

**Notes:**

1. Based on Tailte Eireann Digital maps 2304, 2305, 2367, 2368

**Legend:**

- Landholding
- Planning Application Area (c. 5.8 hectares)
- Proposed Extraction Area (c. 4.2 hectares)
- Planning Permission KA14/1129 (c. 28.5 hectares)
- Permitted Extraction Area KA14/1129 (c. 23.9 hectares)
- Overhead powerline
- Underground power cable route (with 5m exclusion zone either side)
- 2025 Boreholes
- 2016 Boreholes
- 2016 Trial Pits



Rev	Amendments	Date	By	Chk	Auth



Client  
BD Flood Unlimited Company

Project  
Sand & Gravel Pit Extension  
The Murrens, Oldcastle, Co. Meath

Figure Title  
Site Ground Investigation Locations (2016 & 2025)

Scale No Scale @ A3		SLR Project No. 501.065670.00001	
Designed smcd	Drawn scmd	Checked lh	Authorised lh
Date 01/25	Date 01/25	Date 03/25	Date 03/25
Figure Number Figure 6-6			Rev.

## Appendices

### Appendix 6-A: GSI Consultation Response

RECEIVED: 04/07/2025

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Shane McDermott  
SLR Consulting Ireland  
7 Dundrum Business Park  
Windy Arbour  
Dublin, D14 N2Y7

05 February 2025

**Re: Proposed sand and gravel pit extension at Murrens, Oldcastle, Co. Meath**  
**Your Ref: 501.065670.00001**  
**Our Ref: 25/20**

Dear Shane,

Geological Survey Ireland is the national earth science agency and is a division of the Department of the Environment, Climate and Communications. We provide independent geological information and interpretation and gather various data for that purpose. Please see our [website](#) for data availability.

With reference to your email received on the 29 January 2025, concerning the pre-planning consultation on a proposed sand and gravel pit extension at Murrens, Oldcastle, Co. Meath, we recommend using our various data sets when conducting the EIAR, SEA, planning and scoping processes for developments, plans and policies. For more detailed information on how to access this data please access 'Data and Maps' [Data & Maps \(gsi.ie\)](#) on our 'Geoscience for planning' webpage. Use of our data or maps should be attributed correctly (please refer to each individual dataset's metadata for correct attribution).

For specific data available for Environmental Assessment and Planning topics please follow this link [[Data by Environmental Assessment and Planning Topic \(gsi.ie\)](#)], where you will find our data arranged by environmental assessment topic as illustrated below:

<p><b>Land and soils</b></p> <p><i>Soil</i></p> <ul style="list-style-type: none"> <li>Subsoils (Quaternary Geology)</li> <li>Tellus Geochemistry</li> <li>Geotechnical</li> </ul> <p><i>Geology</i></p> <ul style="list-style-type: none"> <li>Bedrock</li> <li>Geophysics</li> <li>Bedrock &amp; Quaternary 3D</li> </ul>	<p><b>Water</b></p> <p><i>Groundwater</i></p> <ul style="list-style-type: none"> <li>Aquifers GW vulnerability, GWPSs (GWPPs)</li> </ul> <p><i>Surface water</i></p> <ul style="list-style-type: none"> <li>Tellus Geochemistry</li> </ul> <p><i>Estuarine &amp; marine waters</i></p> <ul style="list-style-type: none"> <li>Marine and coastal</li> </ul> <p><i>Flooding</i></p> <ul style="list-style-type: none"> <li>GWClimate</li> <li>Karst</li> </ul>	<p><b>Climate Change</b></p> <p><i>Carbon accounting / Carbon balance</i></p> <ul style="list-style-type: none"> <li>Geothermal</li> <li>Carbon capture and storage</li> </ul> <p><i>Climate change trends</i></p> <ul style="list-style-type: none"> <li>National coastal change assessment</li> </ul>
<p><b>Cultural Heritage</b></p> <p><i>Archaeology</i></p> <ul style="list-style-type: none"> <li>Cherish</li> </ul> <p><i>Underwater Archaeology</i></p> <ul style="list-style-type: none"> <li>Shipwrecks</li> </ul>	<p><b>Material Assets</b></p> <p><i>Built Services</i></p> <ul style="list-style-type: none"> <li>Natural resources (Minerals &amp; Aggregates)</li> <li>Active quarries</li> </ul>	<p><b>The Landscape</b></p> <p><i>Landscape Appearance &amp; Character</i></p> <ul style="list-style-type: none"> <li>Physiographic units</li> </ul> <p><i>Historical landscapes</i></p> <ul style="list-style-type: none"> <li>Historic mines</li> </ul>
<p><b>Other Relevant Data</b></p>		
<p><i>Natural (Geo) hazards</i></p> <ul style="list-style-type: none"> <li>Landslide Susceptibility Mapping</li> <li>Groundwater flooding</li> <li>Coastal vulnerability</li> <li>Subsidence</li> <li>Radon</li> </ul>	<p><i>Natural heritage</i></p> <ul style="list-style-type: none"> <li>Geoheritage (County Geological Sites)</li> <li>Dimension Stone/Stone Built Ireland</li> </ul>	



## **Geoheritage**

Geological Survey Ireland is in partnership with the National Parks and Wildlife Service (NPWS, Department of Housing, Local Government and Heritage), to identify and select important geological and geomorphological sites throughout the country for designation as geological NHAs (Natural Heritage Areas). This is addressed by the Geoheritage Programme of Geological Survey Ireland, under 16 different geological themes, in which the minimum number of scientifically significant sites that best represent the theme are rigorously selected by a panel of theme experts.

County Geological Sites (CGSs), as adopted under the National Heritage Plan, include additional sites that may also be of national importance, but which were not selected as the very best examples for NHA designation. All geological heritage sites identified by Geological Survey Ireland are categorised as CGS pending any further NHA designation by NPWS. CGSs are now routinely included in County Development Plans and in the GIS of planning departments, to ensure the recognition and appropriate protection of geological heritage within the planning system. CGSs can be viewed online under the Geological Heritage tab on the online [Map Viewer](#).

The audit for Co. Meath was carried out in 2007. The full report details can be found [here](#). **Our records show that the proposed sand and gravel pit extension is located within a CGS.**

**Murrens**, Co. Meath (GR 252464, 274868), under IGH theme: IGH 7 Quaternary. Wooded ridge – esker and hummocky ground including gravel pit. This is a long beaded esker system which feeds into a large, supraglacial delta complex, with flanking fans and kames. Murrens, is composed of a number of glacial depositional features. These include: an esker, formed by the deposition of sand and gravel by a subglacial river; and an ice contact fan and delta system, which is formed by the deposition of sand and gravel carried by glaciofluvial meltwater from a nearby ice sheet, creating hummocky terrain. This site is of very good quality, showing spectacular topography. Unique in Ireland and of international importance, the esker will be recommended for NHA designation. Link to Site Report: [MH014](#).

With the current plan, it is our opinion it is probable that the planning authority could identify likely impacts on the integrity of current CGSs envisaged by the proposed development. Ideally, the site should not be damaged or integrity impacted or reduced in any manner due to the proposed development. This is an extension to an existing sand and gravel pit, which already has a significant impact on the county geological site. The gravel extractions should not extend to the entire county geological site feature in the future. Appropriate mitigation measures should be put in place to minimize or mitigate potential impacts. Some suggestions are made below.

As with other quarries and gravel pits that are also CGSs, the extraction process can in some cases add knowledge to the understanding of the site. **In these cases, the fresh exposures should be clearly documented, recorded and assessed by a competent geologist. We recommend that this be included as part of the EIAR mitigating actions and that a report be produced as an output.**

Where the integrity cannot be preserved, **we would ask that careful consideration be given in design to accommodating preservation of faces** and access to the site during construction to record the exposures to strengthen our knowledge and datasets. We would also ask that the design of any future development **considers the use of information panels as appropriate to highlight the significance of the impacted CGS**. Please contact Clare Glanville ([Clare.Glanville@gsi.ie](mailto:Clare.Glanville@gsi.ie)) for further information and possible mitigation measures if applicable.

Geological Survey Ireland would request that the operator might assist our geological heritage goals with the following (and ideally this would be written into the restoration / closure plan) and be included as a condition of planning as deemed appropriate by the planning authority:

1. Allowing access to sand and gravel faces by appropriate scientists (upon request and with due regards to Health and Safety requirements) during quarrying to check for interesting new stratigraphies / relationships as they might become exposed and to establish if the quarry site is worthy of recognition post extraction and through aftercare/restoration planning.



2. If deemed appropriate in (1) above, leaving representative sections of the sand and gravel faces at the end of the pit life or inclusion of information panels to promote the geology to the public or develop tourism or educational resources if appropriate depending on the future use of the site. Natural exposures are few, or deeply weathered, this measure would permit on-going improvement of geological knowledge of the subsurface.

The Geoheritage Programme tries to promote a partnership between geological heritage and active quarrying, with such measures as those outlined in the 'Geological Heritage Guidelines for the Extractive Industry', which can be downloaded [here](#). This document, written in association with Irish Concrete Federation, acts as a comprehensive guide in the sustainable extraction of natural resources while preserving the geological heritage of Ireland.

#### **Other Comments**

Should development go ahead, all other factors considered, Geological Survey Ireland would much appreciate a copy of reports detailing any site investigations carried out. The data would be redacted for confidentiality and added to Geological Survey Ireland's national database of site investigation boreholes, implemented to provide a better service to the civil engineering sector. Data can be sent to the Geological Mapping Unit, at <mailto:GeologicalMappingInfo@gsi.ie>.

If we can be of any further help, please do not hesitate to contact me Clare Glanville, or my colleague Trish Smullen at [GSIPlanning@gsi.ie](mailto:GSIPlanning@gsi.ie).

