

VOLUME III – APPENDICES to ENVIRONMENTAL IMPACT ASSESSMENT REPORT

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LARGE-SCALE RESIDENTIAL DEVELOPMENT PLANNING
APPLICATION

FORMER CHADWICKS SITE,
GREENHILLS ROAD, WALKINSTOWN,
DUBLIN 12

FEBRUARY 2025

SUBMITTED ON BEHALF OF:
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APPENDIX 5.1

Bat Survey

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May
2024

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Bat Survey Report



**Greenhills Rd,
Walkinstown,
Dublin**

ASH Ecology & Environmental



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1. INTRODUCTION

1.1 Purpose of the Report

Ash Ecology and Environmental Ltd (AEE) was commissioned by Hughes Planning & Development Consultants to carry out a series of bat emergence and activity surveys at a site located along Greenhills Rd, Walkinstown, Co. Dublin; see Figure 1 and 2 for location. The surveys were conducted in relation to the proposed demolition of existing warehouse buildings and the development of a residential project. Due to the number of vacant buildings on the site scheduled for demolition, bat surveys were required to assess any bat usage on the site.

Previous surveys by the author were carried out for a previous application for the site, including an emergence bat survey on 21/04/2021, 01/03/2022 and 18/10/2023. None of the previous surveys in 2021, 2022, or 2023 detected bats; however, these surveys were carried out late or early in the bat season, which may have affected the results.

The most recent survey was conducted on 09/05/2024, during favourable weather conditions and within the optimal timeframe for bat activity. This survey recorded bat activity on the site, with Common Pipistrelle and Leisler's Bat observed foraging and commuting in the area. The findings of this survey, along with the previous surveys, are discussed in detail in the following sections of this report, along with recommendations for mitigation measures to minimize the impact on bats and other wildlife during the proposed demolition and construction works.

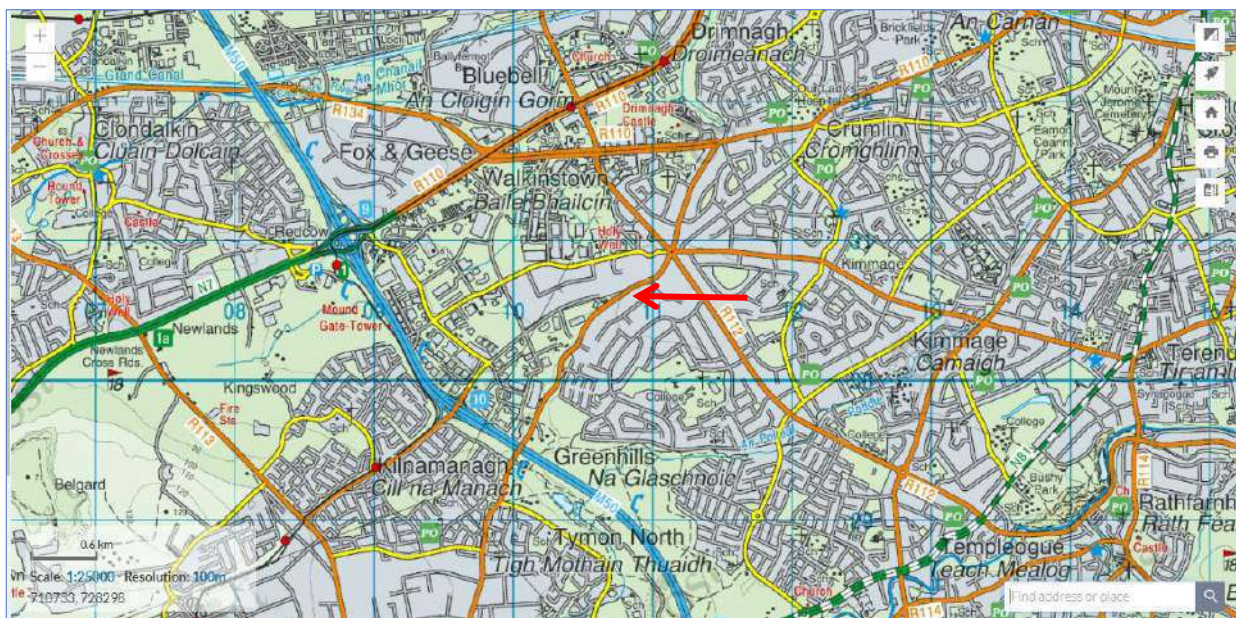


Figure 1 Site Location Map, red arrow.



Figure 2 Aerial Photo of the Site.

1.2 Competency of Assessor

This report has been prepared by Ash Ecology & Environmental Ltd (AEE) whose managing director and leading ecologist is Aisling Walsh who is a full member of the Chartered Institute of Ecological & Environmental Management (CIEEM) while the company, AEE, is a Registered Practice by the CIEEM.

Aisling's qualifications include M.Sc. (Dist) in Biodiversity and Conservation (TCD) and B.Sc. (Hons) Zoology (NUIG), a Diploma in Applied Aquatic Science (GMIT) and a Certificate in Applied Biology (GMIT).

Aisling is a licenced bat ecologist (example of recent: DER/BAT 2020 – 46 EUROPEAN, DER/BAT 2020 – 48 EUROPEAN, DER/BAT 2021 – 89 EUROPEAN, DER/BAT 2022 – 12 EUROPEAN, DER/BAT 2023 – 23 EUROPEAN, DER/BAT 2023 – 106 EUROPEAN, DER/BAT 2023 – 135 EUROPEAN and DER/BAT 2024 - 25 EUROPEAN) and a member of Bat Conservation Ireland and associate member of the Institute of Lighting Professionals (ILP). In addition she has completed several bat courses to continue her training and CPD e.g. a Lantra-accredited course, developed by the Bat Conservation Trust and supported by the Arboricultural Association to access bat tree roost features and a course in 'Understanding Obtrusive Light' accredited by the Institute of Lighting Professionals. Over the past 17 years Aisling has completed several hundred bat surveys providing her with more than adequate experience in the profession.

1.3 Bat Legislation

All bat species are protected under the Wildlife Act 1976 to 2021 which make it an offence to wilfully interfere with or destroy the breeding or resting place of these species; however, the Acts permit limited exemptions for certain kinds of situations.

Section 23 of the Wildlife Act 1976 to 2021 contains several exemptions to the protection given to the species listed for protection on Schedule 5 (e.g. for agriculture or construction). In 2005 a further amendment through the European Communities (Natural Habitats) (Amendment) Regulations 2005 (S.I. No. 378 of 2005) removed all of the exemptions provided in Section 23(7) of the Wildlife Act 1976 to 2021 insofar as they relate to Annex IV species, including all species of bats. Those 2005 Regulations were revoked in 2011 except for Regulation 2 which brings about this strengthened protection for bats (and other Annex IV species). All species of bats in Ireland are listed on Schedule 5 of the 1976 Act, and are therefore subject to the provisions of Section 23, which make it an offence to:

- Intentionally kill, injure or take a bat;
- Wilfully interfere with the breeding or resting place of a bat

The Council Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora ("the Habitats Directive") seeks to protect rare and vulnerable species, including all species of bats, and their habitats and requires that appropriate monitoring of populations be undertaken. All species of bat found in Ireland are listed on Annex IV of the Directive. Member States are required to put in place a system of strict protection (as outlined in Article 12) for species listed on Annex IV ('European protected species'). The lesser horseshoe bat is further protected under Annex II. This Annex relates to the designation of

Special Areas of Conservation (SACs). The Habitats Directive is transposed into Irish law by the European Communities (Birds & Natural Habitats Regulations) 2011 (S.I. No. 477 of 2011) ("the Habitats Regulations"). Under the Habitats Regulations (2011), all bat species are listed on the First Schedule and Regulation 51 makes it an offence to:

- Deliberately capture or kill a bat;
- Deliberately disturb a bat particularly during the period of breeding, hibernating or migrating;
- Damage or destroy a breeding site or resting place of a bat;
- Keep, sell, transport, exchange, offer for sale or offer for exchange any bat taken in the wild.

Across Europe, bats are further protected under the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982), which, in relation to bats, exists to conserve all species and their habitats. The Convention on the Conservation of Migratory Species of Wild Animals (CMS, Bonn Convention 1979) was instigated to protect migrant species across all European boundaries. EUROBATS (a daughter Agreement under CMS) is of particular relevance in relation to cooperation across international borders for the conservation of bats, many of which are known to migrate long distances. The Irish government has ratified both of these conventions as well as the EUROBATS Agreement.

1.4 Derogation licences

It is an offence, under Regulation 51 of the European Communities (Birds and Natural Habitats) Regulations, 2011 ('the 2011 Regulations') to:

- a) Deliberately capture or kill a bat in the wild;
- b) Deliberately disturb a bat particularly during the period of breeding, rearing, hibernation and migration;
- c) Damage or destroy a bat's breeding site or resting place, or;
- d) Keep, transport, sell, exchange, offer for sale or offer for exchange any bat taken in the wild, other than those taken legally before the Habitats Directive before the Habitats Directive was implemented.

A person may apply to the Minister under Regulation 54 of the 2011 Regulations for a derogation licence to carry out one or more of these prohibited activities. But, the Minister may only grant such a derogation licence if three criteria are met.

Firstly the Minister may only grant a derogation licence if it is for one of the following specified reasons listed in Regulation 54:

- a) In the interests of protecting wild fauna and flora and conserving natural habitats;
- b) To prevent serious damage, in particular to crops, livestock, forests, fisheries and water and other types of property;
- c) In the interests of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or

-
- economic nature and the beneficial consequences of primary importance for the environment;
- d) For the purpose of research and education, of repopulating and introducing these species and for the breeding operations necessary for these purposes, including the artificial propagation of plants, or;
 - e) To allow, under strictly supervised conditions, on a selective basis and to a limited extent, the taking or keeping of bats.

Secondly, the Minister may only issue a derogation if there is no alternative to carrying out the prohibited activity. The first aim of the developer, whether from a private company or a public authority, working with professional advice, should be to entirely avoid any potential impact of a proposed development on bats and their breeding and resting places. Alternatives may involve redesigning a development so that bat roosts, and associated commuting routes and feeding areas are kept intact and that bats are not disturbed, for example by inappropriate lighting. It should be noted that the European Commission has a specific understanding of satisfactory alternative solution. "An alternative solution cannot be deemed unsatisfactory merely because it would cause greater inconvenience or compel a change in behaviour" (European Commission, 2021, page 13)¹. Decisions about what solution is satisfactory must be science-based and should solve the problem of how to strictly protect the bats in light of the development.

Thirdly the Minister may only grant a derogation if it is not detrimental to the maintenance of the populations of bats at a favourable conservation status (FCS) in their natural range. There is case law from the Court of Justice of the European Union (CJEU) to back this up. One example is the Finnish Wolf Case C-674/17. The ruling establishes that the Member State must "clearly and precisely" identify in the derogation what the objectives of the derogation are. It must also establish that the derogation is capable of achieving those objectives and demonstrate that there is no satisfactory alternative. Cumulative effects of derogations must be taken into account when issuing derogations. The maximum number of all derogations must not be detrimental to the maintenance or restoration of the population at FCS. Consideration must be given to other human causes of mortality. Any risk to FCS must be ruled out by detailed conditions based on the level of population, its conservation status and its biological characteristics. The conditions must be precisely defined and they must be monitored to ensure they are implemented.

If any of these three criteria are not satisfied, the Minister cannot issue a derogation licence. It must never be assumed that a derogation licence will automatically be granted.

In summary, it is clear that a developer must first look to avoid all impacts on bats. This may mean looking at alternative solutions and redesigning the project accordingly. If this is not possible, the developer needs to check whether there are grounds to apply for a derogation licence, based on the reasons given in Regulation 54 of the Habitats Regulations. When applying for a derogation licence the developer must clearly state the reason and describe in detail all alternative

¹ <https://op.europa.eu/en/publication-detail/-/publication/bbc7ace0-27e2-11ec-bd8e-01aa75ed71a1/language-en>

solutions which were given serious consideration. Any mitigation intended to ensure that there is no impact or minimal impact on the bats must be clearly described in detail, giving examples of how it worked in other places.

If a derogation licence has been refused by the Minister, any aspect of the development for which the derogation licence was sought, must not go ahead, no matter what other permissions are in place.

A derogation licence is required when on the basis of survey information and specialist knowledge, it appears that:

- The site in question is a breeding site or resting place for bats and/or;
- The proposed activity could impact on a breeding site or resting place of a bat.

No licence is required if the proposed activity is unlikely to result in an offence. The advice given in this document (and see also Mullen et al. 2021)² should assist the proponent, or those acting on their behalf, in arriving at a decision on this matter, though it must be recognised that determining whether a particular site is used as a breeding or resting place can be problematic for such mobile animals as bats. Determining whether an activity undertaken near to a roost might impact on that roost (e.g. by removing important flight lines or foraging areas) will also require specialist assessment. Note that if the proposed activity can be timed, organised and carried out so as to avoid committing an offence then no licence is required.

Examples of works that are likely to need a licence because they may result in the destruction of a breeding or resting place and/or disturbance of bats include:

- Demolition of buildings known to be used by bats;
- Conversion of barns or other buildings known to be used by bats;
- Restoration of ruined or derelict buildings;
- Maintenance and preservation of heritage buildings;
- Introduction of artificial lighting inside a roost or near a roost entrance;
- Change of use of buildings resulting in increased ongoing disturbance;
- Removal of trees known to be used by bats;
- Significant alterations to roof voids known to be used by bats. Examples of works that, if carefully planned, may not need a licence include:
 - Works near to or at roosts (e.g. re-roofing) if carried out while bats are not present and the access points and roosting area are not affected;
 - Remedial timber treatment, carried out with the correct (non-toxic to bats) chemicals while bats are not present.

² Mullen, E., Marnell, F & Nelson, B. (2021) Strict protection of animal species. Guidance for public authorities on the application of Articles 12 and 16 of the EU Habitats Directive to development/works undertaken by or on behalf of a public authority. Unpublished Report, National Parks and Wildlife Service. Department of Housing, Local Government and Heritage, Dublin. <https://npws.ie/sites/default/files/files/article-12-guidance-final.pdf>

2. METHODOLOGY

2.1 Information Sources

A desk-based review of information sources was completed. Information contained on the websites of the National Parks and Wildlife Service (NPWS)³ and the National Biodiversity Data Centre (NBDC)⁴ was reviewed.

The following publications and websites were also reviewed and consulted:

- Reason, P.F. and Wray, S. (2023). UK Bat Mitigation Guidelines: a guide to impact assessment, mitigation and compensation for developments affecting bats. Chartered Institute of Ecology and Environmental Management (CIEEM), Ampfield.
- Marnell, F., Kelleher, C. & Mullen, E. (2022) Bat mitigation guidelines for Ireland v2. Irish Wildlife Manuals, No. 134. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland.
- Mullen, E., Marnell, F & Nelson, B. (2021) Strict protection of animal species. Guidance for public authorities on the application of Articles 12 and 16 of the EU Habitats Directive to development/works undertaken by or on behalf of a public authority. Unpublished Report, National Parks and Wildlife Service. Department of Housing, Local Government and Heritage, Dublin. <https://npws.ie/sites/default/files/files/article-12-guidance-final.pdf>
- Bat Conservation Trust (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd edition
- Bat Conservation Ireland <https://www.batconservationireland.org/>
- Bat Roosts in Trees: A Guide to Identification and Assessment for Tree-Care and Ecology Professionals (2018)
- Bat Conservation Trust (2018) Bats and artificial lighting in the UK Bats and the Built Environment series⁵
- Mitchell-Jones, A.J, & McLeish, A.P. (eds). 2004., 3rd Edition Bat Workers' Manual, JNCC, Peterborough, ISBN 1 86107 558 8
- Bat Conservation Ireland (2012) Bats and Appropriate Assessment Guidelines, Version 1, December 2012. Bat Conservation Ireland, www.batconservationireland.org⁶
- Bat Conservation Ireland (2010) Bats & Lighting Guidance Notes for: Planners, engineers, architects and developers⁷
- Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (National Roads Authority, 2005).
- Guidelines for the Treatment of Bats during the Construction of National Road Schemes (National Roads Authority, 2005).
- Bats and Lighting in the UK – Bats and the Built Environment Series (Institute of Lighting Professionals, September 2011)

³ The National Parks and Wildlife Services map viewer <http://webgis.npws.ie/npwsviewer/>

⁴ The National Biodiversity Data Centre www.NBDC.ie

⁵ <https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/>

⁶ https://www.batconservationireland.org/wp-content/uploads/2013/09/BCIreland-AA-Guidelines_Version1.pdf

⁷ https://www.batconservationireland.org/wp-content/uploads/2013/09/BCIrelandGuidelines_Lighting.pdf

- Bats and Lighting – Guidance Notes for Planners, Engineers, Architects and Developers (Bat Conservation Ireland);
- The Eurobats Mitigation of Lighting Document
- Entwistle, A. et al (2001) Habitat Management for Bats A Guide for Land Managers, Land Owners and Their Advisors, Joint Nature Conservation Committee (JNCC, Great Britain)
- IPL and BCT (2023) Guidance Note GN08/23 Bats and Artificial Lighting At Night

2.2 Desk Study

2.2.1 Previous Records

A desktop review was carried out to identify the previous records of Bat species within the Proposed Development Site and its environs. The study area occurs in 10km² Grid Square O13. The website the NBDC (www.nbdc.ie) was accessed on 11/05/2024 to establish any previous bat records and shown below in Table 1.

Table 1 Historical Bat Records in 10km² Grid Square O13 (NBDC website www.nbdc.ie accessed 11/05/2024)

Species Name - Common	Species Name - Latin	Last Documented Record O13
Brown Long-eared Bat	<i>Plecotus auritus</i>	08/07/2021
Daubenton's Bat	<i>Myotis daubentonii</i>	08/08/2023
Lesser Noctule	<i>Nyctalus leisleri</i>	08/08/2023
Nathusius's Pipistrelle	<i>Pipistrellus nathusii</i>	15/09/2020
Natterer's Bat	<i>Myotis nattereri</i>	06/06/2021
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>	21/11/2022
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	08/08/2023
Whiskered Bat	<i>Myotis mystacinus</i>	13/08/2007

2.2.2 Species Background

Ireland had ten known bat species until February 2013, when a single live greater horseshoe bat (*Rhinolophus ferrumequinum*) was found roosting in Co. Wexford⁸. On 8th June 2020, a single audio recording was confirmed in the Glendaough area, Co. Wicklow. It was found on two more occasions in the same area in early July 2020 (Bat Conservation Ireland, July 2020).

The ten species (excluding the greater horseshoe) are briefly described overleaf. For a more comprehensive overview see McAney, 2006.⁹

The dependence of Irish bat species on insect prey has left them vulnerable to habitat destruction, land drainage, agricultural intensification and increase use of pesticides. Also, their reliance on buildings as roosting sites has made them particularly vulnerable to renovation works and the use of timber chemical treatment. Buildings are highly important as roosting sites for bats and all Irish bat species use buildings for all roost types. Most significant in terms of roosts in houses

⁸ National Biodiversity Data Centre <http://www.biodiversityireland.ie/new-bat-species-found-in-ireland/>

⁹ McAney, K. (2006) *A Conservation Plan for Irish Vesper Bats*. Irish Wildlife Manual No.20. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government.

are maternity roosts, but cellars and even attics may serve as hibernation sites for bats. Roosts within buildings can far exceed the numbers encountered in trees, bridges, caves or cliffs and roosts of over 1,000 bats have been recorded in buildings.¹⁰

2.2.2.1 Family Vespertilionidae:

Common pipistrelle *Pipistrellus pipistrellus*

This species was only recently separated from its sibling, the soprano or brown pipistrelle *P. pygmaeus*¹¹, which is detailed below. The common pipistrelle's echolocation calls peak at 45 kHz. The species forages along linear landscape features such as hedgerows and treelines as well as within woodland.

Soprano pipistrelle *Pipistrellus pygmaeus*

The soprano pipistrelle's echolocation calls peak at 55 kHz, which distinguishes it readily from the common pipistrelle on detector. The pipistrelles are the smallest and most often seen of our bats, flying at head height and taking small prey such as midges and small moths. Summer roost sites are usually in buildings, but tree holes and heavy ivy are also used. Roost numbers can exceed 1,500 animals in mid-summer.

Nathusius' pipistrelle *Pipistrellus nathusii*

Nathusius' pipistrelle is a recent addition to the Irish fauna and has mainly been recorded from the north-east of the island in Counties Antrim and Down¹² and also in Fermanagh, Longford and Cavan. It has also recently been recorded in Counties Cork and Kerry.¹³ However, the known resident population is enhanced in the autumn months by an influx of animals from Scandinavian countries. The status of the species has not yet been determined.

