Outline Construction Environmental Management Plan

Proposed Residential Development at Rathmullan, Drogheda, Co. Meath.

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Waterman Moylan Consulting Engineers Limited
Block S, East Point Business Park, Alfie Byrne Road, Dublin D03 H3F4
www.waterman-moylan.ie

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This document has been prepared and checked in accordance with
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No. 1	Jan' 25	L. Song	B. Gallagher	B. Gallagher
No. 2	Sep' 25	L. Song	B. Gallagher	

Comments

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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

This report has been prepared by Waterman Moylan Consulting Engineers, on behalf of Earlsfort Developments Drogheda Limited, for a proposed large-scale residential development at Rathmullan, Drogheda, Co. Meath, situated to the west of Drogheda town centre. The proposal relates to a residential development of 249 No. residential units and a creche.

The 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 Contractor who will be required to develop and implement the Construction Management Plan on site.

This Construction Environmental Management Plan is indicative only and should not be construed as representing the exact method or sequence in which the construction works shall be carried out.

As is normal practice, the Main Contractor for the project is responsible for the method in which the demolition and 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. This plan can be used by the Main Contractor to develop their final Outline Construction Environmental Management Plan. The Applicant reserves the right to deviate from the contents of this report, while still complying with all relevant Local Authority requirements and legislation.

2. Site Location and Description

2.1 Site Location

The site is located on Rathmullan Road in Drogheda, Co. Meath. The site is situated approximately 2.5 km west of Drogheda town centre. The proposed development is bounded to the south by agricultural land. The site is bound to the east by existing residential development, consisting of two-storey terraced houses and three-storey duplexes. The site is bound to the north by Rathmullan Road, the Boyne Greenway and the Boyne River. To the west the site is bound by agricultural land, and the M1 Motorway is c. 500m away from the vicinity of the site in the same direction. The proposed development will be accessed from Rathmullan Road via a new signal-controlled 4-arm junction.

The proposed site area is approximately 9.20ha within the proposed red line boundary. The current agricultural lands exhibit a general slope from the south-west to the north-east towards the River Boyne, with existing ground levels ranging from 30 m to 6m OD Malin within the proposed red line boundary. Access to the site is currently facilitated through an existing entrance located off the Rathmullan Road.

Please refer to Waterman Moylan drawing No. 18-014-P401- Rev A for the exact site location and surrounding lands as outlined above.

Figure 1: Proposed Development Location

2.2 Description of the Proposed Development

The proposed development includes (i) demolition/removal of all existing farm buildings/structures and associated hard standing on site; (ii) construction of a large-scale residential development (LRD) of 249 no. units comprising 170 no. two-storey houses (including 37 no. two-bedroom houses, 111 no. three-bedroom houses and 22 no. four-bedroom houses), 16 no. three-storey duplex buildings (accommodating 16 no. one-bedroom and 16 no. two-bedroom units) and a mix of 8 no. three-storey and 3 no. four-storey apartments blocks accommodating a total of 22 no. one-bedroom and 25 no. two-bedroom apartments); (iii) construction of a new vehicular entrance and access road off Rathmullan Road with associated junction works and associated internal access road network with pedestrian and cyclist infrastructure; (iv) provision of a three-storey creche facility (411sq.m) with external play areas at ground and second floor levels and vehicular/bicycle parking area; and, (v) all ancillary site and infrastructural works, inclusive of removal of existing vehicular entrances, general landscaping and public open space provision, vehicular parking provision (396 no. spaces in total), bicycle parking, boundary treatments, foul/surface water drainage, attenuation areas, provision of a pumping station and provision of an ESB substation, as necessary to facilitate the proposed development. Each house will be served by vehicular parking to the front and private amenity space in the form of a rear garden. Each duplex building will be served by vehicular parking to the front and private amenity space in the form of balcony/terrace spaces to the rear. Each apartment block will have shared access to adjoining car parking bays with communal amenity space and bicycle/bin stores provided to the rear and each apartment will be provided with private amenity space in the form of a balcony or terrace. The development includes provision of a landscaped area of public open space to the north of the site, with 2 no. pedestrian/cyclist connections (via the northern/eastern site boundaries) to Rathmullan Road which will be subsequently ceded to Meath County Council. The application is accompanied by a Natura Impact Statement (NIS) and an Environmental Impact Assessment Report (EIAR).

The application for this development also includes all the necessary associated infrastructure to service the above. This includes the installation of a network of foul water and storm water pipes, watermains, and a network of roads and footpaths.

The proposed estate road levels around the site, range from 19m to 30.20m. Additionally, the proposed finished floor levels for the housing units also range between 19.6m and 30.2m above the OD Malin.

In terms of access to the site, the existing Rathmullan Road will be extended towards the site with the existing road, footpath and cycle path removed and area landscaped. Details can be seen in Waterman Moylan drawing No. RAT-WMX-PH2-00-DR-C-P416 – Rev A. Main point of junction entry will be provided via a newly proposed four-armed signalized junction. This junction will connect the Rathmullan Road (East), the Rathmullan Road (North), the proposed site access and the Oldbridge Road.

The design and layout of the proposal has been prepared to fully comply with the current relevant design standards and specifications applicable to this form of development. The relevant design standards and specifications that the layout has been designed in accordance with but not limited to are as follows:

- DMURS
- Uisce Eireann Code of Practice (CoP) and Standard Details (Water and Wastewater)
- Transport Infrastructure Ireland (TII)
- Cycle Design Manual
- SuDS Manual Ciria C753

- Technical Guidance Documents, Section H etc

2.3 Proposed Construction Programme

The proposed work will consist of the following:

- Site preparation including demolition of the existing farm buildings;
- Demolition of the agricultural buildings on site and the removal of demolition waste;
- Erection of security fencing/perimeter fencing;
- Setting up a secure site compound including wash down area;
- Site clearance including topsoil stripping;
- Construction of infrastructure including access road, footpaths, drainage and services, a pumping station;
- Construction of 4-arm signalised junction and roadways which connect to the existing Rathmullan Road;
- Construction of residential housing scheme comprising 170 no. houses 32 no. duplexes and 47 no. apartments units (providing a total of 249 no. residential units) and a creche.
- The development provides for a preliminary 24-month construction period commencing in 2026 with completion in 2027/28
- Refer to the Construction Waste Management Plan report for the details on site setup, pre commencement measures, site security, construction traffic routes, deliveries, parking, storage and opening hours.
- Relevant chapters of the EIAR are cited where specific environmental aspects are covered, including:
    - Air Quality: CWMP Chapter 9 – Control of Dirt and Dust
    - Noise and Vibration: CWMP Chapter 10 – Noise and Vibration
    - Waste Management: CWMP Chapter 5 – Construction and Demolition Waste Management

3. Summary of Mitigation Measures

The following mitigation measures are planned to address any potential impacts to water quality and to protect the Special Area of Conservation (River Boyne) adjacent to the site of the proposed development throughout.

A refurbishment & demolition survey for asbestos-containing-materials and a site investigation report have been conducted to help understand the soil natural onsite. Full report can be seen in Appendix B and Appendix C. A technical note prepared as an addendum to the site Investigation report is attached in Appendix D

All works will be undertaken with reference to the following guidelines:

- CIRIA C532: Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (Masters-Williams et al., 2001);
- CIRIA C692: Environmental Good Practice on Site, (Audus et al., 2010)
- BPGCS005: Oil Storage Guidelines;
- CIRIA C648: Control of Water Pollution from Linear Construction Projects: Technical Guidance (Murnane et al., 2006a)
- CIRIA C648: Control of Water Pollution from Linear Construction Projects: Site Guide (Murnane et al., 2006a)
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI 2016)
- Guidelines for Planning Authorities – Architectural Heritage Protection – Guidance on Part IV of the Planning and Development Act 2000. (Part 2, Chapter 7) and ICOMOS Principles.

The schedule of mitigation presented within Table 1 summarises measures that will be undertaken to reduce impacts on ecological receptors within the zone of influence of the proposed development.

Table 1: Schedule of Ecological Mitigation

No.	Impact Identified with Biodiversity Chapter of NIS and/or Natura Impact Statement	Mitigation	Result of Mitigation
1	All construction phase impacts	Employment of Environmental Specialist to monitor works	Undertakes pre-construction checks for protected species, reviews method statement of contractor to ensure that it incorporates all aspects of CEMP. Provides tool box talks and other training, and ensures understanding by all involved of all mitigation measures. Assesses effectiveness of mitigation, checks weather forecast and site conditions where trigger levels are required, checks for adequacy of infiltration where water is being pumped, undertakes weekly water-quality monitoring.
2	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Designated parking at least 50m from any watercourse.	Ensures no soil disturbance or hydrocarbons leak near aquatic zone
3	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	The site compound will be located at least 50m from any watercourse. All potentially polluting materials will be contained within bunds with a capacity of 110% of their contents.	Prevents pollution of the aquatic zone from toxic pollutants
4	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Fuels, oils, greases and other potentially polluting chemicals will be stored in bunded compounds at the Contractor's compound or at a location at least 50m from any stream. Bunds are to be provided with 110% capacity of storage container. Spill kits will be kept on site at all times and all staff trained in their appropriate use. Method statements for dealing with accidental spillages will be provided the Contractor for review by the Employer's Representative.	Prevents contamination of aquatic zone by toxic pollutants
5	Water quality impacts Reduction in habitat quality	Silt barrier devices will be installed between the works area and any watercourses to prevent any construction related sediments from entering the existing ditches and watercourses.	Ensures no movement of soil or contaminated water from the construction site to the River Boyne

6	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Pouring of concrete will not be permitted within 50m of any watercourse during inclement weather	Prevents pollution of the aquatic zone by toxic pollutants
7	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	A designated wash down area within the Contractor's compound will be used for cleaning of any equipment or plant, with the safe disposal of any contaminated water.	Prevents contamination of aquatic zone by suspended solids or pollutants, ensures invasive species material is not transported off site
8	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Spill kits will contain 10 hr terrestrial oil booms (80mm diameter x 1000mm) and a plastic sheet, upon which contaminated soil can be placed to prevent leaching to ground water	Prevents contamination of aquatic zone by petrochemicals
9	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Any refuelling and maintenance of equipment will be done at designated bunded areas with full attendance of plant operative(s) within contained areas at least 50m from any watercourse	Prevents contamination of aquatic zone by petrochemicals
10	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	All silt fencing remains actively managed and regularly checked until the construction works are completed The responsibility for, reporting and management of silt fencing during the period after the construction has been completed will be clearly stated in the contract documents. Any and all waste materials arising during the works will either be immediately taken to a location from which discharge to the River Boyne cannot take place or temporarily stored/covered to prevent washout thereto	Prevents contamination of aquatic zone by suspended solids from bare soil. Refer to the details in Table 1 – item 4
11	Unforeseen discovery of bats	Tree inspection surveys will be undertaken by a licenced bat worker to assess whether the trees marked for felling have any suitability to support roosting bats. If the trees are confirmed to have potential roosting features, these trees must be inspected at height for roosting bats the day prior to felling works. Once surveyor is satisfied that bats are not present within potential roosting features, the tree will be felled. If bats are encountered during any works at the site including farm buildings for demolition the relevant works will be suspended until the	Compliance with legislation protecting bats Avoidance of impacts on roosting bats

		advice of a suitably qualified and licenced bat ecologist is sought. A derogation licence may need to be sought from NPWS in order to permit removal of bats and mitigate for the loss of any roosts on the site.	
12	Nesting birds	All tall woody and herbaceous vegetation in worked areas should be removed outside of the breeding bird season (1st March to 31st August, inclusive) to avoid the destruction of nests or disturbance of breeding birds If this is not possible, trees will be inspected by a qualified ecologist immediately prior to removal. If it is found that breeding birds are present, felling works must be suspended immediately and cannot recommence until chicks have fledged and the nest has been abandoned.	Compliance with legislation protecting birds
13	Woodland and hedgerows	All hedgerows and immature woodland marked for retention will be fenced off at the outset of works and for the duration of construction to avoid damage to the trunk, branches or root systems of the trees. Please refer to the arboricultural report for further details. Temporary fencing will be erected at a sufficient distance from the tree so as to enclose the Root Protection Area (RPA) of the tree (National Roads Authority, 2005-2011). In general, the RPA covers an area equivalent to a circle with a radius 12 times the stem diameter (measured at 1.5m above ground level for single stemmed trees); Where fencing is not feasible due to insufficient space, protection for the tree/hedgerow will be afforded by wrapping hessian sacking (or suitable equivalent) around the trunk of the tree and strapping stout buffer timbers around it. It will still be necessary to ensure that the area within the RPA is not used for vehicle parking or the storage of materials (including oils and chemicals) Soil will not be placed within the Root Protection Area of trees or within 5m of hedgerows; The woodland will not be lit during the construction or operational phases of the development; and, The construction compound will be located a minimum of 50m from watercourses.	Avoidance of impacts on KER habitats

4. Management of Environmental Impacts

Construction shall commence upon the final grant of planning permission subject to any works having to be delayed during the bird breeding season or otherwise as may be advised by the NPWS (see flora and fauna section below) It is anticipated that the development will be constructed over a two year period depending upon the housing demand.

The proposed potential pollution mitigation measures outlined below will be implemented in accordance with 'CIRIA C532 – Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors' – CIRIA-2001.

4.1 Roles and Responsibilities

4.1.1 Construction Waste Manager

A Construction Waste Manager shall be appointed from the Contractor's Staff and have overall responsibility for the implementation of the project Waste Management Plan (WMP) during the construction phase. The Construction Waste Manager will be appropriately trained and assigned the authority to instruct all site personnel to comply with the specific provisions of the WMP. At the operational level, a designated person from the main contractor and from each sub-contractor on the site shall be assigned the direct responsibility to ensure that the operations stated in the WMP are performed on an on-going basis.

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.

4.1.2 Environmental Officer

The Environmental Officer will be responsible for, but not limited to, the following activities:

- Ensuring that the requirements of the CEMP are developed and environmental system elements (including procedures, method statements and work instructions) are implemented and adhered to with respect to environmental requirements;
- Reviewing the environmental responsibilities of other managed contractors in scoping their work and during contract execution;
- To ensure that advice, guidance and instruction on all CEMP matters are provided to all their managers, employees, construction contractors and visitors on site;
- Report to the Construction manager on the environmental performance of the Line Management, Supervisory Staff, Employees and Contractors; and,
- Advise site management (including, but not limited to, the site Construction Manager) on environmental matters.

