road, Dunaree, Kingscourt, Co. Cavan.

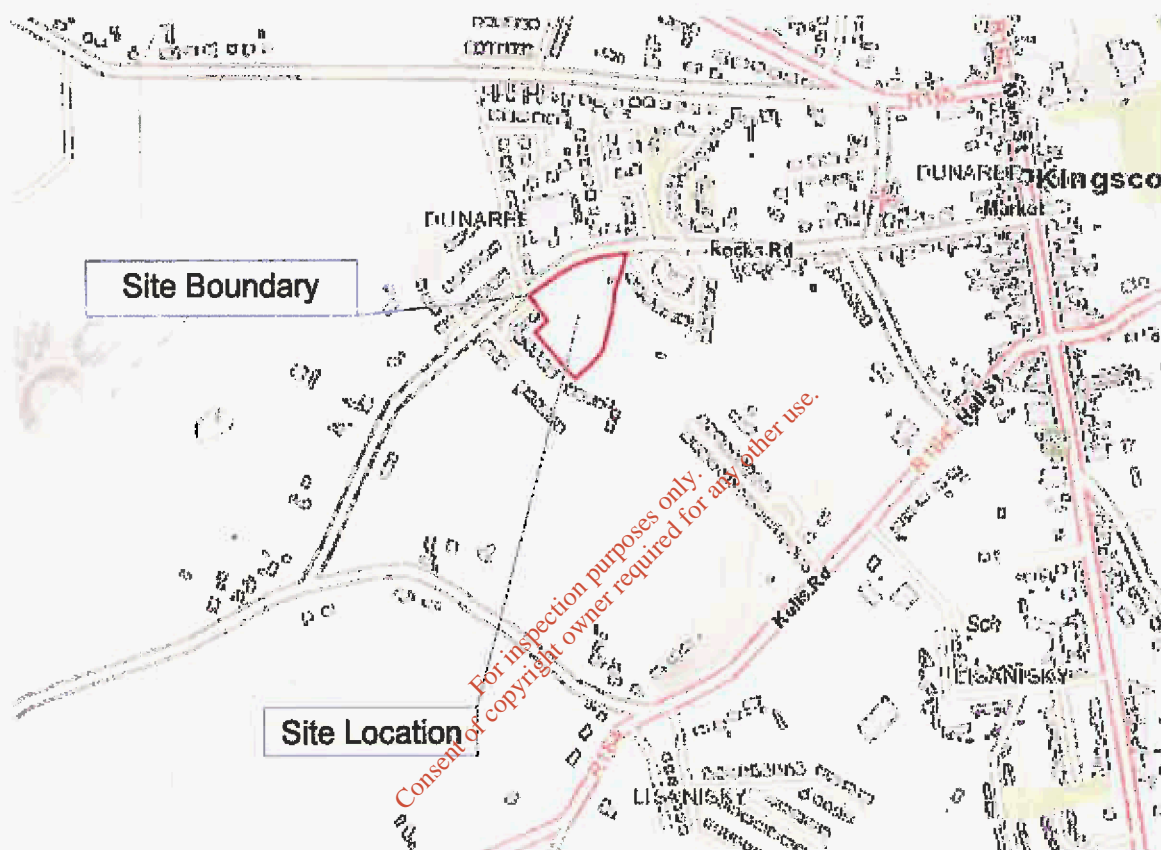


Figure 1 Site Location

The adjacent land use is a local roadway, commercial buildings and a housing estate to the north of the site, a housing estate to the south of the site, a housing estate to the west of the site and an undeveloped area to the east of the site.

Cavan County Council and Traynor Environmental Ltd carried out a Tier 1 and Tier 2 Environmental Risk Assessment in April 2014. Following on from these a full Tier 3 Risk Assessment was undertaken in June 2014. This Tier 3 Assessment in addition to the earlier reports form the basis on which the remediation works were carried out.

Work commenced in July 2015 on the remediation of the Kingscourt Historical Landfill Co. Cavan. This report details how this work was carried out in compliance with the recommendations of the Tier 3 Assessment. It should be read in conjunction with the Tier 3 Traynor report document.

2 SITE PREPARATION:

The initial preparation of the site comprised of securing the access points as a construction site. Safety fencing was erected where required and both on-site and off-site safety signage was erected. A full risk assessment was carried out by the contractor and a safety file prepared and retained on site. Part of the site is in use as a storage depot by Cavan County Council.

Further site clearance works included clearing bushes and shrubs from the site especially at the rear of the houses whose gardens adjoin the facility.



Photograph 1 showing site preparation works.

3. PROFILING WORKS

Phase 1 works comprised the grading and profiling of the site to ensure suitability for lining works. As per the Tier 3 Traynor report it was decided that the option with the lowest impact would be to leave the waste in situ. Therefore the most significant aspect of this work was to ensure that the entire site was graded with a suitable slope and surface that permitted effective lining works. There were three stockpiles of soil and a stockpile of pea gravel on site and these were sampled and analysed for suitability to use for this purpose and for use as the final cap. The Waste Acceptance Criteria (WAC) testing of this soil confirmed that it was suitable for this purpose. There was an initial concern that the pea gravel showed a slightly elevated level for arsenic however on retest this proved not to be the case. Further pea gravel was imported from the same source when required for grading works and to protect the liner. No addition soils was imported on to the site. The locations

of the stockpiles and the results of the WAC testing including the retest of the pea gravel are detailed in Appendix 1.



Photograph 2: Grading and profiling works.



Photograph 3: Grading and profiling works.



Photograph 4: Grading and profiling works

4. LINING

Following the completion of the contouring and profiling of the site the lining works commenced. This work commenced in early August 2015 and was completed by the end of October 2015

The lining comprises a protective layer of Terram, a geosynthetic protective layer which is placed to protect the liner from possible damage by stones etc. in the soil. This is followed by the LLDPE (Linear Low Density Polyethylene) liner, followed by another layer of Terram to protect the liner from stones etc. in the soil above. This will also act as a drainage layer. Finally the cap is finished off with a layer of soil approximately 700 mm deep. The LLDPE liner is welded in situ and all of the welds are tested for quality assurance and to demonstrate that they are leakproof. There is a 1 metre deep anchor trench around the entire perimeter of the landfill.



Photograph 5 showing the LLDPE liner being rolled out.



Photograph 6 showing LLDPE liner and surface water collection (yellow pipe).



Photograph 7 showing Terram top layer in place covered by pea gravel in turn covered by the final soil cap.



Photograph 8 showing placement of final layer of soil



Photograph 9 showing capping layers.



Photograph 10 showing anchor trench

5. SURFACE WATER MANAGEMENT:

The Traynor report recommends that control of surface water be implemented to reduce the infiltration of surface water into the waste body and promote surface water runoff and drainage to the watercourse on the north-eastern aspect of the landfill. The gradient of the slope and the impermeability of the liner combined with the design of the drainage layer as described above will ensure that all surface water runoff is collected and directed to the existing watercourses adjacent to the site. The drainage layer is depicted in photographs 10 and 11 below and comprise the terram layer with slatted pipe placed at the bottom of the slope which directs the water into larger collection pipes for distribution to the local surface water systems.



Photograph 11 showing slatted pipe (yellow) for collection of surface water running into larger (black) pipe.



Photograph 12: Outflow from surface water collection system.

6. PASSIVE GAS WELLS:

As recommended by the Traynor report 6 passive gas wells was installed. These were installed as per the attached locations map (green text) all located within the main body of the waste.

