Construction Environmental Management Plan

Proposed Development at New Road, Donabate, Co. Dublin

April 2024

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

Client Name:	Fingal County Council
Document Reference:	23-129r.005 Construction Environmental Management Plan
Project Number:	23-129

Quality Assurance – Approval Status

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

Issue	Date	Prepared by	Checked by	Approved by
1	04 April 2024	Lai Shan Lai	Mark Duignan	Mark Duignan
2	04 April 2024	Lai Shan Lai	Mark Duignan	Mark Duignan

Comments

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Content

Figures

Tables

Appendices

1. Introduction

Waterman Moylan in conjunction with the Project Design Team have prepared the following Preliminary in Nature Subject to Contractor Appointment, Agreed Construction Methodology, which is to accompany the design pack, for the implementation of the construction of the proposed development at New Road, Donabate, Co. Dublin.

This report outlines details, some of which are included in the reports of the wider project design team including the Project Ecologist; Enviroguide, Project Archaeologist; Rubicon Heritage, and Project Arborist; Charles McCorkell. This report should be read in conjunction with their work and should not be construed as a full amalgamation of other specialists' reports.

This document sets out the typical and site/project specific arrangements and measures that are required to be implemented during the construction stage of the project for environmental protection. The measures recorded in this report will be fully incorporated by the Contractor, whom will be required to develop and implement the Construction Environmental Management Plan on site.

This management plan should not be construed as representing the exact method or sequence in which the construction works shall be carried out.

In advance of work starting on site, the works Contractor will prepare a detailed Construction Environmental Management Plan (CEMP). The detailed CEMP will set out the overarching vision of how the construction of the proposed development will be managed in a safe and organised manner by the Contractor. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works, and all planned works by the Contractor will be in compliance with the CEMP. It will set out requirements and standards which must be met during the construction stage and will include the relevant methods and mitigation measures outlined in this report, the reports of other specialists, and any subsequent planning conditions relevant to the proposed development.

As a minimum, the CEMP will be formulated in accordance with best international practice including but not limited to:

- CIRIA, (2001), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors;
- Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (C650), 2005;
- BPGCS005, Oil Storage Guidelines;
- Eastern Regional Fisheries Board, (2006), Fisheries Protection Guidelines: Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites;
- CIRIA 697, The SUDS Manual, 2007; and
- UK pollution Prevention Guidelines (PPG) UK Environment Agency, 2004

This CEMP is submitted to outline the mitigation measures and construction methodologies which will be implemented during the construction period. The CEMP is, of course, a live document and will be updated by the Main Contractor, once appointed, prior to and during the course of construction to take account of any conditions imposed as part of the consent received as well as conditions on-site as the construction progresses.

The Main Contractor will also prepare the project's Environmental Emergency Response Procedures (or incorporate this as part of the Construction Environmental Management Plan or Construction Management Plan). While a separate document to the Construction Environmental Management Plan, there is a considerable subject overlap between the documents.

2. Surrounding Environs and the Proposed Site

The site is located at New Road, Donabate, Co. Dublin which forms its southern boundary, and is c. 140m west of the R126. It is bound to the west by the St. Patricks Park residential development, to the north by the Ballymastone residential development which is currently under construction and separated by a ditch system, and to the east by the new Lanestown View residential development.

The site is approx. 4.72ha in area and is currently greenfield in nature.

Topographically, the site is relatively flat, and has a high point of 9.11m OD at the site boundary on the back of footpath on the north side of New Road approx. 24m west of the existing site entrance. The site typically slopes down to the north where a ditch is located and generally falls to the east. Part of this ditch has been filled in by the adjacent Ballymastone development to the north.

Surface water from the site discharges to the northern boundary ditch which flows eastwards along the northern boundary of Lanestown View, under the Donabate Road and to the Donabate Golf Club ditch system before ultimately discharging to the Irish Sea.

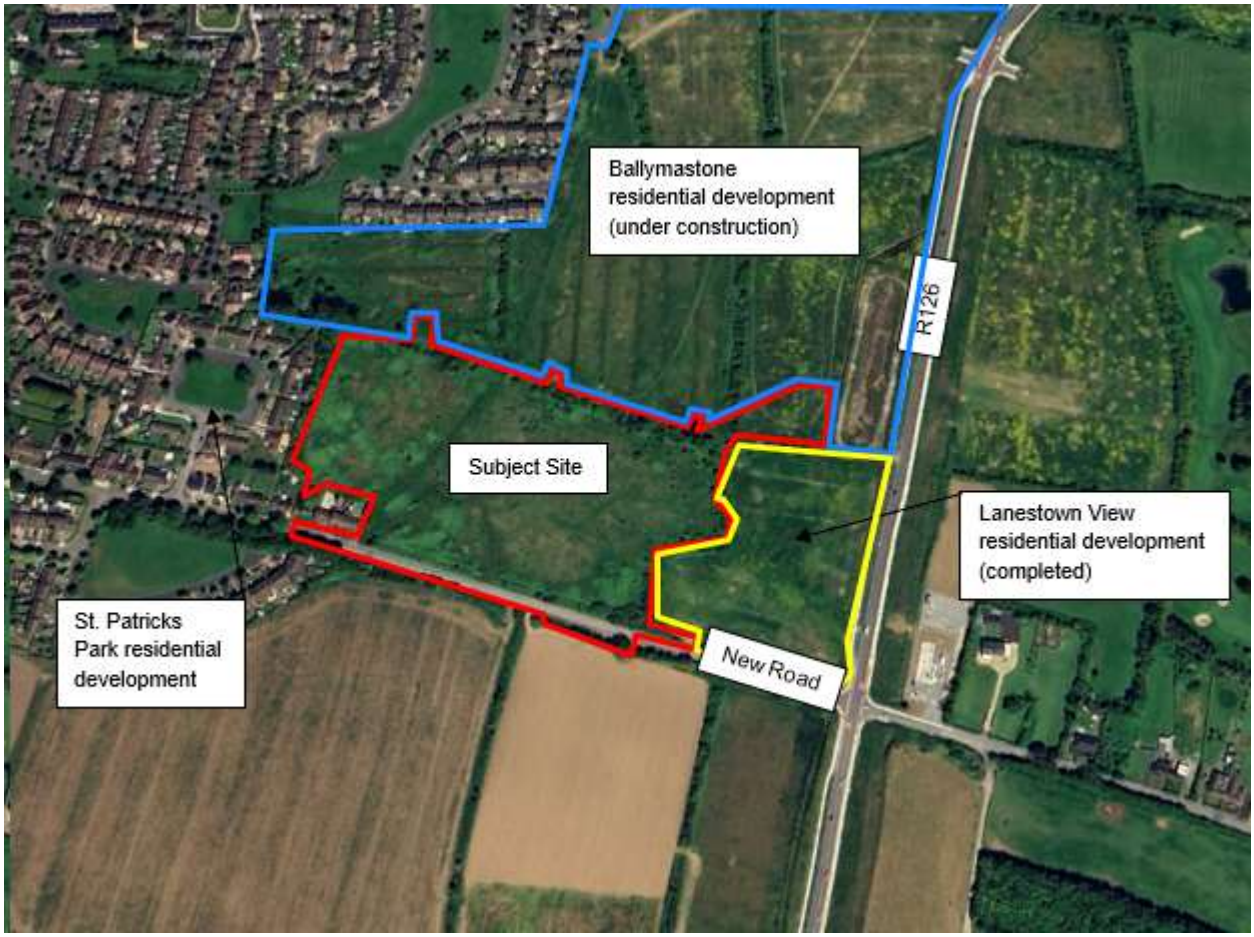


Figure 1 | *Site Location (Source: Google Earth)*

2.1 Proposed Subject Development

The subject development's site plan is as shown in *Figure 2*.

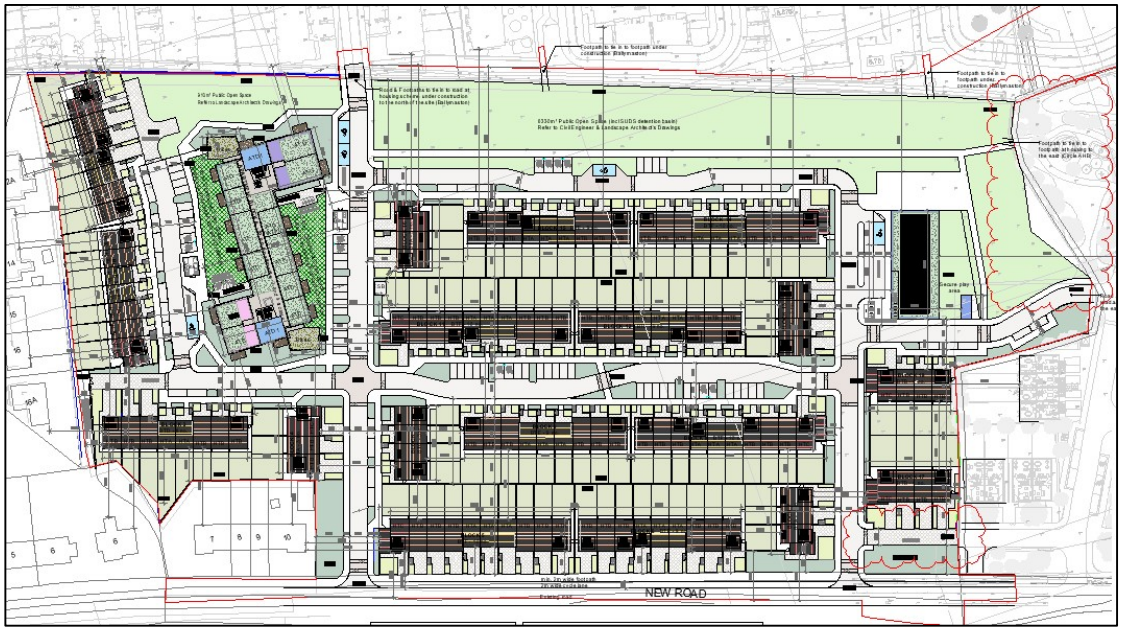


***Figure 2** | Proposed Subject Development Layout*

The proposed development will consist of a total of 175 No. residential units, comprising 123 No. Houses & 52 No. Apartments units. A 4-room crèche with ancillary rooms is also proposed as per the schedule of accommodation below.

