Waterman Moylan
Engineering Consultants

# Preliminary Construction Demolition & Waste Management Plan

## Oldtown Planning: Phase 5 – Strategic Housing Development (SHD)

April 2022

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## Quality Assurance – Approval Status

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

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**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

## 1.1 Background of Report

This report has been prepared by Waterman Moylan as part of the documentation in support of the Oldtown Phase 5 Planning application for a proposed residential development at Oldtown, Swords, Co. Dublin, to be submitted to An Bord Pleanála for a proposed strategic housing development (SHD). This document has been set up to be a 'living document' which will be updated by the developer and contractor as the project progresses.

The proposed planning application for Phase 5 of the development forms part of the Oldtown and Mooretown lands, northwest of Swords, which were subject to the now expired Oldtown-Mooretown Local Area Plan (LAP) adopted by Fingal County Council in October 2010.

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

As is normal practice, the Main Contractor for the project is responsible for the method in which the construction works are carried out and to ensure that best practices and all legal obligations including Local Authority requirements and Health and Safety legislation are complied with. The main contractor is also responsible for the design and installation of all temporary works required to complete the permanent works. The plan should be used by the Main Contractor to develop their construction, demolition & waste management plan.

## 1.2 Site Location

The area of Oldtown-Mooretown LAP lands is approximately 111 hectares. The lands are located at the western development edge of Swords, within the catchment of the Broadmeadow River.

The Oldtown–Mooretown lands are divided by the Rathbeale Road, with Oldtown lands to the north (circa 50 Ha) and Mooretown to the south (circa 61 Ha).

This application (net area 7.80 Ha), which forms Phase 5 of the Oldtown development, is located north-west of the existing Ashton development, in the north-west quarter of the Oldtown Lands.

The location is shown overleaf in *Figure 1* and in detail on drawing 17-144.P1000, Site Location Map.

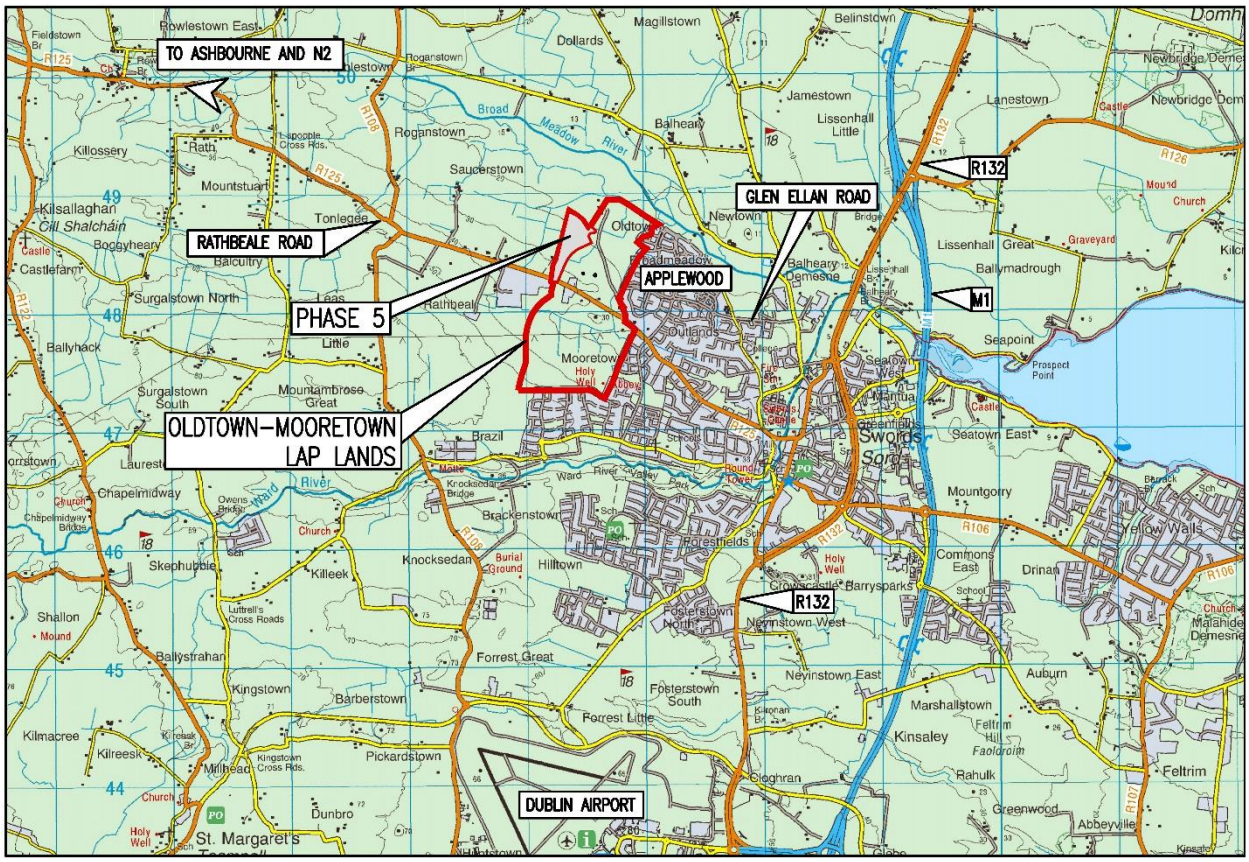


***Figure 1*** | *Oldtown Planning Site Location*

# 2. The Site and the Surrounding Environs

## 2.1 Site Description

The subject site was previously used for agricultural purposes.

The Oldtown lands generally fall from a high point of approximately 33.0m OD Malin on Rathbeale Road down to approximately 9.0m OD Malin at the Broadmeadow River to the north of the subject lands.

The Oldtown Phase 5 site is bounded on the southeast by the Oldtown Phase 2 development currently under construction, to the west by agricultural lands, to the north by the Oldtown Regional Park and to east by the Oldtown 3 & 4 developments.

The site is accessed from Glen Ellan Road and Rathbeale Road via Oldtown Avenue/Miller's Avenue, Park Avenue and Longview Avenue which have been constructed as part of the Oldtown LAP development.

## 2.2 Proposed Development

The proposed development totals 377 No. units, comprising; 173 No. Houses, 134 No. Apartments, and 70 No. Apartment/Duplex units, on an area of c. 8.25ha. A 519m² Creche is also proposed.

The proposed road levels around the site range from 33.39 to 15.99m OD Malin with finished floor levels ranging from 33.11m to 16.47m OD Malin.

| Unit Description | | No. of Units |
|---|---|---|
| Houses | 2-Bed | 9 |
| | 3-Bed | 147 |
| | 4-Bed | 17 |
| Duplexes | Block A | 18 |
| | Block B | 8 |
| | Block C | 8 |
| | Block D | 20 |
| | Block E | 8 |
| | Block F | 8 |
| Apartments | Block A | 48 |
| | Block B1 | 32 |
| | Block B2 | 32 |
| | Block C | 22 |
| **Total** | | **377** |

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

The development includes all associated site works and infrastructure, including internal roads, paths, cycle-paths, public lighting, utilities, foul and surface drainage, and landscaped open space.

## 3. General Site Set-Up and Pre-Commencement Measures

The following measures will be carried out by the Contractor:

- A general condition survey of the roads and infrastructure in the area prior to any work being carried out on the site.
- A site compound including offices and welfare facilities will be set up by the main contractor and is intended to be located in the vicinity of the existing Liffey Developments Compound at the end of the Glen Ellan Road Extension.
- Prior to any site works commencing, the main contractor will investigate/identify the exact location of and tag all existing services and utilities around and through the site.
- Typical working hours for the site will be 08.00 to 19.00 Monday to Friday and 08.00 to 14.00 Saturday. No Sunday work will generally be permitted. The above working hours are typical; however, special construction operations may need to be carried out outside these hours in order to minimise disruption to the surrounding area.
- Hoarding lines and site security will be set up within the development site as required.

Access gates will be provided at all site and compound access points. The main construction access will be from Oldtown Avenue/Millers Avenue. A detailed traffic management plan will be prepared by the Contractor and agreed with Fingal County Council, the Road Authority, prior to commencing works on the public road.

# 4. Construction Waste Management

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

There are no buildings/structures present on this site, and as such an asbestos survey will not be necessary in this instance. In the event that contaminated soil is encountered, this soil will be removed by an appropriately accredited contractor and disposed of at an appropriately accredited facility.

## 4.1 Policy and Legislation

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

- National Policy: The Waste Management Acts 1996 to 2005
- Local Policy: Waste Management Plan for the Dublin Region 2005 – 2010, November 2005.

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

- Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition (C&D) Projects.

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

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

## 4.2 Typical Construction Waste

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

- General site clearance waste including tree stumps etc.
- Some of the excavated material **may** require to be disposed of in a licensed landfill site due to slightly elevated levels of fluoride, sulphate, total dissolved soldis and total monohydric phenols, above the level of “inert”. This shall be determined by the receiving landfill. Otherwise, material is classified as inert and non-hazardous. The Site investigation Report is included as Appendix A.
- Surface water runoff.
- Packaging and waste construction materials generated during the course of the construction activities.

## 4.3 On-Site Construction Waste Management

It is estimated that all cut and fill operations and any other excavation will be balanced in terms of quantities. Therefore, it is envisaged that no significant amounts of excavated materials shall be disposed of off-site.

All waste masonry will be stored and crushed on site and used for site haul roads in later stages of the project.

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

Other non-hazardous waste generated by the site (packaging and running of site offices) will be collected in separate roll-on skips.

There are no hazardous materials expected on this site. Any hazardous material encountered will be disposed of to a suitably licence tip.

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

| C & D Waste Material | Quantity (tonnes) |
|---|---|
| Clay and stones | *None anticipated. All arisings will be used as fill and landscaping on the site.* |
| Concrete* | *None anticipated. *A concrete crushing permit will be required if crushing is to occur. Crushing not anticipated.* |
| Masonry | *None anticipated. All arisings will be used as crushed and used as site haul roads.* |
| Wood | *To be Completed by C&D Waste Manager* |
| Packaging & Other Waste Materials | *To be Completed by C&D Waste Manager* |
| Hazardous Materials | *None anticipated, to be determined by C&D Waste Manager* |
| Total Arisings Off Site | *To be Completed by C&D Waste Manager* |

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

## 4.4 Off-Site Waste Management Licensing/Permitting

All waste materials (where necessary, after in-situ reuse and recycling options have been fully considered) shall be disposed of off-site, under the appropriate Duty of Care and subject to approvals/consents from the relevant statutory bodies. It is the responsibility of the Contractor to ensure that any company to whom waste is transferred is legally permitted to do so and that the facility they bring the waste to is licensed to handle that type of waste as outlined in the Waste Management Acts 1996-2005. The Waste Collection Permit Register, in accordance with the Waste Management (Collection Permit) Regulations 2001 will be consulted to ensure that waste carriers hold the appropriate permit.

The relevant waste collection permits and waste licences shall be provided by the Main Contractor and shall be appended to this report once reviewed.

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

The Contractor shall prepare a detailed inventory of construction based hazardous waste generated, such as tars, adhesives, sealants, and other dangerous substances, and these will be kept segregated from other non-hazardous waste to prevent possible contamination. Arrangements shall be made for such

substances for disposal in a safe manner to an authorized disposal site or by means acceptable to the relevant Authority.

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

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

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

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

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

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

## 4.5 Appointment of C&D Waste Manager

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

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

## 4.6 C&D Record Keeping

It is the duty of the C&D Waste Manager to ensure that necessary licenses have been obtained as needed. Each consignment of C&D waste taken from the site will be subject to documentation which will conform with *Table 3* along with Transportation Dockets to ensure full traceability of the material to its final destination.

| Detail | Particulars |
|---|---|
| Project of Origin | *Oldtown Phase 5, Swords, Co. Dublin* |
| Material being Transported | *Soil, Construction waste* |
| Quantity of Material | *To be completed by C&D Waste Manager* |
| Date of Material Movement | *To be completed by C&D Waste Manager* |
| Name of Carrier | *To be completed by C&D Waste Manager* |
| Destination of Material | *To be completed by C&D Waste Manager* |
| Proposed Use | *To be completed by C&D Waste Manager* |

***Table 3*** | *Details of materials taken from site*

## 4.7 Topsoil

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

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

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

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

## 4.8 Earthworks – Cut and Fill Policy

Earthworks for road and structure foundations form a major part of the quantity of waste that will be generated by the construction phase of this project. In order to optimise the impact of the generation of surplus material due to excavation the following principles has been considered during the detail design and construction phase:

- The quantity of excavated materials to be removed from or imported into the site has been reduced by establishing levels of the proposed buildings which optimise the volume of cut and fill. It is not envisaged that any surplus excavated material will result from this development and that all arisings from excavations will be retained and reused on site.
- Unsuitable sub-soils generated by excavations on site will be reviewed for reuse as landscaping or non-engineering fills on adjoining or other construction sites within the region. Should material exportation/importation be required from/to other sites, these will be subject to an Article 27 notification to the EPA.
- Careful separation of builder's rubble, packaging, and contaminated waste from re-usable material will result in the minimisation of the disposal of material to landfill.

## 5. Deliveries

It is intended that deliveries to the construction site will typically be made to one main access which will be off Millers Avenue.
Materials should be ordered and delivered to site on an “as needed” basis in order to prevent over supply to site. Deliveries will be managed upon arrival to the site and systems should be provided in order to avoid any queuing of delivery vehicles, for example: 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. A number of the construction traffic movements will be undertaken by heavy goods vehicles, though there will also be vehicle movements associated with the appointed contractors and their staff.

An estimate of the day-to-day traffic movements associated with the construction activities, based on experience of similar sites, projects that the number of construction related HGV movements to and from the application site will be approximately 10 arrivals and departures per day.

Similarly, the general workforce, which equates to 60-100 employees and with an allowance for shared journeys could equate to a maximum of around 30-50 arrivals and departures per day by private vehicle.

This number of construction vehicle movements is low compared to the number of trips expected to be generated by the proposed development during the operational phase. It should be noted that the majority of such vehicle movements would be undertaken outside of the traditional peak hours, and it is not considered that this level of traffic would result in any operational problems.

Care will be taken to ensure existing pedestrian routes are suitably maintained as necessary during the construction period, and temporary car parking is provided within the site for contractor’s vehicles.

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

- Minimise the volume of material removed from site by optimising the cut to fill requirements within the site;
- Segregation of waste material produced during the construction process to minimise the contamination or reusable fill material resulting from excavation on the site;
- Wheel wash to be provided for vehicles leaving the site when earthworks are being carried out during winter periods;
- Ensure that deliveries to the site and removal of spoil material from this site are restricted to off peak periods where possible and practicable.
- Optimise routes to be used by heavy vehicles and detail construction traffic forecast;
- Determine the working hours of the site;
- Facilities for loading and unloading and;
- Facilities to parking cars and other vehicles.

Set procedures and designated wash-out areas will be provided, or alternatively vehicle wash-out will be prohibited if a suitable wash-out area is not identified.

Deliveries will be managed on arrival to avoid any queuing of delivery vehicles on to Oldtown Avenue and subsequently Rathbeale Road.

## 6. Parking and Storage

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

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

# 7. Dust and Dirt Control

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

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

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

## 7.1 Mitigation Measures

The following are techniques and methods which are widely used currently throughout the construction industry to control dust and dirt emitting from the site, and which may be used in the Oldtown Phase 5 development.

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

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

## 8. Water

The excavations for the drainage pipes, water supply, utilities and foundations are anticipated as being relatively shallow and will have minimal impact on the ground water in the site.

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

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

# 9. Noise Assessment and Control Measure

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

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

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

## 9.2 Environmental Noise Mitigation Measures

General Considerations:

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

Plant:

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

7. Locate movable plant away from noise sensitive receptors where possible
8. All plant operators to be qualified in their specific piece of plant.
9. Compressors and generators will be sited in areas least likely to give rise to nuisance where practicable.

Vehicle activity:

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

Demolition Phase: (There are no demolition works anticipated on this development)

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

Ground Works and Piling Phase (as required):

1. The following hierarchy of groundwork/piling methods should be used if ground conditions, design and safety allows;
    - Pressed in methods, e.g., hydraulic jacking
    - Auger/bored piling
    - Diaphragm walling
    - Vibratory piling or vibro-replacement
    - Driven Piling or dynamic consolidation

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

Monitoring:

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

Communication and Liaison:

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

## 9.3 Risk Assessment & Mitigation

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

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

- Lower Action Value (LAV) – 80 dBA $L_{EX,8}$, 135 dB Peak – Hearing Protection shall be made available and information shall be provided.

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

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

- Exposure = $L_{EX,8}$ – (SNR - 10)

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

## 9.4 Potential Noise Sources

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

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

## 9.5 Mitigation Measures

The following control measures are to be implemented:-

1. Site Manager shall monitor a likelihood of prolonged exposure to excessive noise and commission noise surveying/monitoring programme where necessary.
2. Works Supervisor shall assess risk arising from noise prior to each particular activity taking place and determine appropriate action. The aim shall be to minimise the exposure to excessive noise levels.
    a. If it is likely that the noise exposure exceeds Lower Action Value, then hearing protection must be made available.
    b. If it is likely that the noise exposure exceeds Upper Action Value, then hearing protection is mandatory to be used. Work Supervisor shall decide on the most suitable hearing protection to be used based on Exposure (see formula above) and worker's personal preference (earmuffs or earplugs).
3. Works Supervisor shall ensure proposed measures are put in place and that their effectiveness and suitability is evaluated on regular bases.

4. Site management shall minimise noise at work by looking for alternative processes and/or working methods, which would make the work quieter and/or exposure times shorter.
5. Site Manager shall liaise with all site contractors in order to effectively control noise exposure.
6. Number of people working near source of the noise shall be minimised.
7. Employees must use hearing protection where its use is made compulsory.
8. Hearing protection zones shall be identified where necessary.
9. Spot checks on appropriate use of hearing protection shall be carried out.
10. Operators of rock breaking machines and workers nearby must wear adequate ear protection.

## 9.6 Proper Use of Hearing Protection

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

All workers are expected to:

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

# 10. Erosion and Sediment Control

## 10.1 Run-Off to Ditches

Significant quantities of waste and potential pollutants can be generated during construction. Controls must be put in place to prevent these pollutants from washing into the local storm water system which discharges to the Broadmeadow River via attenuation ponds (with forebay) to the northeast of the site.

Protection of the Broadmeadow River is paramount during the construction stage of the subject development. Temporary measures will be put in place to remove sediments, oils, and pollutants.

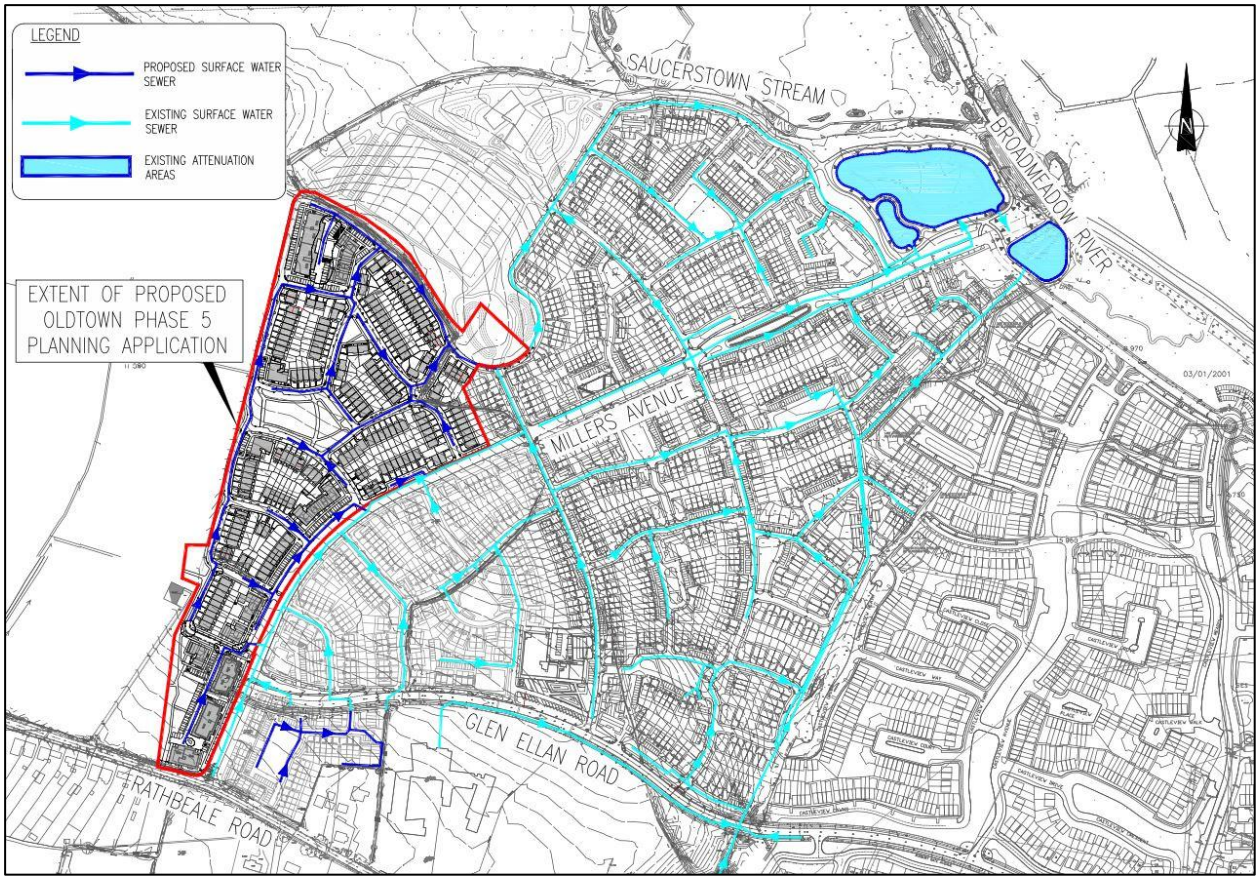


***Figure 2*** | *Surface Water Drainage Network*

The Inland Fisheries Ireland document: Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters 2006, outlines the following areas to be considered for the protection of adjacent water courses during the construction stage

1. Damage to the aquatic and associated riparian habitat due to loss of vegetation, damage to banks, & changes in watercourse morphology & hydrology.
2. Pollution of waters due to construction materials.
3. Introduction of non-native species such as plants, algae, fish & shellfish.
4. Interference to the movement of aquatic life.
5. Timing of in-stream works on seasonal salmonid activity.

6. Temporary crossing structures in waters.

7. Permanent crossing structures in waters.

8. Construction impacts such as cast in-situ concrete, sediment laden surface water, hydrocarbon leaks & water abstraction.

In consideration of the above list the following methods listed, but not limited to, will be implemented on site as appropriate:

1. Fuels, oils, greases, and hydraulic fluids will be stored in bunded compounds well away from the watercourse/ditches. Refuelling of machinery, etc., will be carried out in bunded areas.

2. Runoff from machine service and concrete mixing areas will not enter the watercourse.

3. Stockpile areas for sands and gravel will be kept to minimum size, well away from the watercourse.

4. Runoff from the above will only be routed to the watercourse via suitably designed and sited settlement ponds/filter channels.

5. Settlement ponds will be inspected daily and maintained regularly.

6. Temporary crossings will be designed to the criteria laid down for permanent works.

7. Watercourse banks will be left intact if possible. If they have to be disturbed, all practicable measures should be taken to prevent soils from entering the watercourses.

The main pollutants of site water are silt, fuel/oil, concrete and chemicals. See *Table 4*, for a list and brief description of pollution prevention measures.

| Source | Action |
|---|---|
| Detergents | Use of detergents should be carried out in designated areas draining to the foul sewer. |
| Fuel/Oil | Fuel/oil stores must be located away from the site drainage system and the edge of watercourses. |
| | Ensure adequate measures are identified to prevent or contain any spillage such as creating a fall away from any drainage grid or blocking drainage points. |
| | Prevent oil pollution by:<br>• Suitable bunded storage of fuel/oil, and use of drip trays under plant, and<br>• An oil separator, and/or<br>• On-site spill-kit<br>• Commercially available absorbent granules, pads, or booms. |
| Material Storage | Store drums, oil, and chemicals on an impervious base and within a secured bund. |
| | Ensure topsoil and/or spoil heaps are located at least 10m away from water courses. Consider seeding them or covering with a tarpaulin to prevent silty runoff and losses due to wind. |
| Leaks and Spills | Storage facilities are to be checked on a regular basis to ensure any leaks or drips are fixed to prevent loss and pollution. |

| | |
|---|---|
| | Ensure appropriate spill response equipment is located near to the material in case of containment failure or material spills and ensure site staff know how to use it. |
| | Adequate stocks of absorbent materials, such as sand or commercially available spill kits and booms should be available at all times. |
| Litter | Provide waste bins on-site as appropriate. |
| Construction Vehicles | Provide vehicle wheel washing. |
| Concrete, Cement and Bentonite | Washout of these materials should be carried out in a designated, impermeable contained area. The washout water itself should be disposed of off-site or discharged to the foul sewer if authorised. |

***Table 4*** | *Pollution Prevention Measures*

## 10.2 Sediment Control

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

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

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

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

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

## 10.3 Sediment Control Measures

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

- Straw Bales: Straw bales can be placed at the base of a slope to act as a sediment barrier. These are not recommended for use within a swale or channel. Straw bales are temporary in nature and may perform for only a period of weeks or months. Proper installation and maintenance is necessary to ensure their performance.
- Silt Fencing: A silt fence is made of a woven synthetic material, geotextile, and acts to filter run-off. Silt fencing can be placed as a temporary barrier along the contour at the base of a disturbed area

but is not recommended for use in a channel or swale. The material is durable and will last for more than one season if properly installed and maintained. Silt fencing is not intended to be used as a perimeter fence or in area of concentrated flow. If concentrated flow conditions exist, a more robust filter should be considered.

- Silt Barriers: Silt barriers can also be temporarily installed in any road gullies of partially constructed roads to prevent sediment movement into downstream drainage systems or SUDS components. When the catchment area is greater than that allowed for straw bale barriers or silt fences, runoff should be collected in diversion drains and routed through temporary sediment basins.
- Diversion Drains: Diversion drains are simple linear ditches, often with an earth bund, for channelling water to a desired location. If the drains are being eroded, they can be lined with geotextile fabric or large stones or boulders.

***Figure 3*** | *Examples of Diversion Drains*

# 11. Construction Phasing and Programme

## 11.1 Run-Off to Ditches

It is proposed that the site will be constructed in two phases as follows:-

Stage 1 Site clearance and preparation work for the construction of the housing units and all associated infrastructure.

Stage 2 Site development and construction of the residential units. The development includes all associated site works and infrastructure which includes landscaped open space, internal roads, paths, public lighting, utilities, foul and surface water drainage.

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

# Appendices

## A. Site Investigation Report

***S.I. Ltd Contract No: 5599***

Client: Gannon Homes Ltd
Engineer: Waterman Moylan
Contractor: Site Investigations Ltd

# Millers Glen – Phase 5,
# Swords, Co. Dublin
# Site Investigation Report

Prepared by:

.....
Stephen Letch

| | |
|---|---|
| Issue Date: | 20/06/2019 |
| Status | Final |
| Revision | 1 |

Contents:



Appendices:

## 1. Introduction

On the instructions of Waterman Moylan, Site Investigations Ltd (SIL) was appointed to complete a ground investigation at Millers Glen, Swords, Co. Dublin. The investigation was for the fifth phase of the Millers Glen residential development and was completed on behalf of the Client, Gannon Homes Ltd.

The fieldworks comprised a programme of cable percussive boreholes, trial pits with dynamic probes, soakaway tests and California Bearing Ratio tests. All fieldwork was carried out in accordance with BS 5930:2015, Engineers Ireland GI Specification and Related Document 2nd Edition 2016 and Eurocode 7: Geotechnical Design. Laboratory testing has been performed on representative soil samples recovered from the trial pits and these were completed in accordance of BS1377: 1990.

This report presents the factual geotechnical data obtained from the field and laboratory testing with interpretation of the ground conditions discussed.

## 2. Fieldwork

The initial geotechnical fieldworks were started and completed in May 2019 and comprised the following:

- 13 No. cable percussive boreholes
- 41 No. trial pits with dynamic probes
- 6 No. soakaway tests
- 37 No. California Bearing Ratio tests

### 2.1. Cable Percussive Boreholes

Cable percussion boring was undertaken at 13 No. locations using a Dando 150 rig and constructed 200mm diameter boreholes. The boreholes terminated on obstructions at varying depths ranging from 4.10mbgl (BH01) to 7.50mbgl (BH09). It was not possible to collect undisturbed samples due to the granular soils encountered so bulk disturbed samples were recovered at regular intervals.

To test the strength of the stratum, Standard Penetration Tests (SPT's) were performed at 1.00m intervals in accordance with BS 1377 (1990). In soils with high gravel and cobble content it is appropriate to use a solid cone (60°) (CPT) instead of the split spoon and this was used throughout the testing. The test is completed over 450mm and the cone is driven 150mm into the stratum to ensure that the test is conducted over an undisturbed zone. The cone is then driven the remaining 300mm and the blows recorded to report the N-Value. The report shows the N-Value with the 75mm incremental blows listed in brackets (e.g. BH01 at 1.00mbgl where

N=15-(3,3/4,3,4,4)). Where refusal of 50 blows across the test zone was encountered was achieved during testing, the penetration depth is also reported (e.g. BH01 at 4.00mbgl where N=50-(25 for 5mm/50 for 0mm)).

The logs are presented in Appendix 1.

**2.2. Trial Pits and Dynamic Probes**

41 No. trial pits were excavated using a wheeled excavator. At TP35, an additional pit was excavated due to the original location encountering shallow obstructions at 1.40mbgl. The pits were logged and photographed by SIL geotechnical engineer and representative disturbed bulk samples were recovered as the pits were excavated, which were returned to the laboratory for geotechnical testing.

Adjacent to the trial pits, dynamic probes were completed using a track mounted Competitor 130 machine. The testing complies with the requirements of BS1377: Part 9 (1990) and Eurocode 7: Part 3. The configuration utilised standard DPH (Heavy) probing method comprising a 50kg weight, 500mm drop height and a 50mm diameter (90°) cone. The number of blows required to drive the cone each 100mm increment into the sub soil is recorded in accordance with the standards. The dynamic probe provides no information regarding soil type or groundwater conditions.

The dynamic probe results can be used to analyse the strength of the soil strata encountered by the probe. 'Proceedings of the Trinity College Dublin Symposium of Field and Laboratory Testing of Soils for Foundations and Embankments' presents a paper by Foirbart that is most relevant to Irish soil conditions and within this paper the following equations were included:

**Granular Soils:** DPH $N_{100}$ x 2.5 = SPT N value

**Cohesive Soils:** $C_u$ = 15 x DPH $N_{100}$ + 30 kN/m$^2$

These equations present a relationship between the probe $N_{100}$ value and the SPT N value for granular soils and the undrained shear strength of cohesive soils.

The trial pit logs with the dynamic probe results are presented in Appendix 2 along with the photographs.

**2.3. Soakaway Tests**

At 6 No. locations, soakaway tests were completed and logged by SIL geotechnical engineer. The soakaway test is used to identify possible areas for storm water drainage. The pit was filled with water and the level of the groundwater was recorded over time. As stipulated by BRE Special Digest 365, the pit should be filled three times and that the final cycle is used to provide

the infiltration rate. The time taken for the water level to fall from 75% volume to 25% volume is required to calculate the rate of infiltration. However, if the water level does not fall at a steady rate then the test is deemed to have failed and the area is unsuitable for storm water drainage.

The results are provided in Appendix 3.

### 2.4. California Bearing Ratio tests

At 37 No. locations, undisturbed cylindrical mould samples were taken to complete California Bearing Ratio tests in the laboratory. 19 No. samples were recovered from independent locations and 18 No. samples were recovered from trial pits when the two locations were adjacent to each other. The results facilitate the designing of the access roads and associated areas. These tests were completed to BS1377: 1990: Part 4, Clause 7 'Determination of California Bearing Ratio'. The results are presented as part of Appendix 4 with the geotechnical laboratory test data.

### 2.5. Surveying

Following completion of all the fieldworks, a survey of the exploratory hole locations was completed using a GeoMax GPS Rover. The data is supplied on each individual log and along with a site plan in Appendix 6.

## 3. Laboratory Testing

Geotechnical laboratory testing is currently ongoing on representative soil samples in accordance with BS 1377 (1990). Testing included:

- 5 No. Moisture contents
- 5 No. Atterberg limits
- 5 No. Particle size gradings
- 5 No. pH, sulphate and chloride content

Environmental testing has been scheduled and is being completed by ALS Environmental Ltd. and consists of the following:

- 5 No. Rilta Suite analysis

The geotechnical laboratory test results are presented in Appendix 4 with the environmental tests reported in Appendix 5.

## 4. Ground Conditions

### 4.1. Overburden

A generalised summary of the ground profile is shown below. Reference should be made to the individual borehole and trial pit records in Appendices 1 and 2 for the full strata information at specific locations.

- TOPSOIL.
- Brown sandy slightly gravelly silty CLAY with low cobble content.
- Firm grey brown sandy slightly gravelly silty CLAY with low cobble content.
- Stiff becoming very stiff black slightly sandy gravelly silty CLAY with low cobble content.

MADE GROUND was encountered in 8 No. boreholes and in 8 No. trial pits and extended to a maximum depth of 2.50mbgl at TP27. The locations are generally around the area of the site previously used as a compound for the previous phases of the development and mainly consist of cohesive clay soils with construction waste fragments.

The natural soils consist of over-consolidated lodgment till which is encountered across the North Dublin region with several papers discussing the engineering characteristics of the soil. The brown soils are the weathered surface of the underlying black clays and the gravel and cobbles are generally subrounded to subangular and predominantly limestone in origin. The boundary between the brown soil and the black soil in the boreholes is between 1.60mbgl (BH09) and 3.50mbgl (BH12). The SPT N-values show an increase in blow counts when the black soils are encountered, and this also increases steadily with depth.

The laboratory testing of the soils recorded moisture contents between 10.4% and 15.4% with low plasticity index results between 10 and 14, which indicates CLAY soils with low and intermediate plasticity. The grading curves show poorly graded straight-line profiles with 18% to 36% fines content.

### 4.2. Groundwater

Groundwater details in the boreholes and trial pits during the fieldworks are noted on the logs in Appendices 1 and 2. Groundwater was recorded in 5 of the boreholes with the shallowest strike at 1.60mbgl and the deepest at 5.00mbgl. Groundwater was also encountered in 12 trial pits between 0.40mbgl and 2.20mbgl and these were all recorded as seepages.

## 5.0. Recommendations and Conclusions

Please note the following caveats:

*The recommendations given, and opinions expressed in this report are based on the findings as detailed in the exploratory hole records. Where an opinion is expressed on the material between the exploratory hole locations or below the final level of excavation, this is for guidance only and no liability can be accepted for its accuracy. No responsibility can be accepted for adjacent unexpected conditions that have not been revealed by the exploratory holes. It is further recommended that all bearing surfaces when excavated should be inspected by a suitably qualified Engineer to verify the information given in this report.*

*Excavated surfaces in clay strata should be kept dry to avoid softening prior to foundation placement. Foundations should always be taken to a minimum depth of 0.50mBGL to avoid the effects of frost action and possible seasonal shrinkage/swelling.*

*If it is intended that on-site materials are to be used as fill, then the necessary laboratory testing should be specified by the Client to confirm the suitability. Also, relevant lab testing should be specified where stability of side slopes to excavations is a concern, or where contamination may be an issue.*

### 5.1. Shallow Foundations

Due to the unknown depth of foundation and no longer-term groundwater information, this analysis assumes the groundwater will not influence the construction or performance of these foundations.

SIL do not recommend that shallow foundations are placed on fill material due to the unknown compaction methods used during laying of man-made material. This unknown could result in softer spots and differential settlement of a building once construction is completed. If shallow foundations are to be used and man-made soils are encountered below foundation level, then this soil should be removed and replaced with engineered fill.

The natural ground conditions recorded in the boreholes is generally firm brown slightly sandy gravelly silty CLAY with low cobble content at 1.00mbgl. The SPT test results are consistent with values of 9 to 16 recorded at 1.00mbgl. Therefore, for the analysis an N-value of 9 was chosen for the purposes of design in this stratum, in accordance with Eurocode 7 (EC 7).

Stroud and Butler proposed a correlation between the SPT N-value and undrained shear strength using the Atterberg Limits and using the indices of 14%, a correlation of Cu=6N has been chosen for this site. Therefore, using the value of 9, this indicates that the undrained shear strength of the CLAY is 54kN/m$^2$. This can be used to calculate the ultimate bearing capacity, and this has been calculated to be 300kN/m$^2$. Finally, a factor of safety is applied and with a

factor of 3, an allowable bearing capacity of 100kN/m$^2$ would be anticipated using these SPT values.

BH08 recorded a slightly lower value of 6 but stiffer soils were recorded at 1.60mbgl and therefore, foundations may require to be deeper than 1.00mbgl if soft spots or fill material are encountered across the site.

If higher bearing capacities were required, then the lower black CLAY could be founded on. This recorded an SPT range of 17 to 35 at 2.00mbgl and using this lower value, an ultimate bearing capacity of 555kN/m$^2$ and therefore, an allowable bearing capacity of 185kN/m$^2$ would be anticipated.

As previously discussed, papers have been published about the North Dublin soils and there engineering characteristics. These values recorded on site would be slightly lower than expected for this type of soil with the brown clay normally providing approximately 150kN/m$^2$ allowable bearing capacity with the stiffer black clay offering 300kN/m$^2$ allowable bearing capacity. However, it would still be important that all founding strata be examined by a qualified engineer prior to the pouring of the foundations to confirm the suitability of the soil for the design foundations.

The following assumptions were made as part of these analyses. If any of these assumptions are not in accordance with detailed design or observations made during construction these recommendations should be re-evaluated.

- Foundations are to be constructed on a level formation of uniform material type (described above).
- The bulk unit weight of the material in this stratum has a minimum density of 19kN/m$^3$.
- All bearing capacity calculations allow for a settlement of 25mm.

The trial pits indicate that excavations in the cohesive soils should be stable for a short while at least. However, regular inspection of temporary excavations should be completed during construction to ensure that all slopes are stable. Temporary support should be used on any excavation that will be left open for an extended period.