4.1.3 Project Environmental Consultant

The Project Environmental Consultant will be responsible for, but not limited to, the following activities:

- Preparation of the finalised CEMP, environmental control plans, supporting procedures;
- Advise site management (including, but not limited to, the site Construction Manager) on environmental matters;
- Ensure adherence to the specific measures listed in the Planning Conditions and in the Natura Impact Statement (NIS) Mitigation matters;
- Advise upon the production of written method statements and site environmental rules and on the arrangements to bring these to the attention of the workforce;
- Investigate incidents of significant, potential or actual environmental damage, ensure corrective actions are carried out and recommend means to prevent recurrence; and,
- Be responsible for maintaining all environmental related documentation.

4.1.4 Project Ecologist

The Project Ecologist is required to:

- Undertake pre-construction checks for protected species
- Review method statement of contractor to ensure that it incorporates all aspects of CEMP
- Provide tool-box talks and other training, and ensure understanding by all involved of all mitigation measures
- Assess effectiveness of mitigation, check weather forecast and site conditions where trigger levels are required
- Check for adequacy of infiltration where water is being pumped

4.1.5 Site Supervisors

Site Supervisors are required to:

- Read, understand and implement the CEMP;
- Know the broad requirements of the relevant law in environmental matters and take whatever action is necessary to achieve compliance. Where necessary, they will seek the advice of the Environmental Officer;
- Ensure that the environmental matters are taken into account when considering contractors' construction methods and materials at all stages;
- Be aware of any potential environmental risks relating to the site, plant or materials to be used the premises and bring these to the notice of the senior management.
- Ensure plant suggested is environmentally suited to the task in hand;
- Co-ordinate environmental planning of the construction activities to comply with environmental authorities' requirements and with minimal risk to the environment. Give contractors precise instructions as to their responsibility to ensure correct working methods where risk of environmental damage exists;
- Where appropriate, ensure contractors' method statements include correct waste disposal methods;
- Be aware of any potential environmental risks relating to the contractors and bring these to the notice of the appropriate management

4.1.6 Site Personnel

All contractors and other site personnel on the project will adhere to the following principal duties and responsibilities:

- To co-operate with the construction management team and the Environmental Officer in the implementation and development of the CEMP at the site;
- To conduct all their activities in a manner consistent with regulatory and best environmental practice;
- To participate in the environmental training programme and provide management with any necessary feedback to ensure effective environmental management at the site; and,
- Adhere to the requirements of the site environmental rules.

4.2 Hours of Working

Typical working hours for the site will be 08.00 to 19.00 Monday to Friday and 09.00 to 13.00 Saturday. No Sunday work will generally be permitted. Special construction operations may occasionally need to be carried out outside typical working hours in order to minimise disruption to the surrounding area.

Weather restrictions may apply, e.g. no cement pouring during heavy rainfall. These restrictions shall be determined by the project ecologist taking into account pertaining environmental factors on site.

4.3 Pre-Construction Plan

4.3.1 Designated Storage Area & Site Compound

At least one site compound, including offices and welfare facilities, will constructed by the main contractor in a location or locations to be decided within the subject site.

The main contractor will be required to schedule delivery of materials on a daily basis. The main contractor shall use the constructed site compound(s) on the site for the secure storage of materials.

Prevention and mitigation measures will be implemented throughout the construction stage to prevent contamination of the soil and adjacent watercourses from oil and petrol leakages and significant siltation. Suitable bunded areas will be installed for oil and petrol storage tanks. Designated fuel filling points will be put in place with appropriate oil and petrol interceptors to provide protection from accidental spills. Spill kits will be provided by the main contractor to cater for any other spills.

4.3.2 Cut-Off Trenches

To prevent silt runoff from the development site the contractor will excavate a number of temporary cut-off trenches along the northern development boundary in advance of stripping any topsoil. These cut-off trenches will be connected to a temporary settlement pond. Straw bales will be placed within the cut-off trenches at strategic locations and at the outfall from the settlement pond. Indicative details are attached in Appendix A.

4.3.3 Deliveries and Site Access

Deliveries and access to the construction site will typically be made via Rathmullan Road to the east of the site. Construction traffic will not be permitted to use the River Road to the north of the site or the local Sheephouse Road to the south of the site as these would be considered unsuitable for construction traffic.

Haul roads for construction traffic purposes will generally be 6.0m wide and will be constructed using 300 mm min. capping layer material (clean broken stone).

In the event that large concrete pours are required which may result in congestion at the entrance to the site the deliveries will be organised such that concrete trucks will queue at a pre-determined staging point (such that they do not cause an obstruction to general traffic in the area) and will then be called in by radio as appropriate to the site, via a pre-determined route and to the required access gate.

Set procedures and designated wash-out areas will be provided.

All delivery vehicles will be co-ordinated as required at the relevant access point.

4.4 Construction Plan

4.4.1 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 through use of the prevention and mitigation measures set out herein.

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.

The following are techniques and methods which are widely used currently throughout the construction industry and which shall be used in the construction of the proposed development, where appropriate:

- The roads around the site are all surfaced and no dust is anticipated arising from unsealed surfaces.
- Vehicles travelling on any unsurfaced site roads shall have their speed restricted to 20 kph.
- A regime of ‘wet’ road sweeping will be set up to ensure the roads around the immediate site areas are kept 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.
- Footpaths immediately around the site will be cleaned by hand regularly, with damping as necessary.
- High level walkways and surfaces such as scaffolding shall be cleaned regularly using safe ‘wet’ methods, as opposed to dry methods.
- Vehicle waiting areas or hard standings will be regularly inspected and kept clean by brushing or vacuum sweeping and will be regularly sprayed to keep moist, if necessary.
- Vehicle and wheel washing facilities will be provided at site exit(s) where practicable. If necessary, vehicles shall be washed down before exiting the site.
- Netting will be provided to enclose scaffolding in order to mitigate escape of air borne dust from the existing and new buildings.
- Vehicles and equipment shall not emit black smoke from exhaust system, except during ignition at start up.
- Engines and exhaust systems shall be maintained so that exhaust emissions do not breach stationary emission limits set for the vehicle / equipment type and mode of operation.

- Servicing of vehicles and plant shall be carried out regularly, rather than just following breakdowns.
- Internal combustion plant shall not be left running unnecessarily.
- Exhaust direction and heights shall be such as not to disturb dust on the ground and to ensure adequate local dispersal of emissions.
- Where possible fixed plant such as generators shall be located away from residential areas.
- 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.
- The transport of dusty materials and aggregates shall be carried out using covered / sheeted lorries.
- Material handling areas shall be clean, tidy and free from dust.
- Vehicle loading shall be dampened down and drop heights for material shall be kept to a minimum.
- Drop heights for chutes / skips shall be kept to a minimum.
- Dust dispersal over the site boundary shall be minimised using static sprinklers or other watering methods as necessary.
- Stockpiles of materials shall be kept to a minimum and if necessary, they shall be kept away from sensitive receptors such as residential areas etc.
- Stockpiles where necessary, shall be sheeted or watered down.
- Methods and equipment shall be in place for immediate clean-up of spillages of dusty material.
- No burning of materials will be permitted on site.
- Earthworks excavations shall be kept damp where necessary and where reasonably practicable.
- Cutting on site shall be avoided where possible by using pre-fabrication methods.
- Equipment and techniques for cutting / grinding / drilling / sawing / sanding etc, which minimise dust emissions and which have the best available dust suppression measures, shall be employed.
- Where scabbling is to be employed, tools shall be fitted with dust bags, residual dust shall be vacuumed up rather than swept away, and areas to be scabbled shall be screened off.
- Wet processes shall 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.
- Where possible pre-mixed plasters and masonry compounds shall be used to minimise dust arising from on-site mixing.
- Prior to commencement, the main contractor shall identify the construction operations which are likely to generate dust and draw up action plans to minimise emissions, utilising the methods highlighted above. Furthermore, the main contractor shall prepare environmental risk assessments for all dust generating processes which are envisaged.
- The main contractor shall allocate suitably qualified personnel to be responsible for ensuring the generation of dust is minimised and effectively controlled.
- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board shall also include head/regional office contact details.

The contractor will be obliged to implement the mitigation measures outlined above in respect of dust/dirt control.

4.4.2 Noise Control

The main contractor will deal with the immediate risks 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.

The Main Contractor shall carry out a noise assessment in relation to the proposed works at construction stage. A designated environmental liaison officer should be appointed to site during construction works. Any noise complaints should be logged and followed up in a prompt fashion by the liaison officer. In addition,

where a particularly noisy construction activity is planned or other works with the potential to generate high levels of noise, or where noisy works are expected to operate outside of normal working hours etc., the liaison officer will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.

The noise assessment shall include the following steps:-

- Identify and list all construction work activities where there is likely to be a significant noise hazard.
- Determine the hazards / nuisance.
- Identify all third parties likely to be exposed to the nuisance.
- Measuring the risk: The level of noise in dBA.
- Considering and Implementing Control Measures.
- Control exposure to noise.
- Record the findings of the noise assessment.
- Review and revise.

The contractor will be obliged to implement the noise mitigation measures set out above.

4.4.3 Protection of Soils and Groundwater

In order to preserve the topsoil on the site, topsoil will be removed to stockpiles and protected during the construction period for reuse on completion of the works. Topsoil will be stored in mounds located as far away from the river Boyne as possible, ideally to the south of the subject site and suitably protected to prevent water logging during wet weather. The stripping of topsoil will be undertaken on a phased basis so that no area is stripped until such time as works are imminent in that area. 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.

All topsoil stripping associated with the proposed development will be monitored by a suitably qualified archaeologist. During topsoil stripping a written and photographic record describing the form of the townland boundaries to be impacted upon should be included in the monitoring report.

Levels of the proposed roads will be established to minimise the quantity of fill material to be imported to the site. Surplus subsoil will be used for landscaping where possible.

The provision of wheel wash facilities at the construction entrance to the development will minimise the amount of soils deposited on the surrounding road network. The adjoining road network will be cleaned on a regular basis, if required, to prevent the build-up of soils from the development site on the existing blacktop roads.

Measures will be implemented throughout the construction stage to prevent contamination of the soil and adjacent watercourses from oil and petrol leakages and significant siltation. Suitable bunded areas will be installed for oil and petrol storage tanks. Designated fuel filling points will be put in place with appropriate oil and petrol interceptors to provide protection from accidental spills. Spill kits will be provided by the main contractor to cater for any other spills.

Cut-off trenches along the northern boundary of the development boundary will be constructed prior to stripping topsoil. These cut-off trenches will have a settlement pond / silt trap at the end of each trench with an overflow. Straw bales will be placed within the cut-off trenches at strategic locations and at the outfall of the settlement ponds to the overflow. These measures will be implemented and maintained during the construction phase to prevent silt runoff into the existing ditches/watercourses during the drainage works.

Dampening down measures with water sprays will be implemented during periods of dry weather to reduce dust levels arising from the development works.

After implementation of the above measures the proposed development will not give rise to any significant long term adverse impact. Negative impacts during the construction phase will be short term only in duration.

4.4.4 Protection of Surface Waters

- The main contractor will appoint a suitably qualified person to oversee the implementation of measures for the prevention of pollution to the receiving surface water environment.
- Cut-off trenches along the northern boundary of the development boundary will be constructed prior to stripping topsoil. These cut-off trenches will have a settlement pond silt trap at the end of each trench with an overflow. Straw bales will be placed within the cut off trenches at strategic locations and at the outfall of the settlement ponds to the overflow. These measures will be implemented and maintained during the construction phase to prevent surface water runoff from discharging directly into the local water course. An indicative layout for the proposed cut off trenches is set out in Appendix A of this report.
- Settlement ponds/silt traps as outlined above will be provided to prevent silt runoff into the existing ditches/watercourses during the drainage works
- Regular testing of surface water discharges will be undertaken at the outfall from the subject lands. The location will be agreed between the project ecologist and the site foreman at the commencement of works. Trigger levels for halting works and re-examining protection measures will be: pH >9.0 or pH <6.0; and/or suspended solids >25 mg/l. These trigger levels are based on those outlined within 'Guidelines on Protection of Fisheries During Works in and Adjacent to Waters (IFI, 2016)'.
- Where silt control measures are noted to be failing or not working adequately, works will cease in the relevant area. The project ecologist will review and agree alternative pollution control measures, such as deepening or redirecting trenches as appropriate, before works may recommence.
- All fuels and chemicals will be bunded, and where applicable, stored within double skinned tanks / containers with the capacity to hold 110% of the volume of chemicals and fuels. Bunds will be located on flat ground a minimum distance of 50m from any watercourse or other water conducting features, including the cut off trenches.
- All existing services will be located using service records, GPR surveys and slit trenches to ensure that their position is accurately identified before excavation works commence.
- Temporary traffic management will be implemented as appropriate during the construction of the outfalls on Rathmullan/River Road.

4.4.5 Flora and Fauna

Field surveys were undertaken by Scott Cawley Ltd. to inform the NIS accompanying the application for the development. Mitigation measures within same cover all potential construction-phase impacts on flora and fauna.

The site is located directly south of the River Boyne and is therefore hydrologically connected to four European sites and one Nationally designated site: the River Boyne and Blackwater SAC (002299), River Boyne and Blackwater SPA (004080), Boyne Coast and Estuary SAC (001957), Boyne Estuary SPA (004080) and the Boyne River Islands pNHA (01862). The mitigation measures outlined in this CEMP are designed to prevent pollutants from entering the River Boyne.

Roosting bats were discovered inside the derelict farm buildings onsite and bats were recorded using the treelines and hedgerows for commuting and foraging. The mitigation measures outlined in this CEMP will prevent disturbance and mortality to bats during the construction phase of this development.

A number of bird species were recorded within the hedgerows and treelines on the proposed development site. Please refer to NIS for further details. The mitigation measures outlined in this CEMP will prevent disturbance and mortality to birds during the construction phase of the development.

