Preliminary Construction, Demolition & Waste Management Plan

Proposed Large Residential Development (LRD) at Old Slane Road, Mell/Tullyallen, Drogheda, Co. Louth

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Quality Assurance – Approval Status

This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2015 and BS EN ISO 14001: 2015)

Issue	Date	Prepared by	Checked by	Approved by
1	21 December 2023	Stephen Dent-Neville	Mark Duignan	Mark Duignan
2	8 May 2024	Stephen Dent-Neville	Mark Duignan	Mark Duignan

Comments

Disclaimer

This report has been prepared by Waterman Moylan, with all reasonable skill, care and diligence within the terms of the Contract with the Client, incorporation of our General Terms and Condition of Business and taking account of the resources devoted to us by agreement with the Client.

We disclaim any responsibility to the Client and others in respect of any matters outside the scope of the above.

This report is confidential to the Client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at its own risk.

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1. Introduction

1.1 Context

This Preliminary Construction, Demolition & Waste Management Plan has been prepared by Waterman Moylan as part of the documentation in support of a planning application for a proposed Large Residential Development (LRD) located off the Slane Road, east of Drogheda, in Mell/Tullyallen, Drogheda, Co. Louth.

A previous proposal by the Applicant to develop the subject site received a decision to grant permission from An Bord Pleanála in February 2022 (reference no. ABP-311678-21). The first 30 no. units of the permitted development are under construction under that planning grant. This application proposes a revised site layout for the remainder of the site, with roads, drainage, watermains and other utilities to tie into the infrastructure currently under construction as part of the first 30 no. units.

In general, the strategy for the roads layout, foul and surface water drainage, and water supply remain very similar to the approved Strategic Housing Development (SHD).

This document has been set up to be a 'living document' which will be updated and implemented by the Developer and Main Contractor as the project progresses.

1.2 Site Description

The subject site is located in Mell/Tullyallen, Drogheda, Co. Louth. The site location is indicated on the Figure below:

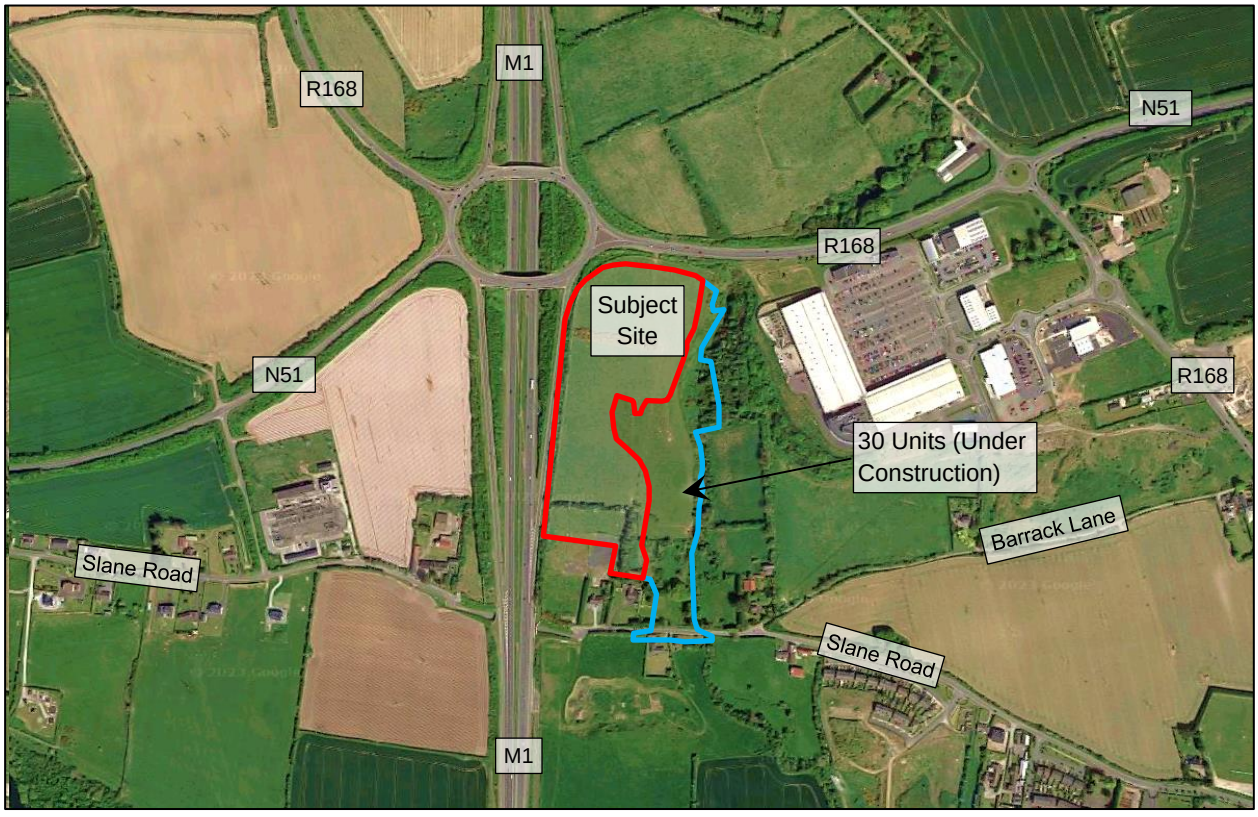

Figure 1 | *Site Location (Source: Google Maps)*

The site is currently greenfield. Topographic survey data indicates that the site falls generally from north-west to south-east, with a high point of approximately 32.8m OD Malin at the north-west corner of the site

of the site and a low point of approximately 18.8m OD Malin at the south-east of the site. The lands continue to fall towards the south-east beyond the redline and within the 30-units development currently under construction, to a low point of approximately 10.0m OD Malin. There is a stream flowing in a southerly direction along the eastern boundary of the site, draining land to the north and crossing under the R168 Road. The stream crosses the Slane Road at Dry Bridge, discharging into the Boyne River approximately 650m south of the site.

In the Louth County Development Plan 2021-2027, the subject site is zoned “A2 New Residential”, as shown in the extract below:

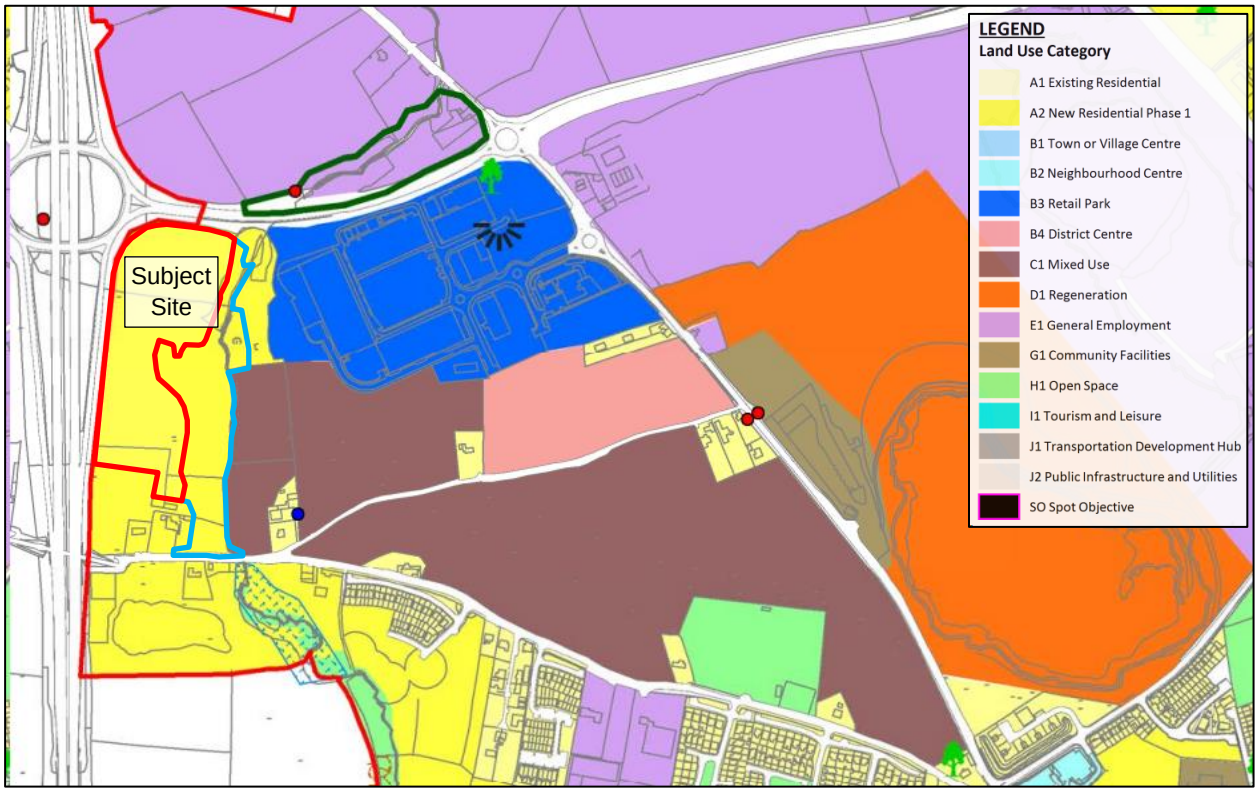

***Figure 2** | Louth Development Plan Zoning Map*

1.3 Proposed Development

The proposed development consists of 207 no. residential units, in addition to the permitted 30 no. units already under construction, as set out in the schedule of accommodation below:

Description	1-Bed	2-Bed	3-Bed	4-Bed	Total No. of Residential Units
Permitted Development (Under Construction)	-	-	27	3	30
Proposed Development	20	47	120	20	207
Total	**20**	**47**	**147**	**23**	**237**

***Table 1** | Schedule of Accommodation*

The site will accommodate car parking spaces, bicycle parking spaces, storage, services and plant areas, and landscaping. The proposed application includes all site landscaping works, green roofs, substations,

boundary treatments, lighting, servicing, signage, and associated and ancillary works, including site development works and services above and below ground.

1.3.1 Riparian Corridor

There is a 20m riparian corridor at the east of the site adjacent to the existing stream. No houses, roads or infrastructure are proposed within this riparian corridor.

1.4 Background of Report

This Preliminary Construction, Demolition and Waste Management Plan sets out typical arrangements and measures which may be undertaken during the construction phase of the project in order to mitigate and minimise disruption/disturbance to the area around the site. The purpose of this report is to summarise the possible impacts and measures to be implemented and to guide the Main Contractor who will be required to develop and implement the Construction, Demolition and Waste Management Plan on site during the course of the construction period.

As is normal practice, the Main Contractor for the project is responsible for the method in which the construction works are carried out and to ensure that best practices and all legal obligations including Local Authority requirements and Health and Safety legislation are complied with. The Main Contractor is also responsible for the design and installation of all temporary works required to complete the permanent works. The plan can be used by the Main Contractor to develop their final Construction, Demolition and Waste Management Plan. The Applicant reserves the right to deviate from the contents of this Report as the construction of the development progresses on site. Any such deviation from this report, however, shall still comply with all relevant Local Authority requirements and legislation.

2. General Site Set-Up and Pre-Commencement Measures

The following measures will be carried out by the Main Contractor:

- A general condition survey of the roads and infrastructure in the area prior to any work being carried out on the site.
- A site compound including offices and welfare facilities will be set up by the Main Contractor.
- Prior to any site works commencing, the Main Contractor will investigate/identify the exact location of and tag all existing services and utilities around and through the site with the assistance of the relevant DCC technical divisions and utility companies.
- The operational hours for the site shall be 08:00 to 17:00 Mondays to Fridays and 08:00 to 14:00 Saturdays. No work is permitted on Sundays or public holidays. Deviation from these hours will only be allowed in exceptional circumstance with prior written approval from the planning authority.
- Hoarding lines and site security will be set up within the development site as required, including around the perimeter of the construction zone and at access to the public road network.
- Fencing will be set up in order to keep construction activity separated from the existing bodies of water.

Access gates will be provided at all site and compound access points. The construction access will be from the site entrance located on Slane Road. A detailed traffic management plan will be prepared and implemented by the Main Contractor and agreed with the Local Authority prior to commencing works.

3. Construction and Demolition Waste Management

The main sources of construction waste arising from this project will be:

- Topsoil and subsoil;
- Packaging and general waste from construction activities; and
- General site clearance waste, including tree stumps, etc.

This Preliminary Construction, Demolition and Waste Management guideline will be incorporated into the requirements for the Main Contractor and the Plan will be developed by the Main Contractor as the construction progresses.

If asbestos containing materials (ACM) are identified, the ACM must be removed and disposed of by a competent contractor. ACM removal will require careful coordination to be carried out safely. Following removal of the asbestos containing materials a site clearance for reoccupation certificate must be obtained from a competent independent analyst in accordance with Regulation 15 (10) of the Safety Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010.

In the event that contaminated soil is encountered, this soil will be removed by an appropriately accredited contractor and disposed of at an appropriately accredited facility.

An invasive plant species survey will be required prior to construction.

3.1 Policy and Legislation

The principles and objectives to deliver sustainable waste management for this project have been incorporated in the preparation of this report and are based on the following strategic objectives:

- National Policy: The Waste Management Act 1996, as amended
- Local Policy: The Eastern Midlands Regional Waste Management Plan 2015 – 2021

This Waste Management Plan is also in accordance with the following guidance note published by the Department of the Environment, Heritage and Local Government in July 2006:

This plan has also been prepared in accordance with:

- The Department of the Environment, Heritage and Local Government's (2006) 'Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects';
- Best practice guidelines for the preparation of resource & waste management plans for construction & demolition projects, EPA 2021;
- Waste Framework Directive 2008/98/EC;
- Landfill Directive 1999/31/EC;
- European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011) as amended;
- Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820 of 2007) as amended;
- Waste Management (Facility Permit and Registration) Regulation 2007 (S.I No. 821 of 2007) as amended;
- Waste Management (Licensing) Regulations 2000 (S.I No. 185 of 2000) as amended;
- European Union (Packaging) Regulations 2014 (S.I. No. 282 of 2014) as amended;

- Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997) as amended;
- Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015);
- European Communities (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014);
- Waste Management (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended;
- Waste Management (Shipments of Waste) Regulations 2007 (S.I. No. 419 of 2007) as amended;
- European Communities (Transfrontier Shipment of Waste) Regulations 1994 (SI 121 of 1994).
- Environmental Protection Act 1992 (S.I. No. 7 of 1992) as amended;
- Litter Pollution Act 1997 (Act No. 12 of 1997) as amended; and
- Planning and Development Act 2000 (S.I. No. 30 of 2000) as amended.

The hierarchy of waste management sets out the guiding principles in order of importance as follows:

1. Reduction of the amount of waste generated by the construction process.
2. Segregation of waste is a key concept that will be implemented during the course of the construction phase of the development to enable ease in re-use and recycling, wherever appropriate.
3. Recycle waste material where feasible, including the use of excess excavations as fill material, recycling of various waste fractions such as metals and packaging etc.

3.1.1 National Waste Policy

In September 2020, the Department of Communications, Climate Action and Environment published 'Ireland's National Waste Policy 2020-2025' (A Waste Action Plan for a Circular Economy). This new national waste policy will inform and give direction to waste planning and management in Ireland over the coming years. The policy shifts the focus from waste disposal and treatment to ensure that materials and products remain in productive use for longer. This aims to prevent waste and supports reuse through discouraging the wasting of resources and rewarding circularity. The policy document contains over 200 measures across various waste areas including C&D. C&D waste related goals of the policy are to

- Revise the 2006 Best Practice Guidelines for C&D waste;
- Streamline by-product notification and end-of-waste decision making processes; and
- Working group to develop national end-of-waste applications for priority waste streams.

The policy outlines the significant projected contributions that soils and stones make to overall C&D wastes between 2020 and 2022.

The policy identifies the need to promote waste prevention in the first instance and the need to plan for C&D wastes at the earliest possible stage in a construction project.

3.1.2 Regional Waste Policy

The Proposed Development is located within the Eastern-Midlands Region (EMR).

The EMR 'Waste Management Plan (2015)' provides a framework for the prevention and management of waste in a sustained manner. The plan was developed in consultation with the Department of the

Environment, Community & Local Government (DECLG), the Environmental Protection Agency (EPA), the Irish Waste Management Association (IWMA) and other stakeholders.

Objectives of the EMR Waste Management Plan include: a reduction of 1% per annum in the amount of household waste; increased recycling of domestic and commercial waste; and further reduce landfill: eliminate all unprocessed waste going to landfill from 2016.

In December 2020, an update to the 2015-2021 regional waste management plans was published. This document (Construction & Demolition Waste Soil and Stone Recovery / Disposal Capacity - Update Report 2020) provided an update to the national C&D soil and stone recovery/disposal capacity.

3.2 Typical Construction Waste

Typical construction waste which will be generated by the development is as follows:

- General site clearance waste including tree stumps, etc.;
- Some of the excavated material may require to be disposed of in a licensed landfill site where elevated levels of contamination are identified in any site investigation;
- Surface water runoff; and
- Packaging and waste construction materials generated during the course of the construction activities.