**5.2. Groundwater**

The caveats below relating to interpretation of groundwater levels should be noted:
*There is always considerable uncertainty as to the likely rates of water ingress into excavations in clayey soil sites due to the possibility of localised unforeseen sand and gravel lenses acting as permeable conduits for unknown volumes of water.*

*Furthermore, water levels noted on the borehole and trial pit logs do not generally give an accurate indication of the actual groundwater conditions as the borehole or trial pit is rarely left open for sufficient time for the water level to reach equilibrium.*

*Also, during boring procedures, a permeable stratum may have been sealed off by the borehole casing, or water may have been added to aid drilling. Therefore, an extended period of groundwater monitoring using any constructed standpipes is required to provide more accurate information regarding groundwater conditions. Finally, groundwater levels vary with time of year, rainfall, nearby construction and tides.*

*Pumping tests would be required to determine likely seepage rates and persistence into excavations taken below the groundwater level. Deep trial pits also aid estimation of seepage rates.*

As discussed previously, groundwater was encountered in 5 of the boreholes and 12 of the trial pits with slow ingress rates. There is always considerable uncertainty as to the likely rates of water ingress into excavations in cohesive soil sites due to the possibility of localised unforeseen sand and gravel lenses acting as permeable conduits for unknown volumes of water. However, based on this information at the exploratory hole locations to date, it is considered likely that any seepages into excavations of the CLAY will be slow. If granular soils are encountered, then the possibility of water ingressing into an excavation increases.

If groundwater is encountered during excavations then mechanical pumps will be required to remove the groundwater from sumps. Sumps should be carefully located and constructed to ensure that groundwater is efficiently removed from excavations and trenches.

**5.3. Soakaway Tests**

The soakaway tests show that generally the areas of the site tested are unsuitable for soakaway design. The BRE Digest stipulates that the pit should half empty within 24hrs, and extrapolation indicates this condition would not be satisfied. The tests were terminated at the end of the first (of a possible three) fill/empty cycle since further testing would give even slower fall rates due to increased soil saturation. The unsuitability of the soils for soakaways is further suggested by the soil descriptions of the materials in this area of the site where the soakaway was completed, i.e. well compacted clay soils.

**5.4. Pavement Design**

The plate test results in Appendix 4 indicate CBR values are generally greater than 5% although lower values of 3.8% (CBR33), 4.2% (CBR32) and 4.7% (CBR25) were recorded.

The samples were taken at 0.50mbgl and inspection of the formation strata should be completed prior to construction of the pavement. Once the exact formation levels are finalised then additional in-situ testing could be completed to assist with the detailed pavement design.

**5.5. Contamination**

Environmental testing was carried out on five samples from the investigation and the results are shown in Appendix 5. For material to be removed from site, Rilta Suite testing was carried out to determine if the material is hazardous or non-hazardous and then the leachate results were compared with the published waste acceptance limits of BS EN 12457-2 to determine whether the material on the site could be accepted as 'inert material' by an Irish landfill.

The Waste Classification report created using HazWasteOnline™ software shows that the material tested can be classified as non-hazardous material. The Total Petroleum Hydrocarbon (TPH) results did record a level above the limit of detection, but the level was low and not in liquid form so therefore, the sample can be recorded as non-hazardous.

Following this analysis of the solid test results, the leachate disposal suite results indicate that the soils tested would generally be able to be treated as Inert Waste. However, the fluoride, sulphate, total dissolved solids and total monohydric phenols results were slightly elevated above the Inert threshold and therefore, these results should be sent to the individual landfill to ensure that the material can be accepted prior to excavation.

Only five samples were tested for analysis and therefore, any localised contamination may have been missed. Any MADE GROUND excavated on site should be stockpiled separately to natural soils to avoid any potential cross contamination of the soils. Additional testing of these soils may be requested by the individual landfill before acceptance and a testing regime designed by an environmental engineer would be recommended to satisfy the landfill.

**5.6. Aggressive Ground Conditions**

The chemical test results in Appendix 4 indicate a general pH value between 7.89 and 8.07, which is close to neutral and below the level of 9, therefore no special precautions are required.

The maximum value obtained for water soluble sulphate was 130mg/l as $SO_3$. The BRE Special Digest 1:2005 – '*Concrete in Aggressive Ground'* guidelines require $SO_4$ values and after conversion ($SO_4 = SO_3 \times 1.2$), the maximum value of 156mg/l shows Class 1 conditions and no special precautions are required.

# Appendix 1

# Cable Percussive Borehole Logs

| Contract No: 5599 | **Cable Percussion Borehole Log** | Borehole No: **BH01** |
|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716173.830 | Date Started: | 27/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748313.669 | Date Completed: | 27/05/2019 |
| Client: | Gannon Homes Ltd | Elevation: | 32.86 | Drilled By: | T. Tindall |
| Engineer: | Waterman Moylan | Borehole Diameter: | 200mm | Status: | FINAL |

| Depth (m) Scale | Depth | Stratum Description | Legend | Level (mOD) Scale | Depth | Samples and Insitu Tests Depth | Type | Result | Water Strike | Backfill |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.5 | 0.10 | TOPSOIL. | | 32.5 | 32.76 | | | | | |
| | | Firm brown slightly sandy gravelly silty CLAY with low cobble content. | | 32.0 | | 1.00 | B | TT01 | | |
| 1.0 | | | | | | 1.00 | C | N=15 (3,3/4,3,4,4) | | |
| 1.5 | | | | 31.5 | | | | | | |
| | 1.70 | Stiff becoming very stiff black slightly sandy gravelly silty CLAY with low cobble content. | | 31.0 | 31.16 | 2.00 | B | TT02 | | |
| 2.0 | | | | | | 2.00 | C | N=29 (5,7/6,6,8,9) | | |
| 2.5 | | | | 30.5 | | | | | | |
| 3.0 | | | | 30.0 | | 3.00 | B | TT03 | | |
| | | | | | | 3.00 | C | N=47 (7,7/9,11,13,14) | | |
| 3.5 | | | | 29.5 | | | | | | |
| 4.0 | 4.00 | Obstruction - possible boulder. | | 29.0 | 28.86 | 4.00 | C | 50 (25 for 5mm/50 for 0mm) | | |
| | 4.10 | Borehole terminated due to obstruction. | | | 28.76 | | | | | |
| 4.5 | | End of Borehole at 4.10m | | 28.5 | | | | | | |
| 5.0 | | | | 28.0 | | | | | | |
| 5.5 | | | | 27.5 | | | | | | |
| 6.0 | | | | 27.0 | | | | | | |
| 6.5 | | | | 26.5 | | | | | | |
| 7.0 | | | | 26.0 | | | | | | |
| 7.5 | | | | 25.5 | | | | | | |
| 8.0 | | | | 25.0 | | | | | | |
| 8.5 | | | | 24.5 | | | | | | |
| 9.0 | | | | 24.0 | | | | | | |
| 9.5 | | | | 23.5 | | | | | | |
| | | | | 23.0 | | | | | | |

| Chiselling: From: | To: | Time: | Water Strikes: Strike: | Rose: | Depth Sealed | Water Details: Date: | Hole Depth: | Water Depth: | Installation: From: | To: | Pipe: | Backfill: From: | To: | Type: | Remarks: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.00 | 4.10 | 01:00 | | | | 27/05 | 4.10 | Dry | | | | 0.00 | 4.10 | Arisings | Borehole terminated due to obstruction. |

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

| Contract No: 5599 | **Cable Percussion Borehole Log** | Borehole No: **BH02** |
|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716186.310 | Date Started: | 28/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748346.488 | Date Completed: | 28/05/2019 |
| Client: | Gannon Homes Ltd | Elevation: | 31.64 | Drilled By: | T. Tindall |
| Engineer: | Waterman Moylan | Borehole Diameter: | 200mm | Status: | FINAL |

| Depth (m) Scale | Depth | Stratum Description | Legend | Level (mOD) Scale | Depth | Samples and Insitu Tests Depth | Type | Result | Water Strike | Backfill |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0.20 | TOPSOIL. | | 31.5 | 31.44 | | | | | |
| 0.5 | | Stiff brown slightly sandy gravelly silty CLAY with low cobble content. | | 31.0 | | | | | | |
| 1.0 | | | | | | 1.00 | B | TT04 | | |
| 1.5 | | | | 30.5 | | 1.00 | C | N=18 (4,3/4,4,5,5) | | |
| | 1.80 | | | 30.0 | 29.84 | | | | | |
| 2.0 | | Stiff becoming very stiff black slightly sandy gravelly silty CLAY with low cobble content. | | | | 2.00 | B | TT05 | | |
| 2.5 | | | | 29.5 | | 2.00 | C | N=35 (6,7/6,8,10,11) | | |
| 3.0 | | | | 29.0 | | | | | | |
| 3.5 | | | | 28.5 | | 3.00 | B | TT06 | | |
| | | | | | | 3.00 | C | N=50 (9,11/50 for 250mm) | | |
| 4.0 | | | | 28.0 | | | | | | |
| | | | | | | 4.00 | B | TT07 | | |
| | 4.30 | | | 27.5 | 27.34 | 4.00 | C | 50 (8,13/50 for 80mm) | | |
| 4.5 | 4.40 | Obstruction - possible boulder. | | | | 4.40 | C | 50 (25 for 5mm/50 for 0mm) | | |
| | | Borehole terminated due to obstruction. | | 27.0 | 27.24 | | | | | |
| | | End of Borehole at 4.40m | | | | | | | | |
| 5.0 | | | | 26.5 | | | | | | |
| 5.5 | | | | 26.0 | | | | | | |
| 6.0 | | | | 25.5 | | | | | | |
| 6.5 | | | | 25.0 | | | | | | |
| 7.0 | | | | 24.5 | | | | | | |
| 7.5 | | | | 24.0 | | | | | | |
| 8.0 | | | | 23.5 | | | | | | |
| 8.5 | | | | 23.0 | | | | | | |
| 9.0 | | | | 22.5 | | | | | | |
| 9.5 | | | | 22.0 | | | | | | |

**Chiselling:**

| From: | To: | Time: |
|---|---|---|
| 3.40 | 3.50 | 00:45 |
| 4.30 | 4.40 | 01:00 |

**Water Strikes:**

| Strike: | Rose: | Depth Sealed |
|---|---|---|
| | | |

**Water Details:**

| Date: | Hole Depth: | Water Depth: |
|---|---|---|
| 28/05 | 4.40 | Dry |

**Installation:**

| From: | To: | Pipe: |
|---|---|---|
| | | |

**Backfill:**

| From: | To: | Type: |
|---|---|---|
| 0.00 | 4.40 | Arisings |

**Remarks:**

Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

| Contract No: 5599 | **Cable Percussion Borehole Log** | Borehole No: **BH03** |
|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716201.740 | Date Started: | 28/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748380.797 | Date Completed: | 28/05/2019 |
| Client: | Gannon Homes Ltd | Elevation: | 30.79 | Drilled By: | J. O'Toole |
| Engineer: | Waterman Moylan | Borehole Diameter: | 200mm | Status: | FINAL |

| Depth (m) Scale | Depth | Stratum Description | Legend | Level (mOD) Scale | Depth | Samples and Insitu Tests Depth | Type | Result | Water Strike | Backfill |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0.20 | TOPSOIL. | | | 30.59 | | | | | |
| | | Firm brown slightly sandy gravelly silty CLAY with low cobble content. | | | | 1.00<br>1.00 | B<br>C | JOT54<br>N=9 (0,1/2,2,2,3) | | |
| | 1.80 | Stiff becoming very stiff black slightly sandy gravelly silty CLAY with low cobble content. | | | 28.99 | 2.00<br>2.00 | B<br>C | JOT55<br>N=19 (2,3/4,4,5,6) | | |
| | | | | | | 3.00<br>3.00 | B<br>C | JOT56<br>N=23 (2,3/5,5,6,7) | | |
| | | | | | | 4.00<br>4.00 | B<br>C | JOT57<br>50 (6,7/50 for 125mm) | | |
| | 4.80 | Obstruction - possible boulder. | | | 25.99 | | | | | |
| | 5.00 | Borehole terminated due to obstruction.<br>End of Borehole at 5.00m | | | 25.79 | 5.00<br>5.00 | B<br>C | JOT58<br>50 (25 for 5mm/50 for 0mm) | | |

| Chiselling: From: | To: | Time: | Water Strikes: Strike: | Rose: | Depth Sealed | Water Details: Date: | Hole Depth: | Water Depth: | Installation: From: | To: | Pipe: | Backfill: From: | To: | Type: | Remarks: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.30 | 4.40 | 00:45 | | | | 28/05 | 5.00 | Dry | | | | 0.00 | 5.00 | Arisings | Borehole terminated due to obstruction. |
| 4.80 | 5.00 | 01:00 | | | | | | | | | | | | | |

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

| Contract No: 5599 | **Cable Percussion Borehole Log** | Borehole No: **BH04** |
|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716199.260 | Date Started: | 24/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748431.387 | Date Completed: | 24/05/2019 |
| Client: | Gannon Homes Ltd | Elevation: | 29.65 | Drilled By: | J. O'Toole |
| Engineer: | Waterman Moylan | Borehole Diameter: | 200mm | Status: | FINAL |

| Depth (m) Scale | Depth | Stratum Description | Legend | Level (mOD) Scale | Depth | Samples and Insitu Tests Depth | Type | Result | Water Strike | Backfill |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.5 | 0.70 | MADE GROUND: brown sandy slightly gravelly silty clay with low cobble content and some brick and plastic. | | 29.5 | | | | | | |
| 1.0 | | Firm brown slightly sandy gravelly silty CLAY with low cobble content. | | 29.0 | 28.95 | 1.00 | B | JOT44 | | |
| 1.5 | | | | 28.5 | | 1.00 | C | N=14 (2,3/3,3,4,4) | | |
| 2.0 | 2.10 | | | 28.0 | | 2.00 | B | JOT45 | | |
| 2.5 | | Very stiff black slightly sandy gravelly silty CLAY with low cobble content. | | 27.5 | 27.55 | 2.00 | C | N=32 (2,4/7,7,8,10) | | |
| 3.0 | 2.80 | Very stiff grey brown sandy slightly gravelly silty CLAY. | | 27.0 | 26.85 | 3.00 | B | JOT46 | | |
| 3.5 | | | | 26.5 | | 3.00 | C | N=48 (4,7/7,10,16,15) | | |
| 4.0 | | | | 26.0 | | 4.00 | B | JOT47 | | |
| 4.5 | 4.50 | | | 25.5 | | 4.00 | C | N=30 (3,4/7,7,7,9) | | |
| 5.0 | | Very stiff grey brown slightly sandy gravelly silty CLAY with low cobble content. | | 25.0 | 25.15 | 5.00 | B | JOT48 | | |
| 5.5 | | | | 24.5 | | 5.00 | C | N=46 (4,7/9,9,12,16) | | |
| 6.0 | 5.80 | | | 24.0 | 23.85 | | | | | |
| | 6.00 | Obstruction - possible boulder. | | | 23.65 | 6.00 | C | 50 (25 for 5mm/50 for 0mm) | | |
| | | Borehole terminated due to obstruction. End of Borehole at 6.00m | | 23.5 | | | | | | |
| 6.5 | | | | 23.0 | | | | | | |
| 7.0 | | | | 22.5 | | | | | | |
| 7.5 | | | | 22.0 | | | | | | |
| 8.0 | | | | 21.5 | | | | | | |
| 8.5 | | | | 21.0 | | | | | | |
| 9.0 | | | | 20.5 | | | | | | |
| 9.5 | | | | 20.0 | | | | | | |

**Chiselling:**

| From: | To: | Time: |
|---|---|---|
| 3.60 | 3.80 | 00:45 |
| 5.80 | 6.00 | 01:00 |

**Water Strikes:**

| Strike: | Rose: | Depth Sealed |
|---|---|---|
| | | |

**Water Details:**

| Date: | Hole Depth: | Water Depth: |
|---|---|---|
| 24/05 | 6.00 | Dry |

**Installation:**

| From: | To: | Pipe: |
|---|---|---|
| | | |

**Backfill:**

| From: | To: | Type: |
|---|---|---|
| 0.00 | 6.00 | Arisings |

**Remarks:** Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

| Contract No: 5599 | **Cable Percussion Borehole Log** | Borehole No: **BH05** |
|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716170.020 | Date Started: | 27/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748448.030 | Date Completed: | 27/05/2019 |
| Client: | Gannon Homes Ltd | Elevation: | 29.46 | Drilled By: | J. O'Toole |
| Engineer: | Waterman Moylan | Borehole Diameter: | 200mm | Status: | FINAL |

| Depth (m) | | Stratum Description | Legend | Level (mOD) | | Samples and Insitu Tests | | | Water Strike | Backfill |
|---|---|---|---|---|---|---|---|---|---|---|
| Scale | Depth | | | Scale | Depth | Depth | Type | Result | | |
| | | MADE GROUND: grey silty sandy gravel. | | | | | | | | |
| | 0.50 | MADE GROUND: black sandy slightly gravelly silty clay with low cobble content and some brick. | | 29.0 | 28.96 | | | | | |
| | 0.80 | Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. | | | 28.66 | | | | | |
| | | | | 28.5 | | 1.00 | B | JOT49 | | |
| | | | | | | 1.00 | C | N=10 (1,1/2,2,3,3) | | |
| | | | | 28.0 | | | | | | |
| | | | | 27.5 | | 2.00 | B | JOT50 | | |
| | | | | | | 2.00 | C | N=16 (2,2/3,4,4,5) | | |
| | | | | 27.0 | | | | | | |
| | 2.80 | Black slightly sandy gravelly silty CLAY. | | | 26.66 | | | | | |
| | 3.00 | Stiff becoming very stiff brown slightly sandy gravelly silty CLAY. | | 26.5 | 26.46 | 3.00 | B | JOT51 | | |
| | | | | | | 3.00 | C | N=28 (2,3/5,7,7,9) | | |
| | | | | 26.0 | | | | | | |
| | | | | 25.5 | | 4.00 | B | JOT52 | | |
| | | | | | | 4.00 | C | N=36 (4,7/7,9,9,11) | | |
| | | | | 25.0 | | | | | | |
| | 4.80 | Very stiff grey slightly sandy gravelly silty CLAY with low cobble content. | | | 24.66 | | | | | |
| | | | | 24.5 | | 5.00 | B | JOT53 | | |
| | | | | | | 5.00 | C | 50 (11,12/50 for 225mm) | | |
| | 5.40 | Obstruction - possible boulder. | | 24.0 | 24.06 | | | | | |
| | 5.50 | Borehole terminated due to obstruction. | | | 23.96 | 5.50 | C | 50 (25 for 5mm/50 for 0mm) | | |
| | | End of Borehole at 5.50m | | | | | | | | |
| | | | | 23.5 | | | | | | |
| | | | | 23.0 | | | | | | |
| | | | | 22.5 | | | | | | |
| | | | | 22.0 | | | | | | |
| | | | | 21.5 | | | | | | |
| | | | | 21.0 | | | | | | |
| | | | | 20.5 | | | | | | |
| | | | | 20.0 | | | | | | |

| Chiselling: | | | Water Strikes: | | | Water Details: | | | Installation: | | | Backfill: | | | Remarks: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| From: | To: | Time: | Strike: | Rose: | Depth Sealed | Date: | Hole Depth: | Water Depth: | From: | To: | Pipe: | From: | To: | Type: | |
| 5.40 | 5.50 | 01:00 | | | | 27/05 | 5.50 | Dry | | | | 0.00 | 5.50 | Arisings | Borehole terminated due to obstruction. |

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

| Contract No: 5599 | **Cable Percussion Borehole Log** | Borehole No: **BH06** |
|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716227.020 | Date Started: | 23/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748511.910 | Date Completed: | 23/05/2019 |
| Client: | Gannon Homes Ltd | Elevation: | 26.94 | Drilled By: | J. O'Toole |
| Engineer: | Waterman Moylan | Borehole Diameter: | 200mm | Status: | FINAL |

| Depth (m) Scale | Depth | Stratum Description | Legend | Level (mOD) Scale | Depth | Samples and Insitu Tests Depth | Type | Result | Water Strike | Backfill |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.5 | | MADE GROUND: brown sandy slightly gravelly silty clay with low cobble content and some brick and plastic. | | 26.5 | | | | | | |
| 1.0 | | | | 26.0 | | 1.00<br>1.00 | B<br>C | JOT34<br>N=8 (0,1/2,2,2,2) | | |
| 1.5 | 1.40 | Stiff brown sandy slightly gravelly silty CLAY. | | 25.5 | 25.54 | | | | | |
| 2.0 | | | | 25.0 | | 2.00<br>2.00 | B<br>C | JOT35<br>N=19 (2,3/4,5,5,5) | | |
| 2.5 | 2.40 | Grey slightly sandy gravelly silty CLAY with low cobble content. | | 24.5 | 24.54 | | | | | |
| 3.0 | 3.00 | Very stiff dark grey slightly sandy gravelly silty CLAY with low cobble content. | | 24.0 | 23.94 | 3.00<br>3.00 | B<br>C | JOT36<br>N=31 (3,5/7,6,9,9) | | |
| 3.5 | | | | 23.5 | | | | | | |
| 4.0 | | | | 23.0 | | 4.00<br>4.00 | B<br>C | JOT37<br>N=50 (7,8/50 for 240mm) | | |
| 4.5 | | | | 22.5 | | | | | | |
| 5.0 | | | | 22.0 | | 5.00<br>5.00 | B<br>C | JOT38<br>N=31 (5,5/6,7,9,9) | | |
| 5.5 | | | | 21.5 | | | | | | |
| 6.0 | 5.90<br>6.00 | Obstruction - possible boulder.<br>Borehole terminated due to obstruction.<br>End of Borehole at 6.00m | | 21.0<br>20.5<br>20.0<br>19.5<br>19.0<br>18.5<br>18.0<br>17.5 | 21.04<br>20.94 | 6.00 | C | 50 (25 for 5mm/50 for 0mm) | | |

| Chiselling: From: | To: | Time: | Water Strikes: Strike: | Rose: | Depth Sealed | Water Details: Date: | Hole Depth: | Water Depth: | Installation: From: | To: | Pipe: | Backfill: From: | To: | Type: | Remarks: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.40 | 4.50 | 00:45 | | | | 23/05 | 6.00 | Dry | | | | 0.00 | 6.00 | Arisings | Borehole terminated due to obstruction. |
| 5.90 | 6.00 | 01:00 | | | | | | | | | | | | | |

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

| Contract No: 5599 | **Cable Percussion Borehole Log** | Borehole No: **BH07** |
|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716243.650 | Date Started: | 22/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748621.941 | Date Completed: | 22/05/2019 |
| Client: | Gannon Homes Ltd | Elevation: | 23.57 | Drilled By: | J. O'Toole |
| Engineer: | Waterman Moylan | Borehole Diameter: | 200mm | Status: | FINAL |

| Depth (m) Scale | Depth (m) Depth | Stratum Description | Legend | Level (mOD) Scale | Level (mOD) Depth | Samples and Insitu Tests Depth | Type | Result | Water Strike | Backfill |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.5 | | MADE GROUND: brown sandy slightly gravelly silty clay with low cobble content and some brick and plastic. | | 23.5 | | 1.00 | B | JOT29 | | |
| 1.0 | | | | 23.0 | | 1.00 | C | N=4 (0,1/1,0,1,2) | | |
| 1.5 | | | | 22.5 | | | | | | |
| 2.0 | 1.80 | | | 22.0 | 21.77 | | | | | |
| 2.5 | 2.00 | MADE GROUND: brown black sandy slightly gravelly silty clay with low cobble content and some brick and plastic. | | 21.5 | 21.57 | 2.00 | B | JOT30 | | |
| 3.0 | | Stiff black slightly sandy gravelly silty CLAY with low cobble content. | | 21.0 | | 2.00 | C | N=17 (2,3/4,4,5,4) | | |
| 3.5 | 2.80 | Stiff becoming very stiff grey slightly sandy gravelly silty CLAY. | | 20.5 | 20.77 | 3.00 | B | JOT31 | | |
| 4.0 | | | | 20.0 | | 3.00 | C | N=25 (2,4/6,6,6,7) | | |
| 4.5 | | | | 19.5 | | 4.00 | B | JOT32 | | |
| 5.0 | 4.60 | Grey slightly sandy gravelly silty CLAY with low cobble content. | | 19.0 | 18.97 | 4.00 | C | 50 (6,7/50 for 25mm) | | |
| 5.5 | 5.00 | Obstruction - possible boulder. Borehole terminated due to obstruction. End of Borehole at 5.00m | | 18.5 | 18.57 | 5.00 | B | JOT33 | | |
| 6.0 | | | | 18.0 | | 5.00 | C | 50 (25 for 5mm/50 for 0mm) | | |
| 6.5 | | | | 17.5 | | | | | | |
| 7.0 | | | | 17.0 | | | | | | |
| 7.5 | | | | 16.5 | | | | | | |
| 8.0 | | | | 16.0 | | | | | | |
| 8.5 | | | | 15.5 | | | | | | |
| 9.0 | | | | 15.0 | | | | | | |
| 9.5 | | | | 14.5 | | | | | | |
| | | | | 14.0 | | | | | | |

**Chiselling:**

| From: | To: | Time: |
|---|---|---|
| 4.20 | 4.40 | 00:45 |
| 5.00 | 5.00 | 01:00 |

**Water Strikes:**

| Strike: | Rose: | Depth Sealed |
|---|---|---|
| 4.60 | 4.50 | NS |

**Water Details:**

| Date: | Hole Depth: | Water Depth: |
|---|---|---|
| 22/05 | 5.00 | 4.90 |

**Installation:**

| From: | To: | Pipe: |
|---|---|---|
| | | |

**Backfill:**

| From: | To: | Type: |
|---|---|---|
| 0.00 | 5.00 | Arisings |

**Remarks:**

Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

| Contract No: 5599 | **Cable Percussion Borehole Log** | Borehole No: **BH08** |
|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716256.480 | Date Started: | 22/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748690.585 | Date Completed: | 22/05/2019 |
| Client: | Gannon Homes Ltd | Elevation: | 20.91 | Drilled By: | J. O'Toole |
| Engineer: | Waterman Moylan | Borehole Diameter: | 200mm | Status: | FINAL |

| Depth (m) Scale | Depth | Stratum Description | Legend | Level (mOD) Scale | Depth | Samples and Insitu Tests Depth | Type | Result | Water Strike | Backfill |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.5 | | Soft brown slightly sandy gravelly silty CLAY with low cobble content. | | 20.5 | | 1.00 | B | JOT25 | | |
| 1.0 | | | | 20.0 | | 1.00 | C | N=6 (1,1/1,2,1,2) | | |
| 1.5 | 1.60 | Stiff brown slightly sandy gravelly silty CLAY with low cobble content. | | 19.5 | 19.31 | | | | | |
| 2.0 | | | | 19.0 | | 2.00 | B | JOT26 | | |
| 2.5 | 2.60 | | | 18.5 | 18.31 | 2.00 | C | N=22 (2,4/5,5,6,6) | | |
| 3.0 | 2.80 | Black slightly sandy gravelly silty CLAY with low cobble content. Stiff becoming very stiff brown slightly sandy gravelly silty CLAY. | | 18.0 | 18.11 | 3.00 | B | JOT27 | | |
| 3.5 | | | | 17.5 | | 3.00 | C | N=26 (2,3/6,6,7,7) | | |
| 4.0 | | | | 17.0 | | 4.00 | B | JOT28 | | |
| 4.5 | 4.40 | Obstruction - possible boulder. | | 16.5 | 16.51 | 4.00 | C | N=50 (2,7/50 for 250mm) | | |
| 5.0 | 4.50 | Borehole terminated due to obstruction. End of Borehole at 4.50m | | 16.0 | 16.41 | 4.50 | C | 50 (25 for 5mm/50 for 0mm) | | |
| 5.5 | | | | 15.5 | | | | | | |
| 6.0 | | | | 15.0 | | | | | | |
| 6.5 | | | | 14.5 | | | | | | |
| 7.0 | | | | 14.0 | | | | | | |
| 7.5 | | | | 13.5 | | | | | | |
| 8.0 | | | | 13.0 | | | | | | |
| 8.5 | | | | 12.5 | | | | | | |
| 9.0 | | | | 12.0 | | | | | | |
| 9.5 | | | | 11.5 | | | | | | |
| | | | | 11.0 | | | | | | |

| Chiselling: From: | To: | Time: | Water Strikes: Strike: | Rose: | Depth Sealed | Water Details: Date: | Hole Depth: | Water Depth: | Installation: From: | To: | Pipe: | Backfill: From: | To: | Type: | Remarks: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.40 | 4.50 | 01:00 | | | | 22/05 | 4.50 | Dry | | | | 0.00 | 4.50 | Arisings | Borehole terminated due to obstruction. |

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

| Contract No: 5599 | **Cable Percussion Borehole Log** | Borehole No: **BH09** |
|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716287.710 | Date Started: | 21/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748869.142 | Date Completed: | 21/05/2019 |
| Client: | Gannon Homes Ltd | Elevation: | 18.34 | Drilled By: | J. O'Toole |
| Engineer: | Waterman Moylan | Borehole Diameter: | 200mm | Status: | FINAL |

| Depth (m) Scale | Depth (m) Depth | Stratum Description | Legend | Level (mOD) Scale | Level (mOD) Depth | Samples and Insitu Tests Depth | Type | Result | Water Strike | Backfill |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.5 | | MADE GROUND: brown sandy slightly gravelly silty clay with low cobble content and some brick and plastic. | | 18.0 | | | | | | |
| 1.0 | 1.00 | Firm brown slightly sandy gravelly silty CLAY with low cobble content. | | 17.5 | 17.34 | 1.00<br>1.00 | B<br>C | JOT18<br>N=11 (1,2/2,2,3,4) | | |
| 1.5 | 1.60 | Stiff becoming very stiff black slightly sandy gravelly silty CLAY with low cobble content. | | 17.0 | 16.74 | | | | | |
| 2.0 | | | | 16.5 | | 2.00<br>2.00 | B<br>C | JOT19<br>N=19 (3,4/3,5,5,6) | | |
| 2.5 | | | | 16.0 | | | | | | |
| 3.0 | | | | 15.5 | | 3.00<br>3.00 | B<br>C | JOT20<br>N=32 (2,6/7,7,9,9) | | |
| 3.5 | | | | 15.0 | | | | | | |
| 4.0 | | | | 14.5 | | 4.00<br>4.00 | B<br>C | JOT21<br>N=19 (2,3/3,4,6,6) | | |
| 4.5 | | | | 14.0 | | | | | | |
| 5.0 | | | | 13.5 | | 5.00<br>5.00 | B<br>C | JOT22<br>N=31 (2,4/7,9,8,7) | | |
| 5.5 | | | | 13.0 | | | | | | |
| 6.0 | | | | 12.5 | | 6.00<br>6.00 | B<br>C | JOT23<br>N=47<br>(4,7/9,12,12,14) | | |
| 6.5 | | | | 12.0 | | | | | | |
| 7.0 | | | | 11.5 | | 7.00<br>7.00 | B<br>C | JOT24<br>50 (6,10/50 for 125mm) | | |
| 7.5 | 7.40<br>7.50 | Obstruction - possible boulder.<br>Borehole terminated due to obstruction.<br>End of Borehole at 7.50m | | 11.0 | 10.94<br>10.84 | 7.50 | C | 50 (25 for 5mm/50 for 0mm) | | |
| 8.0 | | | | 10.5 | | | | | | |
| 8.5 | | | | 10.0 | | | | | | |
| 9.0 | | | | 9.5 | | | | | | |
| 9.5 | | | | 9.0 | | | | | | |
| | | | | 8.5 | | | | | | |

| Chiselling: From: | To: | Time: | Water Strikes: Strike: | Rose: | Depth Sealed | Water Details: Date: | Hole Depth: | Water Depth: | Installation: From: | To: | Pipe: | Backfill: From: | To: | Type: | Remarks: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7.40 | 7.50 | 01:00 | 1.60 | 1.50 | 2.80 | 21/05 | 7.50 | Dry | | | | 0.00 | 7.50 | Arisings | Borehole terminated due to obstruction. |

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

| Contract No: 5599 | **Cable Percussion Borehole Log** | Borehole No: **BH10** |
|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716331.870 | Date Started: | 20/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748840.936 | Date Completed: | 20/05/2019 |
| Client: | Gannon Homes Ltd | Elevation: | 18.54 | Drilled By: | J. O'Toole |
| Engineer: | Waterman Moylan | Borehole Diameter: | 200mm | Status: | FINAL |

| Depth (m) Scale | Depth | Stratum Description | Legend | Level (mOD) Scale | Depth | Samples and Insitu Tests Depth | Type | Result | Water Strike | Backfill |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.5 | | MADE GROUND: brown sandy slightly gravelly silty clay with low cobble content and some brick and plastic. | | 18.0 | | | | | | |
| 1.0 | | | | 17.5 | | 1.00<br>1.00 | B<br>C | JOT12<br>N=17 (1,2/3,4,5,5) | | |
| 1.5 | 1.60 | Very stiff brown slightly sandy gravelly silty CLAY with low cobble content. | | 17.0 | 16.94 | | | | | |
| 2.0 | | | | 16.5 | | 2.00<br>2.00 | B<br>C | JOT13<br>N=32 (3,4/7,7,9,9) | | |
| 2.5 | | | | 16.0 | | | | | | |
| 3.0 | 2.80 | Very stiff dark grey slightly sandy gravelly silty CLAY with low cobble content. | | 15.5 | 15.74 | 3.00<br>3.00 | B<br>C | JOT14<br>N=45<br>(2,4/9,11,12,13) | | |
| 3.5 | | | | 15.0 | | | | | | |
| 4.0 | | | | 14.5 | | 4.00<br>4.00 | B<br>C | JOT15<br>N=50 (6,9/50 for 250mm) | | |
| 4.5 | | | | 14.0 | | | | | | |
| 5.0 | | | | 13.5 | | 5.00<br>5.00 | B<br>C | JOT16<br>50 (10,11/50 for 125mm) | | |
| 5.5 | | | | 13.0 | | | | | | |
| 6.0 | | | | 12.5 | | 6.00<br>6.00<br>6.30 | B<br>C<br>C | JOT17<br>50 (10,13/50 for 50mm)<br>50 (25 for 5mm/50 for 0mm) | | |
| | 6.20 | Obstruction - possible boulder. | | | 12.34 | | | | | |
| 6.5 | 6.30 | Borehole terminated due to obstruction. | | 12.0 | 12.24 | | | | | |
| | | End of Borehole at 6.30m | | | | | | | | |
| 7.0 | | | | 11.5 | | | | | | |
| 7.5 | | | | 11.0 | | | | | | |
| 8.0 | | | | 10.5 | | | | | | |
| 8.5 | | | | 10.0 | | | | | | |
| 9.0 | | | | 9.5 | | | | | | |
| 9.5 | | | | 9.0 | | | | | | |

**Chiselling:**

| From: | To: | Time: |
|---|---|---|
| 5.30 | 5.40 | 00:45 |
| 6.20 | 6.30 | 01:00 |

**Water Strikes:**

| Strike: | Rose: | Depth Sealed |
|---|---|---|
| 1.60 | 1.50 | 3.00 |

**Water Details:**

| Date: | Hole Depth: | Water Depth: |
|---|---|---|
| 20/05 | 6.30 | Dry |

**Installation:**

| From: | To: | Pipe: |
|---|---|---|
| | | |

**Backfill:**

| From: | To: | Type: |
|---|---|---|
| 0.00 | 6.30 | Arisings |

**Remarks:**

Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

| Contract No: 5599 | **Cable Percussion Borehole Log** | Borehole No: **BH11** |
|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716392.760 | Date Started: | 17/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748754.806 | Date Completed: | 17/05/2019 |
| Client: | Gannon Homes Ltd | Elevation: | 17.57 | Drilled By: | J. O'Toole |
| Engineer: | Waterman Moylan | Borehole Diameter: | 200mm | Status: | FINAL |

| Depth (m) Scale | Depth (m) Depth | Stratum Description | Legend | Level (mOD) Scale | Level (mOD) Depth | Samples and Insitu Tests Depth | Type | Result | Water Strike | Backfill |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.5 | | MADE GROUND: brown sandy slightly gravelly silty clay with low cobble content and some brick and plastic. | | 17.5 | | | | | | |
| 1.0 | | | | 17.0 | | 1.00 | B | JOT06 | | |
| | 1.20 | Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with low cobble content. | | 16.5 | 16.37 | 1.00 | C | N=10 (1,2/2,2,3,3) | | |
| 1.5 | | | | 16.0 | | | | | | |
| 2.0 | | | | 15.5 | | 2.00 | B | JOT07 | | |
| | | | | | | 2.00 | C | N=30 (4,5/6,7,9,8) | | |
| 2.5 | 2.60 | Very stiff brown sandy slightly gravelly silty CLAY. | | 15.0 | 14.97 | | | | | |
| 3.0 | | | | 14.5 | | 3.00 | B | JOT08 | | |
| | | | | | | 3.00 | C | N=41 (4,7/9,10,10,12) | | |
| 3.5 | | | | 14.0 | | | | | | |
| 4.0 | | | | 13.5 | | 4.00 | B | JOT09 | | |
| | | | | | | 4.00 | C | N=50 (3,6/50 for 275mm) | | |
| 4.5 | | | | 13.0 | | | | | | |
| | 4.80 | Very stiff brown slightly sandy gravelly silty CLAY with low cobble content. | | | 12.77 | | | | | |
| 5.0 | | | | 12.5 | | 5.00 | B | JOT10 | | |
| | | | | | | 5.00 | C | N=50 (5,7/10,11,14,15) | | |
| 5.5 | | | | 12.0 | | | | | | |
| 6.0 | | | | 11.5 | | 6.00 | B | JOT11 | | |
| | 6.20 | Obstruction - possible boulder. | | | 11.37 | 6.00 | C | 50 (12,13/50 for 25mm) | | |
| | 6.30 | Borehole terminated due to obstruction. | | | 11.27 | 6.30 | C | 50 (25 for 5mm/50 for 0mm) | | |
| 6.5 | | End of Borehole at 6.30m | | 11.0 | | | | | | |
| 7.0 | | | | 10.5 | | | | | | |
| 7.5 | | | | 10.0 | | | | | | |
| 8.0 | | | | 9.5 | | | | | | |
| 8.5 | | | | 9.0 | | | | | | |
| 9.0 | | | | 8.5 | | | | | | |
| 9.5 | | | | 8.0 | | | | | | |

| Chiselling: From: | To: | Time: | Water Strikes: Strike: | Rose: | Depth Sealed | Water Details: Date: | Hole Depth: | Water Depth: | Installation: From: | To: | Pipe: | Backfill: From: | To: | Type: | Remarks: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6.20 | 6.30 | 01:00 | 2.60 | 2.40 | 3.00 | 17/05 | 6.30 | Dry | | | | 0.00 | 6.30 | Arisings | Borehole terminated due to obstruction. |