Yours sincerely,

Dr. Clare Glanville  
**Senior Geologist**  
**Geoheritage and Planning Programme**  
**Geological Survey Ireland**

Trish Smullen  
**Geologist**  
**Geoheritage and Planning Programme**  
**Geological Survey Ireland**

The publicly available data referenced/presented here, should in no way be construed as Geological Survey Ireland support for or objection to the proposed development or plan. The data are made freely available to all and can be used as independent scientific data in assessments, plans or policies. It should be noted that in many cases these data are a baseline or starting point for further site specific assessments.

**Appendix 6-B: Trial Pits Logs 2013**

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# SLR Consulting Ireland

Unit 7, Dundrum Business Pk.,  
Windy Arbour, Dublin 14, Ireland.

Tel: +35312964667 Fax: +35312964676  
www.slrconsulting.com

Trialpit No

**TP1**

Sheet 1 of 2

Date  
25/07/2013

Project Name: BD Floods Murrens EIS

Location: Murrens, Co. Meath

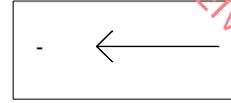
Client: BD Flood

SLR Project No. 501.00023.00011

Co-ords: 252231E - 274398N  
Level: -

Dimensions:

Depth  
6.00m



Scale  
1:25

Logged By

Samples & In Situ Testing				Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Waterstrike	Results				
				0.30			TOPSOIL - Gravelly topsoil (TOPSOIL)
				0.50			Brown clayey very cobbly GRAVEL with boulders (GLACIAL SAND & GRAVEL)
							Grey slightly sandy coarse gravelly COBBLES and BOULDERS, boulders up to 1.5m (GLACIAL SAND & GRAVEL)
1				1			
2				2			
3				3			
4				4			

Continued next sheet

Remarks:

Groundwater:  
No groundwater encountered

Stability:  
Unstable from 0.5m

Shoring:

**TP1**

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# SLR Consulting Ireland

Unit 7, Dundrum Business Pk.,  
Windy Arbour, Dublin 14, Ireland.

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www.slrconsulting.com

Trialpit No

**TP1**

Sheet 2 of 2

Date  
25/07/2013

Project Name: BD Floods Murrens EIS

Location: Murrens, Co. Meath

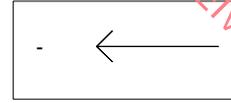
Client: BD Flood

SLR Project No. 501.00023.00011

Co-ords: 252231E - 274398N  
Level: -

Dimensions: -

Depth  
6.00m



Scale  
1:25

Logged By

Samples & In Situ Testing				Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Waterstrike	Results				
6				6.00	6		Grey slightly sandy coarse gravelly COBBLES and BOULDERS, boulders up to 1.5m (GLACIAL SAND & GRAVEL)
							Trialpit Complete at 6.00 m
7					7		
8					8		
9					9		

Remarks:

Groundwater:  
No groundwater encountered

Stability:  
Unstable from 0.5m

Shoring:

**TP1**

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# SLR Consulting Ireland

Unit 7, Dundrum Business Pk.,  
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www.slrconsulting.com

Trialpit No

**TP2**

Sheet 1 of 2

Date  
25/07/2013

Project Name: BD Floods Murrens EIS

Location: Murrens, Co. Meath

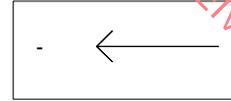
Client: BD Flood

SLR Project No. 501.00023.00011

Co-ords: 252048E - 274399N  
Level: -

Dimensions: -

Depth  
8.00m



Scale  
1:25

Logged By

Samples & In Situ Testing				Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Waterstrike	Results				
				0.60			TOPSOIL - clayey TOPSOIL (TOPSOIL)
				0.70			Brown clayey GRAVEL (GLACIAL SAND & GRAVEL)
							Grey sandy clayey sandy GRAVEL with much cobbles and boulders, sub-rounded to rounded, gravel fine to medium (GLACIAL SAND & GRAVEL)
1				1			
2				2			
3				3			
4				4			

Continued next sheet

Remarks:

Groundwater:

Stability:  
No groundwater encountered

Shoring:

**TP2**

Meath County Council - Viewing Purposes Only!

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Trialpit No

**TP2**

Sheet 2 of 2

Date  
25/07/2013

Project Name: BD Floods Murrens EIS

Location: Murrens, Co. Meath

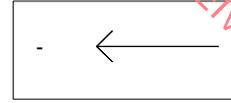
Client: BD Flood

SLR Project No. 501.00023.00011

Co-ords: 252048E - 274399N  
Level: -

Dimensions: -

Depth  
8.00m



Scale  
1:25

Logged By

Samples & In Situ Testing				Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Waterstrike	Results				
6				6			Grey sandy clayey sandy GRAVEL with much cobbles and boulders, sub-rounded to rounded, gravel fine to medium (GLACIAL SAND & GRAVEL)
7				7.00	7		Brown cobblely gravelly CLAY (CLAYEY TILL)
8				8.00	8		Trialpit Complete at 8.00 m
9				9			

Remarks:

Groundwater:

Stability:  
No groundwater encountered

Shoring:

**TP2**

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# SLR Consulting Ireland

Unit 7, Dundrum Business Pk.,  
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Tel: +35312964667 Fax: +35312964676  
www.slrconsulting.com

Trialpit No

**TP3**

Sheet 1 of 1

Date  
25/07/2013

Project Name: BD Floods Murrens EIS

Location: Murrens, Co. Meath

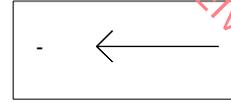
Client: BD Flood

SLR Project No. 501.00023.00011

Co-ords: 251802E - 274691N  
Level: -

Dimensions: -

Depth  
3.50m



Scale  
1:25

Logged By

Samples & In Situ Testing				Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Waterstrike	Results				
				0.40			TOPSOIL - clayey TOPSOIL (TOPSOIL)
				1.90			Brown cobblely gravelly CLAY, many broken angular cobbles and boulders (GLACIAL TILL)
				2.80			Grey sandy slightly silty GRAVEL with many cobbles and occasional boulders, sub rounded to rounded (GLACIAL SAND & GRAVEL)
				3.50			Grey cemented GRAVEL with numerous cobbles and boulders, difficult to excavate, large boulders >1.5m (GLACIAL SAND & GRAVEL)
							Trialpit Complete at 3.50 m

Remarks:

Groundwater:  
No groundwater encountered

Stability:  
Slightly unstable from 1.9m

Shoring:

**TP3**

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Trialpit No

**TP4**

Sheet 1 of 2

Date  
25/07/2013

Project Name: BD Floods Murrens EIS

Location: Murrens, Co. Meath

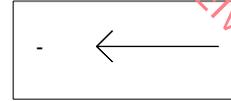
Client: BD Flood

SLR Project No. 501.00023.00011

Co-ords: 251924E - 274465N  
Level: -

Dimensions: -

Depth  
6.00m



Scale  
1:25

Logged By

Samples & In Situ Testing				Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Waterstrike	Results				
				0.30			TOPSOIL - clayey TOPSOIL (TOPSOIL)
				1.10			Brown slightly gravelly silty CLAY (GLACIAL TILL)
							Grey very cobbly slightly clayey sandy GRAVEL, very sandy in places, occasional boulders, minor silt layers (GLACIAL SAND & GRAVEL)
1							
2							
3							
4							

Continued next sheet

Remarks:

Groundwater:  
No groundwater encountered

Stability:  
Unstable throughout

Shoring:

**TP4**

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Trialpit No

**TP4**

Sheet 2 of 2

Date  
25/07/2013

Project Name: BD Floods Murrens EIS

Location: Murrens, Co. Meath

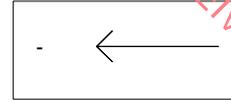
Client: BD Flood

SLR Project No. 501.00023.00011

Co-ords: 251924E - 274465N  
Level: -

Dimensions: -

Depth  
6.00m



Scale  
1:25

Logged By

Samples & In Situ Testing				Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Waterstrike	Results				
6				6.00	6		Grey very cobbly slightly clayey sandy GRAVEL, very sandy in places, occasional boulders, minor silt layers (GLACIAL SAND & GRAVEL)
Trialpit Complete at 6.00 m							
7					7		
8					8		
9					9		

Remarks:

Groundwater:  
No groundwater encountered

Stability:  
Unstable throughout

Shoring:

**TP4**

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# SLR Consulting Ireland

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Trialpit No

**TP5**

Sheet 1 of 2

Date  
25/07/2013

Project Name: BD Floods Murrens EIS

Location: Murrens, Co. Meath

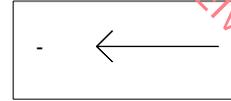
Client: BD Flood

SLR Project No. 501.00023.00011

Co-ords: 252092E - 274357N  
Level: -

Dimensions:

Depth  
5.50m



Scale  
1:25

Logged By

Samples & In Situ Testing				Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Waterstrike	Results				
0.30						TOPSOIL - clayey TOPSOIL (TOPSOIL)	
0.80						Light brown sandy silty CLAY (GLACIAL TILL)	
1				1		Brown / grey clayey GRAVEL with numerous cobbles and boulders, sub-rounded to rounded. Becoming less clayey with depth and gravel becoming coarser with depth. Cobble and boulder content increasing with depth (GLACIAL SAND & GRAVEL)	1
2				2			2
3				3			3
4				4			4

Continued next sheet

Remarks:

Groundwater:  
No groundwater encountered

Stability:

Shoring:

**TP5**

Meath County Council - Viewing Purposes Only!