Leisler's bat *Nyctalus leisleri*

This species is Ireland's largest bat, with a wingspan of up to 320mm; it is also the third most common bat, preferring to roost in buildings, although it is sometimes found in trees and bat boxes. It is the earliest bat to emerge in the evening, flying fast and high with occasional steep dives to ground level, feeding on moths, caddisflies and beetles. The echolocation calls are sometimes audible to the human ear being around 15 kHz at their lowest. The audible chatter from their roost on hot summer days is sometimes an aid to location. This species is uncommon in Europe and as Ireland holds the largest national population the species is considered as Near Threatened here.

Brown long-eared bat *Plecotus auritus*

This species of bat is a 'gleaner', hunting amongst the foliage of trees and shrubs, and hovering briefly to pick a moth or spider off a leaf, which it then takes to a sheltered perch to consume. They often land on the ground to capture their prey.

¹⁰ NRA (2005) Guidelines for the Treatment of Bats Prior to the Construction of National Road Schemes. National Roads Authority, Dublin

¹¹ Barratt, E. M., Deauville, R., Burland, T. M., Bruford, M. W., Jones, G., Racey, P. A., & Wayne, R. K. (1997) *DNA Answers the Call of Pipistrelle Bat Species*. *Nature* 387: 138 - 139.

¹² Richardson, P. (2000) *Distribution Atlas of Bats in Britain and Ireland 1980 - 1999*. The Bat Conservation Trust, London, England.

¹³ Kelleher, C. (2005) *International Bat Fieldcraft Workshop, Killarney, Co. Kerry*. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government.

Using its nose to emit its echolocation, the long-eared bat 'whispers' its calls so that the insects, upon which it preys, cannot hear its approach (and hence, it needs oversized ears to hear the returning echoes). As this is a whispering species, it is extremely difficult to monitor in the field as it is seldom heard on a bat detector. Furthermore, keeping within the foliage, as it does, it is easily overlooked. It prefers to roost in old buildings.

Natterer's bat *Myotis nattereri*

This species has a slow to medium flight, usually over trees but sometimes over water. It usually follows hedges and treelines to its feeding sites, consuming flies, moths, caddisflies and spiders. Known roosts are usually in old stone buildings but they have been found in trees and bat boxes. The Natterer's bat is one of our least studied species and further work is required to establish its status in Ireland.

Daubenton's bat *Myotis daubentonii*

This bat species feeds close to the surface of water, either over rivers, canals, ponds, lakes or reservoirs but it can also be found foraging in woodlands. Flying at 15 kilometres per hour, it gaffs insects with its over-sized feet as they emerge from the surface of the water - feeding on caddis flies, moths, mosquitoes, midges etc. It is often found roosting beneath bridges or in tunnels and also makes use of hollows in trees.

Whiskered bat *Myotis mystacinus*

This species, although widely distributed, has been rarely recorded in Ireland. It is often found in woodland, frequently near water. Flying high, near the canopy, it maintains a steady beat and sometimes glides as it hunts. It also gleans spiders from the foliage of trees. Whiskered bats prefer to roost in buildings, under slates, lead flashing or exposed beneath the ridge beam within attics. However, they also use cracks and holes in trees and sometimes bat boxes. The whiskered bat is one of our least studied species and further work is required to establish its status in Ireland.

Brandt's bat *Myotis brandtii*

This species is known from five specimens found in Counties Wicklow (Mullen, 2007), Cavan, and Clare in 2003, a specimen in Kerry in 2005¹⁴ and another in Tipperary in 2006.¹⁵ No maternity roosts have yet been found. It is very similar to the whiskered bat and cannot be separated by the use of detectors. Its habits are similar to its sibling.

2.2.2.2 Family *Rhinolophidae*:

Lesser horseshoe bat *Rhinolophus hipposideros*

This species is the only representative of the *Rhinolophidae* or horseshoe bat family in Ireland. It differs from our other species in both habits and looks, having a unique nose leaf with which it projects its echolocation calls. It is also quite small and, at rest, wraps its wings around its body. Lesser horseshoe bats feed close to the

¹⁴ Kelleher, C. 2006a *Nathusius pipistrelle* *Pipistrellus nathusii* and Brandt's Bat *Myotis brandtii* - New Bat Species to Co. Kerry – Irish Naturalists' Journal 28: 258.

¹⁵ Kelleher, C. 2006b Brandt's Bat *Myotis brandtii*, New Bat Species to Co. Tipperary. Irish Naturalists' Journal 28: 345.

ground, gleaning their prey from branches and stones. It often carries its prey to a perch to consume, leaving the remains beneath as an indication of its presence.

The echolocation call of this species is of constant frequency and, on a heterodyne bat detector, sounds like a melodious warble. The species is confined to six counties along the Atlantic seaboard: Mayo, Galway, Clare, Limerick, Kerry and Cork. The current Irish national population is estimated at 12,500 animals. This species is listed on Annex II of the EC Habitats Directive and 41 Special Areas of Conservation have been designated in Ireland for its protection. Where it occurs, it is often found roosting within farm buildings.

2.2.3 Landscape Suitability

The National Biodiversity Data Centre (NBDC) maps landscape suitability bats based on Lundy *et al.* (2011). The maps are a visualisation of the results of the analyses based on a 'habitat suitability' index. The index ranges from 0 to 100 with 0 being least favourable and 100 most favourable for bats. The average overall for the higher suitability is 36.4-58.6. The average assessment of bat habitats in the current study area is 23.67– low. Table 2 gives the suitability of the study area for the bat species found in the study area (based on NBDC) along with their Irish Red List Status (from Marnell *et al.*, 2019).¹⁶

Table 2 Suitability of the study area for the bat species found in the Walkinstown area (based on the NBDC data) with Irish Red list status indicated.

Common name	Scientific name	Suitability index	Irish red list status
All bats	-	23.67	Least Concern
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	35	Least Concern
Brown long-eared bat	<i>Plecotus auritus</i>	28	Least Concern
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	39	Least Concern
Lesser-horseshoe bat	<i>Rhinolophus hipposideros</i>	0	Least Concern
Leisler's bat	<i>Nyctalus leisleri</i>	42	Least Concern
Whiskered bat	<i>Myotis mystacinus</i>	20	Least Concern
Daubenton's bat	<i>Myotis daubentonii</i>	18	Least Concern
Nathusius' pipistrelle	<i>Pipistrellus nathusii</i>	15	Least Concern
Natterer's bat	<i>Myotis nattereri</i>	16	Least Concern

2.2.4 Bat Roosts

Bats were originally cave and tree dwelling animals but many now find buildings just as suitable for their needs. Bats are social animals and most species congregate in large colonies during summer. These colonies consist mostly of females of every reproductive class, with some juvenile males from the previous year. Male bats normally roost individually or in small groups meeting up with the females in the late autumn-early winter, when it is time to mate. In summer, bats seek warm dry buildings in which they can give birth and suckle their young. In winter, they seek out places with a constant low temperature and high humidity where they can become torpid and hibernate during adverse weather conditions. However, bats do not hibernate continuously during winter and will awake and

¹⁶ Marnell, F., Looney, D. & Lawton, C. (2019) Ireland Red List No. 12: Terrestrial Mammals. National Parks and Wildlife Service, Department of the Culture, Heritage and the Gaeltacht, Dublin, Ireland.

hunt during mild nights when there are insects available, and it is energetically advantageous to forage.

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2.2.4.1 Maternity Roosts

Maternity roosts are the most significant roosts and they are predominantly all-female aggregations that are formed from late May onwards and remain as a relatively cohesive unit until mid to late August. Not all female bats give birth annually. These females that do bear young in a given year avail of a suitable building, tree and sometimes cave (or equivalent). The young are flightless for several weeks and hence are vulnerable to dangers such as tree felling and restoration, reinforcement or demolition of structures such as buildings and bridges.

2.2.4.2 Mating Roosts

Most bat species mate in autumn but pregnancy does not occur until the following spring. During this time males will take possession of a cavity in a building, tree, bridge, cave or mine and attract females to these sites to establish a harem. Male bats call both from a perch and in flight in much the same manner that male birds sing.

2.2.4.3 Hibernation Roosts

Bats have a high metabolic rate and in temperate countries, such as Ireland, flying insects are not available in sufficient numbers during winter to sustain bats. Therefore, bats hibernate during winter. In hibernation sites, bats are often completely inactive for several days and are extremely vulnerable to disturbance by human activities due to the time taken for them to become sufficiently active to allow escape. Hibernation may extend from November to the end of March, during which time bat activity will take place sporadically.

2.2.4.4 Night Roosts

These are roosts which are used as resting places for bats between foraging bouts. They also provide retreats for bats from predators or during inclement weather conditions. They also function as feeding perches and may be important for socialising.

2.3 Bat Activity and Emergence Survey Methodology

Previous bat surveys of the site was carried out by the author on 21st April 2021 and 1st March 2022 and 18th October 2023 with no bats detected. The current survey was carried out 9th May 2024. Surveys followed the BCT Guidelines 2016 for the April 2021 and March 2022 survey. The new BCT Guidelines 2023 was used for the October 2023 and May 2024 surveys, and involved walking the site boundary to survey the access any activity and monitor buildings to assess any activity within. Weather conditions were suitable during all four surveys. Sunset on May 9th 2024 was 21.09 and the survey commenced a half hour prior (20.40) and lasted 2.5 hours. The weather was very favourable for the May 2024 survey with temperatures was 17-18°C in calm, dry conditions.

The May 2024 survey was carried out within the optimal timeframe for general activity and emergence surveys as per BCT Guidelines 2023, see Table 3.

The equipment used for all bat emergence and activity surveys included a two person assessment with 3 x Elekon Bat Logger M detectors to cover all areas of site with results merged. Visual observations were taken with the aid of a powerful L.E.D. torch (AP Pros-Series 220 Lumens High Performance Spotlight) and Celestron 12x56 Prism Binoculars. Any bat activity would be recorded with GPS coordinates with the bat detector and plotted on a map.

All spaces that could potentially allow bats access the buildings were visually examined in detail for bats, signs of bats, or evidence of bat activity, using a torch where necessary. Cracks, crevices etc. were investigated for ingress / egress points and evidence of bat habitation, such as prey items, smearing lines, droppings, and staining. The floor, and other elevated surfaces were examined closely for bat droppings. The 2023 BCT guidelines were followed for the assessment rating¹⁷ and classification which is shown as Table 4.

The buildings onsite were grouped into 17 areas to facilitate the interpretation of results, see Figure 3.

Photos of the 17 areas, along with general site photos from May 2024 are contained in Appendix A.

¹⁷ Bat Surveys for Professional Ecologists, 4th Edition Good Practice Guidelines (2023)

Table 3 Recommended Survey Times for Survey Types described in Table 2.2. of the BCT 2023 Guidelines.

Survey type	Month											
	J	F	M	A	M	J	J	A	S	O	N	D
Daytime Bat Walkover (DBW)												
PRA – structures												
Emergence survey for maternity or summer roosts ^b												
Emergence survey for transitional/occasional roosts ^b												
Re-entry surveys ^c												
Emergence survey for mating roosts ^b												
Hibernation survey – structures ^a												
GLTA ^d												
PRF inspection survey – trees												
Ground-level bat activity survey – night-time walkover surveys and automated/static												
Pre-, during and post-hibernation – automated/static bat activity survey												
Swarming survey ^e												
Back-tracking survey												
Trapping and radio-tagging survey ^f												

= optimal period
 = sub-optimal period

= weather or location dependent (i.e. may not be suitable due to spring and autumn conditions in any one year or in more northerly latitudes). Note that October emergence surveys are not acceptable in Scotland.

= it is not acceptable to trap bats when they are heavily pregnant and have dependent pups. Mothers need to optimise foraging due to the physiological demands of pregnancy and lactation, and pups need to be regularly fed. Interrupting these activities could potentially have an impact on breeding success in the year in question. The timing of birth can vary between years – it may be as early as the end of May or as late as the start of August, therefore caution should be exercised and local information gained on birth dates before trapping activities are carried out during the summer months. Any information gained and decisions made should be kept as a record.

a Not including trees.
b Please see Chapter 7 for recommended timings for surveys to give confidence in a negative result. For sites assessed as having low suitability, a survey should be carried out between May and August. For sites with moderate and high suitability, a proportion of the surveys should be carried out between May and August (to detect maternity roosts if present) but some of the surveys may be carried out later in the year in order to detect transitional and mating roosts. The survey season for presence/likely absence surveys is defined as May to September. Roost characterisation surveys may be appropriate in April and/or October depending on the need to characterise transitional/occasional roosts at these times.
c The time that bats return to their roosts is very variable and therefore re-entry surveys are no longer recommended as a standard approach. If they are carried out the constraints should be recognised.
d GLTAs can be sub-optimal in the spring, summer and autumn due to foliage obscuring parts of the tree. If all parts of the tree are visible then the survey can be carried out at any time. If parts of the tree are obscured by foliage then it is not possible to carry out a thorough survey and this limitation should be recognised and the impact on the results acknowledged. Please refer to Chapter 6 for more information.
e Different species show a peak in swarming activity at different times, e.g. Daubenton's bat activity tends to peak in August whilst Natterer's bat activity tends to peak in September (Tomlinson, 2020) and therefore surveying across the swarming season is likely to be important.
f Trapping and tagging in cooler conditions can make release of bats difficult, which should be a consideration if trapping is carried out in spring and autumn. Tagging of bats in April and sometimes early May should be avoided following a poor spring, if bats are in poor condition. Tagging of newly volant pups should be avoided. Tagging of bats should be avoided in October due to the risk that bats will enter hibernation with the tag still attached (bats will groom less often as they enter torpor more frequently). If a tag falls off during hibernation this could leave a bald patch if the fur has been clipped, which could have negative impacts for the hibernating bat. Please refer to Chapter 9 for more information.

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Table 4 Guidelines for assessing the potential suitability of proposed development sites for bats, based on the presence of roost features within the landscape, to be applied using professional judgement (BCT Guidelines, 2023)

Potential suitability	Description	
	Roosting habitats in structures	Potential flight-paths and foraging habitats
None	No habitat features on site likely to be used by any roosting bats at any time of the year (i.e. a complete absence of crevices/suitable shelter at all ground/underground levels).	No habitat features on site likely to be used by any commuting or foraging bats at any time of the year (i.e. no habitats that provide continuous lines of shade/protection for flight-lines, or generate/shelter insect populations available to foraging bats).
Negligible ^a	No obvious habitat features on site likely to be used by roosting bats; however, a small element of uncertainty remains as bats can use small and apparently unsuitable features on occasion.	No obvious habitat features on site likely to be used as flight-paths or by foraging bats; however, a small element of uncertainty remains in order to account for non-standard bat behavior.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically at any time of the year. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions ^b and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity and not a classic cool/stable hibernation site, but could be used by individual hibernating bats ^c).	Habitat that could be used by small numbers of bats as flight-paths such as a gappy hedgerow or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	A structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions ^b and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only, such as maternity and hibernation – the categorisation described in this table is made irrespective of species conservation status, which is established after presence is confirmed).	Continuous habitat connected to the wider landscape that could be used by bats for flight-paths such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.

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Potential suitability	Description	
	Roosting habitats in structures	Potential flight-paths and foraging habitats
High	<p>A structure with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions^b and surrounding habitat. These structures have the potential to support high conservation status roosts, e.g. maternity or classic cool/stable hibernation site.</p>	<p>Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by bats for flight-paths such as river valleys, streams, hedgerows, lines of trees and woodland edge.</p> <p>High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland.</p> <p>Site is close to and connected to known roosts.</p>
<p>a Negligible is defined as 'so small or unimportant as to be not worth considering, insignificant'. This category may be used where there are places that a bat could roost or forage (due to one attribute) but it is unlikely that they actually would (due to another attribute).</p> <p>b For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.</p> <p>c Evidence from the Netherlands shows mass swarming events of common pipistrelle bats in the autumn followed by mass hibernation in a diverse range of building types in urban environments (Korsten <i>et al.</i>, 2016 and Jansen <i>et al.</i>, 2022). Common pipistrelle swarming has been observed in the UK (Bell, 2022 and Tomlinson, 2020) and winter hibernation of numbers of this species has been detected at Seaton Delaval Hall in Northumberland (National Trust, 2018). This phenomenon requires some research in the UK, but ecologists should be aware of the potential for larger numbers of this species to be present during the autumn and winter in prominent buildings in the landscape, urban or otherwise.</p>		



Figure 3 Buildings grouped and numbered 1 to 17. Plates in Appendix A show the groupings

2.4 Bat Potential Tree Assessment

There are no mature affected trees onsite, only areas of scrub/immature trees. These had no/negligible potential for roosting bats.

2.5 Landscape Evaluation

Ecological survey results were evaluated to determine the significance of identified features located in the study area on an importance scale ranging from international-national-county-local (from NRA, 2009) The local scale is approximately equivalent to one 10km square but can be operationally defined to reflect the character of the area of interest. Because most sites will fall within the local scale, this is sub-divided into two categories: local importance (higher value) and local importance (lower value).

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3. RESULTS

3.1 Bat Activity and Emergence Survey Results

The bat surveys carried out on April 21st, 2021, March 1st, 2022, and October 18th, 2023, yielded no bat activity. However, the bat survey conducted on May 9th, 2024, recorded low to moderate levels of bat activity, with 13 Common Pipistrelle and 5 Leisler's Bat passes between 20:40 and 23:10 (sunset at 21:09). The weather conditions during the May 2024 survey were favourable, with temperatures of 17-18°C, dry and calm.

The lack of bat activity within the site boundary during the three previous surveys may be attributed to the site's location within a heavily urbanised and industrialised area, with high levels of traffic, lighting, and anthropogenic disturbance, which could discourage bats. Additionally, these surveys were carried out at times outside the optimal surveying periods. In contrast, the May 2024 survey was conducted during optimal weather conditions and within the recommended survey timeframe, which likely contributed to the recorded bat activity.

Despite the presence of bat activity in May 2024, the site generally lacks mature trees and, consequently, optimal commuting and foraging routes to more suitable habitats. The site is also relatively well-illuminated due to the surrounding urban landscape. These factors are further supported by the low bat suitability score given to the general environment surrounding the site (see Section 2.2.3).

The bat passes recorded for Common Pipistrelle span from 20:35 to 22:55. Given the time between the passes and the typical foraging behaviour of this species, it is likely that at least 2-3 individual Common Pipistrelles were active on or across the site. This estimate is based on the assumption that the passes at 21:37, 21:38, 21:39, and 21:39 were likely made by the same individual or a small group of individuals foraging in the area. The passes recorded later in the night (22:07, 22:08, 22:18, 22:51, and 22:55) could be attributed to the same or different individuals.

Leisler's Bat passes were recorded at 20:46, 20:56, 21:33, 21:42, and 22:45. As Leisler's Bats tend to fly high and fast, often covering larger areas, it is challenging to estimate the number of individuals based on the timing of the passes. However, given the time between the recordings, it is likely that a minimum of 1-2 Leisler's Bats were active over the site during the survey period.

Table 5 gives a summary of the bat activity results for May 9th 2024, see also Appendix B for data list and Figure 4 for Bat Activity Map.

Table 5 Bat Results Summary Data – May 9th 2024 between 20.40 and 23.10

Species Name – Common	Species Name – Latin	Number of Passes	Estimated range of individuals	Peak Frequency (kHz)
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>	13	2-3	46.0
Leisler's Bat	<i>Nyctalus leisleri</i>	5	1-2	25.0

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Figure 4 Bat Activity Map – May 9th 2024

The buildings onsite were grouped into 17 sections (see Figure 3) and inspected as per the methodology set out in Section 2.3. All buildings were assessed externally and internally, where accessible, during April 2021, March 2022, October 2023, and May 2024. The majority of the buildings were constructed with corrugated steel and generally lacked suitable bat roosting potential. The attic space of Building 17, which was noted in earlier surveys, was no longer apparent during the October 2023 and May 2024 visits, suggesting it had been removed. The internal building inspections for bat signs during all four surveys did not yield any evidence of bat usage or activity within the structures. It was noted that Buildings 12 and 13 were in use by a car sales business during the October 2023 and May 2024 site visits.

Table 6 presents the suitability of each building or group of buildings for bat roosting, as assessed using the criteria in Table 4. All buildings were accessible to some degree. Following the recorded bat activity in May 2024, the majority of the buildings were considered to have 'Low' roosting potential. Building 17 was assessed as having 'Negligible' potential due to the absence of a roof and Buildings 1, 2, and 3, 14 were also considered Negligible due to lack of access points. No buildings were classified as having 'Moderate' or 'High' suitability for bat roosting.

