

BM BARRETT MAHONY
CONSULTING ENGINEERS
CIVIL & STRUCTURAL



OUTLINE CONSTRUCTION MANAGEMENT PLAN

PROPOSED MIXED-USE DEVELOPMENT
AT THE FORMER GALLAHER'S SITE,
AIRTON ROAD, TALLAGHT, DUBLIN 24

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GALLAHER'S SITE, AIRTON ROAD, TALLAGHT, DUBLIN 24**

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FOR
PROPOSED MIXED-USE DEVELOPMENT,
THE FORMER GALLAHER'S SITE,
AIRTON ROAD,
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1.0 INTRODUCTION

Barrett Mahony Consulting Engineers (BMCE) have been commissioned to prepare an Outline Construction Management Plan (OCMP) by Greenleaf Homes Limited for the proposed mixed-use development at the former Gallaher's Site, Airton Road. The 2.79-hectare site is currently occupied by the disused factory/warehouse & associated hardstanding.

The proposed development will consist of 502no. residential apartment units in 6no. multi-storey blocks (A-F). Ground level car parking will be provided as an undercroft to blocks A-C and basement car parking will be provided below blocks E and F. The total number of car parking spaces provided is 202. 3no. retail units are with a combined total area of 482m² will be provided (187m², 161m² and 134m²). A 329m² crèche will be provided under the south eastern of Block C, within the site adjacent to the open space. The site will also include communal facilities, (gym, offices) of 704m². This is not a 'Build-to-Rent' (BTR) scheme.

Construction of the development involves the following principal elements:

- Demolition of existing buildings.
- Removal of existing services. Site strip.
- Excavation for new foundations.
- Construction of the new reinforced concrete buildings.
- Mechanical & Electrical installations.
- Architectural finishes, non-loadbearing walls, ceilings etc. associated with the above.
- Buried site services installation. Connection to public services.
- Soft and hard landscaping. Roads and footpaths.



Figure 1.1 – Site Location

2.0 PURPOSE OF THE REPORT

This report has been prepared as part of the Planning Application for the Airton Road development in Tallaght. The purpose of this report is to ensure that best construction management practices are applied to the site by the main contractor and that measures are in place during construction to reduce as much as possible the impact of the works on people, property and the environment. The contractor will be asked to develop this outline report further in line with his/her detailed requirements. This report should be read in conjunction with the Outline Construction and Demolition Waste Management Plan (OCDWMP) report for the project

2.1 KEY INTERFACES

2.1.1 Public Roads

The site is bounded by the Greenhills road & Airton road; both are busy public roads. There are public footpaths along the site boundary. There are plans for future widening of the Greenhills road along the site boundary to cater for a Bus Connects corridor.

2.1.2 Adjacent properties

There are industrial units to the west of the site along Airton road. To the north of the site, on the opposite side of Airton road, there is a large Harvey Norman store with car park access off both Greenhills road & off Airton road. Tallaght Astro Park is located to the east of the site, on the opposite side of Greenhill roads with its car park access onto Greenhill road opposite the site.

2.1.3 Poddle/Tymon Stream

There is a small watercourse, the Poddle/Tymon River, along the southern boundary of the site.

3.0 SITE TOPOGRAPHY

A detailed topographical survey of the existing site has been prepared by Geodata Surveying Ltd. The site was levelled out in the past to accommodate the factory buildings & hardstanding areas. The site level varies typically from +91.00 approx. near the north west corner of the main building to +88.00 at the south east car park. These levels are summarised in the plan below.



Figure 3.1 - Site Levels

4.0 GROUND CONDITIONS

A detailed geotechnical and contamination site investigation has been carried out by IGSL for Barrett Mahony & a report issued.

Summarizing the findings, the typical sequence of stratigraphy is a thin layer of made ground/granular fill less than 1.0m thick typically overlying stiff boulder clay becoming very stiff to hard at depths of 4 to 5 metres below ground level (b.g.l.). Rock was not encountered in exploratory drill holes taken to depths of 15.0m b.g.l.

The made ground & soils on site are generally classified as 'Inert'. Refer to the IGSL report for further information.

The water table level is approximately 1.5m to 2.0m b.g.l. The boulder clay is typically impermeable except where local lenses of gravel occur.

5.0 PROPOSED DEVELOPMENT

The proposed new construction works will consist of the following principal elements:

- Demolition of existing buildings.
- Removal of existing services. Site strip.
- Excavation for new foundations.
- Construction of the new reinforced concrete buildings.
- Mechanical & Electrical installations.
- Cladding. Fit-out works.
- Buried site services installation. Connection to public services.
- Soft and hard landscaping. Roads and footpaths.

During construction there will be construction waste generated, in addition to demolition waste, such as excavated earth spoil from the hard & soft landscaping, foundation and service trench excavations, hazardous materials in small quantities (paints, oils, diesel etc), timber formwork, excess steel reinforcing bars and over-supply of materials along with packaging such as cardboard, plastic and polystyrene and miscellaneous items such as broken glazing panels or cladding off-cuts

6.0 DEMOLITION

The demolition of the existing buildings on site is required as part of the proposed developments. There are 3no. existing "blocks" within the site. The BRE Waste Benchmark Data as of June 2012 provides guidance on the estimates of waste based upon the gross internal area of a building and the type of building (office, warehouse). For the purposes of calculating the approximate waste, block 3 has been subdivided into building 3 and building 4. Figure 6.1 shows the buildings to be demolished highlighted in green. Photos of the buildings are shown on the following pages for reference. In summary the buildings are as follows:

- Photo 1: Building 1. Factory warehouse. North Elevation.
- Photo 2: Building 2. Main Office block. East elevation.
- Photo 3: Building 3. Second Office block. East elevation.
- Photo 4: Building 4. Storage warehouse. East elevation.

All demolition works are to be in accordance with the following guidelines:

- BS 6187:2000 'Code of practice for demolition'
- Health and Safety Executive Guidance Notes GS 29 / 1, 2, 3 & 4.
- S.I. 504 Safety, Health & Welfare at Work (Construction) regulations 2013
- Air Pollution Act 1987
- Environmental Protection Agency Act 1992
- BS 5228:2009 Part 1 'Noise & Vibration Control on Construction & Open Sites'.