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# SLR Consulting Ireland

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www.slrconsulting.com

Trialpit No

**TP5**

Sheet 2 of 2

Date  
25/07/2013

Project Name: BD Floods Murrens EIS

Location: Murrens, Co. Meath

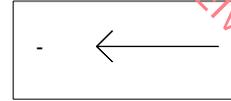
Client: BD Flood

SLR Project No. 501.00023.00011

Co-ords: 252092E - 274357N  
Level: -

Dimensions:

Depth  
5.50m



Scale  
1:25

Logged By

Samples & In Situ Testing				Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Waterstrike	Results				
5.50							Brown / grey clayey GRAVEL with numerous cobbles and boulders, sub-rounded to rounded. Becoming less clayey with depth and gravel becoming coarser with depth. Cobble and boulder content increasing with depth (GLACIAL SAND & GRAVEL)
Trialpit Complete at 5.50 m							
6							
7							
8							
9							

Remarks:

Groundwater:  
No groundwater encountered

Stability:

Shoring:

**TP5**

Meath County Council - Viewing Purposes Only!

RECEIVED: 04/07/2025



# SLR Consulting Ireland

Unit 7, Dundrum Business Pk.,  
Windy Arbour, Dublin 14, Ireland.

Tel: +35312964667 Fax: +35312964676  
www.slrconsulting.com

Trialpit No

**TP6**

Sheet 1 of 2

Date  
25/07/2013

Project Name: BD Floods Murrens EIS

Location: Murrens, Co. Meath

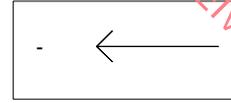
Client: BD Flood

SLR Project No. 501.00023.00011

Co-ords: 252197E - 274643N  
Level: -

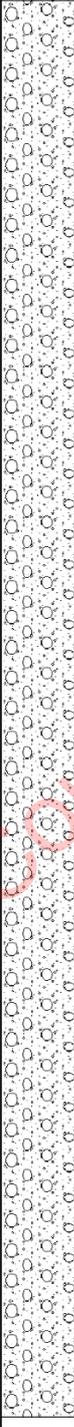
Dimensions: -

Depth  
6.00m



Scale  
1:25

Logged By

Samples & In Situ Testing				Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Waterstrike	Results				
				0.30		 TOPSOIL (TOPSOIL)	
						 Grey fine to medium gravel in COBBLES and BOULDERS, boulders up to 1.5m. Interbedded coarse gravel layers (GLACIAL SAND & GRAVEL)	
1				1			
2				2			
3				3			
4				4			

Continued next sheet

Remarks:

Groundwater:  
No groundwater encountered

Stability:  
Unstable throughout

Shoring:

**TP6**

Meath County Council - Viewing Purposes Only!

RECEIVED: 04/07/2025



# SLR Consulting Ireland

Unit 7, Dundrum Business Pk.,  
Windy Arbour, Dublin 14, Ireland.

Tel: +35312964667 Fax: +35312964676  
www.slrconsulting.com

Trialpit No

**TP6**

Sheet 2 of 2

Date  
25/07/2013

Project Name: BD Floods Murrens EIS

Location: Murrens, Co. Meath

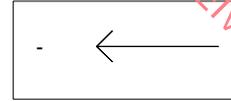
Client: BD Flood

SLR Project No. 501.00023.00011

Co-ords: 252197E - 274643N  
Level: -

Dimensions: -

Depth  
6.00m



Scale  
1:25

Logged By

Samples & In Situ Testing				Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Waterstrike	Results				
6				6.00	6		Grey fine to medium gravel in COBBLES and BOULDERS, boulders up to 1.5m. Interbedded coarse gravel layers (GLACIAL SAND & GRAVEL)
7					7		
8					8		
9					9		

Trialpit Complete at 6.00 m

Remarks:

Groundwater:  
No groundwater encountered

Stability:  
Unstable throughout

Shoring:

**TP6**

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**Appendix 6-C: Borehole Logs 2016**

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**B.D. Flood Ltd**  
**The Murrens**  
**Oldcastle**  
**Co. Meath**

<b>Project:</b>	<b>16-0673</b>
<b>Site</b>	<b>Groundwater monitoring wells, The Murrens, Oldcastle, Co. Meath</b>
<b>Report Date</b>	<b>29<sup>th</sup> August 2016</b>
<b>Prepared by</b>	<b>Stephen Franey</b>

### **Introduction**

At the instruction of the SLR Consulting (the Client's Representative), on behalf of B.D. Flood Ltd (the Client), four wells were drilled at The Murrens site. Three of these wells were installed for groundwater monitoring purposes.

Exploratory works were undertaken on 22<sup>nd</sup> and 23<sup>rd</sup> June and 11<sup>th</sup> July using a HE101 drilling rig.

Boreholes were drilled to depths ranging between 15.0m and 30.0m and installed with 50mm HDPE standpipes to depths specified by the Client's Representative. Details of the geology encountered and monitoring well installations are presented in the enclosed borehole logs.

Encl.: Borehole logs



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## Borehole Logs



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**Project No.:**  
16-0673

**Project Name:**  
Groundwater Monitoring Wells, The Murrens, Oldcastle, Co. Meath

**Borehole No.:**  
1

**Coordinates:**  
E  
N

**Client:**  
B.D. Flood Ltd.

Sheet 1 of 3

**Client's Representative:**  
SLR Consulting

**Scale:** 1:50

**Method:**  
Rotary drilling

**Driller:** DS

**Plant:**  
HE101

**Ground Level:**  
mOD

**Dates:**  
22/06/2016 - 22/06/2016

**Logger:**

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
						(1.40)		Clay and Stones (Driller's description)		
						1.40		Gravel and Boulders (Driller's description)		
						(2.60)				
						4.00		Sand and Cobbles (Driller's description)		
						(1.50)				
						5.50		SAND (Driller's description)		
						(2.00)				
						7.50		Gravel and Boulders (Driller's description)		
						(3.50)				

**Remarks**

Water Added		Water Strike - General			
From (m)	To (m)	Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
Casing Details		Chiselling Details			
To (m)	Diam (mm)	From (m)	To (m)	Time (hh:mm)	
14.50	200				



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<b>Project No.:</b> 16-0673	<b>Project Name:</b> Groundwater Monitoring Wells, The Murrens, Oldcastle, Co. Meath	<b>Borehole No.:</b> <b>1</b>
<b>Coordinates:</b> E N	<b>Client:</b> B.D. Flood Ltd.	Sheet 2 of 3
<b>Method:</b> Rotary drilling	<b>Client's Representative:</b> SLR Consulting	<b>Scale:</b> 1:50
<b>Plant:</b> HE101	<b>Ground Level:</b> mOD	<b>Driller:</b> DS
	<b>Dates:</b> 22/06/2016 - 22/06/2016	<b>Logger:</b>

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Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
								Gravel and Boulders (Driller's description)		
						11.00		CLAY (Driller's description)		
						(3.50)				
						14.50		LIMESTONE (Driller's description)		
						(6.50)				

<b>Remarks</b>	<b>Water Added</b>		<b>Water Strike - General</b>			
	From (m)	To (m)	Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
	<b>Casing Details</b>		<b>Chiselling Details</b>			
To (m)	Diam (mm)	From (m)	To (m)	Time (hh:mm)		
14.50	200					



**CAUSEWAY**  
GEOTECH

<b>Project No.:</b> 16-0673	<b>Project Name:</b> Groundwater Monitoring Wells, The Murrens, Oldcastle, Co. Meath	<b>Borehole No.:</b> <b>1</b>
<b>Coordinates:</b> E N	<b>Client:</b> B.D. Flood Ltd.	Sheet 3 of 3
<b>Method:</b> Rotary drilling	<b>Client's Representative:</b> SLR Consulting	<b>Scale:</b> 1:50
<b>Plant:</b> HE101	<b>Ground Level:</b> mOD	<b>Driller:</b> DS
	<b>Dates:</b> 22/06/2016 - 22/06/2016	<b>Logger:</b>

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Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
		14.50	19.00	22-06-2016		21.00		LIMESTONE (Driller's description)		
								End of Borehole at 21.00m		

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<b>Remarks</b>	<b>Water Added</b>		<b>Water Strike - General</b>			
	From (m)	To (m)	Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
	<b>Casing Details</b>		<b>Chiselling Details</b>			
To (m)	Diam (mm)	From (m)	To (m)	Time (hh:mm)		
14.50	200					



**CAUSEWAY**  
GEOTECH

**Project No.:**  
16-0673

**Project Name:**  
Groundwater Monitoring Wells, The Murrens, Oldcastle, Co. Meath

**Borehole No.:**  
2

**Coordinates:**  
E  
N

**Client:**  
B.D. Flood Ltd.

Sheet 1 of 3

**Method:**  
Rotary drilling

**Client's Representative:**  
SLR Consulting

**Scale:** 1:50

**Plant:**  
HE101

**Ground Level:**  
mOD

**Dates:**  
23/06/2016 - 23/06/2016

**Driller:** DS

**Logger:**

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
						(7.00)		Gravel with boulders (Driller's description)		
						7.00		LIMESTONE (Driller's description)		

**Remarks**

Water Added		Water Strike - General			
From (m)	To (m)	Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
		25.00	7.00	0	0.00

Casing Details		Chiselling Details		
To (m)	Diam (mm)	From (m)	To (m)	Time (hh:mm)
7.00	200			



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<b>Project No.:</b> 16-0673	<b>Project Name:</b> Groundwater Monitoring Wells, The Murrens, Oldcastle, Co. Meath	<b>Borehole No.:</b> 2
<b>Coordinates:</b> E N	<b>Client:</b> B.D. Flood Ltd.	Sheet 2 of 3
	<b>Client's Representative:</b> SLR Consulting	<b>Scale:</b> 1:50
<b>Method:</b> Rotary drilling	<b>Ground Level:</b> mOD	<b>Driller:</b> DS
<b>Plant:</b> HE101	<b>Dates:</b> 23/06/2016 - 23/06/2016	<b>Logger:</b>

RECEIVED: 04/07/2025

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
						(20.00)		LIMESTONE (Driller's description)		