Table 6 Building Suitability for Bats on Site (see Figure 3 for locations within site)

No. Assigned on Figure 3	Plate No. in App A	Suitability	Recommendation
1	1A, 1B	Negligible	No further action
2	1A, 1B	Negligible	No further action
3	1A, 1B	Negligible	No further action
4	2,3	Low	Pre-demolition Survey
5	3	Low	Pre-demolition Survey
6	4	Low	Pre-demolition Survey
7	5	Low	Pre-demolition Survey
8	6	Low	Pre-demolition Survey
9	7,8	Low	Pre-demolition Survey
10	9,10	Low	Pre-demolition Survey
11	11,12	Low	Pre-demolition Survey
12	13,14	Low	Pre-demolition Survey
13	15,16,21	Low	Pre-demolition Survey
14	17	Negligible	No further action
15	18,19	Low	Pre-demolition Survey
16	20	Low	Pre-demolition Survey
17	1A, 1B	Negligible	No further action

3.3 Bat Potential Tree Assessment

All immature trees and scrub onsite are to be felled to facilitate the development. The small trees onsite had no potential for roosting bats.

3.4 Landscape Evaluation

The landscape surrounding the site is considered to be of local importance (lower value) for bats due to the heavily urbanized and industrialised nature of the area,

which presents high levels of traffic, lighting, and anthropogenic disturbance that could discourage bats. The site has been assigned a low landscape suitability score for bats (see Section 2.2.3). There are limited commuting and foraging routes for bats in and around the site that would connect it to more suitable habitats.

The follow-up internal building inspections for bat signs during the March 1st, 2022, October 18th, 2023, and May 9th, 2024 surveys did not identify any evidence of bat presence within the structures. The bat activity surveys on April 21st, 2021, and October 18th, 2023, detected no bat activity, while the survey on May 9th, 2024, recorded Common Pipistrelle and Leisler's Bat flying over and around the site.

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4. RECOMMENDATIONS

4.1 Tree Assessment

No bat potential trees (being used as roosts) were found during surveys as the site is mostly *Buddleia* scrub and willow trees. The bird nesting season should be factored in for their removal and not take place between 1st March and August 31st of a given year (as per Wildlife Acts).

4.2 Lighting for Bats

The IPL and BCT (2023) guidelines provides a list of recommendations in relation to luminaire design, which is based on the extensive research completed to-date on the potential impact of lighting on bats, and therefore provides best practice mitigation measures. The following recommendations to minimise disturbance to bats/other nocturnal wildlife are summarised as follows:

- Warm white (2700K or lower) LEDs should be used to minimize blue light disturbance. Light sources should lack UV and peak above 550nm.
- A photo-electric cell (PEC) for automatic switch-on at dusk and off with time control. Presence detection may also be incorporated for safety purposes & bat consideration, e.g. when nobody is outside, after a set interval time, lighting reduces to a pre-determined level, e.g. 50%, but as soon as human or vehicular movement is detected, full illumination is restored.
- Lighting should be installed where necessary for public safety. These lights should be designed and selected with specific shutters and filters to minimise any potential for back spills into the sensitive locations while still providing the primary function of safely lighting the pedestrian routes.
- Reflectance's – Downward lighting can be reflected from bright surfaces. To minimise bat disturbance, the design should avoid the use of bright surfaces and incorporate darker colour lamp heads and poles to reduce reflectance.
- Shielding of Luminaires & Light - the design should avoid the use of upward lighting by shielding or by downward directional focus.
- Type of Light – the design should avoid the use of strong UV lighting. The lighting design should be based on the use of LED lighting which has minimal or no UV output of significance.

4.3 Demolition Works

The majority of the buildings on the site were assessed as having "Low" bat roost suitability (see Figure 3 and Plates in Appendix A that are mostly from May 2024 but with some from March 2022 and October 2023 as the site remains very much the same). A 'Low' potential bat roost is defined as "a structure with one or more potential roost sites that could be used by individual bats opportunistically." Although no bats were observed emerging from or entering the buildings during the surveys, there was activity onsite and therefore it is crucial to adopt a precautionary approach to minimise the risk of harm to any bats that may have gone undetected.

To minimise the potential impact on bats, the demolition process should be carried out in a phased manner. The roof structures should be removed first, followed by a waiting period of at least one week before demolishing the walls. This approach will provide any bats that may have gone undetected during the surveys with an opportunity to escape and relocate to alternative roosting sites.

As a precautionary measure, it is recommended that a pre-demolition bat survey be carried out on all buildings with "Low" suitability the night before the commencement of demolition works, these include Buildings/structures numbered 4,5,6,7,8,9,10,11,12,13,15 and 16 on Table 6. It is recommended that the demolition works be scheduled during the months September-October, which will avoid the sensitive maternity and hibernation periods for bats. This timing will also minimise the potential impact on birds, such as barn swallow, that may be using the buildings for nesting.

4.4 Bat Box Scheme

To compensate for the loss of potential roosting sites and to enhance the future biodiversity value of the site, a series of 5 x bat boxes should be erected on suitable structures/walls around the site (see Appendix C for bat box options). Bats prefer warm spaces. To cater to this requirement, the bat boxes should be positioned in areas that receive full or partial sunlight exposure. This typically means orienting the boxes towards the south, south-west, or south-east. However, to provide a range of roosting conditions and accommodate different bat species' preferences, it is recommended to install the bat boxes in more than one orientation. To minimise disturbance from potential predators, the bat boxes should be securely attached to a substrate at a height of 4m above the ground. This elevated position ensures that the boxes remain inaccessible to ground-based predators, creating a safer environment for the roosting bats. The boxes should NOT be placed in an illuminated area.

5. OTHER ECOLOGICAL CONSIDERATIONS

5.1 Nesting Birds

The site contains areas of scrub that may provide nesting opportunities for birds. To avoid disturbing any active nests, it is recommended that the removal of scrub be carried out outside of the main bird nesting season, which extends from March 1st to August 31st. However, in the unlikely event that active nests are found outside the nesting season, an appropriate exclusion zone should be established, and the nests should be left undisturbed until the chicks have fledged.

It is important to note that while the majority of birds adhere to the typical nesting season, some species, such as Barn Swallows, may linger and have late broods. Therefore, even when demolition works are scheduled to commence outside the bird nesting season, it is essential to conduct a thorough inspection of the buildings by a qualified ecologist prior to the start of any works if the demolition is planned for September, as this month may still host late-nesting birds.

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5.2 General Animal Welfare Considerations

During the site visits, foxes and pigeons were observed utilising the buildings and surrounding areas. While these species are not formally protected under Irish wildlife legislation, they are still afforded protection under the Animal Health and Welfare Act 2013.

The Animal Health and Welfare Act 2013 provides for the protection of all animals, including wildlife, in Ireland. Under this legislation, it is an offense to cause unnecessary suffering or distress to any animal.

Foxes have been observed on several occasions within the site. As the site is enclosed by tall walls along much of its boundary, it is crucial to ensure that any resident foxes or other mammals, such as hedgehogs, are not trapped within the site during the demolition and construction works.

Prior to the commencement of any demolition or site clearance activities, a thorough inspection of the site should be carried out by a qualified mammal ecologist. The purpose of this inspection will be to identify any potential fox dens or other signs of mammal presence, such as hedgehog nests. If any fox dens or other mammal shelters are discovered, appropriate mitigation measures should be developed and implemented under the guidance of the mammal ecologist.

By implementing these mitigation measures and adhering to the recommendations the potential impacts on foxes, pigeons, and other wildlife can be effectively managed, ensuring compliance with animal welfare legislation.

6. CONCLUSION

The bat surveys conducted on the site in April 2021, March 2022 and October 2023 detected no bat activity onsite, while the May 2024 survey recorded low to moderate levels of bat activity, with an estimated minimum of 2-3 no. Common Pipistrelle and 1-2 no. Leisler's Bat observed foraging and commuting across the site. The inspection of all buildings onsite in April 2021, March 2022, October 2023, and May 2024 found no evidence of bats roosting inside the structures scheduled for demolition.

Despite the recorded bat activity in May 2024, the site is considered to be of Lower Importance for bats due to the following factors:

1. No bat activity was recorded during the surveys conducted in April 2021, March 2022, and October 2023, however these were carried out before or after the main bat activity season.
2. No signs of bats were uncovered during the internal and external inspections of all 17 buildings and/or groups of buildings across the 4 site visits spanning April 2021 and May 2024.
3. The site is illuminated in places due to its urban setting, which may deter bats from using the site.

-
4. The site lacks mature trees and well-connected commuting and foraging routes to other more suitable habitats.
 5. The majority of the buildings onsite were constructed with corrugated steel and generally lacked suitable roosting features for bats.

Based on the findings of the survey work completed between April 2021 and May 2024, it is concluded that the overall impact on bats arising from the proposed development will likely be low to negligible, provided that the general recommendations and specific mitigation measures outlined in Section 4.0 are implemented. These measures include:

1. Conducting a pre-demolition bat survey of all buildings with "Low" suitability the night before roof removal commences.
2. Implementing a phased demolition approach, with roof structures removed first, followed by a waiting period of at least one week before demolishing the walls.
3. Scheduling demolition works during the autumn months (September to November) to avoid sensitive periods for bats and nesting birds.
4. Installing a series of 5+ bat boxes on suitable structures around the site to provide future roosting opportunities for bats.
5. Implementing sensitive lighting design and strategies to minimise light spillage and disturbance to bats and other nocturnal wildlife.

In addition to the bat-specific mitigation measures, it is crucial to consider the potential impacts of the proposed development on other ecological features, such as nesting birds, foxes, and other mammals that may be present on the site. To ensure that these potential impacts are effectively managed and that the proposed development complies with animal welfare legislation, it is strongly recommended that the implementation of the recommendations outlined in Section 5.0 be included as conditions of the planning permission. These conditions should stipulate the following:

1. The requirement for an ecologist to conduct a thorough inspection of the buildings for late-nesting birds if demolition works are scheduled for September.
2. The involvement of a qualified mammal ecologist to carry out a comprehensive site inspection prior to the commencement of any demolition or site clearance activities, to identify potential fox dens or other signs of mammal presence and develop appropriate mitigation measures.

By incorporating all these recommendations as conditions of the planning permission, the local planning authority can ensure the necessary mitigation measures are implemented and that the potential impacts on bats and other wildlife are effectively managed throughout the demolition and construction process.

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APPENDICES

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APPENDIX A

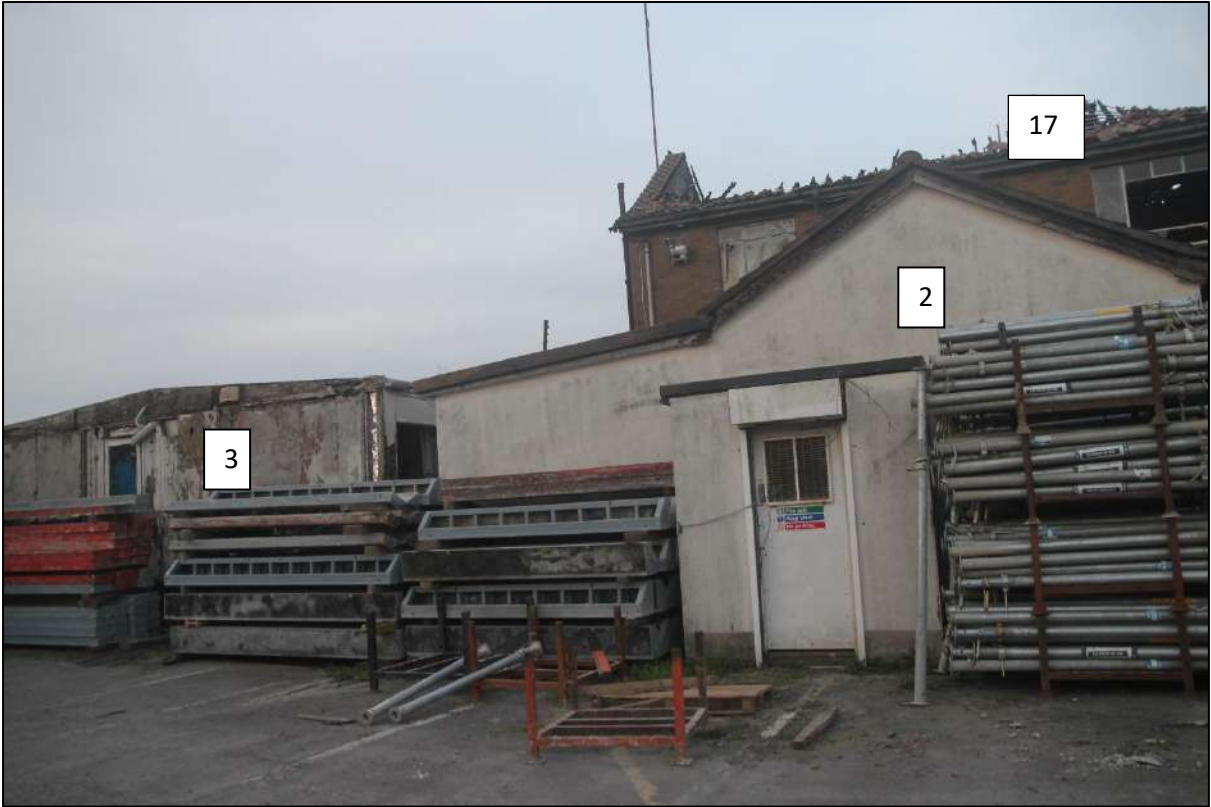


Plate 1 A & B From left to Right Buildings 3, 2 and 1 with Low Bat Potential. Building 17 to the rear with Negligible Bat Roost Potential (May 2024)



Plate 2 Building 4 – Low Bat Potential (May 2024)



Plate 3 Building 4 and 5 - Low Bat Potential (October 2023)



Plate 4 Building 6 - Low Bat Potential (May 2024)



Plate 5 Building 7 - Low Bat Potential (May 2024)



Plate 6 Building 8 - Low Bat Potential (May 2024)



Plate 7 Building 9 - Low Bat Potential (May 2024)



Plate 8 Building 9 –Low Bat Potential. Interior of flat roof building but access inside via windows (October 2023)



Plate 9 Building 10 – Low Bat Potential (May 2024)



Plate 10 Building 10 – Low Bat Potential (March 2022)



Plate 11 Building 11 – Low Bat Potential (May 2024)



Plate 12 Building 11 – Low Bat Potential (March 2022)



Plate 13 Building 12 – Low Bat Potential (May 2024)



Plate 14 Building 12 – Low Bat Potential (October 2023)



Plate 15 Building 13 – Low Bat Potential (May 2024)



Plate 16 Building 13 – Low Bat Potential (May 2024)



Plate 17 Building 14 - Negligible Bat Potential (May 2024)



Plate 18 Building 15 - Low Bat Potential.



Plate 19 Building 15 – Low Bat Potential. Interior (October 2023)



Plate 20 Building 16 – Low Bat Potential (May 2024)



Plate 21 Building 13 – Low Bat Potential (Partially In use in October 2023 and May 2024)



Plate 22 Part of the site in use in October 2023 as Car Sales yard.

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APPENDIX B

09/05/2024	Species Text	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Latitude [WGS84]	Longitude [WGS84]
20:35:04	Common Pipistrelle	1	46.4	46.7	46.1	11.1	0	18	53.31349	-6.3382
20:46:12	Leisler's Bat	9	23.6	35	12	2	482	18	53.31441	-6.33644
20:56:06	Leisler's Bat	2	24.4	31.7	11.9	2	1126	18	53.31438	-6.33809
21:33:19	Leisler's Bat	5	25.9	32.1	14.1	3.3	946	18	53.31469	-6.33713
21:37:59	Common Pipistrelle	9	46.7	67.7	45.2	4	327	18	53.31482	-6.33659
21:38:57	Common Pipistrelle	17	46.8	60.9	45.8	5	90	17	53.31395	-6.33842
21:39:09	Common Pipistrelle	85	48	76	45.1	5	86	17	53.31402	-6.33849
21:39:33	Common Pipistrelle	58	46.7	70.1	45.4	4	96	17	53.31417	-6.33843
21:41:11	Common Pipistrelle	65	47	68.9	45.3	5	100	17	53.3141	-6.33852
21:42:39	Leisler's Bat	13	22.7	23.9	22	16	416	17	53.3141	-6.33647
21:43:48	Common Pipistrelle	14	46.3	66.8	45.6	4	90	17	53.31458	-6.33747
21:55:15	Common Pipistrelle	10	47.3	71.1	45	4	90	17	53.31474	-6.33689
22:07:22	Common Pipistrelle	18	47.9	67.5	46.3	3	60	17	53.31472	-6.337
22:08:14	Common Pipistrelle	10	47.5	68	45.9	4	125	17	53.31469	-6.33682
22:18:41	Common Pipistrelle	12	46.8	69.8	46.1	3	90	17	53.31467	-6.33721
22:45:43	Leisler's Bat	2	21.8	32.8	13.1	2.6	427	17	53.31436	-6.33814
22:51:33	Common Pipistrelle	11	47.8	57.7	46.3	3	90	17	53.31363	-6.33792
22:55:13	Common Pipistrelle	5	46.5	55.1	45.7	3	96	17	53.31356	-6.33793

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APPENDIX C



**2F Schwegler Bat Box
(General Purpose)**



**PRO UK Build-in
WoodStone Bat Box**



Maternity Bat Box



**4m Pole Mounted Large
Colony Bat Box**

Available on link below with fitting instructions on website

<https://www.nhbs.com/search?q=bat+boxes>



Bat Slates -

<https://beddoesproducts.com/products/bat-access-slate>



APPENDIX 5.2

Appropriate Assessment

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Report for the purposes of
Appropriate Assessment Screening

Green Vale Residential Development

Prepared by: Moore Group – Environmental Services

13 May 2025



On behalf of Steeplefield Ltd.

Project Proponent	Steeplefield Ltd.
Project	Green Vale LRD
Title	Report for the purposes of Appropriate Assessment Screening Green Vale LRD

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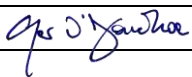
Project Number	23205	Document Ref	23205 Green Vale LRD AAS1 Rev3
Revision	Description	Author	Date
Rev3	Revised Site Layout	G. O'Donohoe 	13 May 2025
Moore Archaeological and Environmental Services Limited			

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Abbreviations

AA	Appropriate Assessment
ABP	An Bord Pleanála
CEMP	Construction Environmental Management Plan
EEC	European Economic Community
EPA	Environmental Protection Agency
EU	European Union
FWPM	Freshwater Pearl Mussel
GIS	Geographical Information System
LAP	Local Area Plan
NHA	Natural Heritage Area
NIS	Natura Impact Statement
NPWS	National Parks and Wildlife Service
OSI	Ordnance Survey Ireland
pNHA	proposed Natural Heritage Area
SAC	Special Area of Conservation
SPA	Special Protection Area
SuDS	Sustainable Drainage System
UÉ	Uisce Éireann
WFD	Water Framework Directive

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1. Introduction

1.1. General Introduction

This report for the purposes of Appropriate Assessment (AA) Screening has been prepared to support a Planning Application for the Proposed Development (described in Section 3 below). This report contains information required for the competent authority to undertake screening for Appropriate Assessment (AA) in respect of the construction and operation of a Large scale Residential Development on the former Chadwicks site at Greenhills Road, Dublin (hereafter referred to as the Proposed Development) to determine whether it is likely individually or in combination with other plans or projects to have a significant effect on any European sites, in light of best scientific knowledge.

Having regard to the provisions of the Planning and Development Act 2000 – 2021 (the “Planning Acts”) (section 177U), the purpose of a screening exercise under section 177U of the PDA 2000 is to assess, in view of best scientific knowledge, if the proposed development, individually or in combination with other plans or projects is likely to have a significant effect on a European site.

If it cannot be *excluded* on the basis of objective information that the proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site then it is necessary to carry out a Stage 2 appropriate assessment under section 177V of the Planning Acts.

When screening the project, there are two possible outcomes:

- the project poses no potential for the possibility of a significant effect and as such requires no Stage 2 assessment; or
- the project has potential to have a significant effect (or this is uncertain and therefore cannot be excluded) and therefore a Stage 2 Appropriate Assessment of the project is necessary.