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

| Contract No: 5599 | **Cable Percussion Borehole Log** | Borehole No: **BH12** |
|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716448.980 | Date Started: | 16/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748663.363 | Date Completed: | 16/05/2019 |
| Client: | Gannon Homes Ltd | Elevation: | 18.00 | Drilled By: | J. O'Toole |
| Engineer: | Waterman Moylan | Borehole Diameter: | 200mm | Status: | FINAL |

| Depth (m) Scale | Depth | Stratum Description | Legend | Level (mOD) Scale | Depth | Samples and Insitu Tests Depth | Type | Result | Water Strike | Backfill |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.5 | | MADE GROUND: brown sandy slightly gravelly silty clay with low cobble content and some brick and plastic. | | 17.5 | | | | | | |
| 1.0 | 0.90 | Very stiff brown slightly sandy gravelly silty CLAY with low cobble content. | | 17.0 | 17.10 | 1.00<br>1.00 | B<br>C | JOT01<br>N=16 (2,3/3,4,4,5) | | |
| 1.5 | | | | 16.5 | | | | | | |
| 2.0 | | | | 16.0 | | 2.00<br>2.00 | B<br>C | JOT02<br>N=33 (5,5/7,8,9,9) | | |
| 2.5 | | | | 15.5 | | | | | | |
| 3.0 | 2.80 | Very stiff brown sandy slightly gravelly silty CLAY. | | 15.0 | 15.20 | 3.00<br>3.00 | B<br>C | JOT03<br>N=32 (4,5/7,9,8,8) | | |
| 3.5 | 3.50 | Very stiff dark grey slightly sandy gravelly silty CLAY with low cobble content. | | 14.5 | 14.50 | | | | | |
| 4.0 | | | | 14.0 | | 4.00<br>4.00 | B<br>C | JOT04<br>N=40<br>(3,7/7,9,12,12) | | |
| 4.5 | | | | 13.5 | | | | | | |
| 5.0 | | | | 13.0 | | 5.00 | B | JOT05 | | |
| 5.5 | 5.20<br>5.30 | Obstruction - possible boulder.<br>Borehole terminated due to obstruction.<br>End of Borehole at 5.30m | | 12.5 | 12.80<br>12.70 | 5.00<br>5.30 | C<br>C | 50 (10,15/50 for 50mm)<br>50 (25 for 5mm/50 for 0mm) | | |
| 6.0 | | | | 12.0 | | | | | | |
| 6.5 | | | | 11.5 | | | | | | |
| 7.0 | | | | 11.0 | | | | | | |
| 7.5 | | | | 10.5 | | | | | | |
| 8.0 | | | | 10.0 | | | | | | |
| 8.5 | | | | 9.5 | | | | | | |
| 9.0 | | | | 9.0 | | | | | | |
| 9.5 | | | | 8.5 | | | | | | |

| Chiselling: From: | To: | Time: | Water Strikes: Strike: | Rose: | Depth Sealed | Water Details: Date: | Hole Depth: | Water Depth: | Installation: From: | To: | Pipe: | Backfill: From: | To: | Type: | Remarks: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5.20 | 5.30 | 01:00 | 5.00 | 4.80 | NS | 16/05 | 5.30 | 5.10 | | | | 0.00 | 5.30 | Arisings | Borehole terminated due to obstruction. |

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

| Contract No: 5599 | **Cable Percussion Borehole Log** | Borehole No: **BH13** |
|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716363.050 | Date Started: | 23/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748603.479 | Date Completed: | 24/05/2019 |
| Client: | Gannon Homes Ltd | Elevation: | 22.06 | Drilled By: | J. O'Toole |
| Engineer: | Waterman Moylan | Borehole Diameter: | 200mm | Status: | FINAL |

| Depth (m) Scale | Depth | Stratum Description | Legend | Level (mOD) Scale | Depth | Samples and Insitu Tests Depth | Type | Result | Water Strike | Backfill |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0.20 | TOPSOIL. | | | 21.86 | | | | | |
| | | Soft brown sandy slightly gravelly silty CLAY. | | | | | | | | |
| | | | | | | 1.00 | B | JOT39 | | |
| | 1.20 | | | | 20.86 | 1.00 | C | N=13 (1,1/3,3,3,4) | | |
| | | Firm brown slightly sandy gravelly silty CLAY with low cobble content. | | | | | | | | |
| | 2.00 | | | | 20.06 | 2.00 | B | JOT40 | | |
| | | Very stiff black slightly sandy gravelly silty CLAY with low cobble content. | | | | 2.00 | C | N=35 (2,4/7,8,10,10) | | |
| | | | | | | 3.00 | B | JOT41 | | |
| | | | | | | 3.00 | C | N=40 (3,6/7,9,12,12) | | |
| | | | | | | 4.00 | B | JOT42 | | |
| | | | | | | 4.00 | C | N=33 (4,5/8,8,9,8) | | |
| | | | | | | 5.00 | B | JOT43 | | |
| | | | | | | 5.00 | C | N=41 (4,7/8,10,11,12) | | |
| | 5.40 | | | | 16.66 | | | | | |
| | 5.50 | Obstruction - possible boulder. Borehole terminated due to obstruction. End of Borehole at 5.50m | | | 16.56 | 5.50 | C | 50 (25 for 5mm/50 for 0mm) | | |

| Chiselling: From: | To: | Time: | Water Strikes: Strike: | Rose: | Depth Sealed | Water Details: Date: | Hole Depth: | Water Depth: | Installation: From: | To: | Pipe: | Backfill: From: | To: | Type: | Remarks: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5.40 | 5.50 | 01:00 | | | | 23/05 | 3.00 | Dry | | | | 0.00 | 5.50 | Arisings | Overnight seepage into borehole. |
| | | | | | | 24/05 | 3.00 | 1.80 | | | | | | | |
| | | | | | | 24/05 | 5.50 | Dry | | | | | | | |

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

# Appendix 2

# Trial Pit and Dynamic Probe Logs and Photographs

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP01** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716487.900 | Date: | 14/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748655.913 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 17.02 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.30 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | | MADE GROUND: light brown slightly sandy gravelly silty clay with low cobble content and some plastic pipe fragments. | | 16.5 | | | | 3 | |
| | 0.90 | | | | 16.12 | | | 2 | |
| 1.0 | | Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 16.0 | | 1.00 | B | 3 | |
| | | | | | | | | 3 | |
| 1.5 | | | | 15.5 | | | | 3 | |
| | | | | | | | | 4 | |
| 2.0 | | | | 15.0 | | 2.00 | B | 4 | |
| | | | | | | | | 5 | |
| 2.5 | | | | 14.5 | | | | 5 | |
| | | | | | | | | 5 | |
| | 2.70 | | | | 14.32 | | | 6 | |
| 3.0 | | Stiff brown slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 14.0 | | 2.80 | B | 6 | |
| | 3.10 | | | | 13.92 | | | 6 | |
| | | | | | | 3.20 | B | 6 | |
| | 3.30 | Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | | 13.72 | | | 9 | |
| 3.5 | | **Pit terminated at 3.30m** | | 13.5 | | | | 9 | |
| | | | | | | | | 8 | |
| | | | | | | | | 7 | |
| | | | | | | | | 13 | |
| | | | | | | | | 16 | |
| | | | | | | | | 16 | |
| 4.0 | | | | 13.0 | | | | 18 | |
| | | | | | | | | 17 | |
| | | | | | | | | 17 | |
| | | | | | | | | 16 | |
| 4.5 | | | | 12.5 | | | | 35 | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP02** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716440.610 | Date: | 14/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748689.188 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 16.51 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.00 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | 0.30 | TOPSOIL. | | 16.0 | 16.21 | | | 2 | |
| 1.0 | | Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 15.5 | | 1.00 | B | 3 2 3 3 2 3 4 4 6 3 3 6 6 6 8 9 11 11 10 10 10 10 | |
| 1.5 | | | | 15.0 | | | | | |
| 2.0 | | | | 14.5 | | | | | |
| 2.5 | | | | 14.0 | | 2.50 | B | 16 18 22 24 30 30 31 | |
| 3.0 | 3.00 | **Pit terminated at 3.00m** | | 13.5 | 13.51 | | | 35 | |
| 3.5 | | | | 13.0 | | | | | |
| 4.0 | | | | 12.5 | | | | | |
| 4.5 | | | | 12.0 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP03** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716438.670 | Date: | 14/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748638.308 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 19.04 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.00 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | | Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 19.0 | | 0.50 | CBR | 3 | |
| 1.0 | | | | 18.5 | | | | 3 | |
| 1.5 | | | | 18.0 | | 1.00 | B | 3 | |
| 2.0 | | | | 17.5 | | | | 4 | |
| 2.5 | | | | 17.0 | | | | 4 | |
| 3.0 | 3.00 | **Pit terminated at 3.00m** | | 16.5 | | 2.50 | B | 4 | |
| 3.5 | | | | 16.0 | 16.04 | | | 4 | |
| 4.0 | | | | 15.5 | | | | 6 | |
| 4.5 | | | | 15.0 | | | | 5 | |
| | | | | 14.5 | | | | 4 | |
| | | | | | | | | 6 | |
| | | | | | | | | 6 | |
| | | | | | | | | 6 | |
| | | | | | | | | 6 | |
| | | | | | | | | 6 | |
| | | | | | | | | 8 | |
| | | | | | | | | 8 | |
| | | | | | | | | 11 | |
| | | | | | | | | 11 | |
| | | | | | | | | 9 | |
| | | | | | | | | 9 | |
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| | | | | | | | | 35 | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP04** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716414.100 | Date: | 15/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748697.864 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 16.89 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.00 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| | 0.10 | Soft light brown sandy silty CLAY. Sand is fine to coarse. | | | 16.79 | | | 2 | |
| | | Firm grey brown slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | | | | | 3 4 5 5 5 4 4 | |
| 0.5 | 0.70 | Firm becoming stiff brown slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 16.5 | 16.19 | | | 6 6 | |
| 1.0 | | | | 16.0 | | 1.00 | B | 8 7 7 6 5 4 4 6 7 | |
| 1.5 | | | | 15.5 | | | | | |
| 2.0 | | | | 15.0 | | | | 11 16 14 14 19 | |
| 2.5 | | | | 14.5 | | 2.50 | B | 24 35 | |
| 3.0 | 3.00 | **Pit terminated at 3.00m** | | 14.0 | 13.89 | | | | |
| 3.5 | | | | 13.5 | | | | | |
| 4.0 | | | | 13.0 | | | | | |
| 4.5 | | | | 12.5 | | | | | |
| | | | | 12.0 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP05** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716430.510 | Date: | 16/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748728.368 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 16.27 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.10 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | 0.30 | Firm grey brown slightly sandy gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. | | 16.0 | 15.97 | | | 2 | |
| | | Firm grey brown slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | | | 0.50 | CBR | 2 | |
| 1.0 | | | | 15.5 | | | | 3 | |
| | | | | | | 1.00 | B | 4 | |
| | 1.20 | | | | 15.07 | | | 3 | |
| 1.5 | | Stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 15.0 | | | | 2 | |
| | | | | | | | | 3 | |
| | | | | 14.5 | | | | 5 | |
| 2.0 | | | | | | | | 5 | |
| | | | | | | 2.00 | B | 4 | |
| | 2.10 | | | | 14.17 | | | 5 | |
| | | Very stiff grey slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 14.0 | | | | 6 | |
| 2.5 | | | | | | | | 6 | |
| | | | | | | 2.50 | B | 5 | |
| | | | | 13.5 | | | | 4 | |
| 3.0 | | | | | | | | 4 | |
| | 3.10 | **Pit terminated at 3.10m** | | | 13.17 | | | 4 | |
| | | | | 13.0 | | | | 6 | |
| 3.5 | | | | | | | | 6 | |
| | | | | | | | | 8 | |
| | | | | 12.5 | | | | 9 | |
| 4.0 | | | | | | | | 11 | |
| | | | | | | | | 14 | |
| | | | | 12.0 | | | | 16 | |
| 4.5 | | | | | | | | 16 | |
| | | | | | | | | 12 | |
| | | | | 11.5 | | | | 11 | |
| | | | | | | | | 11 | |
| | | | | | | | | 13 | |
| | | | | | | | | 13 | |
| | | | | | | | | 12 | |
| | | | | | | | | 15 | |
| | | | | | | | | 16 | |
| | | | | | | | | 35 | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP06** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716399.090 | Date: | 15/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748727.592 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 17.39 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.00 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | | Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 17.0 | | 0.50 | ES | 2 | |
| 1.0 | | | | 16.5 | | 1.00 | B | 2 1 2 2 2 2 2 2 2 4 | |
| 1.5 | | | | 16.0 | | | | 5 5 7 7 8 9 | |
| 2.0 | 1.90 | Very stiff grey slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 15.5 | 15.49 | | | 11 11 14 15 | |
| 2.5 | | | | 15.0 | | 2.50 | B | 35 | |
| 3.0 | 3.00 | **Pit terminated at 3.00m** | | 14.5 | 14.39 | | | | |
| 3.5 | | | | 14.0 | | | | | |
| 4.0 | | | | 13.5 | | | | | |
| 4.5 | | | | 13.0 | | | | | |
| | | | | 12.5 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP07** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716410.670 | Date: | 15/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748766.653 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 17.33 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.10 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | 0.40 | Firm light brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 17.0 | 16.93 | 0.50 | CBR | 3 2 2 2 2 2 2 2 2 2 | |
| 1.0 | | Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 16.5 | | 1.00 | B | 3 3 2 2 3 | |
| 1.5 | 1.60 | Very stiff grey slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 16.0 | 15.73 | | | 4 4 5 5 5 | |
| 2.0 | | | | 15.5 | | 2.00 | B | 4 4 5 6 5 | |
| 2.5 | | | | 15.0 | | | | 7 8 7 7 9 | |
| 3.0 | 3.10 | **Pit terminated at 3.10m** | | 14.5 | 14.23 | | | 11 13 12 12 14 | |
| 3.5 | | | | 14.0 | | | | 11 10 12 13 14 | |
| 4.0 | | | | 13.5 | | | | 16 21 21 35 | |
| 4.5 | | | | 13.0 | | | | | |
| | | | | 12.5 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP08** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716388.910 | Date: | 15/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748784.825 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 18.00 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.10 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | 0.50 | Firm light brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 17.5 | 17.50 | | | 2 2 2 2 3 3 3 3 3 3 | |
| 1.0 | | Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 17.0 | | 1.00 | B | 3 4 4 6 5 4 4 6 6 6 8 | |
| 2.0 | 2.00 | | | 16.0 | 16.00 | | | | |
| | 2.10 | Light grey silty slightly gravelly fine to coarse SAND. Gravel is fine to coarse, angular to subrounded of limestone. | | | 15.90 | | | 7 6 8 7 6 | |
| 2.5 | | Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 15.5 | | 2.50 | B | 9 12 10 11 10 | |
| 3.0 | 3.10 | **Pit terminated at 3.10m** | | 15.0 | 14.90 | | | 9 8 14 13 13 16 18 35 | |
| 3.5 | | | | 14.5 | | | | | |
| 4.0 | | | | 14.0 | | | | | |
| 4.5 | | | | 13.5 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | 2.00 Seepage | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP09** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716373.980 | Date: | 15/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748731.567 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 17.85 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.00 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | | Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 17.5 | | 0.50 | CBR | 4 3 3 2 4 4 4 5 | |
| 1.0 | | | | 17.0 | | 1.00 | B | 6 6 5 7 6 5 4 | |
| 1.5 | 1.60 | Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 16.5 | 16.25 | | | 6 7 9 9 9 | |
| 2.0 | | | | 16.0 | | 2.00 | B | 12 14 16 16 15 | |
| 2.5 | | | | 15.5 | | | | 13 17 35 | |
| 3.0 | 3.00 | **Pit terminated at 3.00m** | | 15.0 | 14.85 | | | | |
| 3.5 | | | | 14.5 | | | | | |
| 4.0 | | | | 14.0 | | | | | |
| 4.5 | | | | 13.5 | | | | | |
| | | | | 13.0 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | 1.30 Seepage | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP10** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716356.260 | Date: | 15/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748794.276 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 18.54 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.00 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | | Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 18.5 | | 0.50 | CBR | 2 2 2 2 3 | |
| 1.0 | | | | 18.0 | | 1.00 | B | 3 3 3 4 3 | |
| 1.5 | | | | 17.5 | | | | 5 5 8 9 12 | |
| 2.0 | 1.90 | Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 17.0 | 16.64 | 2.00 | B | 12 14 16 17 18 | |
| 2.5 | | | | 16.5 | | 2.50 | B | 18 24 27 35 | ▼ |
| 3.0 | 3.00 | **Pit terminated at 3.00m** | | 16.0 | 15.54 | | | | |
| 3.5 | | | | 15.5 | | | | | |
| 4.0 | | | | 15.0 | | | | | |
| 4.5 | | | | 14.5 | | | | | |
| | | | | 14.0 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | 2.10 Seepage | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP11** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716353.400 | Date: | 15/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748825.420 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 18.39 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.00 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | | Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 18.0 | | 0.50 | CBR | 3 3 3 3 2 4 3 4 3 | |
| 1.0 | | | | 17.5 | | 1.00 | B | 4 5 4 4 4 5 5 4 | |
| 1.5 | 1.60 | Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 17.0 | 16.79 | | | 5 5 4 | |
| 2.0 | | | | 16.5 | | 2.00 | B | 5 5 5 5 8 7 8 | |
| 2.5 | | | | 16.0 | | | | 11 14 16 | |
| 3.0 | 3.00 | **Pit terminated at 3.00m** | | 15.5 | 15.39 | | | 15 18 21 23 35 | |
| 3.5 | | | | 15.0 | | | | | |
| 4.0 | | | | 14.5 | | | | | |
| 4.5 | | | | 14.0 | | | | | |
| | | | | 13.5 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP12** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716300.540 | Date: | 15/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748834.757 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 18.90 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.00 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | 0.60 | Firm light brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 18.5 | 18.30 | | | 2 2 2 2 2 3 2 | |
| 1.0 | 1.70 | Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 18.0 | 17.20 | 1.00 | B | 4 3 5 3 4 4 8 6 9 12 | ▼ |
| 2.0 | 3.00 | Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 17.0 | 15.90 | 2.00 | B | 17 14 16 16 15 16 22 35 | |
| | | **Pit terminated at 3.00m** | | 16.5 16.0 15.5 15.0 14.5 14.0 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | 1.10 Seepage | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP13** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716260.720 | Date: | 15/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748800.659 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 19.30 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.10 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 0.30 | Firm grey brown slightly sandy gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. | | 19.0 | 19.00 | | | 1 | |
| 0.5 | | Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 18.5 | | 0.50 | CBR | 1<br>2<br>4<br>4<br>3 | |
| 1.0 | | | | | | 1.00 | B | 4<br>4<br>5<br>7<br>4<br>4 | |
| 1.5 | 1.80 | Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 18.0<br>17.5 | 17.50 | | | 11<br>14<br>16<br>15<br>17 | |
| 2.0 | | | | | | 2.00 | B | 19<br>19<br>18 | |
| 2.5 | | | | 17.0 | | | | 21<br>23<br>22<br>24<br>28 | |
| 3.0 | 3.10 | **Pit terminated at 3.10m** | | 16.5 | 16.20 | | | 35 | |
| 3.5 | | | | 16.0 | | | | | |
| 4.0 | | | | 15.5 | | | | | |
| 4.5 | | | | 15.0 | | | | | |
| | | | | 14.5 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP14** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716317.030 | Date: | 15/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748767.699 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 18.75 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.00 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | | Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 18.5 | | 0.50<br>0.50 | CBR<br>ES | 2<br>2<br>3<br>2<br>2 | |
| 1.0 | | | | 18.0 | | | | 4<br>5<br>5<br>4 | |
| 1.5 | | | | 17.5 | | 1.00 | B | 6<br>6<br>8<br>7<br>5 | |
| 2.0 | 1.80 | Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 17.0 | 16.95 | | | 9<br>9<br>12<br>14 | |
| 2.5 | | | | 16.5 | | 2.00 | B | 12<br>11<br>11<br>11<br>8 | |
| 3.0 | 3.00 | **Pit terminated at 3.00m** | | 16.0 | 15.75 | | | 15<br>35 | |
| 3.5 | | | | 15.5 | | | | | |
| 4.0 | | | | 15.0 | | | | | |
| 4.5 | | | | 14.5 | | | | | |
| | | | | 14.0 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP15** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716255.270 | Date: | 15/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748746.026 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 19.00 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.00 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | | Firm brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 18.5 | | | | 3 2 3 3 2 2 2 3 3 3 3 3 3 | |
| | 0.90 | | | | 18.10 | | | | |
| 1.0 | | Firm becoming stiff grey slightly sandy gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 18.0 | | 1.00 | B | 3 4 6 5 4 4 6 6 6 7 6 7 9 12 35 | |
| 1.5 | | | | 17.5 | | | | | |
| 2.0 | | | | 17.0 | | 2.00 | B | | ▼ |
| 2.5 | | | | 16.5 | | | | | |
| 3.0 | 3.00 | **Pit terminated at 3.00m** | | 16.0 | 16.00 | | | | |
| 3.5 | | | | 15.5 | | | | | |
| 4.0 | | | | 15.0 | | | | | |
| 4.5 | | | | 14.5 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | 2.10 Slow | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP16** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716324.060 | Date: | 15/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748719.507 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 18.26 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.10 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | 0.20 | Firm brown slightly sandy gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. | | 18.0 | 18.06 | 0.50 | CBR | 2 2 2 2 4 4 | |
| 1.0 | | Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 17.5 | | 1.00 | B | 3 5 5 4 3 5 | |
| 1.5 | | | | 17.0 | | | | 7 6 9 12 11 | |
| 2.0 | | | | 16.5 | | | | 10 9 12 12 15 | |
| 2.5 | | | | 16.0 | | 2.50 | B | 17 16 16 14 11 | |
| 3.0 | 3.10 | **Pit terminated at 3.10m** | | 15.5 | 15.16 | | | 14 14 18 22 35 | |
| 3.5 | | | | 15.0 | | | | | |
| 4.0 | | | | 14.5 | | | | | |
| 4.5 | | | | 14.0 | | | | | |
| | | | | 13.5 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP17** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716290.650 | Date: | 15/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748715.769 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 19.49 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.00 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | 0.30 | Firm light brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 19.0 | 19.19 | | | 2 3 2 2 3 4 4 3 4 4 | ▼ |
| 1.0 | | Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 18.5 | | 1.00 | B | 5 5 8 8 7 8 8 11 14 16 14 16 18 35 | |
| 1.5 | | | | 18.0 | | | | | |
| 2.0 | | | | 17.5 | | | | | |
| 2.5 | 2.40 | Very stiff grey slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 17.0 | 17.09 | 2.50 | B | | |
| 3.0 | 3.00 | **Pit terminated at 3.00m** | | 16.5 | 16.49 | | | | |
| 3.5 | | | | 16.0 | | | | | |
| 4.0 | | | | 15.5 | | | | | |
| 4.5 | | | | 15.0 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Instability between 0.40m and 2.20m. | 0.40 Seepage | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP18** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716342.450 | Date: | 15/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748696.355 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 18.84 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.00 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| | | Firm brown slightly sandy gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. | | | | | | 3 | |
| | 0.40 | | | 18.5 | 18.44 | | | 3 | |
| 0.5 | | Firm grey brown slightly sandy gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | | | 0.50 | CBR | 3 | |
| | | | | | | | | 2 | |
| | | | | | | | | 2 | |
| | | | | 18.0 | | | | 2 | |
| 1.0 | | | | | | 1.00 | B | 3 | |
| | | | | | | | | 3 | |
| | | | | | | | | 3 | |
| | | | | | | | | 3 | |
| | | | | 17.5 | | | | 3 | |
| | | | | | | | | 4 | |
| 1.5 | | | | | | | | 4 | |
| | | | | | | | | 4 | |
| | | | | | | | | 3 | |
| | | | | 17.0 | | | | 5 | |
| | | | | | | | | 8 | |
| 2.0 | | | | | | | | 7 | |
| | | | | | | | | 8 | |
| | | | | | | | | 12 | |
| | 2.30 | | | | 16.54 | | | 11 | |
| | | Stiff light grey slightly sandy gravelly silty CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 16.5 | | | | 14 | |
| 2.5 | | | | | | 2.50 | B | 14 | |
| | | | | | | | | 35 | |
| | | | | 16.0 | | | | | |
| 3.0 | 3.00 | **Pit terminated at 3.00m** | | | 15.84 | | | | |
| 3.5 | | | | 15.5 | | | | | |
| | | | | 15.0 | | | | | |
| 4.0 | | | | | | | | | |
| | | | | 14.5 | | | | | |
| 4.5 | | | | | | | | | |
| | | | | 14.0 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP19** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716367.790 | Date: | 15/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748666.198 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 19.73 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.10 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | | Firm brown slightly sandy gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 19.5 | | 1.00 | B | 2 2 2 2 2 4 4 3 4 6 6 7 8 8 8 7 11 6 14 12 12 11 14 12 12 12 16 35 | |
| 1.0 | | | | 19.0 | | | | | |
| 1.5 | 1.50 | Stiff grey slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 18.5 | 18.23 | | | | |
| 2.0 | | | | 18.0 | | 2.00 | B | | |
| 2.5 | | | | 17.5 | | | | | |
| 3.0 | 3.10 | **Pit terminated at 3.10m** | | 17.0 | 16.63 | | | | |
| 3.5 | | | | 16.5 | | | | | |
| 4.0 | | | | 16.0 | | | | | |
| 4.5 | | | | 15.5 | | | | | |
| | | | | 15.0 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP20** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716337.270 | Date: | 14/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748662.233 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 20.42 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 2.40 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | | Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 20.0 | | | | 2 | |
| 1.0 | | | | 19.5 | | 1.00 | B | 2 | |
| 1.5 | 1.50 | | | 19.0 | 18.92 | | | 2 | |
| | | Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | | | | | 3 | |
| 2.0 | | | | 18.5 | | 2.00 | B | 2 | |
| | 2.40 | Pit terminated due to boulder obstructions. **Pit terminated at 2.40m** | | 18.0 | 18.02 | | | 3 | |
| 2.5 | | | | | | | | 2 | |
| 3.0 | | | | 17.5 | | | | 3 | |
| 3.5 | | | | 17.0 | | | | 3 | |
| 4.0 | | | | 16.5 | | | | 3 | |
| 4.5 | | | | 16.0 | | | | 6 | |
| | | | | 15.5 | | | | 8 | |
| | | | | | | | | 7 | |
| | | | | | | | | 8 | |
| | | | | | | | | 8 | |
| | | | | | | | | 7 | |
| | | | | | | | | 9 | |
| | | | | | | | | 11 | |
| | | | | | | | | 14 | |
| | | | | | | | | 16 | |
| | | | | | | | | 16 | |
| | | | | | | | | 18 | |
| | | | | | | | | 19 | |
| | | | | | | | | 18 | |
| | | | | | | | | 35 | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Obstruction - boulders. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP21** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716377.280 | Date: | 14/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748605.280 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 21.71 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.00 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | 0.40 | TOPSOIL. | | 21.5 | 21.31 | | | 3 3 4 4 4 3 4 4 4 5 5 5 6 7 6 6 8 7 8 7 7 9 9 8 6 6 9 7 7 6 6 9 9 12 35 | |
| | | Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 21.0 | | 1.00 | B | | |
| 1.0 | | | | 20.5 | | | | | |
| 1.5 | | | | 20.0 | | | | | |
| 2.0 | | | | | | 2.00 | B | | |
| | 2.30 | Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 19.5 | 19.41 | | | | ▼ |
| 2.5 | | | | 19.0 | | 2.50 | B | | |
| 3.0 | 3.00 | **Pit terminated at 3.00m** | | | 18.71 | | | | |
| 3.5 | | | | 18.5 | | | | | |
| 4.0 | | | | 18.0 | | | | | |
| 4.5 | | | | 17.5 | | | | | |
| | | | | 17.0 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | 2.20 Seepage | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP22** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716302.370 | Date: | 15/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748636.517 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 22.02 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.00 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | | Firm grey brown slightly sandy gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 21.5 | | | | 3 3 3 4 5 3 3 4 5 5 5 4 5 5 4 6 6 5 4 3 5 6 7 7 7 8 6 5 8 8 15 14 15 35 | |
| 1.0 | | | | 21.0 | | 1.00 | B | | |
| 1.5 | 1.50 | Stiff grey slightly sandy gravelly silty CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 20.5 | 20.52 | | | | |
| | 1.90 | Stiff light grey slightly sandy gravelly silty CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 20.0 | 20.12 | 1.80 | B | | |
| 2.5 | | | | 19.5 | | 2.50 | B | | |
| 3.0 | 3.00 | **Pit terminated at 3.00m** | | 19.0 | 19.02 | | | | |
| 3.5 | | | | 18.5 | | | | | |
| 4.0 | | | | 18.0 | | | | | |
| 4.5 | | | | 17.5 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | 0.80 Seepage | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP23** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716266.450 | Date: | 15/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748652.449 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 22.11 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.00 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| | 0.20 | Firm brown slightly sandy gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. | | 22.0 | 21.91 | | | 2 | |
| | | Firm brown slightly sandy gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 21.5 | | 1.00 | B | 2 2 2 2 4 3 4 5 5 5 6 5 4 4 3 5 5 6 7 6 7 7 11 14 14 16 35 | |
| | 2.10 | Stiff grey slightly sandy gravelly silty CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 21.0 | 20.01 | 2.50 | B | | |
| | 3.00 | **Pit terminated at 3.00m** | | 20.5 | 19.11 | | | | |
| | | | | 20.0 | | | | | |
| | | | | 19.5 | | | | | |
| | | | | 19.0 | | | | | |
| | | | | 18.5 | | | | | |
| | | | | 18.0 | | | | | |
| | | | | 17.5 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP24** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716231.410 | Date: | 15/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748696.705 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 21.08 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.10 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | 0.40 | Firm brown slightly sandy gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. | | 21.0 | 20.68 | 0.50 | CBR | 2 2 3 3 3 3 | |
| 1.0 | | Firm grey brown slightly sandy gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 20.5 | | 1.00 | B | 2 3 3 3 3 4 | |
| 1.5 | 1.40 | Stiff grey slightly sandy gravelly silty CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 20.0 | 19.68 | | | 4 5 7 6 5 5 | ▼ |
| 2.0 | | | | 19.5 | | 2.00 | B | 6 6 7 7 6 6 | |
| 2.5 | 2.40 | Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 19.0 | 18.68 | 2.50 | B | 7 7 7 6 6 7 | |
| 3.0 | 3.10 | **Pit terminated at 3.10m** | | 18.5 | | | | 8 9 9 12 12 | |
| 3.5 | | | | 18.0 | 17.98 | | | 35 | |
| 4.0 | | | | 17.5 | | | | | |
| 4.5 | | | | 17.0 | | | | | |
| | | | | 16.5 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | 1.50 Seepage | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP25** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716219.840 | Date: | 15/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748622.510 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 24.15 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.10 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| | | Firm brown slightly sandy gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. | | 24.0 | | 1.00 | B | 2 2 2 1 2 2 2 2 2 2 | |
| | 1.10 | Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 23.5 | 23.05 | 2.00 | B | 4 4 5 5 5 7 7 9 9 11 11 | |
| | 2.50 | Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 23.0 | 21.65 | 2.80 | B | 14 12 13 12 12 12 12 15 17 35 | |
| | 3.10 | **Pit terminated at 3.10m** | | 22.5 | 21.05 | | | | |
| | | | | 22.0 | | | | | |
| | | | | 21.5 | | | | | |
| | | | | 21.0 | | | | | |
| | | | | 20.5 | | | | | |
| | | | | 20.0 | | | | | |
| | | | | 19.5 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP26** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716241.970 | Date: | 15/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748643.520 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 22.73 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.00 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | | Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 22.5 | | | | 2 | |
| 1.0 | | | | 22.0 | | 1.00 | B | 3 3 2 3 3 2 3 4 4 4 3 5 4 5 5 7 11 12 8 9 12 12 12 11 10 12 12 35 | |
| 1.5 | 1.50 | Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 21.5 | 21.23 | | | | |
| 2.0 | | | | 21.0 | | 2.00 | B | | |
| 2.5 | | | | 20.5 | | | | | |
| 3.0 | 3.00 | **Pit terminated at 3.00m** | | 20.0 | 19.73 | | | | |
| 3.5 | | | | 19.5 | | | | | |
| 4.0 | | | | 19.0 | | | | | |
| 4.5 | | | | 18.5 | | | | | |
| | | | | 18.0 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP27** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716269.330 | Date: | 14/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748608.685 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 23.47 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.10 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | | MADE GROUND: brown black slightly sandy gravelly silty clay with low cobble and boulder content and some gravel laminas. | | 23.0 | | 1.00 | B | 3 3 4 4 3 5 4 3 6 5 5 5 4 6 6 6 5 4 7 6 8 8 7 8 8 7 6 7 7 7 9 12 12 12 11 10 12 14 35 | |
| 1.0 | | | | 22.5 | | | | | |
| 1.5 | | | | 22.0 | | | | | ▼ |
| 2.0 | | | | 21.5 | | | | | |
| 2.5 | 2.50 | Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 21.0 | 20.97 | 2.80 | B | | |
| 3.0 | 3.10 | **Pit terminated at 3.10m** | | 20.5 | 20.37 | | | | |
| 3.5 | | | | 20.0 | | | | | |
| 4.0 | | | | 19.5 | | | | | |
| 4.5 | | | | 19.0 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Instability between 0.20m and 1.50m. | 1.50 Seepage | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP28** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716242.180 | Date: | 14/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748582.076 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 25.18 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.00 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| | | MADE GROUND: brown slightly sandy gravelly silty clay with low cobble content and some gravel laminas. | | 25.0 | | 0.50 | CBR | 3 3 2 3 3 2 4 4 3 2 | |
| | | | | 24.5 | | 1.00 | B | 4 4 4 4 4 5 7 6 7 9 | |
| | 2.00 | MADE GROUND: black slightly sandy gravelly silty clay with low cobble and boulder content and some gravel laminas. | | 24.0 | 23.18 | | | 11 | |
| | 2.30 | Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 23.5 | 22.88 | 2.20 | B | 13 16 16 14 15 17 17 17 17 | |
| | 3.00 | **Pit terminated at 3.00m** | | 23.0 | 22.18 | 2.80 | B | 35 | |
| | | | | 22.5 | | | | | |
| | | | | 22.0 | | | | | |
| | | | | 21.5 | | | | | |
| | | | | 21.0 | | | | | |
| | | | | 20.5 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP29** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716305.130 | Date: | 15/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748611.372 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 23.58 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.40 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | | Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 23.5 | | 0.50<br>0.50 | CBR<br>ES | 2 2 2 1 2 2 2 2 2 | |
| 1.0 | | | | 23.0 | | | | | |
| 1.5 | | | | 22.5 | | 1.00 | B | 3 3 4 4 4 4 3 | |
| 2.0 | 1.90 | Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 22.0 | 21.68 | | | 4 5 6 5 5 6 7 7 | |
| 2.5 | | | | 21.5 | | 2.50 | B | 8 8 6 7 9 11 16 18 17 35 | |
| 3.0 | 3.10 | **Pit terminated at 3.10m** | | 21.0 | | | | | |
| 3.5 | | | | 20.5 | 20.48 | | | | |
| 4.0 | | | | 20.0 | | | | | |
| 4.5 | | | | 19.5 | | | | | |
| | | | | 19.0 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP30** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716294.200 | Date: | 14/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748561.395 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 25.04 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 2.50 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 0.30 | Firm grey brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 25.0 | 24.74 | | | 3 | |
| 0.5 | | Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 24.5 | | | | 3 3 3 4 4 3 5 | |
| 1.0 | | | | 24.0 | | 1.00 | B | 5 5 6 8 6 7 | |
| 1.5 | | | | 23.5 | | | | 7 7 7 7 11 | |
| 2.0 | 2.20 | Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 23.0 | 22.84 | | | 16 17 19 19 | ▼ |
| 2.5 | 2.50 | Pit terminated due to boulder obstructions. **Pit terminated at 2.50m** | | 22.5 | 22.54 | 2.40 | B | 14 15 16 17 18 | |
| 3.0 | | | | 22.0 | | | | 35 | |
| 3.5 | | | | 21.5 | | | | | |
| 4.0 | | | | 21.0 | | | | | |
| 4.5 | | | | 20.5 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Obstruction - boulders. | Pit walls stable. | 2.20 Seepage | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP31** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716211.620 | Date: | 14/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748584.607 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 25.91 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 2.10 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | | Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 25.5 | | | | 3 2 3 3 4 4 4 4 4 5 4 | |
| 1.0 | | | | 25.0 | | 1.00 | B | 6 7 8 8 8 7 6 6 | |
| 1.5 | | | | 24.5 | | | | | |
| 2.0 | 1.90 | Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 24.0 | 24.01 | 2.00 | B | 7 7 6 7 7 7 7 8 9 9 8 8 | |
| 2.5 | 2.10 | Pit terminated due to boulder obstructions. **Pit terminated at 2.10m** | | 23.5 | 23.81 | | | | |
| 3.0 | | | | 23.0 | | | | 12 12 16 35 | |
| 3.5 | | | | 22.5 | | | | | |
| 4.0 | | | | 22.0 | | | | | |
| 4.5 | | | | 21.5 | | | | | |
| | | | | 21.0 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Obstruction - boulders. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP32** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716233.520 | Date: | 14/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748550.545 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 26.34 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.10 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| | 0.30 | MADE GROUND: light brown slightly sandy gravelly silty clay with low cobble content and some plastic pipe fragments. | | | 26.04 | | | 3 3 2 | |
| 0.5 | | MADE GROUND: brown slightly sandy gravelly silty clay with low cobble content and some gravel laminas. | | 26.0 | | | | 3 2 2 4 | |
| 1.0 | | | | 25.5 | | 1.00 | B | 2 2 2 2 | |
| 1.5 | | | | 25.0 | | | | 2 2 2 2 2 | |
| | 1.60 | | | | 24.74 | | | 3 | |
| | 1.80 | MADE GROUND: black slightly sandy gravelly silty clay with low cobble and boulder content and some gravel laminas. | | | 24.54 | | | 4 4 | ▼ |
| 2.0 | | Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 24.5 | | 2.00 | B | 5 5 4 4 | |
| 2.5 | | | | 24.0 | | | | 5 6 7 7 7 | |
| | 2.70 | | | | 23.64 | | | 7 7 | |
| 3.0 | | Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 23.5 | | 3.00 | B | 7 6 | |
| | 3.10 | | | | 23.24 | | | 5 5 | |
| 3.5 | | **Pit terminated at 3.10m** | | 23.0 | | | | 4 6 7 9 | |
| 4.0 | | | | 22.5 | | | | 8 7 11 | |
| | | | | | | | | 14 14 15 | |
| 4.5 | | | | 22.0 | | | | 35 | |
| | | | | 21.5 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | 1.90 Seepage | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP33** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716269.980 | Date: | 14/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748552.133 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 25.43 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 2.20 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | | Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 25.0 | | 0.50 | CBR | 2 2 3 4 3 3 4 4 3 | |
| 1.0 | | | | 24.5 | | 1.00 | B | 5 4 4 5 6 8 7 6 6 | |
| 1.5 | 1.70 | Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 24.0 | 23.73 | | | 6 6 6 6 4 | |
| 2.0 | 2.20 | Pit terminated due to boulder obstructions. **Pit terminated at 2.20m** | | 23.5 | 23.23 | 2.00 | B | 5 6 6 6 7 7 6 7 7 9 8 7 6 7 6 7 12 35 | |
| 2.5 | | | | 23.0 | | | | | |
| 3.0 | | | | 22.5 | | | | | |
| 3.5 | | | | 22.0 | | | | | |
| 4.0 | | | | 21.5 | | | | | |
| 4.5 | | | | 21.0 | | | | | |
| | | | | 20.5 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Obstruction - boulders. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP34** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716192.930 | Date: | 16/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748510.478 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 29.42 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 1.60 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | | MADE GROUND: dark grey silty sandy gravel with high cobble content and some concrete, timber, rags, plastic bags, steel and mortar. | | 29.0 | | 0.50 | ES | 3 3 4 4 6 7 6 5 7 7 9 9 9 9 9 16 17 21 24 27 23 35 | |
| 1.0 | | | | 28.5 | | 1.00 | B | | |
| 1.5 | 1.60 | Pit terminated due to obstructions. **Pit terminated at 1.60m** | | 28.0 | 27.82 | | | | |
| 2.0 | | | | 27.5 | | | | | |
| 2.5 | | | | 27.0 | | | | | |
| 3.0 | | | | 26.5 | | | | | |
| 3.5 | | | | 26.0 | | | | | |
| 4.0 | | | | 25.5 | | | | | |
| 4.5 | | | | 25.0 | | | | | |
| | | | | 24.5 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Obstruction - boulders. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP35** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716220.970 | Date: | 16/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748495.365 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 28.88 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 1.40 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | 0.70 | MADE GROUND: brown slightly sandy gravelly silty clay with low cobble content and some gravel laminas. | | 28.5 | 28.18 | | | 4 | |
| 1.0 | 1.40 | MADE GROUND: black sandy gravelly silty clay with some plastic, red brick, tin cans and concrete blocks. | | 28.0 | 27.48 | 1.00 | B | 5 5 6 4 5 5 5 4 4 4 5 6 6 6 35 | |
| 1.5 | | Pit terminated due to obstructions. **Pit terminated at 1.40m** | | 27.5 | | | | | |
| 2.0 | | | | 27.0 | | | | | |
| 2.5 | | | | 26.5 | | | | | |
| 3.0 | | | | 26.0 | | | | | |
| 3.5 | | | | 25.5 | | | | | |
| 4.0 | | | | 25.0 | | | | | |
| 4.5 | | | | 24.5 | | | | | |
| | | | | 24.0 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Obstruction - boulders. | Pit walls stable. | Dry | Pit terminated due to obstruction - reattempt made - TP35A. | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP35A** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716226.270 | Date: | 16/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748493.202 | Excavator: | |
| Client: | Gannon Homes Ltd | Elevation: | 28.90 | Logged By: | |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | x x | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Samples Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | | MADE GROUND: brown slightly sandy gravelly silty clay with low cobble content and some gravel laminas. | | 28.5 | | | | | |
| 1.0 | 0.80 | MADE GROUND: dark grey silty sandy gravelly cobbles with high boulder content and some concrete fragments. | | 28.0 | 28.10 | | | | |
| 1.5 | 1.40 | Pit terminated due to obstructions.<br>**Pit terminated at 1.40m** | | 27.5 | 27.50 | | | | |
| 2.0 | | | | 27.0 | | | | | |
| 2.5 | | | | 26.5 | | | | | |
| 3.0 | | | | 26.0 | | | | | |
| 3.5 | | | | 25.5 | | | | | |
| 4.0 | | | | 25.0 | | | | | |
| 4.5 | | | | 24.5 | | | | | |
| | | | | 24.0 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Obstruction - boulders. | | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP36** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716167.410 | Date: | 16/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748460.628 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 29.38 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.00 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| | | MADE GROUND: grey silty sandy gravel (Cl. 804). | | | 29.18 | | | 3 | |
| | 0.20 | Firm light brown slightly sandy gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. | | | | | | 5 | |
| | 0.40 | Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. | | 29.0 | 28.98 | | | 5 | |
| 0.5 | | | | | | | | 7 | |
| | | | | | | | | 6 | |
| | | | | | | | | 4 | |
| | | | | | | | | 4 | |
| | | | | | | | | 4 | |
| | | | | 28.5 | | | | 3 | |
| 1.0 | | | | | | 1.00 | B | 3 | |
| | | | | | | | | 4 | |
| | | | | | | | | 4 | |
| | | | | | | | | 3 | |
| | | | | 28.0 | | | | 3 | |
| 1.5 | | | | | | | | 4 | |
| | | | | | | | | 4 | |
| | | | | | | | | 4 | |
| | | | | | | | | 4 | |
| | | | | 27.5 | | | | 5 | |
| 2.0 | | | | | | | | 4 | |
| | | | | | | | | 4 | |
| | 2.10 | Very stiff grey slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | | 27.28 | | | 5 | |
| | | | | | | | | 11 | |
| | | | | 27.0 | | | | 12 | |
| | | | | | | | | 16 | |
| 2.5 | | | | | | 2.50 | B | 35 | |
| | | | | 26.5 | | | | | |
| 3.0 | 3.00 | **Pit terminated at 3.00m** | | | 26.38 | | | | |
| | | | | 26.0 | | | | | |
| 3.5 | | | | | | | | | |
| | | | | 25.5 | | | | | |
| 4.0 | | | | | | | | | |
| | | | | 25.0 | | | | | |
| 4.5 | | | | | | | | | |
| | | | | 24.5 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP37** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716212.620 | Date: | 16/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748434.663 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 29.12 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.00 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| | 0.05 | MADE GROUND: grey silty sandy gravel (Cl. 804). Firm becoming stiff brown slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | | 29.07 | | | | |
| | 2.10 | Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | | 27.02 | 1.00<br>2.50 | B<br>B | | |
| | 3.00 | **Pit terminated at 3.00m** | | | 26.12 | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP38** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716206.730 | Date: | 16/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748385.328 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 30.43 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.00 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | | MADE GROUND: brown black slightly sandy gravelly silty clay with low cobble content. | | 30.0 | | 0.50 | CBR | 2 2 4 4 5 6 7 7 8 | |
| 1.0 | 0.90 | Firm becoming stiff brown slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 29.5 | 29.53 | 1.00 | B | 6 11 14 16 19 22 35 | |
| 1.5 | | | | 29.0 | | | | | |
| 2.0 | 1.90 | Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 28.5 | 28.53 | | | | |
| 2.5 | | | | 28.0 | | 2.50 | B | | |
| 3.0 | 3.00 | **Pit terminated at 3.00m** | | 27.5 | 27.43 | | | | |
| 3.5 | | | | 27.0 | | | | | |
| 4.0 | | | | 26.5 | | | | | |
| 4.5 | | | | 26.0 | | | | | |
| | | | | 25.5 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP39** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716179.600 | Date: | 16/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748389.142 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 30.92 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.00 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 0.10 | TOPSOIL. | | 30.5 | 30.82 | 0.50 | CBR | 2 | |
| 0.5 | | Firm becoming stiff brown slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 30.0 | | 1.00 | B | 2<br>2<br>2<br>3<br>2<br>4<br>4<br>6<br>9<br>9<br>7<br>8<br>12<br>16<br>18<br>22<br>26<br>35 | |
| 1.0 | | | | | | | | | |
| 1.5 | | | | 29.5 | | | | | |
| 2 | 1.90 | Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 29.0 | 29.02 | | | | |
| 2.5 | | | | 28.5 | | 2.50 | B | | |
| 3 | 3.00 | **Pit terminated at 3.00m** | | 28.0 | 27.92 | | | | |
| 3.5 | | | | 27.5 | | | | | |
| 4 | | | | 27.0 | | | | | |
| 4.5 | | | | 26.5 | | | | | |
| | | | | 26.0 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP40** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716190.650 | Date: | 16/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748345.002 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 32.20 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.00 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | 0.20 | TOPSOIL. | | 32.0 | 32.00 | | | 2 | |
| | | Firm becoming stiff brown slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | | | | | 2 3 4 4 4 5 3 5 6 | |
| 1.0 | | | | 31.5 | | 1.00 | B | 7 7 6 6 9 | |
| 1.5 | 1.90 | Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | 31.0 | | | | 11 14 16 16 16 17 15 21 35 | |
| 2.0 | | | | 30.5 | 30.30 | | | | |
| 2.5 | | | | 30.0 | | 2.50 | B | | |
| 3.0 | 3.00 | **Pit terminated at 3.00m** | | 29.5 | 29.20 | | | | |
| 3.5 | | | | 29.0 | | | | | |
| 4.0 | | | | 28.5 | | | | | |
| 4.5 | | | | 28.0 | | | | | |
| | | | | 27.5 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