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<b>Remarks</b>	<b>Water Added</b>		<b>Water Strike - General</b>			
	From (m)	To (m)	Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
			25.00	7.00	0	0.00
	<b>Casing Details</b>		<b>Chiselling Details</b>			
To (m)	Diam (mm)	From (m)	To (m)	Time (hh:mm)		
7.00	200					



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<b>Project No.:</b> 16-0673	<b>Project Name:</b> Groundwater Monitoring Wells, The Murrens, Oldcastle, Co. Meath	<b>Borehole No.:</b> 2
<b>Coordinates:</b> E N	<b>Client:</b> B.D. Flood Ltd.	Sheet 3 of 3
<b>Method:</b> Rotary drilling	<b>Client's Representative:</b> SLR Consulting	<b>Scale:</b> 1:50
<b>Plant:</b> HE101	<b>Ground Level:</b> mOD	<b>Driller:</b> DS
	<b>Dates:</b> 23/06/2016 - 23/06/2016	<b>Logger:</b>

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Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
								LIMESTONE (Driller's description)		
				Water Strike at 25.00m						
		7.00	25.00	23-06-2016		27.00		End of Borehole at 27.00m		

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<b>Remarks</b>	<b>Water Added</b>		<b>Water Strike - General</b>			
	From (m)	To (m)	Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
			25.00	7.00	0	0.00
	<b>Casing Details</b>		<b>Chiselling Details</b>			
To (m)	Diam (mm)	From (m)	To (m)	Time (hh:mm)		
7.00	200					



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<b>Project No.:</b> 16-0673	<b>Project Name:</b> Groundwater Monitoring Wells, The Murrens, Oldcastle, Co. Meath	<b>Borehole No.:</b> 3
<b>Coordinates:</b> E N	<b>Client:</b> B.D. Flood Ltd.	Sheet 1 of 3
	<b>Client's Representative:</b> SLR Consulting	<b>Scale:</b> 1:50
<b>Method:</b> Rotary drilling	<b>Ground Level:</b> mOD	<b>Driller:</b> DS
<b>Plant:</b> HE101	<b>Dates:</b> 23/06/2016 - 23/06/2016	<b>Logger:</b>

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Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
						(11.50)		Gravel with boulders (Driller's description)		

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<b>Remarks</b>	<b>Water Added</b>		<b>Water Strike - General</b>			
	From (m)	To (m)	Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
	<b>Casing Details</b>		<b>Chiselling Details</b>			
To (m)	Diam (mm)	From (m)	To (m)	Time (hh:mm)		
11.50	200					



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<b>Project No.:</b> 16-0673	<b>Project Name:</b> Groundwater Monitoring Wells, The Murrens, Oldcastle, Co. Meath	<b>Borehole No.:</b> 3
<b>Coordinates:</b> E N	<b>Client:</b> B.D. Flood Ltd.	Sheet 2 of 3
	<b>Client's Representative:</b> SLR Consulting	<b>Scale:</b> 1:50
<b>Method:</b> Rotary drilling	<b>Ground Level:</b> mOD	<b>Driller:</b> DS
<b>Plant:</b> HE101	<b>Dates:</b> 23/06/2016 - 23/06/2016	<b>Logger:</b>

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Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
						11.50		Gravel with boulders (Driller's description)		
								LIMESTONE (Driller's description)		

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<b>Remarks</b>	<b>Water Added</b>		<b>Water Strike - General</b>			
	From (m)	To (m)	Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
	<b>Casing Details</b>		<b>Chiselling Details</b>			
	To (m)	Diam (mm)	From (m)	To (m)	Time (hh:mm)	
	11.50	200				



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<b>Project No.:</b> 16-0673	<b>Project Name:</b> Groundwater Monitoring Wells, The Murrens, Oldcastle, Co. Meath	<b>Borehole No.:</b> 3
<b>Coordinates:</b> E N	<b>Client:</b> B.D. Flood Ltd.	Sheet 3 of 3
<b>Method:</b> Rotary drilling	<b>Client's Representative:</b> SLR Consulting	<b>Scale:</b> 1:50
<b>Plant:</b> HE101	<b>Ground Level:</b> mOD	<b>Driller:</b> DS
	<b>Dates:</b> 23/06/2016 - 23/06/2016	<b>Logger:</b>

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Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
						(18.50)		LIMESTONE (Driller's description)		
						30.00		End of Borehole at 30.00m		

<b>Remarks</b>	<b>Water Added</b>		<b>Water Strike - General</b>			
	From (m)	To (m)	Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
	<b>Casing Details</b>		<b>Chiselling Details</b>			
To (m)	Diam (mm)	From (m)	To (m)	Time (hh:mm)		
11.50	200					



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<b>Project No.:</b> 16-0673	<b>Project Name:</b> Groundwater Monitoring Wells, The Murrens, Oldcastle, Co. Meath	<b>Borehole No.:</b> 4
<b>Coordinates:</b> E N	<b>Client:</b> B.D. Flood Ltd.	Sheet 1 of 2
<b>Method:</b> Rotary drilling	<b>Client's Representative:</b> SLR Consulting	<b>Scale:</b> 1:50
<b>Plant:</b> HE101	<b>Ground Level:</b> mOD	<b>Dates:</b> 11/07/2016 - 11/07/2016
		<b>Driller:</b> DS
		<b>Logger:</b>

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Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
								CLAY (Driller's description)		
						(2.20)				
						2.20		Cobbles and Boulders (Driller's description)		
						(2.50)				
						4.70		BOULDERS (Driller's description)		
						(5.30)				
						10.00				

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<b>Remarks</b> Additional borehole to prove bedrock	<b>Water Added</b>		<b>Water Strike - General</b>			
	From (m)	To (m)	Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
	<b>Casing Details</b>		<b>Chiselling Details</b>			
To (m)	Diam (mm)	From (m)	To (m)	Time (hh:mm)		
13.50	200					



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<b>Project No.:</b> 16-0673	<b>Project Name:</b> Groundwater Monitoring Wells, The Murrens, Oldcastle, Co. Meath	<b>Borehole No.:</b> 4
<b>Coordinates:</b> E N	<b>Client:</b> B.D. Flood Ltd.	Sheet 2 of 2
	<b>Client's Representative:</b> SLR Consulting	<b>Scale:</b> 1:50
<b>Method:</b> Rotary drilling	<b>Ground Level:</b> mOD	<b>Driller:</b> DS
<b>Plant:</b> HE101	<b>Dates:</b> 11/07/2016 - 11/07/2016	<b>Logger:</b>

RECEIVED: 04/07/2025

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
						(3.50)		GRAVEL (Driller's description)		
						13.50		LIMESTONE (Driller's description)		
						(1.50)				
						15.00		End of Borehole at 15.00m		

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<b>Remarks</b> Additional borehole to prove bedrock	<b>Water Added</b>		<b>Water Strike - General</b>			
	From (m)	To (m)	Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
	<b>Casing Details</b>		<b>Chiselling Details</b>			
To (m)	Diam (mm)	From (m)	To (m)	Time (hh:mm)		
13.50	200					

**Appendix 6-D: Borehole Logs 2025**

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**25-0077**

**MURRENS, OLDCASTLE, CO MEATH  
GROUND INVESTIGATION REPORT**

Client:  
**BD FLOOD**

Client's Representative:  
**SLR CONSULTING IRELAND**

Date:  
**APRIL 2025**

Status:  
**FINAL**

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<b>2 PURPOSE, RATIONALE &amp; SCOPE OF THE INVESTIGATION .....</b>	<b>2</b>
<b>3 DESCRIPTION OF SITE .....</b>	<b>2</b>
<b>4 SITE OPERATIONS .....</b>	<b>3</b>
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**DOCUMENT CONTROL SHEET**

<b>REPORT NO:</b>		25-0077			
<b>PROJECT TITLE:</b>		MURRENS, OLDCASTLE, CO MEATH			
<b>CLIENT:</b>		BD FLOOD			
<b>CLIENT'S REPRESENTATIVE:</b>		SLR CONSULTING IRELAND			
<b>REVISION:</b>	A00	<b>STATUS</b>	FINAL	<b>ISSUE DATE</b>	29/04/2025
<b>PREPARED BY:</b>		<b>REVIEWED BY:</b>		<b>APPROVED BY:</b>	
 Buhlebenkosi Angie Ndebele BSc. Geology		 Celine Rooney BSc. MSc. PGEO (EURGEOL)		 Celine Rooney BSc. MSc. PGEO (EURGEOL)	

This report presents a factual account of the ground investigation in accordance with the Specification and Related Documents for Ground Investigation in Ireland 2<sup>nd</sup> Edition, published by Engineers Ireland (2016).



## METHODS OF DESCRIBING SOILS AND ROCKS

Soil and rock descriptions are based on the guidance in BS5930:2015+A1:2020, The Code of Practice for Ground Investigation.