This report has been prepared by Moore Group - Environmental Services to enable the competent authority to carry out AA screening in relation to the Proposed Development. The report was compiled by Ger O’Donohoe B.Sc. Applied Aquatic Sciences (ATU Galway, 1993) & M.Sc. Environmental Sciences (TCD, 1999) who has over 30 years’ experience in environmental impact assessment and has completed numerous Appropriate Assessment Screening Reports and Natura Impact Statements on terrestrial and aquatic habitats for various development types.

1.2. Legislative Background - The Habitats and Birds Directives

Article 6(3) and 6(4) of the Habitats Directive are transposed into Irish Law inter alia by the Part XAB of the Planning Acts (in particular section 177U and 177V) which governs the requirement to carry out appropriate assessment screening and appropriate assessment, where required, per Section 1.1 above.

The Habitats Directive (Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora) is the main legislative instrument for the protection and conservation of biodiversity in the European Union (EU). Under the Habitats Directive, Member States are obliged to designate Special Areas of Conservation (SACs) which contain habitats or species considered important for protection and conservation in a EU context.

The Birds Directive (Council Directive 2009/147/EC on the conservation of wild birds), transposed into Irish law by the Bird and Natural Habitats Regulations 2011 as amended, and the Wildlife Act 1976, as amended, is concerned with the long-term protection and management of all wild bird species and their habitats in the EU. Among other things, the Birds Directive requires that Special Protection Areas (SPAs) be established to protect migratory species and species which are rare, vulnerable, in danger of extinction, or otherwise require special attention.

SACs designated under the Habitats Directive and SPAs, designated under the Birds Directive, form a pan-European network of protected sites known as Natura 2000. The Habitats Directive sets out a unified system for the protection and management of SACs and SPAs. These sites are also referred to as European sites.

Articles 6(3) and 6(4) of the Habitats Directive set out the requirement for an assessment of proposed plans and projects likely to have a significant effect on Natura 2000 sites.

Article 6(3) establishes the requirement to screen all plans and projects and to carry out an appropriate assessment if required (Appropriate Assessment (AA)).

Article 6(3): *“Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subjected to an appropriate assessment of its implications for the site in view of the site’s conservation objectives. In light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.”*

Article 6(4) establishes requirements in cases of imperative reasons of overriding public interest.

2. Methodology

The Commission's methodological guidance (EC, 2002, 2018, 2021 see Section 2.1 below) promotes a four-stage process to complete the AA and outlines the issues and tests at each stage. An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required.

Stages 1 and 2 deal with the main requirements for assessment under Article 6(3). Stage 3 may be part of Article 6(3) or may be a necessary precursor to Stage 4. Stage 4 is the main derogation step of Article 6(4).

Stage 1 Screening: This stage examines the likely effects of a project either alone or in combination with other projects upon a Natura 2000 site and considers whether it can be objectively concluded that these effects will not be significant. In order to screen out a project, it must be excluded, on the basis of objective information, that the Proposed Development, individually or in combination with other plans or projects, will have a significant effect on a European site.

Stage 2 Appropriate Assessment: This stage examines whether it is likely that the project, either alone or in combination with other projects or plans, will have a significant effect upon a European site. In order to 'screen out' a project (i.e. in order to conclude that it is not necessary to move to the 'Stage 2' appropriate assessment stage (see immediately below), the possibility that the Proposed Development (individually or in combination with other plans or projects), will have a significant effect on a European site must be excluded on the basis of objective information.

Stage 3 Assessment of Alternative Solutions: This stage examines alternative ways of implementing the project that, where possible, avoid any adverse impacts on the integrity of the Natura 2000 site.

Stage 4 Assessment where no alternative solutions exist and where adverse impacts remain: Where imperative reasons of overriding public interest (IROPI) exist, an assessment to consider whether compensatory measures will or will not effectively offset the damage to the sites will be necessary.

To ensure that the Proposed Development complies fully with the requirements of Article 6 of the Habitats Directive and all relevant Irish transposing legislation, Moore Group compiled this report to enable the competent authority to carry out AA screening in relation to the Proposed Development to determine whether it can be excluded, on the basis of objective information, that the Proposed Development, individually or in combination with other plans or projects, will have a significant effect on a European site(s).

2.1. Guidance

This report has been compiled in accordance with guidance contained in the following documents:

- Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities. (Department of Environment, Heritage and Local Government, 2010 rev.).
- Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities. Circular NPWS 1/10 & PSSP 2/10.
- Managing Natura 2000 Sites: The Provisions of Article 6 of the Habitat's Directive 92/43/EEC (EC, 2018).
- Guidance document on the strict protection of animal species of Community interest under the Habitats Directive (EC, 2021).
- Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC (EC, 2021).
- Office of the Planning Regulator (OPR) Practice Note PN01 Appropriate Assessment Screening for Development Management (OPR, 2021).

2.2. Data Sources

Sources of information that were used to collect data on the Natura 2000 network of sites, and the environment within which they are located, are listed below:

- The following mapping and Geographical Information Systems (GIS) data sources, as required:
 - National Parks & Wildlife (NPWS) protected site boundary data;
 - Ordnance Survey of Ireland (OSI) mapping and aerial photography;
 - OSI/Environmental Protection Agency (EPA) rivers and streams, and catchments;
 - Digital Elevation Model over Europe (EU-DEM);
 - Google Earth and Bing aerial photography 1995-2025;
- Online data available on Natura 2000 sites as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie including:
 - Natura 2000 - Standard Data Form;
 - Conservation Objectives;
 - Site Synopses;
- National Biodiversity Data Centre records;
 - Online database of rare, threatened and protected species;
 - Publicly accessible biodiversity datasets.
- Status of EU Protected Habitats in Ireland. (National Parks & Wildlife Service, 2019); and
- Relevant Development Plans;
 - South Dublin County Development Plan 2022-2028

3. Description of the Proposed Development

The proposed development comprises:

- i. The demolition of the former Chadwicks Builders Merchant development comprising 1 no. two storey office building and 9 no. storage/warehouse buildings ranging in height from 3m – 9.9m as follows: Building A (8,764 sq.m.), Building B (1,293 sq.m.), Building C (two-storey office building) (527 sq.m.), Building D (47 sq.m.), Building E (29 sq.m.), Building F (207 sq.m.), Building G (101 sq.m.), Building H (80 sq.m.), Building I (28 sq.m.), and Building J (44 sq.m.), in total comprising 11,120 sq.m.;
- ii. the construction of a mixed-use residential and commercial development comprising 588 no. residential apartment units (291 no. one-beds, 238no. two-beds and 59 no. three-beds), 1 no. 570.91sqm (443sqm indoor space) childcare facility and 6no. no. commercial/retail units in 4 no. blocks (A-D) ranging in height from 5 to 12 storeys as follows:
 - a. Block A comprises 170 no. apartments (103 no. 1 bed-units, 59 no. 2 bed-units and 8 no. 3- bed units) measuring 8 storeys in height.
 - b. Block B comprises 197 no. apartments (89 no. 1 bed-units, 92 no. 2 bed-units and 16 no. 3 bed-units) measuring 10 storeys in height.
 - c. Block C comprises 81 no. apartments (44 no. 1-bed units, 16 no. 2-bed units and 21 no. 3-bed units) measuring 12 storeys in height.
 - d. Block D comprises 140 no. apartments (55 no. 1 bed-units, 71 no. 2 bed-units and 14 no. 3 bed-units) measuring 8 storeys in height.

All apartments will be provided with private balconies/terraces;

- iii. provision of indoor communal residential amenity (614.14 sq.m.) at ground and first floors of Block A, B, C,;
- iv. the construction of 1 no. childcare facility with dedicated outdoor play area located at ground floor of Block B;
- v. the construction of 6no. commercial units at ground floor level of Blocks A, B and D, and 1 no. commercial unit at first floor level of Block A as follows: Block A has 1 no. unit at ground floor comprising 455.8 sq.m. and 1 no. unit at first floor level comprising 160.79 sq.m., Block B has 1 no. unit at ground floor comprising 190.96 . and Block D has 4 no. units at ground floor comprising 361.6, 232.3, 238 and 174.9 sq.m.;
- vi. the construction of 4 no. vehicular entrances; a primary entrance via vehicular ramp from the north (access from Greenhills Road) and 3 no. secondary entrances from the south for access, emergency access and services (access from the existing road to the south of the site) with additional pedestrian accesses proposed along Greenhills Road;

- vii. provision of 270 no. car parking spaces comprising 240 no. standard spaces (including 6 no. car club spaces) and 13 no. mobility spaces located at surface level and within undercroft car parks within Blocks A, B, C and D, 17 no. commercial/ unloading/ drop-off parking spaces at ground level.
- viii. provision of 1,269 no. bicycle parking spaces comprising 952 no. residents' bicycle spaces, 10 no. cargo/accessible bicycle spaces in 14 no. bicycle storerooms in surface and undercroft parking areas and 307 no. visitors' bicycle spaces located externally at ground floor level throughout the development;
- ix. provision of outdoor communal amenity space (3,130.3 sq.m) comprising landscaped courtyards that include play areas, seating areas, grass areas, planting and scented gardens located on podiums at first floor level; provision of communal amenity roof gardens in Block A & B with seating area and planting (746.1 sq.m.) and inclusion of centrally located public open space (6,6650 sq.m.) adjacent to Blocks A, B, C and D comprising grassed areas, planting, seating areas, play areas, water feature, flexible use space and incidental open space/public realm;
- x. provision of toucan crossing and all associated road markings and signage from the subject site to a new footpath on northern side of Greenhills Road;
- xi. development also includes landscaping and infrastructural works, foul and surface water drainage, bin storage, ESB substations, plant rooms, pv panels, boundary treatments, internal roads, cycle paths and footpaths and all associated site works to facilitate the development.

Figure 1 shows the Proposed Development location and Figure 2 shows a detailed view of the Proposed Development boundary on recent aerial photography. Figure 3 shows the layout of the Proposed Development.

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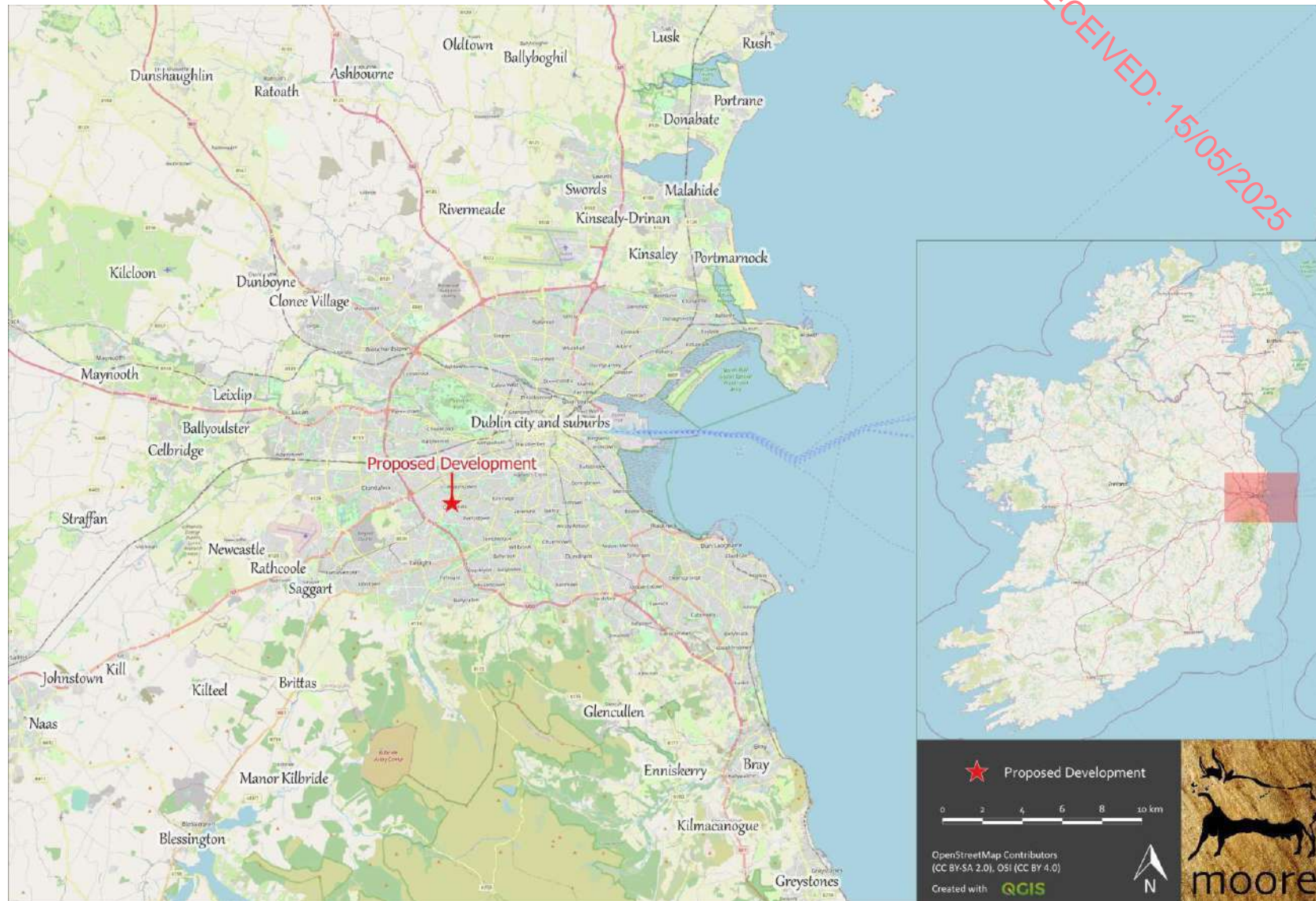


Figure 1. Showing the Proposed Development location at Greenhills, Dublin 12 .

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Figure 2. Showing the Proposed Development boundary on recent aerial photography.

4. Identification of Natura 2000 Sites

4.1. Description of Natura Sites Potentially Significantly Affected

A Zone of Influence (Zoi) of a proposed development is the geographical area over which it could affect the receiving environment in a way that could have significant effects on the Qualifying Interests of a European site. In accordance with the OPR Practice Note (2021), PN01, the Zoi should be established on a case-by-case basis using the Source- Pathway-Receptor framework.

The European Commission's "Assessment of plans and projects in relation to Natura 2000 sites guidance on Article 6(3) and (4) of the Methodological Habitats Directive 92/43/EEC" published 28 September 2021 states at section 3.1.3, that:

"Identifying the Natura 2000 sites that may be affected should be done by taking into consideration all aspects of the plan or project that could have potential effects on any Natura 2000 sites located within the zone of influence of the plan or project. This should take into account all of the designating features (species, habitat types) that are significantly present on the sites and their conservation objectives. In particular, it should identify:

- any Natura 2000 sites geographically overlapping with any of the actions or aspects of the plan or project in any of its phases, or adjacent to them;*
- any Natura 2000 sites within the likely zone of influence of the plan or project Natura 2000 sites located in the surroundings of the plan or project (or at some distance) that could still be indirectly affected by aspects of the project, including as regards the use of natural resources (e.g. water) and various types of waste, discharge or emissions of substances or energy;*
- Natura 2000 sites in the surroundings of the plan or project (or at some distance) which host fauna that can move to the project area and then suffer mortality or other impacts (e.g. loss of feeding areas, reduction of home range);*
- Natura 2000 sites whose connectivity or ecological continuity can be affected by the plan or project".*

The range of Natura 2000 sites to be assessed, i.e. the zone in which impacts from the plan or project may arise, will depend on the nature of the plan or project and the distance at which effects may occur. For Natura 2000 sites located downstream along rivers or wetlands fed by aquifers, it may be that a plan or project can affect water flows, fish migration and so forth, even at a great distance. Emissions of pollutants may also have effects over a long distance. Some projects or plans that do not directly affect Natura 2000 sites may still have a significant impact on them if they cause a barrier effect or prevent ecological linkages. This may happen, for example, when plans affect features of the landscape that connect Natura 2000 sites or that may obstruct the

movements of species or disrupt the continuity of a fluvial or woodland ecosystem. To determine the possible effects of the plan or project on Natura 2000 sites, it is necessary to identify not only the relevant sites but also the habitats and species that are significantly present within them, as well as the site objectives

The Zone of Influence may be determined by considering the Proposed Development's potential connectivity with European sites, in terms of:

- Nature, scale, timing and duration of all aspects of the proposed works and possible impacts, including the nature and size of excavations, storage of materials, flat/sloping sites;
- Distance and nature of potential pathways (dilution and dispersion; intervening 'buffer' lands, roads etc.); and
- Location of ecological features and their sensitivity to the possible impacts.

The potential for source pathway receptor connectivity is firstly identified through GIS interrogation and detailed information is then provided on sites with connectivity. European sites that are located within a potential Zone of Influence of the Proposed Development are listed in Table 1 and presented in Figure 4 below. Spatial boundary data on the Natura 2000 network was extracted from the NPWS website (www.npws.ie) on 7 November 2024. This data was interrogated using GIS analysis to provide mapping, distances, locations and pathways to all sites of conservation concern including pNHAs, NHA and European sites.

Table 1 European Sites located within the potential Zone of Influence¹ of the Proposed Development.

Site Code	Site name	Distance (km) ²
000206	North Dublin Bay SAC	11.17
000210	South Dublin Bay SAC	8.20
001209	Glenasmole Valley SAC	6.32
002122	Wicklow Mountains SAC	8.77
004006	North Bull Island SPA	11.16
004024	South Dublin Bay and River Tolka Estuary SPA	8.23
004040	Wicklow Mountains SPA	8.70

The nearest European site to the Proposed Development is the Glenasmole Valley SAC (Site Code 001209), 6.3km to the south. However this site is located in a separate hydrological catchment, and there is no connectivity. Similarly, the Wicklow Mountains SAC (Site Code 002122) and Wicklow Mountains SPA (Site Code 004040), both 8.7km to the south lack connectivity to the Proposed development. These three sites can be screened out at this stage.

Four Dublin Bay sites, the North Dublin Bay SAC (Site Code 000206), 11.5km to the northeast, South Dublin Bay SAC (Site Code 000210), 8.45km to the east, the North Bull Island SPA (Site Code 004006), 11.4km to the

¹ All European sites potentially connected irrespective of the nature or scale of the Proposed Development.

² Distances indicated are the closest geographical distance between the Proposed Development and the European site boundary, as made available by the NPWS.

northeast, and the South Dublin Bay and River Tolka Estuary SPA (Site Code 004024), 8.5km to the east are also within the potential Zone of Influence of the Proposed Development.

The Proposed Development is located within the hydrological catchment of the Camac River, which flows into the River Liffey at Heuston Station.

However, a review of aerial photography, Ordnance Survey Ireland (OSI) mapping and OSI Geographical Information System (GIS) data for rivers and streams indicates that there are no notable surface water features onsite and no direct hydrological pathways to offsite surface water bodies. This was confirmed during fieldwork on habitat assessment on 18 October 2023.

The Qualifying Interests (QIs) and Special Conservation Interests (SCIs) of the European sites in the Zone of influence of the Proposed Development are provided in Table 2 below.