| Contract No: 5599 | **Trial Pit and Dynamic Probe Log** | | | | Trial Pit No: **TP41** |
|---|---|---|---|---|---|
| Contract: | Millers Glen - Phase 5 | Easting: | 716145.700 | Date: | 16/05/2019 |
| Location: | Swords, Co. Dublin | Northing: | 748341.706 | Excavator: | 12T Wheeled Excavator |
| Client: | Gannon Homes Ltd | Elevation: | 32.17 | Logged By: | M. Kaliski |
| Engineer: | Waterman Moylan | Dimensions (LxWxD) (m): | 3.00 x 0.70 x 3.00 | Scale: | 1:25 |

| Level (mbgl) Scale: | Depth | Stratum Description | Legend | Level (mOD) Scale: | Depth: | Samples Depth | Type | Probe | Water Strike |
|---|---|---|---|---|---|---|---|---|---|
| | | MADE GROUND: grey silty sandy gravel (Cl. 804). | | 32.0 | | | | 2 | |
| | 0.40 | | | | 31.77 | | | 4 | |
| 0.5 | | Firm becoming stiff brown slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | | | 0.50 | CBR | 3 | |
| | | | | 31.5 | | | | 3 | |
| | | | | | | | | 4 | |
| | | | | | | | | 4 | |
| | | | | | | | | 5 | |
| 1.0 | | | | | | 1.00 | B | 5 | |
| | | | | | | | | 5 | |
| | | | | | | | | 6 | |
| | | | | 31.0 | | | | 11 | |
| | | | | | | | | 11 | |
| 1.5 | | | | | | | | 14 | |
| | | | | | | | | 16 | |
| | | | | | | | | 18 | |
| | | | | | | | | 35 | |
| | 1.80 | | | 30.5 | 30.37 | | | | |
| 2.0 | | Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). | | | | 2.00 | B | | |
| | | | | 30.0 | | | | | |
| 2.5 | | | | | | | | | |
| | | | | 29.5 | | | | | |
| 3.0 | 3.00 | **Pit terminated at 3.00m** | | | 29.17 | | | | |
| | | | | 29.0 | | | | | |
| 3.5 | | | | | | | | | |
| | | | | 28.5 | | | | | |
| 4.0 | | | | | | | | | |
| | | | | 28.0 | | | | | |
| 4.5 | | | | | | | | | |
| | | | | 27.5 | | | | | |

| Termination: | Pit Wall Stability: | Groundwater Rate: | Remarks: | Key: |
|---|---|---|---|---|
| Scheduled depth. | Pit walls stable. | Dry | - | B = Bulk disturbed<br>D = Small disturbed<br>CBR = Undisturbed CBR<br>ES = Environmental |

**TP01 Sidewall**

**TP01 Spoil**

**TP02 Sidewall**

**TP02 Spoil**

**TP03 Sidewall**

**TP03 Spoil**

**TP04 Sidewall**

**TP04 Spoil**

**TP05 Sidewall**

**TP05 Spoil**

## TP06 Sidewall

## TP06 Spoil

## TP07 Sidewall

## TP07 Spoil

## TP08 Sidewall

## TP08 Spoil

## TP09 Sidewall

## TP09 Spoil

**TP10 Sidewall**

**TP10 Spoil**

**TP11 Sidewall**

**TP11 Spoil**

**TP12 Sidewall**

**TP12 Spoil**

**TP13 Sidewall**

**TP13 Spoil**

**TP14 Sidewall**

**TP14 Spoil**

## TP15 Sidewall

## TP15 Spoil

**TP16 Sidewall**

**TP16 Spoil**

## TP17 Sidewall

## TP17 Spoil

**TP18 Sidewall**

**TP18 Spoil**

## TP19 Sidewall

## TP19 Spoil

## TP20 Sidewall

## TP20 Spoil

**TP21 Sidewall**

**TP21 Spoil**

## TP22 Sidewall

## TP22 Spoil

## TP23 Sidewall

## TP23 Spoil

## TP24 Sidewall

## TP24 Spoil

**TP25 Sidewall**

**TP25 Spoil**

## TP26 Sidewall

## TP26 Spoil

## TP27 Sidewall

## TP27 Spoil

## TP29 Sidewall

## TP29 Spoil

**TP30 Sidewall**

**TP30 Spoil**

## TP31 Sidewall

## TP31 Spoil

## TP32 Sidewall

## TP32 Spoil

**TP33 Sidewall**

**TP33 Spoil**

**TP34 Sidewall**

**TP34 Spoil**

## TP35 Sidewall

## TP35 Spoil

**TP35A Sidewall**

**TP35A Spoil**

**TP36 Sidewall**

**TP36 Spoil**

## TP37 Sidewall

## TP37 Spoil

## TP38 Sidewall

## TP38 Spoil

## TP39 Sidewall

## TP39 Spoil

## TP40 Sidewall

## TP40 Spoil

**TP41 Sidewall**

**TP41 Spoil**

# Appendix 3

# Soakaway Test Results

# SOAKAWAY TEST

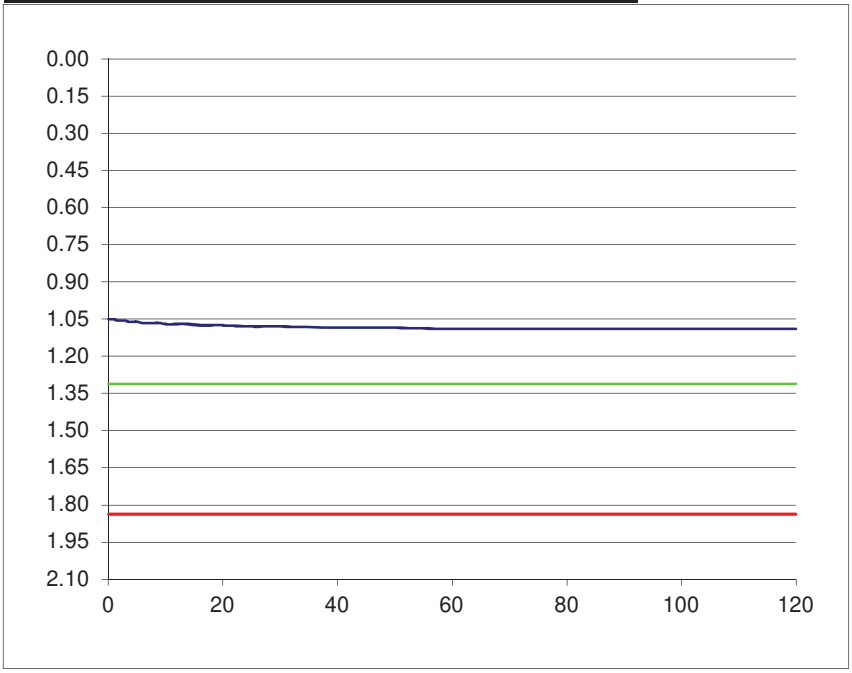
| | |
|---|---|
| **Project Reference:** | 5599 |
| **Contract name:** | Millers Glen - Phase 5 |
| **Location:** | Swords, Co. Dublin |
| **Test No:** | SA01 |
| **Date:** | 16/05/2019 |

**Ground Conditions**

| From | To | |
|---|---|---|
| 0.00 | 0.20 | MADE GROUND: grey silty sandy gravel (Cl. 804). |
| 0.20 | 0.40 | Firm light brown slightly sandy gravelly silty CLAY. |
| 0.40 | 2.10 | Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with medium cobble content. |

| Elapsed Time (mins) | Fall of Water (m) |
|---|---|
| 0 | 1.05 |
| 0.5 | 1.05 |
| 1 | 1.05 |
| 1.5 | 1.06 |
| 2 | 1.06 |
| 2.5 | 1.06 |
| 3 | 1.06 |
| 3.5 | 1.06 |
| 4 | 1.06 |
| 4.5 | 1.06 |
| 5 | 1.06 |
| 6 | 1.07 |
| 7 | 1.07 |
| 8 | 1.07 |
| 9 | 1.07 |
| 10 | 1.07 |
| 12 | 1.07 |
| 14 | 1.07 |
| 16 | 1.08 |
| 18 | 1.08 |
| 20 | 1.08 |
| 25 | 1.08 |
| 30 | 1.08 |
| 40 | 1.09 |
| 50 | 1.09 |
| 60 | 1.09 |
| 75 | 1.09 |
| 90 | 1.09 |
| 120 | 1.09 |

| **Pit Dimensions (m)** | | |
|---|---|---|
| Length (m) | 2.60 | m |
| Width (m) | 0.70 | m |
| Depth | 2.10 | m |
| **Water** | | |
| Start Depth of Water | 1.05 | m |
| Depth of Water | 1.05 | m |
| 75% Full | 1.31 | m |
| 25% Full | 1.84 | m |
| 75%-25% | 0.53 | m |
| Volume of water (75%-25%) | **0.96** | m3 |
| Area of Drainage | **13.86** | m2 |
| Area of Drainage (75%-25%) | **5.285** | m2 |
| Time | | |
| 75% Full | N/A | min |
| 25% Full | N/A | min |
| Time 75% to 25% | **N/A** | min |
| Time 75% to 25% (sec) | **N/A** | sec |




**f =** **Fail** **m/min** or **Fail** **m/s**

# SOAKAWAY TEST

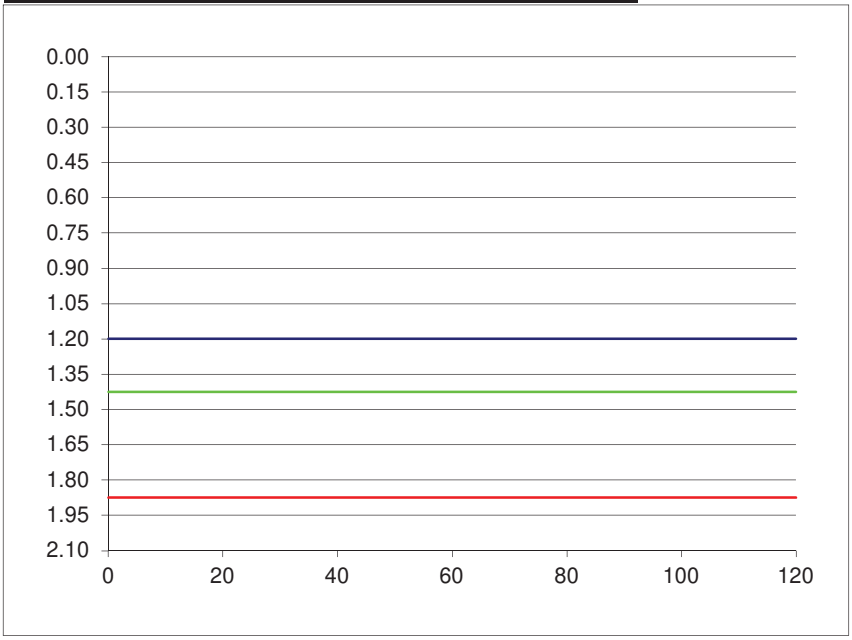
| | |
|---|---|
| **Project Reference:** | 5599 |
| **Contract name:** | Millers Glen - Phase 5 |
| **Location:** | Swords, Co. Dublin |
| **Test No:** | SA02 |
| **Date:** | 14/05/2019 |

**Ground Conditions**

| From | To | |
|---|---|---|
| 0.00 | 0.30 | MADE GROUND: light brown slightly sandy gravelly silty clay with low cobble content and some plastic pipe fragments. |
| 0.30 | 1.40 | MADE GROUND: brown slightly sandy gravelly silty clay with low cobble content and some gravel laminas. |
| 1.40 | 2.10 | Firm brown slightly sandy gravelly silty CLAY with low cobble content. |

| Elapsed Time (mins) | Fall of Water (m) |
|---|---|
| 0 | 1.20 |
| 0.5 | 1.20 |
| 1 | 1.20 |
| 1.5 | 1.20 |
| 2 | 1.20 |
| 2.5 | 1.20 |
| 3 | 1.20 |
| 3.5 | 1.20 |
| 4 | 1.20 |
| 4.5 | 1.20 |
| 5 | 1.20 |
| 6 | 1.20 |
| 7 | 1.20 |
| 8 | 1.20 |
| 9 | 1.20 |
| 10 | 1.20 |
| 12 | 1.20 |
| 14 | 1.20 |
| 16 | 1.20 |
| 18 | 1.20 |
| 20 | 1.20 |
| 25 | 1.20 |
| 30 | 1.20 |
| 40 | 1.20 |
| 50 | 1.20 |
| 60 | 1.20 |
| 75 | 1.20 |
| 90 | 1.20 |
| 120 | 1.20 |

| **Pit Dimensions (m)** | | |
|---|---|---|
| Length (m) | 2.40 | m |
| Width (m) | 0.70 | m |
| Depth | 2.10 | m |
| **Water** | | |
| Start Depth of Water | 1.20 | m |
| Depth of Water | 0.90 | m |
| 75% Full | 1.43 | m |
| 25% Full | 1.88 | m |
| 75%-25% | 0.45 | m |
| Volume of water (75%-25%) | **0.76** | m3 |
| Area of Drainage | **13.02** | m2 |
| Area of Drainage (75%-25%) | **4.47** | m2 |
| Time | | |
| 75% Full | N/A | min |
| 25% Full | N/A | min |
| Time 75% to 25% | **N/A** | min |
| Time 75% to 25% (sec) | **N/A** | sec |




f = **Fail** m/min or **Fail** m/s

# SOAKAWAY TEST

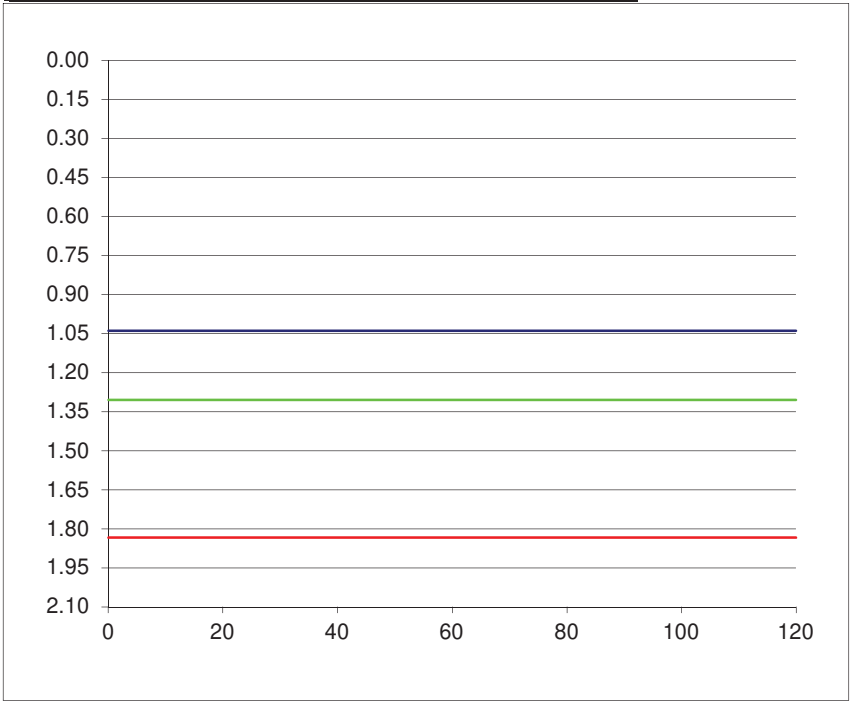
| | |
|---|---|
| **Project Reference:** | 5599 |
| **Contract name:** | Millers Glen - Phase 5 |
| **Location:** | Swords, Co. Dublin |
| **Test No:** | SA03 |
| **Date:** | 15/05/2019 |

**Ground Conditions**

| From | To | |
|---|---|---|
| 0.00 | 0.30 | Firm light brown slightly sandy gravelly silty CLAY with low cobble content. |
| 0.30 | 2.10 | Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with low cobble content. |

| Elapsed Time (mins) | Fall of Water (m) |
|---|---|
| 0 | 1.04 |
| 0.5 | 1.04 |
| 1 | 1.04 |
| 1.5 | 1.04 |
| 2 | 1.04 |
| 2.5 | 1.04 |
| 3 | 1.04 |
| 3.5 | 1.04 |
| 4 | 1.04 |
| 4.5 | 1.04 |
| 5 | 1.04 |
| 6 | 1.04 |
| 7 | 1.04 |
| 8 | 1.04 |
| 9 | 1.04 |
| 10 | 1.04 |
| 12 | 1.04 |
| 14 | 1.04 |
| 16 | 1.04 |
| 18 | 1.04 |
| 20 | 1.04 |
| 25 | 1.04 |
| 30 | 1.04 |
| 40 | 1.04 |
| 50 | 1.04 |
| 60 | 1.04 |
| 75 | 1.04 |
| 90 | 1.04 |
| 120 | 1.04 |

| **Pit Dimensions (m)** | | |
|---|---|---|
| Length (m) | 2.50 | m |
| Width (m) | 0.70 | m |
| Depth | 2.10 | m |
| **Water** | | |
| Start Depth of Water | 1.04 | m |
| Depth of Water | 1.06 | m |
| 75% Full | 1.31 | m |
| 25% Full | 1.84 | m |
| 75%-25% | 0.53 | m |
| Volume of water (75%-25%) | **0.93** | m3 |
| Area of Drainage | **13.44** | m2 |
| Area of Drainage (75%-25%) | **5.142** | m2 |
| Time | | |
| 75% Full | N/A | min |
| 25% Full | N/A | min |
| Time 75% to 25% | **N/A** | min |
| Time 75% to 25% (sec) | **N/A** | sec |




**f =** **Fail** m/min or **Fail** m/s

# SOAKAWAY TEST

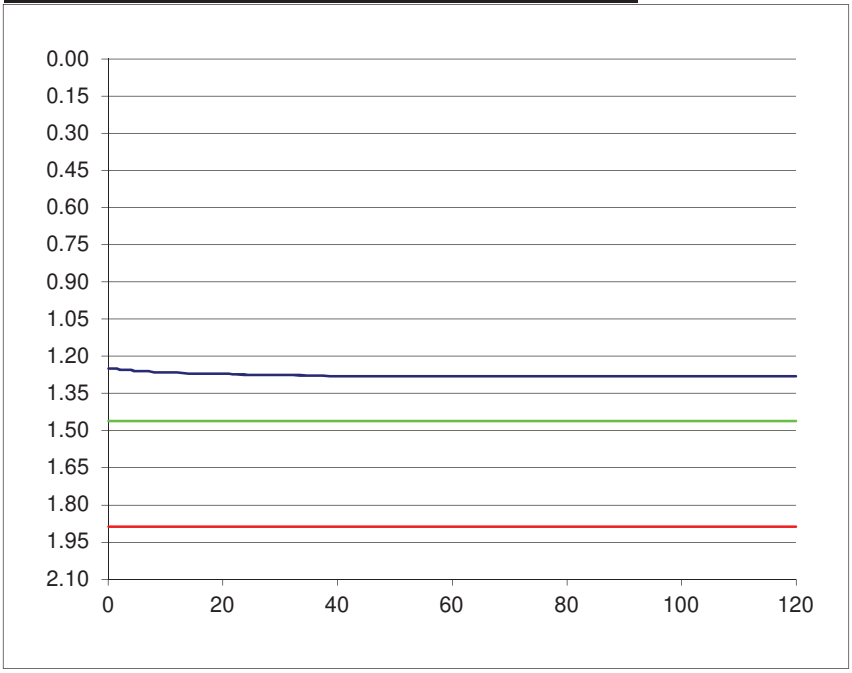
| | |
|---|---|
| **Project Reference:** | 5599 |
| **Contract name:** | Millers Glen - Phase 5 |
| **Location:** | Swords, Co. Dublin |
| **Test No:** | SA04 |
| **Date:** | 15/05/2019 |

**Ground Conditions**

| From | To | |
|---|---|---|
| 0.00 | 1.80 | Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with medium cobble content. |
| 1.80 | 2.10 | Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. |

| Elapsed Time (mins) | Fall of Water (m) |
|---|---|
| 0 | 1.25 |
| 0.5 | 1.25 |
| 1 | 1.25 |
| 1.5 | 1.25 |
| 2 | 1.26 |
| 2.5 | 1.26 |
| 3 | 1.26 |
| 3.5 | 1.26 |
| 4 | 1.26 |
| 4.5 | 1.26 |
| 5 | 1.26 |
| 6 | 1.26 |
| 7 | 1.26 |
| 8 | 1.27 |
| 9 | 1.27 |
| 10 | 1.27 |
| 12 | 1.27 |
| 14 | 1.27 |
| 16 | 1.27 |
| 18 | 1.27 |
| 20 | 1.27 |
| 25 | 1.28 |
| 30 | 1.28 |
| 40 | 1.28 |
| 50 | 1.28 |
| 60 | 1.28 |
| 75 | 1.28 |
| 90 | 1.28 |
| 120 | 1.28 |

| **Pit Dimensions (m)** | | |
|---|---|---|
| Length (m) | 2.30 | m |
| Width (m) | 0.70 | m |
| Depth | 2.10 | m |
| **Water** | | |
| Start Depth of Water | 1.25 | m |
| Depth of Water | 0.85 | m |
| 75% Full | 1.46 | m |
| 25% Full | 1.89 | m |
| 75%-25% | 0.43 | m |
| Volume of water (75%-25%) | **0.68** | m3 |
| Area of Drainage | **12.6** | m2 |
| Area of Drainage (75%-25%) | **4.16** | m2 |
| Time | | |
| 75% Full | N/A | min |
| 25% Full | N/A | min |
| Time 75% to 25% | **N/A** | min |
| Time 75% to 25% (sec) | **N/A** | sec |




**f =** **Fail** **m/min** or **Fail** **m/s**

# SOAKAWAY TEST

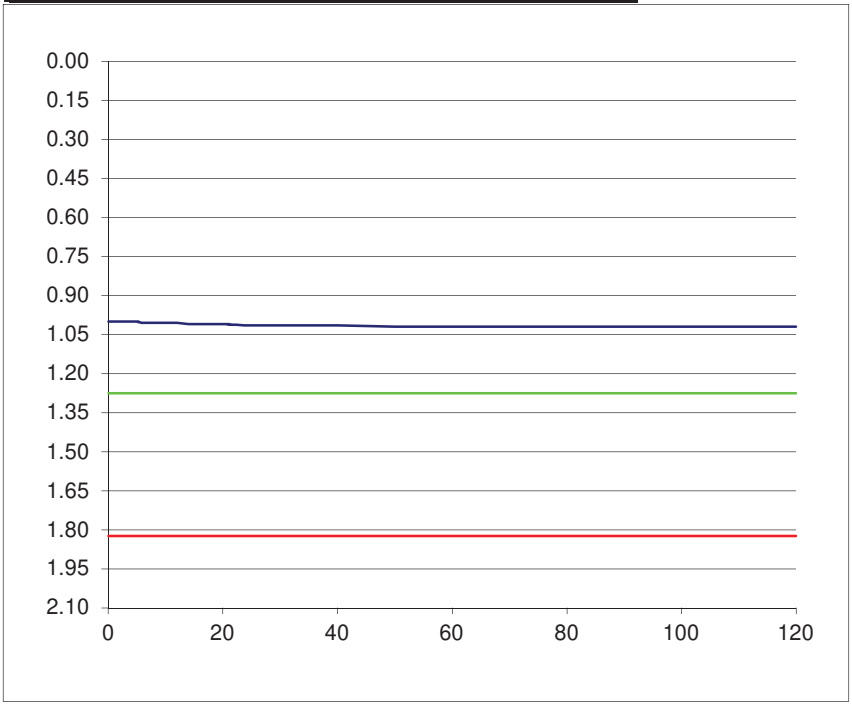
| | |
|---|---|
| **Project Reference:** | 5599 |
| **Contract name:** | Millers Glen - Phase 5 |
| **Location:** | Swords, Co. Dublin |
| **Test No:** | SA05 |
| **Date:** | 15/05/2019 |

**Ground Conditions**

| From | To | |
|---|---|---|
| 0.00 | 0.20 | Firm brown slightly sandy gravelly silty CLAY. |
| 0.20 | 2.10 | Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with medium cobble content. |

| Elapsed Time (mins) | Fall of Water (m) |
|---|---|
| 0 | 1.00 |
| 0.5 | 1.00 |
| 1 | 1.00 |
| 1.5 | 1.00 |
| 2 | 1.00 |
| 2.5 | 1.00 |
| 3 | 1.00 |
| 3.5 | 1.00 |
| 4 | 1.00 |
| 4.5 | 1.00 |
| 5 | 1.00 |
| 6 | 1.01 |
| 7 | 1.01 |
| 8 | 1.01 |
| 9 | 1.01 |
| 10 | 1.01 |
| 12 | 1.01 |
| 14 | 1.01 |
| 16 | 1.01 |
| 18 | 1.01 |
| 20 | 1.01 |
| 25 | 1.02 |
| 30 | 1.02 |
| 40 | 1.02 |
| 50 | 1.02 |
| 60 | 1.02 |
| 75 | 1.02 |
| 90 | 1.02 |
| 120 | 1.02 |

| **Pit Dimensions (m)** | | |
|---|---|---|
| Length (m) | 2.50 | m |
| Width (m) | 0.70 | m |
| Depth | 2.10 | m |
| **Water** | | |
| Start Depth of Water | 1.00 | m |
| Depth of Water | 1.10 | m |
| 75% Full | 1.28 | m |
| 25% Full | 1.83 | m |
| 75%-25% | 0.55 | m |
| Volume of water (75%-25%) | **0.96** | m3 |
| Area of Drainage | **13.44** | m2 |
| Area of Drainage (75%-25%) | **5.27** | m2 |
| Time | | |
| 75% Full | N/A | min |
| 25% Full | N/A | min |
| Time 75% to 25% | **N/A** | min |
| Time 75% to 25% (sec) | **N/A** | sec |




**f =** **Fail** m/min or **Fail** m/s

# SOAKAWAY TEST

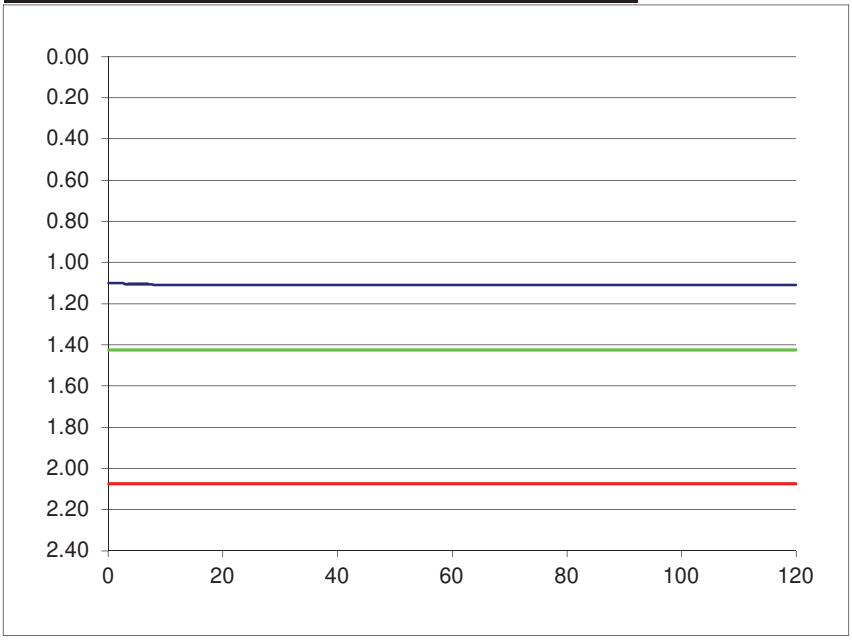
| | |
|---|---|
| **Project Reference:** | 5599 |
| **Contract name:** | Millers Glen - Phase 5 |
| **Location:** | Swords, Co. Dublin |
| **Test No:** | SA06 |
| **Date:** | 14/05/2019 |

**Ground Conditions**

| From | To | |
|---|---|---|
| 0.00 | 0.20 | MADE GROUND: grey brown sandy gravelly silty clay with medium cobble content and some tree roots. |
| 0.20 | 2.10 | Firm brown slightly sandy slightly gravelly silty CLAY with low cobble content. |
| 2.10 | 2.30 | Dark grey silty sandy GRAVEL with low cobble content. |
| 2.30 | 2.40 | Firm brown slightly sandy slightly gravelly silty CLAY with low cobble content. |

| Elapsed Time (mins) | Fall of Water (m) |
|---|---|
| 0 | 1.10 |
| 0.5 | 1.10 |
| 1 | 1.10 |
| 1.5 | 1.10 |
| 2 | 1.10 |
| 2.5 | 1.10 |
| 3 | 1.11 |
| 3.5 | 1.11 |
| 4 | 1.11 |
| 4.5 | 1.11 |
| 5 | 1.11 |
| 6 | 1.11 |
| 7 | 1.11 |
| 8 | 1.11 |
| 9 | 1.11 |
| 10 | 1.11 |
| 12 | 1.11 |
| 14 | 1.11 |
| 16 | 1.11 |
| 18 | 1.11 |
| 20 | 1.11 |
| 25 | 1.11 |
| 30 | 1.11 |
| 40 | 1.11 |
| 50 | 1.11 |
| 60 | 1.11 |
| 75 | 1.11 |
| 90 | 1.11 |
| 120 | 1.11 |

| **Pit Dimensions (m)** | | |
|---|---|---|
| Length (m) | 2.10 | m |
| Width (m) | 0.70 | m |
| Depth | 2.40 | m |
| **Water** | | |
| Start Depth of Water | 1.10 | m |
| Depth of Water | 1.30 | m |
| 75% Full | 1.43 | m |
| 25% Full | 2.08 | m |
| 75%-25% | 0.65 | m |
| Volume of water (75%-25%) | **0.96** | m3 |
| Area of Drainage | **13.44** | m2 |
| Area of Drainage (75%-25%) | **5.11** | m2 |
| Time | | |
| 75% Full | N/A | min |
| 25% Full | N/A | min |
| Time 75% to 25% | **N/A** | min |
| Time 75% to 25% (sec) | **N/A** | sec |