3.3 On-Site Construction Waste Management

Skips will be provided for the disposal of wood from the site. It is envisaged that the majority of the wood for disposal will come from pallets used for the transport of construction materials.

Other non-hazardous waste generated by the site (packaging and running of site offices) will be collected in separate roll-on skips. Any hazardous material encountered will be disposed of to a suitably licence tip.

The Purchasing Manager shall ensure that materials are ordered so that the quantity delivered, the timing of the delivery and the storage is not conducive to the creation of unnecessary waste.

C & D Waste Material	Quantity (tonnes)
Clay and stones	*To be Completed by C&D Waste Manager*
Concrete	*To be Completed by C&D Waste Manager*
Masonry	*To be Completed by C&D Waste Manager*
Wood	*To be Completed by C&D Waste Manager*
Packaging & Other Waste Materials	*To be Completed by C&D Waste Manager*
Hazardous Materials	*To be advised by pre-commencement survey*
Total Arisings Off Site	***To be Completed by C&D Waste Manager***

Table 2 | *Estimated C&D Waste Arisings on Site*

If concrete is to be crushed onsite, a waste facility permit will be required.

Material crushed onsite will be disposed of off-site at an authorised licenced/permitted facility. Note that crushed material from a waste recovery operation is not appropriate for the Article 27 Notification procedure.

Waste logs are to be kept and made available in digital formats for inspection. Waste dockets are to be completed, and these waste dockets will be specific to the authorised waste collector that collected the waste load.

The contractor will be required to furnish a full list of up-to-date authorised waste collection permit NWCPO numbers, and where sub-contractors are to be used, permit details shall be provided. The contractor will be required to confirm the destination facilities that authorised waste collection holders intend to use, and to provide letters on headed paper signed by a relevant competent person from the facilities confirming acceptance of material and tonnages agreed.

3.4 Off-Site Waste Management Licensing/Permitting

All waste materials (where necessary, after in-situ reuse and recycling options have been fully considered) shall be disposed of off-site, under the appropriate Duty of Care and subject to approvals/consents from the relevant statutory bodies. It is the responsibility of the Main Contractor to ensure that any company to whom waste is transferred is legally permitted to do so and that the facility they bring the waste to is licensed to handle that type of waste as outlined in the Waste Management Act 1996, as amended. The Waste Collection Permit Register, in accordance with the Waste Management (Collection Permit) Regulations 2001 will be consulted to ensure that waste carriers hold the appropriate permit.

The relevant waste collection permits and waste licences shall be provided by the Main Contractor and shall be amended to this report upon availability.

An inspection of the site shall be made by the Main Contractor for hazardous substances, gas cylinders and the like. If such substances are encountered during the course of construction, then works must be halted. The project supervisor for construction stage (PSCS) and the responsible Statutory Authority shall be informed immediately.

The Main Contractor shall prepare a detailed inventory of construction based hazardous waste generated, such as tars, adhesives, sealants and other dangerous substances, and these will be kept segregated from other non-hazardous waste to prevent possible contamination. Arrangements shall be made for such substances for disposal in a safe manner to an authorized disposal site or by means acceptable to the relevant Authority.

The Main Contractor will ensure that the excavation works are carried out in accordance with best standard practice and excavation materials are well segregated to minimize any potential cross-contamination.

The Main Contractor shall carry out appropriate environmental chemistry testing in order to determine the waste classification of the soils that are to be excavated and that shall include Waste Acceptance Criteria testing. The test regime shall be agreed with the receiving landfill operator and the testing shall be carried out by an accredited laboratory.

Should excavation materials be assessed to be hazardous, the Main Contractor shall carry out pre-treatment of the waste soils to a methodology that is agreed with the receiving landfill operator and in accordance with Environmental Protection Agency guidance.

The Main Contractor is encouraged to reuse and recycle any waste materials as far as is reasonably practicable.

In respect of any liquid disposal including underground water, the Main Contractor shall carry out appropriate environmental chemistry testing in order to determine whether the liquid is contaminated or not. The test regime shall be agreed with the receiving disposal facility and the testing shall be carried out by an accredited laboratory.

The Main Contractor shall manage and carry out the works in accordance with best environmental practice and in accordance with the requirements of Local Authority, EPA and all requirements as specified in this document.

3.5 Appointment of C&D Waste Manager

The Main Contractor shall appoint a C&D Waste Manager. The C&D Waste Manager will have overall responsibility for the implementation of the project Waste Management Plan (WMP) during the construction phase.

Copies of the Waste Management Plan will be made available to all relevant personnel on site. All site personnel and sub-contractors will be instructed about the objectives of the Waste Management Plan and informed of the responsibilities which fall upon them as a consequence of its provisions. Where source segregation, selective demolition and material reuse techniques apply, each member of staff will be given instructions on how to comply with the Waste Management Plan. Posters will be designed to reinforce the key messages within the Waste Management Plan and will be displayed prominently for the benefit of site staff.

3.6 C&D Record Keeping

It is the duty of the C&D Waste Manager to ensure that necessary licenses have been obtained as needed. Each consignment of C&D waste taken from the site will be subject to documentation which will conform with Table 4 along with Transportation Dockets to ensure full traceability of the material to its final destination.

Detail	Particulars
Project of Origin	*Old Slane Road, Co. Louth*
Material being Transported	*Soil, Construction waste*
Quantity of Material	*To be completed by C&D Waste Manager*
Date of Material Movement	*To be completed by C&D Waste Manager*
Name of Carrier	*To be completed by C&D Waste Manager*
Destination of Material	*To be completed by C&D Waste Manager*
Proposed Use	*To be completed by C&D Waste Manager*

Table 3 | *Details of materials taken from site*

3.7 Topsoil

In the case of topsoil careful planning and on-site storage can ensure that this resource is reused on-site as much as possible. Any surplus of soil not reused on site can be sold. However, topsoil is quite sensitive and can be rendered useless if not stored and cared for properly.

- It is important that topsoil is kept completely separate from all other construction waste as any cross-contamination of the topsoil can render it useless for reuse.
- It is important to ensure that topsoil is protected from all kinds of vehicle damage and kept away from site-track, delivery vehicle turning areas and site plant and vehicle storage areas.

If topsoil is stored in piles of greater than two metres in height the soil matrix (internal structure) can be damaged beyond repair. It should also be kept as dry as possible and used as soon as possible to reduce any deterioration through lengthy storage and excess moving around the site.

Records of topsoil storage, movements and transfer from site will be kept by the C&D Waste Manager.

3.8 Earthworks – Cut and Fill Policy

Efforts have been made to follow the existing topography of the site, in order to minimise the cut and fill requirements. In order to optimise the impact of the generation of surplus material due to excavation the following principles shall be considered during the detail design and construction phase:

- Unsuitable sub-soils generated by excavations on site will be reviewed for reuse as landscaping or non-engineering fills on adjoining or other construction sites within the region.
- Careful separation of builder's rubble packaging and contaminated waste from re-usable material will result in the minimisation of the disposal of material to landfill.

4. Deliveries

It is intended that all deliveries to the construction site will be made to the site access from Slane Road.

Materials should be ordered and delivered to site on an “as needed” basis in order to prevent over supply to site. Deliveries will be managed upon arrival to the site and systems should be provided in order to avoid any queuing of delivery vehicles.

A number of the construction traffic movements will be undertaken by heavy goods vehicles, though there will also be vehicle movements associated with the appointed contractors and their staff.

Care will be taken to ensure existing pedestrian and cycling routes are suitably maintained or appropriately diverted as necessary during the construction period, and temporary car parking is provided within the site for contractor’s vehicles. It is likely that construction will have a negligible impact on pedestrian and cycle infrastructure.

It is proposed that a Construction Management Plan (CMP) will be prepared by the appointed contractor in order to minimise the potential impact of the construction phase of the proposed development on the safety and amenity of other users of the public road. The CMP will consider the following aspects:

- Minimise the volume of material removed from site by optimising the cut to fill requirements within the site;
- Segregation of waste material produced during the construction process to minimise the contamination or reusable fill material resulting from excavation on the site;
- Ensure that deliveries to the site and removal of spoil material from this site are restricted to off peak periods where possible and practicable;
- Optimise routes to be used by heavy vehicles and detail construction traffic forecast;
- Determine the working hours of the site, noting whether there are any additional restrictions of the planning authority’s Final Grant;
- Facilities for loading and unloading; and
- Facilities for parking cars and other vehicles.

5. Parking and Storage

Parking will be provided on site. No on-street parking or parking in the local residential areas will be permitted.

The Main Contractor will be required to schedule delivery of materials strictly on a daily basis. As there are adequate storage facilities available on site it is not envisaged that there will be any necessity to provide a secure material staging compound remote from the site in which to temporarily store materials from suppliers until such time as these can be accommodated on site. Instead, a dedicated material storage area will be set up on the site.

6. Dust and Dirt Control

Nuisance dust emissions from construction activities are a common and well recognised problem. Fine particles from these sources are recognised as a potential significant cause of pollution.

The Main Contractor will be required to demonstrate that both nuisance dust and fine particle emissions from the site are adequately controlled and are within acceptable limits.

Dust and fine particle generation from construction and demolition activities on the site can be substantially reduced through carefully selected mitigation techniques and effective management. Once particles are airborne it is very difficult to prevent them from dispersing into the surrounding area. The most effective technique is to control dust at source and prevent it from becoming air borne, since suppression is virtually impossible once it has become air borne.

6.1 Mitigation Measures

The following are techniques and methods which are widely used currently throughout the construction industry to control dust and dirt emitting from the site, and which may be used at the development:

1. The roads in the vicinity of the site are all surfaced, and no dust is anticipated arising from unsealed surfaces outside the site.
2. A regime of 'wet' road sweeping can be set up to ensure the roads around the immediate site are as clean and free from dirt / dust arising from the site, as is reasonably practicable. This cleaning will be carried out by approved mechanical sweepers.
3. Footpaths immediately around the site can be cleaned by hand regularly, with damping as necessary.
4. High level walkways and surfaces such as scaffolding can be cleaned regularly using safe 'wet' methods, as opposed to dry methods.
5. Vehicle waiting areas or hard standings can be regularly inspected and kept clean by brushing or vacuum sweeping and will be regularly sprayed to keep moist, if necessary.
6. Vehicle and wheel washing facilities can be provided at site exit(s) where practicable. If necessary, vehicles can be washed down before exiting the site.
7. Netting can be provided to enclose scaffolding in order to mitigate escape of air borne dust from the existing and new buildings.
8. Vehicles and equipment shall not emit black smoke from exhaust system, except during ignition at start up.
9. Engines and exhaust systems should be maintained so that exhaust emissions do not breach stationary emission limits set for the vehicle / equipment type and mode of operation.
10. Servicing of vehicles and plant should be carried out regularly, rather than just following breakdowns.
11. Internal combustion plant should not be left running unnecessarily.
12. Where possible fixed plant such as generators should be located away from residential areas.
13. The number of handling operations for materials will be kept to a minimum in order to ensure that dusty material is not moved or handled unnecessarily.

14. The transport of dusty materials and aggregates should be carried out using covered / sheeted lorries.
15. Material handling areas should be clean, tidy, and free from dust.
16. Vehicle loading should be dampened down and drop heights for material to be kept to a minimum.
17. Drop heights for chutes / skips should be kept to a minimum.
18. Dust dispersal over the site boundary should be minimised using static sprinklers or other watering methods as necessary.
19. Stockpiles of materials should be kept to a minimum and if necessary, they should be kept away from sensitive receptors such as residential areas etc.
20. Stockpiles where necessary, should be sheeted or watered down.
21. Methods and equipment should be in place for immediate clean-up of spillages of dusty material.
22. No burning of materials will be permitted on site.
23. Earthworks excavations should be kept damp where necessary and where reasonably practicable.
24. Cutting on site should be avoided where possible by using pre-fabrication methods.
25. Equipment and techniques for cutting / grinding / drilling / sawing / sanding etc., which minimise dust emissions and which have the best available dust suppression measures, should be employed.
26. Where scabbling is to be employed, tools should be fitted with dust bags, residual dust should be vacuumed up rather than swept away, and areas to be scabbled should be screened off.
27. Wet processes should be used to clean building facades if possible. If dry grit blasting is unavoidable then ensure areas of work are sealed off and dust extraction systems used.
28. Where possible pre-mixed plasters and masonry compounds should be used to minimise dust arising from on-site mixing.
29. Prior to commencement, the Main Contractor should identify the construction operations which are likely to generate dust and to draw up action plans to minimise emissions. Furthermore, the Main Contractor should prepare environmental risk assessments for all dust generating processes, which are envisaged.
30. The Main Contractor should allocate suitably qualified personnel to be responsible for ensuring the generation of dust is minimised and effectively controlled.

7. Water

7.1 Excavations

Following completion of any required initial dewatering of excavations for the drainage pipes, water supply, utilities, and foundations, it is expected that flows of water into the excavation will be relatively small. These flows will be managed by sump pumping on an as-required basis.

During any discharge of surface water from the excavations, the quality of the water will be regularly monitored visually for hydrocarbon sheen and suspended solids. Periodic laboratory testing of discharge water samples will be carried out in accordance with the requirements of the discharge licence obtained from the Local Authority.

7.2 Headwall and Surface Water Sewer Construction

It is proposed to install a pre-cast headwall on the outfall to the to the existing stream as part of the proposed surface water drainage system (note that this headwall is to be constructed under the permitted 30 unit development, which is currently under construction). All in-stream works must be carried out in accordance with an approved method statement and under the direction of Inland Fisheries Ireland personnel. Once the schedule of instream works has been drawn up the developer will consult with Inland Fisheries Ireland (IFI) before commencing works. All works will be completed in agreement with IFI.

Prior to installation of the headwall, a bund will be installed in the stream to create a dry section. The timing of the headwall installation will be scheduled to ensure no instream works shall be carried out during the closed season for instream works (October 1st to June 30th).

Prior to construction on the headwall, a constraints zone will be identified and implemented at the construction area adjacent to the stream. This area will ensure the avoidance of physical damage to the stream, ensure all work will be carried out in the dry and effectively isolated from the stream and ensure that no suspended sediment and associated nutrients are released into surface waters from excavation and earthworks.

Where in-stream bed material is to be removed, coarse aggregates, if present, should be stockpiled for replacement in the reformed or new riverbed (note that care should also be taken with in-stream vegetation if required for landscape treatments).

7.3 General Water Protection Measures

Several mitigation measures are proposed to monitor and improve surface water quality and protect the stream and the Boyne River. All works carried out adjacent to the tributary stream will be supervised by the Ecological Clerk of Works (ECoW) and will follow the guidelines published by Inland Fisheries Ireland (IFI) Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters (2016) and The National Roads Authority (now Transport Infrastructure Ireland) Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes.

Appropriate storage facilities will be provided on Site. Areas of high risk include:

- Fuel and chemical storage;
- Refuelling Areas;
- Site Compound; and
- Waste storage areas.

There will be no washdown facilities for plant and equipment on the Proposed Development Site. Designated impermeable cement washout areas must be provided. Concrete mixer trucks will not be permitted to wash out on Site with the exception of cleaning the chute into a container which will be removed off Site to an authorised facility.

If required, fuel, oils and chemicals will be stored on an impervious base within a bund remote from any surface water ditches or locations. Temporary oil interceptor facilities will be installed and maintained where Site Works involve the discharge of drainage waters to nearby watercourses. All containment and treatment facilities will be regularly inspected and maintained.

Refuelling of plant during the Construction Phase will only be carried out at designated refuelling station locations on site. Each station will be fully equipped for spill response and a specially trained and dedicated Environmental and Emergency Spill Response team will be appointed before the commencement of works on site.

Only emergency breakdown maintenance will be carried out on site. Drip trays and spill kits will be available on site to ensure that any spills from vehicles are contained and removed off site. All personnel working on site will be trained in pollution incident control response.

All tank, container and drum storage areas shall be rendered impervious to the materials stored therein. Bunds shall be designed having regard to Environmental Protection Agency guidelines 'Storage and Transfer of Materials for Scheduled Activities' (2904). All tank and drum storage areas shall, as a minimum, be bunded to a volume not less than the greater of the following:

- 110% of the capacity of the largest tank or drum within the bunded area; or
- 25% of the total volume of substance that could be stored within the bunded area.

Water will not be discharged to open water courses. No direct discharges will be made to waters where there is potential for cement or residues in discharges. The pH of any and all discharges made from and during the Construction Phase of the Proposed Development shall be in the range of 6-9 units and not alter the pH of any receiving waters by more than +/- 0.5 pH units. The level of suspended solids in any discharges to fisheries waters as a consequence of construction works shall not exceed 25mg/l, nor result in the deposition of silts on gravels or any element of the aquatic flora or fauna.

Run-off from the working site or any areas of exposed soil will be channelled and intercepted at regular intervals for discharge to silt-traps or lagoons with over-flows directed to land rather than to a watercourse.