The subject lands contains woodlands and hedgerows which are at risk of damage during construction. The mitigation measures outlined within this CEMP will prevent accidental damage to trees in hedgerows and woodland in the site.

Protection of Bats

- Roosting bats were found to be present within the existing farm buildings onsite. Please refer to the most recent bat survey. A draft derogation licence application has been submitted to the NPWS to allow for the demolition of the buildings. The mitigation measures as outlined below and in Table 1 of this report must be adhered to in order to avoid disturbance or mortality of bats;
    - Tree inspection surveys will be undertaken by a licenced bat worker to assess whether the trees marked for felling have any suitability to support roosting bats. If the trees are confirmed to have potential roosting features, these trees must be inspected at height for roosting bats the day prior to felling works. Once surveyor is satisfied that bats are not present within potential roosting features, the tree will be felled; and/or,
    - If bats are encountered during any works at the site the relevant works will be suspended until the advice of a suitably qualified and licenced bat ecologist is sought. A derogation licence may need to be obtained from NPWS in order to permit removal of bats and mitigate for the loss of any roosts on the site.

Protection of Birds

- All tall woody and herbaceous vegetation in worked areas should be removed outside of the breeding bird season (1st March to 31st August, inclusive) to avoid the destruction of nests or disturbance of breeding birds. It is particularly important that areas of dense vegetation be cleared in advance of the breeding bird season, as it is difficult to check or confirm presence/absence of nests in these areas during the breeding season.
- In instance where clearance of vegetation between 1st March and .31st August is unavoidable, vegetation will first be inspected by a qualified ecologist immediately prior to any scheduled clearance. Where birds or their nests are encountered, works may not proceed until chicks have

fledged and the nest has been abandoned. The ecologist may need to implement a buffer area around the nest where works or personnel are not allowed to enter.

Protection of Aquatic Fauna and Habitats

- Aquatic fauna and habitats will be protected through the implementation of mitigation measures detailed within Table 1 of this CEMP.
- All hedgerows and immature woodland marked for retention will be fenced off at the outset of works and for the duration of construction to avoid damage to the trunk, branches or root systems of the trees. Temporary fencing will be erected at a sufficient distance from the tree so as to enclose the Root Protection Area (RPA) of the tree (National Roads Authority, 2005-2011). In general, the RPA covers an area equivalent to a circle with a radius 12 times the stem diameter (measured at 1.5m above ground level for single stemmed trees).
- Where fencing is not feasible due to insufficient space, protection for the tree/hedgerow will be afforded by wrapping hessian sacking (or suitable equivalent) around the trunk of the tree and strapping stout buffer timbers around it. It will still be necessary to ensure that the area within the RPA is not used for vehicle parking or the storage of materials (including oils and chemicals).
- Soil will not be placed within the Root Protection Area of trees or within 5m of hedgerows.

4.4.6 Refuelling

- Construction plant and equipment will only be parked over-night within the site compound. Construction plant and equipment will be checked daily for any visual signs of oil or fuel leakage, as well as wear and tear.

- Fuel will not be stored on site for the duration of the construction phase. Fuel will only be brought to site via mobile fuel bowser. For any liquid other than water, this will include storage in suitable tanks and containers which will be housed in the designated area surrounded by a bund wall of sufficient height and construction so as to contain 110 per cent of the total contents of all containers and associated pipework. The floor and walls of the bunded areas will be impervious of all containers and associated pipework. The floor and walls of the bunded area will be impervious to both water and oil. The pipes will vent downwards into the bund.

- Where contractors are required to refuel vehicles, this will only be carried out at the designated refuelling location within the site storage compound, which must employ pollution control mechanisms to prevent escape of fluids to the river. No refuelling is permitted on site, i.e. within the river or adjacent due to risk of spillage.

- The local authority will be informed immediately of any spillage or pollution incident that may occur on-site during the construction phase.

- All small plant such as generators and pumps bunded and stood in drip trays capable of holding 110 per cent of their tank contents,

- All small plant will be positioned on the bridge itself (within the designated works area – refer to Preliminary Traffic Management Plan), on the secured scaffolding/work platforms, or within the dewatered, 'dry' sections of the dammed river during the works.

- Waste oils, empty oil containers and other hazardous wastes will be disposed of in accordance with the requirements of the Waste Management Act, 1996.

4.4.7 Site Tidiness and Housekeeping

- Construction works will be carried out according to a defined schedule agreed with the client and the relevant contractors, with regard to the hours of work outlined above. Any delays or extensions required will be notified at the earliest opportuning to the client and contractors.

- Contractors will ensure that road edges and footpaths are swept on a regular basis.

- Any and all waste materials arising during the works will either be immediately taken to a location from which discharge to the River Boyne cannot take place or temporarily stored/covered to prevent washout thereto.

- All contractors will be responsible for the clearance of their plant, equipment and any temporary buildings upon completion of construction. The site will be left in a safe condition.

4.4.8 Monitoring, Inspection and Record Keeping

- The Project Ecologist will supervise the sampling of suspended solids downstream prior to commencement of works, and weekly during remediation works. Samples will be analysed on site. Should results show a 10 per cent increase in suspended solids downstream of the site this will be brought to the attention of the contractor by the Project Ecologist and any suitable contingency measures will be instigated.

- Routine inspections of construction activities will be carried out on a daily basis by the contractor staff to ensure all controls to prevent environmental impact, relevant to the construction activities taking place at the time, are in place. Environmental inspections will ensure that the works are undertaken in compliance with the Project CEMP and that the requirements of the Conditions of Planning, the NIS and associated documentation are being adhered to during construction.

- The Contractor will develop their own site inspection programme, which will include an inspection procedure and relevant forms to record any issues.

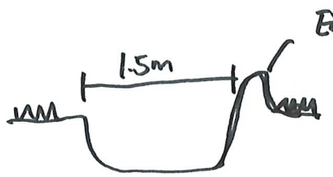
- Only suitably trained staff will undertake environmental site inspections.

- The Project Ecologist will keep records of works undertaken.

APPENDICES

A. Indicative Construction Stage Surface Water Runoff Management Strategy

RATHMULLAN - TEMPORARY CUTOFF TRENCH LAYOUT & DETAILS



TYPICAL CUT OFF TRENCH

NOTE. STRAW BALES TO BE PLACED AT APPROPRIATE INTERVALS ALONG THE CUT OFF TRENCHES AND AT THE OVERFLOW LOCATIONS

B. Refurbishment & Demolition Survey for Asbestos Containing Materials

ABOUT SAFETY LTD.

ASBESTOS | LEAD BASED PAINT | MOULD | SILICA DUST | HAZMAT
SURVEYING & TESTING
RISK MANAGEMENT | PROJECT MANAGEMENT

Refurbishment & Demolition Asbestos Survey

Site Address	**Boyne Ridge** **Rathmullan Road** **Drogheda** **Co. Louth**
Site Location	
Client	**Name:** **Earlsfort Developments Drogheda Ltd** **13-18 City Quay** **Dublin** **Contact:** **David Fitzpatrick** **087 243 8456**
Survey Dates	**26th August, 2025**
Issue Date	**August 2025**
Surveyor(s)	**Lauren O' Donoghue, About Safety Ltd.**

Table of Contents

Executive Summary

Ref:	Confirmed Asbestos [Requires removal and disposal as asbestos waste by a competent asbestos contractor prior to work likely to cause disturbance.]
1,2	Asbestos containing corrugated roof sheeting to Building 1 roof. Asbestos debris around the building from fire damage. 25 square meters approximately.
3,4,5,7-12,16,19,25-27	Asbestos cement pipes and associated debris around various areas of the site. Site remediation by a competent contractor is recommended.

NB: The extent of asbestos containing materials identified in this report are only approximate and should not be relied upon as a basis for tendering removal works. Contractors tendering works are expected to satisfy themselves by site visit and measurement the exact nature and extent of any works which is proposed.

Introduction

About Safety Ltd. was instructed to carry out a Refurbishment and Demolition Asbestos Survey of the above property. The survey and sampling was carried out taking cognizance of the requirements of the Health and Safety Executive (UK) document, *HSG 264*, *Asbestos: The Survey Guide.*

Objectives

The objectives of this survey were to:

To carry out a survey to ascertain the presence of asbestos based materials.
To carry out a survey to locate and describe, as far as reasonably practicable, all asbestos containing materials prior to refurbishment/demolition.
To gain access to all areas, as necessary, to determine the extent of any asbestos that may be present.
To sample and estimate the extent and volume of any asbestos materials that may be present.
To generate asbestos material assessments where the period between the survey and event is significant i.e. more that 3 months.
To produce a report identifying areas containing asbestos to be used as a basis for tendering their removal.
To instigate asbestos removal works prior to refurbishment/demolition.

Scope of Works & Site Description

General Information

Scope of Works:	**Proposed demolition of the buildings on site.**
Structural Details:	**Outhouses and sheds. Corrugated sheeting to shed 1. Galvanized sheeting to all other buildings.**

Survey Limitations

All areas accessed for proposed refurbishment works were subjected to a survey taking cognisance of the requirements of HSG 264, Asbestos: The Survey Guide. The investigation consisted of an inspection of each room and area to be impacted by the works.
No report has been made on any concealed spaces, which may exist within the fabric of the building where the extent and presence of these is not evident due to inaccessibility, lack of building drawings or insufficient knowledge of the structure of the building at the time of the survey. Original and permanent finishes or areas of the building subject to protection orders were not disturbed where requested by the client.

Inaccessible Areas: Electrical equipment such as, boiler units, water heaters, storage heaters, fuse or switch boards. Within floor or wall structures, behind wall or ceiling cladding or within blocked up chimneys. Within internal areas of fire doors unless asbestos observed from keyhole or other damaged areas. Care should always be exercised when working on any electrical equipment in particular the older styles as asbestos-containing materials may be present.

Special considerations for old boilers and plant containing asbestos gaskets:
Some old plant may have gaskets and seals which could contain asbestos. During normal maintenance operations these gaskets or seals may have to be opened, which would not normally be notifiable. If, however the gasket was in a friable condition or had to broken up for removal or examination, the work could become notifiable. An assessment would need to be made and the work notified with the H.S.A. if necessary. Dismantling of boilers and plant is a specialist task requiring specialist tools and is considered demolition.

Asbestos Refurbishment & Demolition Survey: Definition

A refurbishment and demolition survey is needed before any refurbishment or demolition works is carried out. This type of survey is used to locate and describe, as far as reasonably practicable, all ACM's in the area where the refurbishment works will take place or in the whole building if demolition is planned. The survey will be fully intrusive and involve destructive inspection, as necessary, to gain access to all areas, including those that may be difficult to reach. A refurbishment and demolition survey may also be required in other circumstances, e.g. when more intrusive and maintenance and repair work will be carried out or for plant removal and dismantling.
Where the refurbishment or demolition works may not take place for a significant period after the survey (e.g. three months), then the information required for a management survey should be obtained.

Asbestos Contaminated Soils (ACS)

The first point of contact with soil or ground contaminated with asbestos will be during site investigations and exploratory ground works. This may be defined as asbestos operative related work and applies where there is a potential for sporadic or low intensity exposure. People directly involved in these preliminary works, geotechnical engineers and ground workers, should receive formal training enabling them to work safely where asbestos could be present in the ground as a consequence of legacy use issues with the land. In principle, the general tiered approach to the assessment and management of potential risks posed by ACS is the same as that for any other contaminant. However, the unique nature of asbestos means that different methods of analysis, exposure estimation and risk estimation are required. Importantly, soil and air analysis methods need to be more detailed than those currently and commonly used to demonstrate compliance with the Asbestos Regulations.

Material Assessment

No condition assessment is normally necessary for refurbishment and demolition surveys but, where the period between survey and the event is significant, e.g. more than 3 months, then a material assessment should be conducted and interim management arrangements put in place.

Material Assessment Algorithm

In the material assessment process, the main factors influencing fiber release are given a score which can then be added together to obtain a material assessment rating. The four main parameters which determine the amount of fiber released from an ACM when subject to disturbance are:

- **Product Type**
- **Extent of damage or deterioration**
- **Surface Treatment; and**
- **Asbestos type**

Each parameter is scored between 1 and 3. A score of 1 equivalent to a low potential for fiber release, 2 = medium and 3 = high. Two parameters can also be given a nil score (equivalent to a very low potential for fiber release). The value assigned to each of the four parameters is added together to give a total score of between 2 and 12. Presumed or strongly presumed ACM's are scored as Crocidolite (i.e. score = 3) unless there is strong evidence to show otherwise.

Materials with assessment scores of 10 or more are rated as having a high potential to release fibers, if disturbed. Scores of between 7 and 9 are regarded as having a medium potential, and between 5 and 6 a low potential. Scores of 4 or less have a very low potential to release fibers.

Analytical Techniques

Asbestos Bulk Sample Analysis is conducted by using Polarised Light and Dispersion Staining Techniques. Dispersion Staining is used to describe the colour effects produced when a transparent colourless particle or fiber is immersed in a liquid having a refractive index near to that of the particle or fiber, and is viewed under a microscope using transmitted white light (based on HSE Publication, HSG 248).

Samples were returned to About Safety Ltd. Laboratory for Analysis. Photographs were taken at all of the sample locations (unless otherwise stated). The commitment to quality is independently assured through membership of the Asbestos in Materials scheme (AIMS), HSL(UK).
Materials of a similar type were only occasionally sampled and it was assumed that other materials visually inspected to where the sample was taken, were of a similar composition.
Each area was viewed for suspect materials thought or known to contain asbestos and samples taken where it was considered necessary.

General Caveat

This report is based on a Refurbishment & Demolition survey of an unoccupied building.

During the course of the survey all reasonable efforts were made to identify the physical presence of materials containing asbestos. It is known that asbestos materials are frequently concealed within the fabric of buildings or within sealed building voids so that it is not possible to regard the findings of any survey as being definite. It must remain a possibility that asbestos containing materials may be found during demolition activities. For reasons set out in this report, the results cannot give an assurance that all asbestos materials have been found and must not be thought to do so.