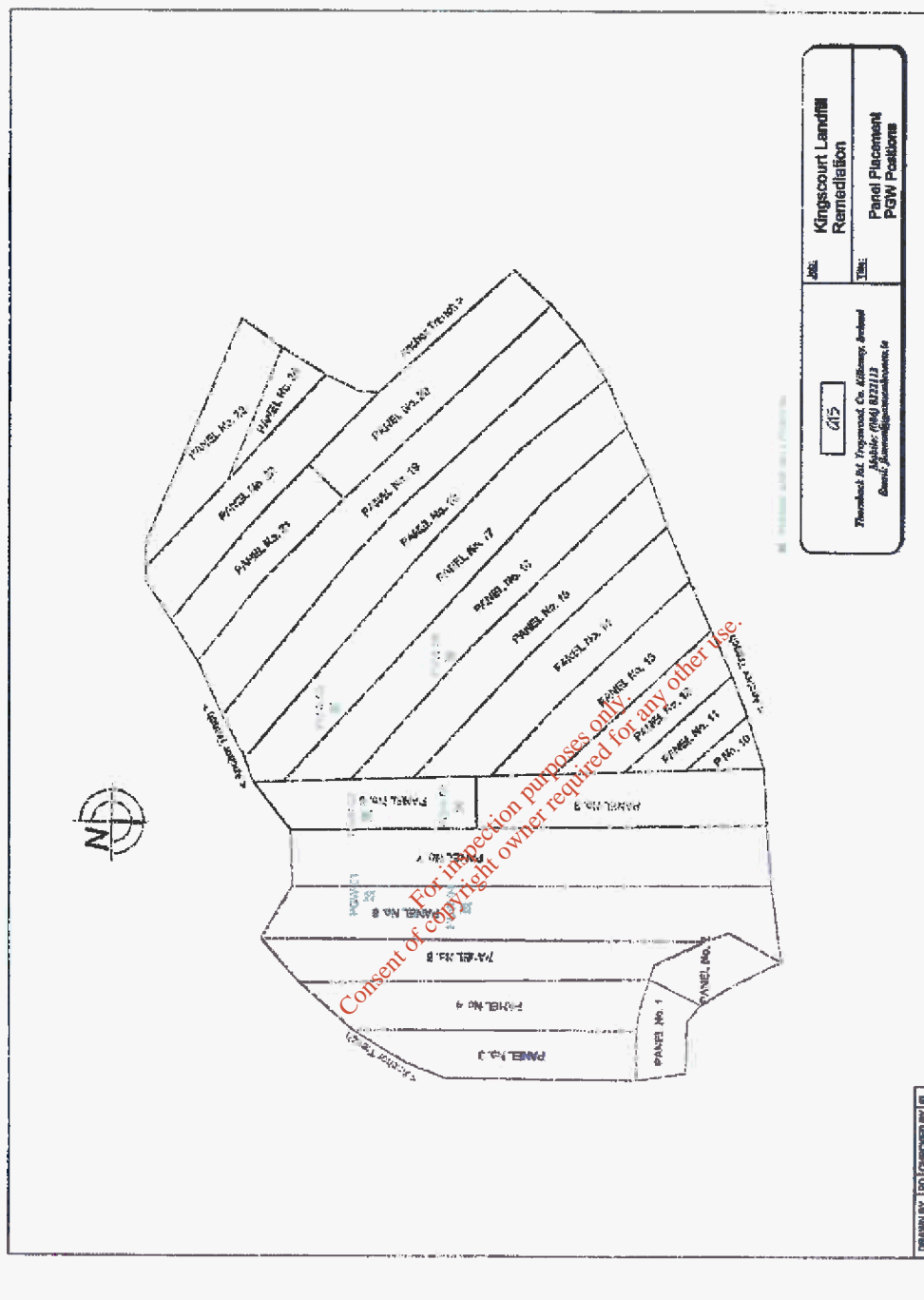


Figure 2 Location of passive gas wells

These wells consist of 160mm slotted pipe installed to a depth of 4 metres with the section of the pipe that is not slotted installed a minimum of 0.5 metres below the liner. The wells are backfilled

with stone 5mm or less to the full depth and with a diameter of 1 metre. See photograph 12. These wells extend to at least 1 metre above the surface.



Photograph 13: Passive venting gas well



Photograph 14: Wells on site

7. MONITORING:

Environmental monitoring was carried out throughout this project. This included odour assessments, landfill gas monitoring using laser methane mini recorder (LMM), soil testing on site and analysis of incoming pea gravel for backfilling.

Odour: Daily odour monitoring was carried out by Enviroguide Consulting during the excavation phase of the project. At no time was offsite odour detected. Localised odours were detected during the excavation of the gas wells but these were not significant and extremely localised in nature. A Laser Methane Mini was used daily during the excavation phase to test for fugitive methane but none was detected. Following the capping works a full site walkover using the LMM analyser was carried out on 19th November 2015 and 14th December 2015. No methane readings above 100ppm were detected.

Soil Testing: Soil testing was carried out on the material stockpiled on site and on pea gravel being imported from a local quarry - O'Reilly Concrete, Kingscourt for the purposes of back filling the excavated areas. This material was deemed to be of good quality and entirely suitable for this purpose. The analysis of this material is attached in Appendix 1.

8. VALIDATION:

Validation is based on the following (as proposed in the Tier 3 Assessment report):

A passive gas venting system has been installed.

Landfill gas monitoring was carried out following the works. There was no evidence of landfill gas on site.

The landfill was fully capped as detailed above. A CQA report is appended to this report.

A surface water management system has been installed as detailed above.

Imported gravel and on-site soil has been tested and deemed acceptable for use in the remediation works. The results are appended in Appendix 3

Photographic records are included as part of this report and an archive of additional photographs is maintained.

All works on site were overseen by Enviroguide Consulting who confirm that the works were carried out as proposed in the Tier 3 Assessment.

A final topographical survey will be carried out in due course.

SUMMARY:

Remediation works on the Historic Landfill at Kingscourt, Co. Cavan were carried out in 2015. These works were carried out in compliance with the recommendations of the Tier 3 Risk Assessment carried out by Traynor Environmental and Cavan County Council. Records in the form of photographs, soil analysis and construction quality analysis on the liner are presented in this report.

Recent photographs of the site are detailed below.



Photograph 15 Entrance to site showing remediation works and passive gas wells



Photograph 16 showing remediated site at rear of dwelling houses. (cf photograph 3.)



Photograph 17 showing overall remediated site.

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APPENDIX 1

Analysis of imported pea gravel and stockpiled soil

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APPENDIX 2

Construction Quality Analysis Report

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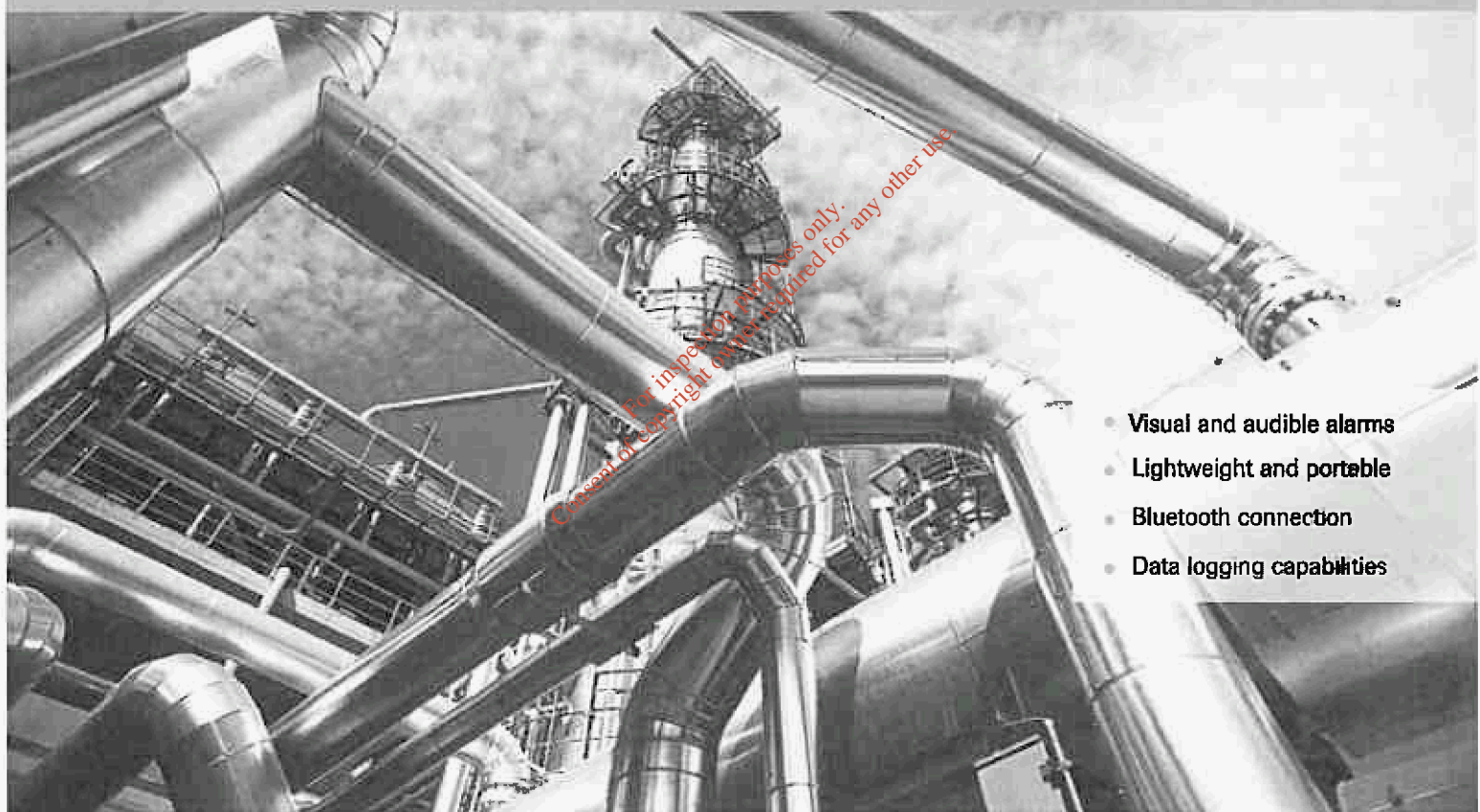
APPENDIX 3

Laser Methane Mini

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Laser Methane Mini

Methane Detection at a Distance



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- Visual and audible alarms
- Lightweight and portable
- Bluetooth connection
- Data logging capabilities



Laser Methane Mini

Remote Methane Gas Detection

When lives and property are at risk and you need gas detection equipment that is totally reliable, you need Crowcon. For over 40 years Crowcon has been developing and manufacturing high quality products with a reputation for reliability and technical innovation.

Crowcon provides both single gas and multigas monitors for personal and portable safety applications providing protection against a wide range of industrial gas hazards.



Choosing a portable gas detector for your needs

Laser Methane mini (LMm) is a compact handheld detector that can detect methane gas from a safe distance. Utilising laser technology, methane leaks can be quickly confirmed by pointing the laser beam towards the suspected leak, or along the survey line. This revolutionary technology removes the need to access elevated places, under floor or other hard to reach areas. It is also ideal for surveying large open spaces e.g. landfills or along pipelines.