All open water bodies adjacent to areas of proposed works will be protected by fencing including settlement ponds. Silty water generated on site will be treated using silt traps/settlement ponds and temporary interceptors and traps will be installed until such time as permanent facilities are constructed. Straw bales or silt fences will be appropriately located near watercourses and woodland to help prevent untreated surface water run-off entering them. A buffer zone should remain between the silt trap and the watercourse with natural vegetation left intact. The developer will ensure that erosion control i.e. silt-traps, silt-fencing and swales are regularly maintained during the Construction Phase.

A regular review of weather forecasts of heavy rainfall will be conducted, and a contingency plan will be prepared for before and after such events to minimise any potential nuisances. As the risk of the break-out of silt laden run-off is higher during these weather conditions, no work will be carried out during such periods where possible.

Any imported materials will, as much as possible, be placed on site in their proposed location and double handling will be avoided. Where this is not possible designated temporary material storage areas will be used. These temporary storage areas will be located at least 10m away from any surface water

features/drainage ditches etc. and will be surrounded with silt fencing to filter out any suspended solids from surface water arising from these materials.

If cast-in-place concrete is required, all work must be carried out in the dry and effectively isolated from any water courses or drainage ditches.

If portaloos and/or containerised toilets and welfare units will be used to provide facilities for site personnel, all associated waste will be removed from site by a licenced waste disposal contractor. Under no circumstances will any untreated wastewater generated onsite (from equipment washing, road sweeping etc.) be released into nearby drains, woodland, or watercourses.

8. Noise Assessment and Control Measures

8.1 Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition

Prior to the commencement of work on the site a construction and demolition plan must be developed. When developing the construction and demolition plan reference must be made to the requirements of the Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition.

This Guide has been produced with reference to the London Good Practice Guide: Noise and Vibration Control for Demolition and Construction produced by the London Authorities Noise Action Forum, July 2016.

8.2 Environmental Noise Mitigation Measures

General Considerations:

1. All site staff shall be briefed on noise mitigation measures and the application of best practicable means to be employed to control noise.
2. Site hoarding should be erected to maximise the reduction in noise levels.
3. The contact details of the Main Contractor and site manager shall be displayed to the public, together with the permitted operating hours, including any special permissions given for out of hours work.
4. In the event that the Main Contractor gets a complaint about noise from a neighbour he will act immediately to remedy the situation.
5. The site entrance shall be located to minimise disturbance to noise sensitive receptors.
6. Internal haul routes shall be maintained, and steep gradients shall be avoided.
7. Material and plant loading and unloading shall only take place during normal working hours unless the requirement for extended hours is for traffic management (i.e. road closure) or health and reasons (written approval, must be obtained from the planning authority prior to this activity being undertaken).
8. Use rubber linings in chutes, dumpers and hoppers to reduce impact noise.
9. Minimise opening and shutting of gates through good coordination of deliveries and vehicle movements.

Plant:

1. Ensure that each item of plant and equipment complies with the noise limits quoted in the relevant European Commission Directive 2000/14/EC.
2. Fit all plant and equipment with appropriate mufflers or silencers of the type recommended by the manufacturer.
3. Use all plant and equipment only for the tasks for which it has been designed.
4. Shut down all plant and equipment in intermittent use in the intervening periods between work or throttle down to a minimum.
5. Power all plant by mains electricity where possible rather than generators.

6. Maximise screening from existing features or structures and employ the use of partial or full enclosures for fixed plant.
7. Locate movable plant away from noise sensitive receptors where possible.
8. All plant operators to be qualified in their specific piece of plant.
9. Compressors and generators will be sited in areas least likely to give rise to nuisance where practicable.

Vehicle activity:

1. Ensure all vehicle movement (on site) occur within normal working hours. (other than where extension of work requiring such movements has been granted in cases of required road closures or for health and safety reasons).
2. Plan deliveries and vehicle movements so that vehicles are not waiting or queuing on the public highway, if unavoidable engines should be turned off.
3. Plan the site layout to ensure that reversing is kept to a minimum.
4. Where reversing is required use broadband reverse sirens or where it is safe to do so disengage all sirens and use banksmen.
5. Rubber/neoprene or similar non-metal lining material matting to line the inside of material transportation vehicles to avoid first drop high noise levels.
6. Wheel washing of vehicles prior to exiting the site shall take place to ensure that adjoining roads are kept clean of dirt and debris. Regular washing of adjoining streets should also take place as required by road sweepers.

Demolition Phase:

1. Employ the use of acoustic screening; this can include planning the demolition sequence to utilise screening afforded by buildings to be demolished.
2. If working out of hours for Health and Safety reasons (following approval by council) limit demolition activities to low level noise activity (unless absolutely unavoidable).
3. Use low impact demolition methods such as non-percussive plant where practicable.
4. Use rotary drills and ‘bursters’ activated by hydraulic or electrical power or chemically based expansion compounds to facilitate fragmentation and excavation of hard material.
5. Avoid the transfer of noise and vibration from demolition activities to adjoining occupied buildings through cutting any vibration transmission path or by structural separation of buildings.
6. Consider the removal of larger sections by lifting them out and breaking them down either in an area away from sensitive receptors or off site.

Ground Works and Piling (if required) Phase:

1. The following hierarchy of groundwork/piling methods should be used if ground conditions, design and safety allow:

    - Pressed-in methods, e.g., hydraulic jacking
    - Auger/bored piling
    - Diaphragm walling
    - Vibratory piling or vibro-replacement

- Driven Piling or dynamic consolidation

2. The location and layout of the piling plant should be designed to minimise potential noise impact of generators and motors.
3. Where impact piling is the only option utilise a non-metallic dolly between the hammer and driving helmet or enclose the hammer and helmet with an acoustic shroud.
4. Consider concrete pour sizes and pump locations. Plan the start of concrete pours as early as possible to avoid overruns.
5. Where obstructions are encountered, work should be stopped, and a review undertaken to ensure that work methods that minimise noise are used.
6. When using an auger piling rig do not dislodge material from the auger by rotating it back and forth. Use alternate methods where safe to do so.
7. Prepare pile caps using methods which minimise the use of breakers, e.g., use hydraulic splitters to crack the top of the pile.

Monitoring:

1. Carry out regular on-site observation monitoring and checks/audits to ensure that best practicable means are being used at all times. Such checks shall include:
    - Hours of work
    - Presence of mitigation measures
    - Number and type of plant
    - Construction methods
2. In the event that the Main Contractor gets a complaint about noise from a neighbour he will act immediately to remedy the situation.
3. A sound level digital meter will be employed as necessary to monitor noise, with results recorded to inform the contractor of noise level.
4. Site reviews must be recorded and made available for inspection.
5. Appraise and review working methods, processes and procedures on a regular basis to ensure continuous development of best practicable means.

Communication and Liaison:

1. A Community Liaison Plan should be developed by the developer in consultation with local residents/businesses and a single point of contact nominated to engage with the Local Authority and the residents/businesses and to handle complaints and communication of site information.
2. All site staff should be briefed on the complaints procedure and mitigation requirements and their responsibilities to register and escalate complaints received.

8.3 Risk Assessment & Mitigation

The Main Contractor shall deal with the immediate dangers to hearing etc. associated with high noise levels and the impact of same on construction operatives, by means of risk assessment and mitigation / precautionary measures and equipment, all pursuant to the current health and safety legislation.

Current legislation limits, assessment period of 8 hours of one week (noisiest 8 hours likely to experience):

- Lower Action Value (LAV) – 80 dBA $L_{EX,8}$, 135 dB Peak – Hearing Protection shall be made available and information shall be provided.
- Upper Action Value (UAV) – 85 dBA $L_{EX,8}$, 137 dB Peak – Use of Hearing Protection is mandatory, measures to eliminate the noise as much as possible shall be applied.
- Exposure Limit Value (ELV) – 87 dBA $L_{EX,8}$, 140 dB Peak – Not to be exceeded

Protection by ear plugs/muffs given by their Signal-to-Noise Ratio (SRN) or Noise Reduction Rating (NRR) is typically 20 – 30 dB.

- Exposure = $L_{EX,8}$ – (SNR - 10)

As a guide, if it is difficult to hear a normal conversation at a distance of 2m or a workplace is consistently noisier than a busy street, it is likely that the noise levels in the area are above 80 dBA.

Noise due to the normal operation of the proposed development shall not cause a noise nuisance to nearby noise sensitive locations and in general shall not exceed the background level by 10dB(A) or exceed the limits set out in the EPA's Guidance Note for Noise (NG4), as measured from the nearest noise sensitive location.

8.4 Potential Noise Sources

It is not envisaged that any excessively noisy activities to be carried out over extended periods of time during the construction stage. However, due to the nature of the construction works, exposure to noise levels in excess of 80 dBA (Safe Working Limit) may occur occasionally. The Main Contractor will carry out a noise assessment in relation to the proposed works at construction stage. The noise assessment shall identify, but not limited to, the following steps in its analysis; -

1. Potentially Hazardous Activities: Use of site machinery and power tools. For example, concrete saws, angle grinders, vibratory plate compactors etc.
2. Potential Hazards: Excessive noise
3. Persons as Risk: People in the vicinity of the work generating an excessive noise. These persons include employees, contractors and members of the public.
4. Risk of Exposure to the Potential Hazard: Temporary or permanent hearing loss.
5. Risk Assessment before the Implementation of Control Measures: Medium
6. Risk Assessment after the Implementation of Control Measures: Low
7. Control Measures Implemented by: Site Manager / Works Supervisor

8.5 Mitigation Measures

The following control measures are to be implemented: -

1. Site Manager shall monitor a likelihood of prolonged exposure to excessive noise and commission noise surveying/monitoring programme where necessary.
2. Works Supervisor shall assess risk arising from noise prior to each particular activity taking place and determine appropriate action. The aim shall be to minimise the exposure to excessive noise levels.
    a. If it is likely that the noise exposure exceeds Lower Action Value, then hearing protection must be made available.

b. If it is likely that the noise exposure exceeds Upper Action Value, then hearing protection is mandatory to be used. Work Supervisor shall decide on the most suitable hearing protection to be used based on Exposure (see formula above) and worker's personal preference (earmuffs or earplugs).

3. Works Supervisor shall ensure proposed measures are put in place and that their effectiveness and suitability is evaluated on regular bases.
4. Site management shall minimise noise at work by looking for alternative processes and/or working methods, which would make the work quieter and/or exposure times shorter.
5. Site Manager shall liaise with all site contractors in order to effectively control noise exposure.
6. Number of people working near source of the noise shall be minimised.
7. Plant and machinery will be compliant with current legislation and fitted with silencers where possible.
8. Employees must use hearing protection where its use is made compulsory.
9. Hearing protection zones shall be identified where necessary.
10. Spot checks on appropriate use of hearing protection shall be carried out.
11. Operators of rock breaking machines and workers nearby must wear adequate ear protection.

8.6 Proper Use of Hearing Protection

- Earmuffs: Worker must make sure that they totally cover their ears, fit tightly and that there are no gaps around the seals. Hair, glasses, jewellery, hats etc. shall not interfere with the seal. Seals and insides of earmuffs shall be kept clean. Worker shall make sure that any headband keeps its tension.
- Earplugs: Workers shall make sure that they are wearing them properly. They shall practice fitting them and get help if they are having trouble. Hands shall be clean before fitting earplugs. Earplugs must not be shared with other workers.
- Semi-inserts/caps: Same applies as for earplugs. Worker shall make sure that any headband keeps its tension.

All workers are expected to:

- Co-operate: Help the Company to do what is needed to protect their hearing. Make sure that they use properly any noise control device and follow any working methods that are put in place.
- Wear any hearing protection they are given: Make sure that they are wearing it properly. They shall wear it all the time when they are exposed noisy environment (over UAV). Taking it off even for a short while means that the hearing could still be damaged.
- Look after their hearing protection.
- Report any problems: Report any problems with the hearing protection or effectiveness of the measures to the work supervisor.

9. Erosion and Sediment Control

9.1 Run-Off to Ditches

Significant quantities of waste and potential pollutants can be generated during construction. Controls must be put in place to prevent these pollutants from washing into the local storm water system.

Protection of the tributary stream at the east of the site and the Boyne River to the south of the site is paramount during the construction stage of the subject development. Temporary measures will be put in place to remove sediments, oils and pollutants.

The recommendations as outlined in the Eastern Regional Fisheries Board document outline the following seven items to be considered for the protection of adjacent water courses during the construction stage:

1. Fuels, oils, greases and hydraulic fluids must be stored in bunded compounds well away from the watercourse. Refuelling of machinery, etc., should be carried out in bunded areas.
2. Runoff from machine service and concrete mixing areas must not enter the watercourse.
3. Stockpile areas for sands and gravel should be kept to minimum size, well away from the watercourse.
4. Runoff from the above should only be routed to the watercourse via suitably designed and sited settlement ponds/filter channels.
5. Settlement ponds should be inspected daily and maintained regularly.
6. Temporary crossings should be designed to the criteria laid down for permanent works.
7. Watercourse banks should be left intact if possible. If they have to be disturbed, all practicable measures should be taken to prevent soils from entering the watercourses.

The main pollutants of site water are silt, fuel/oil, concrete and chemicals. See Table 5, below, for a list and brief description of pollution prevention measures.

Source	Action
Detergents	Use of detergents should be carried out in designated areas draining to the foul sewer.
Fuel/Oil	Fuel/oil stores must be located away from the site drainage system and the edge of watercourses.
	Ensure adequate measures are identified to prevent or contain any spillage such as creating a fall away from any drainage grid or blocking drainage points.
	Prevent oil pollution by:
	• Suitable bunded storage of fuel/oil, and use of drip trays under plant, and
	• An oil separator, and/or
	• On-site spill-kit
	• Commercially available absorbent granules, pads or booms.
Material Storage	Store drums, oil and chemicals on an impervious base and within a secured bund.

	Ensure topsoil and/or spoil heaps are located at least 10m away from water courses. Consider seeding them or covering with a tarpaulin to prevent silty runoff and losses due to wind.
Leaks and Spills	Storage facilities are to be checked on a regular basis to ensure any leaks or drips are fixed to prevent loss and pollution.
	Ensure appropriate spill response equipment is located near to the material in case of containment failure or material spills and ensure site staff know how to use it.
	Adequate stocks of absorbent materials, such as sand or commercially available spill kits and booms should be available at all times.
Litter	Provide waste bins on-site as appropriate.
Construction Vehicles	Provide vehicle wheel washing.
Concrete, Cement and Bentonite	Washout of these materials should be carried out in a designated, impermeable contained area. The washout water itself should be disposed of off-site or discharged to the foul sewer if authorised.

Table 4 | *Pollution Prevention Measures*

9.2 Sediment Control

Construction runoff is heavily laden with silt which can block road gullies and reduce the hydraulic capacity in pipes and rivers, contributing to ponding and flooding. Continued development without appropriate controls will ultimately keep maintenance costs elevated, whether that be in cleaning gullies, jetting pipes or dredging. Sediment control plans can be implanted on site to mitigate these issues.

Sediment basins and traps should be installed before any major site grading takes place. Additional sediment traps and silt fences should be installed as grading takes place to keep sediment contained on site at appropriate locations.

Key runoff-control measures should be located in conjunction with sediment traps to divert water from planned undisturbed areas away from the traps and sediment-laden water into the traps. Diversions should be installed above the areas to be disturbed before any grading operations. Any perimeter drains should be installed with stable outlets before opening major areas for development. Any additional facilities needed for runoff control should be installed as grading takes place.

During grading operations temporary diversions, slope drains, and inlet and outlet protection installed in a timely manner can be very effective in controlling erosion and sediment build up.

The main run-off conveyance system with inlet and outlet protection measures should be installed early and used to convey stormwater run-off through the development site without creating gullies or channels. Install inlet protection for storm drains as soon as the drain is functional to trap sediment on site in shallow pools and to allow the flood flows to enter the storm drainage system safely. Install outlet protection at the same time as the conveyance system to prevent damage to the tributary stream and the Boyne River.

9.3 Sediment Control Measures

Sediment entrapment facilities are necessary to reduce sediment discharges to downstream properties and receiving waters. All run-off leaving a disturbed area should pass through a sediment entrapment facility before it exits the site and flows downstream.

- Straw Bales: Straw bales can be placed at the base of a slope to act as a sediment barrier. These are not recommended for use within a swale or channel. Straw bales are temporary in nature and may perform for only a period of weeks or months. Proper installation and maintenance is necessary to ensure their performance.
- Silt Fencing: A silt fence is made of a woven synthetic material, geotextile, and acts to filter run-off. Silt fencing can be placed as a temporary barrier along the contour at the base of a disturbed area, but is not recommended for use in a channel or swale. The material is durable and will last for more than one season if properly installed and maintained. Silt fencing is not intended to be used as a perimeter fence or in area of concentrated flow. If concentrated flow conditions exist, a more robust filter should be considered.
- Silt Barriers: Silt barriers can also be temporarily installed in any road gullies of partially constructed roads to prevent sediment movement into downstream drainage systems or SUDS components. When the catchment area is greater than that allowed for straw bale barriers or silt fences, runoff should be collected in diversion drains and routed through temporary sediment basins.
- Diversion Drains: Diversion drains are simple linear ditches, often with an earth bund, for channelling water to a desired location. If the drains are being eroded, they can be lined with geotextile fabric or large stones or boulders.