Description	1-Bed	2-Bed	3-Bed	4-Bed	Total	Total Area
Houses	-	30	82	11	123	9,217.2 m^2
Apartments	26	20	6	-	52	4,674.8 m^2
Crèche					1	365 m^2
Total	26	50	88	11	176	14,248 m^2

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

The development includes all associated site works, undergrounding of overhead lines, boundary treatments, drainage, and service connections.

3. General Site Set Up and Pre-Commencement Measures

A detailed condition survey (including photographs) will be carried out on the boundaries surrounding the site. The purpose of the survey is to record the condition of the road and footpath networks, hedgerows, and watercourses around the site prior to the works commencing.

Prior to any site works commencing, the main contractor will meet on site and liaise with the project arborist; Charles McCorkell Arboricultural Consultancy & project ecologist; Enviroguide, to identify items (trees, hedgerows, watercourses etc.) to be preserved and maintained, and other ecological sensitivities can be reviewed. These will be identified on site and protective fencing erected to the separation requirements of the arborist/ecologist, as further discussed in Section 5. Mitigation measures detailed throughout this report will also be agreed by programme. The project archaeologist; Rubicon Heritage Services Ltd., has appointed to prepare the Archaeological, Architectural and Cultural Heritage Impact Assessment Report.

4. Site Security and Hoarding Lines

Hoarding lines and site security will be set up within the development site as required.

Internal fencing will protect Arboricultural/Environmental features as discussed in the following chapter. This fencing is also specified to extend to include root protection zones or areas (RPZ/RPA). It should also be further noted that there may be the requirement to trim some hedges/trees prior to protective fencing being erected, this is to be coordinated with the arborist.

5. Environmental Management for Site Preparation and Construction

The following chapter notes some of the issues, actions, and mitigation measures to be undertaken by the Main Contractor as part of site preparation and during construction works.

A programme will be agreed between the Main Contractor, Project Ecologist & Project Arborist, for undertaking the works specific to their expertise, and implementation of mitigations measures, and arranging of supervision if required, before commencement of any works on site.

5.1 Arborist Exclusion Zone & Site Preparation

The tree survey report has been produced by Charles McCorkell Arboricultural Consultancy. The report advises that the survey commenced on January 31st, 2024, and identified 21 No. trees and 11 No. hedgerows. The assessment advises that the 2 No. trees Category C1 (Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories, the 12 No. trees are Category C2 (low quality trees, trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits). The 7 No. trees are Category U (very low-quality trees, those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years) which corresponds to trees to be removed due to poor condition, respectively. The 11 No. of hedgerows are Category C2(Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits).

5.2 Ecologist Exclusion Zone & Site Preparation

The project ecologist Enviroguide has provided an Ecological Impact Assessment, which is submitted under a separate cover. The Site is comprised of predominantly rank grassland, with pockets of bramble scrub throughout, and linear vegetation/hedgerow habitat, comprised of species such as young ash and hawthorn with dense areas of ivy, along the south and west boundaries of the Site. Sycamore was found on-site and is technically invasive species.

The relatively shallow drainage ditch along the west boundary was mostly unvegetated, and appeared to slowly flow south to north for approx. 110m. This ditch offers limited habitat to local amphibian species.

The Site does not offer roosting habitat for bats, but may offer limited foraging/commuting habitat, however its usage may be further limited due to the fragmented nature of the Site from other suitable bat habitats within the surrounding landscape.

The bird species recorded on Site were common garden bird species, such as robin, blue tit, great tit, chaffinch, wren, blackbird, and starling. The Site would not be considered to offer ex-situ habitat to the wading birds associated with nearby SPAs due to the varying heights of the sward and scrub on Site, which is typically unsuitable habitat for species such as Brent geese.

No signs of rare or protected mammals were recorded on Site. Small mammal trails were observed throughout, with evidence of rabbit and domestic cat recorded. Small burrows, also likely rabbit, were recorded.

5.3 Archaeological Environment

The project Archaeologists, Rubicon Heritage Services Ltd., have provided the Archaeological Testing Report submitted under a separate cover. The site has identified 28 sites of archaeological, and/or cultural heritage significance within the defined study area. These sites include eight RMPs (CH001-CH008), nine National Inventory of Architectural Heritage (NIAH) registrations, four of which are also protected structures (CH009 and CH017) five townland boundaries (CH018-CH022), and six previous archaeological excavations (CH023-CH028).

The proposed development site overlies or crosses five townland boundaries (CH018-CH022) and will have a permanent, localised direct impact on the boundaries.

The proposed development may have a direct impact on CH001; DU012-088----an enclosure, or features associated with this monument. This enclosure has no above ground expression. The marked location of this monument is 10m outside the application boundary, though examination of a preceding geophysical survey suggests the monuments is located immediately adjacent to the proposed development boundary. This monument was subject to geophysical survey (Licence No. 05R012) and test excavation (Licence No. 07E0650) to inform the Donabate Local Area Plan. However, the proposed development site was only partially subject to the geophysical survey at the time as the site was overgrown. The results of the adjacent Geophysical survey suggest that DU012-088---- or associated feature may extend to the proposed development site. The proposed development site crosses the statutory zone of notification for DU012-088----.

5.4 Site Clearance & Preparation

Prior to construction work the site clearance groundworks will need to be undertaken. This will involve the scraping and stockpiling of topsoil.

5.4.1 Demolition Phase

None expected.

5.4.2 Topsoil

The project archaeologist has recommended that the scraping of topsoil be supervised by a suitably qualified archaeologist.

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

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

Topsoil will be stored in stockpiles less than two metres in height as otherwise the soil matrix (internal structure) can be damaged beyond repair. It will 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.

The finished levels on site need to be raised by up to 1.5m above existing ground levels. As such the volume of excavation will be minimal. It is proposed to reuse any excavated topsoil (S.I notes 0.2m to 0.3m topsoil across the site as per the Site Investigation report).

Assuming that 70% of the site area (c. 42,760m2) will need to be topsoil stripped, it will generate c. 5,986m3 to 8,979m3 of topsoil. It is proposed to reuse all of the stripped topsoil on site.

In the unlikely case of a topsoil surplus the Contractor will carry out appropriate environmental chemistry testing in order to determine the waste classification of the soils that are to be excavated and that will include Waste Acceptance Criteria testing. The test regime will be agreed with the receiving landfill operator, if not suitable for an Article 27 transfer, and the testing will be carried out by an accredited laboratory.

Records of topsoil storage, movements and transfer from site will be kept by the C&D Waste Manager. It is projected that all the topsoil will be reused on-site for landscaping purposes in both private residential gardens and public green areas.

5.4.3 Subsoil and excavations

Practical measures have been implemented during the design process to ensure that cut and fill volumes generated have been kept to a minimum by ensuring proposed road and building levels match existing ground levels, however, it is anticipated that the finished development levels will be c. 1.5m higher than the existing levels.

The Site Investigation Reports (S.I. Report) included as Appendix A, has shown that the sites is composed of stratified layers of topsoil, cohesive deposits (brown sandy gravelly clays), and bedrock. Made ground has also been identified on the sites and these deposits are typically composed of brown slightly sandy slightly gravelly clay with occasional cobbles and contained occasional fragments of concrete, red brick, glass, rope, timber, ceramic, metal, and plastic.

Excavated soils to be disposed of will be referenced against the Waste Classification Report also included as part of Appendix A.

With the implementation of practical design measures, the requirement for fill material during the course of construction of the development has been reduced as far as possible. In order to optimise the impact of the generation of excavated material the following principles have been considered during the detail design and construction phase:-

- The quantity of excavated materials to be removed from or imported to the site has been greatly reduced, by establishing levels of the proposed buildings and roads which optimise the volume of cut and fill.
- Surplus subsoil excavated from the site will be reviewed for possible reuse as engineering fill.
- Surplus unsuitable sub-soils generated by excavations on site will be reviewed for reuse as landscaping or non-engineering fills on site.
- 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.