Abbreviations used on exploratory hole logs	
U	Nominal 100mm diameter undisturbed open tube sample (thick walled sampler).
UT	Nominal 100mm diameter undisturbed open tube sample (thin walled sampler).
P	Nominal 100mm diameter undisturbed piston sample.
B	Bulk disturbed sample.
LB	Large bulk disturbed sample.
SB	Sonic bulk disturbed sample.
D	Small disturbed sample.
C	Core sub-sample (displayed in the Field Records column on the logs).
L	Liner sample from dynamic sampled borehole.
W	Water sample.
ES / EW	Soil sample for environmental testing / Water sample for environmental testing.
SPT (s)	Standard penetration test using a split spoon sampler (small disturbed sample obtained).
SPT (c)	Standard penetration test using 60 degree solid cone.
(x,x/x,x,x,x)	Blows per increment during the standard penetration test. The initial two values relate to the seating drive (150mm) and the remaining four to the 75mm increments of the test length.
(Y for Z/ Y for Z)	Incomplete standard penetration test where the full test length was not achieved. The blows 'X' represent the total blows for the given seating or test length 'Z' (mm).
N=X	SPT blow count 'N' given by the summation of the blows 'X' required to drive the full test length (300mm).
HVP / HVR	Uncorrected in situ hand vane peak (HVP) and residual (HVR) result presented in kPa. Vane calibration factor has been applied, but no correction made for soil type.
V VR	Shear vane test (borehole). Shear strength stated in kPa. V: undisturbed vane shear strength VR: remoulded vane shear strength
Soil consistency description	In cohesive soils, where samples are disturbed and there are no suitable laboratory tests, N values may be used to indicate consistency on borehole logs – a median relationship of $N \times 5 = C_u$ is used (as set out in Stroud & Butler 1975).
dd-mm-yyyy	Date at the end and start of shifts, shown at the relevant borehole depth. Corresponding casing and water depths shown in the adjacent columns.
▽	Water strike: initial depth of strike.
▼	Water strike: depth water rose to.
Abbreviations relating to rock core – reference Clause 36.4.4 of BS 5930: 2015+A1:2020	
TCR (%)	Total Core Recovery: Ratio of rock/soil core recovered (both solid and non-intact) to the total length of core run.
SCR (%)	Solid Core Recovery: Ratio of solid core to the total length of core run. Solid core has a full diameter, uninterrupted by natural discontinuities, but not necessarily a full circumference and is measured along the core axis between natural fractures.
RQD (%)	Rock Quality Designation: Ratio of total length of solid core pieces greater than 100mm to the total length of core run.
FI	Fracture Index: Number of natural discontinuities per metre over an indicated length of core of similar intensity of fracturing.
NI	Non Intact: Used where the rock material was recovered fragmented, for example as fine to coarse gravel size particles.
AZCL	Assessed zone of core loss: The estimated depth range where core was not recovered.
DIF	Drilling induced fracture: A fracture of non-geological origin brought about by the rock coring.
(xxx/xxx/xxx)	Spacing between discontinuities (minimum/average/maximum) measured in millimetres.

## 1 AUTHORITY

On the instructions of SLR Consulting Ireland, (the “Client’s Representative”), acting on the behalf of BD flood (the “Client”), a ground investigation was undertaken at the site to install groundwater monitoring wells.

This report details the work carried out on site; it contains a description of the site, the works undertaken and the exploratory hole logs.

All information given in this report is based upon the ground conditions encountered during the ground investigation works. However, there may be conditions at the site that have not been taken into account, such as unpredictable soil strata, contaminant concentrations, and water conditions between or below exploratory holes. It should be noted that groundwater levels usually vary due to seasonal and/or other effects and may at times differ to those recorded during the investigation. No responsibility can be taken for conditions not encountered through the scope of work commissioned, for example between exploratory hole points, or beneath the termination depths achieved.

This report was prepared by Causeway Geotech Ltd for the use of the Client and the Client’s Representative in response to a particular set of instructions. Any other parties using the information contained in this report do so at their own risk and any duty of care to those parties is excluded.

## 2 PURPOSE, RATIONALE & SCOPE OF THE INVESTIGATION

The purpose of this investigation is to assess the ground conditions and groundwater levels and to allow an evaluation of the ground related issues with the current site and proposed development.

The rationale has been determined by the Client’s Representative, with the extent of the investigation including boreholes and the preparation of a factual account of the ground investigation findings.

## 3 DESCRIPTION OF SITE

The site is located on agricultural land/forestry, located in Murrens, Oldcastle, Co. Meath just southeast of the existing BD Flood quarry. The site location is presented in Appendix A and a summary of the surrounding land uses is provided in Table 1.

**Table 1: Summary of surrounding land uses**

Location	Description
North	JJ Flood & Sons Manufacturing Ltd, BD Flood, agricultural land.
East	R195, agricultural land, residential properties.
South	R195, agricultural land, residential properties.
West	L68182 Annagh, agricultural land.



## 4 SITE OPERATIONS

### 4.1 SUMMARY OF SITE WORKS

Site operations, which were conducted between 27/03/2025 and 02/04/2025, comprised:

- Three rotary drilled boreholes
- a standpipe installation in two boreholes

The exploratory holes were located as instructed by the Client.

### 4.2 BOREHOLES

#### 4.2.1 ROTARY DRILLED BOREHOLES

Three boreholes (GW04-GW06) were put to their completion by rotary drilling techniques only. The boreholes were completed using a Comacchio 405 tracked rotary drilling rig.

Hand dug inspection pits were carried out between ground level and 1.20m depth to ensure boreholes were put down at locations clear of services or subsurface obstructions.

Symmetrix-cased full hole rotary percussive drilling techniques were employed to advance the boreholes to their completion depths.

Appendix B presents the borehole logs.

### 4.3 STANDPIPE INSTALLATIONS

A groundwater monitoring standpipe was installed in boreholes GW05-GW06.

Details of the installations, including the depth range of the response zone, are provided in Appendix B on the individual borehole logs.

## 5 GROUND CONDITIONS

### 5.1 GENERAL GEOLOGY OF THE AREA

Published geological mapping from the online Geological Survey Ireland spatial resources database indicate the superficial deposits underlying the site comprise gravels derived from limestone. These deposits are shown to be underlain by Cherty limestone and minor shale of the Derravaragh Cherts Formation.

### 5.2 GROUND TYPES ENCOUNTERED DURING INVESTIGATION OF THE SITE

A summary of the ground types encountered in the exploratory holes is listed below, in approximate stratigraphic order:



- **Glacial Till:** sandy gravelly clay, typically firm encountered from surface to depths ranging from 0.30 -1.20m.
- **Fluvioglacial deposits:** light greyish brown sandy gravels encountered in all the boreholes from 0.30-1.20m.
- **Bedrock (Limestone):** Rockhead was encountered at depths ranging from 3.30m in GW05 to approximately 11.30m in borehole GW04.

Further details of these ground types, including their specific depths and descriptions, can be found on the individual exploratory hole logs accompanying this report.

### 5.3 GROUNDWATER

Details of the individual groundwater strikes, along with any relative changes in levels as works proceeded, are presented on the exploratory hole logs for each location.

It should be noted that any groundwater strikes within bedrock may have been masked by the fluid used as the drilling flush medium.

**Table 2: Groundwater strike details**

Exploratory Hole	Depth of groundwater strike (m bgl)	Comments
GW05	-	Water strike unknown. Water in borehole on morning of the 02/05/25.
GW06	16.00m	-

Groundwater was not noted during drilling at exploratory hole GW04. However, it should be noted that the casing used in supporting the borehole walls during drilling may have sealed out additional groundwater strikes and the possibility of encountering groundwater during excavation works at these locations should not be ruled out.

Seasonal variation in groundwater levels should also be factored into design considerations.



## 6 REFERENCES

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Geological Survey Ireland (GSI). Geological Survey Ireland spatial resources database. Available at: <https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aac3c228>

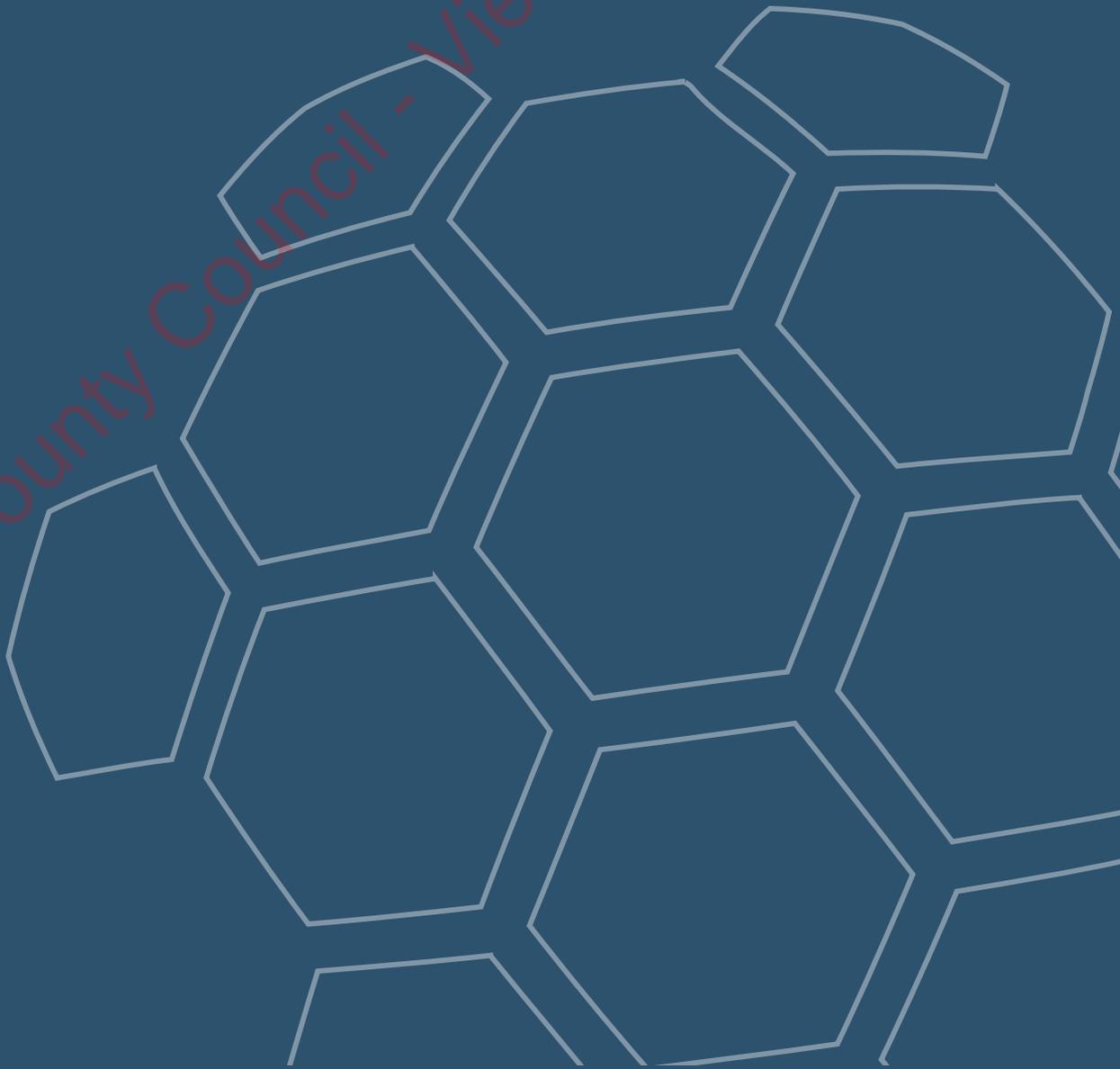
Geological Survey of Northern Ireland (GSNI). GeoIndex. Available at: [https://mapapps2.bgs.ac.uk/gsni\\_geoindex/home.html](https://mapapps2.bgs.ac.uk/gsni_geoindex/home.html)