The proposed development includes a new surface water outfall to the tributary stream at the east of the site via a new headwall (under construction as part of the permitted 30 unit development). Works will only be carried out only during dry weather. The precast headwall will be constructed “in the dry” and isolated from the watercourse using sandbags. The headwall will be installed on cement blinding (50mm minimum) on well compacted clean hardcore (300mm minimum). Ready mix concrete will be brought to the site and no concrete batching will occur at the headwall location. The cement will be allowed to fully cure before the removal of the sandbag bund. Under no circumstances will concrete-contaminated water or effluent be permitted to escape to the river.

10. Proposed Construction Phasing and Programme

A detailed construction programme has not been developed at this stage. However, the proposed development is to be constructed in two stages which will include, in broad terms, the following:

- Stage I: Site demolition, clearance, and preparation work for the construction.
- Stage II: Site development and construction. The development includes all associated site works and infrastructure which includes roads, utilities, foul and surface water drainage.

The construction programme is intended to be a 24-month programme.

Appendices

A. Site Investigation Report

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Ground Investigations Ireland

Old Slane Road, Drogheda – Phase 2

Lagan Homes

Factual Ground Investigation Report

August 2023

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DOCUMENT CONTROL SHEET

Project Title	Old Slane Road – Drogheda Site Phase 2
Engineer	Waterman Moylan
Client	Lagan Homes
Project No	12865-05-23B
Document Title	Factual Ground Investigation Report

Rev.	Status	Author(s)	Reviewed By	Approved By	Office of Origin	Issue Date
A	Final	J Cashen	B Sexton	F McNamara	Dublin	31 August 2023

Ground Investigations Ireland Ltd. present the results of the fieldworks and laboratory testing in accordance with the specification and related documents provided by or on behalf of the client The possibility of variation in the ground and/or groundwater conditions between or below exploratory locations or due to the investigation techniques employed must be taken into account when this report and the appendices inform designs or decisions where such variation may be considered relevant. Ground and/or groundwater conditions may vary due to seasonal, man-made or other activities not apparent during the fieldworks and no responsibility can be taken for such variation. The data presented and the recommendations included in this report and associated appendices are intended for the use of the client and the client's geotechnical representative only and any duty of care to others is excluded unless approved in writing.

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CONTENTS

APPENDICES

1.0 Preamble

On the instructions of Waterman Moylan Consulting Engineers, a site investigation was carried out by Ground Investigations Ireland Ltd. (GII) in July 2023, at the site of the proposed residential development in Drogheda, County Louth. This site investigation was carried out in unison with a more detailed site investigation for Phase 1 of the proposed development, which is discussed in a separate interpretative Ground Investigation Report[1].

2.0 Overview

2.1. Background

It is proposed to construct a new residential development with associated services, access roads and car parking at the proposed site. At the time of the site investigation the site was mostly greenfield however the southern portion of the site was overgrown and contained an old farm shed and some anthropogenic material. The site is situated next to the M1 motorway and is bordered to the south by the Slane Road, which leads into the town centre of Drogheda, County Louth.

2.2. Purpose and Scope

The purpose of the site investigation was to investigate subsurface conditions utilising a variety of investigative methods in accordance with the project specification. The scope of the work undertaken for this project included the following:

- Visit project site to observe existing conditions
- Carry out 10 No. Trial Pits to a maximum depth of 3.10m BGL
- Carry out 10 No. Dynamic Probes to determine soil strength/density characteristics
- Factual Report

3.0 Subsurface Exploration

3.1. General

During the ground investigation a programme of intrusive investigation specified by the Consulting Engineer was undertaken to determine the sub surface conditions at the proposed site. Regular sampling and in-situ testing were undertaken in the exploratory holes to facilitate the geotechnical descriptions and to enable laboratory testing to be carried out on the soil samples recovered during excavation and drilling.
The procedures used in this site investigation are in accordance with Eurocode 7 Part 2: Ground Investigation and testing (ISEN 1997 – 2:2007) and B.S. 5930:2015+A1:2020.

[1] Ground Investigations Ireland, Old Slane Road, Drogheda Site – Phase 1, Ground Investigation Report, August 2023.

3.2. Trial Pits

The trial pits were excavated using JCB 3CX excavator at the locations shown in the exploratory hole location plan in Appendix 1. The locations were checked using a CAT scan to minimise the potential for encountering services during the excavation. The trial pits were sampled, logged and photographed by a Geotechnical Engineer/Engineering Geologist prior to backfilling with arisings. Notes were made of any services, inclusions, pit stability, groundwater encountered, and the characteristics of the strata encountered and are presented on the trial pit logs which are provided in Appendix 2 of this Report.

3.3. Dynamic Probing (DPH)

The dynamic probe tests (DPH) were carried out at the locations shown in the location plan in Appendix 1 in accordance with B.S. 1377: Part 9 1990. The test consists of mechanically driving a cone with a 50kg weight in 100mm intervals and monitoring the number of blows required. An equivalent Standard Penetration Test (SPT) 'N' value may be calculated by dividing the total number of blows over a 300mm drive length by 1.5. The dynamic probe logs are provided in Appendix 3 of this Report.

3.4. Surveying

The exploratory hole locations have been recorded using a KQGeo M8 GNSS System which records the coordinates and elevation of the locations to ITM as required by the project specification. The coordinates and elevations are provided on the exploratory hole logs in the appendices of this Report.

4.0 Ground Conditions

4.1. General

The ground conditions encountered during the investigation are summarised below with reference to in-situ and laboratory test results. The full details of the strata encountered during the ground investigation are provided in the exploratory hole logs included in the appendices of this report.

The sequence of strata encountered was consistent across the site and generally comprised;

- Made Ground
- Cohesive Deposits

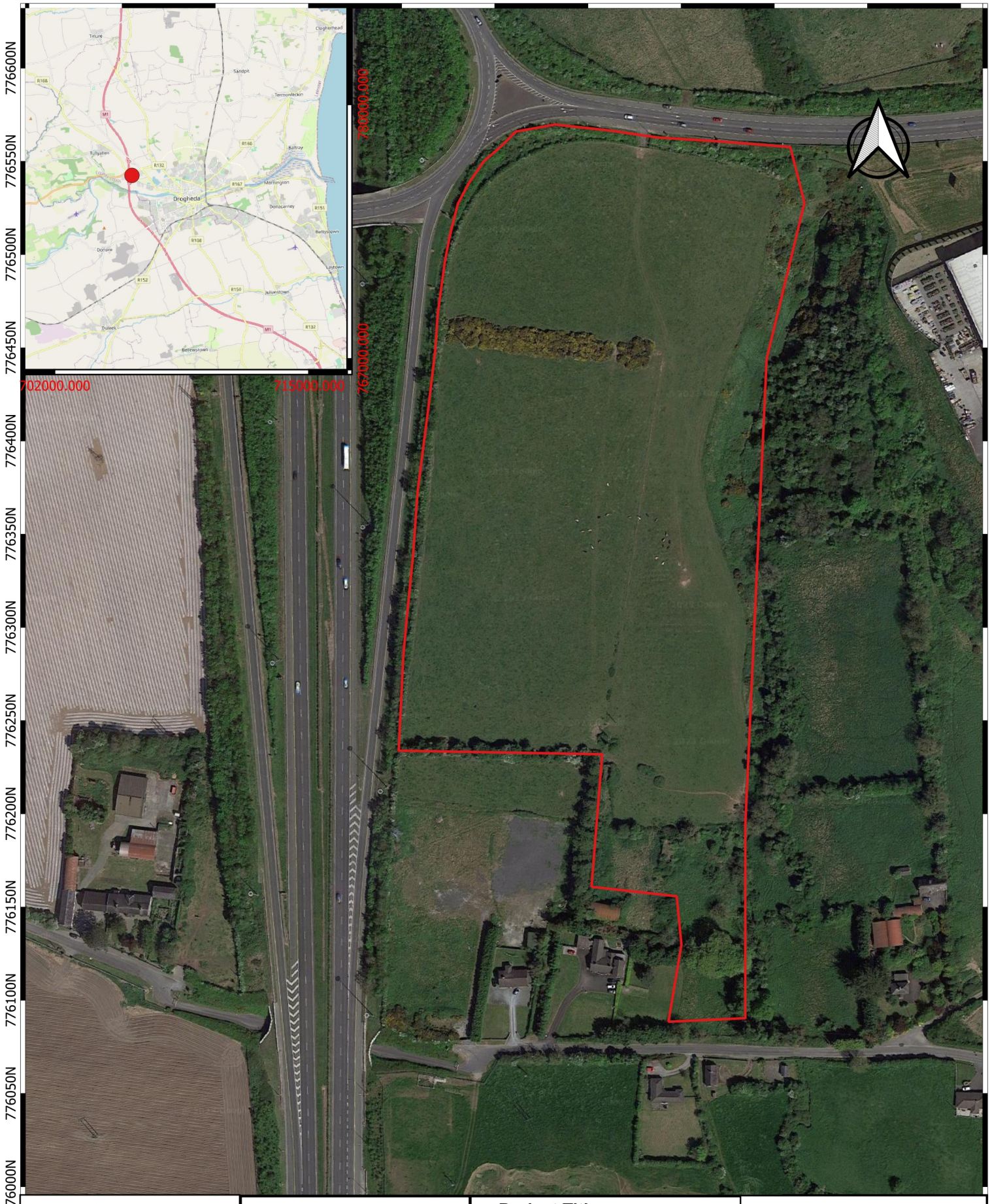
MADE GROUND: Made Ground deposits were encountered from ground level across the site. These deposits were present to a depth of between 0.20m and 0.80m BGL. These deposits were described generally as *brown sandy slightly gravelly Clay with variable cobble content* and contained *rare fragments of ceramic, red brick, mortar, and plastic.* Possible made ground deposits were also noted up to a depth of 1.50m BGL in TP-24.

COHESIVE DEPOSITS: Cohesive deposits were encountered beneath the Made Ground and were described typically as *brown slightly sandy slightly gravelly CLAY low cobble and boulder content.* The secondary sand and gravel constituents varied across the site and with depth, with granular lenses occasionally present in the glacial till matrix. These deposits had low (<5%), medium (5%-20%) or high (20%-50%) cobble and boulder content, where noted on the exploratory hole logs.

4.2. Groundwater

No groundwater strikes were noted at the trial pit locations. It should be noted that these exploratory holes did not remain open for sufficiently long periods of time to establish the hydrogeological regime and groundwater levels would be expected to vary with the tide, time of year, rainfall, nearby construction, and other factors.

APPENDIX 1 - Figures



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Client:

Waterman Moylan
Engineering Consultants

0 25 50 75 100 m

Project Title:
Old Slane Road Drogheda

Drawing Title:
Figure 1 Site Location

GII Project Reference:
12865-05-23

Drawn By:
CMP

Date:
02/08/2023

Site Location

Indicative Site Boundary

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Engineer:

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Engineering Consultants

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Project Title:
Old Slane Road Phase 2

Drawing Title:
Figure 2 - Site Investigation Points

GII Project Reference:
12865-05-23

Drawn By:
CMP

Date:
30/08/2023

Indicative Site Boundary

Trial Pit

APPENDIX 2 – Trial Pit Records

Ground Investigations Ireland Ltd
www.gii.ie

Site Old Slane Road - Drogheda Site			**Trial Pit Number** TP-19
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.40m x 0.70m x 3.00m (L x W x D)	**Ground Level (mOD)** 32.21	**Client** Lagan Homes	**Job Number** 12865-05-23
	Location 705970.7 E 776554.5 N	**Dates** 21/07/2023	**Engineer** Waterman Moylan	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.60)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with rare fragments of red brick and ceramic		
				31.61	0.60			
					(0.50)	Soft to firm light brown slightly sandy slightly gravelly CLAY with low cobble content		
				31.11	1.10			
1.50	B				(1.00)	Soft to firm brown slightly sandy gravelly CLAY with medium cobble and low boulder content		
				30.11	2.10			
					(0.60)	Firm to stiff brown slightly sandy gravelly CLAY with medium cobble and low boulder content		
				29.51	2.70			
					(0.30)	Stiff brown slightly sandy gravelly CLAY with medium cobble and low boulder content		
				29.21	3.00			
						Complete at 3.00m		

Plan

Remarks

No groundwater encountered
Trial pit stable
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	CMP	12865-05-23.TP-19

Ground Investigations Ireland Ltd
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Site Old Slane Road - Drogheda Site			**Trial Pit Number** TP-21
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.40m x 0.70m x 3.10m (L x W x D)	**Ground Level (mOD)** 32.77	**Client** Lagan Homes	**Job Number** 12865-05-23
	Location 705906.6 E 776539.4 N	**Dates** 21/07/2023	**Engineer** Waterman Moylan	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with rare fragments of ceramic and rootlets		
				32.47	0.30	Very soft brown slightly sandy slightly gravelly CLAY		
					(0.70)			
				31.77	1.00	Very soft brown slightly sandy gravelly CLAY with low cobble content		
					(1.10)			
2.00	B			30.67	2.10	Soft brown slightly sandy gravelly CLAY with low cobble content		
					(0.50)			
				30.17	2.60	Sitff brown slightly sandy gravelly CLAY with low cobble content		
					(0.50)			
				29.67	3.10	Complete at 3.10m		

Plan

Remarks

No groundwater encountered
Trial pit stable
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	CMP	12865-05-23.TP-21

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Site Old Slane Road - Drogheda Site			**Trial Pit Number** TP-24
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.10m x 0.70m x 3.00m (L x W x D)	**Ground Level (mOD)** 28.42	**Client** Lagan Homes	**Job Number** 12865-05-23
	Location 706035.6 E 776519.6 N	**Dates** 21/07/2023	**Engineer** Waterman Moylan	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.80)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with high boulder content and with rare fragments of red brick, mortar, ceramic, and plastic		
				27.62	0.80	Possible MADE GROUND: Soft to firm greyish brown sandy gravelly Clay with medium cobble and boulder content		
1.00	B				(0.70)			
				26.92	1.50	Firm brown slightly sandy gravelly CLAY with medium cobble and low boulder content		
					(1.50)			
				25.42	3.00	Complete at 3.00m		

Plan

Remarks

No groundwater encountered
Trial pit stable
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	CMP	12865-05-23.TP-24

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Site Old Slane Road - Drogheda Site			**Trial Pit Number** TP-30
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.20m x 0.70m x 3.00m (L x W x D)	**Ground Level (mOD)** 31.20	**Client** Lagan Homes	**Job Number** 12865-05-23
	Location 705912.5 E 776487.1 N	**Dates** 21/07/2023	**Engineer** Waterman Moylan	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.40)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with rare fragments of ceramic		
				30.80	0.40	Soft to firm light brown slightly sandy slightly gravelly CLAY with low cobble content		
					(0.90)			
				29.90	1.30	Firm brown slightly sandy gravelly CLAY with medium cobble content		
					(1.40)			
				28.50	2.70	Firm brown slightly sandy gravelly CLAY with medium cobble and low boulder content		
					(0.30)			
3.00	B			28.20	3.00	Complete at 3.00m		

Plan

Remarks

No groundwater encountered
Trial pit stable
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	CMP	12865-05-23.TP-30

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Site Old Slane Road - Drogheda Site			**Trial Pit Number** TP-44
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.10m x 0.70m x 3.00m (L x W x D)	**Ground Level (mOD)** 26.62	**Client** Lagan Homes	**Job Number** 12865-05-23
	Location 705991.9 E 776417.4 N	**Dates** 21/07/2023	**Engineer** Waterman Moylan	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with rare fragments of ceramic		
				26.32	0.30			
0.70	B				(1.70)	Soft to firm brown slightly sandy gravelly CLAY with low cobble content		
				24.62	2.00			
					(1.00)	Firm to stiff brown slightly sandy gravelly CLAY with low cobble and boulder content		
				23.62	3.00			
						Complete at 3.00m		

Plan

Remarks

No groundwater encountered
Trial pit stable
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	CMP	12865-05-23.TP-44

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Site Old Slane Road - Drogheda Site			**Trial Pit Number** TP-48
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.50m x 0.70m x 3.00m (L x W x D)	**Ground Level (mOD)** 28.93	**Client** Lagan Homes	**Job Number** 12865-05-23
	Location 705876.1 E 776406.7 N	**Dates** 21/07/2023	**Engineer** Waterman Moylan	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with rare fragments of ceramic and roots		
				28.63	0.30			
					(0.30)	Soft to firm brown slightly sandy gravelly CLAY with low cobble content		
				28.33	0.60			
					(0.50)	Firm brown slightly sandy gravelly CLAY with low cobble content		
				27.83	1.10			
2.00	B				(1.90)	Firm to stiff brown slightly sandy gravelly CLAY with low cobble and boulder content		
				25.93	3.00			
						Complete at 3.00m		

Plan

Remarks

No groundwater encountered
Trial pit stable
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	CMP	12865-05-23.TP-48