This report has been written with reference to the various Guidance Notes etc., issued, and current at the date of this report and describes circumstances at the site on the date the survey took place.

Specific Notes

Legislation and Codes of Practice

The Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006 to 2010, apply to work where there is or may be asbestos fibers present. These regulations apply in particular to any person or employer working with or removing asbestos.

In addition, Safety, Health and Welfare at Work (Construction) Regulations 2013 (SI 291 of 2013) also apply to any building, installation, repair, demolition and asbestos removal work.

Information about working with material containing asbestos cement is containing in Health and Safety Authority's document "Asbestos-containing materials (ACM's) in Workplaces – Practical Guidelines on ACM Management and Abatement".

Provision of information

It is recommended that this report is brought to the attention of any person likely to be involved in refurbishment/demolition works.
Once asbestos materials have been identified it is essential that appropriate remedial measures be introduced prior to any structural alterations, refurbishment or demolition works commencing. All the asbestos removal works should be carried out by a competent asbestos removal contractor in accordance with Asbestos at Work Regulations 2006 to 2010. Statutory notification requirements of 14 days are required under the provisions of the Asbestos Regulations for certain works involving asbestos. The contractor appointed for removal works is responsible for deciding if a 14-day notification is required and for drawing up a plan of work for any removal works.

Appendix A – Asbestos Bulk Identification Report

ASBESTOS BULK IDENTIFICATION REPORT

Report on:
Identification of asbestos content of suspected asbestos containing materials (ACM's) sampled from the following location/site:

Boyne Ridge
Rathmullan Road
Drogheda
Co. Louth

TEST RESULT

SAMPLE NO	LAB. REF.	SAMPLE LOCATION	MATERIAL DESCRIPTION	ASBESTOS TYPE IDENTIFIEID
Jkb19041501	1910501	**Building 1**	**Corrugated roof sheeting**	**Chrysotile**
Jkb19041502	1910502	**Building 1**	**Roof sheeting debris**	**Chrysotile**
Jkb19041503	1910503	**Building 1**	**Cement pipe debris**	**Chrysotile**
Jkb19041504	1910504	**Building 1**	**Cement pipe debris**	**Chrysotile**

Glossary

*NADIS = No Asbestos Detected in Sample Chrysotile (white asbestos) Amosite (brown asbestos) Crocidolite (blue asbestos)
VFT = Vinyl Floor Tile

Analyst: John Kelleher

Appendix B – Schedule of Survey Sheets

Ref No.	Building or Area of Site	Location or Functional Space	Sample No.	Material Description, surface treatment and condition	Extent	Asbestos identified (presumed, strongly presumed or identified)	Product type	Condition	Surface treatment	Asbestos type	Material assessment score	Recommendations	Photo
1.	Boyne ridge Rathmullan Rd	Building 1	1910501	Corrugated roof sheeting with debris strewn around the area	25sm approx.	Chrysotile	1	3	1	1	6	Removal and disposal by a competent contractor prior to demolition. Cleanup of debris around the building.	
2.	Boyne ridge Rathmullan Rd	Building 1	1910502	Corrugated sheeting debris		Chrysotile	1	3	1	1	6	Removal and disposal by a competent contractor prior to demolition. Cleanup of debris around the building.	
3.	Boyne ridge Rathmullan Rd	Building 1 yard	1910504	Cement pipe debris		Chrysotile	1	3	1	1	6	Removal and disposal by a competent contractor prior to demolition. Cleanup of debris around the building.	
4.	Boyne ridge Rathmullan Rd	Building 1/ building 2 yard	1910503	Cement pipe debris		Chrysotile	1	3	1	1	6	Removal and disposal by a competent contractor prior to demolition. Cleanup of debris around the building.	

Key
NAD = No asbestos detected
AIB = Asbestos insulation board
AC = Asbestos cement
VFT = vinyl floor tile
NQ = Not Quantified/Quantifiable
SM = Square Meters
LM = Linear Meters

Confirmed Asbestos
Presumed/Strongly presumed ACM Or Non Accessed Area

Material Assessment Score	Risk
≤ 4	Very Low
5 - 6	Low
7 - 9	Medium
≥ 10	High

No condition assessment is normally necessary for refurbishment and demolition surveys but, where the period between survey and the event is significant, e.g. more than 3 months, then a material assessment should be conducted and interim management arrangements put in place.

Ref No.	Building or Area of Site	Location or Functional Space	Sample No.	Material Description, surface treatment and condition	Extent	Asbestos identified (presumed, strongly presumed or identified)	Product type	Condition	Surface treatment	Asbestos type	Material assessment score	Recommendations	Photo
5.	Boyne ridge Rathmullan Rd	Building 3		Cement pipe debris		Chrysotile	1	3	1	1	6	Removal and disposal by a competent contractor prior to demolition. Cleanup of debris around the building.	
6.	Boyne ridge Rathmullan Rd	Building 2		Corrugated metal sheeting and concrete		NAD							
7.	Boyne ridge Rathmullan Rd	Building 2		Cement pipe debris		Chrysotile	1	3	1	1	6	Removal and disposal by a competent contractor prior to demolition. Cleanup of debris around the building.	
8.	Boyne ridge Rathmullan Rd	Building 2		Cement pipe debris		Chrysotile	1	3	1	1	6	Removal and disposal by a competent contractor prior to demolition. Cleanup of debris around the building.	

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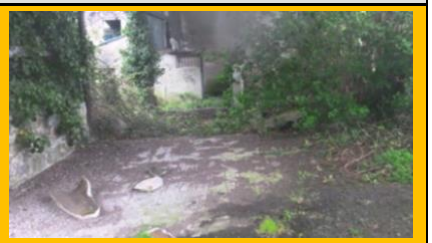
9.	Boyne ridge Rathmullan Rd	Building 2		Cement pipe debris		Chrysotile	1	3	1	1	6	Removal and disposal by a competent contractor prior to demolition. Cleanup of debris around the building.	
10.	Boyne ridge Rathmullan Rd	Building 2		Cement pipe debris		Chrysotile	1	3	1	1	6	Removal and disposal by a competent contractor prior to demolition. Cleanup of debris around the building.	
11.	Boyne ridge Rathmullan Rd	Building 2 water trough		Cement pipe/ corrugated sheeting debris		Chrysotile	1	3	1	1	6	Removal and disposal by a competent contractor prior to demolition. Cleanup of debris around the building.	
12.	Boyne ridge Rathmullan Rd	Ground between building 2 and containers		Cement pipe debris		Chrysotile	1	3	1	1	6	Removal and disposal by a competent contractor prior to demolition. Cleanup of debris around the building.	

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13.	Boyne ridge Rathmullan Rd	Building 3 front		Corrugated metal sheeting		NAD							
14.	Boyne ridge Rathmullan Rd	Building 2 mezzanine				NAD							
15.	Boyne ridge Rathmullan Rd	Building 2 mezzanine		Corrugated metal sheeting		NAD							
16.	Boyne ridge Rathmullan Rd	Building 2 ground floor debris		Cement pipe/ corrugated sheeting debris		Chrysotile	1	3	1	1	6	Removal and disposal by a competent contractor prior to demolition. Cleanup of debris around the building.	

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Ref No.	Building or Area of Site	Location or Functional Space	Sample No.	Material Description, surface treatment and condition	Extent	Asbestos identified (presumed, strongly presumed or identified)	Product type	Condition	Surface treatment	Asbestos type	Material assessment score	Recommendations	Photo
17.	Boyne ridge Rathmullan Rd	Building 2				NAD							
18.	Boyne ridge Rathmullan Rd	Building 2				NAD							
19.	Boyne ridge Rathmullan Rd	Ground at container		Cement pipe debris		Chrysotile	1	3	1	1	6	Removal and disposal by a competent contractor prior to demolition. Cleanup of debris around the building.	
20.	Boyne ridge Rathmullan Rd	Building 4		Concrete construct		NAD							

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21.	Boyne ridge Rathmullan Rd	Building 4		Corrugated metal sheeting		NAD							
22.	Boyne ridge Rathmullan Rd	Building 4		Concrete construct		NAD							
23.	Boyne ridge Rathmullan Rd	Building 5		Corrugated metal sheeting		NAD							
24.	Boyne ridge Rathmullan Rd	Building 5 rear				NAD							

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Ref No.	Building or Area of Site	Location or Functional Space	Sample No.	Material Description, surface treatment and condition	Extent	Asbestos identified (presumed, strongly presumed or identified)	Product type	Condition	Surface treatment	Asbestos type	Material assessment score	Recommendations	Photo
25.	Boyne ridge Rathmullan Rd	Building 5		Cement pipe debris to interior rear		Chrysotile	1	3	1	1	6	Removal and disposal by a competent contractor prior to demolition. Cleanup of debris around the building.	
26.	Boyne ridge Rathmullan Rd	Old containers		Cement pipe debris on ground		Chrysotile	1	3	1	1	6	Removal and disposal by a competent contractor prior to demolition. Cleanup of debris around the building.	
27.	Boyne ridge Rathmullan Rd	Old containers		Cement pipe debris internally		Chrysotile	1	3	1	1	6	Removal and disposal by a competent contractor prior to demolition. Cleanup of debris around the building.	

Key
NAD = No asbestos detected
AIB = Asbestos insulation board
AC = Asbestos cement
VFT = vinyl floor tile
NQ = Not Quantified/Quantifiable
SM = Square Meters
LM = Linear Meters

Confirmed Asbestos
Presumed/Strongly presumed ACM Or Non Accessed Area

Material Assessment Score	Risk
≤ 4	Very Low
5 - 6	Low
7 - 9	Medium
≥ 10	High

No condition assessment is normally necessary for refurbishment and demolition surveys but, where the period between survey and the event is significant, e.g. more than 3 months, then a material assessment should be conducted and interim management arrangements put in place.

C. Site Investigation Report

PRELIMINARY DRAFT REPORT

RATHMULLAN DROGHEDA
PROPOSED HOUSING
CLARD DEVELOPMENTS

WATERMAN MOYLAN
CONSULTING ENGINEERS

CONTENTS

APPENDICES

FOREWORD

The following Conditions and Notes on Site Investigation Procedures should be read in conjunction with this report.

General.

Recommendations made, and opinions expressed in the report are based on the strata observed in the exploratory holes, together with the results of in-situ and laboratory tests. No responsibility can be held for conditions which have not been revealed by exploratory work, or which occur between exploratory hole locations. Whilst the report may suggest the likely configuration of strata, both between exploratory hole locations, or below the maximum depth of the investigation, this is only indicative, and liability cannot be accepted for its accuracy.

Unless specifically stated, no account has been taken of possible subsidence due to mineral extraction below or close to the site.

Boring Procedures.

Unless otherwise stated, the 'Shell and Auger' technique of soft ground boring has been employed. All boring operations sampling and/or logging of soils and in-situ testing complies with the recommendations of the British Standard Code of Practice BS 5930 (1981), 'Site Investigation' and BS 1377:1990, 'Methods of test for soils for civil engineering purposes'.

Whilst the technique allows the maximum data to be obtained in soft ground, some disturbance and variation of soft and layered soils is unavoidable. Attention is drawn to this condition, whenever it is suspected. Where cobbles and boulders are recorded, no conclusion should be drawn concerning the size, presence, lithological nature, or numbers per unit volume of ground.

Where peat has been encountered during siteworks, samples have been logged in accordance with the Von Post Classification (ref. Von Post, L. 1992. Sveriges Gologiska Undersoknings torvinventering och nogra av dess hittils vunna resultat (SGU peat inventory and some preliminary results) Svenska Mosskulturforeningens Tidskrift, Jonkoping, Swedden, 36, 1-37 & Hobbs N. B. Mire morphology and the properties of some British and foreign peats. QJEG, Vol. 19, 1986).

Routine Sampling.

Undisturbed samples of soils, predominantly cohesive in nature are obtained unless otherwise stated by a 104mm diameter open-drive tube sampler. In granular soils, and where undisturbed sampling is inappropriate, disturbed samples are collected. Smaller disturbed samples are also recovered at intervals to allow a visual examination of the full strata section.

In-Situ Testing.

Standard penetration tests, utilising either the standard split spoon sampler or solid cone and automatic trip-hammer are conducted unless otherwise where required by instruction. Subsequent to a seating drive of 150mm, a summation for the number of blows for 300mm penetration is recorded on the boring records together with the blow count for each 75mm penetration. In cases where incomplete penetration is obtained, the number of blows for the recorded value of penetration are noted. In coarse granular soils, a cone end is fitted to the sampler and a similar procedure adopted.

Groundwater.

The depth of entry of any influx of groundwater is recorded during the course of boring operations. However, the normal rate of boring does not usually permit the recording of an equilibrium level for any one water strike. Where possible drilling is suspended for a period of twenty minutes to monitor the subsequent rise in water level.

Groundwater conditions observed in the borings or pits are those appertaining to the period of investigation. It should be noted however, that groundwater levels are subject to diurnal, seasonal and climatic variations and can also be affected by drainage condition, tidal variation or other causes.

Retention of Samples.

After satisfactory completion of all the scheduled laboratory tests on any sample, the remaining material is discarded unless a period of retention of samples is agreed, it is our normal practice to discard all soil samples one month after submission of our final report.

REPORT ON A SITE INVESTIGATION
FOR A HOUSING DEVELOPMENT
AT WEST DROGHEDA
COUNTY MEATH

FOR
CLARD DEVELOPMENTS LTD

WATERMAN MOYLAN
CONSULTING ENGINEERS

Report No. 21345 **NOVEMBER 2018**

I Introduction

A new housing development is proposed for a greenfield site located at Rathmullan, Drogheda West.

An investigation of sub soil conditions in the area of development has been ordered by Waterman Moylan, Consulting Engineers on behalf of Clard Developments Ltd.

The programme of the investigation included the construction of Boreholes, Trial Pits and Dynamic Probes to establish criteria on which to base foundation and infra-structural design. Work was carried out in accordance with BS 5930, Code of Practice for Site Investigations (1999).

In addition percolation testing to BRE Digest 365 was scheduled and carried out at several locations to establish soil percolation characteristics.

A programme of laboratory testing to confirm geotechnical and environmental soil parameters followed site operations.