NEW! LMm is now available with a green laser guide light, which is more visible especially under strong sunlight. The Laser Methane Mini-Green (LMm-G) combines the benefit of LMm with additional data storage functions and comes with Bluetooth capability, which can be connected to any android device (through the Gasviewer app) for a variety of data storage functions. Important data like location, gas levels and time can also be saved or emailed to a central point.

LMm and LMm-G are easy to operate and require little maintenance. An automatic self check and calibration ensures consistent performance and reliability every time the units are turned on.

User friendly

Point and shoot technology	Requires little or no training and is easy to use
Compact and lightweight	Truly portable
Green/Red guide laser light	Clear visibility of where you are surveying
Wide organic electroluminescence display	Clear and bright readout on screen

Reliability

No moving parts	Little maintenance required
Self-check and automatic calibration start up	Ensure accurate and reliable reading

Records

Data storage	Full data logging capabilities
Bluetooth and Gasviewer app	Connectivity to android devices
Location service in Gasviewer app	Display and save value as well as location and time on map



LMm



LMm-G



Gasviewer App

Measurement principles:

Methane absorbs a specific wavelength of infrared rays. The laser diode emits infrared laser, receives the diffused light back and measures the absorption of the light. A reflective surface is required for proper measurement of methane gas. The laser beam from LMm can penetrate opaque surfaces, for example, glass or perspex.

The LMm and LMm-G measure the average methane gas density between the detector and target readings are reported in ppm-m as it is the product of concentration of methane cloud (ppm) and path length (m).

LMm:

LMm-G:

Size	70 x 179 x 42mm, (2.8 x 7 x 1.6 inches) WxDxH	70 x 179 x 42mm, (2.8 x 7 x 1.6 inches) WxDxH
Weight	600g (including Ni-MH battery pack)	530g (including Ni-MH battery pack)
Operating time	Approx. 6 hours	Approx. 4.5 hours
Operating temperature range	-17 ~ +50°C	-10 ~ +50°C
Target gas	Methane (CH ₄) and methane-containing gases	Methane (CH ₄) and methane-containing gases
Detection limits	1-50,000 ppm-m (%LEL or % Vol available)	1-50,000 ppm-m (%LEL or % Vol available)
Accuracy of detection	±10%	±10%
Detection distance (standard)	0.5m - 30m	0.5m - 100m (using an optional reflect sheet)
Ingress protection	IP65	IP65
Guide laser light colour	Red	Green
Certificate	Class 2:1mW CE (ATEX & EMC)	Class 3R: 5mW CE (R&TTE)
Best Application	Hazardous areas	Outdoors under strong sunshine

Applications:

- Industrial and commercial property surveys
- Emergency call out
- Gas plants
- Landfill gas monitoring
- Road surface survey
- Pipeline survey



New products available within the fixed and portable range are:



Crowcon F-Gas Detector
Refrigerant Gas and SF₆ Detector



Gasmaster
1-4 channel
control system



Detective+ and Detective Net
Transportable wireless area
gas monitor



Gas-Pro PID
5 gas VOC monitor

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Crowcon reserves the right to change the design or specification of the product without notice.
Check www.crowcon.com for updates

www.crowcon.com

UK:

Tel: +44 (0) 1235 557700
Fax: +44 (0) 1235 557718
Email: sales@crowcon.com

US:

Tel: +1 859 957 1039
Toll Free: 800 527 6926
Fax: +1 513 957 1044
Email: salesusa@crowcon.us

NL:

Tel: +31 10 421 1232
Fax: +31 10 421 0542
Email: eu@crowcon.com

SG:

Tel: +65 6745 2936
Fax: +65 6745 0467
Email: sales@crowcon.com.sg

CN:

Tel: +86 (0) 10 6787 0335
Fax: +86 (0) 10 6787 4879
Email: saleschina@crowcon.com

IN:

Tel: +91 22 6708 0400
Fax: +91 22 6708 0405
Email: salesindia@crowcon.com



CROWCON
Detecting Gas Saving Lives



Geomembrane Testing Services Limited

CLIENT:

CAVAN COUNTY COUNCIL

REPORT ON:

KINGSCOURT LANDFILL SITE REMEDIATION

KINGSCOURT

CO CAVAN

CAPPING WORKS

LLDPE/GEOCOMPOSITE

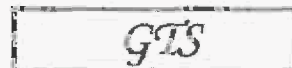
QUALITY CONTROL TESTING

Prepared by:

Geomembrane Testing Services Limited
Thornback Road, Trayswood, Co Kilkenny, Ireland
Tel: (056) 7770953 Mobile: (086 8323113)
Email: flennon@geomembranets.ie

*Geomembrane Testing
Services Limited*

Thornback Road, Troyswood, Co Kilkenny, Ireland



Tel: (056) 7770953

Mobile: 086 8323113

Email: flennon@geomembranets.ie

October 2015

Cavan County Council
Courthouse
Farnham Street
Cavan
Co Cavan

Re: Kingscourt Landfill Remediation – Capping Works - Independent CQA

Dear Sir/Madam,

Based on results of the monitoring of integrity of the Geomembrane liner as described herein, Geomembrane Testing Services Limited certifies that the Geomembrane installation and subsequent testing of the Capping of Kingscourt Landfill Remediation Works, Kingscourt, Co Cavan was carried out in accordance with EPA Guidelines and the Technical Specification for the installation of flexible membranes.

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Yours sincerely,

Frank Lennon

Managing Director

Geomembrane Testing Services Ltd



Geomembrane Testing Services Limited

Thornback Road, Troyswood, Co Kilkenny, Ireland

Tel: (056) 7770953 Mobile: (086 8323113)

Email: flennon@geomembranets.ie

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Section 1:	Works Summary
Section 2:	Plan: LLDPE Panel Placement
Section 3:	Plan: Destructive Sample Positions
Section 4:	Production Destructive Sample Reports
Section 5:	Air-Pressure Test Reports
Section 6:	Geomembrane Seaming Reports
Section 7:	Subgrade Sign off Reports
Section 8:	LLDPE Manufacturers Certificates
Section 9:	Gas/Drainage Geocomposite Manufacturers Certificates

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Section 1: Works Summary

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Geomembrane Testing Services Limited

Thornback Road, Troyswood, Co Kilkenny

Tel: (056) 7770953 Mobile: (086 8323113)

Email: flennon@geomembranets.ie

KINGSCOURT LANDFILL REMEDIATION CAPPING WORKS

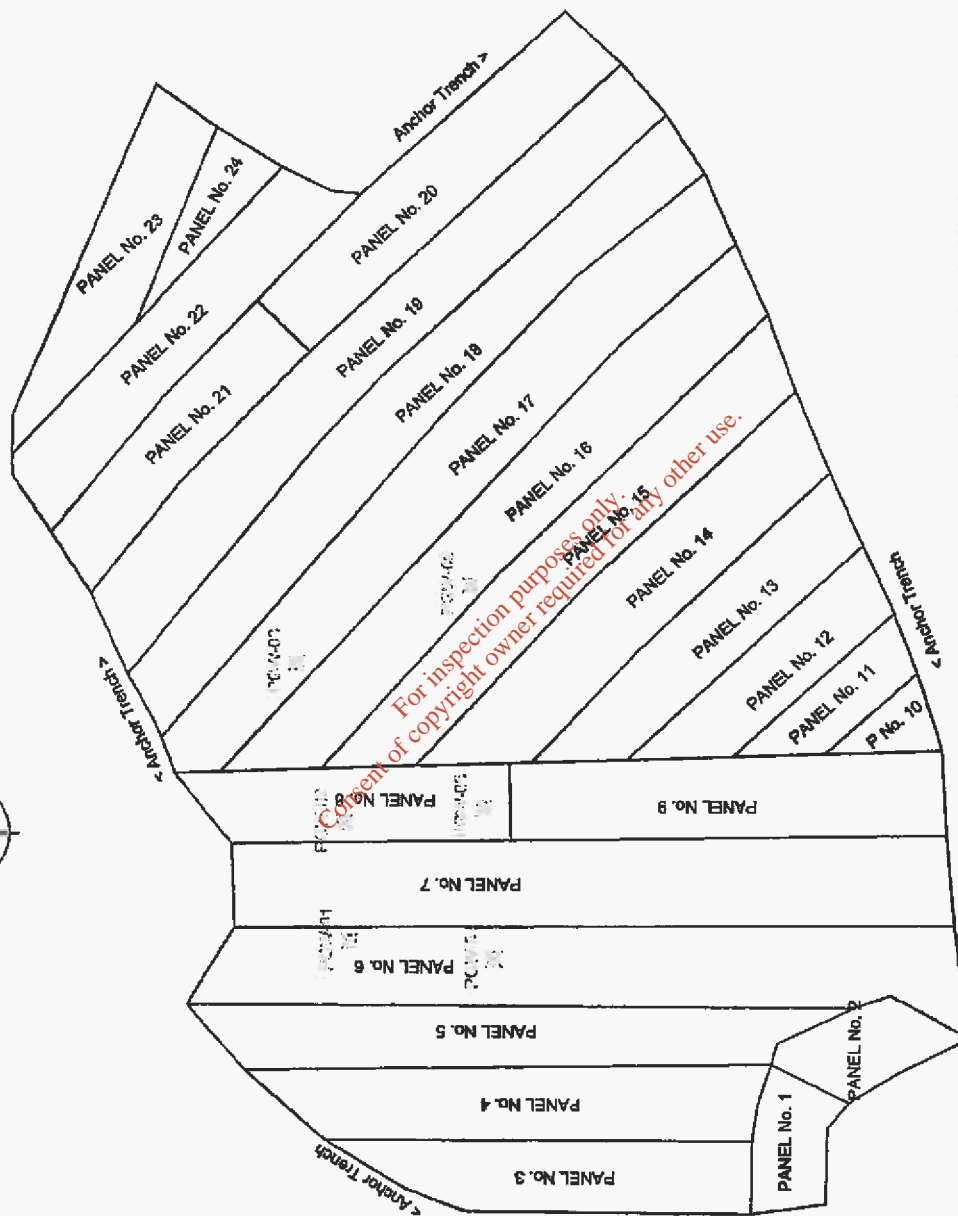
Geomembrane Testing Services Limited carried out Independent Quality Control/Assurance inspections at Kingscourt Landfill Remediation Capping Works, Kingscourt, County Cavan. Seven production weld samples were removed and destructively tested in the peel and shear modes. These samples passed destructive laboratory testing. The results of these tests can be found in Section 4 of this Report. Non-destructive air-pressure testing and vacuum box testing was carried out on completed seams. These tests were found to be acceptable. The results of these tests can be found in Section 5 and 6 of this Report. In addition to production weld destructive testing twenty (20) 25mm wide tabs were selected from various fusion welded and extrusion welded seams. All of these samples were destructively tested by means of a field tensiometer and found to be acceptable. Pre-production weld samples were destructively tested on site by means of a field tensiometer and found to be acceptable. The prepared sub-grade was inspected and found to be free from debris and protruding objects. All logs and associated paperwork requested and verified up-to-date. The deployment of the gas drainage Geocomposite and the LLDPE membrane was carried out to Specification. A visual inspection of the lined area was carried out prior to the deployment of the surface water collection layer - no defects or irregularities were found. Deployment of the Geocomposite surface water collection layer and the final cover material was carried out to Specification.