NOTE: The demolition contractor is required by law to appoint a competent person, experienced or trained for the operations they are involved in, to supervise and control of work on site.



Figure 6.1 – Aerial View of Site Showing Buildings to be Demolished and Building Footprints



Figure 6.2 – Building 1: Factory Warehouse: North Elevation.



Figure 6.3 – Building 2: East Elevation



Figure 6.4 – Building 3: Second Office: East Elevation.



Figure 6.5 – End of Building 3 & 4: Storage Warehouse: East Elevation

7.0 EARTHWORKS

There will be a basement below block E & F of the proposed development, which will make up the bulk of the earthworks. There will also be earthworks associated with the site strip & levelling to suit the new buildings. Building ground floor levels are located close to existing ground levels on the site which minimises excavation works. There will be excavation associated with foundations and trenches for site services.

Table 7.1 – Estimated Excavation Quantities

Item	Made -Ground Excavation Volume (m ³)	Soil Excavation Volume (m ³)	Rock Excavation Volume (m ³)	Total (m ³)
Basement*	1,650	13,200	0	14,850
Site Strip**	10,000	2,500	0	12,500
Foundations	1,500	4,000	0	5,500
Buried Services	500	750	0	1,250
Total	13,650	20,450	0	34,100

* Basement area approx. 3300m² and 4.5m deep.

**Assumed 500mm site strip of entire surface area, which is taken to be 80% made-ground & 20% top-soil.

Excavated material from the site will be generally disposed of off-site as there will be limited opportunities for re-use. Excavated topsoil, 2,500m³, will be retained in a stock pile for re-use in the landscaping.

The total quantity of material to be disposed of off-site is assumed therefore to be 34,100 less 2,500, which equals 31,600m³ approx. Using 4-axle trucks with an 18.0 tonne capacity (36m³), this equates to approximately 878 truck movements spread over a likely period of four months equating to approx. 10 no. truck movements per day a likely maximum during the site strip.

Excavated material will be disposed off-site to a licensed facility. Please refer to the Outline Construction & Demolition Waste Management Plan report for further information.

8.0 NEW CONSTRUCTION

In summary the construction of the development will involve the following:

- Demolition of existing buildings.
- Removal of existing services. Site strip.
- Excavation for new foundations.
- Construction of the new reinforced concrete buildings.
- Architectural finishes, non-loadbearing walls, ceilings etc. associated with the above.
- Mechanical and Electrical services installations associated with the above.
- External landscaping & green roof finishes.
- Buried drainage, water supply and other services associated with the above.

9.0 CONSTRUCTION MANAGEMENT

9.1 Construction Programme & Phasing

It is intended that the development will be constructed in over a three-year period, with sections of the site handed over as they are completed.

9.2 Hoarding & Site Security

The new works will always be hoarded off or fenced off from the public. A 2.4m minimum high plywood painted timber hoarding will be provided along the long-term boundaries at the entrance, and at other areas around the site where the perimeter fence/wall is not deemed sufficient for safety and security.

reasons. Heras type fencing will be used on short term site boundaries where appropriate to suit the works. The hoarding alignment and specification are to be confirmed by the appointed Contractor prior to commencement.

Controlled access points to the site, in the form of gates or doors/turnstiles, will be kept locked for any time that these areas are not monitored (e.g. outside working hours).

During working hours, a gateman will control traffic movements and deliveries to ensure safe access and egress to site. All personnel working on site must have a valid Safe Pass card and be inducted by the Main Contractor with regard to site specific information.



Figure 9.1 – Typical Site Hoarding Arrangement

9.3 Cranes

A number of tower cranes will be required on site for construction of the works.

All materials being lifted by crane will be controlled by guide ropes and will only be completed under the strict supervision of appropriately qualified and experienced banksmen.

Mobile cranes and hoist will likely also be required for construction works. Any works outside of the site hoarding will be each subject to a method statement agreed with South Dublin County Council

9.4 Site Accommodation & Site Parking

On site accommodation will consist of:

- Staff welfare facilities (toilets, canteen, offices/meeting rooms,)
- Materials storage areas and drop off

Temporary water supply, electricity supply and foul drainage will be required for the new facilities. These public services are available on both Greenhills Road & Airton Road.

Limited parking for construction personnel will be provided within the site for the period of construction. It is noted the site is readily accessible by Dublin bus services. The contractor parking areas are to be confirmed by the appointment Contractor prior to commencement.

9.5 Hours of Working / Delivery Times

Unless required otherwise by the Local Authority, it is proposed that standard construction working hours will apply, i.e.:

- 8am - 6pm Monday to Friday
- 8am to 1pm on Saturdays.

Any works proposed outside of these periods shall be strictly by agreement with the Local Authority in advance.

9.6 Traffic Management

9.6.1 General

The works associated with the new development will result in additional traffic on the road network with the removal of excavated material/demolition waste, and the delivery of new materials, concrete trucks etc.

Construction traffic access to the site will be primarily via an entrance off the Airton Road at or close to the existing entrance here as shown in Figure 9.2.

It is proposed that unloading bays should be provided for deliveries to the site within the hoarding perimeter. They should be accessible by tower crane and fork lifts. Appropriately demarcated storage zones will be used to separate and segregate materials.

All deliveries to site will be scheduled to ensure their timely arrival and avoid need for storing large quantities of materials on site. Deliveries will be scheduled outside of rush traffic hours to avoid disturbance to pedestrian and vehicular traffic in vicinity of the site. The storage area is to be located at least 50m from the site access to allow for the possibility of traffic queueing inside the site without any interference with the public road.



Figure 9.2 – Aerial View Showing Proposed and Existing Access.



Photo 9.1 – Existing Site Access onto Airton Road, looking west.