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Site Old Slane Road - Drogheda Site			**Trial Pit Number** TP-60
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.20m x 0.70m x 2.70m (L x W x D)	**Ground Level (mOD)** 25.27	**Client** Lagan Homes	**Job Number** 12865-05-23
	Location 705919.6 E 776328 N	**Dates** 21/07/2023	**Engineer** Waterman Moylan	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with rare fragments of ceramic		
				24.97	0.30	Soft to firm light brown slightly sandy slightly gravelly CLAY		
					(1.10)			
				23.87	1.40	Firm to stiff brown slightly sandy gravelly CLAY with medium cobble and low boulder content		
					(1.30)			
2.50	B			22.57	2.70	Complete at 2.70m		

Plan

Remarks

No groundwater encountered
Trial pit stable
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	CMP	12865-05-23.TP-60

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Site Old Slane Road - Drogheda Site			**Trial Pit Number** TP-69
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.50m x 0.70m x 3.00m (L x W x D)	**Ground Level (mOD)** 22.06	**Client** Lagan Homes	**Job Number** 12865-05-23
	Location 705856.3 E 776253.2 N	**Dates** 21/07/2023	**Engineer** Waterman Moylan	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.50)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with rare fragments of ceramic		
				21.56	0.50	Soft brown slightly sandy slightly gravelly CLAY		
					(0.50)			
				21.06	1.00	Soft brown slightly sandy gravelly CLAY with medium cobble and low boulder content		
1.50	B				(1.50)			
				19.56	2.50	Firm to stiff brown slightly sandy gravelly CLAY with medium cobble and boulder content		
					(0.20)			
				19.36	2.70	Stiff brown slightly sandy gravelly CLAY with medium cobble and boulder content		
					(0.30)			
				19.06	3.00	Complete at 3.00m		

Plan

Remarks

No groundwater encountered
Trial pit stable
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	CMP	12865-05-23.TP-69

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Site Old Slane Road - Drogheda Site			**Trial Pit Number** TP-72
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.20m x 0.70m x 2.80m (L x W x D)	**Ground Level (mOD)** 22.91	**Client** Lagan Homes	**Job Number** 12865-05-23
	Location 705947.1 E 776257.9 N	**Dates** 21/07/2023	**Engineer** Waterman Moylan	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.40)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with rare fragments of ceramic		
				22.51	0.40	Soft brown slightly sandy slightly gravelly CLAY with medium cobble content		
1.00	B				(1.20)			
				21.31	1.60	Soft brown slightly sandy gravelly CLAY with medium cobble and boulder content		
					(0.60)			
				20.71	2.20	Stiff light brown slightly sandy gravelly CLAY with high cobble and medium boulder content		
					(0.60)			
				20.11	2.80	Complete at 2.80m		

Plan

Remarks

No groundwater encountered
Trial pit stable
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	CMP	12865-05-23.TP-72

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Site Old Slane Road - Drogheda Site			**Trial Pit Number** TP-82
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.50m x 0.70m x 3.00m (L x W x D)	**Ground Level (mOD)** 19.79	**Client** Lagan Homes	**Job Number** 12865-05-23
	Location 705959.9 E 776171.4 N	**Dates** 20/07/2023	**Engineer** Waterman Moylan	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.60)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with rare fragments of ceramic		
				19.19	0.60	Possible MADE GROUND: Soft brown slightly sandy gravelly Clay		
					(0.40)			
				18.79	1.00	Soft to firm brown slightly sandy gravelly CLAY with low cobble content		
1.50	B				(1.30)	Encountered multiple gravel lens between 1.00m and 2.30m BGL		
				17.49	2.30	Firm brown slightly sandy gravelly CLAY with medium cobble and boulder content		
					(0.70)			
				16.79	3.00	Complete at 3.00m		

Plan

Remarks

No groundwater encountered
Trial pit stable
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	CMP	12865-05-23.TP-82

Old Slane Road 2nd Phase Additional – Trial Pit Photographs

TP-19

TP-19

Old Slane Road 2nd Phase Additional – Trial Pit Photographs

TP-19

TP-19

Old Slane Road 2nd Phase Additional – Trial Pit Photographs

TP-19

Old Slane Road 2nd Phase Additional – Trial Pit Photographs

TP-21

TP-21

Old Slane Road 2nd Phase Additional – Trial Pit Photographs

TP-21

TP-21

Old Slane Road 2nd Phase Additional – Trial Pit Photographs

TP-21

Old Slane Road 2nd Phase Additional – Trial Pit Photographs

TP-24

TP-24

Old Slane Road 2nd Phase Additional – Trial Pit Photographs

TP-24

TP-24

Old Slane Road 2nd Phase Additional – Trial Pit Photographs

TP-24

Old Slane Road 2nd Phase Additional – Trial Pit Photographs

TP-30

TP-30

Old Slane Road 2nd Phase Additional – Trial Pit Photographs

TP-30

TP-30

Old Slane Road 2nd Phase Additional – Trial Pit Photographs

TP-30

Old Slane Road 2nd Phase Additional – Trial Pit Photographs

TP-44

TP-44

Old Slane Road 2nd Phase Additional – Trial Pit Photographs

TP-44

TP-44

Old Slane Road 2nd Phase Additional – Trial Pit Photographs

TP-44

Old Slane Road 2nd Phase Additional – Trial Pit Photographs

TP-48

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Old Slane Road 2nd Phase Additional – Trial Pit Photographs

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Old Slane Road 2nd Phase Additional – Trial Pit Photographs

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Old Slane Road 2nd Phase Additional – Trial Pit Photographs

TP-60

TP-60

Old Slane Road 2nd Phase Additional – Trial Pit Photographs

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Old Slane Road 2nd Phase Additional – Trial Pit Photographs

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Old Slane Road 2nd Phase Additional – Trial Pit Photographs

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Old Slane Road 2nd Phase Additional – Trial Pit Photographs

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Old Slane Road 2nd Phase Additional – Trial Pit Photographs

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Old Slane Road 2nd Phase Additional – Trial Pit Photographs

TP-72

TP-72

Old Slane Road 2nd Phase Additional – Trial Pit Photographs

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TP-72

Old Slane Road 2nd Phase Additional – Trial Pit Photographs

TP-72

Old Slane Road 2nd Phase Additional – Trial Pit Photographs

TP-82

TP-82

Old Slane Road 2nd Phase Additional – Trial Pit Photographs

TP-82

TP-82

Old Slane Road 2nd Phase Additional – Trial Pit Photographs

TP-82

APPENDIX 3 – Dynamic Probe Records

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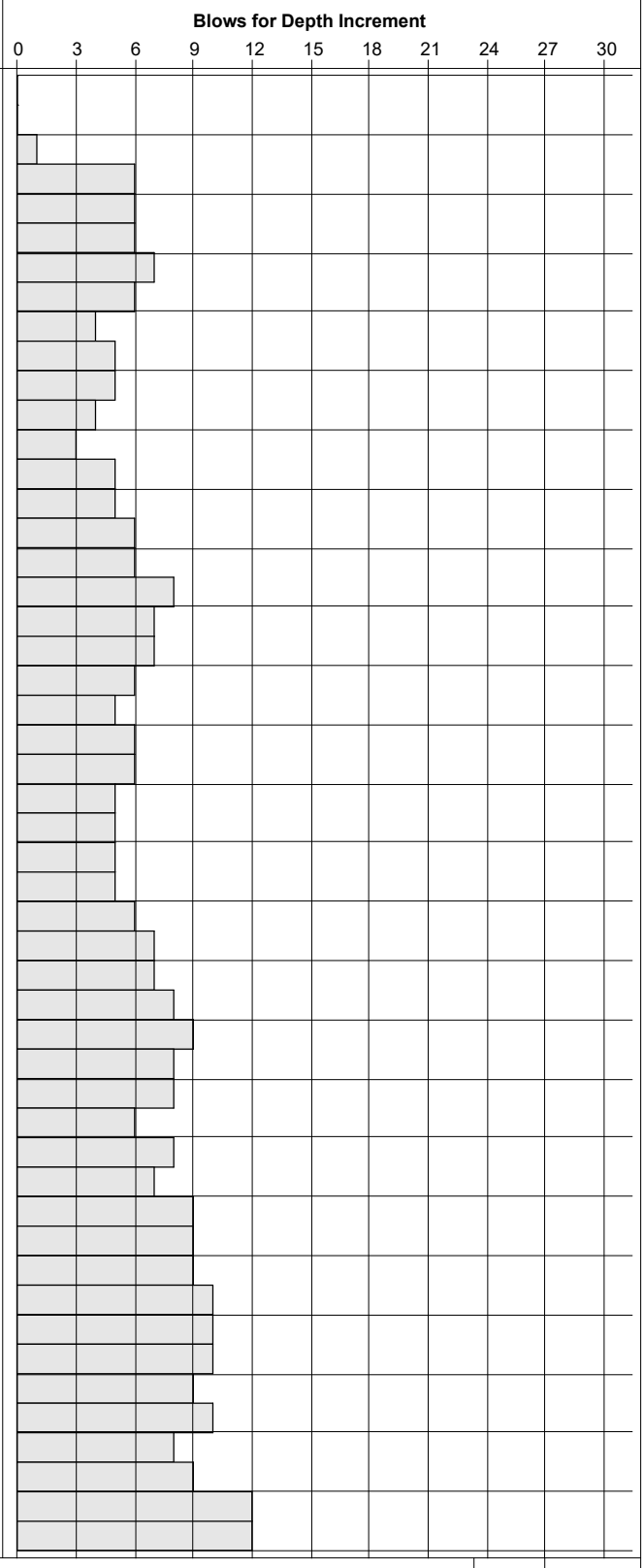
Site	Probe Number
Old Slane Road - Drogheda Site	DP-201

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Hammer Fall Height 500mm, Hammer Weight 50Kg	Diameter 43.70mm	32.21	Lagan Homes	12865-05-23
	Location	**Dates**	**Engineer**	**Sheet**
	705970.7 E 776554.5 N	09/08/2023	Waterman Moylan	1/2

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	0		32.21	0.00
0.10-0.20	0			
0.20-0.30	1			
0.30-0.40	6			
0.40-0.50	6			
0.50-0.60	6		31.71	0.50
0.60-0.70	7			
0.70-0.80	6			
0.80-0.90	4			
0.90-1.00	5			
1.00-1.10	5		31.21	1.00
1.10-1.20	4			
1.20-1.30	3			
1.30-1.40	5			
1.40-1.50	5			
1.50-1.60	6		30.71	1.50
1.60-1.70	6			
1.70-1.80	8			
1.80-1.90	7			
1.90-2.00	7			
2.00-2.10	6		30.21	2.00
2.10-2.20	5			
2.20-2.30	6			
2.30-2.40	6			
2.40-2.50	5			
2.50-2.60	5		29.71	2.50
2.60-2.70	5			
2.70-2.80	5			
2.80-2.90	6			
2.90-3.00	7			
3.00-3.10	7		29.21	3.00
3.10-3.20	8			
3.20-3.30	9			
3.30-3.40	8			
3.40-3.50	8			
3.50-3.60	6		28.71	3.50
3.60-3.70	8			
3.70-3.80	7			
3.80-3.90	9			
3.90-4.00	9			
4.00-4.10	9		28.21	4.00
4.10-4.20	10			
4.20-4.30	10			
4.30-4.40	10			
4.40-4.50	9			
4.50-4.60	10		27.71	4.50
4.60-4.70	8			
4.70-4.80	9			
4.80-4.90	12			
4.90-5.00	12		27.21	5.00



Remarks
Refusal at 7.50m BGL

Scale (approx)	Logged By
1:25	LF

Figure No.
12865-05-23.DP-201

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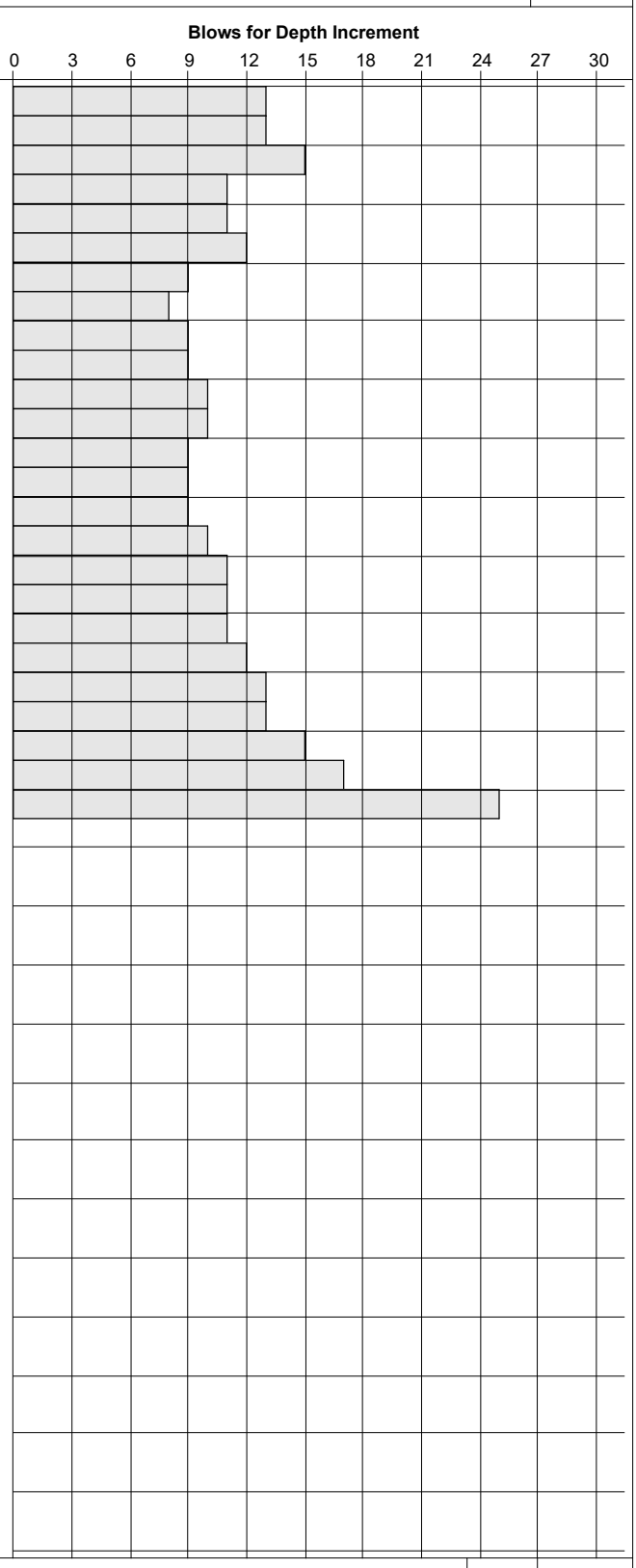
Site	Probe Number
Old Slane Road - Drogheda Site	DP-201

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Hammer Fall Height 500mm, Hammer Weight 50Kg	Diameter 43.70mm	32.21	Lagan Homes	12865-05-23
	Location	**Dates**	**Engineer**	**Sheet**
	705970.7 E 776554.5 N	09/08/2023	Waterman Moylan	2/2

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
5.00-5.10	13		27.21	5.00
5.10-5.20	13			
5.20-5.30	15			
5.30-5.40	11			
5.40-5.50	11			
5.50-5.60	12		26.71	5.50
5.60-5.70	9			
5.70-5.80	8			
5.80-5.90	9			
5.90-6.00	9			
6.00-6.10	10		26.21	6.00
6.10-6.20	10			
6.20-6.30	9			
6.30-6.40	9			
6.40-6.50	9			
6.50-6.60	10		25.71	6.50
6.60-6.70	11			
6.70-6.80	11			
6.80-6.90	11			
6.90-7.00	12			
7.00-7.10	13		25.21	7.00
7.10-7.20	13			
7.20-7.30	15			
7.30-7.40	17			
7.40-7.50	25		24.71	7.50
			24.21	8.00
			23.71	8.50
			23.21	9.00
			22.71	9.50
			22.21	10.00