Approved: Frank Lennon

Section 2:

Plan: LLDPE Panel Placement

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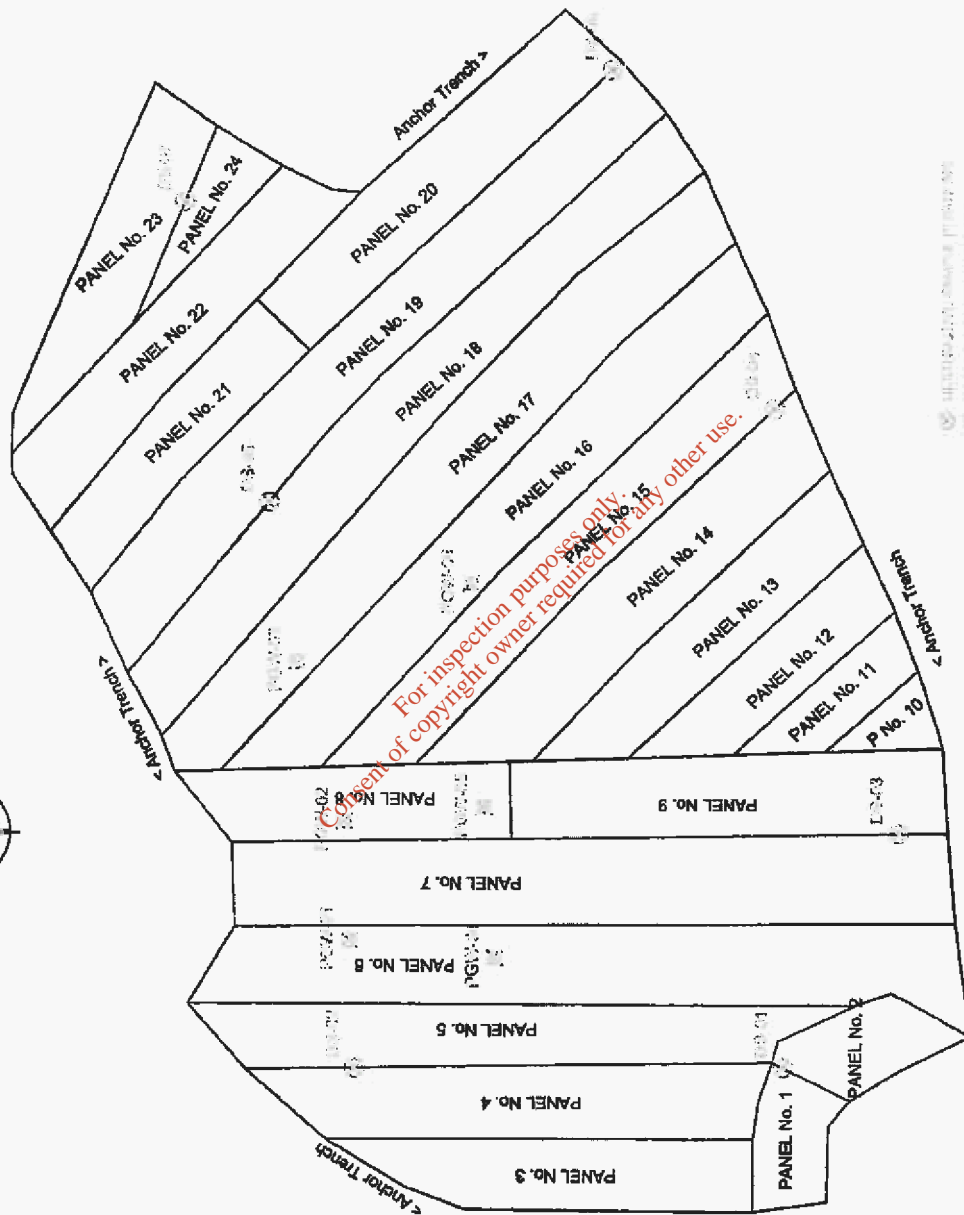
Kingscourt Landfill Remediation	
Job:	
Title:	
Panel Placement PGW Positions	
GIS	
Thornback Rd. Troyevood, Co. Kilkenny, Ireland Mobile: (086) 833113 Email: jennan@geosumbraste.ie	

DRAWN BY IPD CHECKED BY FL

Section 3:

Plan: Destructive Sample Positions

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Job:	Kingscourt Landfill Remediation
Title:	Panel Placement DS & PGW Positions
<div>GIS</div> <p>Thorntree Rd. Troywood, Co. Kilkenny, Ireland Mobile: (085) 8331113 Email: geomatic@kingscourt.ie</p>	

DRAWN BY: PD CHECKED BY: RL

Section 4:

Production Destructive Sample Reports

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Geomembrane Testing Services Limited

Thornback Road, Troyswood, Kilkenny, Ireland

Fax: (056) 7770953

Mobile: (086 8323113)

Geomembrane Seam Destructive Sample Log

Project No. 15/KLR/001

LLDPE

Project Name: Kingscourt Landfill Remediation - Capping Works

Date: August 2015

Thickness: 1mm

Project Location: Kingscourt, Co Cavan

Project Seam Requirements: (Fusion) Peel 50 ppi Shear 60 ppi

Project Team Requirements:	(Extrusion)	Peel	psi	Shear	psi
----------------------------	-------------	------	-----	-------	-----

Equipment used: Tensiometer Serial #NAL-1398

Geomembrane Testing Services carries out these tests at a separation speed of 50mm/min

[illegible]

Inspector: F Lennon



Geomembrane Testing Services Limited

Thornback Road, Troyswood, Kilkenny, Ireland

Fax: (056) 7770953

Mobile: (086 8323113)

Geomembrane Seam Destructive Sample Log

Project No. 15/KLR/001 ■ LLDPE
 Project Name: Kingscourt Landfill Remediation - Capping Works
 Date: August 2015 Thickness: 1mm
 Project Location: Kingscourt, Co Cavan

Project Seam Requirements: (Fusion) Peel 50 ppi Shear 60 ppi
 Project Seam Requirements: (Extrusion) Peel ppi Shear ppi

Equipment used: Tensiometer Serial #NAL-1398

Geomembrane Testing Services carries out these tests at a separation speed of 50mm/min

Sample	Panel # / Panel #	Date Removed	Insp. ID				Lab Test Results Pass/Fail	Remarks
				Peel A (ppi)	Peel B (ppi)	Shear (ppi)		
DS 2	P4/P5	20/08/15	FL	72	66	80	Pass	Good air channel
Describe Sample Location Panel 4 – Panel 5 (see attached drawing)				73	70	82	Pass	Good air channel
				70	64	82	Pass	Good air channel
				74	64	81	Pass	Good air channel
				69	64	80	Pass	Good air channel

Inspector: F Lennon



Geomembrane Testing Services Limited

Thornback Road, Troyswood, Kilkenny, Ireland

Fax: (056) 7770953

Mobile: (086 8323113)

Geomembrane Seam Destructive Sample Log

Project No. 15/KLR/001

■ LLDPE

Project Name: Kingscourt Landfill Remediation - Capping Works

Date: September 2015

Thickness: 1mm

Project Location: Kingscourt, Co Cavan

Project Seam Requirements: (Fusion) Peel 50 ppi Shear 60 ppi

Project Seam Requirements: (Extrusion) Peel ppi Shear ppi

Equipment used: Tensiometer Serial #NAL-1398

Geomembrane Testing Services carries out these tests at a separation speed of 50mm/min

[illegible]

Inspector: F Lennon



Geomembrane Testing Services Limited

Thornback Road, Troyswood, Kilkenny, Ireland

Fax: (056) 7770953

Mobile: (086 8323113)