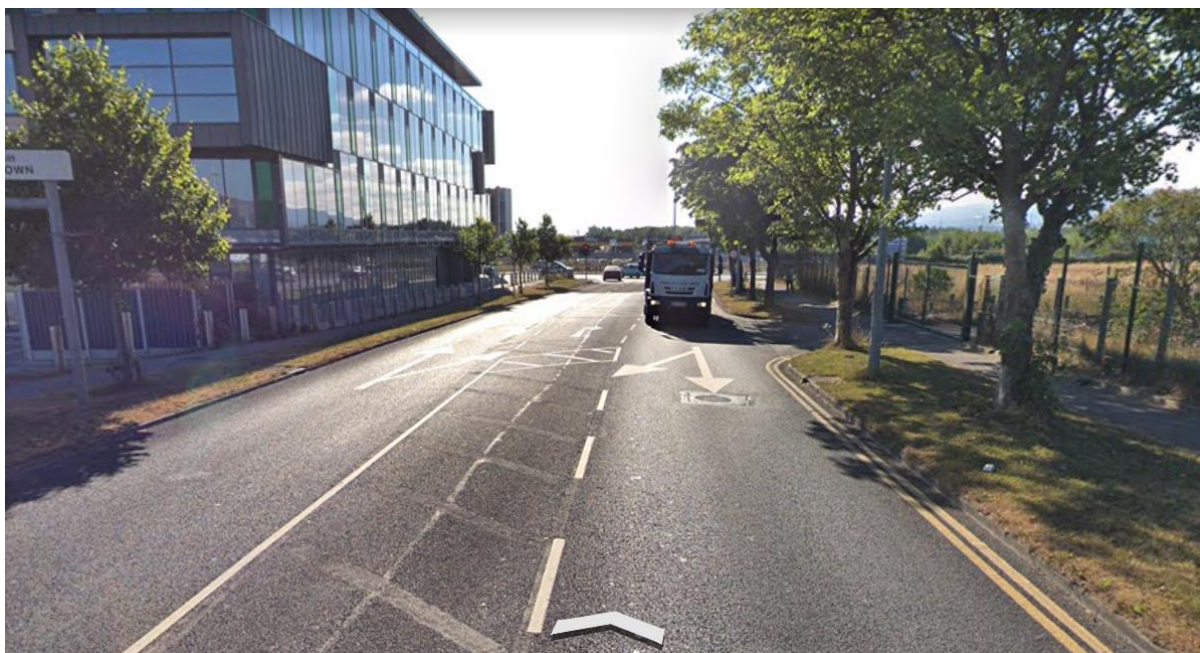


Photo 9.2 – Existing Site Access onto Airton Road, looking east.

9.6.2 Contractor's Traffic Management Plan

A Traffic Management Plan will be prepared by the contractor and agreed with South Dublin County Councils Transportation Department & An Garda Síochána, to mitigate any impact of construction on the surrounding road network. The Traffic Management Plan will provide for the following where required:

1. The contractor shall be responsible for and make good any damage to existing roads or footpaths caused by his own contractor's or suppliers transport to and from the site.
2. The contractor shall at all times keep all public and private roads, footpaths entirely free of excavated materials, debris, rubbish, provide vehicle wheel wash and thoroughly clean all wheels and arches of all vehicles as they leave the site.
3. The contractor shall confine his activities to the area of the site occupied by the works and the builders' compound, as far as practicably possible, during any particular phase of the development.
4. Haul routes to and from the site will be defined and agreed with the Local Authority.
5. Properly designed and designated entrance and egress points to the construction site for construction traffic will be used to minimize impact on external traffic.
6. Flagmen shall be used to control the exit of construction vehicles from the site onto the public road, if required.
7. Existing fire hydrants are to remain accessible as required.

Suggested headings for the Contractor's Traffic Management Plan (not exhaustive)

- Construction Traffic Management – General Requirements
- Traffic Safety and Control
- Temporary Traffic Diversions & one-way systems
- Emergency Contact Numbers and Personnel
- Emergency Plan
- Access Arrangements
- Compound and Staff Parking

9.6.3 Public Traffic

The management of the Public traffic, both pedestrian & vehicular, is a key part of this development due to the proximity of the busy surrounding roads and footpaths.

9.6.4 Construction Traffic

The vehicles associated with the construction activities are as follows: -

- Excavators
- Dump trucks
- Concrete delivery trucks
- Concrete pumps
- Delivery trucks – flatbed & containers
- Mobile cranes
- Mobile hoists

9.6.5 Measures to Minimise Construction Vehicle Movements

Construction vehicle movements will be minimised through:

- Consolidation of delivery loads to/from the site and manage large deliveries on site to occur outside of peak periods;
- Use of precast/prefabricated materials where possible in the new construction;
- 'Cut' material generated by the construction works will be re-used on site where possible, through various accommodation works.
- Adequate storage space on site will be provided;
- Construction staff vehicle movements will also be minimised by promoting the use of public transport.
- Car sharing among the construction staff will be encouraged, especially from areas where homes of staff may be clustered. Such a measure offers a significant opportunity to reduce the proportion of construction staff driving to the off-site car parking facility and will minimise the potential traffic impact on the road network surrounding this facility.
- Public Transport: An information leaflet to all staff as part of their induction on site highlighting the location of the various public transport services in the vicinity of the construction site.

9.7 Site Safety

The Contractor will be responsible for the security of the site. The Contractor will be required to:

- Operate a site induction process for all site staff.
- Ensure all site staff shall have current 'safe pass' cards.
- Install adequate site hoarding to the site boundary.
- Maintain site security staff at all times.
- Separate pedestrian access from construction at the site entrance off Airton Road and provide a safe walkway for pedestrians along the main access road in to the site.
- Ensure restricted access is maintained to the works.

9.8 Water Supply

A water supply will be required for various activities on site.

The main contractor will require a water source for the duration of the works. Water will be required for:

- Main contractor's welfare facilities.
- Wheel wash and vehicle wash-down (use recycled water where feasible).
- Dust suppression (as required).
- Curing of concrete in warm weather.
- General construction cleaning materials/equipment etc.

9.9 Public Relations/Community Liaison

The site is located in a light industrial & retail area. The Main Contractor will be required to ensure that all agents, sub-contractors and suppliers act in a manner to minimise disruption to the locality, in particular the operation of business in the locality. Construction staff will be encouraged to remove all Personal Protective Equipment (PPE) and use wash down facilities before leaving the site.