Remarks

Scale (approx)	Logged By
1:25	LF

Figure No.
12865-05-23.DP-201

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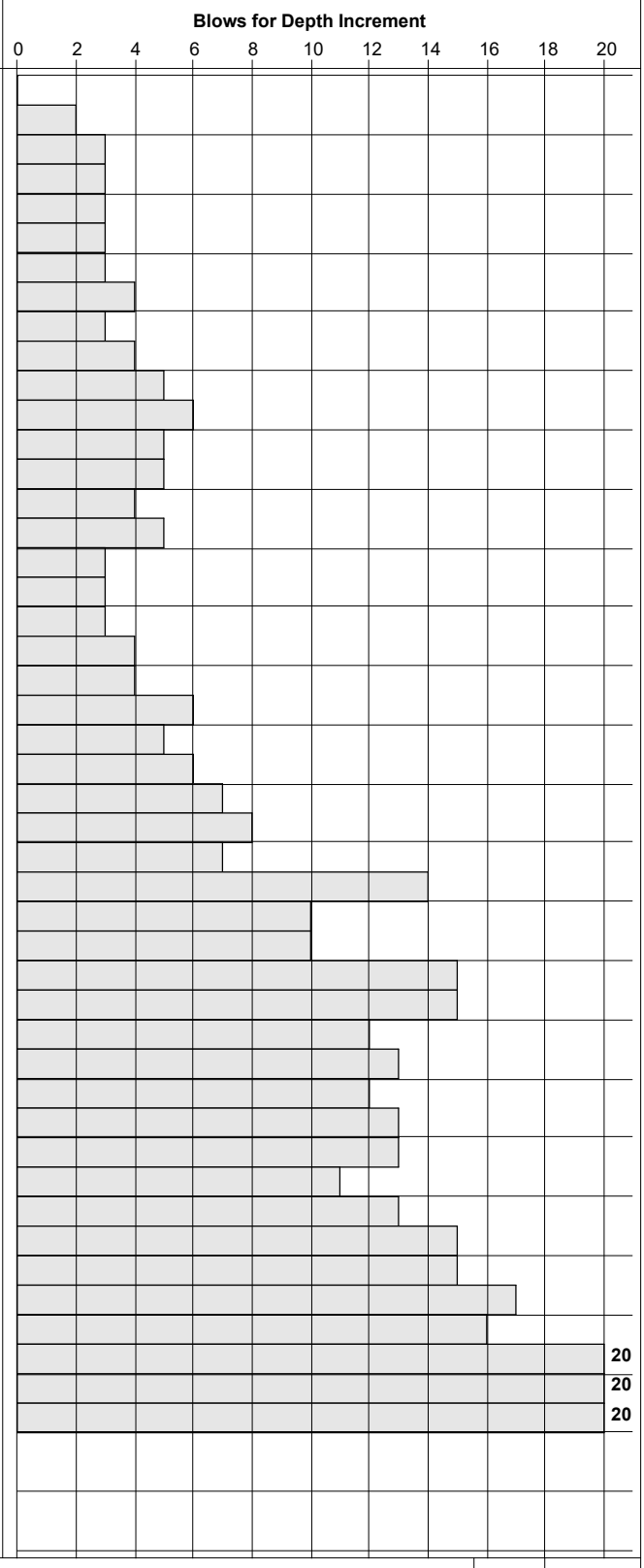
Site	Probe Number
Old Slane Road - Drogheda Site	DP-202

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Hammer Fall Height 500mm, Hammer Weight 50Kg	Diameter 43.70mm	32.77	Lagan Homes	12865-05-23
	Location	**Dates**	**Engineer**	**Sheet**
	705906.6 E 776539.4 N	09/08/2023	Waterman Moylan	1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	0		32.77	0.00
0.10-0.20	2			
0.20-0.30	3			
0.30-0.40	3			
0.40-0.50	3			
0.50-0.60	3		32.27	0.50
0.60-0.70	3			
0.70-0.80	4			
0.80-0.90	3			
0.90-1.00	4			
1.00-1.10	5		31.77	1.00
1.10-1.20	6			
1.20-1.30	5			
1.30-1.40	5			
1.40-1.50	4			
1.50-1.60	5		31.27	1.50
1.60-1.70	3			
1.70-1.80	3			
1.80-1.90	3			
1.90-2.00	4			
2.00-2.10	4		30.77	2.00
2.10-2.20	6			
2.20-2.30	5			
2.30-2.40	6			
2.40-2.50	7			
2.50-2.60	8		30.27	2.50
2.60-2.70	7			
2.70-2.80	14			
2.80-2.90	10			
2.90-3.00	10			
3.00-3.10	15		29.77	3.00
3.10-3.20	15			
3.20-3.30	12			
3.30-3.40	13			
3.40-3.50	12			
3.50-3.60	13		29.27	3.50
3.60-3.70	13			
3.70-3.80	11			
3.80-3.90	13			
3.90-4.00	15			
4.00-4.10	15		28.77	4.00
4.10-4.20	17			
4.20-4.30	16			
4.30-4.40	20			
4.40-4.50	20			
4.50-4.60	20		28.27	4.50
			27.77	5.00



Remarks
Refusal at 4.60m BGL

Scale (approx)	Logged By
1:25	LF

Figure No.
12865-05-23.DP-201

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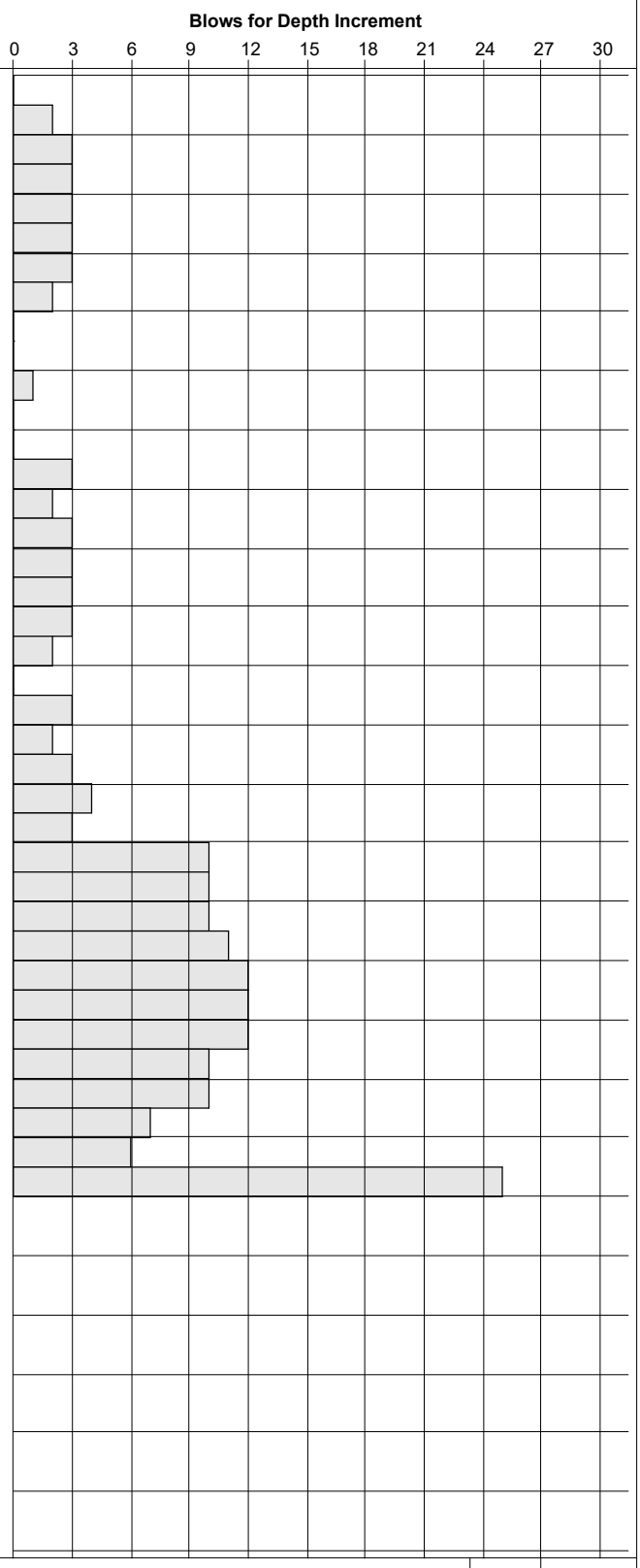
Site	Probe Number
Old Slane Road - Drogheda Site	DP-203

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Hammer Fall Height 500mm, Hammer Weight 50Kg	Diameter 43.70mm	28.42	Lagan Homes	12865-05-23
	Location	**Dates**	**Engineer**	**Sheet**
	706035.6 E 776519.6 N	09/08/2023	Waterman Moylan	1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	0		28.42	0.00
0.10-0.20	2			
0.20-0.30	3			
0.30-0.40	3			
0.40-0.50	3			
0.50-0.60	3		27.92	0.50
0.60-0.70	3			
0.70-0.80	2			
0.80-0.90	0			
0.90-1.00	0			
1.00-1.10	1		27.42	1.00
1.10-1.20	0			
1.20-1.30	0			
1.30-1.40	3			
1.40-1.50	2			
1.50-1.60	3		26.92	1.50
1.60-1.70	3			
1.70-1.80	3			
1.80-1.90	3			
1.90-2.00	2			
2.00-2.10	0		26.42	2.00
2.10-2.20	3			
2.20-2.30	2			
2.30-2.40	3			
2.40-2.50	4			
2.50-2.60	3		25.92	2.50
2.60-2.70	10			
2.70-2.80	10			
2.80-2.90	10			
2.90-3.00	11			
3.00-3.10	12		25.42	3.00
3.10-3.20	12			
3.20-3.30	12			
3.30-3.40	10			
3.40-3.50	10			
3.50-3.60	7		24.92	3.50
3.60-3.70	6			
3.70-3.80	25			
			24.42	4.00
			23.92	4.50
			23.42	5.00



Remarks
Refusal at 3.80m BGL

Scale (approx)	Logged By
1:25	LF

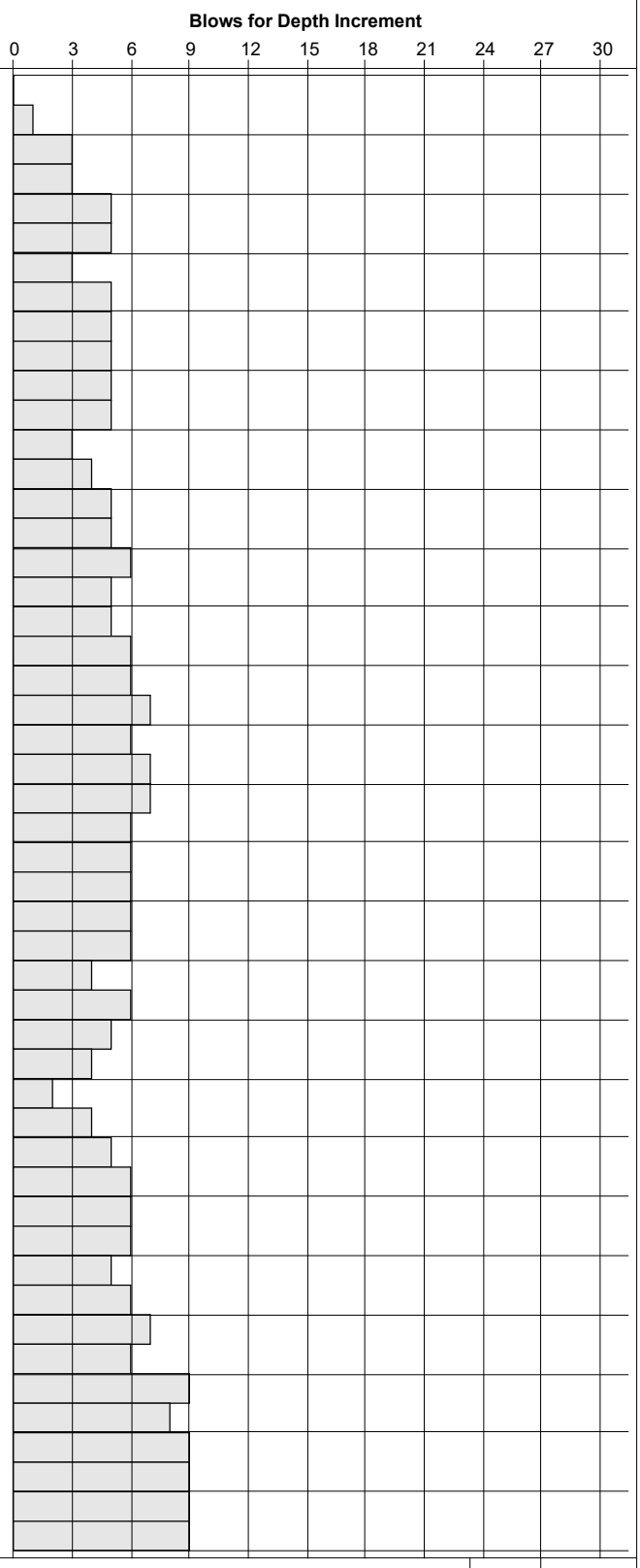
Figure No.
12865-05-23.DP-203

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Old Slane Road - Drogheda Site	DP-204

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Hammer Fall Height 500mm, Hammer Weight 50Kg	Diameter 43.70mm	31.20	Lagan Homes	12865-05-23
	Location	**Dates**	**Engineer**	**Sheet**
	705912.5 E 776487.1 N	09/08/2023	Waterman Moylan	1/2

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	0		31.20	0.00
0.10-0.20	1			
0.20-0.30	3			
0.30-0.40	3			
0.40-0.50	5			
0.50-0.60	5		30.70	0.50
0.60-0.70	3			
0.70-0.80	5			
0.80-0.90	5			
0.90-1.00	5			
1.00-1.10	5		30.20	1.00
1.10-1.20	5			
1.20-1.30	3			
1.30-1.40	4			
1.40-1.50	5			
1.50-1.60	5		29.70	1.50
1.60-1.70	6			
1.70-1.80	5			
1.80-1.90	5			
1.90-2.00	6			
2.00-2.10	6		29.20	2.00
2.10-2.20	7			
2.20-2.30	6			
2.30-2.40	7			
2.40-2.50	7			
2.50-2.60	6		28.70	2.50
2.60-2.70	6			
2.70-2.80	6			
2.80-2.90	6			
2.90-3.00	6			
3.00-3.10	4		28.20	3.00
3.10-3.20	6			
3.20-3.30	5			
3.30-3.40	4			
3.40-3.50	2			
3.50-3.60	4		27.70	3.50
3.60-3.70	5			
3.70-3.80	6			
3.80-3.90	6			
3.90-4.00	6			
4.00-4.10	5		27.20	4.00
4.10-4.20	6			
4.20-4.30	7			
4.30-4.40	6			
4.40-4.50	9			
4.50-4.60	8		26.70	4.50
4.60-4.70	9			
4.70-4.80	9			
4.80-4.90	9			
4.90-5.00	9		26.20	5.00



Remarks
Refusal at 6.60m BGL

Scale (approx)	Logged By
1:25	LF

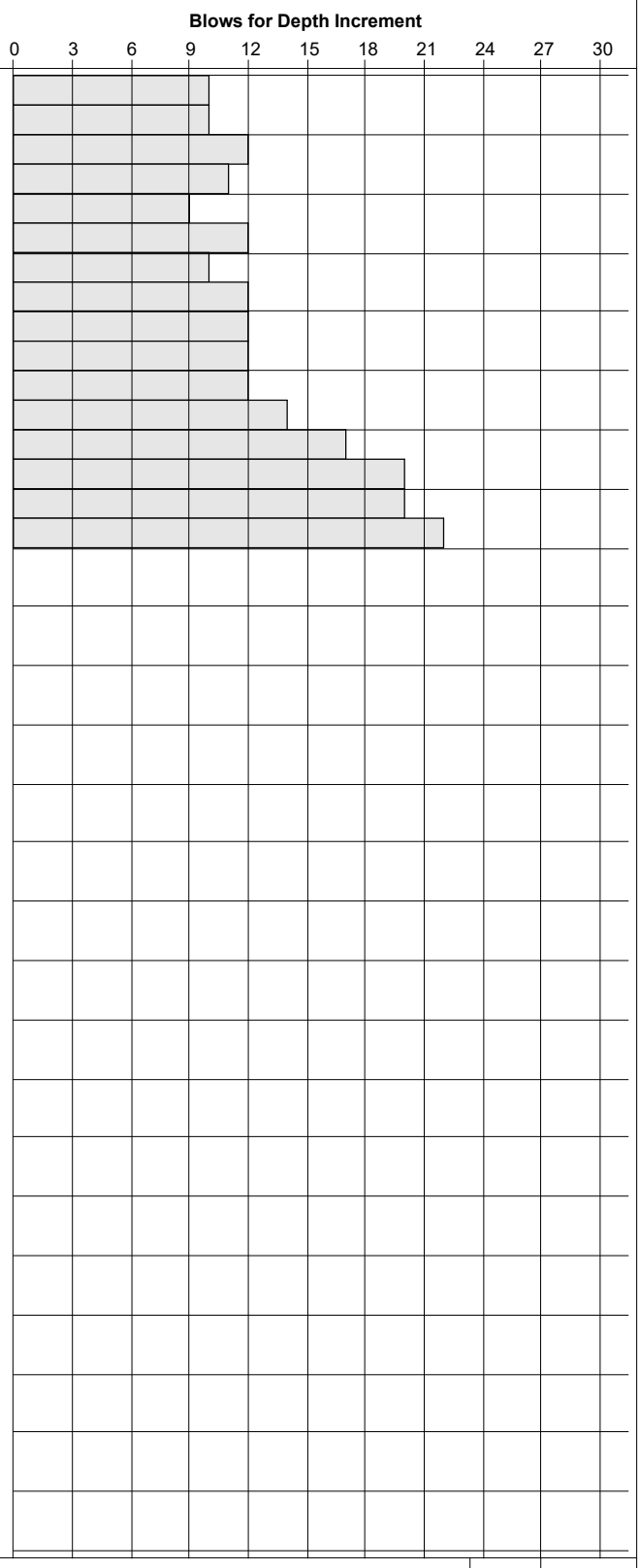
Figure No.
12865-05-23.DP-204

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Old Slane Road - Drogheda Site	DP-204