Geomembrane Seam Destructive Sample Log

Project No. 15/KLR/001

■ LLDPE

Project Name: Kingscourt Landfill Remediation - Capping Works

Date: October 2015

Thickness: 1mm

Project Location: Kingscourt, Co Cavan

Project Seam Requirements: (Fusion) Peel 50 ppi Shear 60 ppi

Project Seam Requirements: (Extrusion) Peel ppi Shear ppi

Equipment used: Tensiometer Serial #NAL-1398

Geomembrane Testing Services carries out these tests at a separation speed of 50mm/min

Sample	Panel # / Panel #	Date Removed	Insp. ID	Peel A (ppi)	Peel B (ppi)	Shear (ppi)	Lab Test Results Pass/Fail	Remarks
DS 5	P18/P19	08/10/15	FL	71	76	93	Pass	Good air channel
Describe Sample Location Panel 18 – Panel 19 (see attached drawing)				71	75	87	Pass	Good air channel
				71	78	89	Pass	Good air channel
				71	77	84	Pass	Good air channel
				71	76	83	Pass	Good air channel
DS 6	P19/P20	08/10/15	FL	60	65	78	Pass	Good air channel
Describe Sample Location Panel 19 – Panel 20 (see attached drawing)				62	65	80	Pass	Good air channel
				62	64	84	Pass	Good air channel
				62	64	83	Pass	Good air channel
				61	63	85	Pass	Good air channel

Inspector: F Lennon

Geomembrane Testing Services Limited*Thornback Road, Troyswood, Kilkenny, Ireland**Fax: (056) 7770953**Mobile: (086 8323113)***Geomembrane Seam Destructive Sample Log**

Project No. 15/KLR/001 ■ LLDPE
 Project Name: Kingscourt Landfill Remediation - Capping Works
 Date: October 2015 Thickness: 1mm
 Project Location: Kingscourt, Co Cavan

Project Seam Requirements: (Fusion) Peel 50 ppi Shear 60 ppi
 Project Seam Requirements: (Extrusion) Peel ppi Shear ppi

Equipment used: Tensiometer Serial #NAL-1398

Geomembrane Testing Services carries out these tests at a separation speed of 50mm/min

Sample	Panel # / Panel #	Date Removed	Insp. ID				Lab Test Results Pass/Fail	Remarks
				Peel A (ppi)	Peel B (ppi)	Shear (ppi)		
DS 7	P23/P24	09/10/15	FL	67	65	77	Pass	Good air channel
Describe Sample Location Panel 23 – Panel 24 (see attached drawing)				68	69	77	Pass	Good air channel
				69	64	78	Pass	Good air channel
				69	67	80	Pass	Good air channel
				69	67	80	Pass	Good air channel

Inspector: F Lennon

Section 5:

Air-Pressure Test Reports

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Geomembrane Testing Services Limited

Thornback Road, Troyswood, Co Kilkenny, Ireland

Tel: (056) 7770953 Mobile: (086 8323113)

Email: flennon@geomembranets.ie

Geomembrane Seam Air Pressure Test Log

Project No. 15/KLR/001

■ LLDPE

Project Name: Kingscourt Landfill Remediation - Capping Works

Date: August 2015

Thickness: 1mm

Project Location: Kingscourt, Co Cavan

Seam requirements: 2 bar minimum

Panel. / Panel.	Air Testing /2bar minimum		Pass/Fail	Date
	Start	End		
Panel No. 1 - Panel No. 2	3.8	3.8	Pass	07/08/15

Approved: F Lennon



Geomembrane Testing Services Limited

Thornback Road, Troyswood, Co Kilkenny, Ireland

Tel: (056) 7770953 Mobile: (086 8323113)

Email: flennon@geomembranets.ie

Geomembrane Seam Air Pressure Test Log

Project No. 15/KLR/001 ■ LLDPE
Project Name: Kingscourt Landfill Remediation - Capping Works
Date: August 2015 Thickness: 1mm
Project Location: Kingscourt, Co Cavan

Seam requirements: 2 bar minimum

Panel. / Panel.	Air Testing /2bar minimum		Pass/Fail	Date
	Start	End		
Panel No. 1 - Panel No. 3	3.8	3.8	Pass	28/08/15
Panel No. 1 - Panel No. 4	3.0	3.0	Pass	28/08/15
Panel No. 3 - Panel No. 4	3.3	3.1	Pass	28/08/15
Panel No. 4 - Panel No. 5	3.4	3.4	Pass	28/08/15
Panel No. 2 - Panel No. 5	3.2	3.1	Pass	28/08/15

Approved: F Lennon



Geomembrane Testing Services Limited

Thornback Road, Troyswood, Co Kilkenny, Ireland

Tel: (056) 7770953 Mobile: (086 8323113)

Email: flennon@geomembranets.ie

Geomembrane Seam Air Pressure Test Log

Project No. 15/KLR/001 ■ LLDPE
Project Name: Kingscourt Landfill Remediation - Capping Works
Date: September 2015 Thickness: 1mm
Project Location: Kingscourt, Co Cavan

Seam requirements: 2 bar minimum

Panel. / Panel.	Air Testing /2bar minimum		Pass/Fail	Date
	Start	End		
Panel No. 2 - Panel No. 6	3.0	3.0	Pass	02/09/15
Panel No. 5 - Panel No. 6	3.6	3.6	Pass	02/09/15
Panel No. 6 - Panel No. 7	3.5	3.4	Pass	02/09/15
Panel No. 7 - Panel No. 8	3.2	3.2	Pass	02/09/15
Panel No. 7 - Panel No. 9	3.0	3.0	Pass	02/09/15
Panel No. 8 - Panel No. 9	Resealed/Retested 02/09/15		Fail	02/09/15
Panel No. 8 - Panel No. 9	4.6	4.6	Pass	02/09/15

Approved: F Lennon



Geomembrane Testing Services Limited

Thornback Road, Troyswood, Co Kilkenny, Ireland

Tel: (056) 7770953 Mobile: (086 8323113)

Email: flennon@geomembranets.ie

Geomembrane Seam Air Pressure Test Log

Project No. 15/KLR/001 ■ LLDPE
 Project Name: Kingscourt Landfill Remediation - Capping Works
 Date: September 2015 Thickness: 1mm
 Project Location: Kingscourt, Co Cavan

Seam requirements: 2 bar minimum

Panel / Panel.	Air Testing /2bar minimum		Pass/Fail	Date
	Start	End		
Panel No. 2 - Panel No. 6	3.0	3.0	Pass	02/09/15
Panel No. 5 - Panel No. 6	3.6	3.6	Pass	02/09/15
Panel No. 6 - Panel No. 7	3.5	3.4	Pass	02/09/15
Panel No. 7 - Panel No. 8	3.2	3.2	Pass	02/09/15
Panel No. 7 - Panel No. 9	3.0	3.0	Pass	02/09/15
Panel No. 8 - Panel No. 9	Resealed/Retested 02/09/15		Fail	02/09/15
Panel No. 8 - Panel No. 9	4.6	4.6	Pass	02/09/15

Approved: F Lennon



Geomembrane Testing Services Limited

Thornback Road, Troyswood, Co Kilkenny, Ireland

Tel: (056) 7770953 Mobile: (086 8323113)

Email: flennon@geomembranets.ie

Geomembrane Seam Air Pressure Test Log

Project No. 15/KLR/001 ■ LLDPE
Project Name: Kingscourt Landfill Remediation - Capping Works
Date: September 2015 Thickness: 1mm
Project Location: Kingscourt, Co Cavan

Seam requirements: 2 bar minimum

Panel / Panel.	Air Testing /2bar minimum		Pass/Fail	Date
	Start	End		
Panel No. 9 - Panel No. 13	3.8	3.8	Pass	18/09/15
Panel No. 8 - Panel No. 14	3.2	3.2	Pass	18/09/15
Panel No. 12 - Panel No. 13	3.8	3.8	Pass	18/09/15
Panel No. 13 - Panel No. 14	3.4	3.4	Pass	18/09/15

Approved: F Lennon



Geomembrane Testing Services Limited

Thornback Road, Troyswood, Co Kilkenny, Ireland

Tel: (056) 7770953 Mobile: (086 8323113)

Email: flennon@geomembranets.ie

Geomembrane Seam Air Pressure Test Log

Project No. 15/KLR/001 ■ LLDPE
Project Name: Kingscourt Landfill Remediation - Capping Works
Date: September 2015 Thickness: 1mm
Project Location: Kingscourt, Co Cavan

Seam requirements: 2 bar minimum

Panel / Panel.	Air Testing /2bar minimum		Pass/Fail	Date
	Start	End		
Panel No. 8 - Panel No. 15	3.3	3.3	Pass	23/09/15
Panel No. 8 - Panel No. 16	3.2	3.2	Pass	23/09/15
Panel No. 8 - Panel No. 17	Resealed/Retested 23/09/15		Fail	23/09/15
Panel No. 8 - Panel No. 17	3.9	3.3	Pass	23/09/15
Panel No. 14 - Panel No. 15	3.8	3.8	Pass	23/09/15
Panel No. 15 - Panel No. 16	3.7	3.6	Pass	23/09/15
Panel No. 16 - Panel No. 17	3.9	3.9	Pass	23/09/15

Approved: F Lennon



Geomembrane Testing Services Limited

Thornback Road, Troyswood, Co Kilkenny, Ireland

Tel: (056) 7770953 Mobile: (086 8323113)