This report includes all factual data pertaining to the project and comments on the findings relative to the new development.

II Fieldwork

The proposed development is to be undertaken on existing farm land located at Rathmullan, Drogheda West. The development area is bounded by the M1 Motorway to the West, The River Boyne to the North and The Riverbank Housing Estate to the East. The location is shown on the site map in Appendix VI. This drawing also shows the location of the various exploratory positions.

The field investigation included the following elements.

- Cable Percussion Boreholes at five locations
- Machine Excavated Trial Pits at five locations
- HD Dynamic Probes at five locations
- BRE Digest 365 Percolation Tests at five locations

The various locations have been referenced to national grid and OD levels established. Photographs of all excavations are included with this report in the relevant appendices.

Boreholes

Five exploratory holes were scheduled and bored with conventional 200mm cable-tool methods using a Dando Exploratory Rig. Each location was electronically scanned and shallow trial pits were opened to ensure that existing services were not damaged. One additional hole (BH02A) was bored when shallow refusal was recorded in the original location.

Detailed geotechnical records are contained in Appendix I to this report - the records give details of stratification, sampling, in-situ testing and groundwater. Note is also taken of any obstructions to normal boring requiring the use of the heavy chisel for advancement. In general it was not possible to recover undisturbed samples because of the high stone/cobble content of the strata encountered.

The boreholes consistently identified surface topsoil (300mm) overlying initially firm brown sandy gravelly CLAY. The gravelly CLAY stratum increases in strength to stiff and very stiff below about 1.20 metres with holes continuing to completion at depths between 5.80 and 8.50 metres. Angular and sub-angular cobbles and boulders were noted at varying depths in each borehole. The soils represent GLACIAL TILL or BOULDER CLAY deposition, typical of the region.

The final refusal depths may be indicative of boulders in the glacial clay or possibly the local bedrock horizon. Proof core drilling would be required to confirm the presence of bedrock in the area.

No water was encountered during the course of boring. Long-term ground water observation was not required.

Trial Pits

A JCB excavator was used under geotechnical engineering supervision to open trial pits at five locations.

Detailed trial pit records are presented in Appendix II. These records note stratification and ground water regime and detail sampling, obstructions and excavation stability. Photographs of each location are also included with the records.

The records confirm the borehole findings with topsoil overlying firm to stiff brown very sandy gravelly CLAY, typically containing cobble and boulder fragments. Difficulty in advancing the trial pits was noted in each location. Three pits were terminated on boulder obstructions between 1.50 and 2.00 metres BGL however TP01 continued to 2.60 metres and TP03 to 3.00 metres.

Ground water was not encountered during excavation of the trial pits. The pits were backfilled and compacted with the excavated spoil.

Dynamic Probes

Heavy Duty Probes were taken at a total of five locations each adjacent to an excavated trial pit and referenced DP01 to DP05.

Probing was in accordance with the heavy-duty probe specification of BS 1377: Part 9: 1990. In these tests, the soil resistance is measured in terms of the number of drop-hammer blows required to drive the test probe through each 100 mm increment of penetration. Probing is terminated when the blow count exceeds 25/100mm to avoid damage to the apparatus. Where loose material is present a single blow count may drive the apparatus in excess of 100mm. In this instance blow counts of zero may be recorded. Individual probe records are contained in Appendix III.

The probe graphs generally reflect a pattern of gradually increasing soil strength with penetration depth with probe refusals generally occurring between 1.20 and 3.00 metres. Isolate thin soft zones (100mm to 200mm thick) were noted at 1.70 metres BGL in DP01 and DP02.

A probe resistance of N100 = 4 with no significant underlying deterioration is indicative of an allowable bearing pressure of 100 Kpa, suitable for traditional two storey house construction.

Probe No.	**Depth to $N_{100} = 5$**	**Refusal**
DP01	0.50	2.50
DP02	1.80	3.10
DP03	0.50	1.20
DP04	0.50	1.50
DP05	0.50	1.10

Percolation Test to BRE Digest 365

Infiltration testing was performed at five locations in accordance with BRE Digest 365 'Soakaway Design'. The test pit was excavated and logged. The test material was firm to stiff brown very sandy gravelly CLAY with cobbles and boulders

To obtain a measure of the infiltration rate of the sub-soils, water is poured into the test pit, and records taken of the fall in water level against time. The test is carried out over two cycles following initial soakage.

The infiltration rate is the volume of water dispersed per unit exposed area per unit of time, and is generally expressed as metres/minute or metres/second. In these calculations the exposed area is the sum of the base area and the average internal area of the permeable stratum over the test duration. Designs are based on the slowest infiltration rate, which has been calculated from the final cycle.

In the test locations the water level dropped slowly over the test period. The design calculations are presented in Appendix IV, with the infiltration rates as follows:

SA 01	**Infiltration Rate (f)**	**0.00057 m/min**
SA02	**Infiltration Rate (f)**	**0.00068 m/min**
SA03	**Infiltration Rate (f)**	**0.00029 m/min**
SA04	**Infiltration Rate (f)**	**0.00052 m/min**
SA05	**Infiltration Rate (f)**	**0.00051 m/min**

The results are typical of low-permeability glacial till deposition.

III Testing

a. In-Situ

Standard penetration tests were carried out in each borehole at 1.00 metre intervals to establish relative soil strength. Results are presented in the right hand column of the boring records and are summarised as follows:

Stratum	**N Value Range**	**Comment**
Brown sandy gravelly CLAY		
1.00 metres BGL	10 to 18	Firm to Stiff
2.00 metres BGL	16 to 30	Stiff
3.00 metres BGL	25 to 33	Stiff to Very Stiff
4.00 metres BGL	31 to 51	Very Stiff to Hard
5.00 metres BGL	23 to 53	Stiff to Hard

b. Laboratory

All geotechnical samples from the boreholes and trial pits have been returned to the IGSL laboratory for initial visual inspection, a schedule of testing was prepared and tests carried out.

The programme of testing included the following elements and all results are presented in Appendix V. Standard geotechnical testing is carried out by IGSL in it's INAB-accredited laboratory. Chemical and environmental testing was carried out by CHEMTEST in the UK.

a. Classification (Liquid and Plastic Limits)
b. Particle size distribution (Sieve Analysis and Hydrometer)
c. Sulphate and pH determination
d. RILTA Environmental Suite

Classification and Moisture Content

Liquid and plastic limits were determined for samples of the cohesive soils from the trial pits and boreholes. Results are detailed and plotted on the standard Casagrande Classification Chart.

Particle Size Distribution

Grading curves for selected samples of the gravelly clay stratum from the boreholes were determined by wet sieve and hydrometer analysis.

Chemical (pH and Sulphate)

Four samples were submitted for chemical analysis.

RILTA Environmental Suite

Five sample were submitted for RILTA Suite (WAC) analysis.

IV Discussion

The proposed new housing development is to be undertaken on agricultural land at Rathmullan in Drogheda North.

A comprehensive investigation of sub soil conditions has been carried out for Waterman Moylan on behalf of Clard Developments Ltd.

This preliminary report is based on field findings, detailed geotechnical and environmental testing is being carried out to confirm design parameters.

The detailed findings are presented earlier in this report and these can be summarised as follows:

Boreholes indicate topsoil overlying firm brown sandy gravelly CLAY which extends to about 1.20 metres BGL. This overlies stiff to very stiff to hard brown gravelly CLAY (Brown Boulder CLAY). Boreholes were completed on refusal at depths between 5.80 and 8.50 metres. The final borehole depths are not indicative of rock horizon. No ground water was encountered.

Trial Pits confirmed this general pattern, with numerous cobble and boulder particles noted and recovered and excavation difficulty noted in several locations.

NEW HOUSE FOUNDATIONS

Standard Penetration Tests and Dynamic Probes indicate that an allowable bearing pressure of at least 125 kN/sq.m. can be taken at a depth of 1.00 metre BGL. Conventional reinforced strip or pad foundations will therefore be appropriate for this development with foundations placed 0.70 to 0.80 metres BGL.

At one probe location (DP02) a reduction in soil strength was noted between 1.60 and 1.80 metres. The overlying soils are stiff and consideration could be given to founding at 0.70 metres with a reduced bearing pressure of 75 kN/sq.m. to avoid overstressing the weaker underlying zone.

Alternatively foundations in this area could be deepened to 1.80 metres to achieve the higher allowable bearing pressure.

The sub soils increase in strength with depth and results indicate an allowable bearing pressure of 250 kN/sq.m. on the soils below 2.00 metres.

Careful visual inspection of foundation excavations is advised to ensure uniformity and suitability of the founding medium. This is particularly relevant given the variation noted at DP02.

PERCOLATION

Testing to BRE Digest 365 was carried out at five location with relatively low infiltration available in the gravelly boulder clay formation. An average infiltration rate (f) of 0.00050 metres/minute has been obtained.

ENVIRONMENTAL

CONCRETE

IGSL/JC
November 2018

Appendix I Boring Records

GEOTECHNICAL BORING RECORD

REPORT NUMBER 21345

CONTRACT	Rathmullen,Drogheda,Co.Louth	BOREHOLE NO.	BH01
		SHEET	Sheet 1 of 1
CO-ORDINATES	RIG TYPE Dando 2000	DATE COMMENCED	02/11/2018
GROUND LEVEL (m AOD)	BOREHOLE DIAMETER (mm) 200 BOREHOLE DEPTH (m) 4.20	DATE COMPLETED	05/11/2018
CLIENT	SPT HAMMER REF. NO.	BORED BY	W.Cahill
ENGINEER Waterman Moylan	ENERGY RATIO (%)	PROCESSED BY	F.C

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	TOPSOIL/subsoil			0.30						
	Firm light brown sandy SILT/CLAY with some gravel and occasional cobbles				AA11709	B	1.00		N = 10 (2, 2, 3, 3, 2, 2)	
1				1.80						
	Stiff to very stiff dark brown sandy SILT/CLAY with grvael and occasional cobbles and boulders				AA11710	B	2.00		N = 21 (4, 4, 5, 5, 5, 6)	
2										
					AA11711	B	3.00		N = 33 (5, 5, 7, 9, 7, 10)	
3										
				4.20	AA11712	B	4.00		N = 48/75 mm (15, 10, 48)	
4	Obstruction End of Borehole at 4.20 m									
5										
6										
7										
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
4	4.2	2	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Cat scanned location and hand dug inspection pit carried out.

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 21345.GPJ IGSL.GDT 14/11/18

GEOTECHNICAL BORING RECORD

REPORT NUMBER 21345

CONTRACT	Rathmullen,Drogheda,Co.Louth	**BOREHOLE NO.**	**BH01A**
		SHEET	Sheet 1 of 1
CO-ORDINATES	**RIG TYPE** Dando 2000	**DATE COMMENCED**	02/11/2018
GROUND LEVEL (m AOD)	**BOREHOLE DIAMETER (mm)** 200	**DATE COMPLETED**	05/11/2018
	BOREHOLE DEPTH (m) 6.20		
CLIENT	**SPT HAMMER REF. NO.**	**BORED BY**	W.Cahill
ENGINEER Waterman Moylan	**ENERGY RATIO (%)**	**PROCESSED BY**	F.C

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	TOPSOIL/subsoil			0.30						
	firm light brown sandy SILT/CLAY with some gravel and occasional cobbles			1.80	AA10561	B	1.00		N = 11 (2, 3, 2, 3, 3, 3)	
2	Stiff to very stiff dark brown sandy SILT/CLAY with grvael and occasional cobbles and boulders			3.60	AA10562	B	2.00		N = 21 (4, 6, 4, 6, 5, 6)	
					AA10563	B	3.00		N = 31 (5, 4, 5, 6, 9, 11)	
4	Dense grey/brown fine to coarse clayey GRAVEL with cobbles and some boulders			4.20	AA10564	B	4.00		N = 42 (6, 6, 9, 9, 10, 14)	
	Very stiff dark brown SILT			4.50						
5	Very stiff dark brown very gravelly SILT/CLAY with cobbbles and occasional boulders				AA10565	B	5.00		N = 41 (5, 7, 9, 9, 11, 12)	
6				6.20	AA10566	B	6.00		N = 50/75 mm (7, 18, 50)	
	Obstruction End of Borehole at 6.20 m									
7										
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
3.5	3.7	0.75	
6	6.2	2	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Cat scanned location and hand dug inspection pit carried out.

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 21345.GPJ IGSL.GDT 14/11/18

GEOTECHNICAL BORING RECORD

REPORT NUMBER 21345

CONTRACT	Rathmullen,Drogheda,Co.Louth	BOREHOLE NO.	BH02
		SHEET	Sheet 1 of 1
CO-ORDINATES	RIG TYPE Dando 2000	DATE COMMENCED	06/11/2018
GROUND LEVEL (m AOD)	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED	06/11/2018
	BOREHOLE DEPTH (m) 6.50		
CLIENT	SPT HAMMER REF. NO.	BORED BY	W.Cahill
ENGINEER Waterman Moylan	ENERGY RATIO (%)	PROCESSED BY	F.C

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	TOPSOIL			0.15						
	Subsoil			0.35						
	Firm to stiff light brown sandy SILT/CLAY with gravel and occasional cobbles				AA105601	B	1.00		N = 18 (2, 3, 3, 4, 6, 5)	
1										
					AA105602	B	2.00		N = 16 (3, 3, 4, 4, 4, 4)	
2				2.90						
	Very stiff to hard light brown sandy SILT/CLAY with gravel,cobbles and some boulders				AA105603	B	3.00		N = 35 (5, 6, 6, 8, 10, 11)	
3										
					AA105604	B	4.00		N = 51 (6, 9, 11, 13, 14, 13)	
4										
					AA105605	B	5.00		N = 53 (11, 13, 10, 9, 19, 15)	
5										
					AA105606	B	6.00		N = 50/75 mm (25, 50)	
6				6.50						
	Obstruction End of Borehole at 6.50 m									
7										
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
4.2	4.5	0.75	
5.4	5.6	1	
6.3	6.5	2	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Cat scanned location and hand dug inspection pit carried out.