**f =** **Fail** **m/min** or **Fail** **m/s**

# Appendix 4

# Geotechnical Laboratory Test Results

# Classification Tests in accordance with BS1377: Part 4

| | |
|---|---|
| Client | Gannon Homes Ltd. |
| Site | Millers Glen - Phase 5 |
| S.I. File No | 5599 / 19 |
| Test Lab | Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email info@siteinvestigations.ie |
| Report Date | 7th June 2019 |

| Hole ID | Depth | Sample No | Lab Ref No. | Sample Type | Natural Moisture Content % | Liquid Limit % | Plastic Limit % | Plastic Index % | Min. Dry Density $Mg/m^3$ | Particle Density $Mg/m^3$ | % passing 425um | Comments | **Remarks** **C**=Clay; **M**=Silt **Plasticity**: **L**=Low; **I**=Intermediate; **H**=High; **V**=Very High; **E**=Extremely High |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TP01 | 1.00 | MK01 | 19/755 | B | 15.4 | 36 | 22 | 14 | | | 54.3 | | CI |
| TP10 | 2.50 | MK67 | 19/756 | B | 10.4 | 33 | 23 | 10 | | | 31.0 | | CL |
| TP15 | 1.00 | MK50 | 19/757 | B | 13.1 | 35 | 21 | 14 | | | 39.2 | | CL |
| TP27 | 1.00 | MK26 | 19/758 | B | 14.7 | 35 | 23 | 12 | | | 46.9 | | CL/CI |
| TP37 | 1.00 | MK85 | 19/759 | B | 10.5 | 34 | 20 | 14 | | | 46.1 | | CL |



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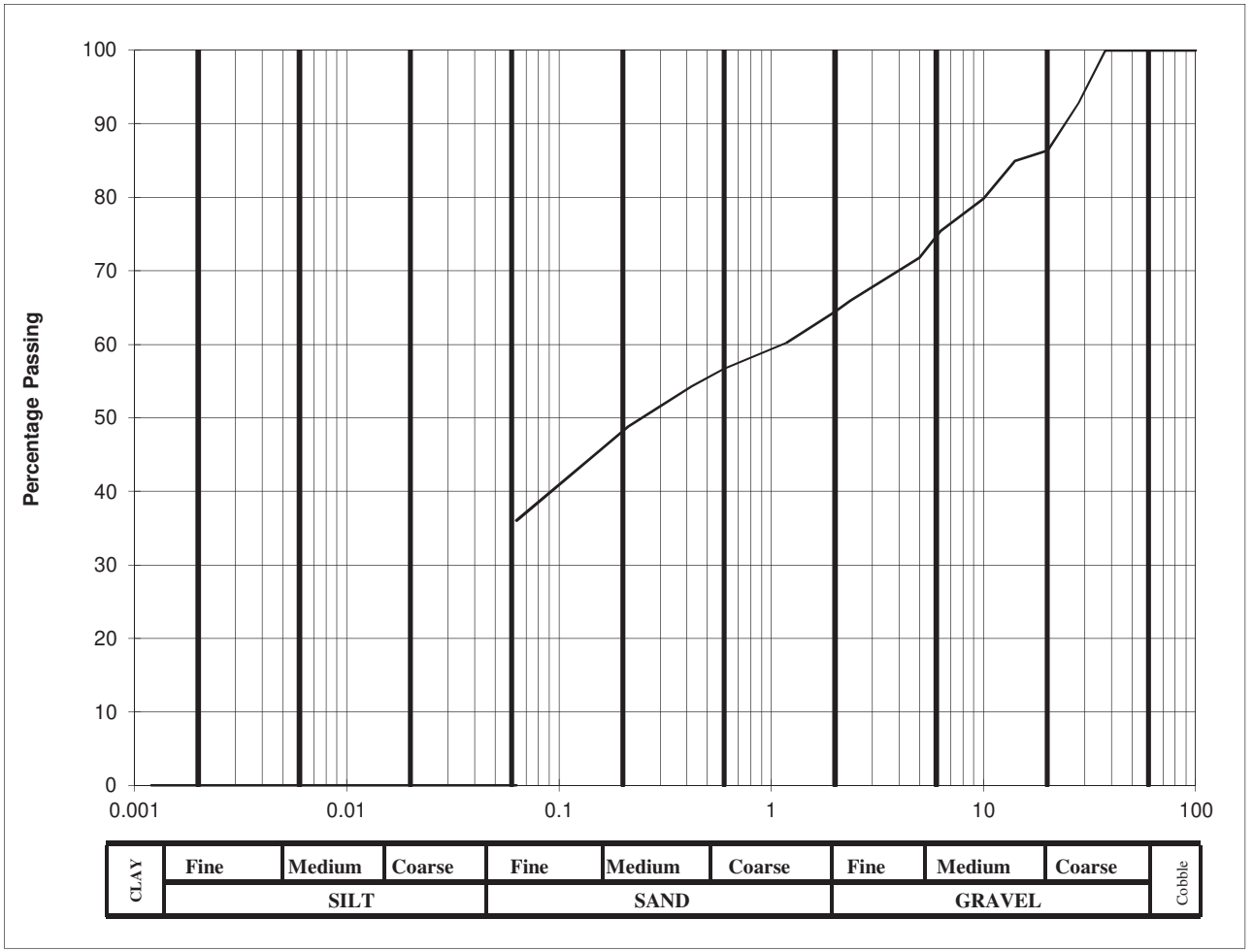
Site Investigations Ltd

# BS 1377 Particle Size Analysis

***Site Investigations Limited***

| BS Sieve size, mm | Percent passing | Hydrometer analysis | |
|---|---|---|---|
| | | Diameter, mm | % passing |
| **100** | 100 | **0.0630** | |
| **90** | 100 | **0.0200** | |
| **75** | 100 | **0.0060** | |
| **63** | 100 | **0.0020** | |
| **50** | 100 | | |
| **37.5** | 100 | | |
| **28** | 92.8 | | |
| **20** | 86.3 | | |
| **14** | 84.9 | | |
| **10** | 79.8 | | |
| **6.3** | 75.4 | | |
| **5.0** | 71.8 | | |
| **2.36** | 66 | | |
| **2.00** | 64.4 | | |
| **1.18** | 60.2 | | |
| **0.600** | 56.7 | | |
| **0.425** | 54.3 | | |
| **0.300** | 51.6 | | |
| **0.212** | 48.8 | | |
| **0.150** | 45.2 | | |
| **0.063** | 36 | | |

| | |
|---|---|
| Cobbles, % | 0 |
| Gravel, % | 36 |
| Sand, % | 28 |
| Clay / Silt, % | 36 |




| | |
|---|---|
| Client : | Gannon Homes Ltd. |
| Project : | Millers Glen - Phase 5 |

| | |
|---|---|
| Lab. No : | 19/755 |
| Sample No : | MK01 |

| | |
|---|---|
| Hole ID : | TP 01 |
| Depth, m : | 1.00 |

| | |
|---|---|
| Material description : | slightly sandy gravelly silty CLAY |
| Remarks : | Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour.<br>Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt |

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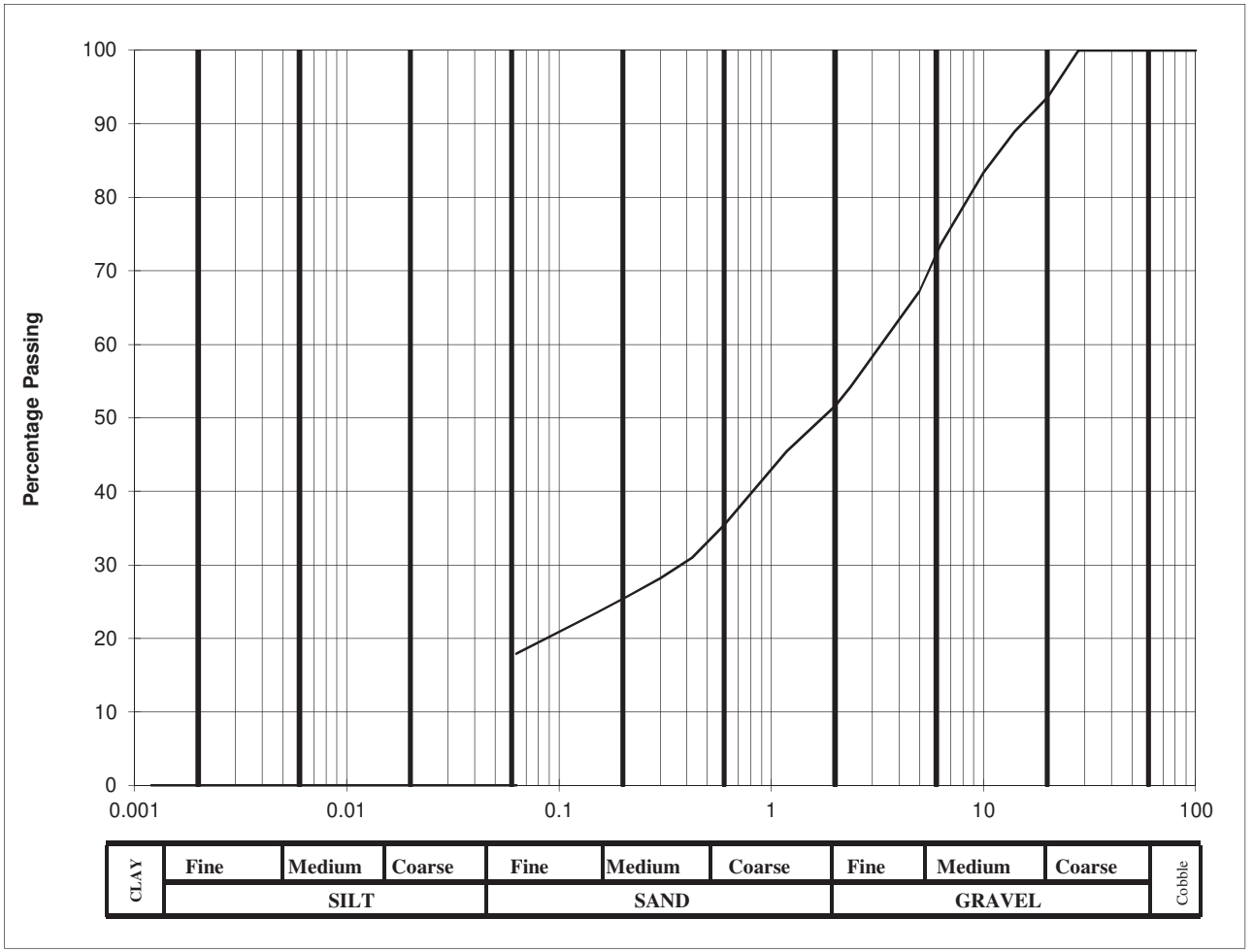
# BS 1377 Particle Size Analysis

***Site Investigations Limited***

| BS Sieve size, mm | Percent passing | Hydrometer analysis | |
|---|---|---|---|
| | | Diameter, mm | % passing |
| **100** | 100 | **0.0630** | |
| **90** | 100 | **0.0200** | |
| **75** | 100 | **0.0060** | |
| **63** | 100 | **0.0020** | |
| **50** | 100 | | |
| **37.5** | 100 | | |
| **28** | 100 | | |
| **20** | 93.6 | | |
| **14** | 88.9 | | |
| **10** | 83.4 | | |
| **6.3** | 73.6 | | |
| **5.0** | 67.2 | | |
| **2.36** | 54.2 | | |
| **2.00** | 51.6 | | |
| **1.18** | 45.4 | | |
| **0.600** | 35.4 | | |
| **0.425** | 31 | | |
| **0.300** | 28.2 | | |
| **0.212** | 25.7 | | |
| **0.150** | 23.5 | | |
| **0.063** | 18 | | |

| | |
|---|---|
| Cobbles, % | 0 |
| Gravel, % | 48 |
| Sand, % | 34 |
| Clay / Silt, % | 18 |




| | |
|---|---|
| Client : | Gannon Homes Ltd. |
| Project : | Millers Glen - Phase 5 |

| | |
|---|---|
| Lab. No : | 19/756 |
| Sample No : | MK67 |

| | |
|---|---|
| Hole ID : | TP 10 |
| Depth, m : | 2.50 |

| | |
|---|---|
| Material description : | slightly sandy gravelly silty CLAY |
| Remarks : | Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour.<br>Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt |

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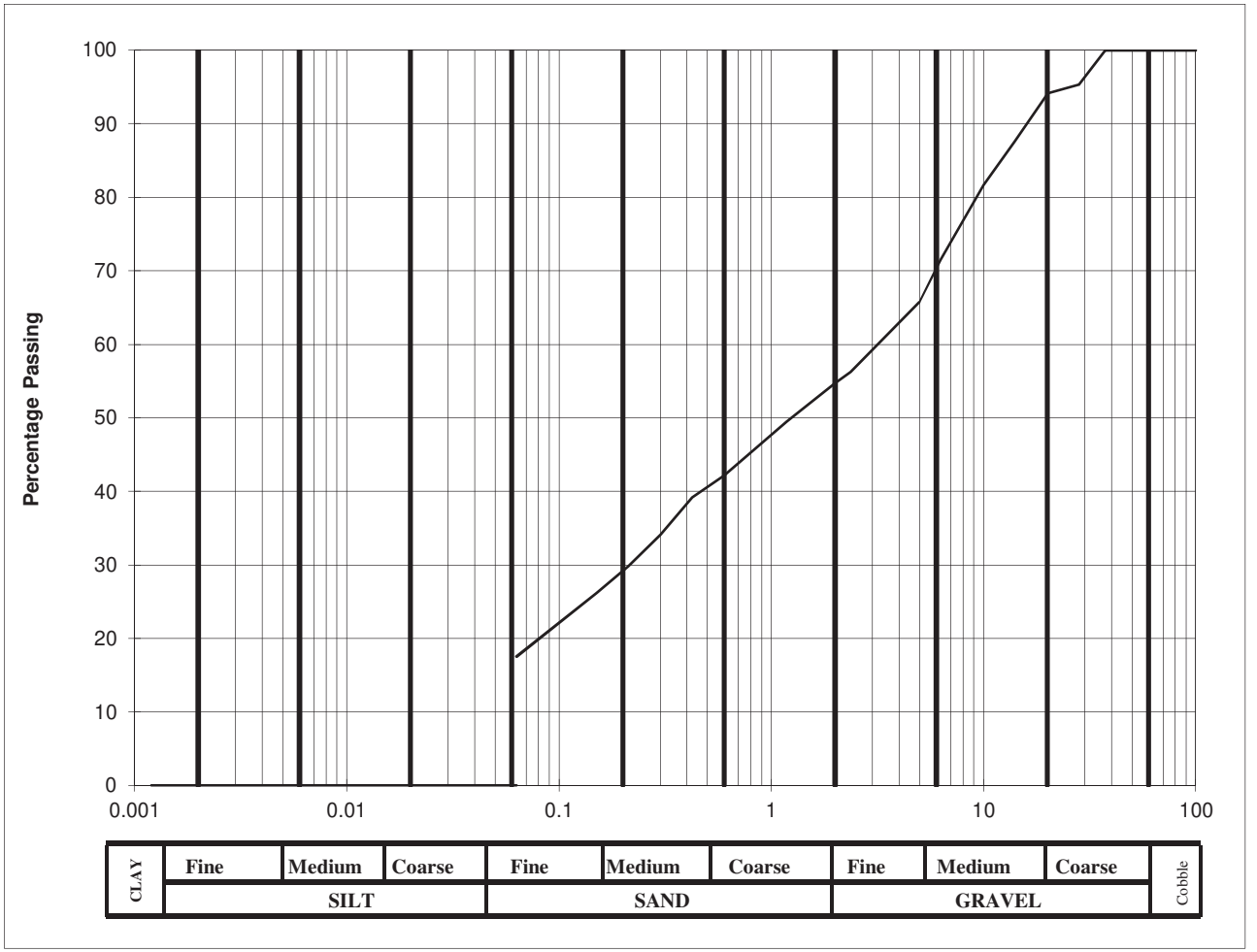
# BS 1377 Particle Size Analysis

***Site Investigations Limited***

| BS Sieve size, mm | Percent passing | Hydrometer analysis | |
|---|---|---|---|
| | | Diameter, mm | % passing |
| **100** | 100 | **0.0630** | |
| **90** | 100 | **0.0200** | |
| **75** | 100 | **0.0060** | |
| **63** | 100 | **0.0020** | |
| **50** | 100 | | |
| **37.5** | 100 | | |
| **28** | 95.3 | | |
| **20** | 94.1 | | |
| **14** | 87.6 | | |
| **10** | 81.7 | | |
| **6.3** | 71.5 | | |
| **5.0** | 65.8 | | |
| **2.36** | 56.2 | | |
| **2.00** | 54.7 | | |
| **1.18** | 49.5 | | |
| **0.600** | 42.1 | | |
| **0.425** | 39.2 | | |
| **0.300** | 34.1 | | |
| **0.212** | 29.8 | | |
| **0.150** | 26.2 | | |
| **0.063** | 18 | | |

| | |
|---|---|
| Cobbles, % | 0 |
| Gravel, % | 45 |
| Sand, % | 37 |
| Clay / Silt, % | 18 |




| | |
|---|---|
| Client : | Gannon Homes Ltd. |
| Project : | Millers Glen - Phase 5 |

| | |
|---|---|
| Lab. No : | 19/757 |
| Sample No : | MK50 |

| | |
|---|---|
| Hole ID : | TP 15 |
| Depth, m : | 1.00 |

| | |
|---|---|
| Material description : | sandy gravelly silty CLAY |
| Remarks : | Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt |

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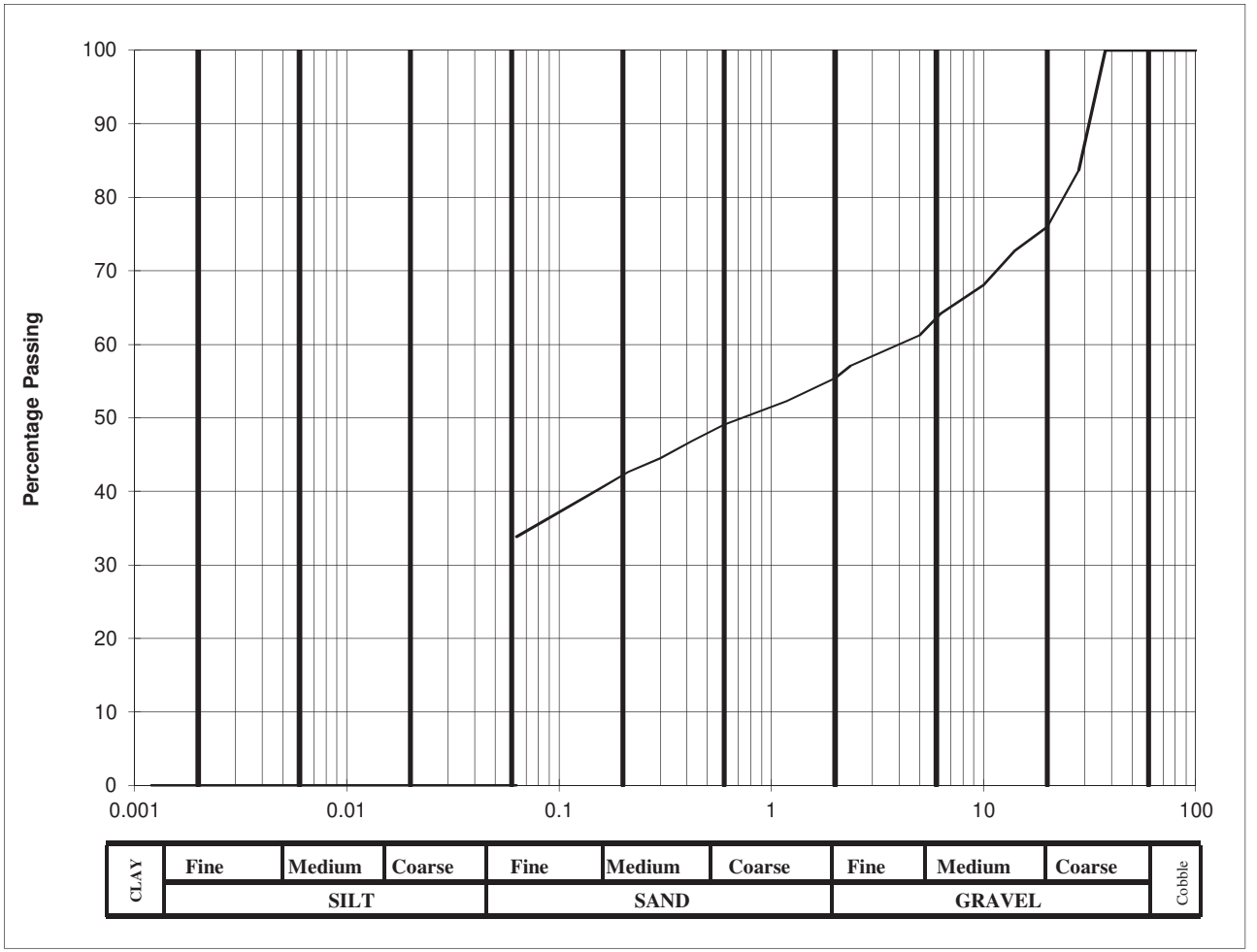
# BS 1377 Particle Size Analysis

***Site Investigations Limited***

| BS Sieve size, mm | Percent passing | Hydrometer analysis | |
|---|---|---|---|
| | | Diameter, mm | % passing |
| **100** | 100 | **0.0630** | |
| **90** | 100 | **0.0200** | |
| **75** | 100 | **0.0060** | |
| **63** | 100 | **0.0020** | |
| **50** | 100 | | |
| **37.5** | 100 | | |
| **28** | 83.6 | | |
| **20** | 76 | | |
| **14** | 72.7 | | |
| **10** | 68.1 | | |
| **6.3** | 64.2 | | |
| **5.0** | 61.2 | | |
| **2.36** | 57.1 | | |
| **2.00** | 55.4 | | |
| **1.18** | 52.3 | | |
| **0.600** | 49.1 | | |
| **0.425** | 46.9 | | |
| **0.300** | 44.5 | | |
| **0.212** | 42.6 | | |
| **0.150** | 40.1 | | |
| **0.063** | 34 | | |

| | |
|---|---|
| Cobbles, % | 0 |
| Gravel, % | 45 |
| Sand, % | 21 |
| Clay / Silt, % | 34 |




| | |
|---|---|
| Client : | Gannon Homes Ltd. |
| Project : | Millers Glen - Phase 5 |

| | |
|---|---|
| Lab. No : | 19/758 |
| Sample No : | MK26 |

| | |
|---|---|
| Hole ID : | TP 27 |
| Depth, m : | 1.00 |

| | |
|---|---|
| Material description : | slightly sandy gravelly silty CLAY |
| Remarks : | Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour.<br>Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt |

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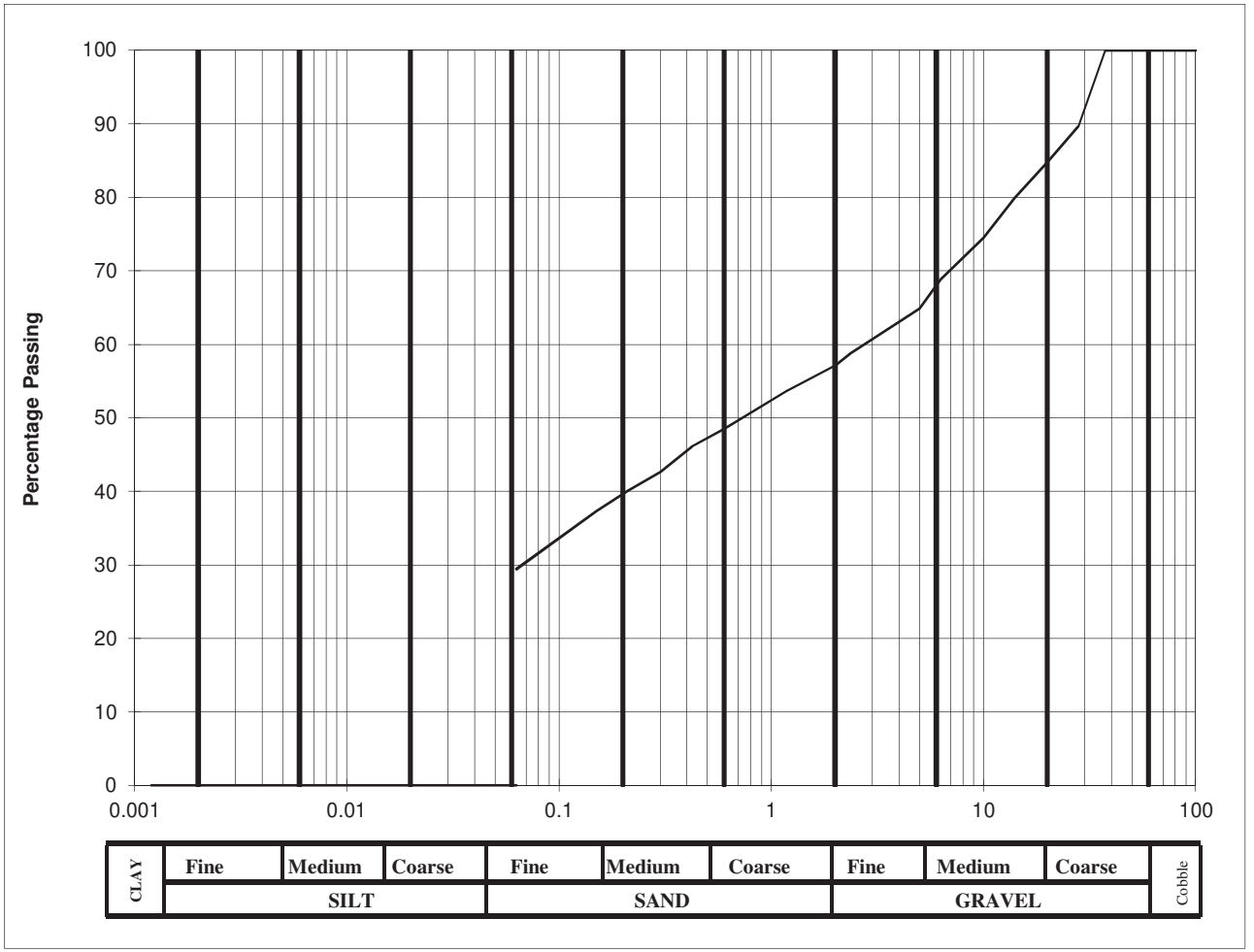
# BS 1377 Particle Size Analysis

***Site Investigations Limited***

| BS Sieve size, mm | Percent passing | Hydrometer analysis | |
|---|---|---|---|
| | | Diameter, mm | % passing |
| **100** | 100 | **0.0630** | |
| **90** | 100 | **0.0200** | |
| **75** | 100 | **0.0060** | |
| **63** | 100 | **0.0020** | |
| **50** | 100 | | |
| **37.5** | 100 | | |
| **28** | 89.7 | | |
| **20** | 84.8 | | |
| **14** | 79.9 | | |
| **10** | 74.5 | | |
| **6.3** | 68.8 | | |
| **5.0** | 64.9 | | |
| **2.36** | 58.8 | | |
| **2.00** | 57.1 | | |
| **1.18** | 53.6 | | |
| **0.600** | 48.5 | | |
| **0.425** | 46.1 | | |
| **0.300** | 42.6 | | |
| **0.212** | 40.1 | | |
| **0.150** | 37.3 | | |
| **0.063** | 29 | | |

| | |
|---|---|
| Cobbles, % | 0 |
| Gravel, % | 43 |
| Sand, % | 28 |
| Clay / Silt, % | 29 |




| | |
|---|---|
| Client : | Gannon Homes Ltd. |
| Project : | Millers Glen - Phase 5 |

| | |
|---|---|
| Lab. No : | 19/759 |
| Sample No : | MK85 |

| | |
|---|---|
| Hole ID : | TP 37 |
| Depth, m : | 1.00 |

| | |
|---|---|
| Material description : | slightly sandy gravelly silty CLAY |
| Remarks : | Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour.<br>Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt |

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# California Bearing Ratio (CBR) In accordance with BS1377: Part 4: Method 7

| | |
|---|---|
| Client | Gannon Homes Ltd. |
| Site | Millers Glen - Phase 5 |
| S.I. File No | 5599 / 19 |
| Test Lab | Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email info@siteinvestigations.ie |
| Report Date | 13th June 2019 |

| CBR No | Depth (mBGL) | Sample No | Sample Type | Lab Ref | Moisture Content (%) | CBR Value (%) | Location / Remarks |
|---|---|---|---|---|---|---|---|
| CBR01 | 0.50 | MK100 | CBR | 19/760 | 12.3 | 12.7 | |
| CBR02 | 0.50 | MK101 | CBR | 19/761 | 11.6 | 9.3 | Sample taken from TP41 |
| CBR03 | 0.50 | MK102 | CBR | 19/762 | 14.2 | 8.6 | Sample taken from TP39 |
| CBR04 | 0.50 | MK103 | CBR | 19/763 | 12.7 | 7.7 | Sample taken from TP38 |
| CBR05 | 0.50 | MK104 | CBR | 19/764 | 10.5 | 9.4 | |
| CBR06 | 0.50 | MK105 | CBR | 19/765 | 13.7 | 14.0 | |
| CBR07 | 0.50 | MK106 | CBR | 19/766 | 15.7 | 5.8 | |
| CBR08 | 0.50 | MK107 | CBR | 19/767 | 20.3 | 6.1 | |
| CBR09 | 0.50 | MK108 | CBR | 19/768 | 11.1 | 9.7 | |
| CBR10 | 0.50 | MK109 | CBR | 19/769 | 26.7 | 8.1 | |
| CBR11 | 0.50 | MK110 | CBR | 19/770 | 13.8 | 8.9 | Sample taken from TP33 |
| CBR12 | 0.50 | MK111 | CBR | 19/771 | 17.4 | 7.7 | Sample taken from TP28 |
| CBR13 | 0.50 | MK112 | CBR | 19/772 | 15.7 | 13.2 | |
| CBR14 | 0.50 | MK113 | CBR | 19/773 | 13.7 | 7.7 | Sample taken from TP24 |
| CBR15 | 0.50 | MK114 | CBR | 19/774 | 12.8 | 8.1 | |
| CBR16 | 0.50 | MK115 | CBR | 19/775 | 17.4 | 7.3 | Sample taken from TP29 |
| CBR17 | 0.50 | MK116 | CBR | 19/776 | 10.0 | 7.3 | |
| CBR18 | 0.50 | MK117 | CBR | 19/777 | 14.6 | 7.7 | |
| CBR19 | 0.50 | MK118 | CBR | 19/778 | 11.0 | 7.3 | Sample taken from TP03 |
| CBR20 | 0.50 | MK119 | CBR | 19/779 | 12.1 | 7.8 | Sample taken from TP04 |
| CBR21 | 0.50 | MK120 | CBR | 19/780 | 12.4 | 6.9 | Sample taken from TP18 |
| CBR22 | 0.50 | MK121 | CBR | 19/781 | 31.2 | 6.2 | Sample taken from TP16 |
| CBR23 | 0.50 | MK122 | CBR | 19/782 | 20.5 | 6.9 | |

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Site Investigations Ltd

# California Bearing Ratio (CBR) In accordance with BS1377: Part 4: Method 7

| | |
|---|---|
| Client | Gannon Homes Ltd. |
| Site | Millers Glen - Phase 5 |
| S.I. File No | 5599 / 19 |
| Test Lab | Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email info@siteinvestigations.ie |
| Report Date | 13th June 2019 |

| CBR No | Depth (mBGL) | Sample No | Sample Type | Lab Ref | Moisture Content (%) | CBR Value (%) | Location / Remarks |
|---|---|---|---|---|---|---|---|
| CBR24 | 0.50 | MK123 | CBR | 19/783 | 18.4 | 7.2 | |
| CBR25 | 0.50 | MK124 | CBR | 19/784 | 21.4 | 4.7 | |
| CBR26 | 0.50 | MK125 | CBR | 19/785 | 12.5 | 8.6 | |
| CBR27 | 0.50 | MK126 | CBR | 19/786 | 17.8 | 6.4 | Sample taken from TP14 |
| CBR28 | 0.50 | MK127 | CBR | 19/787 | 9.0 | 11.6 | Sample taken from TP09 |
| CBR29 | 0.50 | MK128 | CBR | 19/788 | 11.0 | 7.9 | Sample taken from TP05 |
| CBR30 | 0.50 | MK129 | CBR | 19/789 | 12.0 | 7.4 | |
| CBR31 | 0.50 | MK130 | CBR | 19/790 | 11.6 | 8.1 | Sample taken from TP07 |
| CBR32 | 0.50 | MK131 | CBR | 19/791 | 15.6 | 4.2 | |
| CBR33 | 0.50 | MK132 | CBR | 19/792 | 15.2 | 3.8 | Sample taken from TP11 |
| CBR34 | 0.50 | MK133 | CBR | 19/793 | 13.6 | 5.3 | Sample taken from TP10 |
| CBR35 | 0.50 | MK134 | CBR | 19/794 | 12.1 | 8.3 | |
| CBR36 | 0.50 | MK135 | CBR | 19/795 | 20.7 | 6.5 | |
| CBR37 | 0.50 | MK136 | CBR | 19/796 | 13.3 | 5.3 | Sample taken from TP13 |

Printed 20/06/2019

_____Paddy McGonagle
Site Investigations Ltd

# Chemical Testing
# In accordance with BS 1377: Part 3

| | |
|---|---|
| Client | Gannon Homes Ltd. |
| Site | Millers Glen - Phase 5 |
| S.I. File No | 5599 / 19 |
| Test Lab | Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email:info@siteinvestigations.ie |
| Report Date | 7th June 2019 |

| Hole Id | Depth (mBGL) | Sample No | Lab Ref | pH Value | Water Soluble Sulphate Content (2:1 Water-soil extract) ($SO_3$) g/L | Water Soluble Sulphate Content (2:1 Water-soil extract) ($SO_3$) % | Loss on Ignition (Organic Content) % | Chloride ion Content (water:soil ratio 2:1) % | % passing 2mm | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| TP01 | 1.00 | MK01 | 19/755 | 7.96 | 0.116 | 0.075 | | 0.19 | 64.4 | |
| TP10 | 2.50 | MK67 | 19/756 | 7.89 | 0.130 | 0.067 | | 0.18 | 51.6 | |
| TP15 | 1.00 | MK50 | 19/757 | 7.96 | 0.126 | 0.069 | | 0.21 | 54.7 | |
| TP27 | 1.00 | MK26 | 19/758 | 8.07 | 0.123 | 0.068 | | 0.17 | 55.4 | |
| TP37 | 1.00 | MK85 | 19/759 | 8.01 | 0.117 | 0.067 | | 0.19 | 57.1 | |

Printed 20/06/2019

_____Paddy McGonagle
Site Investigations Ltd.

# Appendix 5

# Environmental Laboratory Test Results

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
Fax: (01244) 528701
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Site Investigations Ltd
The Grange
Carhugar
12th Lock Road
Lucan
Co. Dublin

**Attention:** Stephen Letch

# CERTIFICATE OF ANALYSIS

| | |
|---|---|
| **Date of report Generation:** | 29 May 2019 |
| **Customer:** | Site Investigations Ltd |
| **Sample Delivery Group (SDG):** | 190521-93 |
| **Your Reference:** | 5599 |
| **Location:** | Millers Glen - Phase 5 |
| **Report No:** | 507840 |

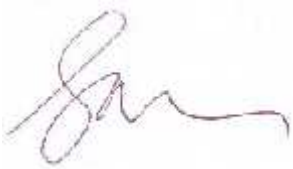
We received 5 samples on Tuesday May 21, 2019 and 5 of these samples were scheduled for analysis which was completed on Wednesday May 29, 2019. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.
Incorrect sampling dates and/or sample information will affect the validity of results.
The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:



**Sonia McWhan**

Operations Manager

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 190521-93 | **Client Reference:** | 5599 | **Report Number:** | 507840 |
| **Location:** | Millers Glen - Phase 5 | **Order Number:** | 46/A/19 | **Superseded Report:** | |

## Received Sample Overview

| Lab Sample No(s) | Customer Sample Ref. | AGS Ref. | Depth (m) | Sampled Date |
|---|---|---|---|---|
| 19996776 | CBR6 | | 0.50 - 0.50 | 20/05/2019 |
| 19996774 | TP6 | | 0.50 - 0.50 | 20/05/2019 |
| 19996775 | TP14 | | 0.50 - 0.50 | 20/05/2019 |
| 19996779 | TP29 | | 0.50 - 0.50 | 20/05/2019 |
| 19996778 | TP34 | | 0.30 - 0.30 | 20/05/2019 |

**Maximum Sample/Coolbox Temperature (°C) :** **10.6**

**ISO5667-3 Water quality - Sampling - Part3 -**

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

**Only received samples which have had analysis scheduled will be shown on the following pages.**

Validated

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 190521-93 | **Client Reference:** | 5599 | **Report Number:** | 507840 |
| **Location:** | Millers Glen - Phase 5 | **Order Number:** | 46/A/19 | **Superseded Report:** | |