Email: flennon@geomembranets.ie

Geomembrane Seam Air Pressure Test Log

Project No. 15/KLR/001 ■ LLDPE
 Project Name: Kingscourt Landfill Remediation - Capping Works
 Date: October 2015 Thickness: 1mm
 Project Location: Kingscourt, Co Cavan

Seam requirements: 2 bar minimum

Panel. / Panel.	Air Testing /2bar minimum		Pass/Fail	Date
	Start	End		
Panel No. 17 - Panel No. 18	3.5	3.5	Pass	08/10/15
Panel No. 18 - Panel No. 19	3.6	3.6	Pass	08/10/15
Panel No. 19 - Panel No. 20	3.5	3.5	Pass	08/10/15
Panel No. 19 - Panel No. 21	3.8	3.8	Pass	08/10/15
Panel No. 20 - Panel No. 21	3.4	3.4	Pass	08/10/15
Panel No. 20 - Panel No. 22	3.5	3.5	Pass	08/10/15
Panel No. 21 - Panel No. 22	3.6	3.6	Pass	08/10/15
Panel No. 22 - Panel No. 23	3.8	3.8	Pass	08/10/15
Panel No. 22 - Panel No. 24	3.4	3.4	Pass	08/10/15
Panel No. 23 - Panel No. 24	3.6	3.5	Pass	08/10/15

Approved: F Lennon

Section 6:

Geomembrane Seaming Reports

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Geomembrane Testing Services Limited

Thornback Road, Troyswood, Co Kilkenny, Ireland

Tel: (056) 7770953 Mobile: (086 8323113)

Email: flennon@geomembranets.ie

Geomembrane Seaming Record

Project No. 15/KLR/001

■ LLDPE

Project Name: Kingscourt Landfill Remediation - Capping Works

Date: August 2015

Thickness: 1mm

Project Location: Kingscourt, Co Cavan

Panel # / Panel #	Seaming Record						
	Date	Inspector ID	Weld type	Temperature °C		Machine Speed	Non Destructive Vacuum Box Test Pass/Fail
				Machine	Pre Heat		
Destructive Sample 01 (repair)	07/08/15	FL	Extrusion	225	230	1.2m/min	Pass

Approved: F Lennon



Geomembrane Testing Services Limited

Thornback Road, Troyswood, Co Kilkenny, Ireland

Tel: (056) 7770953 Mobile: (086 8323113)

Email: flennon@geomembranets.ie

Geomembrane Seaming Record

Project No. 15/KLR/001

LLDPE

Project Name: Kingscourt Landfill Remediation - Capping Works

Date: August 2015

Thickness: 1mm

Project Location: Kingscourt, Co Cavan

[illegible]

Approved: F Lennon

Geomembrane Testing Services Limited

Thornback Road, Troyswood, Co Kilkenny, Ireland

Tel: (056) 7770953 Mobile: (086 8323113)

Email: flennon@geomembranets.ie

Geomembrane Seaming Record

Project No. 15/KLR/001 ■ LLDPE
 Project Name: Kingscourt Landfill Remediation - Capping Works
 Date: September 2015 Thickness: 1mm
 Project Location: Kingscourt, Co Cavan

Panel # /Panel #	Seaming Record						Non Destructive Vacuum Box Test Pass/Fail
	Date	Inspector ID	Weld type	Temperature °C		Machine Speed	
				Machine	Pre Heat		
Destructive Sample 03 (repair)	20/09/15	FL	Extrusion	225	230	1.2m/min	Pass
PGW - 01 Pipe Booth Adaptor	20/09/15	FL	Extrusion	225	230	1.2m/min	Pass
PGW - 02 Pipe Booth Adaptor	20/09/15	FL	Extrusion	225	230	1.2m/min	Pass
PGW - 04 Pipe Booth Adaptor	20/09/15	FL	Extrusion	225	230	1.2m/min	Pass
PGW - 05 Pipe Booth Adaptor	20/09/15	FL	Extrusion	225	230	1.2m/min	Pass

Approved: F Lennon



Geomembrane Testing Services Limited

Thornback Road, Troyswood, Co Kilkenny, Ireland

Tel: (056) 7770953 Mobile: (086 8323113)

Email: flennon@geomembranets.ie

Geomembrane Seaming Record

Project No. 15/KLR/001

■ LLDPE

Project Name: Kingscourt Landfill Remediation - Capping Works

Date: September 2015

Thickness: 1mm

Project Location: Kingscourt, Co Cavan

Panel # /Panel #	Seaming Record						
	Date	Inspector ID	Weld type	Temperature °C		Machine Speed	Non Destructive Vacuum Box Test Pass/Fail
				Machine	Pre Heat		
Destructive Sample 04 (repair)	29/09/15	FL	Extrusion	227	234	1.2m/min	Pass
PGW - 03 Pipe Booth Adaptor	29/09/15	FL	Extrusion	227	234	1.2m/min	Pass
PGW - 06 Pipe Booth Adaptor	29/09/15	FL	Extrusion	227	234	1.2m/min	Pass
Panel No. 9 – Panel No. 14	29/09/15	FL	Extrusion	227	234	1.2m/min	Pass

Approved: F Lennon

Geomembrane Testing Services Limited

Thornback Road, Troyswood, Co Kilkenny, Ireland

Tel: (056) 7770953 Mobile: (086 8323113)

Email: flennon@geomembranets.ie

Geomembrane Seaming Record

Project No. 15/KLR/001 ■ LLDPE
 Project Name: Kingscourt Landfill Remediation - Capping Works
 Date: October 2015 Thickness: 1mm
 Project Location: Kingscourt, Co Cavan

Panel # /Panel #	Seaming Record						
	Date	Inspector ID	Weld type	Temperature °C		Machine Speed	Non Destructive Vacuum Box Test Pass/Fail
				Machine	Pre Heat		
Destructive Sample 05 (repair)	09/10/15	FL	Extrusion	229	237	1.2m/min	Pass
Destructive Sample 06 (repair)	09/10/15	FL	Extrusion	229	237	1.2m/min	Pass
Destructive Sample 07 (repair)	09/10/15	FL	Extrusion	229	237	1.2m/min	Pass

Approved: F Lennon

Section 7:

Subgrade Sign off Reports

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Geomembrane Testing Services Limited

Thornback Road, Troyswood, Co Kilkenny

Tel: (056) 7770953 Mobile: (086 8323113)

Email: flennon@geomembranets.ie

Certificate of Acceptance of Soil Subgrade Surface

Project No. 15/KLR/001 ■ LLDPE
Project Name: Kingscourt Landfill Remediation - Capping Works
Date: August 2015 Thickness: 1mm
Project Location: Kingscourt, Co Cavan

I, the under named, a duly appointed representative of Geomembrane Testing Services Limited, have visually inspected the soil subgrade surface described below and found it to be an acceptable surface on which to install geomembranes. This certification is based on observations of the surface of the subgrade only.

Area being accepted: Subgrade Surface for Panel's 1 & 2

Geomembrane Testing Services Limited Representative:

Date: 07/08/15
Name: Frank Lennon
Title: Managing Director/Senior Inspector

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Geomembrane Testing Services Limited

Thornback Road, Troyswood, Co Kilkenny

Tel: (056) 7770953 Mobile: (086 8323113)

Email: flennon@geomembranets.ie

Certificate of Acceptance of Soil Subgrade Surface

Project No. 15/KLR/001 ■ LLDPE
Project Name: Kingscourt Landfill Remediation - Capping Works
Date: August 2015 Thickness: 1mm
Project Location: Kingscourt, Co Cavan

I, the under named, a duly appointed representative of Geomembrane Testing Services Limited, have visually inspected the soil subgrade surface described below and found it to be an acceptable surface on which to install geomembranes. This certification is based on observations of the surface of the subgrade only.

Area being accepted: Subgrade Surface for Panel's 3, 4 & 5

Geomembrane Testing Services Limited Representative:

Date: 18/08/15
Name: Frank Lennon
Title: Managing Director/Senior Inspector

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Geomembrane Testing Services Limited

Thornback Road, Troyswood, Co Kilkenny

Tel: (056) 7770953 Mobile: (086 8323113)

Email: flennon@geomembranets.ie

Certificate of Acceptance of Soil Subgrade Surface

Project No. 15/KLR/001 ■ LLDPE
Project Name: Kingscourt Landfill Remediation - Capping Works
Date: September 2015 Thickness: 1mm
Project Location: Kingscourt, Co Cavan

I, the under named, a duly appointed representative of Geomembrane Testing Services Limited, have visually inspected the soil subgrade surface described below and found it to be an acceptable surface on which to install geomembranes. This certification is based on observations of the surface of the subgrade only.

Area being accepted: Subgrade Surface for Panel's 6, 7, 8 & 9

Geomembrane Testing Services Limited Representative:

Date: 02/09/15
Name: Frank Lennon
Title: Managing Director/Senior Inspector

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Geomembrane Testing Services Limited

*Thornback Road, Troyswood, Co Kilkenny
Tel: (056) 7770953 Mobile: (086 8323113)
Email: flennon@geomembranets.ie*

Certificate of Acceptance of Soil Subgrade Surface

Project No. 15/KLR/001 ■ LLDPE
Project Name: Kingscourt Landfill Remediation - Capping Works
Date: September 2015 Thickness: 1mm
Project Location: Kingscourt, Co Cavan

I, the under named, a duly appointed representative of Geomembrane Testing Services Limited, have visually inspected the soil subgrade surface described below and found it to be an acceptable surface on which to install geomembranes. This certification is based on observations of the surface of the subgrade only.