It has been preliminarily estimated that the infrastructure and groundworks will generate c. 3,200m3 of subsoil. It is noted that approximately 90% of the roads, paths and buildings will be constructed above the

level of subsoil so it is estimated that only 10% of the roads, paths and buildings will generate c. 2,100m3 of subsoil. In addition it is also estimated that c. 1,100m3 will be generated by drainage construction.

All excavated subsoil will be stored on site in the spoil heap/stockpile area of the construction compound as per the Proposed Construction Compound Layout Plan. The Landscaping Plan has been optimised to ensure that cut materials will be incorporated to the site as part of the final reinstatement and regrading works including future phases to minimise the requirement for offsite disposal. Please refer to the Landscape Architects reports and drawings in this regard.

The excavation of soil can lead to dust pollution. Methods and mitigation measures for this topic are discussed in Chapter 8 of this report.

As discussed later in Chapter 7, there has been invasive species identified on site. Vehicular movements present an opportunity for invasive species to be exported from site, and for further species to be introduced. All vehicles entering the site will be inspected so as to ensure they are free from muck/dirt which may carry invasive species. No importation of soil type materials to the site is permitted without an Article 27 notification having been approved by the EPA.

6. Watercourse Management

There is no direct hydrological connectivity from the sites to natural watercourses or surface water networks. There is potential for an indirect hydrological connectivity to the local surface water drainage network, whereby during heavy rainfall events, surface water from the sites flows over the site boundary to the road gullies on the adjacent streets.

The most likely potential sources of contamination to the local surface water network are from silt and suspended particles, and from chemical compounds entering these networks as surface water runoff.

Silt and suspended particles may arise from surface runoff from stockpiled materials or from the pumping of water volumes in excavations.

Chemical contamination can result due to fuel/chemical leaks and spills.

Spoil heap/stockpiles will not be located within 20m of the existing surface water networks. Spoil heaps/stockpiles will be considered for seeding if their storage is likely to be longer than a few seasons. Drainage diversion ditches will be constructed between the stockpile area and local surface water networks. This drainage ditch will flow to a sedimentation/settlement pond prior to outfalling to the surface water network. A Discharge Licence will be obtained from the local Authority by the Main Contractor. If topography doesn't allow for a gravity outfall from the sedimentation/settlement pond, a commercially available modular settlement tank will be utilised for the project, or outfall volumes may instead be pumped. Untreated surface water will not be permitted to flow to any natural or piped surface water network.

Further details on method statements and mitigation measures against pollutant run-off is located in Chapter 11 of this report.

7. Construction Stage

The mitigation measures as specified by the project arborist of this report will be regularly monitored for compliance. Fencing of the RPAs will be maintained and unmoved from its original installation location.

The following method statements and mitigation measures, as well as those discussed previously, will be subject to frequent reviews and inspections to ensure they are working or will work as intended.

Further methods to reduce and eliminate environmental risks at construction phase, post site preparation phase, are discussed in the following chapters of this report. As noted previously, these details are compiled from various reports and drawings of the wider design team. Full consideration will be given to these other documents by the main contractor when preparing their Construction Environmental Management Plan.

7.1 Earthworks and Dust Suppression

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 airborne, since suppression is virtually impossible once it has become airborne.

The following are techniques and methods which are widely used currently throughout the construction industry, and which will be used in the 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 will 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 will be cleaned by hand regularly, with damping, as necessary.
4. High level walkways and surfaces such as scaffolding will be cleaned regularly using safe ‘wet’ methods, as opposed to dry methods.
5. Vehicle waiting areas or hard standings will be regularly inspected and kept clean by brushing or vacuum sweeping and will be regularly sprayed to keep moist, if necessary.
6. Vehicle and wheel washing facilities will be provided at the site exit(s). If necessary, vehicles will be washed down before exiting the site.
7. Netting will be provided to enclose scaffolding in order to mitigate escape of airborne dust from the new buildings.

8. Vehicles and equipment will not emit black smoke from exhaust system, except during ignition at start up.
9. Engines and exhaust systems will 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 will be carried out regularly, rather than just following breakdowns.
11. Internal combustion plant will not be left running unnecessarily.
12. Exhaust direction and heights will be such as not to disturb dust on the ground and to ensure adequate local dispersal of emissions.
13. Fixed plant such as generators will be located away from residential areas.
14. 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.
15. The transport of dusty materials and aggregates will be carried out using covered / sheeted lorries.
16. Material handling areas will be clean, tidy, and free from dust.
17. Vehicle loading will be dampened down and drop heights for material to be kept to a minimum.
18. Drop heights for chutes / skips will be kept to a minimum.
19. Dust dispersal over the site boundary will be minimised using static sprinklers or other watering methods, as necessary.
20. Stockpiles of materials will be kept to a minimum and if necessary, they will be kept away from sensitive receptors such as residential areas etc.
21. Stockpiles where necessary, will be sheeted or watered down.
22. Methods and equipment will be in place for immediate clean-up of spillages of dusty material.
23. No burning of materials will be permitted on site.
24. Earthworks excavations will be kept damp where necessary and where reasonably practicable.
25. Cutting on site will be avoided where possible by using pre-fabrication methods.
26. Equipment and techniques for cutting / grinding / drilling / sawing / sanding etc, which minimise dust emissions and which have the best available dust suppression measures, will be employed.
27. Where scabbling is to be employed, tools will be fitted with dust bags, residual dust will be vacuumed up rather than swept away, and areas to be scabbled will be screened off.
28. Wet processes will be used to clean building facades if possible. If dry grit blasting is unavoidable, then areas of work will be sealed off and dust extraction systems used.
29. Where possible pre-mixed plasters and masonry compounds will be used to minimise dust arising from on-site mixing.
30. Prior to commencement, the main contractor will identify the construction operations which are likely to generate dust and to draw up action plans to minimise emissions. Furthermore, the main

contractor will prepare environmental risk assessments for all dust generating processes, which are envisaged.

31. The main contractor will allocate suitably qualified personnel to be responsible for ensuring the generation of dust is minimised and effectively controlled.
32. Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced road, the limit shall be 20 kph, and on surfaced roads as site management dictates.

7.2 Lighting During Construction (and Operational Phase)

- Construction phase lighting will be controlled to minimise light pollution as a matter of good practice. Controls will include implementations of lights out hours when construction is not active on site.
- Operational phase lighting at night will only be used when necessary and will be directed/cowled and at a low level where possible. Illumination of surrounding tree canopies will be avoided wherever practicable.

7.3 Noise/Vibration

The contractor will meet the requirements of the Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition, which 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.

Environmental Noise Mitigation Measures:

General Considerations:

1. All site staff will be briefed on noise mitigation measures and the application of best practicable means to be employed to control noise.
2. Site hoarding will be erected to maximise the reduction in noise levels.
3. The contact details of the Main Contractor and site manager will be displayed to the public, together with the permitted operating hours, including any special permissions given for out of hours work.
4. In the event that the Main Contractor gets a complaint about noise from a neighbour he or she will act immediately to remedy the situation.
5. The site entrance will be located to minimise disturbance to noise sensitive receptors.
6. Internal haul routes will be maintained, and steep gradients will be avoided.
7. Material and plant loading and unloading will only take place during normal working hours unless the requirement for extended hours is for traffic management (i.e. road closure) or health and safety reasons (advance notification, or possibly an application to the local council would be required if proposing to work outside non-typical hours).
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 will 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 banks-men.
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 will take place to ensure that adjoining roads are kept clean of dirt and debris. Regular washing of adjoining streets will also take place as required by road sweepers.

Demolition Phase (not expected):

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:

1. The following hierarchy of groundwork/piling methods will be used if ground conditions, design and safety allow;
    - Pressed in methods, e.g., hydraulic jacking
    - Auger/bored piling
    - Diaphragm walling
    - Vibratory piling or vibro-replacement
    - Driven Piling or dynamic consolidation
2. The location and layout of the piling plant will 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 will 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 will include;
    - Hours of work
    - Presence of mitigation measures
    - Number and type of plant
    - Construction methods
2. In the event that the Main Contractor gets a complaint about noise from a neighbour he or she 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 Strategy will 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 will be briefed on the complaints procedure and mitigation requirements and their responsibilities to register and escalate complaints received.

   Where appropriate, a resident monitoring committee will be established for the duration of the project in order to promote best construction management and considered construction practices to protect the amenities of adjacent properties as provided in Section 15.18.1 of the Development Plan.

Section 15.18.1.2 of the same documents advise that': "Considered Construction seeks to improve the image of the construction industry which requires registered contractors to commit to care about appearance, respect the community, protect the environment, secure everyone's safety and value their workforce. Fingal County Council will support the provision of considered construction in all design pack. Commitment to the scheme should be identified as part of the Construction Management Plan submitted with design pack."

7.4 Spills and Leaks

Spills and leaks may contaminate soil, groundwater, and surface water networks via surface run-off. Method statements and mitigation measures reduce the potential for leaks and spills and limit their impact should they occur. As any potential leaks and spills are likely to be from storage containers to the surface of the ground, the associated methods and measures are discussed in Chapter 11 of this report however, these measures nonetheless also provide protection to the soils and groundwater.