A senior member of the construction staff should be appointed as a Liaison Manager. He/she will be responsible for the following:

- Participation and distribution of a local information leaflet on site activities.
- Briefing as necessary with neighbours on progress and issues.
- Liaison with South Dublin County Council and emergency services as appropriate.
- Liaison with An Garda Siochana, particularly in relation to traffic movements and permits.
- Preparation of reports for the site meetings on neighbourhood issues, as required.

Efficient signage, maintenance and cleanliness of services and temporary facilities will be given high priority.

Due to the nature of construction works, it is essential to operate Good Neighbour Policies wherever possible. The key aspects of the Projects Team's good neighbour policy include:

- Early implementation
- Good client, staff and neighbourhood liaison.
- Reduction of nuisance factors.
- Clear access for neighbouring premises to be maintained.
- Clear and concise information to neighbours in response to queries.
- Designated liaison officer.
- Working within the prescribed hours

It is essential that the Good Neighbour Policy and any necessary procedures be in place before any works are commenced on site.

10.0 ENVIRONMENTAL CONSIDERATIONS

The main contractor will be required to be accredited with ISO14001 Environmental Management Systems. The main contractor will be required to mitigate the impact of the construction works on the environment. Proposed measures in relation to a number of items are set out in the following sections.

10.1 Noise

Some impact of noise is likely to occur as a result of the construction activity. Construction work is of a temporary nature and the resulting noise levels are usually acceptable, subject to typical management and time control procedures which are common to most urban based development projects.

Construction plant used on site will comply with the relevant Irish regulations in relation to noise and vibration requirements.

Noise will be minimized as far as possible, by limiting the use of compressors and other plant to stated hours and by fitting and use of silencing devices wherever practicable. Attention should be paid to the recommendations given in BS 5228. 'Noise Control on construction & Open Sites' & BS 6187 Code of Practice for Demolition.

Measures employed to reduce noise should include

- Noise monitoring stations, which will be monitored daily, will be located on site and at recommended locations in the vicinity of the site to record background and construction noise activity.
- Proper maintenance of all operating plant to ensure noise emission compliance. Operating plant will be selected on the basis of incorporating noise reducing systems, and at a minimum be fitted with effective exhaust silencers.
- Compressors will be fitted with acoustically lined covers, which will remain closed while the machines are in operation.
- Plant such as pumps and generators which are required to work outside of normal working hours will be enclosed with acoustic enclosures.

10.2 Dust

The Contractor's proposals are to include dust control measures in accordance with best practice and with reference to the following:

- Air Pollution Act 1987
- BS 6187: Code of Practice for Demolition

Measures are to include the following:

- Ensuring construction vehicles have a clean surface to travel on within the site (i.e. haul road).
- Truck spraying and hosing down will be carried out during dry periods and as necessary to control dust.
- A road sweeper operating during excavation stage as required.
- Wheel washing facility to be provided if required.
- For operations resulting in significant dust generation, including some demolition works, the work areas will be sheeted off to control the spread of dust.

A dust minimisation plan will be formulated for the construction phase of the project. The Contractor will put in place a regime for monitoring dust levels in the vicinity of the site during the works using the Bergerhoff Method. Then minimum criteria to be maintained shall be the limit specified by the Environmental Protection Agency (EPA) for licensed facilities in Ireland which is 350mg/m²/day as a 30-day average.

10.3 Pollution Control

Prior to the commencement of construction, the appointed contractor will be required to obtain formal agreement from the Local Authority on pollution prevention measures as well the overall approach and emergency procedures for all construction stages.

Contractors will have regard to the following best practice guidelines to ensure that water bodies are adequately protected from construction work:

- Construction Industry Research and Information Association (CIRIA) C649: *Control of water pollution from linear construction projects: Technical guidance* (Murnane et al. 2006)
- CIRIA C649: *Control of water pollution from linear construction projects: Site guide* (Murnane et al. 2006)

This plan will provide precise details on methods to prevent sediment or pollutants from leaving the construction site:

10.3.1 General

- Demolition and Construction methods used should be tailored to reduce, as much as possible, dust and noise pollution.
- In order to prevent the accidental release of hazardous materials (fuels, paints, cleaning agents, etc.) during site activity, all hazardous materials should be stored within secondary containment designed to retain at least 110% of the storage contents. Temporary bunds for oil/diesel storage tanks should be used on the site during the construction phase of the project. Safe materials handling of all potentially hazardous materials should be emphasised to all construction personnel employed during this phase of the project.
- Prior to the commencement of demolition and construction, details will be provided for locations and safe-guards for refuelling of machinery, machine servicing, concrete-mixing, etc.
- Comprehensive traffic management procedures, including the provision of access to all roads, and access/egress points should be prepared and agreed with the Local Authority. These traffic management measures should be implemented at times when traffic disruption may be experienced.
- Road sweeping and/or wheel wash facilities should be provided, as required.

- All oils/diesel stored on site for construction equipment are to be located in appropriately bunded areas.
- The location and size of stockpile areas for sands and gravel will be specified and identified on the maps.
- Sediment runoff will be minimised by standard engineering measures including sediment skirts around soil stockpiles, sediment retention barriers in surface water drains and the use of adequate construction roads.

10.3.2 Water / De-Watering

- A method statement for all works to be carried out will be prepared by the contractor and agreed with the Local County Council prior to commencement of works to outline what measures are to be taken to ensure there is no loss of service during the works.
- Dewatering measures should only be employed where necessary.
- In the event of groundwater being encountered during the demolition or construction phase, mitigation measures will include;
 - Dewatering by pumping to an appropriate treatment facility or settlement tanks in order to allow sediment to settle from solution prior to discharge.
 - Excluding contaminating materials such as fuels and hydrocarbons from sensitive parts of the site i.e. highly vulnerable groundwater areas.
- If concrete mixing is carried out on site, the mixing plant should be sited in a designated area with an impervious surface.
- Existing drains within the site that serve adjacent lands should be retained where possible to prevent causing increased flooding impacts.
- All surface water sewer connections should be made under the supervision of the Local Authority and checked prior to commissioning.
- All new onsite surface water drains should be tested and surveyed prior to connection to the public sewer to prevent any possibility of ingress of ground water.
- All surface water manholes and drains will be inspected and where necessary sealed to ensure that uncontrolled ground water inflow does not occur.
- Filters and silt traps will be used to prevent rain washing silts and other materials into the surface water network and creating blockages.
- Adjacent watercourses/groundwater need to be protected from sedimentation and erosion due to direct surface water runoff generated onsite during the demolition and construction phase. To prevent this from occurring surface water discharge from the site will be managed and controlled for the duration of the construction works until the permanently attenuated surface water drainage system of the proposed site is complete. Cut off land drains should be provided where there is a risk of uncontrolled runoff from the site.
- Regular inspections of settlement tanks are to be carried out and additional treatment used if settlement is not adequate.
- Bunded areas will be created for the storage or use of any fuels, oils, greases, cement, etc.
- Emergency spill kits will be kept close to works.