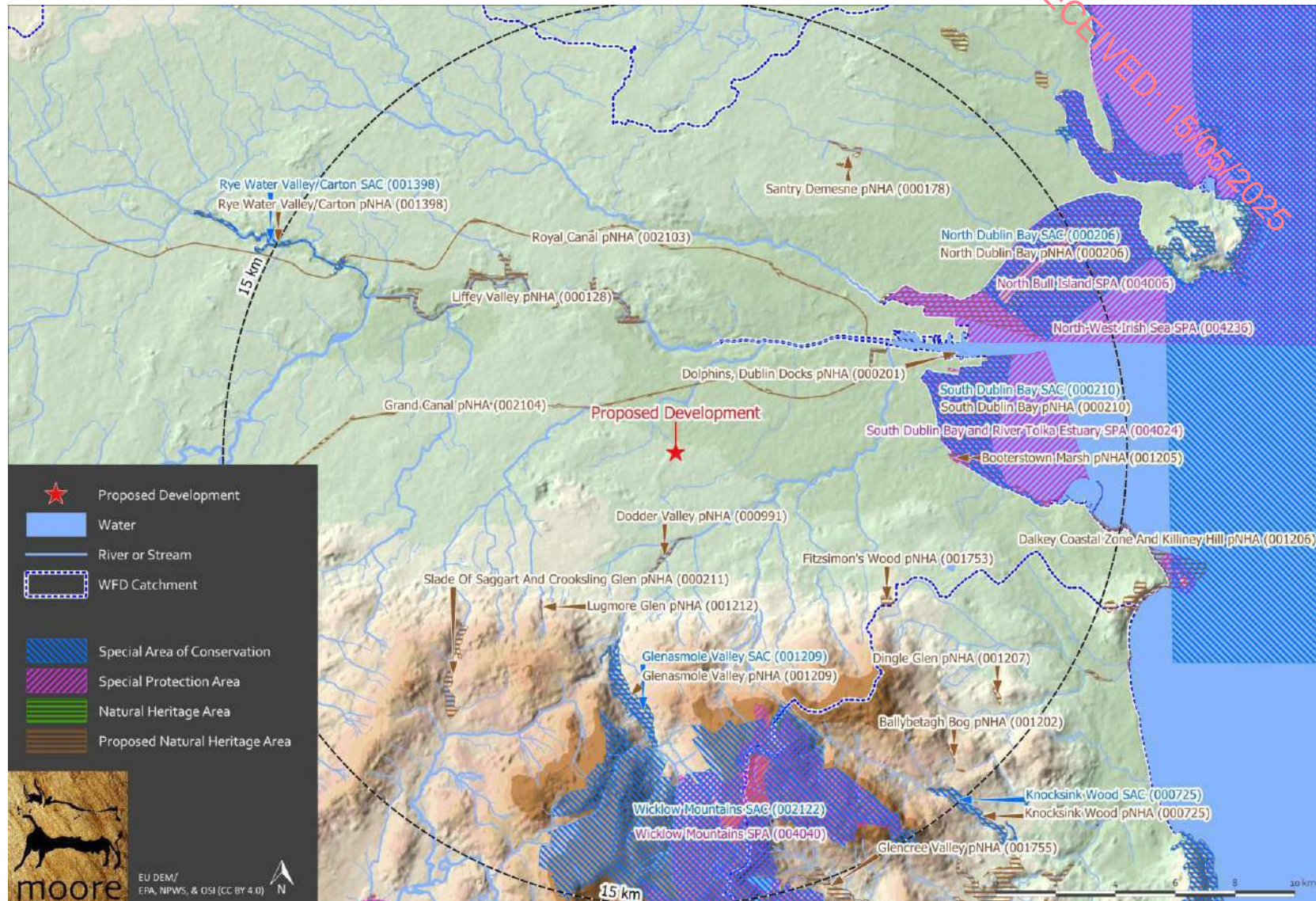


Figure 4. Showing European sites and NHAs/pNHAs within the wider Potential Zone of Influence of the Proposed Development

Table 2 Identification of relevant European sites using Source-Pathway-Receptor model and compilation of information QIs and conservation objectives. *Priority Habitats

European Site name, Site code and Conservation Objectives	Location Relative to the Proposed Development Site	Connectivity – Source-Pathway-Receptor	Considered further in Screening – Y/N
<p>North Dublin Bay SAC (000206)</p> <p>The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest:</p> <p>1140 Mudflats and sandflats not covered by seawater at low tide</p> <p>1210 Annual vegetation of drift lines</p> <p>1310 <i>Salicornia</i> and other annuals colonising mud and sand</p> <p>1330 Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>)</p> <p>1395 Petalwort <i>Petalophyllum ralfsii</i></p> <p>1410 Mediterranean salt meadows (<i>Juncetalia maritimi</i>)</p> <p>2110 Embryonic shifting dunes</p> <p>2120 Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes)</p> <p>2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)</p> <p>2190 Humid dune slacks</p> <p>NPWS (2013) Conservation Objectives: North Dublin Bay SAC 000206. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.</p>	<p>11.45km to the northeast of the Proposed Development</p>	<p>No</p> <p>There are no pathways or connectivity to the habitats and/or species of this site.</p>	<p>No</p>
<p>South Dublin Bay SAC (000210)</p> <p>The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest:</p> <p>1140 Mudflats and sandflats not covered by seawater at low tide</p> <p>NPWS (2013) Conservation Objectives: South Dublin Bay SAC 000210. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht</p>	<p>8.45km to the east of the Proposed Development</p>	<p>No</p> <p>There are no pathways or connectivity to the habitats and/or species of this site.</p>	<p>No</p>
<p>North Bull Island SPA (004006)</p> <p>The overall aim of the Birds Directive is to maintain or restore the favourable conservation status of habitats and species of community interest:</p>	<p>11.43km to the northeast of the Proposed Development</p>	<p>No</p> <p>Due to distance and the lack of any relevant ex-situ factors of significance to</p>	<p>No</p>

<p>A046 Light-bellied Brent Goose <i>Branta bernicla hrota</i></p> <p>A048 Shelduck <i>Tadorna tadorna</i></p> <p>A052 Teal <i>Anas crecca</i></p> <p>A054 Pintail <i>Anas acuta</i></p> <p>A056 Shoveler <i>Anas clypeata</i></p> <p>A130 Oystercatcher <i>Haematopus ostralegus</i></p> <p>A140 Golden Plover <i>Pluvialis apricaria</i></p> <p>A141 Grey Plover <i>Pluvialis squatarola</i></p> <p>A143 Knot <i>Calidris canutus</i></p> <p>A144 Sanderling <i>Calidris alba</i></p> <p>A149 Dunlin <i>Calidris alpina alpina</i></p> <p>A156 Black-tailed Godwit <i>Limosa limosa</i></p> <p>A157 Bar-tailed Godwit <i>Limosa lapponica</i></p> <p>A160 Curlew <i>Numenius arquata</i></p> <p>A162 Redshank <i>Tringa totanus</i></p> <p>A169 Turnstone <i>Arenaria interpres</i></p> <p>A179 Black-headed Gull <i>Chroicocephalus ridibundus</i></p> <p>A999 Wetlands</p> <p>NPWS (2015) Conservation Objectives: North Bull Island SPA 004006. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.</p>		bird species or wetland habitat.	
<p>South Dublin Bay and River Tolka Estuary SPA (004024)</p> <p>The overall aim of the Birds Directive is to maintain or restore the favourable conservation status of habitats and species of community interest:</p> <p>A046 Light-bellied Brent Goose <i>Branta bernicla hrota</i></p> <p>A130 Oystercatcher <i>Haematopus ostralegus</i></p> <p>A137 Ringed Plover <i>Charadrius hiaticula</i></p> <p>A141 Grey Plover <i>Pluvialis squatarola</i></p> <p>A143 Knot <i>Calidris canutus</i></p> <p>A144 Sanderling <i>Calidris alba</i></p> <p>A149 Dunlin <i>Calidris alpina alpina</i></p>	8.48km to the east of the Proposed Development	No Due to distance and the lack of any relevant ex-situ factors of significance to bird species or wetland habitat.	No

<p>A157 Bar-tailed Godwit <i>Limosa lapponica</i></p> <p>A162 Redshank <i>Tringa totanus</i></p> <p>A179 Black-headed Gull <i>Chroicocephalus ridibundus</i></p> <p>A192 Roseate Tern <i>Sterna dougallii</i></p> <p>A193 Common Tern <i>Sterna hirundo</i></p> <p>A194 Arctic Tern <i>Sterna paradisaea</i></p> <p>A999 Wetlands</p> <p>NPWS (2015) Conservation Objectives: South Dublin Bay and River Tolka Estuary SPA 004024. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.</p>		<p>RECEIVED: 15/05/2025</p>	
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4.2. Ecological Network Supporting Natura 2000 Sites

A concurrent GIS analysis of the proposed Natural Heritage Areas (pNHA) and designated Natural Heritage Areas (NHA) in terms of their role in supporting the species using Natura 2000 sites was undertaken along with GIS investigation of European sites. These supporting roles mainly relate to mobile fauna such as mammals and birds which may use pNHAs and NHAs as ecological corridors or “stepping stones” between Natura 2000 sites.

Article 10 of the Habitats Directive and the Habitats Regulations 2011 place a high degree of importance on such non-Natura 2000 areas as features that connect the Natura 2000 network. Features such as ponds, woodlands and important hedgerows were taken into account in the decision process and during the preparation of this AA Screening report.

The NHAs and pNHAs identified in Figure 4 are located outside the Zone of Influence, and there are no areas of supporting habitat that will be impacted by the Proposed Development.

5. Identification of Potential Impacts & Assessment of Significance

The Proposed Development is not directly connected with or necessary to the management of the sites considered in the assessment and therefore potential impacts must be identified and considered.

5.1. Assessment of Likely Significant Effects

There are no notable surface water features onsite and no direct hydrological pathways to offsite surface water bodies.

The consideration of all potential direct and indirect impacts that may result in significant effects on the conservation objectives of a European site, taking into account the size and scale of the Proposed Development are presented in Table 3.

Table 3 Assessment of Likely Significant Effects.

Identification of all potential direct and indirect impacts that may result in significant effects on the conservation objectives of a European site, taking into account the size and scale of the project.	
Impacts:	Significance of Impacts:
<p>Construction phase e.g.</p> <p>Vegetation clearance</p> <p>Demolition</p> <p>Surface water runoff from soil excavation/infill/landscaping (including borrow pits)</p> <p>Dust, noise, vibration</p> <p>Lighting disturbance</p> <p>Impact on groundwater/dewatering</p> <p>Storage of excavated/construction materials</p> <p>Access to site</p> <p>Pests</p>	<p>None</p> <p>The Proposed Development site is located within a site consisting of disused warehouses, in a heavily developed commercial and light industrial suburb of Dublin.</p> <p>There are no notable surface water features onsite and no direct hydrological pathways to offsite surface water bodies.</p>
<p>Operational phase e.g.</p> <p>Direct emission to air and water</p> <p>Surface water runoff containing contaminant or sediment</p> <p>Lighting disturbance</p> <p>Noise/vibration</p>	<p>All foul and separate surface water runoff, once the facility is operational, will be contained on site and discharged to urban drainage systems.</p> <p>There is no real likelihood of any significant effects on European Sites in the wider catchment area.</p> <p>The facility is located at a distance of removal such that there will be no disturbance to qualifying interest species in any European sites.</p>

<p>Changes to water/groundwater due to drainage or abstraction</p> <p>Presence of people, vehicles and activities</p> <p>Physical presence of structures (e.g. collision risks)</p>	<p style="color: red; font-size: 2em; transform: rotate(-45deg);">RECEIVED: 15/05/2025</p>
<p>Describe any likely changes to the European site:</p>	
<p>Examples of the type of changes to give consideration to include:</p> <p>Reduction or fragmentation of habitat area</p> <p>Disturbance to QI species</p> <p>Habitat or species fragmentation</p> <p>Reduction or fragmentation in species density</p> <p>Changes in key indicators of conservation status value (water quality etc.)</p> <p>Changes to areas of sensitivity or threats to QI</p> <p>Interference with the key relationships that define the structure or ecological function of the site</p> <p>Climate change</p>	<p>None.</p> <p>The Proposed Development site is not located adjacent or within a European site, therefore there is no risk of habitat loss or fragmentation or any effects on QI habitats or species directly or ex-situ.</p>

5.2. Assessment of Potential In-Combination Effects

Cumulative or In-combination effects are changes in the environment that result from numerous human-induced alterations. In-combination effects can be thought of as occurring through two main pathways: first, through persistent additions or losses of the same materials or resource, and second, through the compounding effects as a result of the coming together of two or more effects.

As part of the Screening for an Appropriate Assessment, in addition to the Proposed Development, other relevant plans and projects in the area must also be considered at this stage. This step aims to identify at this early stage any possible significant in-combination effects of the Proposed Development with other such plans and projects on European sites.

A review of the National Planning Application Database was undertaken. The database was then queried for developments granted planning permission within 250m of the Proposed Development within the last three years, these are presented in Table 4 below.

Table 4. Planning applications granted permission in the vicinity of the Proposed Development.

Planning Ref.	Description of development	Comments
SD22A/0406	Demolition of an existing commercial two storey building and the construction of 2 commercial units with Plantroom on Ground floor level with 8 residential apartments comprising 2 one Bed apartments 3 two bed apartments and 3 three bed apartments all with private balconies over 4 floors; A communal roof garden is located on the fourth floor; Enclosed bin stores for the commercial and residential units is located at the rear of the building; 5 total car parking spaces including 1 disabled car space is provided; 8 bicycle spaces are provided at the front for commercial units and 10 no. bicycle spaces at the rear for residential units; Sustainable drainage (SuDs) roof and roof garden are provided for the development and all associated engineering and site works necessary to facilitate the development.	No potential for in-combination effects given there will be no negative effects on any European sites.
SD22B/0227	Increase width of existing vehicular entrance to 3.5m and alteration to existing front garden to create an additional car parking space and all associated site development works.	No potential for in-combination effects given there will be no negative effects on any European sites.
SD23A/0044	Removal of existing gate piers & portion of low wall forming entrance & exit, to replace with new entrance piers & associated wing walls with inset signage & new entrance gate, together with relocation of existing light pole.	No potential for in-combination effects given there will be no negative effects on any European sites.
SD23A/0053	A single storey pizza oven container unit located to the rear incorporating the following (a) a 17sq.m single storey metal container housing a pizza oven which is ancillary to the existing public house; (b) decorative timber fencing enclosing an outdoor storage area and a secure outdoor walkway connecting the container to the public house; (c) a decorative canopy; (d) associated signage.	No potential for in-combination effects given there will be no negative effects on any European sites.
SD23A/0074	Provision of a vehicle entrance door to the front elevation.	No potential for in-combination effects given there will be no negative effects on any European sites.
SD23A/0023	Redevelopment of existing grease store through the increase in footprint of 9sq.m and the increase in height of 2.8m to a level of 62.242sq.m to match the adjacent existing ingredients dispensary and the replacement of the existing shutter doors; Increase in height of 1.097m of the existing workshop area to a level of 59.180m to match the adjoining boiler house and the replacement of the existing roof to accommodate an internal washroom.	No potential for in-combination effects given there will be no negative effects on any European sites.
SD23A/0108	Demolition of the existing Unit 1 building at the eastern end of the site and the construction of a new enclosed van and truck loading area which shall contain two articulated vehicle loading docks on its northern gable along with a large roller shutter door providing access to twenty internal van loading points and a finished goods storage area.	No potential for in-combination effects given there will be no negative effects on any European sites.
SD23A/0299	New aluminium composite wall cladding panel system to external walls of existing office building Tam House together with replacement of existing windows with new and re-configuring existing entrance steps	No potential for in-combination effects given there will be no negative effects on any European sites.
SD23A/0242	Removal of existing window to form new reception entrance together with new aluminium composite wall cladding panel to existing wall.	No potential for in-combination effects given there will be no negative effects on any European sites.

SD23B/0254	"Conversion of existing attic space comprising of modification of existing roof structure, new access stairs and flat roof dormer to the rear;	No potential for in-combination effects given there will be no negative effects on any European sites.
SD23B/0229	Convert existing detached single storey garage to rear of existing dwelling into gym and office along with associated ancillary works.	No potential for in-combination effects given there will be no negative effects on any European sites.
SD24A/0293	The removal of the existing fence and vegetation. The construction of a new single - storey ESB substation (15.2 MS) Raising the grade outside the substation entrance, the erection of a new replacement security fence. And all associated landscaping and site development works	No potential for in-combination effects given there will be no negative effects on any European sites.

The South Dublin County Development Plan in complying with the requirements of the Habitats Directive requires that all Projects and Plans that could affect the Natura 2000 sites in the same potential Zone of Influence of the Proposed Development site would be initially screened for Appropriate Assessment and if requiring Stage 2 AA, that appropriate employable mitigation measures would be put in place to avoid, reduce or ameliorate negative impacts. In this way any, in-combination impacts with Plans or Projects for the proposed development area and surrounding townlands in which the proposed development site is located, would be avoided.

The listed developments have been granted permission in most cases with conditions relating to sustainable development by the consenting authority in compliance with the relevant Local Authority Development Plan and in compliance with the Local Authority requirement with regard to the Habitats Directive. The development cannot have received planning permission without having met the consenting authority requirement in this regard.

There are no predicted in-combination effects given that it is predicted that the Proposed Development will have no effect on any European site.

Any new applications for the Proposed Development area will be assessed on a case by case basis *initially* by South Dublin County Council which will determine the requirement for AA Screening as per the requirements of Article 6(3) of the Habitats Directive.

6. Conclusion

There is no connectivity to any European sites within or outside the potential Zone of Influence.

There are no predicted effects on any European sites given:

- The lack of direct connectivity between the Proposed Development and any hydrological pathways; there are no watercourses within the Proposed Development boundary and there is no connectivity between the Proposed Development site and any watercourses that lead to Dublin Bay;

- The Proposed Development is to be connected to the existing public sewer network for the treatment of wastewater.
- There are no predicted emissions to air, water or the environment during the construction or operational phases that would result in significant effects.

It has been objectively concluded by Moore Group Environmental Services that:

1. The Proposed Development is not directly connected with, or necessary to the conservation management of the European sites considered in this assessment.
2. The Proposed Development is not likely to either directly or indirectly significantly affect the Qualifying interests or Conservation Objectives of the European sites considered in this assessment.
3. The Proposed Development, either alone or in combination with other plans or projects, is not likely to have significant effects on a European site.
4. It is possible to conclude that significant effects can be excluded at the screening stage.

It can be *excluded*, on the basis of objective information, that the Proposed Development, individually or in combination with other plans or projects, will have a significant effect on a European site.

An appropriate assessment is not, therefore, required.

A final determination will be made by the competent authority in this regard.

7. References

Department of the Environment, Heritage and Local Government (2010) Guidance on Appropriate Assessment of Plans and Projects in Ireland (as amended February 2010).

European Commission (2007) Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC: Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interests, compensatory measures, overall coherence and opinion of the Commission. European Commission, Brussels.

European Commission (2018) Managing Natura 2000 sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC.

European Commission (2021) Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC, Brussels 28.9.21.

European Commission (2021) Guidance document on the strict protection of animal species of Community interest under the Habitats Directive, Brussels 12.10.21.

NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin.