8. Construction Waste Management

Construction waste management is discussed in full in the Resource & Waste Management Plan Report prepared by AWN Consulting and is submitted under a separate cover. This report details the requirements of the Main Contractor in order to minimise and mitigate any environmental impacts from the waste streams generated on-site during the construction phase of the project.

9. Ground Water

The excavations for the drainage pipes, water supply, utilities, and foundations have been designed to be as shallow as possible in order to reduce excavation depths. Careful attention will be required to maintain the excavations clear of ground water.

A discharge licence will be required for all water pumped from the excavations to any public water course or sewer.

All water pumped from the excavations will require to be treated for silt and deleterious matter. 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. Further details on Pollution and Sediment control are contained in the following chapter.

Method statements and mitigation measures against groundwater contamination are discussed in the following Chapter.

10. Runoff Pollution and Sediment Control

10.1 Runoff Pollution Control

Significant quantities of waste and potential pollutants can be generated during construction. Controls will be put in place to prevent these pollutants from washing into the local watercourse network during storm events.

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

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

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

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

4. Runoff from the above should only be routed to the watercourse via suitably designed and sited settlement ponds/filter channels. If topography doesn't allow for this, commercially available modular settlement tanks will be utilised. Untreated runoff will not be permitted to enter the natural watercourse.

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 2* below for a list and brief description of pollution prevention measures.

Source	**Action**
Detergents	Use of detergents will be carried out in designated areas draining to the construction stage foul sewer.
Fuel/Oil	Fuel/oil stores must be located away from the site drainage system and the edge of watercourses.
Fuel/Oil	Ensure adequate measures are identified to prevent or contain any spillage such as creating a fall away from any drainage grid or blocking drainage points.
	Prevent oil pollution by • Suitable bunded storage of fuel/oil (roofed to exclude rainwater), and use of drip trays under plant, and • An oil separator, and/or

	• On-site spill-kit • Commercially available absorbent granules, pads, or booms. • Refuel plant in designated bunded areas only
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 20m 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 will 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 will 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 will be carried out in a designated, impermeable contained area. The washout water itself should be disposed of off-site, or discharged to the construction stage foul sewer if authorised.

***Table 2** | Pollution Protection Measures*

Guidelines such as “Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors” (CIRIA 532, 2001) will be complied with.

Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility offsite.

In the case of drummed fuel or other chemicals which may be used during construction, containers will be stored in a dedicated internally bunded chemical storage cabinet and labelled clearly to allow appropriate remedial action in the event of a spillage.

Emergency response procedures will be outlined in the detailed CEMP. All personnel working on the site will be suitably trained in the implementation of the procedures.

10.2 Sediment Control

Construction runoff can be heavily laden with silt which can block road gullies and reduce the hydraulic capacity in pipes and watercourses, 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 will be implemented on-site to mitigate these issues.

Sediment basins and traps will be installed before any major site grading takes place. Should topography not permit for this, commercially available modular settlement tanks will be employed. Untreated surface runoff will not be permitted to enter the natural watercourses. Additional sediment traps and silt fences will be installed as grading takes place to keep sediment contained on site at appropriate locations.

Key runoff-control measures will 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 will be installed above the areas to be disturbed before any grading operations. Any perimeter drains will be installed with stable outlets before opening major areas for development. Any additional facilities needed for runoff control will 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 will be installed early and used to convey stormwater run-off through the development site without creating gullies or channels. Inlet protection for storm drains will be installed 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. Outlet protection will be installed at the same time as the conveyance system to prevent damage to the receiving watercourse.

During the final stages of construction unstable sediment from sediment basins and traps will be removed and if possible incorporated into the topsoil, not just spread on the surface.

10.2.1 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 will 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.

Settlement tank

Commercially available settlement tanks, also known as sediment tanks, have compartments that allow suspended solid contents such as sand and silts to precipitate and sink to the bottom, falling out of suspension. The settlement tank has an inlet for the runoff which enters a chamber where it is held before flowing to the next compartment or tank for further treatment, prior to outfall.

11. Reinstatement

Details of the site reinstatement after completion of construction works (Landscaping) can be found in the Landscape Architects reports and drawings.

APPENDICES

A. Site Investigation Report

DONABATE DEVELOPMENT
COUNTY DUBLIN
SITE NO. 2

MCNAMARA
CONSTRUCTION LTD

CONTENTS

APPENDICES

FOREWORD

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

General.

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

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

Boring Procedures.

Unless otherwise stated, the 'Shell and Auger' technique of soft ground boring has been employed. All boring operations sampling and/or logging of soils and in-situ testing complies with the recommendations of the British Standard Code of Practice BS 5930 (1999), 'Site Investigation' and BS 1377:1990, 'Methods of test for soils for civil engineering purposes'.

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

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

Routine Sampling.

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

In-Situ Testing.

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

Groundwater.

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

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

Retention of Samples.

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

REPORT ON A SITE INVESTIGATION
FOR A DEVELOPMENT
AT DONABATE
COUNTY DUBLIN
FOR
MCNAMARA CONSTRUCTION

SITE REFERENCE NO. 2

Report No 19870 **MARCH 2017**

I Introduction

A new housing development is proposed for a site in Donabate, County Dublin. The area has been designated **SITE 2** by the developers.

An investigation of sub soil conditions has been ordered by the developers, McNamara Construction.

The programme of the investigation included the construction of three boreholes, to establish geotechnical and environmental criteria on which to base foundation design. Work was carried out in accordance with BS 5930, Code of Practice for Site Investigations (1999).

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

This report includes all factual data pertaining to the project and comments on the geotechnical findings relative to foundation design.

II Fieldwork

The site is located in Donabate, County Dublin. Borehole locations were marked out on site by a representative of the developers and equipment was mobilised from Site 1 to Site 2.

a.Boreholes

The exploratory holes were bored with conventional 200mm cable-tool methods using a Dando Exploratory Rig.

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

Top-soil overlies generally stiff sandy gravelly CLAY, which grades in places to medium dense clay bound sandy GRAVEL. Angular fragments of grey limestone/ mudstone, presenting as very dense angular GRAVEL are noted at relatively shallow depth in each borehole with refusals recorded at respective depths of 2.60, 2.50 and 1.80 metres BGL.

Water seepages were note in BH01 and BH03, with no water observed in BH02.

III Testing

***(a) In-Situ* :**

Standard penetration tests were carried out at approximate 1.00 metre intervals in the geotechnical boreholes to measure relative in-situ soil strength. N values are noted in the right hand column of the boring records, representing the blow count required to drive the standard sampler 300mm into the soil, following initial seating blows. Where full test penetration was not achieved the blow count for a specific penetration is recorded, or refusal is indicated where appropriate. The results of the tests are summarised as follows:

STRATUM	N VALUE RANGE	COMMENT
Gravelly CLAY (1.00 m BGL)	27 to 32	Firm to Stiff
Dense GRAVEL (2.00 m BGL) (Weathered rock)	31 to +50	Hard

Some limited penetration SPT tests with refusal were recorded on the presumed weathered rock at the base of the three boreholes.

(b) Laboratory :

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

Geotechnical testing was carried out by IGSL and chemical and environmental analysis by EXOVA-JONES.

Testing included the following elements:

a. Classification (Liquid and Plastic Limits)
b. Grading Analysis
c. Sulphate and pH determination
d. RILTA Environmental Suite / Pyrite Chemical Test

Classification
The liquid and plastic limits were established for samples of the upper gravelly CLAY. Values are tabulated with relevant moisture contents and plotted on the standard Casagrande Chart, falling uniformly in the CL Zone. The results indicate that the soil is CLAY matrix, is of uniformly low plasticity with a high sensitivity to moisture content variation.

Grading
Three samples had particle size distribution established by wet sieve analysis and hydrometer analysis. The curves reflect the very granular nature of the soil, the material is described as very clayey sandy GRAVEL with angular limestone fragments observed.

Sulphate and pH.
One samples was sent for sulphate and pH analysis. A sulphate concentration (SO_4 2:1 extract) of 0.0302 was established with a pH of 8.5. No special precautions are necessary to protect foundation concrete from sulphate aggression. A sulphate design class of DS-1 (ACEC Classification for Concrete) is indicated for concentrations less than 0.5 g/l.

Environmental
One samples was submitted for detailed environmental analysis to RILTA Suite (WAC) parameters. The results indicate that the material is essentially INERT with little or no elevated contaminant levels recorded. Material excavated from this site can be readily disposed of to a regular licensed landfill facility and no problems are anticipated with personnel operating on the site. No asbestos was identified.

Pyrite Tests

One sample of the weathered limestone / mudstone rock from BH01 exhibits elevated levels of Sulphur (S) and Pyrite.

IV Discussion

The borehole investigation was carried out in three locations marked out on site by the developer and referenced BH01 to BH03.

The investigation has indicated that top soil overlies firm to stiff gravelly CLAY / dense clay-bound GRAVEL.

Shallow borehole refusals were recorded with angular limestone or mudstone fragments recovered from each borehole. The horizon of this stratum was noted at depths between 2.30 and 1.60 metres, with borehole refusals occurring between 2.60 and 1.80 metres. Proof core drilling to confirm bedrock parameters was not scheduled as part of this investigation.