Any groundwater in the basement foundation & service trenches excavations will be pumped out. It is estimated that the required pumping rate will be low, given the ground conditions which are predominantly boulder clay, (low permeability). It is envisaged that any water to be discharged will be clean groundwater or rainwater falling into the basement excavation, becoming trapped by the impermeable clay. If water needs to be discharged off site then it will be discharged to a public surface water sewer or the adjacent Poddle/Tymon river watercourse, under a discharge license regulated by South Dublin County Council issued under the Water Pollution Act (Section 4 License). Frequent monitoring will be adopted to ensure that the water is of sufficient quality to discharge from the site. The use of slit traps will be adopted if the monitoring indicates the requirements for the same with no silt or contaminated water permitted to discharge to the sewer.

10.3.3 Soil

- If un-contaminated, any existing topsoil will be retained on site to be used for the proposed development. Topsoil should be stored in an appropriate manner on site for the duration of the construction works and protected for re-use on completion of the main site works.
- During the demolition and construction phase, all excavations and exposed sub-soils in open cuts will be blinded and protected with clean broken stone as soon as possible after exposing the subsoil in order to prevent erosion.

10.3.4 Harmful Materials

Harmful materials shall be stored on site for use in connection with the construction works only. These materials shall be stored in a controlled manner. Where on site fuelling facilities are used there shall be bunded filling area using a double bunded steel tank at a minimum.

10.4 Reinstatement / Road Cleaning

10.4.1 Construction Stage

Prior to the works commencing, detailed photograph surveys (condition schedules) of adjoining walls, roads, footpaths, grass verges etc. is to be prepared. Copies of the relevant parts are to be made available to adjoining owners and South Dublin County Council. This record will form the basis of assessing repairs to adjoining areas in the future should a dispute arise as to their cause. Roadways are to be kept clean of muck and other debris. A road sweeping truck is to be provided if necessary to ensure that this is so.

10.4.2 On Completion

Reinstatement at completion of the works will involve:

- The cleaning of the existing sewers in the vicinity of the development as required.
- Testing and cleaning of all watermains in the development to the requirements of the Local Authority prior to connection to the public watermain. This will reduce the risk of contamination to the public water supply when the new network is connected to the system.
- Testing & cleaning of all new drains on site. CCTV surveys.
- Repair of any damage to any adjacent public roadways, kerbs, grass verges etc. in accordance with South Dublin County Council requirements.
- Reinstatement of all excavations to the requirements of South Dublin County Council.
- Leaving the area in a neat and clean condition, removing all deleterious materials that may have been deposited during construction works.

11.0 MONITORING & PROTECTION OF NEIGHBOURING PROPERTIES

A monitoring regime will be put in place to protect neighbours & neighbouring properties with a full and detailed vibration, noise, dust and groundwater monitoring regime put in place for the duration of the works.

11.1 Monitoring Works Specialist:

The Contractor will appoint a competent person to be referred to as the Surveying, Instrumentation and Monitoring Subcontractor (**MSC**) and together with them will prepare and maintain the noise, dust and groundwater monitoring plan, for the agreement/approval of the Client, Employers Representative and the Technical Advisors.

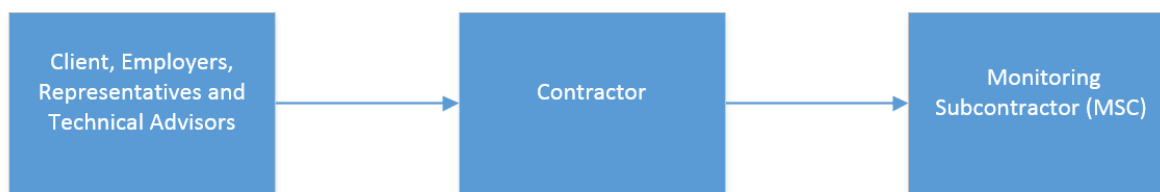


Figure 11.1 – Flowchart for the MSC

11.2 Condition Schedules:

The MSC will be responsible for preparing or organising the preparation of condition surveys of surrounding walls and hardstanding area etc. prior to the carrying out of any works on site. Extent of surveys to be agreed.

The condition surveys shall be carried out to a level of detail, suitable to the nature and extent of conditions encountered in order to obtain an understanding of the general structural condition of any relevant property/structure and/or external environments.

11.3 Movement Monitoring

Movement will be monitored through a weekly survey of targets fixed to adjoining structures deemed within the zone of influence of the construction works. The limits for settlements of structures immediately adjacent to any piling works will be determined through further analysis of the piling solution (by the piling contractor's designer), with guidance from Ciria Embedded retaining walls - guidance for economic design (C580) in terms of maximum settlement limits. Gross movement of the substructure will be limited to a level that will cause 'negligible' or at worst 'cosmetic' damage to adjoining structures as defined in BRE251. Defects and distress shall be Categorised and classified in accordance with BRE Digest 251 "Assessment of Damage in Low-Rise Buildings".

11.4 Noise & Dust Monitoring / Control:

Refer to Section 8.1 & 8.2 of this report for details.

11.5 Groundwater:

The quality of any groundwater to be discharged off site is to be monitored via testing in accordance with Section 7.8 of this report. The frequency of testing is to be agreed with the Licensing Authority.

11.6 Recording:

The MSC will monitor, collate and report, noise, dust and groundwater results in report format, on a weekly basis during critical activities. The report format is to be agreed.