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Hammer Fall Height 500mm, Hammer Weight 50Kg	Diameter 43.70mm	31.20	Lagan Homes	12865-05-23
	Location	**Dates**	**Engineer**	**Sheet**
	705912.5 E 776487.1 N	09/08/2023	Waterman Moylan	2/2

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
5.00-5.10	10		26.20	5.00
5.10-5.20	10			
5.20-5.30	12			
5.30-5.40	11			
5.40-5.50	9			
5.50-5.60	12		25.70	5.50
5.60-5.70	10			
5.70-5.80	12			
5.80-5.90	12			
5.90-6.00	12			
6.00-6.10	12		25.20	6.00
6.10-6.20	14			
6.20-6.30	17			
6.30-6.40	20			
6.40-6.50	20			
6.50-6.60	22		24.70	6.50
			24.20	7.00
			23.70	7.50
			23.20	8.00
			22.70	8.50
			22.20	9.00
			21.70	9.50
			21.20	10.00



Remarks

Scale (approx)	Logged By
1:25	LF

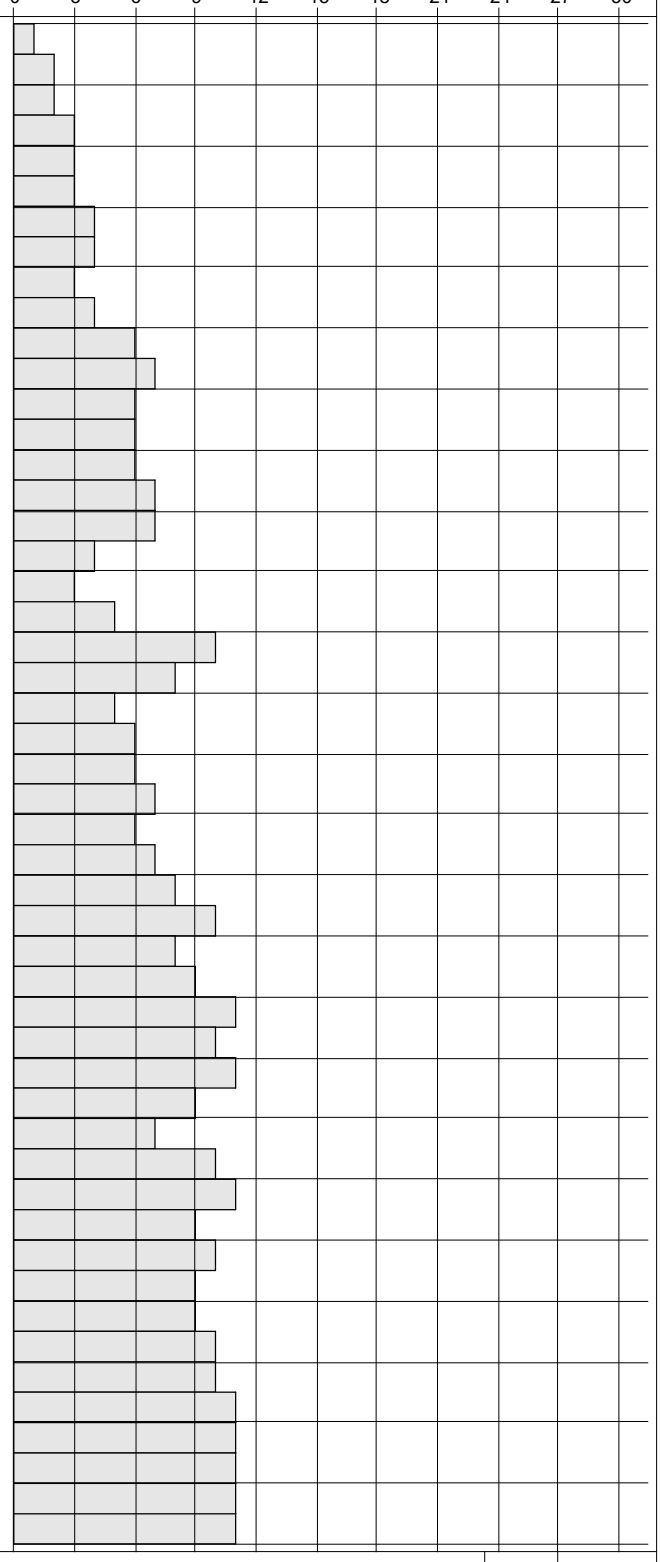
Figure No.
12865-05-23.DP-204

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Old Slane Road - Drogheda Site	DP-205

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Hammer Fall Height 500mm, Hammer Weight 50Kg	Diameter 43.70mm	26.62	Lagan Homes	12865-05-23
	Location	**Dates**	**Engineer**	**Sheet**
	705991.9 E 776417.4 N	09/08/2023	Waterman Moylan	1/2

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	1		26.62	0.00
0.10-0.20	2			
0.20-0.30	2			
0.30-0.40	3			
0.40-0.50	3			
0.50-0.60	3		26.12	0.50
0.60-0.70	4			
0.70-0.80	4			
0.80-0.90	3			
0.90-1.00	4			
1.00-1.10	6		25.62	1.00
1.10-1.20	7			
1.20-1.30	6			
1.30-1.40	6			
1.40-1.50	6			
1.50-1.60	7		25.12	1.50
1.60-1.70	7			
1.70-1.80	4			
1.80-1.90	3			
1.90-2.00	5			
2.00-2.10	10		24.62	2.00
2.10-2.20	8			
2.20-2.30	5			
2.30-2.40	6			
2.40-2.50	6			
2.50-2.60	7		24.12	2.50
2.60-2.70	6			
2.70-2.80	7			
2.80-2.90	8			
2.90-3.00	10			
3.00-3.10	8		23.62	3.00
3.10-3.20	9			
3.20-3.30	11			
3.30-3.40	10			
3.40-3.50	11			
3.50-3.60	9		23.12	3.50
3.60-3.70	7			
3.70-3.80	10			
3.80-3.90	11			
3.90-4.00	9			
4.00-4.10	10		22.62	4.00
4.10-4.20	9			
4.20-4.30	9			
4.30-4.40	10			
4.40-4.50	10			
4.50-4.60	11		22.12	4.50
4.60-4.70	11			
4.70-4.80	11			
4.80-4.90	11			
4.90-5.00	11		21.62	5.00



Remarks
Refusal at 5.20m BGL

Scale (approx)	Logged By
1:25	LF

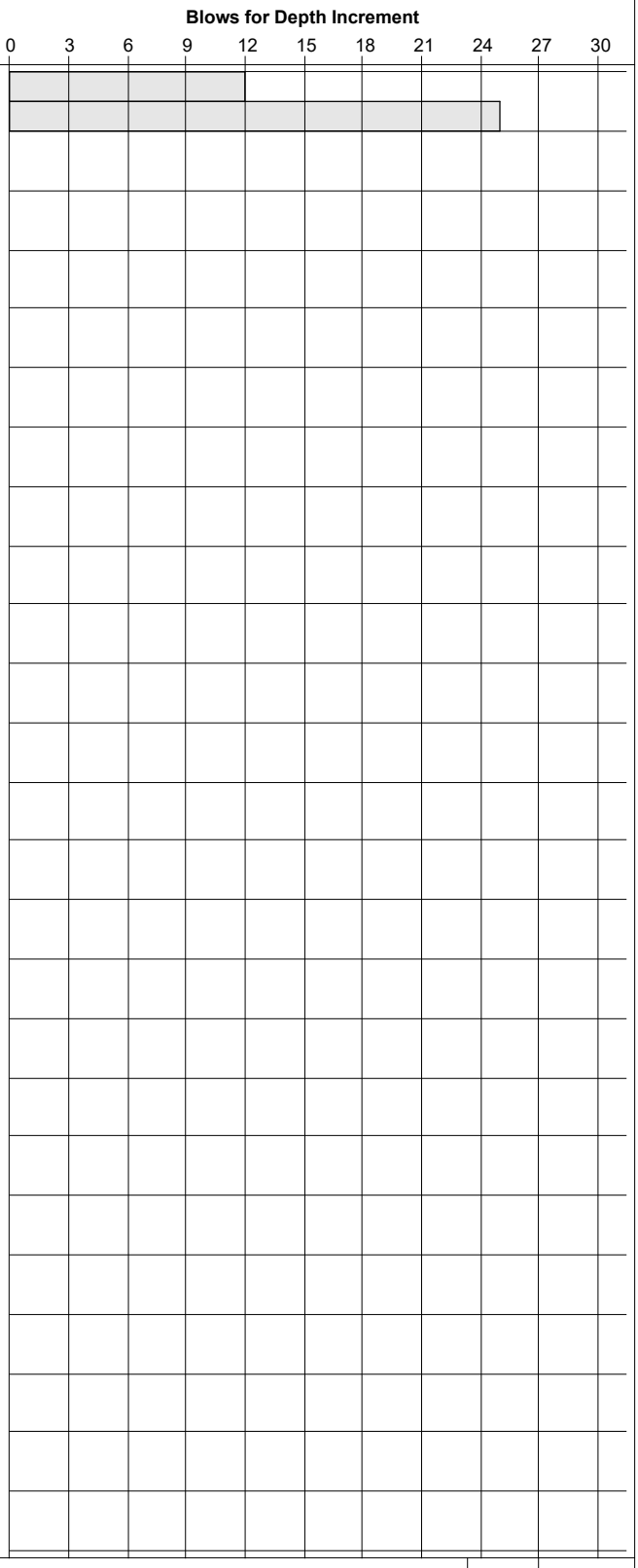
Figure No.
12865-05-23.DP-205

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Old Slane Road - Drogheda Site	DP-205

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Hammer Fall Height 500mm, Hammer Weight 50Kg	Diameter 43.70mm	26.62	Lagan Homes	12865-05-23
	Location	**Dates**	**Engineer**	**Sheet**
	705991.9 E 776417.4 N	09/08/2023	Waterman Moylan	2/2

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
5.00-5.10	12		21.62	5.00
5.10-5.20	25		21.12	5.50
			20.62	6.00
			20.12	6.50
			19.62	7.00
			19.12	7.50
			18.62	8.00
			18.12	8.50
			17.62	9.00
			17.12	9.50
			16.62	10.00



Remarks

Scale (approx)	Logged By
1:25	LF

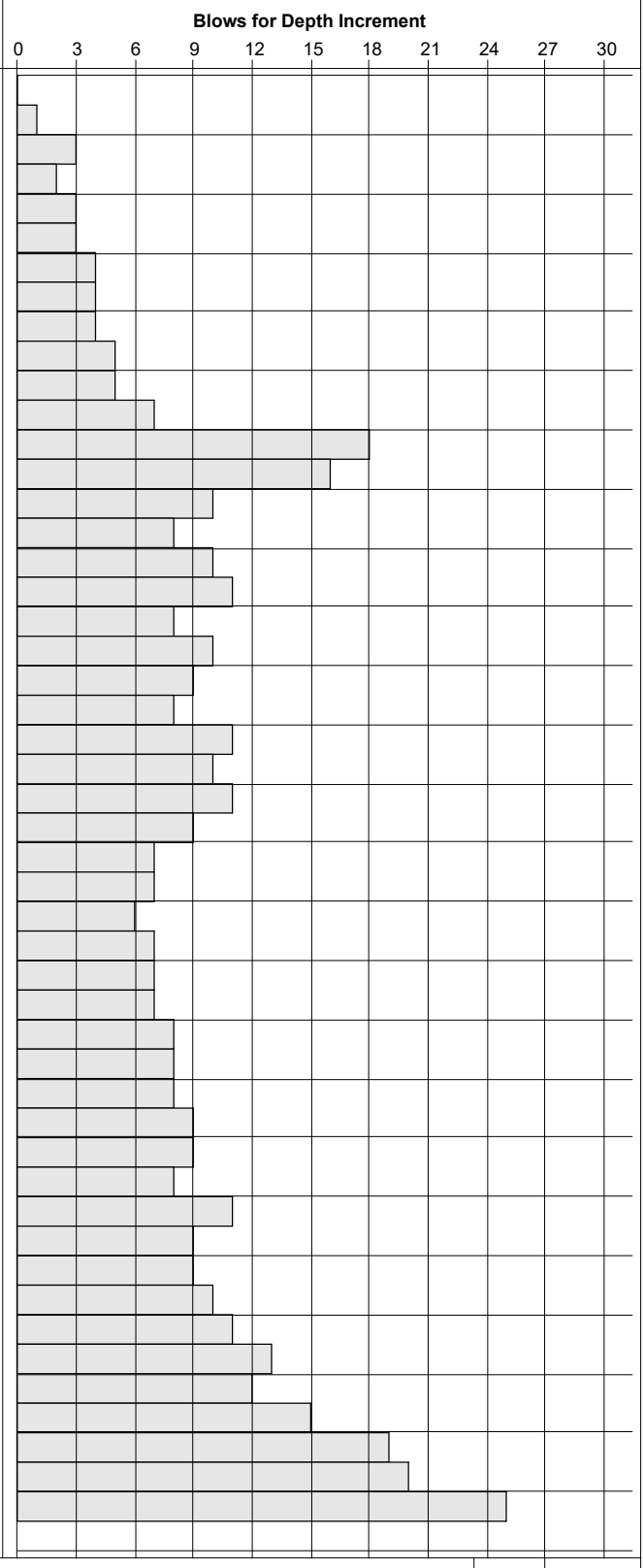
Figure No.
12865-05-23.DP-205

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Old Slane Road - Drogheda Site	DP-206

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Hammer Fall Height 500mm, Hammer Weight 50Kg	Diameter 43.70mm	28.93	Lagan Homes	12865-05-23
	Location	**Dates**	**Engineer**	**Sheet**
	705876.1 E 776406.7 N	09/08/2023	Waterman Moylan	1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	0		28.93	0.00
0.10-0.20	1			
0.20-0.30	3			
0.30-0.40	2			
0.40-0.50	3			
0.50-0.60	3		28.43	0.50
0.60-0.70	4			
0.70-0.80	4			
0.80-0.90	4			
0.90-1.00	5			
1.00-1.10	5		27.93	1.00
1.10-1.20	7			
1.20-1.30	18			
1.30-1.40	16			
1.40-1.50	10			
1.50-1.60	8		27.43	1.50
1.60-1.70	10			
1.70-1.80	11			
1.80-1.90	8			
1.90-2.00	10			
2.00-2.10	9		26.93	2.00
2.10-2.20	8			
2.20-2.30	11			
2.30-2.40	10			
2.40-2.50	11			
2.50-2.60	9		26.43	2.50
2.60-2.70	7			
2.70-2.80	7			
2.80-2.90	6			
2.90-3.00	7			
3.00-3.10	7		25.93	3.00
3.10-3.20	7			
3.20-3.30	8			
3.30-3.40	8			
3.40-3.50	8			
3.50-3.60	9		25.43	3.50
3.60-3.70	9			
3.70-3.80	8			
3.80-3.90	11			
3.90-4.00	9			
4.00-4.10	9		24.93	4.00
4.10-4.20	10			
4.20-4.30	11			
4.30-4.40	13			
4.40-4.50	12			
4.50-4.60	15		24.43	4.50
4.60-4.70	19			
4.70-4.80	20			
4.80-4.90	25			
			23.93	5.00



Remarks
Refusal at 4.90m BGL

Scale (approx)	Logged By
1:25	LF

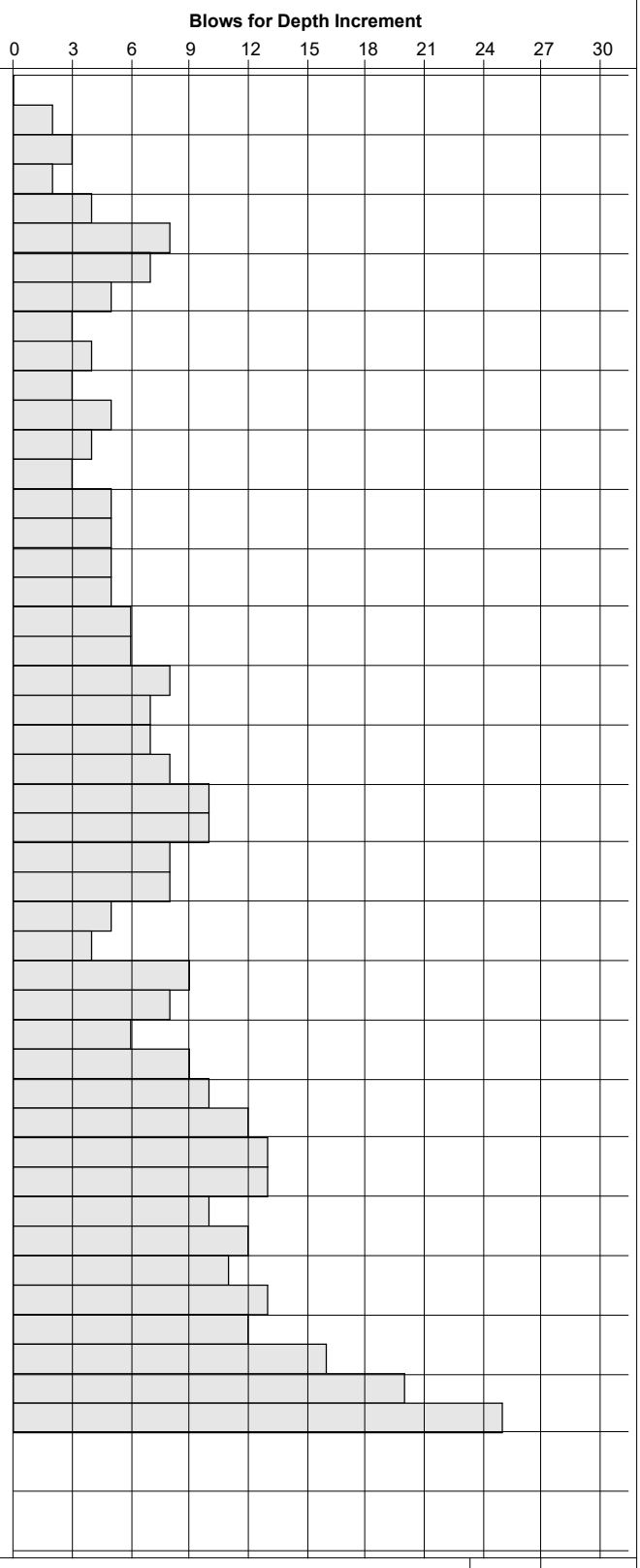
Figure No.
12865-05-23.DP-206

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Old Slane Road - Drogheda Site	DP-207