# APPENDIX A – SITE HOLE LOCATION PLANS

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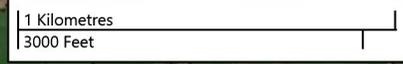
Legend Key

RECEIVED: 04/07/2025



**SITE LOCATION**

**WHITE LOUGH**



<b>Project No.</b>	25-0077
<b>Client</b>	BD flood
<b>Client's Rep</b>	SLR Consulting Ireland

**Site Location Plan**

**Murrrens, Oldcastle, Co Meath**



<b>Last Revision</b>	14/04/2025
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<b>Scale</b>	1:20000
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Legend Key  
 ○ Locations By Type - RO

RECEIVED: 04/07/2025

<b>Project No.</b>	25-0077
<b>Client</b>	BD flood
<b>Client's Rep</b>	SLR Consulting Ireland

**Exploratory Hole Location Plan**

**Murrrens, Oldcastle, Co Meath**



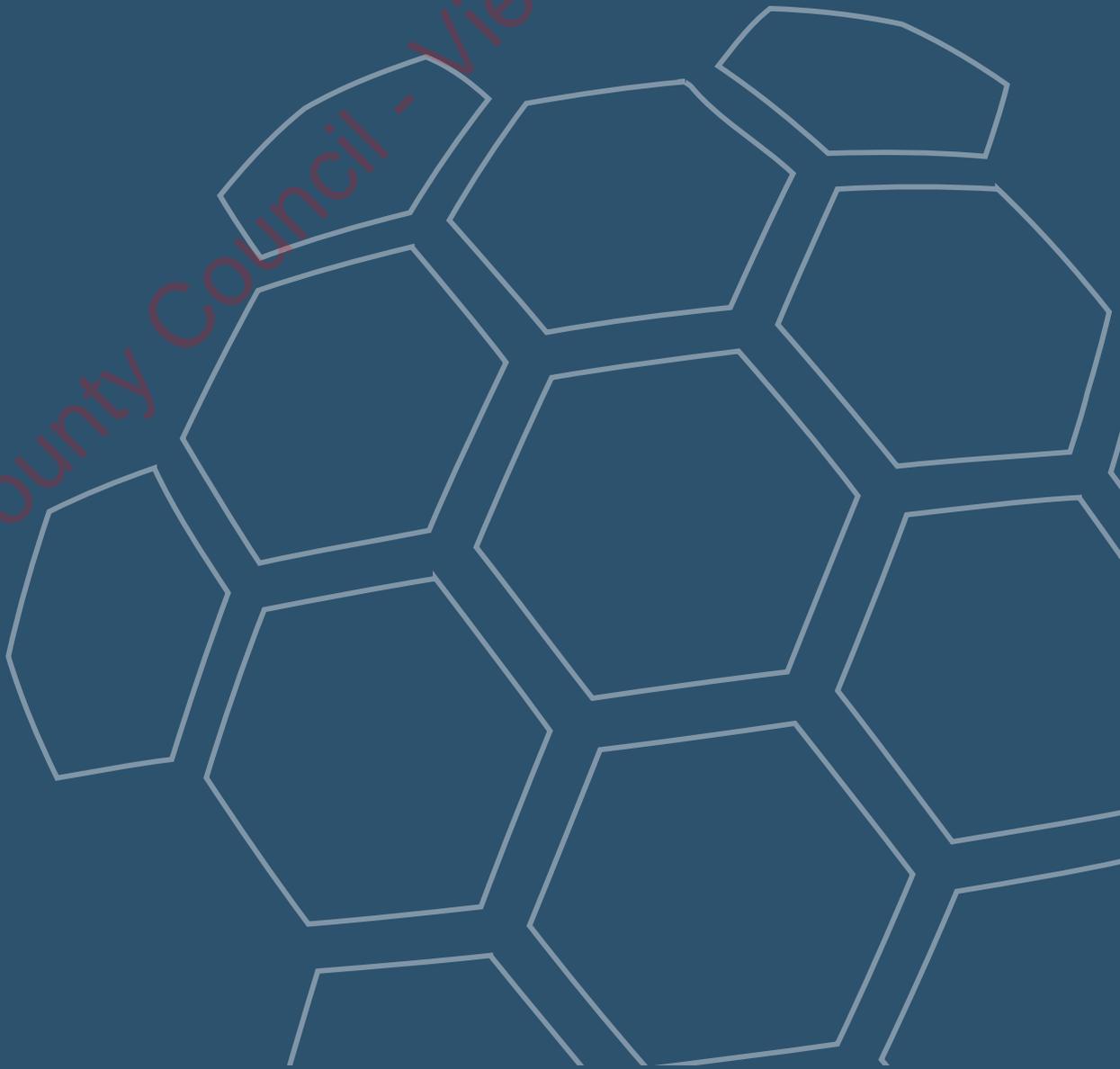
<b>Last Revision</b>	29/04/2025
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<b>Scale</b>	1:5000
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# APPENDIX B – BOREHOLE LOGS

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**CAUSEWAY**  
GEOTECH

**Project No.**  
25-0077

**Project Name:** Murrens, Oldcastle, Co Meath

**Borehole ID**  
GW04

**Client:** BD flood

**Client's Rep:** SLR Consulting Ireland

Method	Plant Used	Top (m)	Base (m)	Coordinates
Rotary Percussion	Comacchio 405	0.00	28.00	652268.00 E 774153.00 N

<b>Final Depth:</b> 28.00 m	<b>Start Date:</b> 31/03/2025	<b>Driller:</b> COS	Sheet 1 of 4 Scale: 1:40
<b>Elevation:</b> 137.70 mOD	<b>End Date:</b> 01/04/2025	<b>Logger:</b> CR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					137.40	0.30		Brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse. (Driller's description).		
								Light greyish brown very sandy subrounded fine to coarse GRAVEL. Sand is fine to coarse. (Driller's description).		

<b>Water Strikes</b>				<b>Remarks</b>									
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	Inspection pit hand dug to 1.20m. No groundwater strikes noted.									
<b>Casing Details</b>				<b>Water Added</b>									
To (m)	Diam (mm)	From (m)	To (m)										
28.00	125							<b>Core Barrel</b>		<b>Flush Type</b>	<b>Termination Reason</b>	<b>Last Updated</b>	
								Air	Terminated on Engineer's instruction.	29/04/2025			



**Project No.**  
25-0077

**Project Name:** Murrens, Oldcastle, Co Meath

**Borehole ID**  
GW04

**Client:** BD flood

**Client's Rep:** SLR Consulting Ireland

**Method**  
Rotary Percussion

**Plant Used**  
Comacchio 405

**Top (m)**  
0.00

**Base (m)**  
28.00

**Coordinates**  
652268.00 E  
774153.00 N

**Final Depth:** 28.00 m

**Start Date:** 31/03/2025

**Driller:** COS

Sheet 2 of 4  
Scale: 1:40

**Elevation:** 137.70 mOD

**End Date:** 01/04/2025

**Logger:** CR

FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					126.40	11.30		Light grey LIMESTONE (Driller's description).		

<b>Water Strikes</b>				<b>Remarks</b>									
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	Inspection pit hand dug to 1.20m. No groundwater strikes noted.									
<b>Casing Details</b>		<b>Water Added</b>											
To (m)	Diam (mm)	From (m)	To (m)										
28.00	125			<b>Core Barrel</b>				<b>Flush Type</b>		<b>Termination Reason</b>		<b>Last Updated</b>	
								Air		Terminated on Engineer's instruction.		29/04/2025	





**CAUSEWAY**  
GEOTECH

**Project No.**  
25-0077

**Project Name:** Murrens, Oldcastle, Co Meath

**Borehole ID**  
GW04

**Client:** BD flood

**Client's Rep:** SLR Consulting Ireland

**Method**  
Rotary Percussion

**Plant Used**  
Comacchio 405

**Top (m)**  
0.00

**Base (m)**  
28.00

**Coordinates**  
652268.00 E  
774153.00 N

**Final Depth:** 28.00 m

**Start Date:** 31/03/2025

**Driller:** COS

Sheet 3 of 4  
Scale: 1:40

**Elevation:** 137.70 mOD

**End Date:** 01/04/2025

**Logger:** CR

FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill

**Water Strikes**

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

**Remarks**

Inspection pit hand dug to 1.20m.  
No groundwater strikes noted.

**Casing Details**

**Water Added**

To (m)	Diam (mm)	From (m)	To (m)
28.00	125		

**Core Barrel**

**Flush Type**

**Termination Reason**

**Last Updated**

Air

Terminated on Engineer's instruction.