APPENDIX
1
SITE
LOCATION





AIRTON ROAD

GREENHILLS ROAD

Proposed Ground Level Site Plan
1 : 500

- Application Site
- Extent of property owned by Applicant

- Existing trees
- Proposed trees

NOTES:
 * Please refer to Arborist report and drawings for information on trees to be removed.
 ** Please refer to Landscape Design drawings for landscaping and boundary treatment details.

GENERAL NOTES:
 ALL DIMENSIONS ARE TO BE CONFIRMED ON SITE
 DIMENSIONS ARE NOT TO BE SCALED FROM THIS DRAWING
 THIS DRAWING IS TO BE READ IN CONJUNCTION WITH CONSULTANT'S DRAWINGS
 ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH CURRENT BUILDING REGULATIONS

rev	date	by	Description
A	11.02.2020	CB	For Planning

TECHNOLOGICAL UNIVERSITY DUBLIN, TALLAGHT

FOR PLANNING

PROJECT TITLE: Residential Development at the Former Gallaher site, Airton Road, Tallaght, Dublin 24 for Greenleaf Homes Limited

DRAWING TITLE: Proposed Ground Level Site Plan

PROJECT NO: 1904	DATE: 27/01/20
SCALE: 1 : 500 @ A1	DRAWN BY: CB/PS
MODEL NAME: 1904-FA-ZZ-00-M3-A-Site	CHECKED BY: CB
DRAWING NO: 1904 - SITE - 0502	REVISION: A

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APPENDIX

2

GEOTECHNICAL
SITE SUMMARY



**AIRTON ROAD
DEVELOPMENT
FOR
AIRTON ROAD PROPERTIES**

**B.M.C.E.
CONSULTING ENGINEERS**

CONTENTS

I	INTRODUCTION
II	FIELDWORK
III	TESTING
III	DISCUSSION

APPENDICES

I	BOREHOLE LOGS
II	ROTARY CORE LOGS / MONITORING DATA
III	TRIAL PIT RECORDS
IV	PLATE BEARING TESTS
V	BRE DIGEST 365 TEST
VI	LABORATORY
	a. Geotechnical / Rock
	b. Chemical
VII	SITE PLANS

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.

Standards

The ground investigation works for this project have been carried out by IGSL in accordance with Eurocode 7 - Part 2: Ground Investigation & Testing (EN 1997-2:2007). This has been used together with complementary documents such as BS 5930 (1999), BS 1377 (Parts 1 to 9) and Engineers Ireland Specification & Related Documents for Ground Investigation in Ireland (2006). The following Irish (IS) and European Standards or Norms are referenced:

- IS EN 1997-2 Eurocode 7: 2007 – Geotechnical Design – Part 2: Ground Investigation & Testing
- IS EN ISO 22475-1:2006 Geotechnical Investigation and Sampling – Sampling Methods & Groundwater Measurements
- IS EN ISO 14688-1:2002 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 1: Identification and Description
- IS EN ISO 14688-2:2004 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 2: Classification Principles

Routine Sampling.

Undisturbed samples of soils, predominantly cohesive in nature are obtained unless otherwise stated by a 104mm diameter open-drive tube sampler or Piston 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 were conducted strictly in accordance with Section 4.6 of IS EN 1997-2:2007. The SPT equipment (hammer energy test) has been calibrated in accordance with EN ISO 22476-3:2005 to obtain the Energy Ratio (E_r) of each hammer. A calibration certificate is available upon request. The E_r is defined as the ratio of the actual energy E_{meas} (measured energy during calibration) delivered to the drive weight assembly into the drive rod below the anvil, to the theoretical energy (E_{theor}) as calculated from the drive weight assembly. The recorded number of blows (N) reported on the engineering logs are uncorrected. In sands, the energy losses due to rod length and the effect of the overburden pressure should be taken into account (see IS EN ISO 22476-3:2005).

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 conditions, tidal variations etc.

Engineering Logging

Soil and rock identification has been based on the examination of the samples recovered and conforms with IS EN ISO 14688-1:2002 and IS EN ISO 14689-1:2004.

Where peat has been encountered during site works, 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).

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.

Reporting

Recommendations made and opinions expressed in this 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 by IGSL Ltd for ground conditions between exploratory hole locations.

The engineering logs provide ground profiles and configuration of strata relevant to the investigation depths achieved and caution should be taken when extrapolating between exploratory points. No liability is accepted for ground conditions extraneous to the investigation points. Unless specifically stated, no account has been taken of possible subsidence due to mineral extraction, mining works or karstification below or close to the site.

This report has been prepared for the project client and the information should not be used without prior written permission. Any recommendations developed in this report specifically relate to the proposed development. IGSL Ltd accepts no responsibility or liability for this document being used other than for the purposes for which it was intended.

**REPORT ON A SITE INVESTIGATION
FOR A DEVELOPMENT
AT AIRTON ROAD TALLAGHT**

**FOR
AIRTON ROAD PROPERTIES LTD**

**BARRETT MAHONY CONSULTING ENGINEERS
(BMCE)**

Report No. 21813

JULY 2019

I Introduction

A new commercial development is proposed for a brownfield site located off Airton Road in Tallaght. A large disused commercial building occupies much of the site.

An investigation of sub soil conditions in the area of the development has been carried out by IGSL for Barrett Mahony Consulting Engineers on behalf of Airton Road Properties Ltd.

This work was carried out by IGSL Ltd. following a competitive tender process.

The site investigation included the following elements:

- * Boreholes 7 nr.
- * Rotary Core Drilling 7 nr.
- Trial Pit Excavations 9 nr.
- CBR by Plate Test 7 nr.
- BRE Digest 365 Percolation 3 nr.
- Geotechnical Laboratory Testing
- Environmental Laboratory Testing

This report includes all factual data from field operations and soils laboratory and discusses these findings relative to the proposed new development.

II Fieldwork

The site and the exploratory locations are noted on the drawing enclosed in Appendix VII. This drawing was provided by BMCE.

The site is located off the Airton Road in Tallaght. The area contains a large disused building with surrounding surfaces of concrete, hardcore and grass.