Foundations

The test results indicate the following allowable bearing pressures at varying depths.

Gravelly CLAY/Gravel @ 1.00 m BGL Allowable Bearing Pressure 150 - 200 KPa

Weathered Limestone @ 1.50 – 2.00 m Allowable Bearing Pressure 300 KPa

The above confirms that conventional reinforced strip or pad foundations should be appropriate for this development.

The glacial till is over-consolidated and consequently settlement under the above loads will be very low, with negligible differential movement anticipated.

The heterogeneous nature of the glacial sub soils is emphasised and variation from hard clay to dense gravel (sometimes water bearing) can occur randomly. Careful visual examination of excavated formation is advised to ensure uniformity and suitability of the founding medium. Any unsuitable material should be removed and replaced by low-grade concrete.

Statutory safety regulations prohibit personnel entry to unsupported excavations greater than 1.20 metres deep, irrespective of apparent stability.

Ground Water

Minor water seepages were noted at the soil / presumed rock interface. This is not expected to be of concern in shallow foundation construction, and water ingress will be readily dealt with by pumping from shallow sumps.

Environmental

One soil sample was tested to RILTA (WAC) parameters and the soils are classified as inert. No problems are anticipated in this regard with disposal to licensed landfill.

One sample of the weathered rock (limestone / mudstone) had a pyrite chemical suite of tests performed.

Elevated levels of both Sulphur and Pyrite were noted.

It will be essential to protect all foundation excavations placed on the bedrock by immediately blinding the excavated area to avoid any possible deterioration and swelling following oxidation or contact with water.

Mudstone or limestone excavated from the site area must NOT be used as engineered fill under ground floor slabs or associated service areas (roads / car parking etc).

Appendix I Boring Records

GEOTECHNICAL BORING RECORD

REPORT NUMBER 19870

CONTRACT	Donabate Housing - Site 2	**BOREHOLE NO.**	**BH01**
		SHEET	Sheet 1 of 1
CO-ORDINATES		**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	
GROUND LEVEL (m AOD)		**BOREHOLE DEPTH (m)**	2.60
		DATE COMMENCED	07/02/2017
		DATE COMPLETED	07/02/2017
CLIENT		**SPT HAMMER REF. NO.**	
ENGINEER	McNamara Construction	**ENERGY RATIO (%)**	
		BORED BY	E.Leahy
		PROCESSED BY	F.C

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	TOPSOIL			0.20						
	Firm brown very gravelly sandy SILT/CLAY with cobbles			1.10	AA61841	B	1.00		N = 27 (3, 3, 4, 6, 8, 9)	
1	Dense grey/brown claybound GRAVEL with cobbles (Possibly very gravelly clay)									
2				2.30	AA61842	B	2.00		N = 31 (7, 5, 5, 6, 8, 12)	
	Dense angular COBBLES and BOULDERS			2.60	AA61843	B	2.50		N = 25/75 mm (25, 25)	
	Obstruction End of Borehole at 2.60 m									
3										
4										
5										
6										
7										
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
2.3	2.6	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
0.70	0.70	No	0.50	20	Slow

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
07-02-17	2.60	Nil	G.L	End of BH

REMARKS CAT scanned location.

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

IGSL BH LOG 19870X.GPJ IGSL.GDT 13/2/17

GEOTECHNICAL BORING RECORD

REPORT NUMBER 19870

CONTRACT	Donabate Housing - Site 2	**BOREHOLE NO.**	**BH02**
		SHEET	Sheet 1 of 1
CO-ORDINATES		**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	
GROUND LEVEL (m AOD)		**BOREHOLE DEPTH (m)**	2.50
		DATE COMMENCED	07/02/2017
		DATE COMPLETED	08/02/2017
CLIENT		**SPT HAMMER REF. NO.**	
ENGINEER	McNamara Construction	**ENERGY RATIO (%)**	
		BORED BY	E.Leahy
		PROCESSED BY	F.C

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Samples: Sample Type	Samples: Depth (m)	Samples: Recovery	Field Test Results	Standpipe Details
0	TOPSOIL			0.30						
1	Very stiff brown very gravelly slightly sandy SILT/CLAY with cobbles			1.60	AA61844	B	1.00		N = 32 (3, 7, 7, 10, 7, 8)	
2	Dense angular COBBLES and BOULDERS			2.50	AA61845	B	2.00		N = 23/75 mm (25, 27, 23)	
3	Obstruction End of Borehole at 2.50 m									
4										
5										
6										
7										
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
2.2	2.5	2	

WATER STRIKE DETAILS

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

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
07-02-17	1.00	1.00	Nil	End of 1st day
08-02-17	2.00	Nil	0.20	End of BH

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS CAT scanned location . Dumper needed to move rig.

Sample Legend

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

IGSL BH LOG 19870X.GPJ IGSL.GDT 13/2/17

GEOTECHNICAL BORING RECORD

REPORT NUMBER 19870

CONTRACT Donabate Housing - Site 2		**BOREHOLE NO.**	**BH03**
		SHEET	Sheet 1 of 1
CO-ORDINATES	**RIG TYPE** Dando 2000	**DATE COMMENCED**	08/02/2017
	BOREHOLE DIAMETER (mm)	**DATE COMPLETED**	08/02/2017
GROUND LEVEL (m AOD)	**BOREHOLE DEPTH (m)** 1.80		
CLIENT	**SPT HAMMER REF. NO.**	**BORED BY**	E.Leahy
ENGINEER McNamara Construction	**ENERGY RATIO (%)**	**PROCESSED BY**	F.C

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Samples: Sample Type	Samples: Depth (m)	Samples: Recovery	Field Test Results	Standpipe Details
0	TOPSOIL			0.20						
	Firm brown/grey gravelly SILT/CLAY with cobbles			0.80						
1	Dense angular GRAVEL with cobbles			1.55	AA61846	B	1.00		N = 29 (6, 9, 8, 5, 9, 7)	
	Dense angular COBBLES and BOULDERS			1.80	AA61847	B	1.60		N = 25/75 mm (25, 25)	
2	Obstruction End of Borehole at 1.80 m									
3										
4										
5										
6										
7										
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
1.55	1.8	2	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
0.80	0.80	No	0.40	20	Slow

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
08-02-17	1.80	Nil	0.50	End of BH

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS CAT scanned location . Dumper needed to move rig.

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

IGSL BH LOG 19870X.GPJ IGSL.GDT 13/2/17

Appendix II Test Results

IGSL Ltd
Materials Laboratory
Unit J5, M7 Business Park
Newhall, Naas
Co. Kildare
045 846176

Test Report

Determination of Moisture Content, Liquid & Plastic Limits

Tested in accordance with BS1377:Part 2:1990, clauses 3.2*, 4.3, 4.4 & 5.3

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.1331

Report No. **R77513** Contract No. 19870 Contract Name: Donabate Housing - Site 2

Customer McNamara

Samples Received: 13-02-17 Date Tested: 16-02-17

BH/TP	Sample No.	Depth (m)	Lab. Ref	Sample Type	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425µm	Preparation	Liquid Limit Clause	Classification (BS5930)	Description
BH01	AA61836	1.0	A17/0605	D	11	32	17	15	37	WS	4.4	C L	Brown clayey, sandy, GRAVEL with many cobbles
BH02	AA61844	1.0	A17/0607	D	9.5	32	16	16	43	WS	4.4	C L	Light brown clayey, sandy, GRAVEL

Notes:
Preparation: WS - Wet sieved; AR - As received; NP - Non plastic
Liquid Limit Clause: 4.3 Cone Penetrometer definitive method; 4.4 Cone Penetrometer one point method
Sample Type: B - Bulk Disturbed; U - Undisturbed

Remarks:

NOTE: *Clause 3.2 of BS1377 is a "withdrawn" standard due to publication of ISO17892-1:2014
Opinions and interpretations are outside the scope of accreditation.
The results relate to the specimens tested. Any remaining material will be retained for one month.