29/04/2025



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**CAUSEWAY**  
GEOTECH

**Project No.**  
25-0077

**Project Name:** Murrens, Oldcastle, Co Meath

**Borehole ID**  
GW04

**Client:** BD flood

**Client's Rep:** SLR Consulting Ireland

<b>Method</b> Rotary Percussion	<b>Plant Used</b> Comacchio 405	<b>Top (m)</b> 0.00	<b>Base (m)</b> 28.00	<b>Coordinates</b> 652268.00 E 774153.00 N	<b>Final Depth:</b> 28.00 m	<b>Start Date:</b> 31/03/2025	<b>Driller:</b> COS	Sheet 4 of 4 Scale: 1:40
					<b>Elevation:</b> 137.70 mOD	<b>End Date:</b> 01/04/2025	<b>Logger:</b> CR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					109.70	28.00		End of Borehole at 28.00m		

<b>Water Strikes</b>				<b>Remarks</b>									
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	Inspection pit hand dug to 1.20m. No groundwater strikes noted.									
<b>Casing Details</b>				<b>Water Added</b>									
To (m)	Diam (mm)	From (m)	To (m)										
28.00	125							<b>Core Barrel</b>		<b>Flush Type</b>	<b>Termination Reason</b>	<b>Last Updated</b>	
				Air		Terminated on Engineer's instruction.		29/04/2025					

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**Project No.**  
25-0077

**Project Name:** Murrens, Oldcastle, Co Meath

**Borehole ID**  
GW05

**Client:** BD flood

**Client's Rep:** SLR Consulting Ireland

Method	Plant Used	Top (m)	Base (m)	Coordinates
Rotary Percussion	Comacchio 405	0.00	28.00	652146.00 E 774653.00 N

<b>Final Depth:</b> 28.00 m	<b>Start Date:</b> 01/04/2025	<b>Driller:</b> COS	Sheet 1 of 4 Scale: 1:40
<b>Elevation:</b> 126.25 mOD	<b>End Date:</b> 02/04/2025	<b>Logger:</b> CR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
						125.05	1.20		Brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse. (Driller's description).	
						122.75	3.50		Light greyish brown very sandy subrounded fine to coarse GRAVEL. Sand is fine to coarse. (Driller's description).	
									Light grey Limestone. (Driller's description).	

<b>Water Strikes</b>				<b>Remarks</b> Inspection pit hand dug to 1.20m. Water strike unknown, water in borehole morning of 02/04/25.							
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)								
<b>Casing Details</b>				<b>Water Added</b>				<b>Core Barrel</b>			
To (m)	Diam (mm)	From (m)	To (m)	From (m)	To (m)	From (m)	To (m)				
28.00	125										
				<b>Flush Type</b> Air				<b>Termination Reason</b> Terminated on Engineer's instruction.			
								<b>Last Updated</b> 29/04/2025			





**CAUSEWAY**  
GEOTECH

**Project No.**  
25-0077

**Project Name:** Murrens, Oldcastle, Co Meath

**Borehole ID**  
GW05

**Client:** BD flood

**Client's Rep:** SLR Consulting Ireland

**Method**  
Rotary Percussion

**Plant Used**  
Comacchio 405

**Top (m)**  
0.00

**Base (m)**  
28.00

**Coordinates**  
652146.00 E  
774653.00 N

**Final Depth:** 28.00 m

**Start Date:** 01/04/2025

**Driller:** COS

Sheet 2 of 4  
Scale: 1:40

**Elevation:** 126.25 mOD

**End Date:** 02/04/2025

**Logger:** CR

FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill

<b>Water Strikes</b>				<b>Remarks</b>							
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	Inspection pit hand dug to 1.20m. Water strike unknown, water in borehole morning of 02/04/25.							
<b>Casing Details</b>				<b>Water Added</b>							
To (m)	Diam (mm)	From (m)	To (m)								
28.00	125										
				<b>Core Barrel</b>	<b>Flush Type</b>	<b>Termination Reason</b>			<b>Last Updated</b>		
					Air	Terminated on Engineer's instruction.			29/04/2025		

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**CAUSEWAY**  
GEOTECH

**Project No.**  
25-0077

**Project Name:** Murrens, Oldcastle, Co Meath

**Borehole ID**  
GW05

**Client:** BD flood

**Client's Rep:** SLR Consulting Ireland

**Method**  
Rotary Percussion

**Plant Used**  
Comacchio 405

**Top (m)**  
0.00

**Base (m)**  
28.00

**Coordinates**  
652146.00 E  
774653.00 N

**Final Depth:** 28.00 m

**Start Date:** 01/04/2025

**Driller:** COS

Sheet 3 of 4  
Scale: 1:40

**Elevation:** 126.25 mOD

**End Date:** 02/04/2025

**Logger:** CR

FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill

**Water Strikes**

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

**Remarks**

Inspection pit hand dug to 1.20m. Water strike unknown, water in borehole morning of 02/04/25.

**Casing Details**

**Water Added**

To (m)	Diam (mm)	From (m)	To (m)
28.00	125		

**Core Barrel**

**Flush Type**

**Termination Reason**

**Last Updated**

Air

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**Project No.**  
25-0077

**Project Name:** Murrens, Oldcastle, Co Meath

**Borehole ID**  
GW05

**Client:** BD flood

**Client's Rep:** SLR Consulting Ireland

Method	Plant Used	Top (m)	Base (m)	Coordinates
Rotary Percussion	Comacchio 405	0.00	28.00	652146.00 E 774653.00 N

<b>Final Depth:</b> 28.00 m	<b>Start Date:</b> 01/04/2025	<b>Driller:</b> COS	Sheet 4 of 4 Scale: 1:40
<b>Elevation:</b> 126.25 mOD	<b>End Date:</b> 02/04/2025	<b>Logger:</b> CR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					98.25	28.00		End of Borehole at 28.00m		

<b>Water Strikes</b>				<b>Remarks</b>							
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	Inspection pit hand dug to 1.20m. Water strike unknown, water in borehole morning of 02/04/25.							
<b>Casing Details</b>		<b>Water Added</b>									
To (m)	Diam (mm)	From (m)	To (m)								
28.00	125			<b>Core Barrel</b>				<b>Flush Type</b>	<b>Termination Reason</b>	<b>Last Updated</b>	
								Air	Terminated on Engineer's instruction.	29/04/2025	



**Project No.**  
25-0077

**Project Name:** Murrens, Oldcastle, Co Meath

**Borehole ID**  
GW06

**Client:** BD flood

**Client's Rep:** SLR Consulting Ireland

Method	Plant Used	Top (m)	Base (m)	Coordinates
Rotary Percussion	Comacchio 405	0.00	22.00	652425.00 E 773900.00 N

<b>Final Depth:</b> 22.00 m	<b>Start Date:</b> 27/03/2025	<b>Driller:</b> COS	Sheet 1 of 4 Scale: 1:40
<b>Elevation:</b> 127.93 mOD	<b>End Date:</b> 31/03/2025	<b>Logger:</b> CR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					126.73	1.20		Firm brown slightly sandy gravelly slightly silty CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse. (Driller's description).		
								Light greyish brown very sandy subrounded fine to coarse GRAVEL. Sand is fine to coarse. (Driller's description).		

<b>Water Strikes</b>				<b>Remarks</b>							
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	Inspection pit hand dug to 1.20m.							
16.00											
<b>Casing Details</b>				<b>Water Added</b>							
To (m)	Diam (mm)	From (m)	To (m)								
22.00	125										
				<b>Core Barrel</b>	<b>Flush Type</b>	<b>Termination Reason</b>			<b>Last Updated</b>		
					Air	Terminated on Engineer's instruction.			29/04/2025		

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**Project No.**  
**25-0077**

**Project Name:** Murrens, Oldcastle, Co Meath

**Borehole ID**  
**GW06**

**Client:** BD flood

**Client's Rep:** SLR Consulting Ireland

Sheet 2 of 4  
Scale: 1:40

**Method**  
Rotary Percussion

**Plant Used**  
Comacchio 405

**Top (m)**  
0.00

**Base (m)**  
22.00

**Coordinates**  
652425.00 E  
773900.00 N

**Final Depth:** 22.00 m

**Start Date:** 27/03/2025

**Driller:** COS

**Elevation:** 127.93 mOD

**End Date:** 31/03/2025

**Logger:** CR

**FINAL**

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					118.53	9.40		Light grey LIMESTONE (Driller's description).		

**Water Strikes**

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
16.00			

**Remarks**

Inspection pit hand dug to 1.20m.

**Casing Details**

**Water Added**

To (m)	Diam (mm)	From (m)	To (m)
22.00	125		

**Core Barrel**

**Flush Type**

**Termination Reason**

**Last Updated**

Air

Terminated on Engineer's instruction.

29/04/2025



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**Project No.**  
25-0077

**Project Name:** Murrens, Oldcastle, Co Meath

**Borehole ID**  
GW06

**Client:** BD flood

**Client's Rep:** SLR Consulting Ireland

Method	Plant Used	Top (m)	Base (m)	Coordinates
Rotary Percussion	Comacchio 405	0.00	22.00	652425.00 E 773900.00 N

<b>Final Depth:</b> 22.00 m	<b>Start Date:</b> 27/03/2025	<b>Driller:</b> COS	Sheet 3 of 4 Scale: 1:40
<b>Elevation:</b> 127.93 mOD	<b>End Date:</b> 31/03/2025	<b>Logger:</b> CR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill

<b>Water Strikes</b>				<b>Remarks</b>							
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	Inspection pit hand dug to 1.20m.							
16.00											
<b>Casing Details</b>				<b>Water Added</b>							
To (m)	Diam (mm)	From (m)	To (m)								
22.00	125										
				<b>Core Barrel</b>	<b>Flush Type</b>	<b>Termination Reason</b>			<b>Last Updated</b>		
					Air	Terminated on Engineer's instruction.			29/04/2025		

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**CAUSEWAY**  
GEO TECH

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Causeway Geotech Limited has made its commitment to health and safety of people, the environment and the quality of its services an integral part of our strategy.