The various elements of the investigation are detailed in the following paragraphs. All field works were supervised by an experienced geotechnical engineer who carefully recorded stratification, recovered samples as required and prepared detailed records.

Each location was scanned electronically (CAT) to ensure that existing services were not damaged. At borehole locations a 1.00 metre deep inspection pit was opened by hand to confirm the absence of services. All locations have been referenced to National Grid and OD levels have been determined.

Boreholes

Seven exploratory holes were bored with conventional 200mm cable-tool methods using a Dando Exploratory Rig. Locations were referenced as per the original drawing. One re-bore was taken following shallow refusal on obstruction in BH02.

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

The findings are relatively consistent. Surface Concrete and Hardcore overlies some generally firm CLAY FILL. The fill extends generally to approximately 1.00 to 1.50 metres, but in three locations to an average depth of 2.80 metres.

Below these upper zones very stiff to hard GLACIAL TILL or BOULDER CLAY is encountered. This comprises stiff BROWN BOULDER CLAY which extends to depth ranging from 1.90 to 2.90 metres. Very stiff to hard BLACK BOULDER CLAY forms the base stratum and all seven boreholes were terminated in this stratum when further advancement was not possible despite the use of the heavy chisel.

Final borehole refusal depths ranged from 5.90 to 8.30 metres, with boulder obstruction noted at each location.

Ground water was encountered as light seepage in several of the boreholes, probably indicative of some granular zones within the generally cohesive boulder clays.

Rotary Core Drilling

Rotary drilling was scheduled at each location to advance the borehole depths and establish bedrock horizon if practical.

A tracked GEO305 rig was mobilised to drill 90 mm diameter boreholes with 78mm diameter core recovered if possible using triple tube diamond drilling technique.

Detailed drilling records are presented in Appendix II, noting stratification, core recovery and in-situ test data.

The exploratory drill holes penetrated to depths ranging from 12.00 to 13.70 metres BGL. Limestone bedrock was not identified within this depth range.

Recovery of core was generally impractical, however some core of the hard black boulder clay was possible at RC01 and RC05.

The overburden stratum is variously described as very stiff to hard brown and black very gravelly CLAY with cobbles and boulders grading in places to more granular material described as silt or clay-bound sandy GRAVEL.

Standard penetration tests were carried out at intervals in each rotary hole to establish in-situ soil strength. N values are noted in the RH column of the individual records.

Monitoring standpipes were installed in three locations (RC01, RC06 and RC07) to facilitate long term ground water and possible landfill gas concentrations. Each installation was protected by a steel cover. Readings have been taken in the period following the site works. Results are presented with the drilling data in Appendix II.

Trial Pits

Pits were excavated at nine locations under experienced engineering supervision. Each location was electronically scanned (CAT) to ensure that underground services were not damaged. Detailed trial pit logs are enclosed in Appendix III.

The records confirm the borehole findings. Surface FILL extends to up to 0.90 metres. Firm to stiff brown BOULDER CLAY is then encountered and penetrated to depths ranging from 2.10 to 2.90 metres. Hard black BOULDER CLAY was noted at the base of each excavation with excavator refusal on very hard black clay / boulders generally at 2.80 to 3.00 metres BGL.

Four of the trial excavations were dry, however, some minor water ingress was recorded at varying depth in TPs.01, 02, 04, 08 and 09. All trial excavations were recorded as stable during the short-term investigation period.

In Situ CBR by Plate Bearing Test

The CBR value of the soils at shallow depth was established at seven trial pit locations using Plate Bearing Test Apparatus.

A steel plate is loaded and off-loaded incrementally over two stages and the deflection under load and recovery under off-load is measured by a system of dial gauges. The data is processed and load settlement graphs are prepared. An equivalent CBR value is calculated in accordance with NRA HD25-26/10.

Results are summarised in the following table and details are presented in Appendix IV

TABLE A

Test No.	Depth	CBR at Load Cycle (%)	CBR @ Re-Load (%)
PBT 1	0.50	12.2	55.5
PBT 2	0.50	14.5	106.4
PBT 3	0.50	6.2	21.2
PBT 4	0.50	6.1	37.3
PBT 5	0.50	3.7	23.6
PBT 6	0.50	26.7	N/A
PBT 7	0.50	9.6	50.2

Percolation Tests (BRE Digest 365)

Infiltration testing was performed at three locations in accordance with BRE Digest 365 'Soakaway Design'. Details are presented in Appendix V. The Test Pits were opened to approximately 2.00 metres deep in gravelly boulder CLAY and detailed logs were prepared.

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

The infiltration rate is the volume of water dispersed per unit exposed area per unit of time, and is generally expressed as metres/minute or metres/second. In these calculations the exposed area is the sum of the base area and the average internal area of the pit sides over the test duration.

Designs are based on the slowest infiltration rate, which is generally calculated from the final cycle. In each location no fall in water level was measured over the test period and the results confirm the very low permeability of the glacial till or boulder clay.

III. Testing

(a) In-Situ

Standard penetration tests were carried out in the boreholes at 1.00 metre intervals to establish relative soil strength. In addition SPT values were also established at intervals during rotary drilling. Results are presented in the right hand column of the boring and drilling records and are summarised as follows in Table B.

TABLE B

Stratum / Depth	N Value Range	Comment
FILL DEPOSITS	3 to 25	Variable soft to stiff
BROWN BOULDER CLAY		
1.00 metres BGL	18 to 24	Stiff
2.00 metres BGL	21 to 44	Stiff to Very Stiff
BLACK BOULDER CLAY		
3.00 metres BGL	28 to 55	Stiff to Hard
4.00 metres BGL	44 to 64	Hard
5.00 metres BGL	42 to 56	Hard
> 5.00 metres BGL	40 to 60	Hard

Refusal of SPT apparatus was recorded on numerous boulders throughout and at the base of the respective boreholes.

(b) Laboratory

A programme of laboratory testing was scheduled following completion of site operations. Geotechnical soil testing was carried out by IGSL in it's INAB-Accredited laboratory. Chemical and Environmental testing was carried out in the UK by specialist laboratory. All test results are presented in Appendices VIa and VIb. The test programme includes the following elements:

- Liquid and Plastic Limits / Moisture Content
- PSD Grading by wet sieve and hydrometer.
- Sulphate and pH
- RILTA Environmental Suite

Individual test results are discussed in the following paragraphs.