IGSL Ltd Materials Laboratory

Persons authorized to approve reports

H Byrne (Laboratory Manager)

Approved by: H Byrne

Date: 23-02-17

Page: 1 of 1

TEST REPORT
Determination of Particle Size Distribution

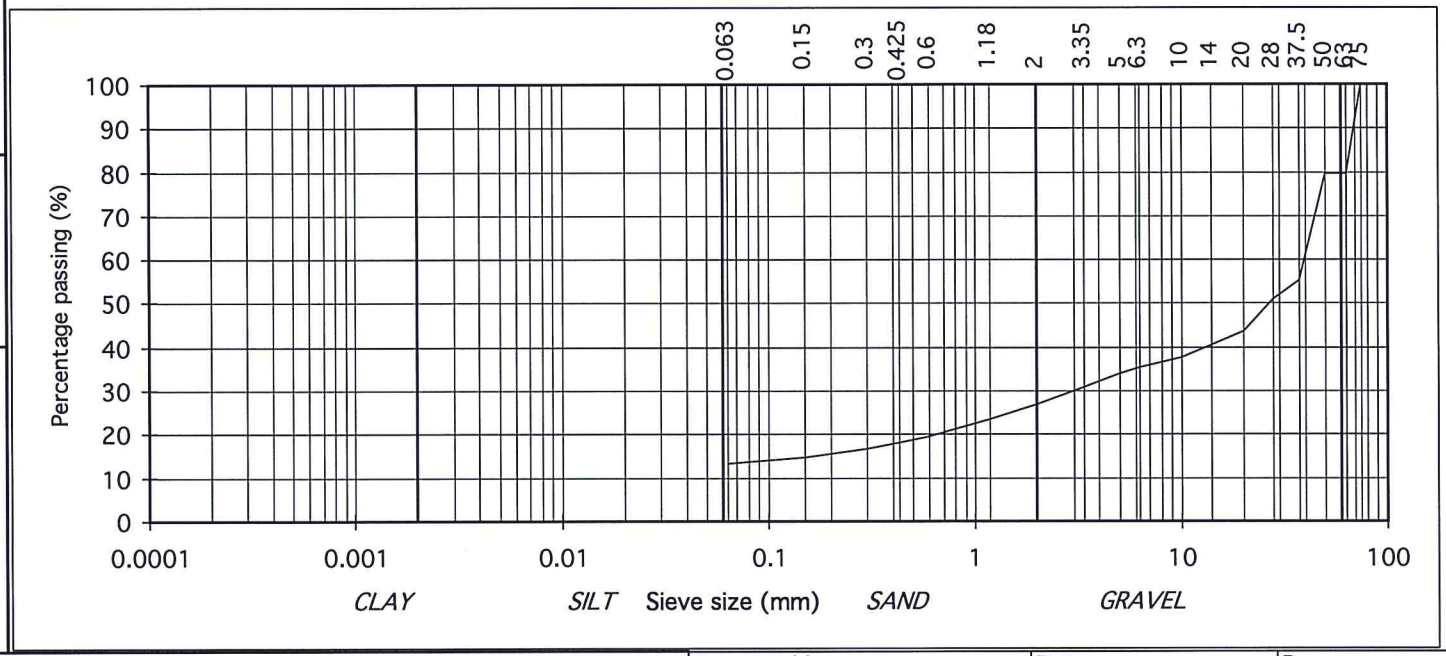
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

ISO 17025 IVNAB TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	80	
50	80	GRAVEL
37.5	55	
28	51	
20	44	
14	41	
10	38	
6.3	35	
5	34	
3.35	31	
2	27	
1.18	23	SAND
0.6	20	
0.425	18	
0.3	17	
0.15	15	
0.063	13	SILT/CLAY

Contract No: 19869 Report No. R77626
Contract: Donabate Housing - Site 2
BH/TP : BH01
Sample No. AA61836 Lab. Sample No. A17/0605
Sample Type: B
Depth (m) 1.00 Customer: McNamara
Date Received 13-02-17 Date Testing started 16-02-17
Description: Brown clayey, sandy, GRAVEL with many cobbles

Remarks Sample size did not meet the requirements of BS1377



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	22-02-17	1 of 1

Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5

(note: Sedimentation stage not accredited)

ISO 17025 IVNAB TESTING DETAILED IN SCOPE REG NO. 13 3T

particle size	% passing	
75	100	COBBLES
63	100	
50	77	GRAVEL
37.5	62	
28	53	
20	48	
14	47	
10	45	
6.3	42	
5	41	
3.35	38	
2	35	
1.18	32	SAND
0.6	29	
0.425	28	
0.3	27	
0.15	24	
0.063	19	SILT/CLAY

Contract No: 19869 Report No. R77585

Contract: Donabate Housing - Site 2

BH/TP : BH02

Sample No. AA61844 Lab. Sample No. A17/0607

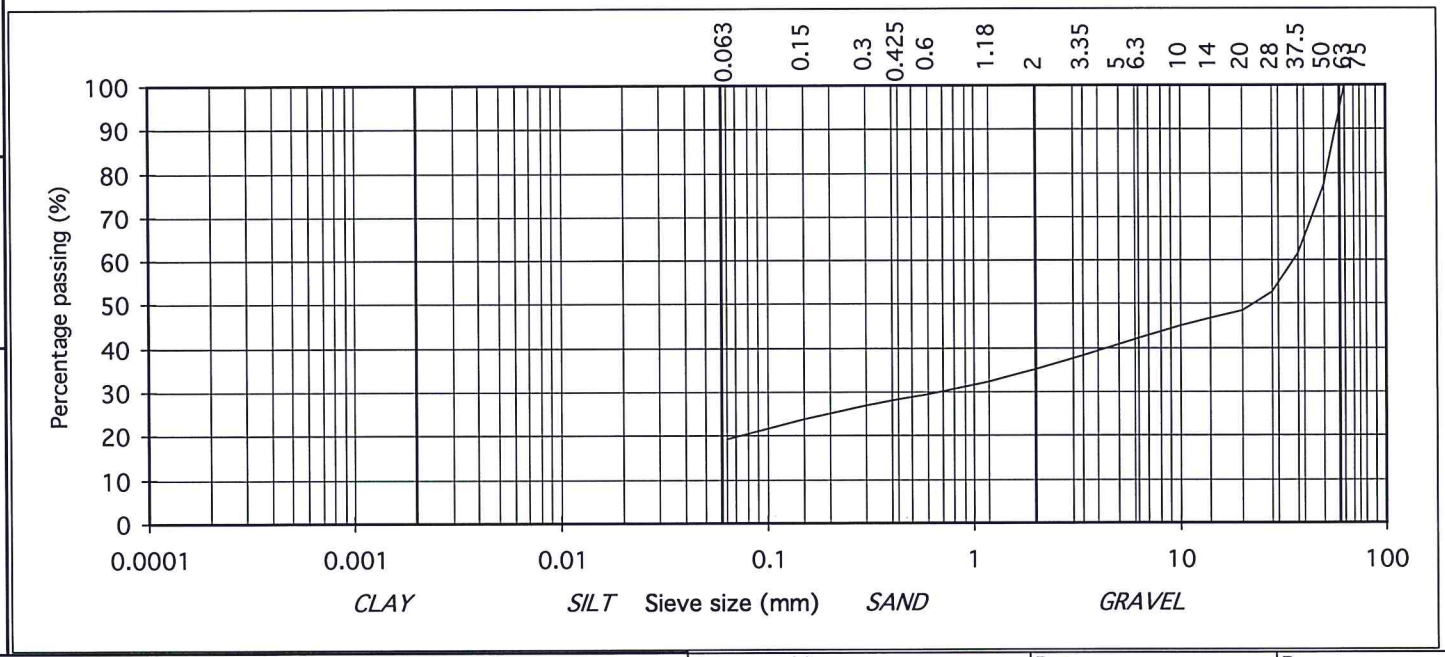
Sample Type: B

Depth (m) 1.00 Customer: McNamara

Date Received 13-02-17 Date Testing started 16-02-17

Description: Light brown clayey, sandy, GRAVEL

Remarks Sample size did not meet the requirements of BS1377



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	21-02-17	1 of 1

Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5

(note: Sedimentation stage not accredited)

ISO 17025 IVNAB ACCREDITATION TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	63	
50	43	GRAVEL
37.5	34	
28	29	
20	20	
14	17	
10	16	
6.3	15	
5	15	
3.35	13	
2	10	
1.18	7	SAND
0.6	4	
0.425	4	
0.3	3	
0.15	3	
0.063	3	SILT/CLAY