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 21345.GPJ IGSL.GDT 14/11/18

GEOTECHNICAL BORING RECORD

REPORT NUMBER 21345

CONTRACT	Rathmullen,Drogheda,Co.Louth	**BOREHOLE NO.**	**BH03**
		SHEET	Sheet 1 of 1
CO-ORDINATES	**RIG TYPE** Dando 2000	**DATE COMMENCED**	12/11/2018
GROUND LEVEL (m AOD)	**BOREHOLE DIAMETER (mm)** 200	**DATE COMPLETED**	12/11/2018
	BOREHOLE DEPTH (m) 7.50		
CLIENT	**SPT HAMMER REF. NO.**	**BORED BY**	W.Cahill
ENGINEER Waterman Moylan	**ENERGY RATIO (%)**	**PROCESSED BY**	F.C

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	TOPSOIL/subsoil			0.20						
1	Firm dark brown sandy SILT/CLAY with some gravel and occasional cobbles			1.60	AA105620	B	1.00		N = 15 (2, 2, 2, 3, 3, 7)	
2	Stiff light brown sandy SILT/CLAY with gravel and some cobbles and boulders				AA105621	B	2.00		N = 22 (2, 3, 4, 5, 6, 7)	
3				3.20	AA105622	B	3.00		N = 36 (4, 6, 8, 8, 9, 11)	
4	Very stiff light brown sandy SILT/CLAY with gravel and some cobbles and boulders				AA105623	B	4.00		N = 50 (7, 9, 12, 11, 12, 15)	
5					AA105624	B	5.00		N = 23 (4, 4, 4, 6, 6, 7)	
6					AA105625	B	6.00		N = 30 (5, 6, 7, 7, 8, 8)	
7				7.50	AA105626	B	7.00		N = 50/150 mm (8, 14, 16, 34)	
8	Obstruction End of Borehole at 7.50 m									
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
4.3	4.5	0.75	
7.2	7.5	2	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Cat scanned location and hand dug inspection pit carried out.

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 21345.GPJ IGSL.GDT 14/11/18

GEOTECHNICAL BORING RECORD

REPORT NUMBER 21345

CONTRACT	Rathmullen,Drogheda,Co.Louth	BOREHOLE NO.	BH04
		SHEET	Sheet 1 of 1
CO-ORDINATES		RIG TYPE	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (m AOD)		BOREHOLE DEPTH (m)	8.50
		DATE COMMENCED	09/11/2018
		DATE COMPLETED	09/11/2018
CLIENT		SPT HAMMER REF. NO.	
ENGINEER	Waterman Moylan	ENERGY RATIO (%)	
		BORED BY	W.Cahill
		PROCESSED BY	F.C

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	Soft dark brown sandy SILT/CLAY with some gravel (subsoil)			0.20						
	Firm to stiff light brown sandy SILT/CLAY with gravel and some cobbles and boulders				AA105612	B	1.00		N = 17 (2, 4, 3, 5, 5, 4)	
1										
					AA105613	B	2.00		N = 21 (3, 2, 4, 4, 4, 9)	
2										
					AA105614	B	3.00		N = 25 (3, 5, 4, 5, 7, 9)	
3				3.30						
	Very stiff brown gravelly CLAY with cobbles				AA105615	B	4.00		N = 31 (6, 5, 7, 7, 9, 8)	
4										
					AA105616	B	5.00		N = 33 (5, 5, 5, 5, 8, 15)	
5				5.80						
	Stiff light brown sandy SILT/CLAY with gravel				AA105617	B	6.00		N = 24 (3, 6, 4, 5, 5, 10)	
6				6.80						
	Very stiff mottled light and dark brown sandy SILT/CLAY with gravel and angular cobbles				AA105618	B	7.00		N = 35 (8, 7, 9, 10, 8, 8)	
7										
					AA105619	B	8.00		N = 50/150 mm (8, 7, 15, 35)	
8				8.50						
	Obstruction End of Borehole at 8.50 m									
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
5.4	5.6	0.5	
8.3	8.5	2	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Cat scanned location and hand dug inspection pit carried out.

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 21345.GPJ IGSL.GDT 14/11/18

GEOTECHNICAL BORING RECORD

REPORT NUMBER 21345

CONTRACT	Rathmullen,Drogheda,Co.Louth	**BOREHOLE NO.**	**BH05**
		SHEET	Sheet 1 of 1
CO-ORDINATES	**RIG TYPE** Dando 2000	**DATE COMMENCED**	07/11/2018
GROUND LEVEL (m AOD)	**BOREHOLE DIAMETER (mm)** 200	**DATE COMPLETED**	07/11/2018
	BOREHOLE DEPTH (m) 5.80		
CLIENT	**SPT HAMMER REF. NO.**	**BORED BY**	W.Cahill
ENGINEER Waterman Moylan	**ENERGY RATIO (%)**	**PROCESSED BY**	F.C

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	TOPSOIL/subsoil			0.25						
1	Firm to stiff light brown sandy SILT/CLAY with gravel,cobbles and occasional boulders			1.90	AA105607	B	1.00		N = 18 (2, 3, 3, 4, 5, 6)	
2	Very stiff dark brown sandy SILT/CLAY with gravel,cobbles and occasional boulders				AA105608	B	2.00		N = 30 (3, 4, 5, 7, 9, 9)	
3					AA105609	B	3.00		N = 50/225 mm (8, 12, 14, 15, 21)	
4					AA105610	B	4.00		N = 36 (6, 9, 9, 10, 9, 8)	
5					AA105611	B	5.00		N = 31 (2, 4, 5, 7, 7, 12)	
6	Obstruction End of Borehole at 5.80 m			5.80					N = 50/225 mm (12, 13, 16, 15, 19)	
7										
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
3.1	3.3	0.75	
5.6	5.8	2	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Cat scanned location and hand dug inspection pit carried out.

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 21345.GPJ IGSL.GDT 14/11/18

Appendix II Trial Pit Records

TRIAL PIT RECORD

REPORT NUMBER 21345

CONTRACT 21345	TRIAL PIT NO. TP01
	SHEET Sheet 1 of 1
LOGGED BY TOS	CO-ORDINATES
	DATE STARTED 05/11/2018
	DATE COMPLETED 05/11/2018
CLIENT	GROUND LEVEL (m)
ENGINEER Waterman Moylan	EXCAVATION METHOD JCB 3CX

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL		0.30							
Firm / stiff brown sandy gravelly CLAY with medium cobble content / low boulder content. Sand is fine to coarse gravel is angular / subangular of grey limestone					AA104513	B	0.50		
1.0									
Compact very gravelly SAND with medium cobble content and medium boulder content. Sand is fine to coarse gravel is subangular / subrounded fine to coarse of grey limestone		1.30			AA104514	B	1.50		
2.0									
End of Trial Pit at 2.60m		2.60			AA104515	B	2.50		
3.0									
4.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Trial pit terminated at 2.6 due to refusal in Boulders

IGSL TP LOG 21345.GPJ IGSL.GDT 19/11/18

TRIAL PIT RECORD

REPORT NUMBER 21345

CONTRACT 21345	TRIAL PIT NO. TP02
	SHEET Sheet 1 of 1
LOGGED BY TOS	CO-ORDINATES
	DATE STARTED 05/11/2018
	DATE COMPLETED 05/11/2018
CLIENT	GROUND LEVEL (m)
ENGINEER Waterman Moylan	EXCAVATION METHOD JCB 3CX

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL					AA104510	B	0.20		
		0.35							
Firm / stiff orange brown slightly gravelly sandy CLAY. Sand is fine to coarse gravel is angular / subangular fine to coarse of dark grey limestone					AA104511	B	0.50		
1.0									
		1.30							
Compact BOULDERS and COBBLES with gravelly very sandy clay. Sand is fine to coarse gravel is angular / subangular fine to coarse of grey limestone					AA104512	B	1.50		
2.0									
		2.30							
End of Trial Pit at 2.30m									
3.0									
4.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Trial pit terminated at 2.3 due to refusal in Boulders

IGSL TP LOG 21345.GPJ IGSL.GDT 19/11/18

TRIAL PIT RECORD

REPORT NUMBER 21345

CONTRACT 21345	TRIAL PIT NO. TP03
	SHEET Sheet 1 of 1
LOGGED BY TOS	CO-ORDINATES
	DATE STARTED 05/11/2018
	DATE COMPLETED 05/11/2018
CLIENT	GROUND LEVEL (m)
ENGINEER Waterman Moylan	EXCAVATION METHOD JCB 3CX

	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0	TOPSOIL									
	Firm / stiff brown slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse gravel is subangular / subrounded fine to coarse of grey limestone		0.30			AA104506	B	0.50		
1.0	Compact very gravelly SAND with medium cobble content and medium boulder content. Sand is fine to coarse gravel is subangular / subrounded fine to coarse of grey limestone		1.00			AA104507	B	1.20		
2.0						AA104508	B	2.00		
3.0	End of Trial Pit at 3.00m		3.00			AA104509	B	3.00		
4.0										

Groundwater Conditions
Dry

Stability
Good

General Remarks
Trial pit terminated at scheduled depth

IGSL TP LOG 21345.GPJ IGSL.GDT 19/11/18

TRIAL PIT RECORD

REPORT NUMBER 21345

CONTRACT 21345		TRIAL PIT NO.	TP04
		SHEET	Sheet 1 of 1
LOGGED BY TOS	CO-ORDINATES	DATE STARTED	05/11/2018
		DATE COMPLETED	05/11/2018
CLIENT	GROUND LEVEL (m)	EXCAVATION METHOD	JCB 3CX
ENGINEER Waterman Moylan			

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
Firm / stiff orange brown slightly gravelly sandy CLAY. Sand is fine to coarse gravel is angular / subangular fine to coarse of dark grey limestone		0.30			AA104503	B	0.20		
					AA104504	B	0.50		
1.0									
Compact BOULDERS and COBBLES with gravelly very sandy clay. Sand is fine to coarse gravel is angular / subangular fine to coarse of grey limestone		1.50			AA104505	B	1.60		
2.0									
End of Trial Pit at 2.30m		2.30							
3.0									
4.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Trial pit terminated at 2.3 due to slow progress in compact boulders and cobbles

TRIAL PIT RECORD

REPORT NUMBER 21345

CONTRACT 21345	TRIAL PIT NO. TP05
	SHEET Sheet 1 of 1
LOGGED BY TOS	CO-ORDINATES
	DATE STARTED 05/11/2018
	DATE COMPLETED 05/11/2018
CLIENT	GROUND LEVEL (m)
ENGINEER Waterman Moylan	EXCAVATION METHOD JCB 3CX

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
Firm / stiff orange brown slightly gravelly sandy CLAY. Sand is fine to coarse gravel is angular / subangular fine to coarse of dark grey limestone		0.40			AA104501	B	0.50		
1.0 Compact BOULDERS and COBBLES with gravelly very sandy clay. Sand is fine to coarse gravel is angular / subangular fine to coarse of grey limestone		1.00			AA104502	B	1.20		
End of Trial Pit at 1.60m		1.60							
2.0									
3.0									
4.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Trial pit terminated at 1.6 due to slow progress in compact boulders and cobbles

IGSL TP LOG 21345.GPJ IGSL.GDT 19/11/18

Appendix III Probe Records

DYNAMIC PROBE RECORD

REPORT NUMBER 21345

CONTRACT	Rathmullen , Drogheda , Co.Louth	PROBE NO.	DP01
		SHEET	Sheet 1 of 1
CO-ORDINATES		DATE DRILLED	05/11/2018
GROUND LEVEL (mOD)	HAMMER MASS (kg) 50	DATE LOGGED	05/11/2018
CLIENT	INCREMENT SIZE (mm) 100		
ENGINEER Waterman Moylan	FALL HEIGHT (mm) 500	PROBE TYPE	DPH

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)
0.0						0.00	0
						0.10	3
						0.20	4
						0.30	4
						0.40	5
						0.50	8
						0.60	8
						0.70	5
						0.80	5
						0.90	5
1.0						1.00	6
						1.10	6
						1.20	7
						1.30	5
						1.40	4
						1.50	5
						1.60	4
						1.70	4
						1.80	2
						1.90	11
2.0						2.00	11
						2.10	11
						2.20	14
						2.30	20
						2.40	25
	End of Probe at 2.50 m						
3.0							
4.0							

Graphic Probe Record: 0 5 10 15 20 25

GROUNDWATER OBSERVATIONS

REMARKS

IGSL DP LOG 100MM INCREMENTS 21345.GPJ IGSL.GDT 6/11/18

DYNAMIC PROBE RECORD

REPORT NUMBER 21345

CONTRACT	Rathmullen , Drogheda , Co.Louth	PROBE NO.	DP02
		SHEET	Sheet 1 of 1
CO-ORDINATES		DATE DRILLED	05/11/2018
GROUND LEVEL (mOD)	HAMMER MASS (kg) 50	DATE LOGGED	05/11/2018
CLIENT	INCREMENT SIZE (mm) 100		
ENGINEER Waterman Moylan	FALL HEIGHT (mm) 500	PROBE TYPE	DPH

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)
0.0						0.00	0
						0.10	0
						0.20	1
						0.30	5
						0.40	4
						0.50	3
						0.60	5
						0.70	6
						0.80	7
						0.90	6
1.0						1.00	6
						1.10	4
						1.20	4
						1.30	3
						1.40	3
						1.50	2
						1.60	2
						1.70	1
						1.80	2
						1.90	6
2.0						2.00	10
						2.10	11
						2.20	9
						2.30	9
						2.40	11
						2.50	14
						2.60	16
						2.70	16
						2.80	18
						2.90	19
3.0	End of Probe at 3.10 m					3.00	25
4.0							