**Results Legend**

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Lab Sample No(s)** | | | 19996776 | | | 19996774 | | | 19996775 | | | 19996779 | | | 19996778 | | | |
| **Customer Sample Reference** | | | CBR6 | | | TP6 | | | TP14 | | | TP29 | | | TP34 | | | |
| **AGS Reference** | | | | | | | | | | | | | | | | | | |
| **Depth (m)** | | | 0.50 - 0.50 | | | 0.50 - 0.50 | | | 0.50 - 0.50 | | | 0.50 - 0.50 | | | 0.30 - 0.30 | | | |
| **Container** | | | 1kg TUB | 250g Amber Jar (ALE210) | 60g VOC (ALE215) | 1kg TUB | 250g Amber Jar (ALE210) | 60g VOC (ALE215) | 1kg TUB | 250g Amber Jar (ALE210) | 60ml Amber Glass Jar | 1kg TUB | 250g Amber Jar (ALE210) | 60g VOC (ALE215) | 1kg TUB | 250g Amber Jar (ALE210) | 60g VOC (ALE215) | |
| **Sample Type** | | | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | |
| Anions by Kone (w) | All | NDPs: 0 Tests: 5 | X | | | X | | | X | | | X | | | X | | | |
| Asbestos ID in Solid Samples | All | NDPs: 0 Tests: 1 | | | | X | | | | | | | | | | | | |
| CEN Readings | All | NDPs: 0 Tests: 5 | X | | | X | | | X | | | X | | | X | | | |
| Chromium III | All | NDPs: 0 Tests: 5 | | X | | | X | | | X | | | X | | | X | | |
| Coronene | All | NDPs: 0 Tests: 5 | | X | | | X | | | X | | | X | | | X | | |
| Dissolved Metals by ICP-MS | All | NDPs: 0 Tests: 5 | X | | | X | | | X | | | X | | | X | | | |
| Dissolved Organic/Inorganic Carbon | All | NDPs: 0 Tests: 5 | X | | | X | | | X | | | X | | | X | | | |
| EPH CWG (Aliphatic) GC (S) | All | NDPs: 0 Tests: 5 | | X | | | X | | | X | | | X | | | X | | |
| EPH CWG (Aromatic) GC (S) | All | NDPs: 0 Tests: 5 | | X | | | X | | | X | | | X | | | X | | |
| Fluoride | All | NDPs: 0 Tests: 5 | X | | | X | | | X | | | X | | | X | | | |
| GRO by GC-FID (S) | All | NDPs: 0 Tests: 5 | | | X | | | X | | | X | | | X | | | | X |
| Hexavalent Chromium (s) | All | NDPs: 0 Tests: 5 | | X | | | X | | | X | | | X | | | X | | |
| Loss on Ignition in soils | All | NDPs: 0 Tests: 5 | | X | | | X | | | X | | | X | | | X | | |
| Mercury Dissolved | All | NDPs: 0 Tests: 5 | X | | | X | | | X | | | X | | | X | | | |
| Metals in solid samples by OES | All | NDPs: 0 Tests: 5 | | X | | | X | | | X | | | X | | | X | | |

Validated

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 190521-93 | **Client Reference:** | 5599 | **Report Number:** | 507840 |
| **Location:** | Millers Glen - Phase 5 | **Order Number:** | 46/A/19 | **Superseded Report:** | |

**Results Legend**

X Test

N No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

| | | | Lab Sample No(s) | | | Customer Sample Reference | | | AGS Reference | | | Depth (m) | | | Container | | | Sample Type | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 19996776 | 19996774 | 19996775 | 19996779 | 19996778 | | | | | | | | | | | | | |
| | | | CBR6 | TP6 | TP14 | TP29 | TP34 | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | 0.50 - 0.50 | 0.50 - 0.50 | 0.50 - 0.50 | 0.50 - 0.50 | 0.30 - 0.30 | | | | | | | | | | | | | |
| | | | 1kg TUB | 250g Amber Jar (ALE210) | 60g VOC (ALE215) | 1kg TUB | 250g Amber Jar (ALE210) | 60g VOC (ALE215) | 1kg TUB | 250g Amber Jar (ALE210) | 60ml Amber Glass Jar | 1kg TUB | 250g Amber Jar (ALE210) | 60g VOC (ALE215) | 1kg TUB | 250g Amber Jar (ALE210) | 60g VOC (ALE215) | | | |
| | | | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S | | | |
| Mineral Oil | All | NDPs: 0 Tests: 5 | | X | | | X | | | X | | | X | | | X | | | | |
| PAH by GCMS | All | NDPs: 0 Tests: 5 | | X | | | X | | | X | | | X | | | X | | | | |
| PCBs by GCMS | All | NDPs: 0 Tests: 5 | | X | | | X | | | X | | | X | | | X | | | | |
| Phenols by HPLC (W) | All | NDPs: 0 Tests: 5 | X | | | X | | | X | | | X | | | X | | | | | |
| Sample description | All | NDPs: 0 Tests: 5 | | X | | | X | | | X | | | X | | | X | | | | |
| Total Dissolved Solids on Leachates | All | NDPs: 0 Tests: 5 | X | | | X | | | X | | | X | | | X | | | | | |
| Total Organic Carbon | All | NDPs: 0 Tests: 5 | | X | | | X | | | X | | | X | | | X | | | | |
| TPH CWG GC (S) | All | NDPs: 0 Tests: 5 | | X | | | X | | | X | | | X | | | X | | | | |
| VOC MS (S) | All | NDPs: 0 Tests: 5 | | | X | | | X | | | X | | | X | | | X | | | |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 190521-93 | **Client Reference:** | 5599 | **Report Number:** | 507840 |
| **Location:** | Millers Glen - Phase 5 | **Order Number:** | 46/A/19 | **Superseded Report:** | |

# Sample Descriptions

## Grain Sizes

| very fine | <0.063mm | fine | 0.063mm - 0.1mm | medium | 0.1mm - 2mm | coarse | 2mm - 10mm | very coarse | >10mm |
|---|---|---|---|---|---|---|---|---|---|

| Lab Sample No(s) | Customer Sample Ref. | Depth (m) | Colour | Description | Inclusions | Inclusions 2 |
|---|---|---|---|---|---|---|
| 19996776 | CBR6 | 0.50 - 0.50 | Dark Brown | Sandy Loam | Stones | None |
| 19996774 | TP6 | 0.50 - 0.50 | Dark Brown | Silt Loam | Stones | Crushed Brick |
| 19996775 | TP14 | 0.50 - 0.50 | Dark Brown | Silt Loam | Stones | Vegetation |
| 19996779 | TP29 | 0.50 - 0.50 | Dark Brown | Loamy Sand | Vegetation | Stones |
| 19996778 | TP34 | 0.30 - 0.30 | Dark Brown | Loamy Sand | Stones | None |

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Validated

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 190521-93 | **Client Reference:** | 5599 | **Report Number:** | 507840 |
| **Location:** | Millers Glen - Phase 5 | **Order Number:** | 46/A/19 | **Superseded Report:** | |

**Results Legend**

| | |
|---|---|
| # | ISO17025 accredited. |
| M | mCERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted - refer to subcontractor report for accreditation status. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-3+§@ | Sample deviation (see appendix) |

| Component | LOD/Units | Method | Customer Sample Ref. | CBR6 | TP6 | TP14 | TP29 | TP34 |
|---|---|---|---|---|---|---|---|---|
| | | | Depth (m) | 0.50 - 0.50 | 0.50 - 0.50 | 0.50 - 0.50 | 0.50 - 0.50 | 0.30 - 0.30 |
| | | | Sample Type | Soil/Solid (S) | Soil/Solid (S) | Soil/Solid (S) | Soil/Solid (S) | Soil/Solid (S) |
| | | | Date Sampled | 20/05/2019 | 20/05/2019 | 20/05/2019 | 20/05/2019 | 20/05/2019 |
| | | | Sample Time | . | . | . | . | . |
| | | | Date Received | 21/05/2019 | 21/05/2019 | 21/05/2019 | 21/05/2019 | 21/05/2019 |
| | | | SDG Ref | 190521-93 | 190521-93 | 190521-93 | 190521-93 | 190521-93 |
| | | | Lab Sample No.(s) | 19996776 | 19996774 | 19996775 | 19996779 | 19996778 |
| | | | AGS Reference | | | | | |
| Moisture Content Ratio (% of as received sample) | % | PM024 | | 15 | 10 | 14 | 15 | 6.3 |
| Loss on ignition | <0.7 % | TM018 | | 4.11 M | 1.65 M | 2.85 M | 2.73 M | 1.86 M |
| Mineral oil >C10-C40 | <1 mg/kg | TM061 | | <1 | <1 | <1 | <1 | <1 |
| Organic Carbon, Total | <0.2 % | TM132 | | 0.663 M | 0.452 M | 0.484 M | 0.466 M | 0.534 M |
| Chromium, Hexavalent | <0.6 mg/kg | TM151 | | <0.6 # | <0.6 # | <0.6 # | <0.6 # | <0.6 # |
| PCB congener 28 | <3 µg/kg | TM168 | | <3 M | <3 M | <3 M | <3 M | <3 M |
| PCB congener 52 | <3 µg/kg | TM168 | | <3 M | <3 M | <3 M | <3 M | <3 M |
| PCB congener 101 | <3 µg/kg | TM168 | | <3 M | <3 M | <3 M | <3 M | <3 M |
| PCB congener 118 | <3 µg/kg | TM168 | | <3 M | <3 M | <3 M | <3 M | <3 M |
| PCB congener 138 | <3 µg/kg | TM168 | | <3 M | <3 M | <3 M | <3 M | <3 M |
| PCB congener 153 | <3 µg/kg | TM168 | | <3 M | <3 M | <3 M | <3 M | <3 M |
| PCB congener 180 | <3 µg/kg | TM168 | | <3 M | <3 M | <3 M | <3 M | <3 M |
| Sum of detected PCB 7 Congeners | <21 µg/kg | TM168 | | <21 | <21 | <21 | <21 | <21 |
| Chromium, Trivalent | <0.9 mg/kg | TM181 | | 18.7 | 9.28 | 11.9 | 12 | <0.9 |
| Antimony | <0.6 mg/kg | TM181 | | 1.88 # | 1.73 # | 1.86 # | 2 # | 2.14 # |
| Arsenic | <0.6 mg/kg | TM181 | | 15 M | 12.7 M | 13 M | 13.9 M | 43.9 M |
| Barium | <0.6 mg/kg | TM181 | | 151 # | 137 # | 318 # | 84 # | 122 # |
| Cadmium | <0.02 mg/kg | TM181 | | 1.93 M | 1.27 M | 1.52 M | 1.33 M | 0.222 M |
| Chromium | <0.9 mg/kg | TM181 | | 18.7 M | 9.28 M | 11.9 M | 12 M | <0.9 M |
| Copper | <1.4 mg/kg | TM181 | | 29.3 M | 28.1 M | 30 M | 31.3 M | 12.9 M |
| Lead | <0.7 mg/kg | TM181 | | 24.9 M | 20.6 M | 19.6 M | 19.6 M | 19.3 M |
| Mercury | <0.14 mg/kg | TM181 | | <0.14 M | <0.14 M | <0.14 M | <0.14 M | <0.14 M |
| Molybdenum | <0.1 mg/kg | TM181 | | 3.37 # | 3.52 # | 5.36 # | 3.11 # | 0.422 # |
| Nickel | <0.2 mg/kg | TM181 | | 48.3 M | 36.2 M | 37.6 M | 38.4 M | 31.8 M |
| Selenium | <1 mg/kg | TM181 | | <1 # | 1 # | <1 # | <1 # | <1 # |
| Zinc | <1.9 mg/kg | TM181 | | 86.4 M | 72.7 M | 64.7 M | 68.9 M | 62.6 M |
| Coronene | <200 µg/kg | TM410 | | <200 | <200 | <200 | <200 | <200 |

Validated

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 190521-93 | **Client Reference:** | 5599 | **Report Number:** | 507840 |
| **Location:** | Millers Glen - Phase 5 | **Order Number:** | 46/A/19 | **Superseded Report:** | |

## PAH by GCMS

| Results Legend | |
|---|---|
| # | ISO17025 accredited. |
| M | mCERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted - refer to subcontractor report for accreditation status. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-3+§@ | Sample deviation (see appendix) |

| Component | LOD/Units | Method | Customer Sample Ref. | CBR6 | TP6 | TP14 | TP29 | TP34 |
|---|---|---|---|---|---|---|---|---|
| | | | Depth (m) | 0.50 - 0.50 | 0.50 - 0.50 | 0.50 - 0.50 | 0.50 - 0.50 | 0.30 - 0.30 |
| | | | Sample Type | Soil/Solid (S) | Soil/Solid (S) | Soil/Solid (S) | Soil/Solid (S) | Soil/Solid (S) |
| | | | Date Sampled | 20/05/2019 | 20/05/2019 | 20/05/2019 | 20/05/2019 | 20/05/2019 |
| | | | Sample Time | . | . | . | . | . |
| | | | Date Received | 21/05/2019 | 21/05/2019 | 21/05/2019 | 21/05/2019 | 21/05/2019 |
| | | | SDG Ref | 190521-93 | 190521-93 | 190521-93 | 190521-93 | 190521-93 |
| | | | Lab Sample No.(s) | 19996776 | 19996774 | 19996775 | 19996779 | 19996778 |
| | | | AGS Reference | | | | | |
| Naphthalene | <9 µg/kg | TM218 | | <9 M | <9 M | <9 M | <9 M | <9 M |
| Acenaphthylene | <12 µg/kg | TM218 | | <12 M | <12 M | <12 M | <12 M | <12 M |
| Acenaphthene | <8 µg/kg | TM218 | | <8 M | <8 M | <8 M | <8 M | <8 M |
| Fluorene | <10 µg/kg | TM218 | | <10 M | <10 M | <10 M | <10 M | <10 M |
| Phenanthrene | <15 µg/kg | TM218 | | <15 M | <15 M | <15 M | <15 M | <15 M |
| Anthracene | <16 µg/kg | TM218 | | <16 M | <16 M | <16 M | <16 M | <16 M |
| Fluoranthene | <17 µg/kg | TM218 | | <17 M | <17 M | <17 M | <17 M | <17 M |
| Pyrene | <15 µg/kg | TM218 | | <15 M | <15 M | <15 M | <15 M | <15 M |
| Benz(a)anthracene | <14 µg/kg | TM218 | | <14 M | <14 M | <14 M | <14 M | <14 M |
| Chrysene | <10 µg/kg | TM218 | | <10 M | <10 M | <10 M | <10 M | <10 M |
| Benzo(b)fluoranthene | <15 µg/kg | TM218 | | <15 M | <15 M | <15 M | <15 M | <15 M |
| Benzo(k)fluoranthene | <14 µg/kg | TM218 | | <14 M | <14 M | <14 M | <14 M | <14 M |
| Benzo(a)pyrene | <15 µg/kg | TM218 | | <15 M | <15 M | <15 M | <15 M | <15 M |
| Indeno(1,2,3-cd)pyrene | <18 µg/kg | TM218 | | <18 M | <18 M | <18 M | <18 M | <18 M |
| Dibenzo(a,h)anthracene | <23 µg/kg | TM218 | | <23 M | <23 M | <23 M | <23 M | <23 M |
| Benzo(g,h,i)perylene | <24 µg/kg | TM218 | | <24 M | <24 M | <24 M | <24 M | <24 M |
| PAH, Total Detected USEPA 16 | <118 µg/kg | TM218 | | <118 | <118 | <118 | <118 | <118 |

Validated

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 190521-93 | **Client Reference:** | 5599 | **Report Number:** | 507840 |
| **Location:** | Millers Glen - Phase 5 | **Order Number:** | 46/A/19 | **Superseded Report:** | |

## TPH CWG (S)

| Results Legend | |
|---|---|
| # | ISO17025 accredited. |
| M | mCERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted - refer to subcontractor report for accreditation status. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-3+§@ | Sample deviation (see appendix) |

| Component | LOD/Units | Method | Customer Sample Ref. | CBR6 | TP6 | TP14 | TP29 | TP34 |
|---|---|---|---|---|---|---|---|---|
| | | | Depth (m) | 0.50 - 0.50 | 0.50 - 0.50 | 0.50 - 0.50 | 0.50 - 0.50 | 0.30 - 0.30 |
| | | | Sample Type | Soil/Solid (S) | Soil/Solid (S) | Soil/Solid (S) | Soil/Solid (S) | Soil/Solid (S) |
| | | | Date Sampled | 20/05/2019 | 20/05/2019 | 20/05/2019 | 20/05/2019 | 20/05/2019 |
| | | | Sample Time | . | . | . | . | . |
| | | | Date Received | 21/05/2019 | 21/05/2019 | 21/05/2019 | 21/05/2019 | 21/05/2019 |
| | | | SDG Ref | 190521-93 | 190521-93 | 190521-93 | 190521-93 | 190521-93 |
| | | | Lab Sample No.(s) | 19996776 | 19996774 | 19996775 | 19996779 | 19996778 |
| | | | AGS Reference | | | | | |
| GRO Surrogate % recovery** | % | TM089 | | 126 | 98.7 | 98 2 | 118 | 49.8 3 |
| GRO TOT (Moisture Corrected) | <100 µg/kg | TM089 | | <100 M | <100 M | <100 2 M | <100 M | <100 3 # |
| Aliphatics >C5-C6 | <10 µg/kg | TM089 | | <10 | <10 | <10 2 | <10 | 53.4 3 |
| Aliphatics >C6-C8 | <10 µg/kg | TM089 | | <10 | <10 | <10 2 | <10 | <10 3 |
| Aliphatics >C8-C10 | <10 µg/kg | TM089 | | <10 | <10 | <10 2 | <10 | 11.7 3 |
| Aliphatics >C10-C12 | <10 µg/kg | TM089 | | <10 | <10 | <10 2 | <10 | <10 3 |
| Aliphatics >C12-C16 | <100 µg/kg | TM173 | | <100 | <100 | <100 | <100 | <100 |
| Aliphatics >C16-C21 | <100 µg/kg | TM173 | | <100 | <100 | <100 | <100 | <100 |
| Aliphatics >C21-C35 | <100 µg/kg | TM173 | | 250 | <100 | <100 | <100 | 3210 |
| Aliphatics >C35-C44 | <100 µg/kg | TM173 | | <100 | <100 | <100 | <100 | <100 |
| Total Aliphatics >C12-C44 | <100 µg/kg | TM173 | | 250 | <100 | <100 | <100 | 3210 |
| Aromatics >EC5-EC7 | <10 µg/kg | TM089 | | <10 | <10 | <10 2 | <10 | <10 3 |
| Aromatics >EC7-EC8 | <10 µg/kg | TM089 | | <10 | <10 | <10 2 | <10 | <10 3 |
| Aromatics >EC8-EC10 | <10 µg/kg | TM089 | | <10 | <10 | <10 2 | <10 | <10 3 |
| Aromatics >EC10-EC12 | <10 µg/kg | TM089 | | <10 | <10 | <10 2 | <10 | <10 3 |
| Aromatics >EC12-EC16 | <100 µg/kg | TM173 | | <100 | <100 | <100 | <100 | <100 |
| Aromatics >EC16-EC21 | <100 µg/kg | TM173 | | 402 | <100 | <100 | <100 | <100 |
| Aromatics >EC21-EC35 | <100 µg/kg | TM173 | | 4210 | <100 | <100 | <100 | 869 |
| Aromatics >EC35-EC44 | <100 µg/kg | TM173 | | 913 | <100 | <100 | <100 | <100 |
| Aromatics >EC40-EC44 | <100 µg/kg | TM173 | | <100 | <100 | <100 | <100 | <100 |
| Total Aromatics >EC12-EC44 | <100 µg/kg | TM173 | | 5530 | <100 | <100 | <100 | 869 |
| Total Aliphatics & Aromatics >C5-C44 | <100 µg/kg | TM173 | | 5780 | <100 | <100 | <100 | 4150 |
| GRO >C5-C6 | <20 µg/kg | TM089 | | <20 | <20 | <20 2 | <20 | 53.4 3 |
| GRO >C6-C7 | <20 µg/kg | TM089 | | <20 | <20 | <20 2 | <20 | <20 3 |
| GRO >C7-C8 | <20 µg/kg | TM089 | | <20 | <20 | <20 2 | <20 | <20 3 |
| GRO >C8-C10 | <20 µg/kg | TM089 | | <20 | <20 | <20 2 | <20 | <20 3 |
| GRO >C10-C12 | <20 µg/kg | TM089 | | <20 | <20 | <20 2 | <20 | <20 3 |

Validated

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 190521-93 | **Client Reference:** | 5599 | **Report Number:** | 507840 |
| **Location:** | Millers Glen - Phase 5 | **Order Number:** | 46/A/19 | **Superseded Report:** | |

## VOC MS (S)

| Results Legend | |
|---|---|
| # | ISO17025 accredited. |
| M | mCERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted - refer to subcontractor report for accreditation status. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-3+§@ | Sample deviation (see appendix) |

| Component | LOD/Units | Method | Customer Sample Ref. | CBR6 | TP6 | TP14 | TP29 | TP34 |
|---|---|---|---|---|---|---|---|---|
| | | | Depth (m) | 0.50 - 0.50 | 0.50 - 0.50 | 0.50 - 0.50 | 0.50 - 0.50 | 0.30 - 0.30 |
| | | | Sample Type | Soil/Solid (S) | Soil/Solid (S) | Soil/Solid (S) | Soil/Solid (S) | Soil/Solid (S) |
| | | | Date Sampled | 20/05/2019 | 20/05/2019 | 20/05/2019 | 20/05/2019 | 20/05/2019 |
| | | | Sample Time | . | . | . | . | . |
| | | | Date Received | 21/05/2019 | 21/05/2019 | 21/05/2019 | 21/05/2019 | 21/05/2019 |
| | | | SDG Ref | 190521-93 | 190521-93 | 190521-93 | 190521-93 | 190521-93 |
| | | | Lab Sample No.(s) | 19996776 | 19996774 | 19996775 | 19996779 | 19996778 |
| | | | AGS Reference | | | | | |
| Dibromofluoromethane** | % | TM116 | | 104 | 107 | 125 2 | 122 | 109 |
| Toluene-d8** | % | TM116 | | 97.5 | 98.7 | 99 2 | 99.1 | 98 |
| 4-Bromofluorobenzene** | % | TM116 | | 85.7 | 95 | 96.6 2 | 94.6 | 83.2 |
| Methyl Tertiary Butyl Ether | <10 µg/kg | TM116 | | <10 M | <10 M | <10 2 M | <10 M | <100 M |
| Benzene | <9 µg/kg | TM116 | | <9 M | <9 M | <9 2 M | <9 M | <90 M |
| Toluene | <7 µg/kg | TM116 | | <7 M | 10.4 M | 14.2 2 M | 10.5 M | <70 M |
| Ethylbenzene | <4 µg/kg | TM116 | | <4 M | <4 M | <4 2 M | <4 M | <40 M |
| p/m-Xylene | <10 µg/kg | TM116 | | <10 # | <10 # | <10 2 # | <10 # | <100 # |
| o-Xylene | <10 µg/kg | TM116 | | <10 M | <10 M | <10 2 M | <10 M | <100 M |

Validated

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 190521-93 | **Client Reference:** | 5599 | **Report Number:** | 507840 |
| **Location:** | Millers Glen - Phase 5 | **Order Number:** | 46/A/19 | **Superseded Report:** | |

## Asbestos Identification - Solid Samples

**Results Legend**

| | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| * | Subcontracted test. |
| (F) | Trigger breach confirmed |
| 1-5&+§@ | Sample deviation (see appendix) |

| | | Date of Analysis | Analysed By | Comments | Amosite (Brown) Asbestos | Chrysotile (White) Asbestos | Crocidolite (Blue) Asbestos | Fibrous Actinolite | Fibrous Anthophyllite | Fibrous Tremolite | Non-Asbestos Fibre |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cust. Sample Ref. | TP6 | 23/05/2019 | Agnieszka Chelmowska | - | Not Detected (#) | Not Detected (#) | Not Detected (#) | Not Detected (#) | Not Detected (#) | Not Detected (#) | Not Detected |
| Depth (m) | 0.50 - 0.50 | | | | | | | | | | |
| Sample Type | SOLID | | | | | | | | | | |
| Date Sampled | 20/05/2019 00:00:00 | | | | | | | | | | |
| Date Receieved | 21/05/2019 09:30:00 | | | | | | | | | | |
| SDG | 190521-93 | | | | | | | | | | |
| Original Sample | 19996774 | | | | | | | | | | |
| Method Number | TM048 | | | | | | | | | | |

Validated

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 190521-93 | **Client Reference:** | 5599 | **Report Number:** | 507840 |
| **Location:** | Millers Glen - Phase 5 | **Order Number:** | 46/A/19 | **Superseded Report:** | |

## CEN 10:1 SINGLE STAGE LEACHATE TEST

## WAC ANALYTICAL RESULTS

**REF : BS EN 12457/2**

| | | | |
|---|---|---|---|
| **Client Reference** | | **Site Location** | Millers Glen - Phase 5 |
| **Mass Sample taken (kg)** | 0.100 | **Natural Moisture Content (%)** | 11.1 |
| **Mass of dry sample (kg)** | 0.090 | **Dry Matter Content (%)** | 90 |
| **Particle Size <4mm** | >95% | | |

| | |
|---|---|
| **Case** | |
| **SDG** | 190521-93 |
| **Lab Sample Number(s)** | 19996774 |
| **Sampled Date** | 20-May-2019 |
| **Customer Sample Ref.** | TP6 |
| **Depth (m)** | 0.50 - 0.50 |

| **Solid Waste Analysis** | **Result** | **Landfill Waste Acceptance Criteria Limits** | | |
|---|---|---|---|---|
| | | **Inert Waste Landfill** | **Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon (%) | 0.452 | 3 | 5 | 6 |
| Loss on Ignition (%) | 1.65 | - | - | 10 |
| Sum of BTEX (mg/kg) | - | - | - | - |
| Sum of 7 PCBs (mg/kg) | <0.021 | 1 | - | - |
| Mineral Oil (mg/kg) | <1 | 500 | - | - |
| PAH Sum of 17 (mg/kg) | - | - | - | - |
| pH (pH Units) | - | - | - | - |
| ANC to pH 6 (mol/kg) | - | - | - | - |
| ANC to pH 4 (mol/kg) | - | - | - | - |

| **Eluate Analysis** | **$C_2$ Conc$^n$ in 10:1 eluate (mg/l)** | | **$A_2$ 10:1 conc$^n$ leached (mg/kg)** | | **Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg** | | |
|---|---|---|---|---|---|---|---|
| | **Result** | **Limit of Detection** | **Result** | **Limit of Detection** | | | |
| Arsenic | <0.0005 | <0.0005 | <0.005 | <0.005 | 0.5 | 2 | 25 |
| Barium | 0.00791 | <0.0002 | 0.0791 | <0.002 | 20 | 100 | 300 |
| Cadmium | <0.00008 | <0.00008 | <0.0008 | <0.0008 | 0.04 | 1 | 5 |
| Chromium | <0.001 | <0.001 | <0.01 | <0.01 | 0.5 | 10 | 70 |
| Copper | <0.0003 | <0.0003 | <0.003 | <0.003 | 2 | 50 | 100 |
| Mercury Dissolved (CVAF) | <0.00001 | <0.00001 | <0.0001 | <0.0001 | 0.01 | 0.2 | 2 |
| Molybdenum | 0.00947 | <0.003 | 0.0947 | <0.03 | 0.5 | 10 | 30 |
| Nickel | <0.0004 | <0.0004 | <0.004 | <0.004 | 0.4 | 10 | 40 |
| Lead | <0.0002 | <0.0002 | <0.002 | <0.002 | 0.5 | 10 | 50 |
| Antimony | <0.001 | <0.001 | <0.01 | <0.01 | 0.06 | 0.7 | 5 |
| Selenium | <0.001 | <0.001 | <0.01 | <0.01 | 0.1 | 0.5 | 7 |
| Zinc | <0.001 | <0.001 | <0.01 | <0.01 | 4 | 50 | 200 |
| Chloride | <2 | <2 | <20 | <20 | 800 | 15000 | 25000 |
| Fluoride | <0.5 | <0.5 | <5 | <5 | 10 | 150 | 500 |
| Sulphate (soluble) | <2 | <2 | <20 | <20 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 58.1 | <10 | 581 | <100 | 4000 | 60000 | 100000 |
| Total Monohydric Phenols (W) | <0.016 | <0.016 | <0.16 | <0.16 | 1 | - | - |
| Dissolved Organic Carbon | <3 | <3 | <30 | <30 | 500 | 800 | 1000 |

## Leach Test Information

| | |
|---|---|
| Date Prepared | 22-May-2019 |
| pH (pH Units) | 8.47 |
| Conductivity (µS/cm) | 72.30 |
| Temperature (°C) | 20.20 |
| Volume Leachant (Litres) | 0.890 |

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation
Mcerts Certification does not apply to leachates
29/05/2019 15:22:04

15:21:49 29/05/2019

Validated

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 190521-93 | **Client Reference:** | 5599 | **Report Number:** | 507840 |
| **Location:** | Millers Glen - Phase 5 | **Order Number:** | 46/A/19 | **Superseded Report:** | |

## CEN 10:1 SINGLE STAGE LEACHATE TEST

## WAC ANALYTICAL RESULTS

**REF : BS EN 12457/2**

| | | | |
|---|---|---|---|
| **Client Reference** | | **Site Location** | Millers Glen - Phase 5 |
| **Mass Sample taken (kg)** | 0.105 | **Natural Moisture Content (%)** | 16.3 |
| **Mass of dry sample (kg)** | 0.090 | **Dry Matter Content (%)** | 86 |
| **Particle Size <4mm** | >95% | | |

| | |
|---|---|
| **Case** | |
| **SDG** | 190521-93 |
| **Lab Sample Number(s)** | 19996775 |
| **Sampled Date** | 20-May-2019 |
| **Customer Sample Ref.** | TP14 |
| **Depth (m)** | 0.50 - 0.50 |

| **Solid Waste Analysis** | **Result** | **Landfill Waste Acceptance Criteria Limits** | | |
|---|---|---|---|---|
| | | **Inert Waste Landfill** | **Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon (%) | 0.484 | 3 | 5 | 6 |
| Loss on Ignition (%) | 2.85 | - | - | 10 |
| Sum of BTEX (mg/kg) | - | - | - | - |
| Sum of 7 PCBs (mg/kg) | <0.021 | 1 | - | - |
| Mineral Oil (mg/kg) | <1 | 500 | - | - |
| PAH Sum of 17 (mg/kg) | - | - | - | - |
| pH (pH Units) | - | - | - | - |
| ANC to pH 6 (mol/kg) | - | - | - | - |
| ANC to pH 4 (mol/kg) | - | - | - | - |

| **Eluate Analysis** | **$C_2$ Conc$^n$ in 10:1 eluate (mg/l)** | | **$A_2$ 10:1 conc$^n$ leached (mg/kg)** | | **Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg** | | |
|---|---|---|---|---|---|---|---|
| | **Result** | **Limit of Detection** | **Result** | **Limit of Detection** | | | |
| Arsenic | <0.0005 | <0.0005 | <0.005 | <0.005 | 0.5 | 2 | 25 |
| Barium | 0.0127 | <0.0002 | 0.127 | <0.002 | 20 | 100 | 300 |
| Cadmium | <0.00008 | <0.00008 | <0.0008 | <0.0008 | 0.04 | 1 | 5 |
| Chromium | <0.001 | <0.001 | <0.01 | <0.01 | 0.5 | 10 | 70 |
| Copper | <0.0003 | <0.0003 | <0.003 | <0.003 | 2 | 50 | 100 |
| Mercury Dissolved (CVAF) | <0.00001 | <0.00001 | <0.0001 | <0.0001 | 0.01 | 0.2 | 2 |
| Molybdenum | 0.00683 | <0.003 | 0.0683 | <0.03 | 0.5 | 10 | 30 |
| Nickel | <0.0004 | <0.0004 | <0.004 | <0.004 | 0.4 | 10 | 40 |
| Lead | 0.000665 | <0.0002 | 0.00665 | <0.002 | 0.5 | 10 | 50 |
| Antimony | <0.001 | <0.001 | <0.01 | <0.01 | 0.06 | 0.7 | 5 |
| Selenium | <0.001 | <0.001 | <0.01 | <0.01 | 0.1 | 0.5 | 7 |
| Zinc | 0.00258 | <0.001 | 0.0258 | <0.01 | 4 | 50 | 200 |
| Chloride | <2 | <2 | <20 | <20 | 800 | 15000 | 25000 |
| Fluoride | 0.771 | <0.5 | 7.71 | <5 | 10 | 150 | 500 |
| Sulphate (soluble) | <2 | <2 | <20 | <20 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 68 | <10 | 680 | <100 | 4000 | 60000 | 100000 |
| Total Monohydric Phenols (W) | <0.016 | <0.016 | <0.16 | <0.16 | 1 | - | - |
| Dissolved Organic Carbon | <3 | <3 | <30 | <30 | 500 | 800 | 1000 |

## Leach Test Information

| | |
|---|---|
| Date Prepared | 22-May-2019 |
| pH (pH Units) | 6.82 |
| Conductivity (µS/cm) | 88.70 |
| Temperature (°C) | 20.40 |
| Volume Leachant (Litres) | 0.885 |

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation
Mcerts Certification does not apply to leachates
29/05/2019 15:22:04

15:21:49 29/05/2019

Validated

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 190521-93 | **Client Reference:** | 5599 | **Report Number:** | 507840 |
| **Location:** | Millers Glen - Phase 5 | **Order Number:** | 46/A/19 | **Superseded Report:** | |

## CEN 10:1 SINGLE STAGE LEACHATE TEST

## WAC ANALYTICAL RESULTS

**REF : BS EN 12457/2**

| | | | |
|---|---|---|---|
| **Client Reference** | | **Site Location** | Millers Glen - Phase 5 |
| **Mass Sample taken (kg)** | 0.105 | **Natural Moisture Content (%)** | 17.6 |
| **Mass of dry sample (kg)** | 0.090 | **Dry Matter Content (%)** | 85 |
| **Particle Size <4mm** | >95% | | |

| | |
|---|---|
| **Case** | |
| **SDG** | 190521-93 |
| **Lab Sample Number(s)** | 19996776 |
| **Sampled Date** | 20-May-2019 |
| **Customer Sample Ref.** | CBR6 |
| **Depth (m)** | 0.50 - 0.50 |

| **Solid Waste Analysis** | **Result** | **Landfill Waste Acceptance Criteria Limits** | | |
|---|---|---|---|---|
| | | **Inert Waste Landfill** | **Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon (%) | 0.663 | 3 | 5 | 6 |
| Loss on Ignition (%) | 4.11 | - | - | 10 |
| Sum of BTEX (mg/kg) | - | - | - | - |
| Sum of 7 PCBs (mg/kg) | <0.021 | 1 | - | - |
| Mineral Oil (mg/kg) | <1 | 500 | - | - |
| PAH Sum of 17 (mg/kg) | - | - | - | - |
| pH (pH Units) | - | - | - | - |
| ANC to pH 6 (mol/kg) | - | - | - | - |
| ANC to pH 4 (mol/kg) | - | - | - | - |

| **Eluate Analysis** | **$C_2$** Conc$^n$ in 10:1 eluate (mg/l) | | **$A_2$** 10:1 conc$^n$ leached (mg/kg) | | **Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg** | | |
|---|---|---|---|---|---|---|---|
| | **Result** | **Limit of Detection** | **Result** | **Limit of Detection** | | | |
| Arsenic | 0.00096 | <0.0005 | 0.0096 | <0.005 | 0.5 | 2 | 25 |
| Barium | 0.0226 | <0.0002 | 0.226 | <0.002 | 20 | 100 | 300 |
| Cadmium | <0.00008 | <0.00008 | <0.0008 | <0.0008 | 0.04 | 1 | 5 |
| Chromium | <0.001 | <0.001 | <0.01 | <0.01 | 0.5 | 10 | 70 |
| Copper | 0.00076 | <0.0003 | 0.0076 | <0.003 | 2 | 50 | 100 |
| Mercury Dissolved (CVAF) | <0.00001 | <0.00001 | <0.0001 | <0.0001 | 0.01 | 0.2 | 2 |
| Molybdenum | 0.00717 | <0.003 | 0.0717 | <0.03 | 0.5 | 10 | 30 |
| Nickel | 0.00165 | <0.0004 | 0.0165 | <0.004 | 0.4 | 10 | 40 |
| Lead | <0.0002 | <0.0002 | <0.002 | <0.002 | 0.5 | 10 | 50 |
| Antimony | <0.001 | <0.001 | <0.01 | <0.01 | 0.06 | 0.7 | 5 |
| Selenium | <0.001 | <0.001 | <0.01 | <0.01 | 0.1 | 0.5 | 7 |
| Zinc | 0.00353 | <0.001 | 0.0353 | <0.01 | 4 | 50 | 200 |
| Chloride | 2.8 | <2 | 28 | <20 | 800 | 15000 | 25000 |
| Fluoride | 0.524 | <0.5 | 5.24 | <5 | 10 | 150 | 500 |
| Sulphate (soluble) | 34.2 | <2 | 342 | <20 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 143 | <10 | 1430 | <100 | 4000 | 60000 | 100000 |
| Total Monohydric Phenols (W) | <0.016 | <0.016 | <0.16 | <0.16 | 1 | - | - |
| Dissolved Organic Carbon | 5.06 | <3 | 50.6 | <30 | 500 | 800 | 1000 |

## Leach Test Information

| | |
|---|---|
| Date Prepared | 22-May-2019 |
| pH (pH Units) | 8.04 |
| Conductivity (µS/cm) | 189.00 |
| Temperature (°C) | 20.40 |
| Volume Leachant (Litres) | 0.884 |

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation
Mcerts Certification does not apply to leachates
29/05/2019 15:22:04

15:21:49 29/05/2019

Validated

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 190521-93 | **Client Reference:** | 5599 | **Report Number:** | 507840 |
| **Location:** | Millers Glen - Phase 5 | **Order Number:** | 46/A/19 | **Superseded Report:** | |