Contract No: 19869 Report No. R77625

Contract: Donabate Housing - Site 2

BH/TP : BH03

Sample No. AA61846 Lab. Sample No. A17/0608

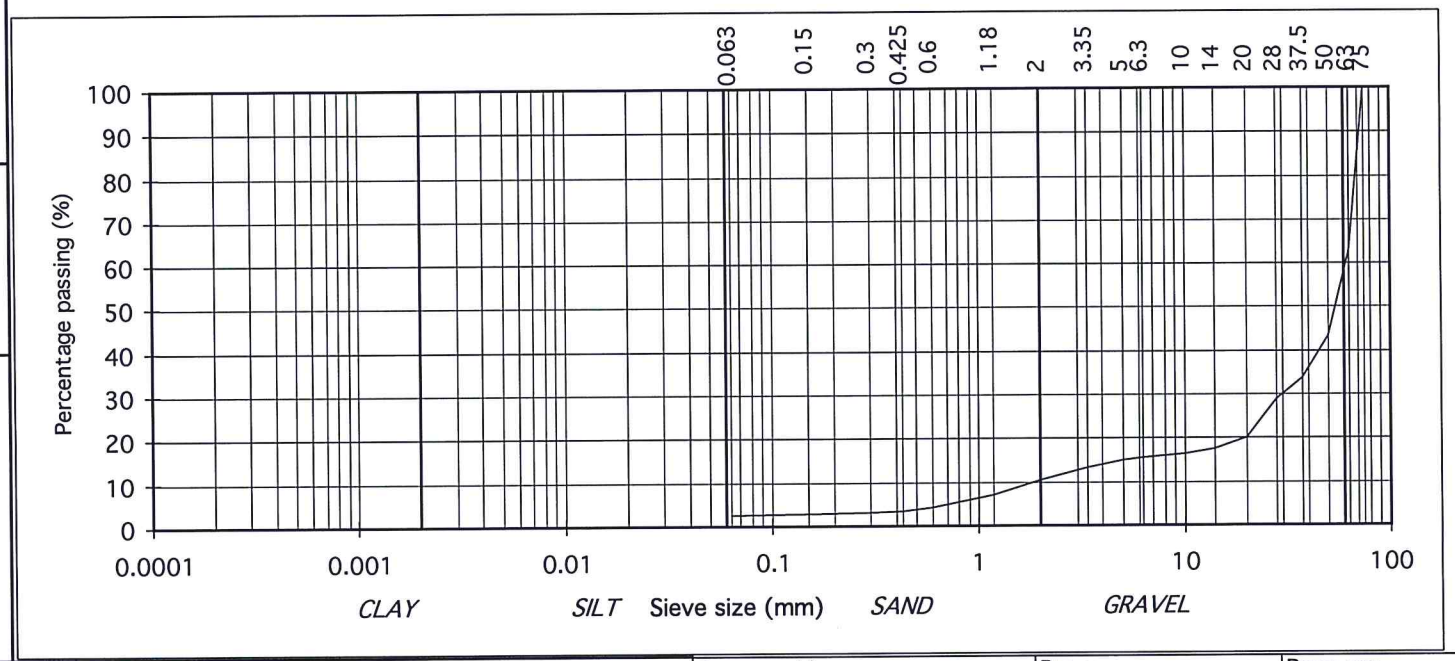
Sample Type: B

Depth (m) 1.00 Customer: McNamara

Date Received 13-02-17 Date Testing started 16-02-17

Description: Light brown slightly clayey/silty, sandy, GRAVEL with many cobbles

Remarks Sample size did not meet the requirements of BS1377



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	22-02-17	1 of 1

Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

Exova Jones Environmental

Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

Tel: +44 (0) 1244 833780
Fax: +44 (0) 1244 833781

IGSL
Unit F
M7 Business Park
Naas
Co Kildare
Ireland

Attention :	Darren Keogh
Date :	6th March, 2017
Your reference :	
Our reference :	Test Report 17/4215 Batch 1
Location :	Donabate
Date samples received :	17th February, 2017
Status :	Final report
Issue :	1

Two samples were received for analysis on 17th February, 2017. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Where Waste Acceptance Criteria Suite (EC Decision of 19 December 2002 (2003/33/EC)) has been requested, all analyses have been performed using the relevant EN methods where they exist.

Compiled By:

Phil Sommerton BSc
Project Manager

Client Name: IGSL
Reference:
Location: Donabate
Contact: Darren Keogh
JE Job No.: 17/4215

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	3-4	5									LOD/LOR	Units	Method No.
Sample ID	BH1 (SITE 2)	BH1 (SITE 2)											
Depth	1.00	2.50											
COC No / misc													
Containers	V J	T											
Sample Date	16/02/2017	16/02/2017											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	17/02/2017	17/02/2017											
Antimony	2	-									<1	mg/kg	TM30/PM15
Arsenic #	11.4	-									<0.5	mg/kg	TM30/PM15
Barium #	20	-									<1	mg/kg	TM30/PM15
Cadmium #	<0.1	-									<0.1	mg/kg	TM30/PM15
Chromium #	13.7	-									<0.5	mg/kg	TM30/PM15
Copper #	11	-									<1	mg/kg	TM30/PM15
Lead #	29	-									<5	mg/kg	TM30/PM15
Mercury #	<0.1	-									<0.1	mg/kg	TM30/PM15
Molybdenum #	1.0	-									<0.1	mg/kg	TM30/PM15
Nickel #	10.9	-									<0.7	mg/kg	TM30/PM15
Selenium #	2	-									<1	mg/kg	TM30/PM15
Sulphur as S	-	0.81									<0.01	%	TM30/PM15
Pyrite (FeS2)	-	1.43									<0.01	%	TM30/TM60/PM15/PM20
Zinc #	<5	-									<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	-									<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	-									<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	-									<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	-									<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	-									<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	-									<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	-									<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	-									<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	-									<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	-									<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	-									<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	-									<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	-									<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	-									<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	-									<0.04	mg/kg	TM4/PM8
Coronene	<0.04	-									<0.04	mg/kg	TM4/PM8
PAH 6 Total #	<0.22	-									<0.22	mg/kg	TM4/PM8
PAH 17 Total	<0.64	-									<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	-									<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	-									<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	-									<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	107	-									<0	%	TM4/PM8
Mineral Oil (C10-C40)	<30	-									<30	mg/kg	TM5/PM16

Please see attached notes for all abbreviations and acronyms

Client Name: IGSL
Reference:
Location: Donabate
Contact: Darren Keogh
JE Job No.: 17/4215

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	3-4	5											
Sample ID	BH1 (SITE 2)	BH1 (SITE 2)											
Depth	1.00	2.50									Please see attached notes for all abbreviations and acronyms		
COC No / misc													
Containers	V J	T											
Sample Date	16/02/2017	16/02/2017											
Sample Type	Soil	Soil											
Batch Number	1	1									LOD/LOR	Units	Method No.
Date of Receipt	17/02/2017	17/02/2017											
TPH CWG													
Aliphatics													
>C5-C6 #	<0.1	-									<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1	-									<0.1	mg/kg	TM36/PM12
>C8-C10	0.3	-									<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	-									<0.2	mg/kg	TM5/PM16
>C12-C16 #	<4	-									<4	mg/kg	TM5/PM16
>C16-C21 #	<7	-									<7	mg/kg	TM5/PM16
>C21-C35 #	<7	-									<7	mg/kg	TM5/PM16
>C35-C40	<7	-									<7	mg/kg	TM5/PM16
Total aliphatics C5-40	<26	-									<26	mg/kg	TM5/TM36/PM12/PM16
>C6-C10	0.3	-									<0.1	mg/kg	TM36/PM12
>C10-C25	<10	-									<10	mg/kg	TM5/PM16
>C25-C35	<10	-									<10	mg/kg	TM5/PM16
Aromatics													
>C5-EC7 #	<0.1	-									<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1	-									<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1	-									<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	-									<0.2	mg/kg	TM5/PM16
>EC12-EC16 #	<4	-									<4	mg/kg	TM5/PM16
>EC16-EC21 #	<7	-									<7	mg/kg	TM5/PM16
>EC21-EC35 #	<7	-									<7	mg/kg	TM5/PM16
>EC35-EC40	<7	-									<7	mg/kg	TM5/PM16
Total aromatics C5-40	<26	-									<26	mg/kg	TM5/TM36/PM12/PM16
Total aliphatics and aromatics(C5-40)	<52	-									<52	mg/kg	TM5/TM36/PM12/PM16
>EC6-EC10 #	<0.1	-									<0.1	mg/kg	TM36/PM12
>EC10-EC25	<10	-									<10	mg/kg	TM5/PM16
>EC25-EC35	<10	-									<10	mg/kg	TM5/PM16
MTBE #	<5	-									<5	ug/kg	TM31/PM12
Benzene #	<5	-									<5	ug/kg	TM31/PM12
Toluene #	<5	-									<5	ug/kg	TM31/PM12
Ethylbenzene #	6	-									<5	ug/kg	TM31/PM12
m/p-Xylene #	7	-									<5	ug/kg	TM31/PM12
o-Xylene #	<5	-									<5	ug/kg	TM31/PM12
PCB 28 #	<5	-									<5	ug/kg	TM17/PM8
PCB 52 #	<5	-									<5	ug/kg	TM17/PM8
PCB 101 #	<5	-									<5	ug/kg	TM17/PM8
PCB 118 #	<5	-									<5	ug/kg	TM17/PM8
PCB 138 #	<5	-									<5	ug/kg	TM17/PM8
PCB 153 #	<5	-									<5	ug/kg	TM17/PM8
PCB 180 #	<5	-									<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	-									<35	ug/kg	TM17/PM8

Client Name: IGSL
Reference:
Location: Donabate
Contact: Darren Keogh
JE Job No.: 17/4215

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

J E Sample No.	3-4	5											
Sample ID	BH1 (SITE 2)	BH1 (SITE 2)											
Depth	1.00	2.50											
COC No / misc													
Containers	V J	T											
Sample Date	16/02/2017	16/02/2017											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	17/02/2017	17/02/2017											
Natural Moisture Content	5.6	-										<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	5.3	-										<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	-										<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0302	-										<0.0015	g/l	TM38/PM20
Chromium III	13.7	-										<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	0.05	-										<0.02	%	TM21/PM24
pH #	8.46	-										<0.01	pH units	TM73/PM11
Mass of raw test portion	0.1027	-											kg	NONE/PM17
Mass of dried test portion	0.09	-											kg	NONE/PM17

Client Name: IGSL
Reference:
Location: Donabate
Contact: Darren Keogh
JE Job No.: 17/4215