Graphic Probe Record: 0 5 10 15 20 25

GROUNDWATER OBSERVATIONS

REMARKS

IGSL DP LOG 100MM INCREMENTS 21345.GPJ IGSL.GDT 6/11/18

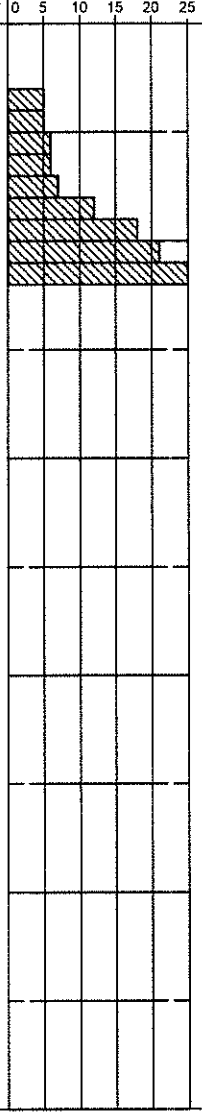
DYNAMIC PROBE RECORD

REPORT NUMBER 21345

CONTRACT	Rathmullen , Drogheda , Co.Louth	PROBE NO.	DP03
		SHEET	Sheet 1 of 1
CO-ORDINATES		DATE DRILLED	05/11/2018
GROUND LEVEL (mOD)	HAMMER MASS (kg) 50	DATE LOGGED	05/11/2018
CLIENT	INCREMENT SIZE (mm) 100	PROBE TYPE	DPH
ENGINEER Waterman Moylan	FALL HEIGHT (mm) 500		

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)
0.0	.					0.00	0
						0.10	0
						0.20	0
						0.30	5
						0.40	5
						0.50	6
						0.60	6
						0.70	7
						0.80	12
						0.90	18
1.0						1.00	21
						1.10	25
	End of Probe at 1.20 m						
2.0							
3.0							
4.0							

Graphic Probe Record



GROUNDWATER OBSERVATIONS

REMARKS

IGSL DP LOG 100MM INCREMENTS 21345.GPJ IGSL.GDT 6/11/18

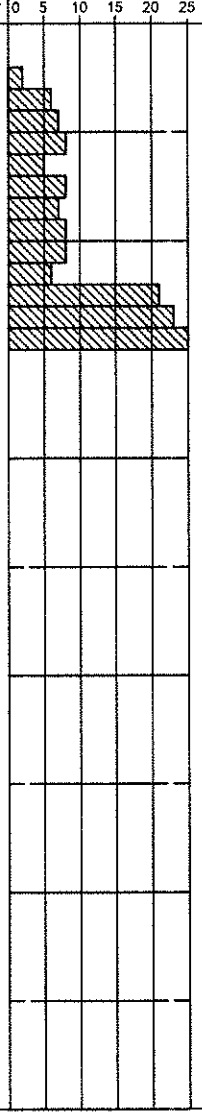
DYNAMIC PROBE RECORD

REPORT NUMBER 21345

CONTRACT	Rathmullen , Drogheda , Co.Louth	PROBE NO.	DP04
		SHEET	Sheet 1 of 1
CO-ORDINATES		DATE DRILLED	05/11/2018
GROUND LEVEL (mOD)	HAMMER MASS (kg) 50	DATE LOGGED	05/11/2018
CLIENT	INCREMENT SIZE (mm) 100	PROBE TYPE	DPH
ENGINEER Waterman Moylan	FALL HEIGHT (mm) 500		

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)
0.0	.					0.00	0
						0.10	0
						0.20	2
						0.30	6
						0.40	7
						0.50	8
						0.60	5
						0.70	8
						0.80	7
						0.90	8
1.0						1.00	8
						1.10	6
						1.20	21
						1.30	23
						1.40	25
	End of Probe at 1.50 m						
2.0							
3.0							
4.0							

Graphic Probe Record



GROUNDWATER OBSERVATIONS

REMARKS

IGSL DP LOG 100MM INCREMENTS 21345.GPJ IGSL.GDT 6/11/18

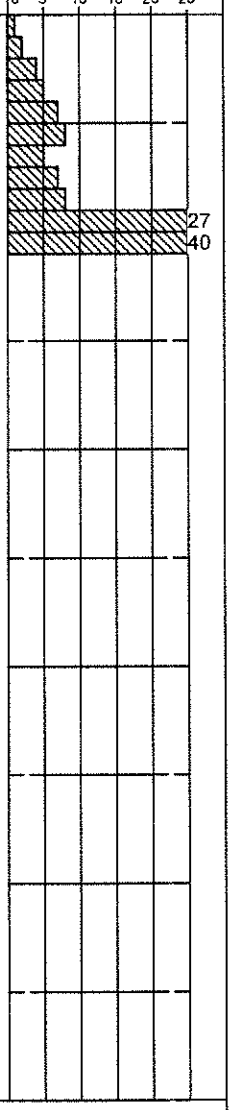
DYNAMIC PROBE RECORD

REPORT NUMBER 21345

CONTRACT	Rathmullen , Drogheda , Co.Louth	PROBE NO.	DP05
		SHEET	Sheet 1 of 1
CO-ORDINATES		DATE DRILLED	05/11/2018
GROUND LEVEL (mOD)	HAMMER MASS (kg) 50	DATE LOGGED	05/11/2018
CLIENT	INCREMENT SIZE (mm) 100	PROBE TYPE	DPH
ENGINEER Waterman Moylan	FALL HEIGHT (mm) 500		

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)
0.0						0.00	1
						0.10	2
						0.20	4
						0.30	5
						0.40	7
						0.50	8
						0.60	5
						0.70	7
						0.80	8
						0.90	27
1.0						1.00	40
	End of Probe at 1.10 m						
2.0							
3.0							
4.0							

Graphic Probe Record



GROUNDWATER OBSERVATIONS

REMARKS

IGSL DP LOG 100MM INCREMENTS 21345.GPJ IGSL.GDT 6/11/18

Appendix IV BRE Digest 365

Soakaway Design f -value from field tests (F2C) IGSL

Contract: Rathmullan, Drogheda Contract No. 21345
Test No. SA01
Client Waterman Moylan
Date: 06/11/2018

Summary of ground conditions

from	to	Description	Ground water
0.00	0.30	TOPSOIL	
0.30	1.50	Firm / stiff brown slightly gravelly sandy CLAY with medium cobble	
		content	

Notes:

Field Data

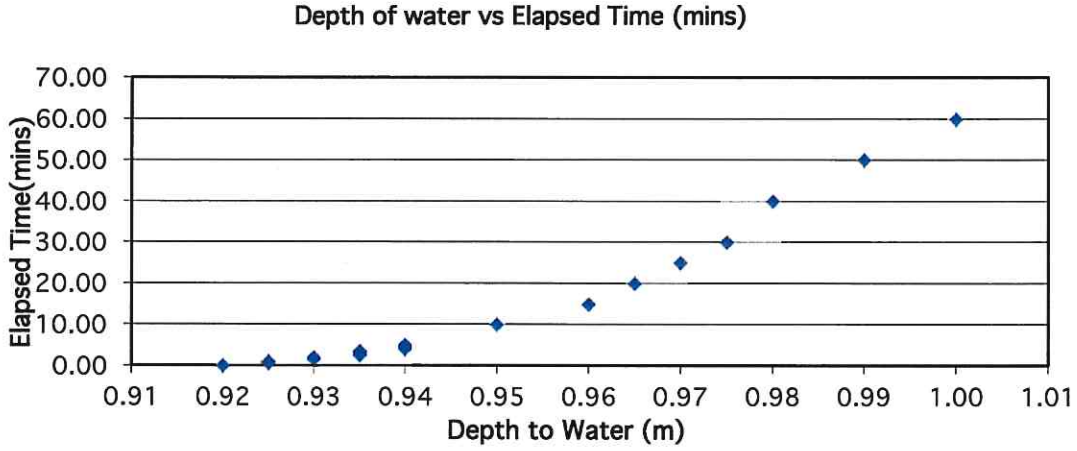
Depth to Water (m)	Elapsed Time (min)
0.92	0.00
0.93	0.50
0.93	1.00
0.93	1.50
0.93	2.00
0.94	2.50
0.94	3.00
0.94	3.50
0.94	4.00
0.94	4.50
0.94	5.00
0.95	10.00
0.96	15.00
0.97	20.00
0.97	25.00
0.98	30.00
0.98	40.00
0.99	50.00
1.00	60.00

Field Test

Depth of Pit (D)	1.50	m
Width of Pit (B)	1.50	m
Length of Pit (L)	1.80	m
Initial depth to Water =	0.92	m
Final depth to water =	1.00	m
Elapsed time (mins)=	60.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	2.7	m2
*Av. side area of permeable stratum over test period=	3.564	m2
Total Exposed area =	6.264	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0.00057 m/min or 9.5785E-06 m/sec



Soakaway Design f -value from field tests (F2C) IGSL

Contract: Rathmullan, Drogheda Contract No. 21345
Test No. SA02
Client Waterman Moylan
Date: 06/11/2018

Summary of ground conditions

from	to	Description	Ground water
0.00	0.30	TOPSOIL	
0.30	1.50	Firm / stiff brown slightly gravelly sandy CLAY with medium cobble	
		content	

Notes:

Field Data

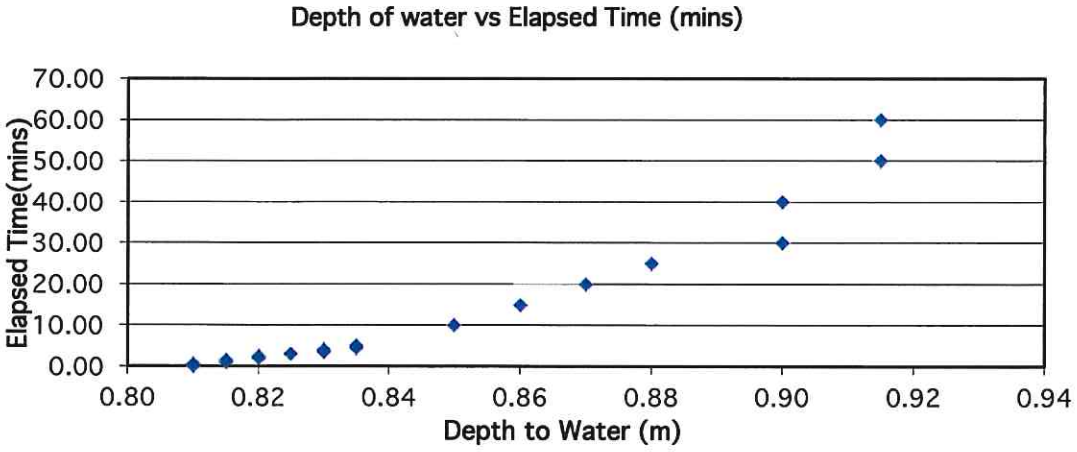
Depth to Water (m)	Elapsed Time (min)
0.81	0.00
0.81	0.50
0.82	1.00
0.82	1.50
0.82	2.00
0.82	2.50
0.83	3.00
0.83	3.50
0.83	4.00
0.84	4.50
0.84	5.00
0.85	10.00
0.86	15.00
0.87	20.00
0.88	25.00
0.90	30.00
0.90	40.00
0.92	50.00
0.92	60.00

Field Test

Depth of Pit (D)	1.50	m
Width of Pit (B)	1.50	m
Length of Pit (L)	1.80	m
Initial depth to Water =	0.81	m
Final depth to water =	0.92	m
Elapsed time (mins)=	60.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	2.7	m2
*Av. side area of permeable stratum over test period=	4.2075	m2
Total Exposed area =	6.9075	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0.00068 m/min or 1.1401E-05 m/sec



Soakaway Design f -value from field tests (F2C) IGSL

Contract: Rathmullan, Drogheda Contract No. 21345
Test No. SA03
Client Waterman Moylan
Date: 06/11/2018

Summary of ground conditions

from	to	Description	Ground water
0.00	0.30	TOPSOIL	
0.30	1.50	Firm / stiff brown slightly gravelly sandy CLAY	

Notes:

Field Data

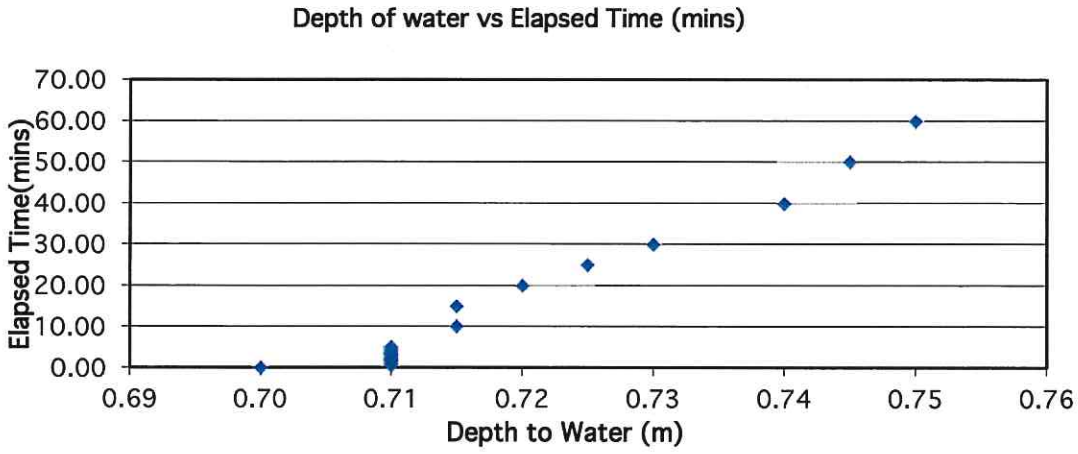
Depth to Water (m)	Elapsed Time (min)
0.70	0.00
0.71	0.50
0.71	1.00
0.71	1.50
0.71	2.00
0.71	2.50
0.71	3.00
0.71	3.50
0.71	4.00
0.71	4.50
0.71	5.00
0.72	10.00
0.72	15.00
0.72	20.00
0.73	25.00
0.73	30.00
0.74	40.00
0.75	50.00
0.75	60.00

Field Test

Depth of Pit (D)	1.50	m
Width of Pit (B)	1.50	m
Length of Pit (L)	1.80	m
Initial depth to Water =	0.70	m
Final depth to water =	0.75	m
Elapsed time (mins)=	60.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	2.7	m2
*Av. side area of permeable stratum over test period=	5.115	m2
Total Exposed area =	7.815	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0.00029 m/min or 4.7985E-06 m/sec



Soakaway Design f -value from field tests (F2C) IGSL

Contract: Rathmullan, Drogheda Contract No. 21345
Test No. SA04
Client Waterman Moylan
Date: 06/11/2018