NPWS (2025) National Parks and Wildlife Service Metadata available online at <https://www.npws.ie/maps-and-data>

Office-of-the-Planning-Regulator (2021) Appropriate Assessment Screening for Development Management ^{CPR} Practice Note PN01. March 2021

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APPENDIX 6.1

TII RATING IMPORTANCE

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ROUTE CORRIDOR SELECTION

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Box 4.1: CRITERIA FOR RATING SITE ATTRIBUTES - Estimation of Importance of Soil and Geology Attributes		
Importance	Criteria	Typical Examples
Very High	Attribute has a high quality, significance or value on a regional or national scale Degree or extent of soil contamination is significant on a national or regional scale Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale*	Geological feature rare on a regional or national scale (NHA) Large existing quarry or pit Proven economically extractable mineral resource
High	Attribute has a high quality, significance or value on a local scale Degree or extent of soil contamination is significant on a local scale Volume of peat and/or soft organic soil underlying route is significant on a local scale*	Contaminated soil on site with previous heavy industrial usage Large recent landfill site for mixed wastes Geological feature of high value on a local scale (County Geological Site) Well drained and/or highly fertility soils Moderately sized existing quarry or pit Marginally economic extractable mineral resource
Medium	Attribute has a medium quality, significance or value on a local scale Degree or extent of soil contamination is moderate on a local scale Volume of peat and/or soft organic soil underlying route is moderate on a local scale*	Contaminated soil on site with previous light industrial usage Small recent landfill site for mixed wastes Moderately drained and/or moderate fertility soils Small existing quarry or pit Sub-economic extractable mineral resource
Low	Attribute has a low quality, significance or value on a local scale Degree or extent of soil contamination is minor on a local scale Volume of peat and/or soft organic soil underlying route is small on a local scale*	Large historical and/or recent site for construction and demolition wastes Small historical and/or recent landfill site for construction and demolition wastes Poorly drained and/or low fertility soils Uneconomically extractable mineral resource

* relative to the total volume of inert soil disposed of and/or recovered

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**Box 4.2: CRITERIA FOR RATING SITE ATTRIBUTES - Estimation of Importance
of Hydrology Attributes**

Importance	Criteria	Typical Examples
Extremely High	Attribute has a high quality or value on an international scale	River, wetland or surface water body ecosystem protected by EU legislation e.g. 'European sites' designated under the Habitats Regulations or 'Salmonid waters' designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988.
Very High	Attribute has a high quality or value on a regional or national scale	River, wetland or surface water body ecosystem protected by national legislation – NHA status Regionally important potable water source supplying >2500 homes Quality Class A (Biotic Index Q4, Q5) Flood plain protecting more than 50 residential or commercial properties from flooding Nationally important amenity site for wide range of leisure activities
High	Attribute has a high quality or value on a local scale	Salmon fishery Locally important potable water source supplying >1000 homes Quality Class B (Biotic Index Q3-4) Flood plain protecting between 5 and 50 residential or commercial properties from flooding Locally important amenity site for wide range of leisure activities
Medium	Attribute has a medium quality or value on a local scale	Coarse fishery Local potable water source supplying >50 homes Quality Class C (Biotic Index Q3, Q2-3) Flood plain protecting between 1 and 5 residential or commercial properties from flooding
Low	Attribute has a low quality or value on a local scale	Locally important amenity site for small range of leisure activities Local potable water source supplying <50 homes Quality Class D (Biotic Index Q2, Q1) Flood plain protecting 1 residential or commercial property from flooding Amenity site used by small numbers of local people

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Box 4.3: CRITERIA FOR RATING SITE ATTRIBUTES - Estimation of Importance of Hydrogeology Attributes

Importance	Criteria	Typical Examples
Extremely High	Attribute has a high quality or value on an international scale	Groundwater supports river, wetland or surface water body ecosystem protected by EU legislation e.g. SAC or SPA status
Very High	Attribute has a high quality or value on a regional or national scale	Regionally Important Aquifer with multiple wellfields Groundwater supports river, wetland or surface water body ecosystem protected by national legislation – NHA status Regionally important potable water source supplying >2500 homes Inner source protection area for regionally important water source
High	Attribute has a high quality or value on a local scale	Regionally Important Aquifer Groundwater provides large proportion of baseflow to local rivers Locally important potable water source supplying >1000 homes Outer source protection area for regionally important water source Inner source protection area for locally important water source
Medium	Attribute has a medium quality or value on a local scale	Locally Important Aquifer Potable water source supplying >50 homes Outer source protection area for locally important water source
Low	Attribute has a low quality or value on a local scale	Poor Bedrock Aquifer Potable water source supplying <50 homes

**Guidelines on Procedures for Assessment and Treatment of
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**Box 4.4: CRITERIA FOR RATING IMPACT SIGNIFICANCE AT ROUTE SELECTION STAGE -
Rating of Significant Environmental Impacts at Route Selection Stage**

Impact Level	Attribute Importance				
	Extremely High **	Very High	High	Medium	Low
Profound	Any permanent impact on attribute	Permanent impact on significant proportion of attribute			
Significant	Temporary impact on significant proportion of attribute	Permanent impact on small proportion of attribute	Permanent impact on significant proportion of attribute		
Moderate	Temporary impact on small proportion of attribute	Temporary impact on significant proportion of attribute	Permanent impact on small proportion of attribute	Permanent impact on significant proportion of attribute	
Slight		Temporary impact on small proportion of attribute	Temporary impact on significant proportion of attribute	Permanent impact on small proportion of attribute	Permanent impact on significant proportion of attribute
Imperceptible			Temporary impact on small proportion of attribute	Temporary impact on significant proportion of attribute	Permanent impact on small proportion of attribute

** In rating impacts on an 'European site' account must be taken of Article 6(3) and 6(4) of the Habitats Directive (Council Directive 92/43/EEC). Also see guidance contained within Guidelines for Assessment of Ecological Impacts of National Road Schemes (Rev 2, National Roads Authority, 2008)

APPENDIX 6.2

GROUND INVESTIGATIONS REPORT

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Ground Investigations Ireland

Greenhills Road

Lohan & Donnelly

Ground Investigation Report

March 2021





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DOCUMENT CONTROL SHEET

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



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GROUND INVESTIGATIONS IRELAND
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1.0 Preamble

On the instructions of Lohan & Donnelly Consulting Engineers, a site investigation was carried out by Ground Investigations Ireland Ltd. in January 2021 at the site of the proposed residential development on the Greenhills Road, Dublin 12.

2.0 Overview

2.1. Background

It is proposed to construct new residential development with associated services, access roads and car parking at the proposed site. The site was historically used as a gravel quarry, with a large retaining wall structure marking the southwestern boundary of the site. The site is currently occupied by several derelict industrial/commercial buildings and is situated near the Walkinstown Roundabout, on the southern side of Greenhills Road (R918), Dublin 12. The proposed construction is envisaged to consist of conventional foundations and pavement make up with some local excavations for services and plant.

2.2. Purpose and Scope

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

- Visit project site to observe existing conditions
- Carry out 14 No. Window Sample Boreholes to recover soil samples
- Carry out 10 No. Cable Percussion boreholes to a maximum depth of 4.50m BGL
- Installation of 3 No. Groundwater monitoring wells
- Geotechnical & Environmental Laboratory testing
- Report with recommendations

3.0 Subsurface Exploration

3.1. General

During the ground investigation a programme of intrusive investigation specified by the Consulting Engineer was undertaken to determine the sub surface conditions at the proposed site. Regular sampling and in-situ testing was undertaken in the exploratory holes to facilitate the geotechnical descriptions and to enable laboratory testing to be carried out on the soil samples recovered during excavation and drilling.

The procedures used in this site investigation are in accordance with Eurocode 7 Part 2: Ground Investigation and testing (ISEN 1997 – 2:2007) and B.S. 5930:2015.

3.2. Window Sampling

The window sampling was carried out at the locations shown in Figure 2 in Appendix 1 using a Tecopsa SPT Tec 10 percussion drilling rig. The window sampling consists of a 1m long steel tube with a cutting edge and an internal plastic liner which is mechanically driven into the ground utilising a 50kg weight falling a height of 500mm. Upon completion of the 1m sample, the tube is withdrawn and the plastic liner removed and sealed for logging and sub sampling by a Geotechnical Engineer/Engineering Geologist. The tube is replaced in the borehole and a subsequent 1m sample can be recovered. Occasionally outer casing or a reduced diameter tube is utilised to enable the window sample to progress in difficult drilling conditions. Geotechnical or environmental soil samples can be recovered from each of the liners following logging. The window sample records are provided in Appendix 2 of this Report.

3.3. Cable Percussion Boreholes

The Cable Percussion Boreholes were drilled using a Dando 2000 drilling rig with regular in-situ testing and sampling undertaken to facilitate the production of geotechnical logs and laboratory testing. The standard method of boring in soil for site investigation is known as the Cable Percussion method. It consists of using a Shell in non cohesive soils and a clay cutter in cohesive soils, both operated on a wire cable. Very hard soils, boulders and other hard obstructions are broken up by chiselling and the fragments removed with the Shell. Where ground conditions made it necessary, the borehole was lined with 200mm diameter steel casing. While the use of the Cable Percussion method of boring gives the maximum data on soil conditions, some mixing of laminated soil is inevitable. For this reason, thin lenses of granular material may not be noticed. Disturbed samples were taken from the boring tools at suitable depths, so that there is a representative sample at the top of each change in stratum and thereafter at regular intervals down the borehole until the next stratum was encountered. The disturbed samples were then sealed and sent to the laboratory where they were visually examined to confirm the description of the relevant strata. Standard Penetration Tests were carried out in the boreholes. The results of these tests, together with the depths at which the tests were taken are shown on the accompanying borehole records. The test consists of a thick wall sampler tube, 50mm external diameter, being driven into the soil by a monkey weighing 63.5kg and with a free drop of 760mm. For gravels and glacial till the driving shoe was replaced by a solid 60° cone. The Standard Penetration Test number referred to as the 'N' value is the number of blows required to drive the tube 300mm, after an initial penetration of 150mm. The number gives a guide to the consistency of the soil and can also be used to estimate the relative strength/density at the depth of the test and also to estimate the bearing capacity and compressibility of the soil. The cable percussion borehole logs are provided in Appendix 3 of this Report.

3.4. Surveying

The exploratory hole locations have been recorded using a Trimble R10 GNSS System which records the coordinates and elevation of the locations to ITM, as required by the project specification. In areas where the Trimble R10 GNSS System was unable to record the data due to building interference, observation

methods were used to estimate the exploratory hole location. The coordinates and elevations are provided on the exploratory hole logs in the appendices of this Report.

3.5. Laboratory Testing

Samples were selected from the exploratory holes for a range of geotechnical and environmental testing to assist in the classification of soils and to provide information for the proposed design.

Environmental & Chemical testing on soil samples, as required by the specification, including the Rilta Suite, pH and sulphate testing was carried out by Element Materials Technology Laboratory in the UK. The Rilta Suite testing includes both Solid Waste and Leachate Waste Acceptance Criteria. A number of groundwater samples were also tested by Element, using an indicator parameter suite.

Geotechnical testing consisting of moisture content, Atterberg limits and, Particle Size Distribution (PSD), tests were carried out in NMTL's Geotechnical Laboratory in Carlow.

The results of the completed laboratory are included in Appendix 4 of this Report.

4.0 Ground Conditions

4.1. General

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

The sequence of strata encountered were variable across the site but generally comprised;

- Surfacing
- Made Ground
- Cohesive Deposits
- Granular Deposits

SURFACING: Tarmacadam or Concrete surfacing was present in all exploratory holes and was present to a maximum depth of 0.30m BGL.

MADE GROUND: Made Ground and suspected Made Ground deposits were encountered beneath the surfacing and were present to a depth of between 0.40m and 2.40m BGL, with the full extent of these deposits not determined at BH02, BH02A, BH03, WS02, WS02A, WS02B, WS08, and WS08A. These deposits varied across the site but were generally described as either a *brown clayey sandy subangular to subrounded fine to coarse Gravel* or a *greyish brown sandy gravelly Clay* and contained *rare fragments of red brick*.

COHESIVE DEPOSITS: Cohesive deposits were encountered beneath the made ground and/or surfacing at BH03A, BH04, BH05, BH06, WS03, WS04, WS05, WS09, WS10, and WS11. These deposits were

described typically as *dark brown/grey slightly sandy gravelly CLAY with occasional cobbles*. The secondary sand and gravel constituents varied across the site and with depth, with granular lenses occasionally present in the glacial till matrix. These deposits had occasional, some or many cobble and boulder content were noted on the exploratory hole logs.

GRANULAR DEPOSITS: Granular deposits were encountered beneath the made ground and/or cohesive deposits at BH01, BH04, BH05, BH06, BH07, BH08, WS01, WS06, and WS07. These deposits were generally described as *grey/brown clayey subangular to subrounded fine to coarse GRAVEL with occasional cobbles* and *brown clayey gravelly fine to coarse SAND*. The secondary sand/gravel and silt/clay constituents varied across the site and with depth while occasional, some or many cobble and boulder content also present where noted on the exploratory hole logs.

Based on the SPT N values the deposits are typically medium dense and become dense with depth.

4.2. Groundwater

Groundwater strikes are noted on the exploratory hole logs where they occurred and where possible drilling was suspended for twenty minutes to allow the subsequent rise in groundwater to be recorded. We would point out that these exploratory holes did not remain open for sufficiently long periods of time to establish the hydrogeological regime and groundwater levels would be expected to vary with the tide, time of year, rainfall, nearby construction, and other factors. For this reason, standpipes were installed in BH04, BH06 and BH08 to allow the equilibrium groundwater level to be determined. The groundwater monitoring is included in Appendix 5 of this Report.

4.3. Laboratory Testing

4.3.1. Geotechnical Laboratory Testing

The geotechnical testing carried out on soil samples recovered generally confirm the descriptions on the logs with the primary constituent of the cohesive deposits found to be a CLAY of low to intermediate plasticity.

The Particle Size Distribution tests confirm that generally the cohesive deposits are well-graded with percentages of sands and gravels ranging between 19% and 46.2% generally with fines contents of 25.5% to 45%.

The Particle Size Distribution tests confirm that generally the granular deposits are well-graded with percentages of sands and silt/clay typically between 0.3% and 32.7% with a gravel content of typically 46% to 81.2%.

4.3.2. Chemical Laboratory Testing

The pH and sulphate testing carried out indicate that pH results are near neutral and that the water-soluble sulphate results is low when compared to the guideline values from BRE Special Digest 1:2005. The samples tested classify the soil as a Design Sulphate Level DS-1.

4.3.3. Environmental Laboratory Testing

A number of samples were analysed for a suite of parameters which allows for the assessment of the sampled material in terms of total pollutant content for classification of materials as *hazardous* or *non-hazardous*. The suite also allows for the assessment of the sampled material in terms of suitability for placement at licenced landfills (inert, stable non-reactive, hazardous etc.). The parameter list for the suite includes analysis of the solid samples for arsenic, barium, cadmium, chromium, copper, cyanide, lead, nickel, mercury, zinc, speciated aliphatic and aromatic petroleum hydrocarbons, pH, sulphate, sulphide, moisture content, soil organic matter and an asbestos screen.

The suite also includes those parameters specified in the EU Council Decision establishing criteria for the acceptance of waste at Landfills (Council Decision 2003/33/EC), which for the solid samples are total organic carbon (TOC), speciated aliphatic and aromatic petroleum hydrocarbons, BTEX, phenol, polychlorinated biphenyls (PCB) and PAH.

As part of the suite a leachate is generated from the solid sample, which is analysed for antimony, arsenic, barium, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium, zinc, chloride, fluoride, soluble sulphate, sulphide, phenols, dissolved organic carbon (DOC) and total dissolved solids (TDS).

While the laboratory report provides a comparison with the waste acceptance criteria limits it does not provide a waste classification of the material sampled nor does it comment on any potentially hazardous properties of the materials tested. The possibility for contamination, not revealed by the testing undertaken should be borne in mind particularly where Made Ground deposits are present, or the previous site use or location indicate a risk of environmental variation. The environmental assessment report is included under the cover of a sperate report by Ground Investigations Ireland.

The results of the completed laboratory are included in Appendix 4 of this Report.

5.0 Recommendations & Conclusions

5.1. General

The recommendations given and opinions expressed in this report are based on the findings as detailed in the exploratory hole records. Where an opinion is expressed on the material between exploratory hole locations, this is for guidance only and no liability can be accepted for its accuracy. No responsibility can be accepted for conditions which have not been revealed by the exploratory holes. Limited information has been provided at the ground investigation stage and any designs based on the recommendations or conclusions should be completed in accordance with the current design codes, taking into account the variation and the specific details contained within the exploratory hole logs.

5.2. Foundations

An allowable bearing capacity of 125 kN/m² is recommended for conventional strip or pad foundations on the stiff cohesive deposits and medium dense granular deposits at a depth of 2.20m BGL. If a higher bearing capacity is required, an allowable bearing capacity of 250 kN/m² is recommended for conventional strip or pad foundations on the very stiff cohesive deposits and dense granular deposits at a depth of 3.00m BGL. For each unit, where granular and cohesive deposits are encountered at foundation level, we recommend that all foundations of the unit in question be lowered to the same stratum to avoid differential settlement. The possibility for variation in the depth of the made ground in the vicinity of these foundations should be considered and foundation inspections should be carried out. Any soft spots encountered at the proposed foundation depths should be excavated and replaced with lean mix concrete.

A ground bearing floor slab is recommended to be based on the stiff cohesive deposits or medium dense granular deposits with an appropriate depth of compacted hardcore specified by the consulting engineer and in accordance with the limits and guidelines in SR21:2014+A1:2016 and/or NRA SRW CL808 Type E granular stone fill. Where the depth of Made Ground/Soft deposits exceeds 0.90m then suspended floor slabs should be considered.

The pH and sulphate testing completed on samples recovered from the exploratory holes indicates the pH results are near neutral and the sulphate results are low, when compared to the guideline values from BRE Special Digest 1:2005. No special precautions are required for concrete foundations to prevent sulphate attack. The samples tested were below the limits of DS1 in the BRE Special Digest 1:2005.

Due to the high loading anticipated, piled foundations may be more economically advantageous for the proposed buildings. The type, size and depth of the pile foundations should be confirmed by a specialist piling contractor based on the loading from the proposed building. The floor slab is recommended be suspended and also supported on the building piles.

5.3. Excavations

Short term temporary excavations in the cohesive deposits will remain stable for a limited time only and will require to be appropriately battered or the sides supported if the excavation is below 1.25m BGL or is required to permit man entry.

Excavations in the Made Ground or soft Cohesive Deposits will require to be appropriately battered or the sides supported due to the low strength of these deposits.

Any excavations which penetrate the granular deposits will require to be appropriately battered or the sides supported and are likely to require dewatering due to the groundwater seepages noted in the exploratory hole logs in the Appendices of this Report.

Any waste material to be removed off site should be disposed of to a suitably licenced landfill.

The environmental testing completed during the ground investigation is reported under the cover of a separate GII Environmental Assessment Report.

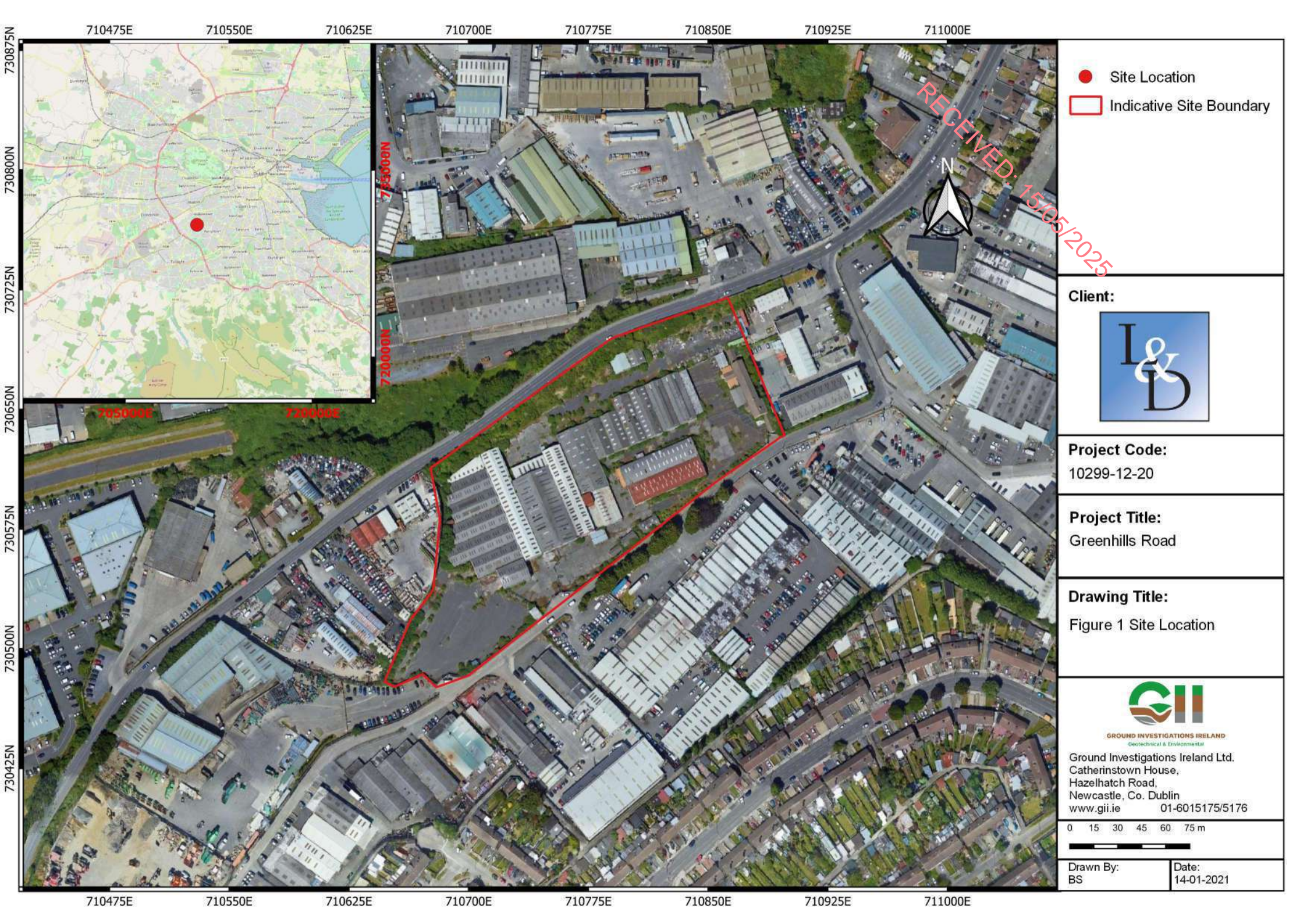
The recommendations provided in this report should be verified in the design of the proposed buildings, using the full details of the loading conditions and taking into consideration the allowable tolerable settlements/movements that the building can accommodate. The founding strata should be inspected and verified by a suitably qualified engineer prior to construction of the building foundations.