Whether it be ensuring people's safety or meeting the challenges of operating in an ecologically diverse environment, we aim to act in a sustainable and responsible manner at all times.

#### CERTIFICATIONS / ACCREDITATIONS



#### MEMBERSHIPS



#### CAUSEWAY GEOTECH LTD

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Co. Antrim, Northern Ireland, BT53 7QL

+44 (0)28 2766 6640

info@causewaygeotech.com

www.causewaygeotech.com

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**Appendix 6-E: BD Flood Trial Pit Details**

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# Trial Holes

<u>Hole Number</u>	<u>Depth</u>	<u>Over burden Depth</u>	<u>Condition</u>
Number 1	3.3m	300mm	Very Clean gravel
Number 2	2.7m	300mm	Very Clean gravel
Number 3	2.3m	300mm	Very Clean gravel
Number 4	2.5m	500mm	Very Clean gravel
Number 5	2.4m	400mm	Very Clean gravel
Number 6	2.4m	550mm	Very Clean gravel
Number 7	2.4m	300mm	Clean gravel
Number 8	3.2m	400mm	Very Clean gravel
Number 9	2.6m	400mm	Clean gravel
Number 10	2.1m	300mm	Clean gravel
Number 11	3.3m	300mm	Very Clean gravel
Number 12	2.0m	350mm	Clean gravel
Number 13	2.0m	350mm	Clean gravel
Number 14	2.4m	350mm	Very Clean gravel
Number 15	2.5m	300mm	Very Clean gravel
Number 16	2.4m	300mm	Clean gravel
Number 17	1.8m	1000mm	Black rock
Number 18	2.2m	300mm	Clean gravel
Number 19	2.0m	300mm	Clean gravel
Number 20	2.2m	300mm	Clean gravel
Number 21	1.9m	400mm	Clean gravel
Number 22	2.4m	300mm	Very Clean gravel
Number 23	2.2m	300mm	Very Clean Gravel

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# Map of Area

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# Test Hole photos

RECEIVED: 04/07/2025



Hole 1



Hole 5



Hole 12



Hole 17

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**Appendix 6-F: County Geological Site Report - Murrens CGS**

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## MEATH - COUNTY GEOLOGICAL SITE REPORT

<b>NAME OF SITE</b>	<b>Murrrens</b>
Other names used for site	Finnea-Murrrens (Westmeath-Meath), Castletown Esker
<b>IGH THEME:</b>	IGH 7 (Quaternary)
<b>TOWNLAND(S)</b>	Murrrens, numerous
<b>NEAREST TOWN</b>	Oldcastle
<b>SIX INCH MAP NUMBER</b>	14, 15
<b>NATIONAL GRID REFERENCE</b>	252500 274800 = N 52 74
<b>1:50,000 O.S. SHEET NUMBER</b>	34, 41, 42
	<b>1/2 inch Sheet No.</b> 13

### Outline Site Description

Wooded ridge – esker and hummocky ground including gravel pit.

### Geological System/Age and Primary Rock Type

Quaternary glacial deposits (esker, ice contact fan and delta system).

### Main Geological or Geomorphological Interest

This is a long beaded esker system which feeds into a large, supraglacial delta complex, with flanking fans and kames. It extends into Westmeath (Finnea-Murrrens Esker) over a distance of 15 km and comprising 11 segments in total. Murrrens, which is situated 4km south of Oldcastle along the R195, is composed of a number of glacial depositional features. These include: an esker, formed by the deposition of sand and gravel by a subglacial river; and an ice contact fan and delta system, which is formed by the deposition of sand and gravel carried by glaciofluvial meltwater from a nearby ice sheet, creating hummocky terrain. A large sand and gravel quarry, called Murrrens Quarry (owned by J.J. Flood and Sons) lies within this site.

### Site Importance

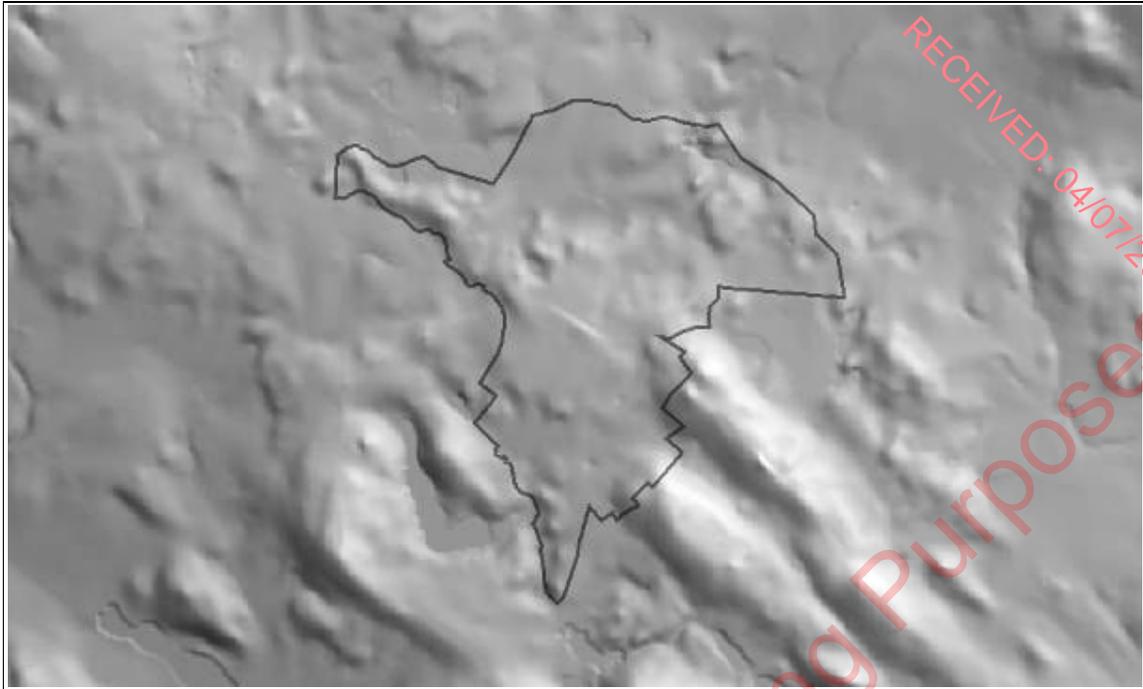
This site is of very good quality, showing spectacular topography. Unique in Ireland and of international importance, the esker will be recommended for NHA designation.

### Management/promotion issues

No further quarrying should be permitted on this esker system. Illegal dumping has been noted on several occasions in old pits. It also has excellent educational potential, with a roadside cutting into the esker.



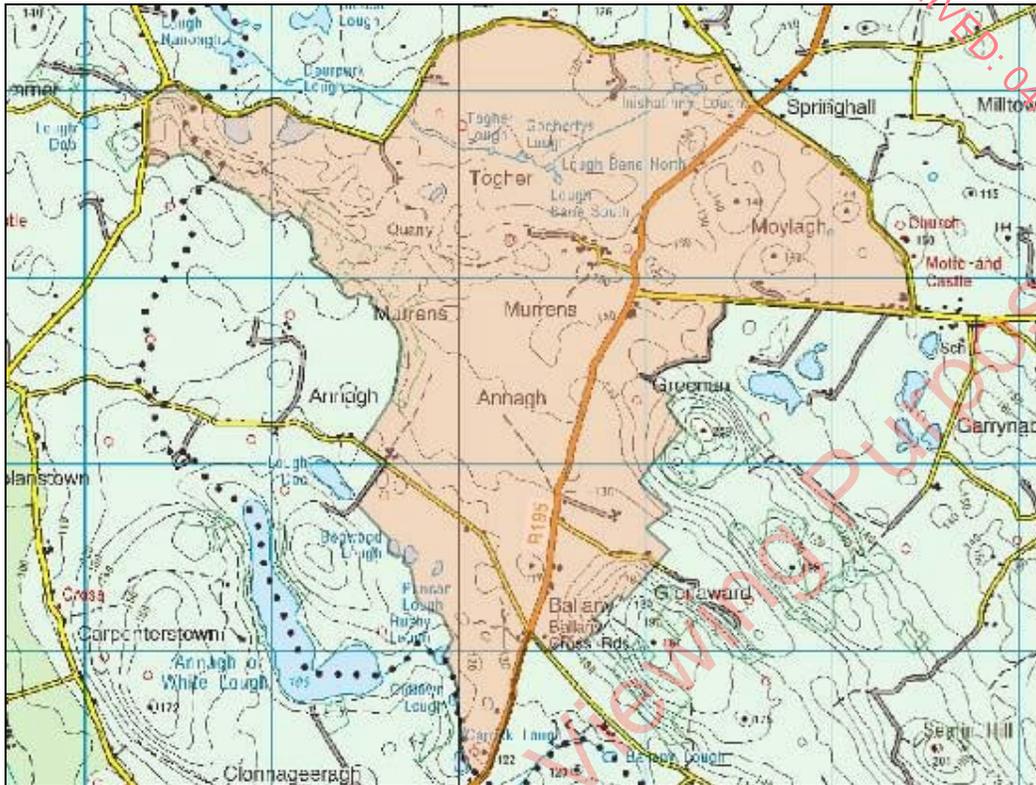
Above: A view from the north looking towards the esker at Murrrens, seen here as a wooded ridge in the background.



Above: Digital elevation model (DEM) of Murrens clearly showing the esker as a ridge to the north west of the site. The low relief area directly to the south east of this ridge represents deposits of sand and gravel in a glacial outwash plain.  
Below: Hummocky sands and gravels flanking the main esker ridge within the fan-shaped area (R.Meehan, 2007).

# Murrens

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Meath County Council