## CEN 10:1 SINGLE STAGE LEACHATE TEST

## WAC ANALYTICAL RESULTS

**REF : BS EN 12457/2**

| | | | |
|---|---|---|---|
| **Client Reference** | | **Site Location** | Millers Glen - Phase 5 |
| **Mass Sample taken (kg)** | 0.097 | **Natural Moisture Content (%)** | 6.72 |
| **Mass of dry sample (kg)** | 0.090 | **Dry Matter Content (%)** | 93.7 |
| **Particle Size <4mm** | >95% | | |

| | |
|---|---|
| **Case** | |
| **SDG** | 190521-93 |
| **Lab Sample Number(s)** | 19996778 |
| **Sampled Date** | 20-May-2019 |
| **Customer Sample Ref.** | TP34 |
| **Depth (m)** | 0.30 - 0.30 |

| **Solid Waste Analysis** | **Result** | **Landfill Waste Acceptance Criteria Limits** | | |
|---|---|---|---|---|
| | | **Inert Waste Landfill** | **Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon (%) | 0.534 | 3 | 5 | 6 |
| Loss on Ignition (%) | 1.86 | - | - | 10 |
| Sum of BTEX (mg/kg) | - | - | - | - |
| Sum of 7 PCBs (mg/kg) | <0.021 | 1 | - | - |
| Mineral Oil (mg/kg) | <1 | 500 | - | - |
| PAH Sum of 17 (mg/kg) | - | - | - | - |
| pH (pH Units) | - | - | - | - |
| ANC to pH 6 (mol/kg) | - | - | - | - |
| ANC to pH 4 (mol/kg) | - | - | - | - |

| **Eluate Analysis** | **$C_2$ Conc$^n$ in 10:1 eluate (mg/l)** | | **$A_2$ 10:1 conc$^n$ leached (mg/kg)** | | **Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg** | | |
|---|---|---|---|---|---|---|---|
| | **Result** | **Limit of Detection** | **Result** | **Limit of Detection** | | | |
| Arsenic | <0.0005 | <0.0005 | <0.005 | <0.005 | 0.5 | 2 | 25 |
| Barium | 0.0339 | <0.0002 | 0.339 | <0.002 | 20 | 100 | 300 |
| Cadmium | <0.00008 | <0.00008 | <0.0008 | <0.0008 | 0.04 | 1 | 5 |
| Chromium | <0.001 | <0.001 | <0.01 | <0.01 | 0.5 | 10 | 70 |
| Copper | <0.0003 | <0.0003 | <0.003 | <0.003 | 2 | 50 | 100 |
| Mercury Dissolved (CVAF) | <0.00001 | <0.00001 | <0.0001 | <0.0001 | 0.01 | 0.2 | 2 |
| Molybdenum | <0.003 | <0.003 | <0.03 | <0.03 | 0.5 | 10 | 30 |
| Nickel | 0.00437 | <0.0004 | 0.0437 | <0.004 | 0.4 | 10 | 40 |
| Lead | 0.000294 | <0.0002 | 0.00294 | <0.002 | 0.5 | 10 | 50 |
| Antimony | <0.001 | <0.001 | <0.01 | <0.01 | 0.06 | 0.7 | 5 |
| Selenium | <0.001 | <0.001 | <0.01 | <0.01 | 0.1 | 0.5 | 7 |
| Zinc | 0.0296 | <0.001 | 0.296 | <0.01 | 4 | 50 | 200 |
| Chloride | <2 | <2 | <20 | <20 | 800 | 15000 | 25000 |
| Fluoride | 1.04 | <0.5 | 10.4 | <5 | 10 | 150 | 500 |
| Sulphate (soluble) | 1380 | <10 | 13800 | <100 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 1510 | <10 | 15100 | <100 | 4000 | 60000 | 100000 |
| Total Monohydric Phenols (W) | 0.13 | <0.016 | 1.3 | <0.16 | 1 | - | - |
| Dissolved Organic Carbon | <3 | <3 | <30 | <30 | 500 | 800 | 1000 |

## Leach Test Information

| | |
|---|---|
| Date Prepared | 22-May-2019 |
| pH (pH Units) | 7.18 |
| Conductivity (µS/cm) | 2,020.00 |
| Temperature (°C) | 20.60 |
| Volume Leachant (Litres) | 0.894 |

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation
Mcerts Certification does not apply to leachates
29/05/2019 15:22:04

15:21:49 29/05/2019

Validated

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 190521-93 | **Client Reference:** | 5599 | **Report Number:** | 507840 |
| **Location:** | Millers Glen - Phase 5 | **Order Number:** | 46/A/19 | **Superseded Report:** | |

## CEN 10:1 SINGLE STAGE LEACHATE TEST

## WAC ANALYTICAL RESULTS

**REF : BS EN 12457/2**

| | | | |
|---|---|---|---|
| **Client Reference** | | **Site Location** | Millers Glen - Phase 5 |
| **Mass Sample taken (kg)** | 0.106 | **Natural Moisture Content (%)** | 17.6 |
| **Mass of dry sample (kg)** | 0.090 | **Dry Matter Content (%)** | 85 |
| **Particle Size <4mm** | >95% | | |

| | |
|---|---|
| **Case** | |
| **SDG** | 190521-93 |
| **Lab Sample Number(s)** | 19996779 |
| **Sampled Date** | 20-May-2019 |
| **Customer Sample Ref.** | TP29 |
| **Depth (m)** | 0.50 - 0.50 |

| **Solid Waste Analysis** | **Result** | **Landfill Waste Acceptance Criteria Limits** | | |
|---|---|---|---|---|
| | | **Inert Waste Landfill** | **Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon (%) | 0.466 | 3 | 5 | 6 |
| Loss on Ignition (%) | 2.73 | - | - | 10 |
| Sum of BTEX (mg/kg) | - | - | - | - |
| Sum of 7 PCBs (mg/kg) | <0.021 | 1 | - | - |
| Mineral Oil (mg/kg) | <1 | 500 | - | - |
| PAH Sum of 17 (mg/kg) | - | - | - | - |
| pH (pH Units) | - | - | - | - |
| ANC to pH 6 (mol/kg) | - | - | - | - |
| ANC to pH 4 (mol/kg) | - | - | - | - |

| **Eluate Analysis** | **$C_2$ Conc$^n$ in 10:1 eluate (mg/l)** | | **$A_2$ 10:1 conc$^n$ leached (mg/kg)** | | **Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg** | | |
|---|---|---|---|---|---|---|---|
| | **Result** | **Limit of Detection** | **Result** | **Limit of Detection** | | | |
| Arsenic | <0.0005 | <0.0005 | <0.005 | <0.005 | 0.5 | 2 | 25 |
| Barium | 0.0106 | <0.0002 | 0.106 | <0.002 | 20 | 100 | 300 |
| Cadmium | <0.00008 | <0.00008 | <0.0008 | <0.0008 | 0.04 | 1 | 5 |
| Chromium | <0.001 | <0.001 | <0.01 | <0.01 | 0.5 | 10 | 70 |
| Copper | <0.0003 | <0.0003 | <0.003 | <0.003 | 2 | 50 | 100 |
| Mercury Dissolved (CVAF) | <0.00001 | <0.00001 | <0.0001 | <0.0001 | 0.01 | 0.2 | 2 |
| Molybdenum | 0.00552 | <0.003 | 0.0552 | <0.03 | 0.5 | 10 | 30 |
| Nickel | <0.0004 | <0.0004 | <0.004 | <0.004 | 0.4 | 10 | 40 |
| Lead | <0.0002 | <0.0002 | <0.002 | <0.002 | 0.5 | 10 | 50 |
| Antimony | <0.001 | <0.001 | <0.01 | <0.01 | 0.06 | 0.7 | 5 |
| Selenium | <0.001 | <0.001 | <0.01 | <0.01 | 0.1 | 0.5 | 7 |
| Zinc | 0.00372 | <0.001 | 0.0372 | <0.01 | 4 | 50 | 200 |
| Chloride | <2 | <2 | <20 | <20 | 800 | 15000 | 25000 |
| Fluoride | <0.5 | <0.5 | <5 | <5 | 10 | 150 | 500 |
| Sulphate (soluble) | <2 | <2 | <20 | <20 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 69.1 | <10 | 691 | <100 | 4000 | 60000 | 100000 |
| Total Monohydric Phenols (W) | <0.016 | <0.016 | <0.16 | <0.16 | 1 | - | - |
| Dissolved Organic Carbon | <3 | <3 | <30 | <30 | 500 | 800 | 1000 |

## Leach Test Information

| | |
|---|---|
| Date Prepared | 22-May-2019 |
| pH (pH Units) | 8.32 |
| Conductivity (µS/cm) | 86.10 |
| Temperature (°C) | 20.20 |
| Volume Leachant (Litres) | 0.884 |

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation
Mcerts Certification does not apply to leachates
29/05/2019 15:22:04

15:21:49 29/05/2019

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 190521-93 | **Client Reference:** | 5599 | **Report Number:** | 507840 |
| **Location:** | Millers Glen - Phase 5 | **Order Number:** | 46/A/19 | **Superseded Report:** | |

## Table of Results - Appendix

| Method No | Reference | Description |
|---|---|---|
| PM001 | | Preparation of Samples for Metals Analysis |
| PM024 | Modified BS 1377 | Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material |
| PM115 | | Leaching Procedure for CEN One Stage Leach Test 2:1 & 10:1 1 Step |
| TM018 | BS 1377: Part 3 1990 | Determination of Loss on Ignition |
| TM048 | HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures | Identification of Asbestos in Bulk Material |
| TM061 | Method for the Determination of EPH,Massachusetts Dept.of EP, 1998 | Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40) |
| TM089 | Modified: US EPA Methods 8020 & 602 | Determination of Gasoline Range Hydrocarbons (GRO) by Headspace GC-FID (C4-C12) |
| TM090 | Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060 | Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water |
| TM104 | Method 4500F, AWWA/APHA, 20th Ed., 1999 | Determination of Fluoride using the Kone Analyser |
| TM116 | Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602 | Determination of Volatile Organic Compounds by Headspace / GC-MS |
| TM123 | BS 2690: Part 121:1981 | The Determination of Total Dissolved Solids in Water |
| TM132 | In - house Method | ELTRA CS800 Operators Guide |
| TM151 | Method 3500D, AWWA/APHA, 20th Ed., 1999 | Determination of Hexavalent Chromium using Kone analyser |
| TM152 | Method 3125B, AWWA/APHA, 20th Ed., 1999 | Analysis of Aqueous Samples by ICP-MS |
| TM168 | EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography | Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils |
| TM173 | Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria | Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID |
| TM181 | US EPA Method 6010B | Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES |
| TM183 | BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3 | Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry |
| TM184 | EPA Methods 325.1 & 325.2, | The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers |
| TM218 | Shaker extraction - EPA method 3546. | The determination of PAH in soil samples by GC-MS |
| TM259 | by HPLC | Determination of Phenols in Waters and Leachates by HPLC |
| TM410 | Shaker extraction-In house coronene method | Determination of Coronene in soils by GCMS |

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 190521-93 | **Client Reference:** | 5599 | **Report Number:** | 507840 |
| **Location:** | Millers Glen - Phase 5 | **Order Number:** | 46/A/19 | **Superseded Report:** | |

## Test Completion Dates

| Lab Sample No(s) | 19996776 | 19996774 | 19996775 | 19996779 | 19996778 |
|---|---|---|---|---|---|
| **Customer Sample Ref.** | CBR6 | TP6 | TP14 | TP29 | TP34 |
| **AGS Ref.** | | | | | |
| **Depth** | 0.50 - 0.50 | 0.50 - 0.50 | 0.50 - 0.50 | 0.50 - 0.50 | 0.30 - 0.30 |
| **Type** | Soil/Solid (S) | Soil/Solid (S) | Soil/Solid (S) | Soil/Solid (S) | Soil/Solid (S) |
| Anions by Kone (w) | 24-May-2019 | 24-May-2019 | 24-May-2019 | 24-May-2019 | 24-May-2019 |
| Asbestos ID in Solid Samples | | 23-May-2019 | | | |
| CEN 10:1 Leachate (1 Stage) | 22-May-2019 | 22-May-2019 | 22-May-2019 | 22-May-2019 | 22-May-2019 |
| CEN Readings | 25-May-2019 | 25-May-2019 | 25-May-2019 | 25-May-2019 | 25-May-2019 |
| Chromium III | 25-May-2019 | 25-May-2019 | 25-May-2019 | 25-May-2019 | 25-May-2019 |
| Coronene | 28-May-2019 | 28-May-2019 | 28-May-2019 | 28-May-2019 | 28-May-2019 |
| Dissolved Metals by ICP-MS | 28-May-2019 | 28-May-2019 | 28-May-2019 | 28-May-2019 | 28-May-2019 |
| Dissolved Organic/Inorganic Carbon | 24-May-2019 | 24-May-2019 | 24-May-2019 | 24-May-2019 | 24-May-2019 |
| EPH CWG (Aliphatic) GC (S) | 28-May-2019 | 28-May-2019 | 24-May-2019 | 28-May-2019 | 28-May-2019 |
| EPH CWG (Aromatic) GC (S) | 28-May-2019 | 28-May-2019 | 24-May-2019 | 28-May-2019 | 28-May-2019 |
| Fluoride | 28-May-2019 | 28-May-2019 | 28-May-2019 | 28-May-2019 | 24-May-2019 |
| GRO by GC-FID (S) | 28-May-2019 | 29-May-2019 | 29-May-2019 | 28-May-2019 | 29-May-2019 |
| Hexavalent Chromium (s) | 24-May-2019 | 24-May-2019 | 24-May-2019 | 24-May-2019 | 24-May-2019 |
| Loss on Ignition in soils | 23-May-2019 | 28-May-2019 | 23-May-2019 | 23-May-2019 | 23-May-2019 |
| Mercury Dissolved | 24-May-2019 | 24-May-2019 | 24-May-2019 | 24-May-2019 | 24-May-2019 |
| Metals in solid samples by OES | 24-May-2019 | 23-May-2019 | 24-May-2019 | 24-May-2019 | 24-May-2019 |
| Mineral Oil | 28-May-2019 | 28-May-2019 | 28-May-2019 | 28-May-2019 | 28-May-2019 |
| PAH by GCMS | 29-May-2019 | 24-May-2019 | 24-May-2019 | 24-May-2019 | 29-May-2019 |
| PCBs by GCMS | 24-May-2019 | 24-May-2019 | 24-May-2019 | 24-May-2019 | 24-May-2019 |
| Phenols by HPLC (W) | 24-May-2019 | 24-May-2019 | 28-May-2019 | 24-May-2019 | 28-May-2019 |
| Sample description | 21-May-2019 | 21-May-2019 | 21-May-2019 | 21-May-2019 | 21-May-2019 |
| Total Dissolved Solids on Leachates | 24-May-2019 | 24-May-2019 | 24-May-2019 | 24-May-2019 | 24-May-2019 |
| Total Organic Carbon | 24-May-2019 | 24-May-2019 | 24-May-2019 | 28-May-2019 | 24-May-2019 |
| TPH CWG GC (S) | 28-May-2019 | 29-May-2019 | 29-May-2019 | 28-May-2019 | 29-May-2019 |
| VOC MS (S) | 28-May-2019 | 28-May-2019 | 28-May-2019 | 28-May-2019 | 29-May-2019 |

# Appendix

## General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP - No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

12. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethyphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

21. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as “mixed hydrocarbons”. Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

## Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

| | |
|---|---|
| 1 | **Container with Headspace provided for volatiles analysis** |
| 2 | **Incorrect container received** |
| 3 | **Deviation from method** |
| § | **Sampled on date not provided** |
| ♦ | **Sample holding time exceeded in laboratory** |
| @ | **Sample holding time exceeded due to late arrival of instructions or samples** |

## Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

| Asbestos Type | Common Name |
|---|---|
| Chrysotile | White Asbestos |
| Amosite | Brown Asbestos |
| Crocidolite | Blue Asbestos |
| Fibrous Actinolite | - |
| Fibrous Anthophyllite | - |
| Fibrous Tremolite | - |

**Visual Estimation Of Fibre Content**

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

**Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.**

**The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.**

# Waste Classification Report

AJAAJ-XCRQW-V5W5W

## Job name

5599

## Description/Comments

Client: Gannon Homes Ltd
Engineer: Waterman Moylan

## Project

Millers Glen - Phase 5

## Site

Swords, Co. Dublin

## Related Documents

| # | Name | Description |
|---|---|---|
| 1 | 190521-93.hwol | .hwol file used to create the Job |

## Waste Stream Template

Rilta Suite NEW

## Classified by

Name:
**Stephen Letch**
Date:
**05 Jun 2019 12:30 GMT**
Telephone:
**353 1 6108 768**

Company:
**Site Investigations Ltd**
**Carhugar, The Grange**
**12th Lock Road, Lucan**
**Dublin**

## Report

Created by: Stephen Letch
Created date: 05 Jun 2019 12:30 GMT

## Job summary

| # | Sample Name | Depth [m] | Classification Result | Hazard properties | Page |
|---|---|---|---|---|---|
| 1 | CBR6-200519-0.50-0.50 | | Non Hazardous | | 2 |
| 2 | TP14-200519-0.50-0.50 | | Non Hazardous | | 5 |
| 3 | TP29-200519-0.50-0.50 | | Non Hazardous | | 8 |
| 4 | TP34-200519-0.30-0.30 | | Non Hazardous | | 11 |
| 5 | TP6-200519-0.50-0.50 | | Non Hazardous | | 14 |

## Classification of sample: CBR6-200519-0.50-0.50

**Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

## Sample details

Sample Name:
**CBR6-200519-0.50-0.50**
Moisture content:
**15%**
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

## Hazard properties

None identified

## Determinands

Moisture content: 15% Wet Weight Moisture Correction applied (MC)

| # | Determinand | CLP index number | EC Number | CAS Number | CLP Note | User entered data | Conv. Factor | Compound conc. | Classification value | MC Applied | Conc. Not Used |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | TPH (C6 to C40) petroleum group | | | TPH | | 5.78 mg/kg | | 4.913 mg/kg | 0.000491 % | ✓ | |
| 2 | antimony { antimony trioxide } | 051-005-00-X | 215-175-0 | 1309-64-4 | | 1.88 mg/kg | 1.197 | 1.913 mg/kg | 0.000191 % | ✓ | |
| 3 | arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex } | 033-002-00-5 | | | 1 | 15 mg/kg | | 12.75 mg/kg | 0.00128 % | ✓ | |
| 4 | barium { barium oxide } | | 215-127-9 | 1304-28-5 | | 151 mg/kg | 1.117 | 143.304 mg/kg | 0.0143 % | ✓ | |
| 5 | cadmium { cadmium oxide } | 048-002-00-0 | 215-146-2 | 1306-19-0 | | 1.93 mg/kg | 1.142 | 1.874 mg/kg | 0.000187 % | ✓ | |
| 6 | copper { dicopper oxide; copper (I) oxide } | 029-002-00-X | 215-270-7 | 1317-39-1 | | 29.3 mg/kg | 1.126 | 28.04 mg/kg | 0.0028 % | ✓ | |
| 7 | lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } | 082-001-00-6 | | | 1 | 24.9 mg/kg | | 21.165 mg/kg | 0.00212 % | ✓ | |
| 8 | mercury { mercury dichloride } | 080-010-00-X | 231-299-8 | 7487-94-7 | | <0.14 mg/kg | 1.353 | <0.189 mg/kg | <0.0000189 % | | <LOD |
| 9 | molybdenum { molybdenum(VI) oxide } | 042-001-00-9 | 215-204-7 | 1313-27-5 | | 3.37 mg/kg | 1.5 | 4.297 mg/kg | 0.00043 % | ✓ | |
| 10 | nickel { nickel sulfate } | 028-009-00-5 | 232-104-9 | 7786-81-4 | | 48.3 mg/kg | 2.637 | 108.249 mg/kg | 0.0108 % | ✓ | |
| 11 | selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } | 034-002-00-8 | | | | <1 mg/kg | 2.554 | <2.554 mg/kg | <0.000255 % | | <LOD |
| 12 | zinc { zinc sulphate } | 030-006-00-9 | 231-793-3 [1]<br>231-793-3 [2] | 7446-19-7 [1]<br>7733-02-0 [2] | | 86.4 mg/kg | 2.469 | 181.345 mg/kg | 0.0181 % | ✓ | |
| 13 | chromium in chromium(III) compounds { chromium(III) oxide } | | 215-160-9 | 1308-38-9 | | 18.7 mg/kg | 1.462 | 23.231 mg/kg | 0.00232 % | ✓ | |

| # | | Determinand | | | CLP Note | User entered data | | Conv. Factor | Compound conc. | | Classification value | MC Applied | Conc. Not Used |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CLP index number | EC Number | CAS Number | | | | | | | | | |
| 14 | | chromium in chromium(VI) compounds { chromium(VI) oxide } | | | | <0.6 | mg/kg | 1.923 | <1.154 | mg/kg | <0.000115 % | | <LOD |
| | | 024-001-00-0 | 215-607-8 | 1333-82-0 | | | | | | | | | |
| 15 | | naphthalene | | | | <0.009 | mg/kg | | <0.009 | mg/kg | <0.0000009 % | | <LOD |
| | | 601-052-00-2 | 202-049-5 | 91-20-3 | | | | | | | | | |
| 16 | | acenaphthylene | | | | <0.012 | mg/kg | | <0.012 | mg/kg | <0.0000012 % | | <LOD |
| | | | 205-917-1 | 208-96-8 | | | | | | | | | |
| 17 | | acenaphthene | | | | <0.008 | mg/kg | | <0.008 | mg/kg | <0.0000008 % | | <LOD |
| | | | 201-469-6 | 83-32-9 | | | | | | | | | |
| 18 | | fluorene | | | | <0.01 | mg/kg | | <0.01 | mg/kg | <0.000001 % | | <LOD |
| | | | 201-695-5 | 86-73-7 | | | | | | | | | |
| 19 | | phenanthrene | | | | <0.015 | mg/kg | | <0.015 | mg/kg | <0.0000015 % | | <LOD |
| | | | 201-581-5 | 85-01-8 | | | | | | | | | |
| 20 | | anthracene | | | | <0.016 | mg/kg | | <0.016 | mg/kg | <0.0000016 % | | <LOD |
| | | | 204-371-1 | 120-12-7 | | | | | | | | | |
| 21 | | fluoranthene | | | | <0.017 | mg/kg | | <0.017 | mg/kg | <0.0000017 % | | <LOD |
| | | | 205-912-4 | 206-44-0 | | | | | | | | | |
| 22 | | pyrene | | | | <0.015 | mg/kg | | <0.015 | mg/kg | <0.0000015 % | | <LOD |
| | | | 204-927-3 | 129-00-0 | | | | | | | | | |
| 23 | | benzo[a]anthracene | | | | <0.014 | mg/kg | | <0.014 | mg/kg | <0.0000014 % | | <LOD |
| | | 601-033-00-9 | 200-280-6 | 56-55-3 | | | | | | | | | |
| 24 | | chrysene | | | | <0.01 | mg/kg | | <0.01 | mg/kg | <0.000001 % | | <LOD |
| | | 601-048-00-0 | 205-923-4 | 218-01-9 | | | | | | | | | |
| 25 | | benzo[b]fluoranthene | | | | <0.015 | mg/kg | | <0.015 | mg/kg | <0.0000015 % | | <LOD |
| | | 601-034-00-4 | 205-911-9 | 205-99-2 | | | | | | | | | |
| 26 | | benzo[k]fluoranthene | | | | <0.014 | mg/kg | | <0.014 | mg/kg | <0.0000014 % | | <LOD |
| | | 601-036-00-5 | 205-916-6 | 207-08-9 | | | | | | | | | |
| 27 | | benzo[a]pyrene; benzo[def]chrysene | | | | <0.015 | mg/kg | | <0.015 | mg/kg | <0.0000015 % | | <LOD |
| | | 601-032-00-3 | 200-028-5 | 50-32-8 | | | | | | | | | |
| 28 | | indeno[123-cd]pyrene | | | | <0.018 | mg/kg | | <0.018 | mg/kg | <0.0000018 % | | <LOD |
| | | | 205-893-2 | 193-39-5 | | | | | | | | | |
| 29 | | dibenz[a,h]anthracene | | | | <0.023 | mg/kg | | <0.023 | mg/kg | <0.0000023 % | | <LOD |
| | | 601-041-00-2 | 200-181-8 | 53-70-3 | | | | | | | | | |
| 30 | | benzo[ghi]perylene | | | | <0.024 | mg/kg | | <0.024 | mg/kg | <0.0000024 % | | <LOD |
| | | | 205-883-8 | 191-24-2 | | | | | | | | | |
| 31 | | polychlorobiphenyls; PCB | | | | <0.021 | mg/kg | | <0.021 | mg/kg | <0.0000021 % | | <LOD |
| | | 602-039-00-4 | 215-648-1 | 1336-36-3 | | | | | | | | | |
| 32 | | tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane | | | | <0.01 | mg/kg | | <0.01 | mg/kg | <0.000001 % | | <LOD |
| | | 603-181-00-X | 216-653-1 | 1634-04-4 | | | | | | | | | |
| 33 | | benzene | | | | <0.009 | mg/kg | | <0.009 | mg/kg | <0.0000009 % | | <LOD |
| | | 601-020-00-8 | 200-753-7 | 71-43-2 | | | | | | | | | |
| 34 | | toluene | | | | <0.007 | mg/kg | | <0.007 | mg/kg | <0.0000007 % | | <LOD |
| | | 601-021-00-3 | 203-625-9 | 108-88-3 | | | | | | | | | |
| 35 | | ethylbenzene | | | | <0.004 | mg/kg | | <0.004 | mg/kg | <0.0000004 % | | <LOD |
| | | 601-023-00-4 | 202-849-4 | 100-41-4 | | | | | | | | | |
| 36 | | coronene | | | | <0.2 | mg/kg | | <0.2 | mg/kg | <0.00002 % | | <LOD |
| | | | 205-881-7 | 191-07-1 | | | | | | | | | |
| 37 | | o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4] | | | | <0.02 | mg/kg | | <0.02 | mg/kg | <0.000002 % | | <LOD |
| | | 601-022-00-9 | 202-422-2 [1]<br>203-396-5 [2]<br>203-576-3 [3]<br>215-535-7 [4] | 95-47-6 [1]<br>106-42-3 [2]<br>108-38-3 [3]<br>1330-20-7 [4] | | | | | | | | | |
| | | | | | | | | | | Total: | 0.0535 % | | |

| Key | |
|---|---|
| | User supplied data |
| | Determinand values ignored for classification, see column 'Conc. Not Used' for reason |
| | Determinand defined or amended by HazWasteOnline (see Appendix A) |
| | Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration |
| **<LOD** | Below limit of detection |
| CLP: Note 1 | Only the metal concentration has been used for classification |

## Supplementary Hazardous Property Information

**HP 3(i): Flammable** "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because HP 3 can be discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

**Flam. Liq. 3; H226** "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00049%)

## Classification of sample: TP14-200519-0.50-0.50

**Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

## Sample details

Sample Name:
**TP14-200519-0.50-0.50**
Moisture content:
**14%**
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

## Hazard properties

None identified

## Determinands

Moisture content: 14% Wet Weight Moisture Correction applied (MC)

| # | Determinand | CLP index number | EC Number | CAS Number | CLP Note | User entered data | Conv. Factor | Compound conc. | Classification value | MC Applied | Conc. Not Used |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | TPH (C6 to C40) petroleum group | | | TPH | | <0.1 mg/kg | | <0.1 mg/kg | <0.00001 % | | <LOD |
| 2 | antimony { antimony trioxide } | 051-005-00-X | 215-175-0 | 1309-64-4 | | 1.86 mg/kg | 1.197 | 1.915 mg/kg | 0.000191 % | ✓ | |
| 3 | arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex } | 033-002-00-5 | | | 1 | 13 mg/kg | | 11.18 mg/kg | 0.00112 % | ✓ | |
| 4 | barium { barium oxide } | | 215-127-9 | 1304-28-5 | | 318 mg/kg | 1.117 | 305.342 mg/kg | 0.0305 % | ✓ | |
| 5 | cadmium { cadmium oxide } | 048-002-00-0 | 215-146-2 | 1306-19-0 | | 1.52 mg/kg | 1.142 | 1.493 mg/kg | 0.000149 % | ✓ | |
| 6 | copper { dicopper oxide; copper (I) oxide } | 029-002-00-X | 215-270-7 | 1317-39-1 | | 30 mg/kg | 1.126 | 29.048 mg/kg | 0.0029 % | ✓ | |
| 7 | lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } | 082-001-00-6 | | | 1 | 19.6 mg/kg | | 16.856 mg/kg | 0.00169 % | ✓ | |
| 8 | mercury { mercury dichloride } | 080-010-00-X | 231-299-8 | 7487-94-7 | | <0.14 mg/kg | 1.353 | <0.189 mg/kg | <0.0000189 % | | <LOD |
| 9 | molybdenum { molybdenum(VI) oxide } | 042-001-00-9 | 215-204-7 | 1313-27-5 | | 5.36 mg/kg | 1.5 | 6.915 mg/kg | 0.000692 % | ✓ | |
| 10 | nickel { nickel sulfate } | 028-009-00-5 | 232-104-9 | 7786-81-4 | | 37.6 mg/kg | 2.637 | 85.26 mg/kg | 0.00853 % | ✓ | |
| 11 | selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } | 034-002-00-8 | | | | <1 mg/kg | 2.554 | <2.554 mg/kg | <0.000255 % | | <LOD |
| 12 | zinc { zinc sulphate } | 030-006-00-9 | 231-793-3 [1]<br>231-793-3 [2] | 7446-19-7 [1]<br>7733-02-0 [2] | | 64.7 mg/kg | 2.469 | 137.397 mg/kg | 0.0137 % | ✓ | |
| 13 | chromium in chromium(III) compounds { chromium(III) oxide } | | 215-160-9 | 1308-38-9 | | 11.9 mg/kg | 1.462 | 14.958 mg/kg | 0.0015 % | ✓ | |

| # | | Determinand | CLP index number | EC Number | CAS Number | CLP Note | User entered data | Conv. Factor | Compound conc. | Classification value | MC Applied | Conc. Not Used |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14 | | chromium in chromium(VI) compounds { chromium(VI) oxide } | 024-001-00-0 | 215-607-8 | 1333-82-0 | | <0.6 mg/kg | 1.923 | <1.154 mg/kg | <0.000115 % | | <LOD |
| 15 | | naphthalene | 601-052-00-2 | 202-049-5 | 91-20-3 | | <0.009 mg/kg | | <0.009 mg/kg | <0.0000009 % | | <LOD |
| 16 | | acenaphthylene | | 205-917-1 | 208-96-8 | | <0.012 mg/kg | | <0.012 mg/kg | <0.0000012 % | | <LOD |
| 17 | | acenaphthene | | 201-469-6 | 83-32-9 | | <0.008 mg/kg | | <0.008 mg/kg | <0.0000008 % | | <LOD |
| 18 | | fluorene | | 201-695-5 | 86-73-7 | | <0.01 mg/kg | | <0.01 mg/kg | <0.000001 % | | <LOD |
| 19 | | phenanthrene | | 201-581-5 | 85-01-8 | | <0.015 mg/kg | | <0.015 mg/kg | <0.0000015 % | | <LOD |
| 20 | | anthracene | | 204-371-1 | 120-12-7 | | <0.016 mg/kg | | <0.016 mg/kg | <0.0000016 % | | <LOD |
| 21 | | fluoranthene | | 205-912-4 | 206-44-0 | | <0.017 mg/kg | | <0.017 mg/kg | <0.0000017 % | | <LOD |
| 22 | | pyrene | | 204-927-3 | 129-00-0 | | <0.015 mg/kg | | <0.015 mg/kg | <0.0000015 % | | <LOD |
| 23 | | benzo[a]anthracene | 601-033-00-9 | 200-280-6 | 56-55-3 | | <0.014 mg/kg | | <0.014 mg/kg | <0.0000014 % | | <LOD |
| 24 | | chrysene | 601-048-00-0 | 205-923-4 | 218-01-9 | | <0.01 mg/kg | | <0.01 mg/kg | <0.000001 % | | <LOD |
| 25 | | benzo[b]fluoranthene | 601-034-00-4 | 205-911-9 | 205-99-2 | | <0.015 mg/kg | | <0.015 mg/kg | <0.0000015 % | | <LOD |
| 26 | | benzo[k]fluoranthene | 601-036-00-5 | 205-916-6 | 207-08-9 | | <0.014 mg/kg | | <0.014 mg/kg | <0.0000014 % | | <LOD |
| 27 | | benzo[a]pyrene; benzo[def]chrysene | 601-032-00-3 | 200-028-5 | 50-32-8 | | <0.015 mg/kg | | <0.015 mg/kg | <0.0000015 % | | <LOD |
| 28 | | indeno[123-cd]pyrene | | 205-893-2 | 193-39-5 | | <0.018 mg/kg | | <0.018 mg/kg | <0.0000018 % | | <LOD |
| 29 | | dibenz[a,h]anthracene | 601-041-00-2 | 200-181-8 | 53-70-3 | | <0.023 mg/kg | | <0.023 mg/kg | <0.0000023 % | | <LOD |
| 30 | | benzo[ghi]perylene | | 205-883-8 | 191-24-2 | | <0.024 mg/kg | | <0.024 mg/kg | <0.0000024 % | | <LOD |
| 31 | | polychlorobiphenyls; PCB | 602-039-00-4 | 215-648-1 | 1336-36-3 | | <0.021 mg/kg | | <0.021 mg/kg | <0.0000021 % | | <LOD |
| 32 | | tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane | 603-181-00-X | 216-653-1 | 1634-04-4 | | <0.01 mg/kg | | <0.01 mg/kg | <0.000001 % | | <LOD |
| 33 | | benzene | 601-020-00-8 | 200-753-7 | 71-43-2 | | <0.009 mg/kg | | <0.009 mg/kg | <0.0000009 % | | <LOD |
| 34 | | toluene | 601-021-00-3 | 203-625-9 | 108-88-3 | | 0.0142 mg/kg | | 0.0122 mg/kg | 0.00000122 % | ✓ | |
| 35 | | ethylbenzene | 601-023-00-4 | 202-849-4 | 100-41-4 | | <0.004 mg/kg | | <0.004 mg/kg | <0.0000004 % | | <LOD |
| 36 | | coronene | | 205-881-7 | 191-07-1 | | <0.2 mg/kg | | <0.2 mg/kg | <0.00002 % | | <LOD |
| 37 | | o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4] | 601-022-00-9 | 202-422-2 [1]<br>203-396-5 [2]<br>203-576-3 [3]<br>215-535-7 [4] | 95-47-6 [1]<br>106-42-3 [2]<br>108-38-3 [3]<br>1330-20-7 [4] | | <0.02 mg/kg | | <0.02 mg/kg | <0.000002 % | | <LOD |
| | | | | | | | | | Total: | 0.0615 % | | |

| Key | |
|---|---|
| | User supplied data |
| | Determinand values ignored for classification, see column 'Conc. Not Used' for reason |
| | Determinand defined or amended by HazWasteOnline (see Appendix A) |
| | Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration |
| **<LOD** | Below limit of detection |
| CLP: Note 1 | Only the metal concentration has been used for classification |

## Supplementary Hazardous Property Information

**HP 3(i): Flammable** "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because HP 3 can be discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

**Flam. Liq. 2; H225** "Highly flammable liquid and vapour."

Because of determinand:

toluene: (conc.: 1.22e-06%)

## Classification of sample: TP29-200519-0.50-0.50

**Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

## Sample details

Sample Name:
**TP29-200519-0.50-0.50**
Moisture content:
**15%**
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