Area being accepted: Subgrade Surface for Panel's 10, 11, 12 & 13

Geomembrane Testing Services Limited Representative:

Date: 15/09/15
Name: Frank Lennon
Title: Managing Director/Senior Inspector

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Geomembrane Testing Services Limited

Thornback Road, Troyswood, Co Kilkenny

Tel: (056) 7770953 Mobile: (086 8323113)

Email: flennon@geomembranets.ie

Certificate of Acceptance of Soil Subgrade Surface

Project No. 15/KLR/001 ■ LLDPE
Project Name: Kingscourt Landfill Remediation - Capping Works
Date: September 2015 Thickness: 1mm
Project Location: Kingscourt, Co Cavan

I, the under named, a duly appointed representative of Geomembrane Testing Services Limited, have visually inspected the soil subgrade surface described below and found it to be an acceptable surface on which to install geomembranes. This certification is based on observations of the surface of the subgrade only.

Area being accepted: Subgrade Surface for Panel's 14

Geomembrane Testing Services Limited Representative:

Date: 16/09/15
Name: Frank Lennon
Title: Managing Director/Senior Inspector

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Geomembrane Testing Services Limited

Thornback Road, Troyswood, Co Kilkenny

Tel: (056) 7770953 Mobile: (086 8323113)

Email: flennon@geomembranets.ie

Certificate of Acceptance of Soil Subgrade Surface

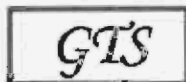
Project No. 15/KLR/001 ■ LLDPE
Project Name: Kingscourt Landfill Remediation - Capping Works
Date: September 2015 Thickness: 1mm
Project Location: Kingscourt, Co Cavan

I, the under named, a duly appointed representative of Geomembrane Testing Services Limited, have visually inspected the soil subgrade surface described below and found it to be an acceptable surface on which to install geomembranes. This certification is based on observations of the surface of the subgrade only.

Area being accepted: Subgrade Surface for Panel's 15, 16, 17 & 18

Geomembrane Testing Services Limited Representative:

Date: 22/09/15
Name: Frank Lennon
Title: Managing Director/Senior Inspector



Geomembrane Testing Services Limited

Thornback Road, Troyswood, Co Kilkenny

Tel: (056) 7770953 Mobile: (086 8323113)

Email: flennon@geomembranets.ie

Certificate of Acceptance of Soil Subgrade Surface

Project No. 15/KLR/001 ■ LLDPE
Project Name: Kingscourt Landfill Remediation - Capping Works
Date: October 2015 Thickness: 1mm
Project Location: Kingscourt, Co Cavan

I, the under named, a duly appointed representative of Geomembrane Testing Services Limited, have visually inspected the soil subgrade surface described below and found it to be an acceptable surface on which to install geomembranes. This certification is based on observations of the surface of the subgrade only.

Area being accepted: Subgrade Surface for Panel's 19, 20, 21, 22, 23 & 24

Geomembrane Testing Services Limited Representative:

Date: 06/10/15
Name: Frank Lennon
Title: Managing Director/Senior Inspector

Section 8:

LLDPE Manufacturers Certificates

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ROLL TEST DATA REPORT

Inspection Certificate 3.1 (DIN EN 10204)

GSE Lining Technology GmbH

Roll No 420058390
Bill of Lading VKL+109922

ENVIRONMENTAL™

Roll Identification

Roll Number	420058390	Length	210 meters	Sheet Area	1.460 m²
Product Name	LDT-100AM-BBB-V-00	Width	8,95 meters	Weight	1.608 kilograms
Production Date	Jul 10, 2015				

Resin Information

Batch number AO15007-2400005397

Physical Properties	Test Method	Test Result
Core Thickness Average [mm]	ASTM D5994 MW	1,02
Core Thickness Minimum [mm]	ASTM D5994 MI	0,93
Core Thickness Maximum [mm]	ASTM D5994 MA	1,09
Carbon Black Content [%]	ASTM D1603	2,2
Carbon Black Dispersion [Cat]	ASTM D5596	1
MFR (190/2,16) [g/10min]	ASTM D1238(190/2,16)	0,2
Density [g/cm³]	ASTM D792	0,934
Dimensional Stability [%] MD	ASTM D1204	-0,2
Dimensional Stability [%] CMD	ASTM D1204	0,0
Break Strength [N/mm] MD	ASTM D6693 ZF	25
Break Strength [N/mm] CMD	ASTM D6693 ZF	24
Break Elongation [%] MD	ASTM D6693 BD	552
Break Elongation [%] CMD	ASTM D6693 BD	538
Tear Resistance [N] MD	ASTM D1004	147
Tear Resistance [N] CMD	ASTM D1004	135
Asperity Height [mm]	ASTM D7466 /A	0,48
Puncture Resistance [N]	ASTM D4833	447
OIT [min]	ASTM D3895	123

Sales Order No. VK106313

Customer Name Geomembrane Testing Services Limited

Project Name Geomembrane Testing Services Limited

Location Co Cavan

* Modified





ROLL TEST DATA REPORT

Inspection Certificate 3.1 (DIN EN 10204)

GSE Lining Technology GmbH

Roll No 420058386
Bill of Lading VKL+109922

ENVIRONMENTAL™

Roll Identification

Roll Number	420058386	Length	210 meters	Sheet Area	1.460 m²
Product Name	LDT-100AM-BBB-V-00	Width	6,95 meters	Weight	1.610 kilograms
Production Date	Jul 10, 2015				

Roll Information

Batch number AO15004-2400005395

Physical Properties	Test Method	Test Result
Core Thickness Average [mm]	ASTM D5994 MW	1,02
Core Thickness Minimum [mm]	ASTM D5994 MI	0,90
Core Thickness Maximum [mm]	ASTM D5994 MA	1,09
Carbon Black Content [%]	ASTM D1603	2,3
Carbon Black Dispersion [Cat]	ASTM D5596	1
MFR (190/2,16) [g/10min]	ASTM D1238(190/2,16)	0,2
Density [g/cm³]	ASTM D792	0,834
Dimensional Stability [%] MD	ASTM D1204	-0,1
Dimensional Stability [%] CMD	ASTM D1204	-0,1
Break Strength [N/mm] MD	ASTM D6693 ZF	23
Break Strength [N/mm] CMD	ASTM D6693 ZF	20
Break Elongation [%] MD	ASTM D6693 BD	546
Break Elongation [%] CMD	ASTM D6693 BD	496
Tear Resistance [N] MD	ASTM D1004	135
Tear Resistance [N] CMD	ASTM D1004	134
Asperity Height [mm]	ASTM D7466 /A	0,57
Puncture Resistance [N]	ASTM D4833	417
OIT [min]	ASTM D3895	123

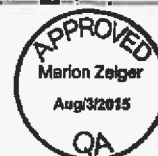
Sales Order No. VK106313

Customer Name Geomembrane Testing Services Limited

Project Name Geomembrane Testing Services Limited

Location Co Cavan

* Modified





ROLL TEST DATA REPORT

Inspection Certificate 3.1 (DIN EN 10204)

GSE Lining Technology GmbH

Roll No 420058384
Bill of Lading VKL+109922

ENVIRONMENTAL™

Roll Identification

Roll Number	420058384	Length	210 meters	Sheet Area	1.460 m²
Product Name	LDT-100AM-BBB-V-00	Width	6,95 meters	Weight	1.606 kilograms
Production Date	Jul 10, 2015				

Resin Information

Batch number AO15004-2400005396

Physical Properties	Test Method	Test Result
Core Thickness Average [mm]	ASTM D5994 MW	1,01
Core Thickness Minimum [mm]	ASTM D5994 MI	0,90
Core Thickness Maximum [mm]	ASTM D5994 MA	1,08
Carbon Black Content [%]	ASTM D1603	2,3
Carbon Black Dispersion [Cat]	ASTM D5596	1
MFR (190/2,16) [g/10min]	ASTM D1238(190/2,16)	0,2
Density [g/cm³]	ASTM D792	0,934
Dimensional Stability [%] MD	ASTM D1204	-0,1
Dimensional Stability [%] CMD	ASTM D1204	-0,1
Break Strength [N/mm] MD	ASTM D6693 ZF	24
Break Strength [N/mm] CMD	ASTM D6693 ZF	21
Break Elongation [%] MD	ASTM D6693 BD	571
Break Elongation [%] CMD	ASTM D6693 BD	516
Tear Resistance [N] MD	ASTM D1004	135
Tear Resistance [N] CMD	ASTM D1004	134
Asperity Height [mm]	ASTM D7468 /A	0,48
Puncture Resistance [N]	ASTM D4833	417
OIT [min]	ASTM D3895	123

Sales Order No. VK106313

Customer Name Geomembrane Testing Services Limited

Project Name Geomembrane Testing Services Limited

Location Co Cavan

* Modified





ROLL TEST DATA REPORT

Inspection Certificate 3.1 (DIN EN 10204)

GSE Lining Technology GmbH

Roll No 420058380
Bill of Lading VKL+109922

ENVIRONMENTAL™

Roll Identification

Roll Number	420058380	Length	210 meters	Sheet Area	1.460 m ²
Product Name	LDT-100AM-BBB-V-00	Width	6,95 meters	Weight	1.594 kilograms
Production Date	Jul 10, 2015				