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APPENDIX 1 - Figures



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710475E

710550E

710625E

710700E

710775E

710850E

710925E

711000E

730875N

730800N

730725N

730650N

730575N

730500N

730425N

710475E

710550E

710625E

710700E

710775E

710850E

710925E

711000E

- Site Location
- Indicative Site Boundary

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Client:



Project Code:
10299-12-20

Project Title:
Greenhills Road

Drawing Title:
Figure 1 Site Location



GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

Ground Investigations Ireland Ltd.
Catherinstown House,
Hazelhatch Road,
Newcastle, Co. Dublin
www.gii.ie 01-6015175/5176

0 15 30 45 60 75 m



Drawn By:
BS

Date:
14-01-2021

710625E

710700E

710775E

710850E

710925E

730725N

730650N

730575N

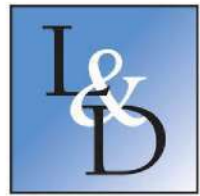
730500N



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- Indicative Site Boundary
- Borehole
- Window Sample

Client:



Project Code:

10299-12-20

Project Title:

Greenhills Road

Drawing Title:

Figure 5 SI Points



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Drawn By:
SG

Date:
21-01-2021

710625E

710700E

710775E

710850E

710925E

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APPENDIX 2 – Window Sample Records





Excavation Method Drive-in Windowless Sampler	Dimensions 85mm to 2.00m 65mm to 3.00m	Ground Level (mOD) 58.28	Client Lohan and Donnelly	Job Number 10299-12-20
	Location 710701.7 E 730493.4 N	Dates 18/01/2021	Project Contractor GII	Sheet 1/1

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Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	ES01			58.16 58.08	(0.12) (0.08) (0.20)	TARMACADAM MADE GROUND: Grey silty sandy subangular to subrounded fine to coarse Gravel MADE GROUND: Brown slightly clayey sandy subangular fine to coarse Gravel		
1.50	ES02			57.88	0.40 (0.40)	MADE GROUND: Brown slightly gravelly clayey fine to coarse Sand with rare fragments of red brick		
2.80	ES03			57.48 55.88	0.80 (1.60) 2.40 (0.60)	Possible MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional cobbles Brown gravelly very clayey fine to coarse SAND. Gravel is subrounded fine to coarse		
				55.28	3.00	Complete at 3.00m		

Remarks Borehole backfilled upon completion	Scale (approx)	Logged By
	1:25	SG
	Figure No. 10299-12-20.WS01	



Excavation Method Drive-in Windowless Sampler	Dimensions 85mm to 0.40m	Ground Level (mOD) 57.98	Client Lohan and Donnelly	Job Number 10299-12-20
	Location 710696.6 E 730528.8 N	Dates 18/01/2021	Project Contractor GII	Sheet 1/1

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Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				57.86	(0.12)	TARMACADAM		
					0.12	TARMACADAM		
				57.68	(0.18)	MADE GROUND: Grey silty sandy Subangular fine to coarse Gravel		
				57.58	(0.30)			
					(0.10)			
					0.40	Complete at 0.40m		

Remarks Unable to advance borehole due to possible boulder	Scale (approx) 1:25	Logged By SG
	Figure No. 10299-12-20.WS02	



Excavation Method Drive-in Windowless Sampler	Dimensions 85mm to 0.40m	Ground Level (mOD) 57.94	Client Lohan and Donnelly	Job Number 10299-12-20
	Location 710700.6 E 730527.3 N	Dates 18/01/2021	Project Contractor GII	Sheet 1/1

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Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				57.82	(0.12)	TARMACADAM		
					0.12	TARMACADAM		
				57.64	(0.30)	MADE GROUND: Grey silty sandy Subangular fine to coarse Gravel		
				57.54	(0.10)			
					0.40	Complete at 0.40m		

Remarks Unable to advance borehole due to possible boulder	Scale (approx) 1:25	Logged By SG
	Figure No. 10299-12-20.WS02a	



Excavation Method Drive-in Windowless Sampler	Dimensions 85mm to 0.40m	Ground Level (mOD) 57.98	Client Lohan and Donnelly	Job Number 10299-12-20
	Location 710691.4 E 730524.3 N	Dates 20/01/2021	Project Contractor GII	Sheet 1/1

RECEIVED: 15/05/2025

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				57.86	(0.12)	TARMACADAM		
					0.12	TARMACADAM		
				57.68	(0.18)	MADE GROUND: Grey silty sandy Subangular fine to coarse Gravel		
				57.58	0.30			
					(0.10)			
					0.40	Complete at 0.40m		

Remarks Unable to advance borehole due to possible boulder	Scale (approx) 1:25	Logged By SG
	Figure No. 10299-12-20.WS02b	



Excavation Method Drive-in Windowless Sampler	Dimensions 85mm to 2.00m 65mm to 3.00m	Ground Level (mOD)	Client Lohan and Donnelly	Job Number 10299-12-20
	Location 710717.6 E 730562.5 N		Dates 18/01/2021	Project Contractor GII

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Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	ES04				0.23	CONCRETE		
					(0.47)	Possible MADE GROUND: Brown very clayey very sandy subangular to subrounded fine to coarse Gravel		
					(0.50)	Possible MADE GROUND: Dark brown slightly sandy slightly gravelly Clay		
1.50	ES05				1.20	Grey slightly sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse		
					(1.30)	Moderate hydrocarbon odour		
3.00	ES06				2.50	Brown clayey sandy subangular to subrounded fine to coarse GRAVEL		
					(0.50)			
					3.00	Complete at 3.00m		

Remarks Borehole backfilled upon completion	Scale (approx)	Logged By
	1:25	SG
	Figure No. 10299-12-20.WS03	



Excavation Method Drive-in Windowless Sampler	Dimensions 85mm to 2.00m 65mm to 3.00m	Ground Level (mOD)	Client Lohan and Donnelly	Job Number 10299-12-20
	Location 710707.6 E 730590.2 N		Dates 18/01/2021	Project Contractor GII

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Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.30	ES07				0.22	CONCRETE		
					(1.28)	Possible MADE GROUND: Brown clayey very sandy subangular fine to coarse Gravel with occasional cobbles Mild hydrocarbon odour		
1.30	ES08				1.50	Dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse		
					(0.50)			
					2.00	Light brown slightly clayey very sandy subangular to subrounded fine to coarse GRAVEL		
					(0.80)			
					2.80	Light brown slightly clayey very sandy subrounded fine to coarse GRAVEL		
					(0.20)			
					3.00	Complete at 3.00m		

Remarks Borehole backfilled upon completion	Scale (approx)	Logged By
	1:25	SG
	Figure No. 10299-12-20.WS04	



Excavation Method Drive-in Windowless Sampler	Dimensions 85mm to 2.00m 65mm to 2.80m	Ground Level (mOD)	Client Lohan and Donnelly	Job Number 10299-12-20
	Location 710747.7 E 730588.6 N		Dates 18/01/2021	Project Contractor GII

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Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
1.50	ES09				(0.22)	CONCRETE		
					0.22	Possible MADE GROUND: Brown clayey sandy subangular fine to coarse Gravel		
					(0.28)	Possible MADE GROUND: Dark brown clayey very sandy subangular fine to coarse Gravel		
2.10	ES10				(1.50)			
					2.00	Brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse		
					(0.40)	Black slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse		
					2.40			
					(0.40)			
					2.80	Complete at 2.80m		

Remarks Refusal at 2.80m BGL Borehole backfilled upon completion	Scale (approx)	Logged By
	1:25	SG
	Figure No. 10299-12-20.WS05	



Excavation Method Drive-in Windowless Sampler	Dimensions 85mm to 2.00m	Ground Level (mOD)	Client Lohan and Donnelly	Job Number 10299-12-20
	Location 710784.5 E 730591.2 N	Dates 19/01/2021	Project Contractor GII	Sheet 1/1

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Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
1.00	ES12				0.05	TARMACADAM		
					(0.25)	MADE GROUND: Red clayey very sandy subangular to subrounded fine to coarse Gravel		
					0.30	Possible MADE GROUND: Brown slightly sandy slightly gravelly Clay		
					(0.15)			
					0.45	Possible MADE GROUND: Brown clayey very gravelly fine to coarse Sand		
					(0.55)			
					1.00	Dark brown clayey very gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse		
					(1.00)			
2.00	ES13				2.00	Complete at 2.00m		

Remarks Refusal at 2.00m BGL Borehole backfilled upon completion	Scale (approx)	Logged By
	1:25	SG
	Figure No. 10299-12-20.WS06	



Excavation Method Drive-in Windowless Sampler	Dimensions 85mm to 2.00m 65mm to 2.30m	Ground Level (mOD)	Client Lohan and Donnelly	Job Number 10299-12-20
	Location 710772.3 E 730620.9 N		Dates 19/01/2021	Project Contractor GII

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Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.20-1.00	ES11				(0.20)	CONCRETE		
					0.20	Recovered as; MADE GROUND: Brown sandy gravelly Clay with rare fragments of red brick		
					(1.80)			
					2.00	Recovered as; Dark brown clayey sandy subangular to subrounded fine to coarse GRAVEL		
					(0.30)			
					2.30	Complete at 2.30m		

Remarks Refusal at 2.30 Borehole backfilled upon completion	Scale (approx)	Logged By
	1:25	SG
Figure No. 10299-12-20.WS07		



Excavation Method Drive-in Windowless Sampler	Dimensions 85mm to 1.00m	Ground Level (mOD)	Client Lohan and Donnelly	Job Number 10299-12-20
	Location 710801.2 E 730635.6 N		Dates 20/01/2021	Project Contractor GII

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Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					0.18	CONCRETE		
					0.18	MADE GROUND: Brown slightly sandy slightly gravelly Clay with rare fragments of red brick		
					0.42			
					0.60	Possible MADE GROUND: Grey clayey sandy subangular to subrounded fine to coarse Gravel with occasional cobbles		
					0.40			
					1.00	Complete at 1.00m		

Remarks Refusal at 1.00m BGL Borehole backfilled upon completion	Scale (approx) 1:25	Logged By SG
	Figure No. 10299-12-20.WS08	



Excavation Method Drive-in Windowless Sampler	Dimensions 85mm to 1.40m	Ground Level (mOD)	Client Lohan and Donnelly	Job Number 10299-12-20
	Location 710806.2 E 730632.5 N	Dates 20/01/2021	Project Contractor GII	Sheet 1/1

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Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
1.00	ES21				0.20	CONCRETE		
					0.20	MADE GROUND: Brown slightly sandy slightly gravelly Clay with rare fragments of red brick		
					0.55			
					0.75	MADE GROUND: Grey clayey very sandy subrounded fine to coarse Gravel with rare fragments of red brick		
					0.65			
					1.40	Complete at 1.40m		

Remarks Refusal at 1.40m BGL Borehole backfilled upon completion	Scale (approx) 1:25	Logged By SG
	Figure No. 10299-12-20.WS08a	



Excavation Method Drive-in Windowless Sampler	Dimensions 85mm to 2.00m 65mm to 3.00m	Ground Level (mOD)	Client Lohan and Donnelly	Job Number 10299-12-20
	Location 710829.4 E 730651.4 N		Dates 19/01/2021	Project Contractor GII

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Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
1.70	ES14				(0.20)	CONCRETE		
					0.20	Possible MADE GROUND: Brown slightly sandy gravelly Clay		
					(0.55)			
					0.75	Possible MADE GROUND: Greyish brown slightly clayey sandy subrounded fine to coarse Gravel		
2.50	ES15				(0.25)	Possible MADE GROUND: Brown slightly sandy gravelly Clay		
					1.00			
					(0.70)	Possible MADE GROUND: Dark brown clayey gravelly fine to coarse Sand		
					2.20	Brown slightly gravelly very sandy SILT. Gravel is subrounded fine to coarse		
					(0.50)			
					2.70	Brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse		
					(0.30)			
					3.00	Complete at 3.00m		

Remarks Borehole backfilled upon completion	Scale (approx) 1:25	Logged By SG
	Figure No. 10299-12-20.WS09	



Excavation Method Drive-in Windowless Sampler	Dimensions 85mm to 2.00m 65mm to 2.60m	Ground Level (mOD)	Client Lohan and Donnelly	Job Number 10299-12-20
	Location 710808 E 730604.9 N		Dates 19/01/2021	Project Contractor GII

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Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	ES16				0.05 (1.05)	TARMACADAM MADE GROUND: Dark brown slightly sandy slightly gravelly Clay with rare fragments of red brick		
2.00	ES17				1.10 (1.50)	Dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse		
					2.60	Complete at 2.60m		

Remarks Refusal at 2.60m BGL Borehole backfilled upon completion	Scale (approx) 1:25	Logged By SG
	Figure No. 10299-12-20.WS10	



Excavation Method Drive-in Windowless Sampler	Dimensions 85mm to 2.00m 65mm to 2.80m	Ground Level (mOD)	Client Lohan and Donnelly	Job Number 10299-12-20
	Location 710835.1 E 730616.7 N	Dates 20/01/2021	Project Contractor GII	Sheet 1/1

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Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.80	ES18				0.05	TARMACADAM		
					(0.45)	MADE GROUND: Brown clayey sandy subangular to subrounded fine to coarse Gravel		
					0.50 (0.30)	Possible MADE GROUND: Brown slightly sandy slightly gravelly Clay		
1.50	ES19				0.80 (0.40)	Possible MADE GROUND: Brown gravelly very clayey fine to coarse Sand		
					1.20 (0.10)	Brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse		
					1.30 (0.35)	Greyish brown slightly gravelly silty fine to coarse SAND. Gravel subrounded fine to medium		
2.50	ES20				1.65 (0.35)	Brown slightly gravelly silty sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to medium		
					2.00 (0.80)	Brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse Moderate hydrocarbon odour		
					2.80	Complete at 2.80m		

Remarks Refusal at 2.80m BGL Borehole backfilled upon completion	Scale (approx)	Logged By
	1:25	SG
	Figure No. 10299-12-20.WS11	

Greenhills Road – Window Sample Core Photographs

WS01



(0.00 – 1.00m BGL)



(1.00 – 2.00m BGL)



(2.00 – 3.00m BGL)

WS03



(0.00 – 1.00m BGL)



(1.00 – 2.00m BGL)



(2.00 – 3.00m BGL)

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Greenhills Road – Window Sample Core Photographs

WS04



(0.00 – 1.00m BGL)



(1.00 – 2.00m BGL)



(2.00 – 3.00m BGL)

WS05



(0.00 – 1.00m BGL)



(1.00 – 2.00m BGL)



(2.00 – 2.80m BGL)

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Greenhills Road – Window Sample Core Photographs

WS06



(0.00 – 1.00m BGL)



(1.00 – 2.00m BGL)

WS07



(0.00 – 1.00m BGL)



(1.00 – 2.00m BGL)



(2.00 – 2.30m BGL)

Greenhills Road – Window Sample Core Photographs

WS08



(0.00 – 1.00m BGL)

WS08a



(0.00 – 1.00m BGL)



(1.00 – 1.40m BGL)

WS09



(0.00 – 1.00m BGL)



(1.00 – 2.00m BGL)

Greenhills Road – Window Sample Core Photographs



(2.00 – 3.00m BGL)

WS10



(0.00 – 1.00m BGL)



(1.00 – 2.00m BGL)



(2.00 – 2.60m BGL)

WS11



(0.00 – 1.00m BGL)



(1.00 – 2.00m BGL)



(2.00 – 2.80m BGL)

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APPENDIX 3 – Cable Percussion Borehole Records





Machine : Dando 2000	Casing Diameter 200mm cased to 4.50m	Ground Level (mOD) 58.84	Client Lohan and Donnelly	Job Number 10299-12-20
Method : Cable Percussion	Location (dGPS) 710668.2 E 730490.5 N	Dates 20/01/2021- 25/01/2021	Project Contractor GII	Sheet 1/1

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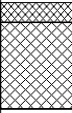
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10 0.20	B01 ES01				58.74 58.64 58.54	0.10 0.20 0.30 (0.50)	TARMACADAM MADE GROUND: Brown slightly silty slightly gravelly fine to coarse Sand Drillers note: MADE GROUND: 804 fill		
1.00-1.21 1.00	SPT(C) 50/60 B02			7,9/50	58.04	0.80	Drillers Note: Brown clayey fine Sand Dense grey very sandy subangular to subrounded fine to coarse GRAVEL		
2.00-2.45 2.00	SPT(C) N=41 B03			7,7/9,10,10,12		(2.20)			
3.00-3.45 3.00	SPT(C) N=49 B04			7,10/19,9,9,12	55.84	3.00 (1.00)	Dense grey sandy subangular to subrounded fine to coarse GRAVEL with occasional subrounded cobbles and some bands of brown slightly sandy slightly gravelly Clay		▽1
4.00-4.06 4.00	SPT(C) 25*/20 50/40 B05			25/50	54.84	4.00 (0.50)	Dense grey slightly sandy subangular fine to coarse GRAVEL with some subangular to subrounded cobbles		▽1
				Water strike(1) at 4.50m, rose to 3.00m in 20 mins.	54.34	4.50	Complete at 4.50m		

Remarks BH-01 terminated at 4.50m BGL due to obstruction. Chiselling from 4.50m to 4.50m for 1 hour.	Scale (approx)	Logged By
	1:50	SG
	Figure No. 10299-12-20.BH-01	



Machine : Dando 2000 Method : Cable Percussion	Casing Diameter 200mm cased to 0.70m	Ground Level (mOD) 58.02	Client Lohan and Donnelly	Job Number 10299-12-20
	Location (dGPS) 710724.1 E 730510.2 N	Dates 25/01/2021	Project Contractor GII	Sheet 1/1

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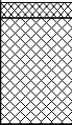
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B01				57.89	(0.13)	TARMACADAM		
					57.32	0.70	MADE GROUND: Brown slightly clayey very sandy subangular to subrounded fine to coarse GRAVEL with occasional subangular to subrounded cobbles Complete at 0.70m		

Remarks BH-02 terminated at 0.70m BGL due to obstruction. Offset location and re-drill BH-02a Chiselling from 0.70m to 0.70m for 1 hour.	Scale (approx)	Logged By
	1:50	SG
	Figure No. 10299-12-20.BH-02	



Machine : Dando 2000 Method : Cable Percussion	Casing Diameter 200mm cased to 0.80m	Ground Level (mOD) 58.00	Client Lohan and Donnelly	Job Number 10299-12-20
	Location	Dates 28/01/2021	Project Contractor GII	Sheet 1/1

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Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.50	ES01				57.90	0.10	TARMACADAM		
0.50	B01				57.20	0.80	MADE GROUND: Light brown slightly sandy gravelly Clay with occasional subangular to subrounded cobbles Complete at 0.80m		

Remarks BH-02A terminated at 1.20m BGL due to obstruction. Chiselling from 0.80m to 0.80m for 1 hour.	Scale (approx)	Logged By
	1:50	PM
Figure No. 10299-12-20.BH-02A		



Machine : Dando 2000 Method : Cable Percussion		Casing Diameter 200mm cased to 1.80m	Ground Level (mOD) 56.81	Client Lohan and Donnelly	Job Number 10299-12-20
Location (dGPS) 710761.6 E 730546.6 N		Dates 25/01/2021	Project Contractor GII	Sheet 1/1	

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Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B01				56.65	(0.16) 0.16	CONCRETE		
1.00-1.29	SPT(C) 50/135 B02 ES01			1,2/19,31	55.61	1.20 (0.60)	MADE GROUND: Brown clayey gravelly fine to coarse Sand with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse Drillers note: Pushing cobble in front of casing. No recovery		
1.00					55.01	1.80	Complete at 1.80m		

Remarks BH-03 terminated at 1.80m BGL due to obstruction. Offset location and re-drill BH-03a Chiselling from 1.20m to 1.80m for 1 hour.	Scale (approx)	Logged By
	1:50	SG
	Figure No. 10299-12-20.BH-03	



Machine : Dando 2000 Method : Cable Percussion		Casing Diameter 200mm cased to 1.20m		Ground Level (mOD)		Client Lohan and Donnelly		Job Number 10299-12-20	
		Location		Dates 28/01/2021		Project Contractor GII		Sheet 1/1	

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Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.20	ES01					0.10	TARMACADAM		
0.50 0.50	B01 ES02					(0.90)	Possible MADE GROUND: Light brown slightly sandy slightly gravelly silty CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse		
1.00-1.45 1.00	SPT(C) N=50 B02			6,7/14,22,14		1.00 (0.20) 1.20	Very stiff light brown slightly sandy slightly gravelly silty CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse Complete at 1.20m		

Remarks BH-03A terminated at 1.20m BGL due to obstruction. Chiselling from 1.20m to 1.20m for 1 hour.	Scale (approx)	Logged By
	1:50	PM
	Figure No. 10299-12-20.BH-03A	



Machine : Dando 2000 Method : Cable Percussion	Casing Diameter 200mm cased to 3.30m	Ground Level (mOD) 56.50	Client Lohan and Donnelly	Job Number 10299-12-20
	Location 710728.4 E 730621.4 N	Dates 27/01/2021	Project Contractor GII	Sheet 1/1