Summary of ground conditions

from	to	Description	Ground water
0.00	0.30	TOPSOIL	
0.30	1.50	Firm / stiff brown slightly gravelly sandy CLAY	

Notes:

Field Data

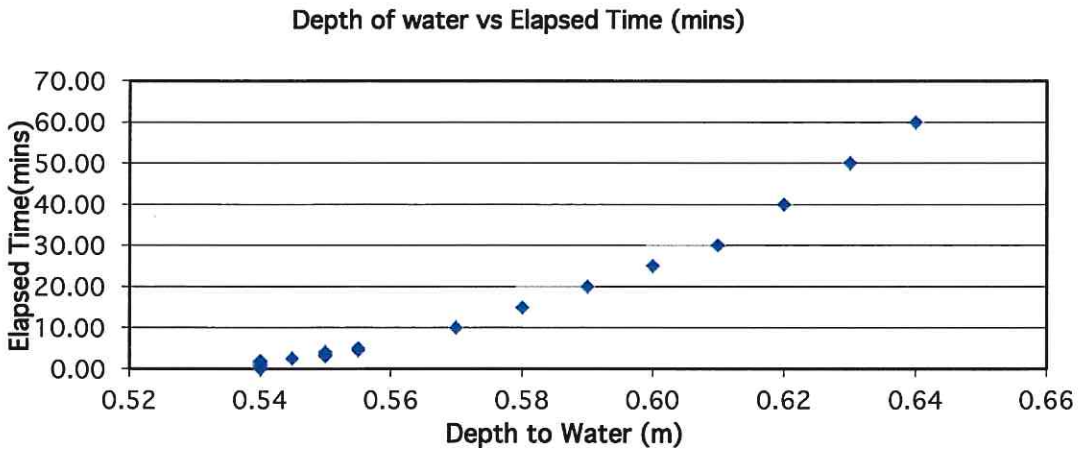
Depth to Water (m)	Elapsed Time (min)
0.54	0.00
0.54	0.50
0.54	1.00
0.54	1.50
0.54	2.00
0.55	2.50
0.55	3.00
0.55	3.50
0.55	4.00
0.56	4.50
0.56	5.00
0.57	10.00
0.58	15.00
0.59	20.00
0.60	25.00
0.61	30.00
0.62	40.00
0.63	50.00
0.64	60.00

Field Test

Depth of Pit (D)	1.50	m
Width of Pit (B)	1.50	m
Length of Pit (L)	1.80	m
Initial depth to Water =	0.54	m
Final depth to water =	0.64	m
Elapsed time (mins)=	60.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	2.7	m2
*Av. side area of permeable stratum over test period=	6.006	m2
Total Exposed area =	8.706	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0.00052 m/min or 8.6147E-06 m/sec



Soakaway Design f -value from field tests (F2C) IGSL

Contract: Rathmullan, Drogheda Contract No. 21345
Test No. SA05
Client Waterman Moylan
Date: 06/11/2018

Summary of ground conditions

from	to	Description	Ground water
0.00	0.30	TOPSOIL	
0.30	1.30	Firm / stiff orange brown slightly gravelly sandy CLAY	

Notes: Refusal at 1.3 due to cobble

Field Data

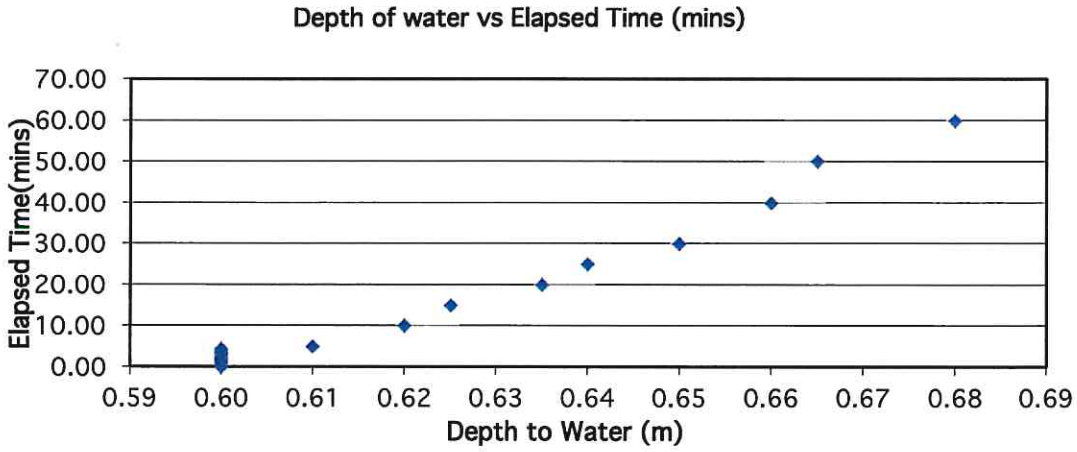
Depth to Water (m)	Elapsed Time (min)
0.60	0.00
0.60	0.50
0.60	1.00
0.60	1.50
0.60	2.00
0.60	2.50
0.60	3.00
0.60	3.50
0.60	4.00
0.60	4.50
0.61	5.00
0.62	10.00
0.63	15.00
0.64	20.00
0.64	25.00
0.65	30.00
0.66	40.00
0.67	50.00
0.68	60.00

Field Test

Depth of Pit (D)	1.30	m
Width of Pit (B)	1.50	m
Length of Pit (L)	1.80	m
Initial depth to Water =	0.60	m
Final depth to water =	0.68	m
Elapsed time (mins)=	60.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	2.7	m2
*Av. side area of permeable stratum over test period=	4.356	m2
Total Exposed area =	7.056	m2

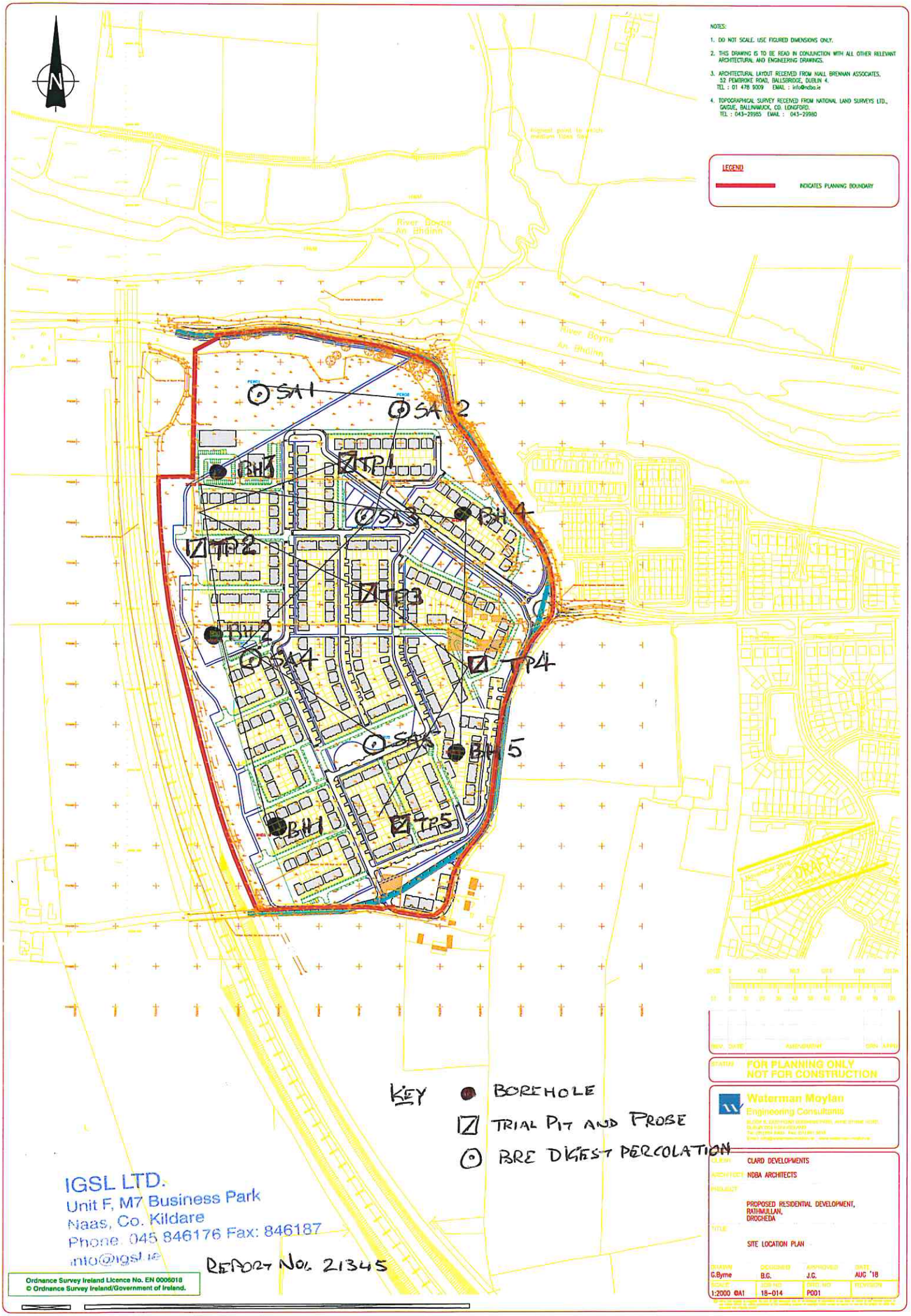
Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0.00051 m/min or 8.5034E-06 m/sec



Appendix V Laboratory Data

Appendix VI Site Plan


NOTES:
1. DO NOT SCALE. USE FIGURED DIMENSIONS ONLY.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECTURAL AND ENGINEERING DRAWINGS.
3. ARCHITECTURAL LAYOUT RECEIVED FROM HALL BRENNAN ASSOCIATES, 52 PEMBROKE ROAD, BALLSBRIDGE, DUBLIN 4. TEL : 01 478 9009 EMAIL : info@nbbc.ie
4. TOPOGRAPHICAL SURVEY RECEIVED FROM NATIONAL LAND SURVEYS LTD., SAGUE, BALLINAMUCK, CO. LONGFORD. TEL : 043-29955 EMAIL : 043-29980
LEGEND
INDICATES PLANNING BOUNDARY
River Boyne
An Bhóinn
SA1
SA2
SA3
SA4
SA5
BH1
BH2
BH3
BH4
BH5
TP1
TP2
TP3
TP4
TP5
KEY
BOREHOLE
TRIAL PIT AND PROBE
BRE DIGEST PERCOLATION
FOR PLANNING ONLY
NOT FOR CONSTRUCTION
Waterman Moylan
Engineering Consultants
CLIENT CLARD DEVELOPMENTS
ARCHITECT NOBA ARCHITECTS
PROJECT
PROPOSED RESIDENTIAL DEVELOPMENT, RATHMULLAN, DROGHEDA
TITLE
SITE LOCATION PLAN
DRAWN G.Byrne
DESIGNED B.G.
APPROVED J.G.
DATE AUG '18
SCALE 1:2000 @A1
JOB NO 18-014
DWG NO P001
REVISION
IGSL LTD.
Unit F, M7 Business Park
Naas, Co. Kildare
Phone: 045 846176 Fax: 846187
info@igsl.ie
REPORT NO. 21345
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D. Technical Note

TECHNICAL NOTE

Project:	**Rathmullan**	**Job No:**	18-014
Subject:	**Site Investigation**	**Revision:**	
Prepared by:	**J. Gibbons**	**Date:**	27/08/2025
Checked by:	**J. Gibbons**	**Date:**	28/08/2025
Approved by:	**P. O'Connell**	**Date:**	28/08/2025

This note has been prepared as an addendum to the Site Investigation report (Ref number 21345) prepared by IGSL Ltd and dated November 2018.

It is noted that the Site Investigation was carried out some 7 years ago and that the planning application for a Large Scale Residential development is relying upon the findings of the report.

The site investigation report is a factual report providing details of the underlying ground condition on the site at the time of the investigation.

The purpose of this technical note is to confirm that the site has not been changed since the preparation of the report that would give rise to any change in the ground conditions. In this regard Joe Gibbons, Chartered Engineer and Director of Waterman Moylan Consulting Engineers undertook a site inspection to review the site and to determine if there had been any works undertaken on the site which could have changed the underlying ground conditions. The inspection was carried out on Tuesday 27th August 2025. During the inspection a number of photographs were taken which are set out below. Google Earth images were also reviewed for the period between 2018 and 2025 and these are also presented below.

The site is in agricultural use as can be seen in the photographs and google earth images. There have been no works carried out on the site which would have in any way changed the underlying ground conditions. The site investigation report of 2018 would be considered to represent the underlying ground conditions and can still be relied upon.

Google Earth Image - May 2025

Block S, EastPoint Business Park, Alfie Byrne Road, Dublin D03 H3F4
t. 00 353 1 664 8900 **f.** 00 353 1 661 3618 **e.** info@waterman-moylan.ie **w.** www.waterman-moylan.ie

Google Earth Image – June 2024

Google Earth Image – September 2023

Google Earth Image – August 2022

Google Eart Image – July 2021

Block S, EastPoint Business Park, Alfie Byrne Road, Dublin D03 H3F4
t. 00 353 1 664 8900 **f.** 00 353 1 661 3618 **e.** info@waterman-moylan.ie **w.** www.waterman-moylan.ie

Google Earth Image – April 2020

Google Earth Image – June 2019

Block S, EastPoint Business Park, Alfie Byrne Road, Dublin D03 H3F4
t. 00 353 1 664 8900 **f.** 00 353 1 661 3618 **e.** info@waterman-moylan.ie **w.** www.waterman-moylan.ie

Google Earth Image June 2018

Photographs taken during site visit of 27 August 2025

Block S, EastPoint Business Park, Alfie Byrne Road, Dublin D03 H3F4
t. 00 353 1 664 8900 **f.** 00 353 1 661 3618 **e.** info@waterman-moylan.ie **w.** www.waterman-moylan.ie








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In conclusion the site has remained unchanged and has been in agricultural use since 2018. The underlying ground condition would not have changed in the period and the site investigation report can therefore be relied upon despite the fact that it was carried out in 2018.

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