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Hammer Fall Height 500mm, Hammer Weight 50Kg	Diameter 43.70mm	25.27	Lagan Homes	12865-05-23
	Location	**Dates**	**Engineer**	**Sheet**
	705919.6 E 776328 N	09/08/2023	Waterman Moylan	1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	0		25.27	0.00
0.10-0.20	2			
0.20-0.30	3			
0.30-0.40	2			
0.40-0.50	4			
0.50-0.60	8		24.77	0.50
0.60-0.70	7			
0.70-0.80	5			
0.80-0.90	3			
0.90-1.00	4			
1.00-1.10	3		24.27	1.00
1.10-1.20	5			
1.20-1.30	4			
1.30-1.40	3			
1.40-1.50	5			
1.50-1.60	5		23.77	1.50
1.60-1.70	5			
1.70-1.80	5			
1.80-1.90	6			
1.90-2.00	6			
2.00-2.10	8		23.27	2.00
2.10-2.20	7			
2.20-2.30	7			
2.30-2.40	8			
2.40-2.50	10			
2.50-2.60	10		22.77	2.50
2.60-2.70	8			
2.70-2.80	8			
2.80-2.90	5			
2.90-3.00	4			
3.00-3.10	9		22.27	3.00
3.10-3.20	8			
3.20-3.30	6			
3.30-3.40	9			
3.40-3.50	10			
3.50-3.60	12		21.77	3.50
3.60-3.70	13			
3.70-3.80	13			
3.80-3.90	10			
3.90-4.00	12			
4.00-4.10	11		21.27	4.00
4.10-4.20	13			
4.20-4.30	12			
4.30-4.40	16			
4.40-4.50	20			
4.50-4.60	25		20.77	4.50
			20.27	5.00



Remarks
Refusal at 4.60m BGL

Scale (approx)	Logged By
1:25	LF

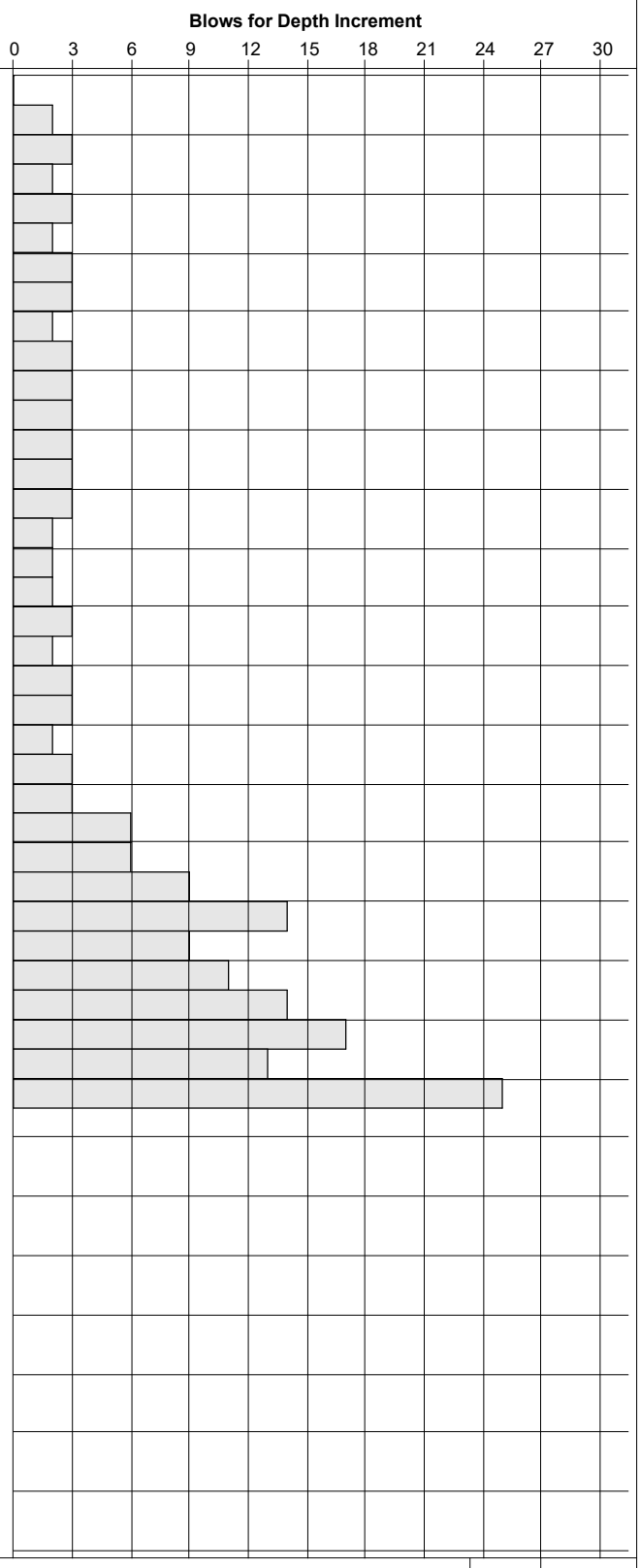
Figure No.
12865-05-23.DP-207

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Old Slane Road - Drogheda Site	DP-208

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Hammer Fall Height 500mm, Hammer Weight 50Kg	Diameter 43.70mm	22.06	Lagan Homes	12865-05-23
	Location	**Dates**	**Engineer**	**Sheet**
	705856.3 E 776253.2 N	09/08/2023	Waterman Moylan	1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	0		22.06	0.00
0.10-0.20	2			
0.20-0.30	3			
0.30-0.40	2			
0.40-0.50	3			
0.50-0.60	2		21.56	0.50
0.60-0.70	3			
0.70-0.80	3			
0.80-0.90	2			
0.90-1.00	3			
1.00-1.10	3		21.06	1.00
1.10-1.20	3			
1.20-1.30	3			
1.30-1.40	3			
1.40-1.50	3			
1.50-1.60	2		20.56	1.50
1.60-1.70	2			
1.70-1.80	2			
1.80-1.90	3			
1.90-2.00	2			
2.00-2.10	3		20.06	2.00
2.10-2.20	3			
2.20-2.30	2			
2.30-2.40	3			
2.40-2.50	3			
2.50-2.60	6		19.56	2.50
2.60-2.70	6			
2.70-2.80	9			
2.80-2.90	14			
2.90-3.00	9			
3.00-3.10	11		19.06	3.00
3.10-3.20	14			
3.20-3.30	17			
3.30-3.40	13			
3.40-3.50	25		18.56	3.50
			18.06	4.00
			17.56	4.50
			17.06	5.00



Remarks
Refusal at 3.50m BGL

Scale (approx)	Logged By
1:25	LF

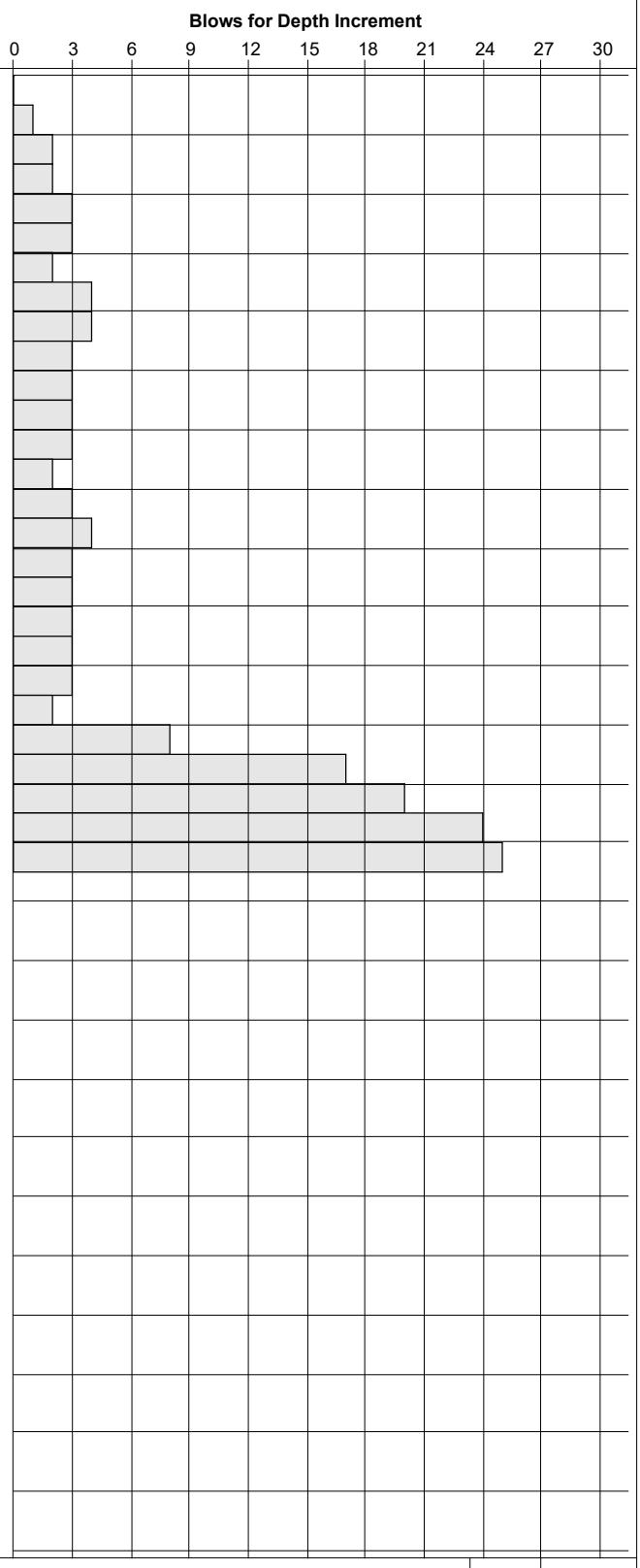
Figure No.
12865-05-23.DP-208

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Old Slane Road - Drogheda Site	DP-209

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Hammer Fall Height 500mm, Hammer Weight 50Kg	Diameter 43.70mm	22.91	Lagan Homes	12865-05-23
	Location	**Dates**	**Engineer**	**Sheet**
	705947.1 E 776257.9 N	09/08/2023	Waterman Moylan	1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	0		22.91	0.00
0.10-0.20	1			
0.20-0.30	2			
0.30-0.40	2			
0.40-0.50	3			
0.50-0.60	3		22.41	0.50
0.60-0.70	2			
0.70-0.80	4			
0.80-0.90	4			
0.90-1.00	3			
1.00-1.10	3		21.91	1.00
1.10-1.20	3			
1.20-1.30	3			
1.30-1.40	2			
1.40-1.50	3			
1.50-1.60	4		21.41	1.50
1.60-1.70	3			
1.70-1.80	3			
1.80-1.90	3			
1.90-2.00	3			
2.00-2.10	3		20.91	2.00
2.10-2.20	2			
2.20-2.30	8			
2.30-2.40	17			
2.40-2.50	20			
2.50-2.60	24		20.41	2.50
2.60-2.70	25			
			19.91	3.00
			19.41	3.50
			18.91	4.00
			18.41	4.50
			17.91	5.00



Remarks
Refusal at 2.70m BGL

Scale (approx)	Logged By
1:25	LF

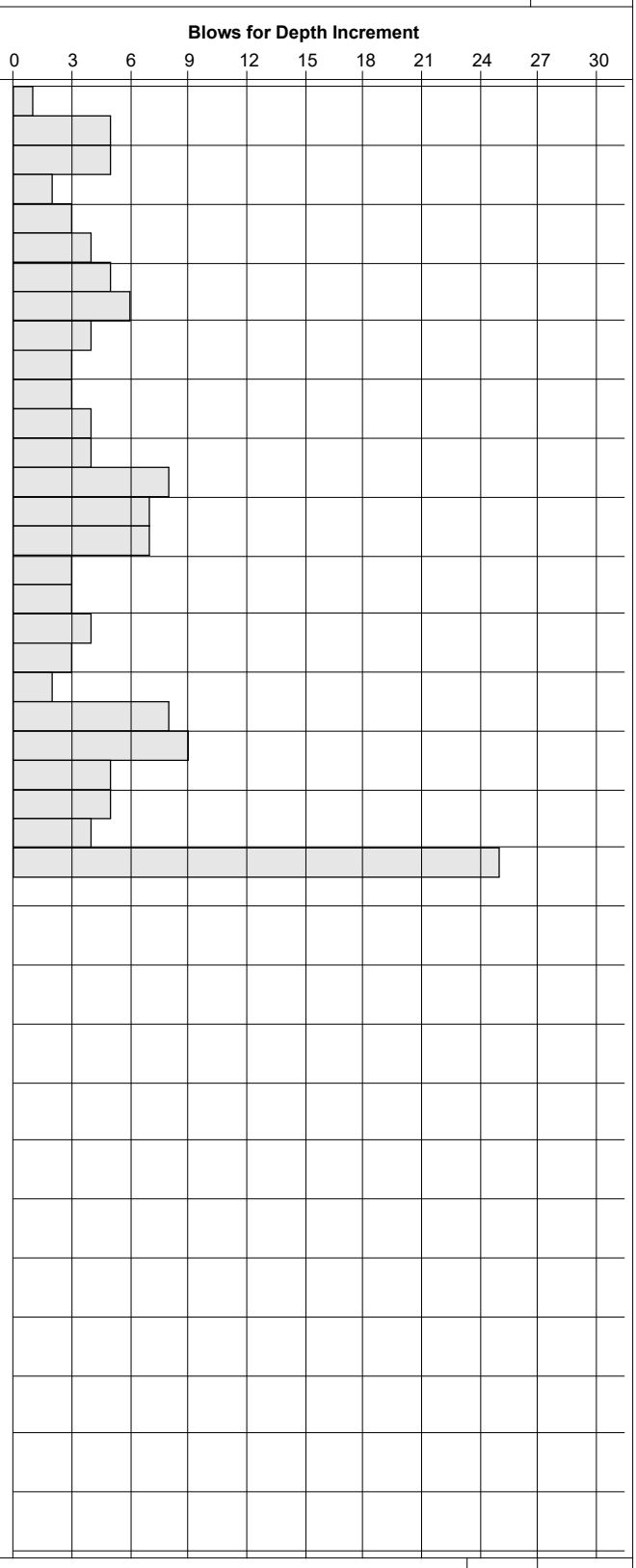
Figure No.
12865-05-23.DP-209

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Old Slane Road - Drogheda Site	DP-210

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Hammer Fall Height 500mm, Hammer Weight 50Kg	Diameter 43.70mm	19.79	Lagan Homes	12865-05-23
	Location	**Dates**	**Engineer**	**Sheet**
	705959.9 E 776171.4 N	09/08/2023	Waterman Moylan	1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	1		19.79	0.00
0.10-0.20	5			
0.20-0.30	5			
0.30-0.40	2			
0.40-0.50	3			
0.50-0.60	4		19.29	0.50
0.60-0.70	5			
0.70-0.80	6			
0.80-0.90	4			
0.90-1.00	3			
1.00-1.10	3		18.79	1.00
1.10-1.20	4			
1.20-1.30	4			
1.30-1.40	8			
1.40-1.50	7			
1.50-1.60	7		18.29	1.50
1.60-1.70	3			
1.70-1.80	3			
1.80-1.90	4			
1.90-2.00	3			
2.00-2.10	2		17.79	2.00
2.10-2.20	8			
2.20-2.30	9			
2.30-2.40	5			
2.40-2.50	5			
2.50-2.60	4		17.29	2.50
2.60-2.70	25			
			16.79	3.00
			16.29	3.50
			15.79	4.00
			15.29	4.50
			14.79	5.00



Remarks
Refusal at 2.70m BGL

Scale (approx)	Logged By
1:25	LF

Figure No.
12865-05-23.DP-210

UK and Ireland Office Locations