Resin Information

Batch number AO15004-2400005396

Physical Properties	Test Method	Test Result
Core Thickness Average [mm]	ASTM D5994 MW	1,00
Core Thickness Minimum [mm]	ASTM D5994 MI	0,91
Core Thickness Maximum [mm]	ASTM D5994 MA	1,09
Carbon Black Content [%]	ASTM D1603	2,3
Carbon Black Dispersion [Cat]	ASTM D5596	1
MFR (190/2,16) [g/10min]	ASTM D1238(190/2,16)	0,2
Density [g/cm ³]	ASTM D792	0,934
Dimensional Stability [%] MD	ASTM D1204	-0,1
Dimensional Stability [%] CMD	ASTM D1204	-0,1
Break Strength [N/mm] MD	ASTM D6693 ZF	24
Break Strength [N/mm] CMD	ASTM D6693 ZF	21
Break Elongation [%] MD	ASTM D6693 BD	571
Break Elongation [%] CMD	ASTM D6693 BD	516
Tear Resistance [N] MD	ASTM D1004	135
Tear Resistance [N] CMD	ASTM D1004	134
Asperity Height [mm]	ASTM D7466 /A	0,46
Puncture Resistance [N]	ASTM D4833	417
OIT [min]	ASTM D3895	123

Sales Order No. VK106313
Customer Name Geomembrane Testing Services Limited
Project Name Geomembrane Testing Services Limited
Location Co Cavan
• Modified





ROLL TEST DATA REPORT

Inspection Certificate 3.1 (DIN EN 10204)

GSE Lining Technology GmbH

Roll No 420058369
Bill of Lading VKL+109922

ENVIRONMENTAL™

Roll Identification

Roll Number	420058369	Length	210 meters	Sheet Area	1.480 m²
Product Name	LDT-100AM-BBB-V-00	Width	6,95 meters	Weight	1.596 kilograms
Production Date	Jul 09, 2015				

Resin Information

Batch number AO15004-2400005396

Physical Properties	Test Method	Test Result
Core Thickness Average [mm]	ASTM D5994 MW	1,03
Core Thickness Minimum [mm]	ASTM D5994 MI	0,94
Core Thickness Maximum [mm]	ASTM D5994 MA	1,09
Carbon Black Content [%]	ASTM D1603	2,2
Carbon Black Dispersion [Cat]	ASTM D5596	1
MFR (190/2,16) [g/10min]	ASTM D1238(190/2,16)	0,2
Density [g/cm³]	ASTM D792	0,934
Dimensional Stability [%] MD	ASTM D1204	-0,2
Dimensional Stability [%] CMD	ASTM D1204	-0,0
Break Strength [N/mm] MD	ASTM D6693 ZF	24
Break Strength [N/mm] CMD	ASTM D6693 ZF	22
Break Elongation [%] MD	ASTM D6693 BD	572
Break Elongation [%] CMD	ASTM D6693 BD	522
Tear Resistance [N] MD	ASTM D1004	139
Tear Resistance [N] CMD	ASTM D1004	129
Asperity Height [mm]	ASTM D7466 /A	0,53
Puncture Resistance [N]	ASTM D4833	432
OIT [min]	ASTM D3895	124

Sales Order No. VK106313

Customer Name Geomembrane Testing Services Limited

Project Name Geomembrane Testing Services Limited

Location Co Cavan

* Modified





ROLL TEST DATA REPORT

Inspection Certificate 3.1 (DIN EN 10204)

GSE Lining Technology GmbH

Roll No 420058366
Bill of Lading VKL+109922

ENVIRONMENTAL™

Roll Identification

Roll Number	420058366	Length	210 meters	Sheet Area	1.460 m²
Product Name	LDT-100AM-BBB-V-00	Width	6.95 meters	Weight	1.590 kilograms
Production Date	Jul 09, 2015				

Resin Information

Batch number AO16005-2400005396

Physical Properties	Test Method	Test Result
Core Thickness Average [mm]	ASTM D5994 MW	1,03
Core Thickness Minimum [mm]	ASTM D5994 MI	0,92
Core Thickness Maximum [mm]	ASTM D5994 MA	1,10
Carbon Black Content [%]	ASTM D1603	2,2
Carbon Black Dispersion [Cat]	ASTM D5596	1
MFR (190/2,16) [g/10min]	ASTM D1238(190/2,16)	0,2
Density [g/cm³]	ASTM D792	0,934
Dimensional Stability [%] MD	ASTM D1204	-0,2
Dimensional Stability [%] CMD	ASTM D1204	-0,0
Break Strength [N/mm] MD	ASTM D6693 ZF	24
Break Strength [N/mm] CMD	ASTM D6693 ZF	22
Break Elongation [%] MD	ASTM D6693 BD	572
Break Elongation [%] CMD	ASTM D6693 BD	522
Tear Resistance [N] MD	ASTM D1004	139
Tear Resistance [N] CMD	ASTM D1004	129
Asperity Height [mm]	ASTM D7466 /A	0,53
Puncture Resistance [N]	ASTM D4833	432
OIT [min]	ASTM D3885	124

Sales Order No. VK106313
Customer Name Geomembrane Testing Services Limited
Project Name Geomembrane Testing Services Limited
Location Co Cavan
•Modified



Section 9:

Gas/Drainage Geocomposite Manufacturers Certificates

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Consent of copyright owner required for any other use.

Easy Installation
Quality Economical
 High Performance

GEOfabrics®

Issue Date: 02/05/14

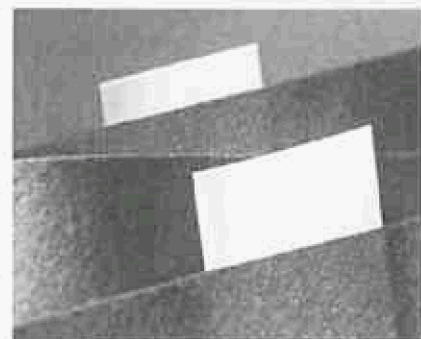
Product: GPT3

High Performance Drainage Composite

Geotextile protector



GPT3 with surface band drains
 at 1.0m centres across the roll width



Property	Method	Units	Product Value
Drain Data			
Polymer	Polypropylene extruded profile		
Width		mm	100
Geocomposite Data			
Static Puncture Strength (CBR)	BS EN ISO 12238	kPa	3.3
Tensile strength (md / cnd)	BS EN ISO 10319	kN/m	2.1
Tensile elongation (md / cnd)	BS EN ISO 10319		60
Dynamic Perforation Test	BS EN ISO 13433	mm	6
Thickness @ 2kPa	BS EN ISO 9859.1	mm	3.8
Water flow	BS EN ISO 11058	l/m ² /s	50
In-place Flow Capacity using soft/hard platens (i=1.0)	BS EN ISO 12958		
@ 20kPa		l/s/m using band drains at 1m	0.2
@ 100kPa			0.2
@ 200kPa			0.17
Geocomposite Physical Properties			
Roll Dimensions		m	5.0 x 75
Approximate Roll Weight		kg	200
<p>Values are Typical, with the exception of Thickness, which is Nominal. Typical indicates the mean value derived from the samples taken for any one test as defined in the BS EN ISO standard - usually the mean of five samples. Nominal is a guide value.</p> <p>All GEOfabrics' Drainage Composite products are tested in independently-audited ISO 17025 UKAS-accredited laboratories for all mechanical, hydraulic and performance related properties at a minimum of one set every 6000m².</p> <p>Further values not listed on this data sheet are available on request from GEOfabrics Ltd.</p>			

LFX geocomposite comprises of a three-dimensional geonet drainage core with a woven filter/reinforcement geotextile bonded on both sides and a non-woven geotextile protector on the lower side. GEOfabrics composite drains directly replace traditional primary resources such as aggregate based drainage solutions. Using drainage composites reduces carbon footprint and the impact on the environment by replacing granular drainage blankets meaning reduced quarrying at source, less haulage to site, reduced excavation and a quicker installation phase. A GEOfabrics composite drain can provide up to the equivalent flow of up to 1m of standard 10-20mm well rounded gravel and at a fraction of the cost.



GEOfabrics Limited
 Skelton Grange Road, Stourton
 Leeds LS10 1RZ
 United Kingdom

Tel: +44 (0) 113 202 5678
 Fax: +44 (0) 113 202 5655
 Email: info@geofabrics.com
 Web: www.geofabrics.com

Laboratory Test Report



MATTEST (IRELAND) LIMITED

Mattest Ireland Ltd.
Unit 2
Northwest Business Park
Ballycoolin
Dublin 15

Tel: 01 8278600
Fax: 01 8278601

e-mail: info@mattest.ie
Web: www.mattest.ie

Report No.: **MIL SA 15/545**
Report Date: **14/09/2015**

Customer: **O'Reilly Concrete**

Contract: **n/a**

Address: **Kingscourt
Co Meath**

Site Address: **n/a**

Sample Ref: **MIL SA 15/545**

Location:	n/a	Sample Cert:	No
Sample Description:	Crushed rock	Sampled By:	Customer
Source/Supplier:	Tathart Quarry	Date Sampled:	n/a
Site Ref:	Crushed rock	Date Received:	25/08/2015
Sample Type:	Bulk	Date Tested:	31/08/2015
Specification:	BS 1377-2:1990		

Test Results

Arsenic
Content **0.084 mg/kg**

Remarks: This work was carried out by our accredited, competent sub-contract laboratory.

Authorised Signatories

- ☒ B. Gilroy - Technical & Area Manager
☐ B. Fitzsimons - Quality Manager
☐ R. McCormack - Laboratory Manager
☐ M. Bain - Operations Manager

Signed: 

For Mattest (Ireland) Ltd.