Classification

Thirteen samples from the boreholes and trial pits had index properties established. Results consistently fall into Zones CL and CI of the standard Classification, indicative of low plasticity sensitive clay matrix soils.

Two samples have been classified as clay-bound sandy GRAVEL. Moisture content for the clay samples range from 8% to 18% while for the gravel samples moisture contents of 3.9 and 8.1% were established.

Grading

Wet sieve analysis and hydrometer was used to establish PSD grading curves for samples of the boulder clay. The graphs reflect material graded from the clay to gravel fraction, the straight line pattern of the graphs is typical of the local boulder clays.

Two graphs from the more granular soils confirm coarser grading in the sand gravel fraction with up to 18% of material passing to the fine silt/clay fraction.

Sulphate and pH.

Three soil samples were selected for sulphate and pH analysis. Sulphate concentrations (SO₄ 2:1 extract) of from < 0.010 g/l to 0.076 g/l were established with pH values from 7.6 to 8.6. 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.

RILTA Environmental

Twenty-five soil samples were submitted for detailed environmental analysis to RILTA (WAC) parameters. The results confirm that the soils can be classified as INERT with no elevated contaminant levels recorded on any of the samples submitted. Results indicate that material excavated from this site can be readily disposed of either on-site or to a licensed landfill facility.

No asbestos traces were found during routine screening.

IV. Discussion:

The new development is to be carried out on a Brownfield site located at Airton Road in Tallaght.

A comprehensive site investigation has been carried out for BMCE and Airton Road Properties Ltd. to establish design parameters for new structures and confirm that the sub soils are not contaminated.

Summary Stratification

The findings reflect the general stratification of the Airton Road / Tallaght area where GLACIAL TLL deposits are encountered below superficial surface soils comprising FILL / OLD TOPSOIL / RECENT SANDY CLAY OR SILT.

The glacial till comprises firm to stiff brown sandy gravelly CLAY (Brown Boulder Clay) overlying at an approximate depth of 2.00 metres very stiff to hard black silty gravelly CLAY (Black Boulder Clay or Lodgement Till)

Exploratory holes have been formed using both cable percussion and rotary drilling to depths in excess of 15.00 metres. Bedrock was not encountered within this depth zone.

Pockets or more extensive zones of GRAVEL can typically and randomly occur within the cohesive boulder clay deposits. These are generally water bearing.

Variation in the general grading pattern of the till can also occur, with a higher granular content and increased moisture content classifying the material as either clay or silt bound sandy GRAVEL.

Foundations

The made ground encountered over the site area is variable in both composition and compaction and no information is available as to it's origin and method of placement.

This material is therefore regarded as unsuitable as a founding medium and structural loads should be transferred to the competent underling boulder clays.

The following table outlines the allowable bearing pressures available in the various strata at various depths BGL based on in-situ test results, visual assessment of soils during trial pit excavation and consideration of the geotechnical laboratory data.

The characteristics of the local boulder clays are well documented in numerous publications. These have also been considered in preparing this report.

TABLE C

Stratum	Depth	Allowable Bearing Pressure
FILL	GL to 2.00	Not Suitable
Brown Boulder CLAY	1.00 m	200 KPa
	2.00 m	250 KPa
Black Boulder CLAY	2.00 m	250 KPa
	3.00 m	300 KPa
	4.00 m +	400 Kpa

Settlement in the glacial till under the above loads will be less than 10mm in the brown boulder clay and less than 5mm in the black lodgement till.

Conventional reinforced strip or pad foundations are therefore recommended for this development. If basements are proposed the black lodgement till below 2.00 metres will be the obvious founding medium with allowable bearing pressures probably exceeding design requirements.

Significant ground water ingress during shallow foundation construction is not expected. Should isolated seepages occur they will be readily controlled using light pumping from local sumps.

Installed standpipes indicate that the final standing ground water level is approximately 1.20 metres BGL. This will be significant if basement construction is envisaged.

Visual inspection of all foundation excavation is strongly recommended to ensure uniformity and suitability of the founding medium. Any soft or suspect material should be removed and replaced with low-grade concrete.

Excavation

Trial Pit excavations were quite stable and foundation or trench excavations should remain stable during the construction period.

Statutory safety regulations should however be observed. These prohibit personnel entering unsupported excavations greater than 1.20 metres deep, irrespective of apparent stability.

The very high strength of the black boulder clay and presence of boulders may present excavation difficulties. Experienced local contractors will be well acquainted with excavation in this material and plant requirements for the purpose.

Ground Water / Gas

Ground water and gas levels were monitored in the three installed standpipes over two site visits after completion of works. Full details are presented in Appendix II.

Water levels ranged from 3.25 to 4.40 metres BGL on the initial visit with levels rising to 2.30 to 3.80 metres BGL one month after completion of drilling. A final standing water table of 1.50 to 2.00 metres BGL can be expected and would be typical of the local boulder clay deposits.

Landfill gas concentrations were also established at both site visits. Levels for CH₄, CO₂, O₂, CO and H₂S were negligible and no issues relating to gas generation arise.

Roads

CBR values have been established at seven locations over the site area. Tests were carried out on generally granular material (FILL) at a depth of 0.50 metres.

High values were established with an average CBR in excess of 10% indicating suitability for road or car park construction.

We would recommend careful visual inspection of excavated formation to ensure that all top soil and organic peaty soils is removed.

Percolation (BRE Digest 365)

Three percolation tests carried out in the gravelly boulder clay all recorded refusal. The results are typical of the highly impermeable soils of the greater Dublin area.

Disposal of storm or surface water to the local authority system or to a suitable watercourse should be considered.

Concrete

Low sulphate content and near neutral pH values confirm that no special precautions are required for protection of foundation concrete.

Environmental

Comprehensive RILTA Suite (WAC) testing confirms that the made ground and sub soil is INERT and no issues arise as to safety of personnel on site or disposal of excavated material either on or off site.

IGSL/JC
July 2019

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