## Hazard properties

None identified

## Determinands

Moisture content: 15% Wet Weight Moisture Correction applied (MC)

| # | Determinand | CLP index number | EC Number | CAS Number | CLP Note | User entered data | Conv. Factor | Compound conc. | Classification value | MC Applied | Conc. Not Used |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | TPH (C6 to C40) petroleum group | | | TPH | | <0.1 mg/kg | | <0.1 mg/kg | <0.00001 % | | <LOD |
| 2 | antimony { antimony trioxide } | 051-005-00-X | 215-175-0 | 1309-64-4 | | 2 mg/kg | 1.197 | 2.035 mg/kg | 0.000204 % | ✓ | |
| 3 | arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex } | 033-002-00-5 | | | 1 | 13.9 mg/kg | | 11.815 mg/kg | 0.00118 % | ✓ | |
| 4 | barium { barium oxide } | | 215-127-9 | 1304-28-5 | | 84 mg/kg | 1.117 | 79.719 mg/kg | 0.00797 % | ✓ | |
| 5 | cadmium { cadmium oxide } | 048-002-00-0 | 215-146-2 | 1306-19-0 | | 1.33 mg/kg | 1.142 | 1.291 mg/kg | 0.000129 % | ✓ | |
| 6 | copper { dicopper oxide; copper (I) oxide } | 029-002-00-X | 215-270-7 | 1317-39-1 | | 31.3 mg/kg | 1.126 | 29.954 mg/kg | 0.003 % | ✓ | |
| 7 | lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } | 082-001-00-6 | | | 1 | 19.6 mg/kg | | 16.66 mg/kg | 0.00167 % | ✓ | |
| 8 | mercury { mercury dichloride } | 080-010-00-X | 231-299-8 | 7487-94-7 | | <0.14 mg/kg | 1.353 | <0.189 mg/kg | <0.0000189 % | | <LOD |
| 9 | molybdenum { molybdenum(VI) oxide } | 042-001-00-9 | 215-204-7 | 1313-27-5 | | 3.11 mg/kg | 1.5 | 3.966 mg/kg | 0.000397 % | ✓ | |
| 10 | nickel { nickel sulfate } | 028-009-00-5 | 232-104-9 | 7786-81-4 | | 38.4 mg/kg | 2.637 | 86.061 mg/kg | 0.00861 % | ✓ | |
| 11 | selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } | 034-002-00-8 | | | | <1 mg/kg | 2.554 | <2.554 mg/kg | <0.000255 % | | <LOD |
| 12 | zinc { zinc sulphate } | 030-006-00-9 | 231-793-3 [1]<br>231-793-3 [2] | 7446-19-7 [1]<br>7733-02-0 [2] | | 68.9 mg/kg | 2.469 | 144.614 mg/kg | 0.0145 % | ✓ | |
| 13 | chromium in chromium(III) compounds { chromium(III) oxide } | | 215-160-9 | 1308-38-9 | | 12 mg/kg | 1.462 | 14.908 mg/kg | 0.00149 % | ✓ | |

| # | | Determinand | | | CLP Note | User entered data | | Conv. Factor | Compound conc. | | Classification value | MC Applied | Conc. Not Used |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CLP index number | EC Number | CAS Number | | | | | | | | | |
| 14 | | chromium in chromium(VI) compounds { chromium(VI) oxide } | | | | <0.6 | mg/kg | 1.923 | <1.154 | mg/kg | <0.000115 % | | <LOD |
| | | 024-001-00-0 | 215-607-8 | 1333-82-0 | | | | | | | | | |
| 15 | | naphthalene | | | | <0.009 | mg/kg | | <0.009 | mg/kg | <0.0000009 % | | <LOD |
| | | 601-052-00-2 | 202-049-5 | 91-20-3 | | | | | | | | | |
| 16 | | acenaphthylene | | | | <0.012 | mg/kg | | <0.012 | mg/kg | <0.0000012 % | | <LOD |
| | | | 205-917-1 | 208-96-8 | | | | | | | | | |
| 17 | | acenaphthene | | | | <0.008 | mg/kg | | <0.008 | mg/kg | <0.0000008 % | | <LOD |
| | | | 201-469-6 | 83-32-9 | | | | | | | | | |
| 18 | | fluorene | | | | <0.01 | mg/kg | | <0.01 | mg/kg | <0.000001 % | | <LOD |
| | | | 201-695-5 | 86-73-7 | | | | | | | | | |
| 19 | | phenanthrene | | | | <0.015 | mg/kg | | <0.015 | mg/kg | <0.0000015 % | | <LOD |
| | | | 201-581-5 | 85-01-8 | | | | | | | | | |
| 20 | | anthracene | | | | <0.016 | mg/kg | | <0.016 | mg/kg | <0.0000016 % | | <LOD |
| | | | 204-371-1 | 120-12-7 | | | | | | | | | |
| 21 | | fluoranthene | | | | <0.017 | mg/kg | | <0.017 | mg/kg | <0.0000017 % | | <LOD |
| | | | 205-912-4 | 206-44-0 | | | | | | | | | |
| 22 | | pyrene | | | | <0.015 | mg/kg | | <0.015 | mg/kg | <0.0000015 % | | <LOD |
| | | | 204-927-3 | 129-00-0 | | | | | | | | | |
| 23 | | benzo[a]anthracene | | | | <0.014 | mg/kg | | <0.014 | mg/kg | <0.0000014 % | | <LOD |
| | | 601-033-00-9 | 200-280-6 | 56-55-3 | | | | | | | | | |
| 24 | | chrysene | | | | <0.01 | mg/kg | | <0.01 | mg/kg | <0.000001 % | | <LOD |
| | | 601-048-00-0 | 205-923-4 | 218-01-9 | | | | | | | | | |
| 25 | | benzo[b]fluoranthene | | | | <0.015 | mg/kg | | <0.015 | mg/kg | <0.0000015 % | | <LOD |
| | | 601-034-00-4 | 205-911-9 | 205-99-2 | | | | | | | | | |
| 26 | | benzo[k]fluoranthene | | | | <0.014 | mg/kg | | <0.014 | mg/kg | <0.0000014 % | | <LOD |
| | | 601-036-00-5 | 205-916-6 | 207-08-9 | | | | | | | | | |
| 27 | | benzo[a]pyrene; benzo[def]chrysene | | | | <0.015 | mg/kg | | <0.015 | mg/kg | <0.0000015 % | | <LOD |
| | | 601-032-00-3 | 200-028-5 | 50-32-8 | | | | | | | | | |
| 28 | | indeno[123-cd]pyrene | | | | <0.018 | mg/kg | | <0.018 | mg/kg | <0.0000018 % | | <LOD |
| | | | 205-893-2 | 193-39-5 | | | | | | | | | |
| 29 | | dibenz[a,h]anthracene | | | | <0.023 | mg/kg | | <0.023 | mg/kg | <0.0000023 % | | <LOD |
| | | 601-041-00-2 | 200-181-8 | 53-70-3 | | | | | | | | | |
| 30 | | benzo[ghi]perylene | | | | <0.024 | mg/kg | | <0.024 | mg/kg | <0.0000024 % | | <LOD |
| | | | 205-883-8 | 191-24-2 | | | | | | | | | |
| 31 | | polychlorobiphenyls; PCB | | | | <0.021 | mg/kg | | <0.021 | mg/kg | <0.0000021 % | | <LOD |
| | | 602-039-00-4 | 215-648-1 | 1336-36-3 | | | | | | | | | |
| 32 | | tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane | | | | <0.01 | mg/kg | | <0.01 | mg/kg | <0.000001 % | | <LOD |
| | | 603-181-00-X | 216-653-1 | 1634-04-4 | | | | | | | | | |
| 33 | | benzene | | | | <0.009 | mg/kg | | <0.009 | mg/kg | <0.0000009 % | | <LOD |
| | | 601-020-00-8 | 200-753-7 | 71-43-2 | | | | | | | | | |
| 34 | | toluene | | | | 0.0105 | mg/kg | | 0.0089 | mg/kg | 0.000000893 % | ✓ | |
| | | 601-021-00-3 | 203-625-9 | 108-88-3 | | | | | | | | | |
| 35 | | ethylbenzene | | | | <0.004 | mg/kg | | <0.004 | mg/kg | <0.0000004 % | | <LOD |
| | | 601-023-00-4 | 202-849-4 | 100-41-4 | | | | | | | | | |
| 36 | | coronene | | | | <0.2 | mg/kg | | <0.2 | mg/kg | <0.00002 % | | <LOD |
| | | | 205-881-7 | 191-07-1 | | | | | | | | | |
| 37 | | o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4] | | | | <0.02 | mg/kg | | <0.02 | mg/kg | <0.000002 % | | <LOD |
| | | 601-022-00-9 | 202-422-2 [1]<br>203-396-5 [2]<br>203-576-3 [3]<br>215-535-7 [4] | 95-47-6 [1]<br>106-42-3 [2]<br>108-38-3 [3]<br>1330-20-7 [4] | | | | | | | | | |
| | | | | | | | | | | Total: | 0.0396 % | | |

| Key | |
|---|---|
| | User supplied data |
| | Determinand values ignored for classification, see column 'Conc. Not Used' for reason |
| | Determinand defined or amended by HazWasteOnline (see Appendix A) |
| | Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration |
| **<LOD** | Below limit of detection |
| CLP: Note 1 | Only the metal concentration has been used for classification |

## Supplementary Hazardous Property Information

**HP 3(i): Flammable** "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because HP 3 can be discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

**Flam. Liq. 2; H225** "Highly flammable liquid and vapour."

Because of determinand:

toluene: (conc.: 8.93e-07%)

## Classification of sample: TP34-200519-0.30-0.30

**Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

## Sample details

Sample Name:
**TP34-200519-0.30-0.30**
Moisture content:
**6.3%**
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

## Hazard properties

None identified

## Determinands

Moisture content: 6.3% Wet Weight Moisture Correction applied (MC)

| # | Determinand | CLP index number | EC Number | CAS Number | CLP Note | User entered data | Conv. Factor | Compound conc. | Classification value | MC Applied | Conc. Not Used |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | TPH (C6 to C40) petroleum group | | | TPH | | 4.15 mg/kg | | 3.889 mg/kg | 0.000389 % | ✓ | |
| 2 | antimony { antimony trioxide } | 051-005-00-X | 215-175-0 | 1309-64-4 | | 2.14 mg/kg | 1.197 | 2.4 mg/kg | 0.00024 % | ✓ | |
| 3 | arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex } | 033-002-00-5 | | | 1 | 43.9 mg/kg | | 41.134 mg/kg | 0.00411 % | ✓ | |
| 4 | barium { barium oxide } | | 215-127-9 | 1304-28-5 | | 122 mg/kg | 1.117 | 127.632 mg/kg | 0.0128 % | ✓ | |
| 5 | cadmium { cadmium oxide } | 048-002-00-0 | 215-146-2 | 1306-19-0 | | 0.222 mg/kg | 1.142 | 0.238 mg/kg | 0.0000238 % | ✓ | |
| 6 | copper { dicopper oxide; copper (I) oxide } | 029-002-00-X | 215-270-7 | 1317-39-1 | | 12.9 mg/kg | 1.126 | 13.609 mg/kg | 0.00136 % | ✓ | |
| 7 | lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } | 082-001-00-6 | | | 1 | 19.3 mg/kg | | 18.084 mg/kg | 0.00181 % | ✓ | |
| 8 | mercury { mercury dichloride } | 080-010-00-X | 231-299-8 | 7487-94-7 | | <0.14 mg/kg | 1.353 | <0.189 mg/kg | <0.0000189 % | | <LOD |
| 9 | molybdenum { molybdenum(VI) oxide } | 042-001-00-9 | 215-204-7 | 1313-27-5 | | 0.422 mg/kg | 1.5 | 0.593 mg/kg | 0.0000593 % | ✓ | |
| 10 | nickel { nickel sulfate } | 028-009-00-5 | 232-104-9 | 7786-81-4 | | 31.8 mg/kg | 2.637 | 78.564 mg/kg | 0.00786 % | ✓ | |
| 11 | selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } | 034-002-00-8 | | | | <1 mg/kg | 2.554 | <2.554 mg/kg | <0.000255 % | | <LOD |
| 12 | zinc { zinc sulphate } | 030-006-00-9 | 231-793-3 [1]<br>231-793-3 [2] | 7446-19-7 [1]<br>7733-02-0 [2] | | 62.6 mg/kg | 2.469 | 144.84 mg/kg | 0.0145 % | ✓ | |
| 13 | chromium in chromium(III) compounds { chromium(III) oxide } | | 215-160-9 | 1308-38-9 | | <0.9 mg/kg | 1.462 | <1.315 mg/kg | <0.000132 % | | <LOD |

| # | | Determinand | CLP index number | EC Number | CAS Number | CLP Note | User entered data | Conv. Factor | Compound conc. | Classification value | MC Applied | Conc. Not Used |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14 | | chromium in chromium(VI) compounds { chromium(VI) oxide } | 024-001-00-0 | 215-607-8 | 1333-82-0 | | <0.6 mg/kg | 1.923 | <1.154 mg/kg | <0.000115 % | | **<LOD** |
| 15 | | naphthalene | 601-052-00-2 | 202-049-5 | 91-20-3 | | <0.009 mg/kg | | <0.009 mg/kg | <0.0000009 % | | **<LOD** |
| 16 | | acenaphthylene | | 205-917-1 | 208-96-8 | | <0.012 mg/kg | | <0.012 mg/kg | <0.0000012 % | | **<LOD** |
| 17 | | acenaphthene | | 201-469-6 | 83-32-9 | | <0.008 mg/kg | | <0.008 mg/kg | <0.0000008 % | | **<LOD** |
| 18 | | fluorene | | 201-695-5 | 86-73-7 | | <0.01 mg/kg | | <0.01 mg/kg | <0.000001 % | | **<LOD** |
| 19 | | phenanthrene | | 201-581-5 | 85-01-8 | | <0.015 mg/kg | | <0.015 mg/kg | <0.0000015 % | | **<LOD** |
| 20 | | anthracene | | 204-371-1 | 120-12-7 | | <0.016 mg/kg | | <0.016 mg/kg | <0.0000016 % | | **<LOD** |
| 21 | | fluoranthene | | 205-912-4 | 206-44-0 | | <0.017 mg/kg | | <0.017 mg/kg | <0.0000017 % | | **<LOD** |
| 22 | | pyrene | | 204-927-3 | 129-00-0 | | <0.015 mg/kg | | <0.015 mg/kg | <0.0000015 % | | **<LOD** |
| 23 | | benzo[a]anthracene | 601-033-00-9 | 200-280-6 | 56-55-3 | | <0.014 mg/kg | | <0.014 mg/kg | <0.0000014 % | | **<LOD** |
| 24 | | chrysene | 601-048-00-0 | 205-923-4 | 218-01-9 | | <0.01 mg/kg | | <0.01 mg/kg | <0.000001 % | | **<LOD** |
| 25 | | benzo[b]fluoranthene | 601-034-00-4 | 205-911-9 | 205-99-2 | | <0.015 mg/kg | | <0.015 mg/kg | <0.0000015 % | | **<LOD** |
| 26 | | benzo[k]fluoranthene | 601-036-00-5 | 205-916-6 | 207-08-9 | | <0.014 mg/kg | | <0.014 mg/kg | <0.0000014 % | | **<LOD** |
| 27 | | benzo[a]pyrene; benzo[def]chrysene | 601-032-00-3 | 200-028-5 | 50-32-8 | | <0.015 mg/kg | | <0.015 mg/kg | <0.0000015 % | | **<LOD** |
| 28 | | indeno[123-cd]pyrene | | 205-893-2 | 193-39-5 | | <0.018 mg/kg | | <0.018 mg/kg | <0.0000018 % | | **<LOD** |
| 29 | | dibenz[a,h]anthracene | 601-041-00-2 | 200-181-8 | 53-70-3 | | <0.023 mg/kg | | <0.023 mg/kg | <0.0000023 % | | **<LOD** |
| 30 | | benzo[ghi]perylene | | 205-883-8 | 191-24-2 | | <0.024 mg/kg | | <0.024 mg/kg | <0.0000024 % | | **<LOD** |
| 31 | | polychlorobiphenyls; PCB | 602-039-00-4 | 215-648-1 | 1336-36-3 | | <0.021 mg/kg | | <0.021 mg/kg | <0.0000021 % | | **<LOD** |
| 32 | | tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane | 603-181-00-X | 216-653-1 | 1634-04-4 | | <0.1 mg/kg | | <0.1 mg/kg | <0.00001 % | | **<LOD** |
| 33 | | benzene | 601-020-00-8 | 200-753-7 | 71-43-2 | | <0.09 mg/kg | | <0.09 mg/kg | <0.000009 % | | **<LOD** |
| 34 | | toluene | 601-021-00-3 | 203-625-9 | 108-88-3 | | <0.07 mg/kg | | <0.07 mg/kg | <0.000007 % | | **<LOD** |
| 35 | | ethylbenzene | 601-023-00-4 | 202-849-4 | 100-41-4 | | <0.04 mg/kg | | <0.04 mg/kg | <0.000004 % | | **<LOD** |
| 36 | | coronene | | 205-881-7 | 191-07-1 | | <0.2 mg/kg | | <0.2 mg/kg | <0.00002 % | | **<LOD** |
| 37 | | o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4] | 601-022-00-9 | 202-422-2 [1]<br>203-396-5 [2]<br>203-576-3 [3]<br>215-535-7 [4] | 95-47-6 [1]<br>106-42-3 [2]<br>108-38-3 [3]<br>1330-20-7 [4] | | <0.2 mg/kg | | <0.2 mg/kg | <0.00002 % | | **<LOD** |
| | | | | | | | | | Total: | 0.0437 % | | |

| Key | |
|---|---|
| | User supplied data |
| | Determinand values ignored for classification, see column 'Conc. Not Used' for reason |
| | Determinand defined or amended by HazWasteOnline (see Appendix A) |
| | Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration |
| **<LOD** | Below limit of detection |
| CLP: Note 1 | Only the metal concentration has been used for classification |

## Supplementary Hazardous Property Information

**HP 3(i): Flammable** "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because HP 3 can be discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

**Flam. Liq. 3; H226** "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00038%)

## Classification of sample: TP6-200519-0.50-0.50

**Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

## Sample details

Sample Name:
**TP6-200519-0.50-0.50**
Moisture content:
**10%**
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

## Hazard properties

None identified

## Determinands

Moisture content: 10% Wet Weight Moisture Correction applied (MC)

| # | Determinand | CLP index number | EC Number | CAS Number | CLP Note | User entered data | | Conv. Factor | Compound conc. | | Classification value | MC Applied | Conc. Not Used |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | TPH (C6 to C40) petroleum group | | | TPH | | <0.1 | mg/kg | | <0.1 | mg/kg | <0.00001 % | | <LOD |
| 2 | antimony { antimony trioxide } | 051-005-00-X | 215-175-0 | 1309-64-4 | | 1.73 | mg/kg | 1.197 | 1.864 | mg/kg | 0.000186 % | ✓ | |
| 3 | arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex } | 033-002-00-5 | | | 1 | 12.7 | mg/kg | | 11.43 | mg/kg | 0.00114 % | ✓ | |
| 4 | barium { barium oxide } | | 215-127-9 | 1304-28-5 | | 137 | mg/kg | 1.117 | 137.665 | mg/kg | 0.0138 % | ✓ | |
| 5 | cadmium { cadmium oxide } | 048-002-00-0 | 215-146-2 | 1306-19-0 | | 1.27 | mg/kg | 1.142 | 1.306 | mg/kg | 0.000131 % | ✓ | |
| 6 | copper { dicopper oxide; copper (I) oxide } | 029-002-00-X | 215-270-7 | 1317-39-1 | | 28.1 | mg/kg | 1.126 | 28.474 | mg/kg | 0.00285 % | ✓ | |
| 7 | lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } | 082-001-00-6 | | | 1 | 20.6 | mg/kg | | 18.54 | mg/kg | 0.00185 % | ✓ | |
| 8 | mercury { mercury dichloride } | 080-010-00-X | 231-299-8 | 7487-94-7 | | <0.14 | mg/kg | 1.353 | <0.189 | mg/kg | <0.0000189 % | | <LOD |
| 9 | molybdenum { molybdenum(VI) oxide } | 042-001-00-9 | 215-204-7 | 1313-27-5 | | 3.52 | mg/kg | 1.5 | 4.753 | mg/kg | 0.000475 % | ✓ | |
| 10 | nickel { nickel sulfate } | 028-009-00-5 | 232-104-9 | 7786-81-4 | | 36.2 | mg/kg | 2.637 | 85.903 | mg/kg | 0.00859 % | ✓ | |
| 11 | selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } | 034-002-00-8 | | | | <1 | mg/kg | 2.554 | <2.554 | mg/kg | <0.000255 % | | <LOD |
| 12 | zinc { zinc sulphate } | 030-006-00-9 | 231-793-3 [1]<br>231-793-3 [2] | 7446-19-7 [1]<br>7733-02-0 [2] | | 72.7 | mg/kg | 2.469 | 161.566 | mg/kg | 0.0162 % | ✓ | |
| 13 | chromium in chromium(III) compounds { chromium(III) oxide } | | 215-160-9 | 1308-38-9 | | 9.28 | mg/kg | 1.462 | 12.207 | mg/kg | 0.00122 % | ✓ | |

| # | | Determinand | CLP index number | EC Number | CAS Number | CLP Note | User entered data | Conv. Factor | Compound conc. | Classification value | MC Applied | Conc. Not Used |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14 | | chromium in chromium(VI) compounds { chromium(VI) oxide } | 024-001-00-0 | 215-607-8 | 1333-82-0 | | <0.6 mg/kg | 1.923 | <1.154 mg/kg | <0.000115 % | | <LOD |
| 15 | | naphthalene | 601-052-00-2 | 202-049-5 | 91-20-3 | | <0.009 mg/kg | | <0.009 mg/kg | <0.0000009 % | | <LOD |
| 16 | | acenaphthylene | | 205-917-1 | 208-96-8 | | <0.012 mg/kg | | <0.012 mg/kg | <0.0000012 % | | <LOD |
| 17 | | acenaphthene | | 201-469-6 | 83-32-9 | | <0.008 mg/kg | | <0.008 mg/kg | <0.0000008 % | | <LOD |
| 18 | | fluorene | | 201-695-5 | 86-73-7 | | <0.01 mg/kg | | <0.01 mg/kg | <0.000001 % | | <LOD |
| 19 | | phenanthrene | | 201-581-5 | 85-01-8 | | <0.015 mg/kg | | <0.015 mg/kg | <0.0000015 % | | <LOD |
| 20 | | anthracene | | 204-371-1 | 120-12-7 | | <0.016 mg/kg | | <0.016 mg/kg | <0.0000016 % | | <LOD |
| 21 | | fluoranthene | | 205-912-4 | 206-44-0 | | <0.017 mg/kg | | <0.017 mg/kg | <0.0000017 % | | <LOD |
| 22 | | pyrene | | 204-927-3 | 129-00-0 | | <0.015 mg/kg | | <0.015 mg/kg | <0.0000015 % | | <LOD |
| 23 | | benzo[a]anthracene | 601-033-00-9 | 200-280-6 | 56-55-3 | | <0.014 mg/kg | | <0.014 mg/kg | <0.0000014 % | | <LOD |
| 24 | | chrysene | 601-048-00-0 | 205-923-4 | 218-01-9 | | <0.01 mg/kg | | <0.01 mg/kg | <0.000001 % | | <LOD |
| 25 | | benzo[b]fluoranthene | 601-034-00-4 | 205-911-9 | 205-99-2 | | <0.015 mg/kg | | <0.015 mg/kg | <0.0000015 % | | <LOD |
| 26 | | benzo[k]fluoranthene | 601-036-00-5 | 205-916-6 | 207-08-9 | | <0.014 mg/kg | | <0.014 mg/kg | <0.0000014 % | | <LOD |
| 27 | | benzo[a]pyrene; benzo[def]chrysene | 601-032-00-3 | 200-028-5 | 50-32-8 | | <0.015 mg/kg | | <0.015 mg/kg | <0.0000015 % | | <LOD |
| 28 | | indeno[123-cd]pyrene | | 205-893-2 | 193-39-5 | | <0.018 mg/kg | | <0.018 mg/kg | <0.0000018 % | | <LOD |
| 29 | | dibenz[a,h]anthracene | 601-041-00-2 | 200-181-8 | 53-70-3 | | <0.023 mg/kg | | <0.023 mg/kg | <0.0000023 % | | <LOD |
| 30 | | benzo[ghi]perylene | | 205-883-8 | 191-24-2 | | <0.024 mg/kg | | <0.024 mg/kg | <0.0000024 % | | <LOD |
| 31 | | polychlorobiphenyls; PCB | 602-039-00-4 | 215-648-1 | 1336-36-3 | | <0.021 mg/kg | | <0.021 mg/kg | <0.0000021 % | | <LOD |
| 32 | | tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane | 603-181-00-X | 216-653-1 | 1634-04-4 | | <0.01 mg/kg | | <0.01 mg/kg | <0.000001 % | | <LOD |
| 33 | | benzene | 601-020-00-8 | 200-753-7 | 71-43-2 | | <0.009 mg/kg | | <0.009 mg/kg | <0.0000009 % | | <LOD |
| 34 | | toluene | 601-021-00-3 | 203-625-9 | 108-88-3 | | 0.0104 mg/kg | | 0.0093 mg/kg | 0.000000936 % | ✓ | |
| 35 | | ethylbenzene | 601-023-00-4 | 202-849-4 | 100-41-4 | | <0.004 mg/kg | | <0.004 mg/kg | <0.0000004 % | | <LOD |
| 36 | | coronene | | 205-881-7 | 191-07-1 | | <0.2 mg/kg | | <0.2 mg/kg | <0.00002 % | | <LOD |
| 37 | | o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4] | 601-022-00-9 | 202-422-2 [1]<br>203-396-5 [2]<br>203-576-3 [3]<br>215-535-7 [4] | 95-47-6 [1]<br>106-42-3 [2]<br>108-38-3 [3]<br>1330-20-7 [4] | | <0.02 mg/kg | | <0.02 mg/kg | <0.000002 % | | <LOD |
| | | | | | | | | | Total: | 0.0468 % | | |

| Key | |
|---|---|
| | User supplied data |
| | Determinand values ignored for classification, see column 'Conc. Not Used' for reason |
| | Determinand defined or amended by HazWasteOnline (see Appendix A) |
| | Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration |
| **<LOD** | Below limit of detection |
| CLP: Note 1 | Only the metal concentration has been used for classification |

## Supplementary Hazardous Property Information

**HP 3(i): Flammable** "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because HP 3 can be discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

**Flam. Liq. 2; H225** "Highly flammable liquid and vapour."

Because of determinand:

toluene: (conc.: 9.36e-07%)

## Appendix A: Classifier defined and non CLP determinands

**TPH (C6 to C40) petroleum group** (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Aquatic Chronic 2 H411 , Repr. 2 H361d , Carc. 1B H350 , Muta. 1B H340 , STOT RE 2 H373 , Asp. Tox. 1 H304 , Flam. Liq. 3 H226

**arsenic compounds, with the exception of those specified elsewhere in this Annex**

CLP index number: 033-002-00-5
Description/Comments: Worst Case: IARC considers arsenic compounds Group 1; Carcinogenic to humans
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s)/Risk Phrase(s):
03 Jun 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

**barium oxide** (EC Number: 215-127-9, CAS Number: 1304-28-5)

Conversion factor: 1.117
Description/Comments: Data from C&L Inventory Database; No entries in Registered Substances Database, IARC or Pesticide Properties Database
Data source:
http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=88825&HarmOnly=no?fc=true&lang=en
Data source date: 02 Jun 2014
Hazard Statements: Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Skin Corr. 1A H314 , Acute Tox. 3 H301 , Acute Tox. 4 H302 , Acute Tox. 4 H332

**lead compounds with the exception of those specified elsewhere in this Annex (worst case)**

CLP index number: 082-001-00-6
Description/Comments: Worst Case: IARC considers lead compounds Group 1; Carcinogenic to humans; Lead REACH Consortium considers some lead compounds Carcinogenic category 1A
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s)/Risk Phrase(s):
03 Jun 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html (worst case lead compounds). Review date 29/09/2015

**chromium(III) oxide** (EC Number: 215-160-9, CAS Number: 1308-38-9)

Conversion factor: 1.462
Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Repr. 1B H360FD , Skin Sens. 1 H317 , Resp. Sens. 1 H334 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302 , Acute Tox. 4 H332

**acenaphthylene** (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 1 H310 , Acute Tox. 1 H330 , Acute Tox. 4 H302

**acenaphthene** (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 2 H411 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

**fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

- **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Skin Irrit. 2 H315 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Carc. 2 H351 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302

- **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

- **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Acute Tox. 4 H302

- **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Skin Irrit. 2 H315

- **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2 H351

- **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

- **polychlorobiphenyls; PCB** (EC Number: 215-648-1, CAS Number: 1336-36-3)

CLP index number: 602-039-00-4
Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans; POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s)/Risk Phrase(s):
29 Sep 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

- **ethylbenzene** (EC Number: 202-849-4, CAS Number: 100-41-4)

CLP index number: 601-023-00-4
Description/Comments:
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s)/Risk Phrase(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

- **coronene** (EC Number: 205-881-7, CAS Number: 191-07-1)

Description/Comments: Data from C&L Inventory Database; no entries in Registered Substances or Pesticides Properties databases; SDS: Sigma Aldrich, 1907/2006 compliant, dated 2012 - no entries; IARC – Group 3, not carcinogenic.
Data source:
http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=17010&HarmOnly=no?fc=true&lang=en
Data source date: 16 Jun 2014
Hazard Statements: STOT SE 2 H371

## Appendix B: Rationale for selection of metal species

**antimony {antimony trioxide}**

Worst case scenario

**arsenic {arsenic compounds, with the exception of those specified elsewhere in this Annex}**

Chromium VII at limits of detection. Arsenic compounds used as the next most hazardous species. No chromate present.

**barium {barium oxide}**

Chromium VII at limits of detection. Barium compounds used as the next most hazardous species. No chromate present.

**cadmium {cadmium oxide}**

Chromium VII at limits of detection. Cadmium compounds used as the next most hazardous species. No chromate present.

**copper {dicopper oxide; copper (I) oxide}**

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected.

**lead {lead compounds with the exception of those specified elsewhere in this Annex (worst case)}**

Chromium VII at limits of detection. Lead compounds used as the next most hazardous species. No chromate present.

**mercury {mercury dichloride}**

Worst case CLP species based on hazard statements/molecular weight (edit as required)

**molybdenum {molybdenum(VI) oxide}**

Worst case CLP species based on hazard statements/molecular weight (edit as required)

**nickel {nickel sulfate}**

Chromium VII at limits of detection. Nickel sulphate used as the next most hazardous species. No chromate present.

**selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}**

Harmonised group entry used as most reasonable case. Pigment cadmium sulphoselenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil. (edit as required)

**zinc {zinc sulphate}**

Chromium VII at limits of detection. Zinc sulphate used as the next most hazardous species. No chromate present.

**chromium in chromium(III) compounds {chromium(III) oxide}**

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass (edit as required)

**chromium in chromium(VI) compounds {chromium(VI) oxide}**

Worst case CLP species based on hazard statements/molecular weight. Industrial sources include: production stainless steel, electroplating, wood preservation, anti-corrosion agents or coatings, pigments (edit as required)

## Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2019.152.3882.7895 (01 Jun 2019)
HazWasteOnline Database: 2019.152.3882.7895 (01 Jun 2019)

This classification utilises the following guidance and legislation:
**WM3 v1.1 - Waste Classification** - 1st Edition v1.1 - May 2018
**CLP Regulation** - Regulation 1272/2008/EC of 16 December 2008
**1st ATP** - Regulation 790/2009/EC of 10 August 2009
**2nd ATP** - Regulation 286/2011/EC of 10 March 2011
**3rd ATP** - Regulation 618/2012/EU of 10 July 2012
**4th ATP** - Regulation 487/2013/EU of 8 May 2013
**Correction to 1st ATP** - Regulation 758/2013/EU of 7 August 2013
**5th ATP** - Regulation 944/2013/EU of 2 October 2013
**6th ATP** - Regulation 605/2014/EU of 5 June 2014
**WFD Annex III replacement** - Regulation 1357/2014/EU of 18 December 2014
**Revised List of Wastes 2014** - Decision 2014/955/EU of 18 December 2014
**7th ATP** - Regulation 2015/1221/EU of 24 July 2015
**8th ATP** - Regulation (EU) 2016/918 of 19 May 2016
**9th ATP** - Regulation (EU) 2016/1179 of 19 July 2016
**10th ATP** - Regulation (EU) 2017/776 of 4 May 2017
**HP14 amendment** - Regulation (EU) 2017/997 of 8 June 2017
**13th ATP** - Regulation (EU) 2018/1480 of 4 October 2018
**POPs Regulation 2004** - Regulation 850/2004/EC of 29 April 2004
**1st ATP to POPs Regulation** - Regulation 756/2010/EU of 24 August 2010
**2nd ATP to POPs Regulation** - Regulation 757/2010/EU of 24 August 2010

# Appendix 6

# Survey Data

# Survey Data

| Location | Irish Transverse Mercator | | Elevation | Irish National Grid | |
|---|---|---|---|---|---|
| | Easting | Northing | | Easting | Northing |
| **Boreholes** | | | | | |
| BH01 | 716173.833 | 748313.669 | 32.86 | 316248.146 | 248290.467 |
| BH02 | 716186.310 | 748346.488 | 31.64 | 316260.625 | 248323.293 |
| BH03 | 716201.741 | 748380.797 | 30.79 | 316276.059 | 248357.610 |
| BH04 | 716199.256 | 748431.387 | 29.65 | 316273.573 | 248408.211 |
| BH05 | 716170.019 | 748448.030 | 29.46 | 316244.330 | 248424.857 |
| BH06 | 716227.020 | 748511.910 | 26.94 | 316301.342 | 248488.751 |
| BH07 | 716243.645 | 748621.941 | 23.57 | 316317.970 | 248598.806 |
| BH08 | 716256.475 | 748690.585 | 20.91 | 316330.802 | 248667.465 |
| BH09 | 716287.706 | 748869.142 | 18.34 | 316362.038 | 248846.061 |
| BH10 | 716331.869 | 748840.936 | 18.54 | 316406.210 | 248817.849 |
| BH11 | 716392.764 | 748754.806 | 17.57 | 316467.119 | 248731.701 |
| BH12 | 716448.979 | 748663.363 | 18.00 | 316523.347 | 248640.238 |
| BH13 | 716363.054 | 748603.479 | 22.06 | 316437.404 | 248580.341 |
| **Trial Pits** | | | | | |
| TP01 | 716487.904 | 748655.913 | 17.02 | 316562.281 | 248632.787 |
| TP02 | 716440.612 | 748689.188 | 16.51 | 316514.978 | 248666.069 |
| TP03 | 716438.671 | 748638.308 | 19.04 | 316513.037 | 248615.178 |
| TP04 | 716414.104 | 748697.864 | 16.89 | 316488.464 | 248674.747 |
| TP05 | 716430.514 | 748728.368 | 16.27 | 316504.878 | 248705.257 |
| TP06 | 716399.085 | 748727.592 | 17.39 | 316473.442 | 248704.481 |
| TP07 | 716410.670 | 748766.653 | 17.33 | 316485.029 | 248743.550 |
| TP08 | 716388.911 | 748784.825 | 18.00 | 316463.265 | 248761.726 |
| TP09 | 716373.983 | 748731.567 | 17.85 | 316448.335 | 248708.457 |
| TP10 | 716356.264 | 748794.276 | 18.54 | 316430.611 | 248771.179 |
| TP11 | 716353.395 | 748825.420 | 18.39 | 316427.741 | 248802.330 |
| TP12 | 716300.535 | 748834.757 | 18.90 | 316374.870 | 248811.668 |
| TP13 | 716260.724 | 748800.659 | 19.30 | 316335.051 | 248777.563 |
| TP14 | 716317.031 | 748767.699 | 18.75 | 316391.370 | 248744.596 |
| TP15 | 716255.273 | 748746.026 | 19.00 | 316329.599 | 248722.918 |
| TP16 | 716324.058 | 748719.507 | 18.26 | 316398.399 | 248696.394 |
| TP17 | 716290.650 | 748715.769 | 19.49 | 316364.984 | 248692.655 |
| TP18 | 716342.446 | 748696.355 | 18.84 | 316416.791 | 248673.237 |
| TP19 | 716367.785 | 748666.198 | 19.73 | 316442.136 | 248643.073 |
| TP20 | 716337.273 | 748662.233 | 20.42 | 316411.617 | 248639.107 |
| TP21 | 716377.279 | 748605.280 | 21.71 | 316451.632 | 248582.142 |
| TP22 | 716302.365 | 748636.517 | 22.02 | 316376.702 | 248613.386 |
| TP23 | 716266.448 | 748652.449 | 22.11 | 316340.777 | 248629.321 |
| TP24 | 716231.411 | 748696.705 | 21.08 | 316305.733 | 248673.586 |
| TP25 | 716219.839 | 748622.510 | 24.15 | 316294.159 | 248599.375 |
| TP26 | 716241.971 | 748643.520 | 22.73 | 316316.295 | 248620.390 |
| TP27 | 716269.330 | 748608.685 | 23.47 | 316343.660 | 248585.547 |
| TP28 | 716242.182 | 748582.076 | 25.18 | 316316.507 | 248558.932 |

# Survey Data

| Location | Irish Transverse Mercator | | Elevation | Irish National Grid | |
|---|---|---|---|---|---|
| | Easting | Northing | | Easting | Northing |
| TP29 | 716305.130 | 748611.372 | 23.58 | 316379.468 | 248588.235 |
| TP30 | 716294.195 | 748561.395 | 25.04 | 316368.531 | 248538.247 |
| TP31 | 716211.618 | 748584.607 | 25.91 | 316285.936 | 248561.464 |
| TP32 | 716233.523 | 748550.545 | 26.34 | 316307.846 | 248527.395 |
| TP33 | 716269.975 | 748552.133 | 25.43 | 316344.306 | 248528.983 |
| TP34 | 716192.929 | 748510.478 | 29.42 | 316267.244 | 248487.319 |
| TP35 | 716220.972 | 748495.365 | 28.88 | 316295.293 | 248472.203 |
| TP35A | 716226.269 | 748493.202 | 28.90 | 316300.591 | 248470.039 |
| TP36 | 716167.412 | 748460.628 | 29.38 | 316241.722 | 248437.458 |
| TP37 | 716212.617 | 748434.663 | 29.12 | 316286.937 | 248411.487 |
| TP38 | 716206.729 | 748385.328 | 30.43 | 316281.048 | 248362.142 |
| TP39 | 716179.600 | 748389.142 | 30.92 | 316253.914 | 248365.956 |
| TP40 | 716190.650 | 748345.002 | 32.20 | 316264.966 | 248321.807 |
| TP41 | 716145.700 | 748341.706 | 32.17 | 316220.007 | 248318.510 |
| **Soakaways** | | | | | |
| SA01 | 716156.205 | 748433.899 | 31.66 | 316230.513 | 248410.723 |
| SA02 | 716232.482 | 748536.195 | 26.56 | 316306.805 | 248513.041 |
| SA03 | 716285.525 | 748705.152 | 19.91 | 316359.858 | 248682.035 |
| SA04 | 716327.695 | 748776.319 | 18.75 | 316402.036 | 248753.218 |
| SA05 | 716350.282 | 748721.286 | 17.99 | 316424.629 | 248698.173 |
| SA06 | 716447.087 | 748682.206 | 16.12 | 316521.455 | 248659.085 |
| **California Bearing Ratio tests** | | | | | |
| CBR01 | 716135.149 | 748322.301 | 33.24 | 316209.454 | 248299.101 |
| CBR05 | 716176.858 | 748423.197 | 29.92 | 316251.171 | 248400.019 |
| CBR06 | 716173.387 | 748468.453 | 29.36 | 316247.698 | 248445.284 |
| CBR07 | 716195.504 | 748443.952 | 29.68 | 316269.820 | 248420.778 |
| CBR08 | 716228.398 | 748430.589 | 28.67 | 316302.722 | 248407.413 |
| CBR09 | 716246.439 | 748501.985 | 26.83 | 316320.766 | 248478.824 |
| CBR10 | 716191.946 | 748518.024 | 29.58 | 316266.261 | 248494.866 |
| CBR13 | 716208.921 | 748599.441 | 25.38 | 316283.239 | 248576.301 |
| CBR15 | 716257.640 | 748644.859 | 22.48 | 316331.968 | 248621.729 |
| CBR17 | 716329.117 | 748592.228 | 24.15 | 316403.460 | 248569.087 |
| CBR18 | 716335.098 | 748638.940 | 21.70 | 316409.442 | 248615.809 |
| CBR23 | 716244.296 | 748723.792 | 20.81 | 316318.620 | 248700.679 |
| CBR24 | 716258.830 | 748770.348 | 19.48 | 316333.157 | 248747.245 |
| CBR25 | 716290.888 | 748755.859 | 19.20 | 316365.222 | 248732.753 |
| CBR26 | 716308.219 | 748742.060 | 18.96 | 316382.556 | 248718.951 |
| CBR30 | 716436.941 | 748713.604 | 15.45 | 316511.306 | 248690.490 |
| CBR32 | 716376.589 | 748806.303 | 18.12 | 316450.940 | 248783.209 |
| CBR35 | 716304.232 | 748865.656 | 18.31 | 316378.567 | 248842.574 |
| CBR36 | 716278.329 | 748846.540 | 18.45 | 316352.659 | 248823.454 |

Legend Key

- Locations By Type - CP
- Locations By Type - ICBR
- Locations By Type - IP
- Locations By Type - TP


| | |
|---|---|
| Contract No: | 5599 |
| Contract Name: | Millers Glen - Phase 5 |
| Location: | Swords, Co. Dublin |
| Client: | Gannon Homes Ltd |
| Engineer: | Waterman Moylan |
| Title: | Site Plan |
| Scale: | 1:3250 |
| Drawn By: | SL |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# UK and Ireland Office Locations