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

J E Sample No.	3-4												
Sample ID	BH1 (SITE 2)												
Depth	1.00												
COC No / misc													
Containers	V J												
Sample Date	16/02/2017												
Sample Type	Soil												
Batch Number	1												
Date of Receipt	17/02/2017												
												LOD/LOR	Units	Method No.
Dissolved Antimony #	<0.002											<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	<0.02											<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	<0.0025											<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	<0.025											<0.025	mg/kg	TM30/PM17
Dissolved Barium #	<0.003											<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	<0.03											<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005											<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005											<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	<0.0015											<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	<0.015											<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007											<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07											<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005											<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05											<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	0.003											<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.03											<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	<0.002											<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02											<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003											<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03											<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	<0.003											<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	<0.03											<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001											<0.00001	mg/l	TM61/PM38
Mercury Dissolved by CVAF #	<0.0001											<0.0001	mg/kg	TM61/PM38
Phenol	<0.01											<0.01	mg/l	TM26/PM0
Phenol	<0.1											<0.1	mg/kg	TM26/PM0
Fluoride	<0.3											<0.3	mg/l	TM173/PM0
Fluoride	<3											<3	mg/kg	TM173/PM0
Sulphate as SO4 #	6.14											<0.05	mg/l	TM38/PM0
Sulphate as SO4 #	61.4											<0.5	mg/kg	TM38/PM0
Chloride #	2.6											<0.3	mg/l	TM38/PM0
Chloride #	26											<3	mg/kg	TM38/PM0
Leachant Volume	0.887												l	NONE/PM17
Eluate Volume	0.75												l	NONE/PM17
Dissolved Organic Carbon	<2											<2	mg/l	TM60/PM0
Dissolved Organic Carbon	<20											<20	mg/kg	TM60/PM0
pH	7.89											<0.01	pH units	TM73/PM0
Total Dissolved Solids #	54											<35	mg/l	TM20/PM0
Total Dissolved Solids #	540											<350	mg/kg	TM20/PM0

Mass of sample taken (kg)	0.1027	Dry Matter Content Ratio (%) =	87.2
Mass of dry sample (kg) =	0.09	Leachant Volume (l)	0.887
Particle Size <4mm =	>95%	Eluate Volume (l)	0.75

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**17/4215**			
Sample No	**4**			
Client Sample No	**BH1 (SITE 2)**			
Depth/Other	**1.00**	**Inert**	**Stable Non-reactive**	**Hazardous**
Sample Date	**16/02/2017**			
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	0.05	3	5	6
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg)	<30	500	-	-
PAH Sum of 6 (mg/kg)	<0.22	-	-	-
PAH Sum of 17 (mg/kg)	<0.64	100	-	-

Eluate Analysis	**10:1 concn leached**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	A10			
	mg/kg	**mg/kg**		
Arsenic	<0.025	0.5	2	25
Barium	<0.03	20	100	300
Cadmium	<0.005	0.04	1	5
Chromium	<0.015	0.5	10	70
Copper	<0.07	2	50	100
Mercury	<0.0001	0.01	0.2	2
Molybdenum	0.03	0.5	10	30
Nickel	<0.02	0.4	10	40
Lead	<0.05	0.5	10	50
Antimony	<0.02	0.06	0.7	5
Selenium	<0.03	0.1	0.5	7
Zinc	<0.03	4	50	200
Chloride	26	800	15000	25000
Fluoride	<3	10	150	500
Sulphate as SO4	61.4	1000	20000	50000
Total Dissolved Solids	540	4000	60000	100000
Phenol	<0.1	1	-	-
Dissolved Organic Carbon	<20	500	800	1000

Exova Jones Environmental

EPH Interpretation Report

Matrix : Solid

Client Name: IGSL
Reference:
Location: Donabate
Contact: Darren Keogh

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	EPH Interpretation
17/4215	1	BH1 (SITE 2)	1.00	3-4	No interpretation possible

Exova Jones Environmental

Client Name: IGSL
Reference:
Location: Donabate
Contact: Darren Keogh

Note:

Analysis was carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

Ryan Butterworth
Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
17/4215	1	BH1 (SITE 2)	1.00	4	01/03/2017	**General Description (Bulk Analysis)**	soil/stones
					01/03/2017	**Asbestos Fibres**	NAD
					01/03/2017	**Asbestos Fibres (2)**	NAD
					01/03/2017	**Asbestos ACM**	NAD
					01/03/2017	**Asbestos ACM (2)**	NAD
					01/03/2017	**Asbestos Type**	NAD
					01/03/2017	**Asbestos Type (2)**	NAD
					01/03/2017	**Asbestos Level Screen**	NAD
17/4215	1	BH2 (SITE 2)	1.00	7	03/03/2017	**General Description (Bulk Analysis)**	Soil/Stone
					03/03/2017	**Asbestos Fibres**	NAD
					03/03/2017	**Asbestos Fibres (2)**	NAD
					03/03/2017	**Asbestos ACM**	NAD
					03/03/2017	**Asbestos ACM (2)**	NAD
					03/03/2017	**Asbestos Type**	NAD
					03/03/2017	**Asbestos Type (2)**	NAD
					03/03/2017	**Asbestos Level Screen**	NAD

Client Name: IGSL
Reference:
Location: Donabate
Contact: Darren Keogh

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
No deviating sample report results for job 17/4215						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 17/4215

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS) accredited - UK.
SA	ISO17025 (SANAS) accredited - South Africa.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

JE Job No: 17/4215

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5/TM36	TM005: Modified USEPA 8015B. Determination of solvent Extractable Petroleum Hydrocarbons (EPH) including column fractionation in the carbon range of C10-35 into aliphatic and aromatic fractions by GC-FID. TM036: Modified USEPA 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C5-10 by headspace GC-FID. Including determination of	PM12/PM16	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis./Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3: 1990/USEPA 160.3 Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes

JE Job No: 17/4215

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7 and 6010B	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7 and 6010B	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7 and 6010B	PM17	Modified method EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM30/TM50	TM30 : Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7 and 6010B. TM50 : Acid soluble sulphate (Total Sulphate) analysed by ICP-OES	PM15/PM29	PM15 : Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground. PM29 : Dried and ground solid sample is boiled with dilute hydrochloric acid, the resulting liquor is then analysed.			AD	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes

JE Job No: 17/4215

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM60	Modified USEPA 9060. Determination of TOC by calculation from Total Carbon and Inorganic Carbon using a TOC analyser, the carbon in the sample is converted to CO2 and then passed through a non-dispersive infrared gas analyser (NDIR).	PM0	No preparation is required.			AR	Yes
TM61	Modified US EPA methods 245.7 and 200.7. Determination of Mercury by Cold Vapour Atomic Fluorescence.	PM38	Samples are brominated to reduce all mercury compounds to Mercury (II) which is analysed using method TM061.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.			AR	
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	Yes
TM73	Modified US EPA methods 150.1 and 9045D. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2	PM0	No preparation is required.			AR	Yes

JE Job No: 17/4215

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
NONE	No Method Code	NONE	No Method Code			AR	Yes
NONE	No Method Code	PM17	Modified method EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				
NONE	No Method Code	PM17	Modified method EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.			AR	
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.			AR	

Appendix - Methods used for WAC (2003/33/EC)

Leachate tests	
10l/kg; 4mm	I.S. EN 12457-2:2002 Specified particle size; water added to L/S ratio; capped; agitated for 24 ± 0.5 hours; eluate settled and filtered over 0.45 µm membrane filter.
Eluate analysis	
As	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ba	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cd	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cr total	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cu	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Hg	I.S. EN 13370 rec. EN 1483 (CVAAS)
Mo	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ni	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Pb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Sb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Se	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Zn	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Chloride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Fluoride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Sulphate	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Phenol index	I.S. EN 13370 rec. ISO 6439 (4-Aminoantipyrine spectrometic methods after distillation)* (BY HPLC - Jones Env)
DOC	I.S. EN 1484
TDS	I.S. EN 15216
Compositional analysis	
TOC	I.S. EN 13137 Method B: carbonates removed with acid; TOC by combustion.
BTEX	GC-FID
PCB7**	I.S. EN 15308 analysis by GC-ECD.
Mineral oil	I.S. EN 14039 C10 to C40 analysis by GC-FID.
PAH17***	I.S. EN 15527 PAH17 analysis by GC-MS
Metals	I.S. EN 13657 - Aqua regia digestion: EN ISO 11885 (ICP-OES)
Other	
Dry matter	I.S. EN 14346 sample is dried to a constant mass in an oven at 105 ± 3 °C; Method B Water content by direct Karl-Fischer-titration and either volumetric or coulometric detection.
LOI	I.S. EN 15169 Difference in mass after heating in a furnace up to 550 ± 25 °C.
ANC	CEN/TS 15364 Determined by amouns of acid or base needed to cover the pH range

Notes:
*If not suitable due to LOD, precision, etc., any other suitable method can be used, e.g. AFS, ICP-MS
**PCB-28, PCB-52, PCB-101, PCB-118, PCB-138, PCB-153 and PCB-180

***Naphthalene, Acenaphthylene, Acenaphthene, Anthracene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, Benzo(a)pyrene, Chrysene, Coronene, Dibenzo(a,h)anthracene, Fluorene, Fluoranthene, Indeno(1,2,3-c,d)pyrene, Phenanthrene and Pyrene.

Appendix III Site Plan

UK and Ireland Office Locations