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Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-1.70	ES01				56.30	(0.20) 0.20	TARMACADAM			
0.50	B01						Soft to firm light brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse			
1.00-1.45 1.00	SPT(C) N=8 B02			1,1/1,2,2,3		(1.50)				
1.70-3.00	ES02				54.80	1.70	Medium dense dark brown slightly clayey slightly gravelly SAND. Gravel is subangular to subrounded fine to coarse			
2.00-2.45 2.00	SPT(C) N=32 B03			3,3/6,7,10,9	54.30	2.20	Very stiff dark brown gravelly very sandy CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse		▽1	
3.00-3.45 3.00 3.30	SPT(C) N=50 B04 B05			17,9/19,31 Water strike(1) at 3.20m, rose to 2.50m in 20 mins.	53.50 53.20	3.00 (0.30) 3.30	Dense grey slightly clayey slightly sandy subangular to subrounded fine to coarse GRAVEL		▽1	
							Complete at 3.30m			

Remarks BH-04 terminated at 3.30m BGL due to obstruction. 50mm slotted standpipe installed from 3.80m to 1.00m BGL with pea gravel surround, plain pipe installed from 1.00m to ground level with bentonite seal and flush cover Chiselling from 3.30m to 3.30m for 1 hour.	Scale (approx)	Logged By
	1:50	PM
	Figure No. 10299-12-20.BH-04	



Machine : Dando 2000 Method : Cable Percussion	Casing Diameter 200mm cased to 3.20m	Ground Level (mOD) 56.30	Client Lohan and Donnelly	Job Number 10299-12-20
Location 710790.6 E 730600.4 N		Dates 27/01/2021	Project Contractor GII	Sheet 1/1

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Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.50	ES01				56.10	(0.20)	CONCRETE		
0.50	B01				55.80	(0.30)	POSSIBLE MADE GROUND: Dark brown slightly silty slightly sandy slightly gravelly Clay		
0.50-2.40	ES02					0.50			
1.00-1.45	SPT(C) N=5 B02			1,0/1,1,1,2		(1.50)	Soft dark brown mottled grey slightly silty slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse		
1.00									
2.00-2.45	SPT(C) N=17 B03			1,2/3,4,4,6	54.30	2.00	Stiff dark brown mottled grey slightly silty slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse		
2.00					53.90	(0.40)			
2.40-3.00	ES03				53.90	2.40			
						(0.60)	Stiff dark grey mottled brown slightly sandy slightly gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse		
3.00-3.40	SPT(C) 50*/100 N=50 B04			50/50	53.30	3.00	Dense grey fine to coarse subangular to subrounded GRAVEL with occasional subangular to subrounded cobbles		
3.00				Water strike(1) at 3.20m, rose to 2.20m in 20 mins.	53.10	(0.20)			
						3.20	Complete at 3.20m		

Remarks BH-05 terminated at 3.20m BGL due to obstruction. Chiselling from 3.00m to 3.20m for 1 hour.	Scale (approx)	Logged By
	1:50	PM
	Figure No. 10299-12-20.BH-05	



Machine : Dando 2000		Casing Diameter 200mm cased to 3.30m		Ground Level (mOD) 55.97		Client Lohan and Donnelly		Job Number 10299-12-20	
Method : Cable Percussion		Location 710836.6 E 730597.5 N		Dates 27/01/2021		Project Contractor GII		Sheet 1/1	

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.30	ES01				55.87	0.10 (0.20)	TARMACADAM			
0.30-0.80	ES02				55.67	0.30	MADE GROUND: Dark brown slightly silty sandy fine to coarse subangular to subrounded Gravel			
0.50	B01					(0.50)	POSSIBLE MADE GROUND: Greyish brown slightly silty slightly gravelly sandy Clay with occasional subangular to subrounded cobbles. (reworked)			
0.80-3.00	ES03			1,0/1,1,1,2	55.17	0.80				
1.00-1.45	SPT(C) N=5					(1.20)	Soft dark brown slightly sandy slightly gravelly silty CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse			
1.00	B02									
2.00-2.45	SPT(C) N=17			1,2/3,4,4,6	53.97	2.00	Stiff dark brown slightly sandy slightly gravelly silty CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse			
2.00	B03					(0.70)				
3.00	B04			Water strike(1) at 2.70m, fell to 3.20m in 20 mins. 50/50	53.27	2.70	Dense grey slightly sandy silty subangular to subrounded fine to coarse GRAVEL		▽1	
3.00-3.40	SPT(C) 50*/100					(0.60)	Strong hydrocarbon odour odour noted at 3.30m BGL		▽1	
3.00-3.30	N=50				52.67	3.30	Complete at 3.30m			
	ES04									

Remarks Strong hydrocarbon odour noted at 3.30m BGL. BH-06 terminated at 3.30m BGL due to obstruction. 50mm slotted standpipe installed from 3.30m to 1.00m BGL with pea gravel surround, plain pipe installed from 1.00m to ground level with bentonite seal and flush cover Chiselling from 1.20m to 1.20m for 1 hour.	Scale (approx)	Logged By
	1:50	PM
	Figure No. 10299-12-20.BH-06	



Machine : Dando 2000 Method : Cable Percussion	Casing Diameter 200mm cased to 3.10m	Ground Level (mOD) 55.57	Client Lohan and Donnelly	Job Number 10299-12-20
	Location (dGPS) 710845.7 E 730676.7 N	Dates 26/01/2021	Project Contractor GII	Sheet 1/1

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Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B01				55.52	0.05	TARMACADAM		
1.00-1.45	SPT(C) N=15 B02 ES01			3,3/4,3,4,4	54.27	1.30 (1.25)	Possible MADE GROUND: Brown gravelly very clayey fine to coarse Sand		
2.00-2.44	SPT(C) 50/285 B03			6,9/10,12,14,14	53.57	2.00 (0.70)	Medium dense grey sandy subangular to subrounded fine to coarse GRAVEL		
3.00-3.12	SPT(C) 25*/100 50/20 B04			17,8/50	52.97	2.60 (0.60)	Dense grey sandy subangular to subrounded fine to coarse GRAVEL		
3.00					52.47	3.10 (0.50)	Dense grey subangular to subrounded coarse GRAVEL with some to many subangular to subrounded cobbles		
							Complete at 3.10m		

Remarks BH-07 terminated at 3.10m BGL due to obstruction. Chiselling from 3.10m to 3.10m for 1 hour.	Scale (approx)	Logged By
	1:50	SG
	Figure No. 10299-12-20.BH-07	



Machine : Dando 2000	Casing Diameter 200mm cased to 3.80m	Ground Level (mOD) 55.36	Client Lohan and Donnelly	Job Number 10299-12-20
Method : Cable Percussion	Location (dGPS) 710867.4 E 730633.6 N	Dates 26/01/2021	Project Contractor GII	Sheet 1/1

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Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.50	B01				55.26	0.10 (0.20)	TARMACADAM			
					55.06	0.30	Drillers Note: MADE GROUND: Gravel			
1.00-1.45 1.00	SPT(C) N=20 B02			2,2/3,5,6,6	54.46	0.90	MADE GROUND: Orangish brown slightly sandy slightly gravelly CLAY with organic odour			
					53.76	1.60	Medium dense dark brown clayey gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse			
2.00-2.45 2.00	SPT(C) N=14 B03 ES01			2,2/3,3,4,4	53.26	2.10	Drillers note: Brown sandy gravelly Clay (stiff)			
					52.86	2.50 (0.20)	Drillers note: pushing cobble in front of casing. No recovery			
3.00	B04			Water strike(1) at 3.00m, rose to 2.90m in 20 mins, sealed at 3.20m. 6,9/17,33	52.66	2.70	Very stiff grey slightly sandy slightly gravelly CLAY. Gravelly is subangular to subrounded fine to coarse			
3.00-3.29	SPT(C) 50/135					(1.10)				
3.80 3.80	B05 ES02				51.56	3.80	Complete at 3.80m			

Remarks 50mm slotted standpipe installed from 3.80m to 1.00m BGL with pea gravel surround, plain pipe installed from 1.00m to ground level with bentonite seal and flush cover BH-08 terminated at 3.80m BGL due to obstruction. Chiselling from 3.80m to 3.80m for 1 hour.	Scale (approx)	Logged By
	1:50	SG
	Figure No. 10299-12-20.BH-08	

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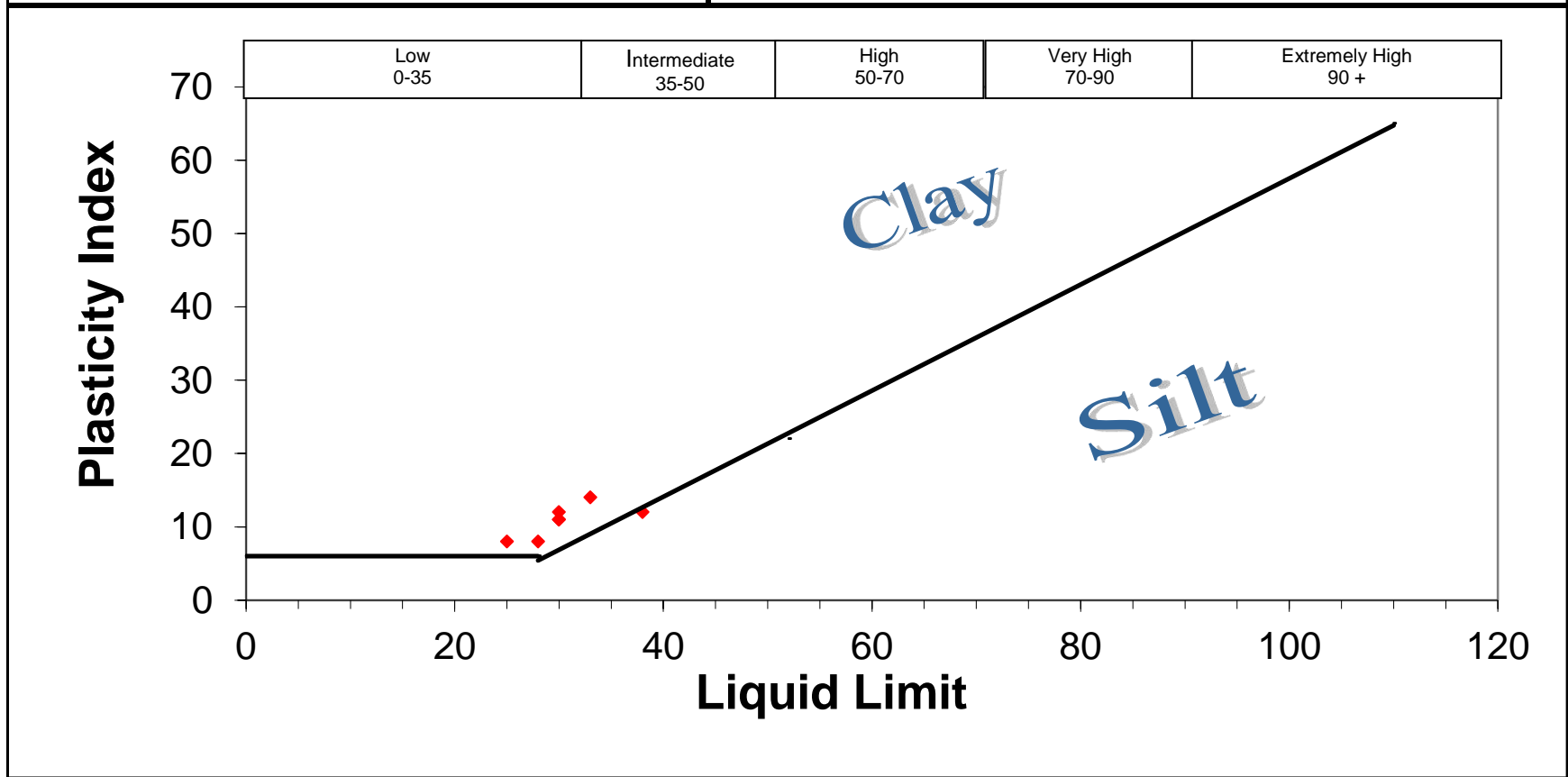
APPENDIX 4 – Laboratory Testing



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NMTL LTD
Unit 18c, Tullow Industrial Estate
Tullow
County Carlow
Tel: 00353 59 9180822
Mob: 00353 872575508
billa@nmtl.ie

Contract: Greenhills Road
Client: Ground Investigations Ireland Ltd
Engineer: James Cashen
GII Project ID 10299-12-20
Date: 01/03/2021
Tested By: Sb/Tch/Ms **Checked:** Bc
Job ref No. NMTL 3351

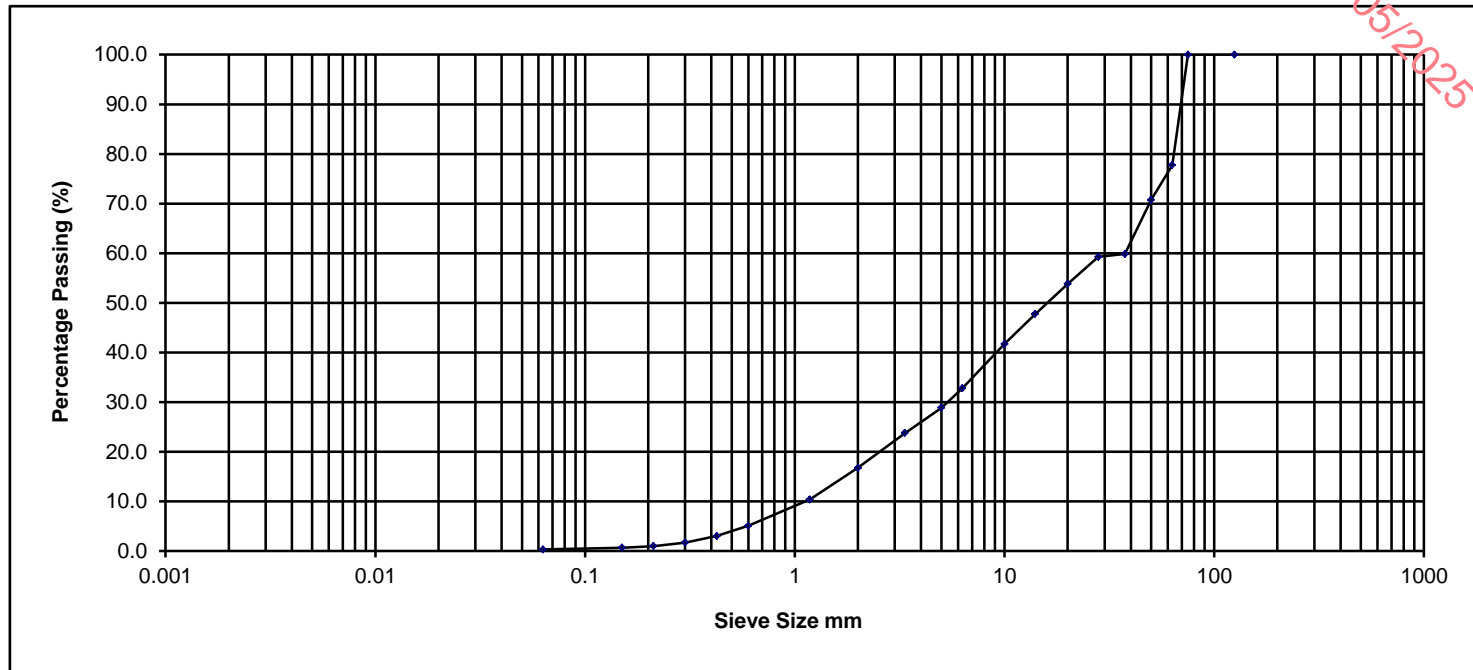


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NMTL Ltd

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	77.7
50.000	70.7
37.500	59.9
28.000	59.2
20.000	53.8
14.000	47.8
10.000	41.7
6.300	32.8
5.000	28.9
3.350	23.8
2.000	16.8
1.180	10.4
0.600	5.1
0.425	3.0
0.300	1.7
0.212	1.0
0.150	0.7
0.063	0.3

Determination of Particle Size Distribution
BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine			Medium			Coarse			Cobbles	Boulder
	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse		
	Silt			Sand			Gravel				
	0.3			16.4			61.0			22.3	0.0

Sample Description Grey sandy fine to coarse GRAVEL.

Project No. NMTL 3351

BH/TP No. BH01

Project Greenhills Road

GII PROJECT ID:10299-12-20

Sample No. B

NMTL Ltd

Operator	Bc	Checked	Nc	Approved	Bc	Date sample tested	25/02/2021	Depth	2.0m
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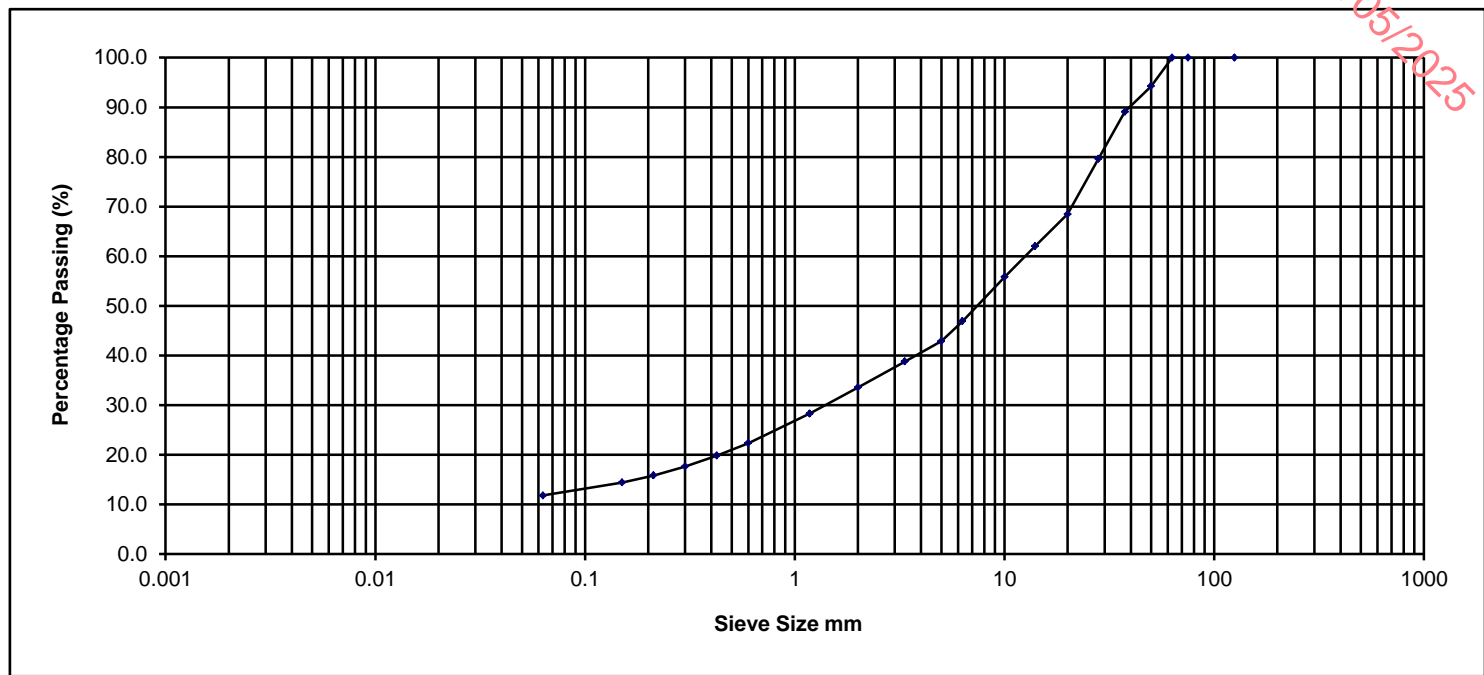
RECEIVED: 15/05/2025

NMTL Ltd

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	94.2
37.500	89.1
28.000	79.6
20.000	68.5
14.000	62.0
10.000	55.8
6.300	46.9
5.000	42.9
3.350	38.8
2.000	33.6
1.180	28.3
0.600	22.4
0.425	19.8
0.300	17.6
0.212	15.8
0.150	14.4
0.063	11.8

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine			Medium			Coarse			Cobbles	Boulder
	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse		
	Silt			Sand			Gravel				
	11.8			21.8			66.4			0.0	0.0

Sample Description: Brown clayey silty sandy GRAVEL.

Project No. NMTL 3351

BH/TP No. BH04

Project Greenhills Road

GII PROJECT ID:10299-12-20

Sample No. B

NMTL Ltd

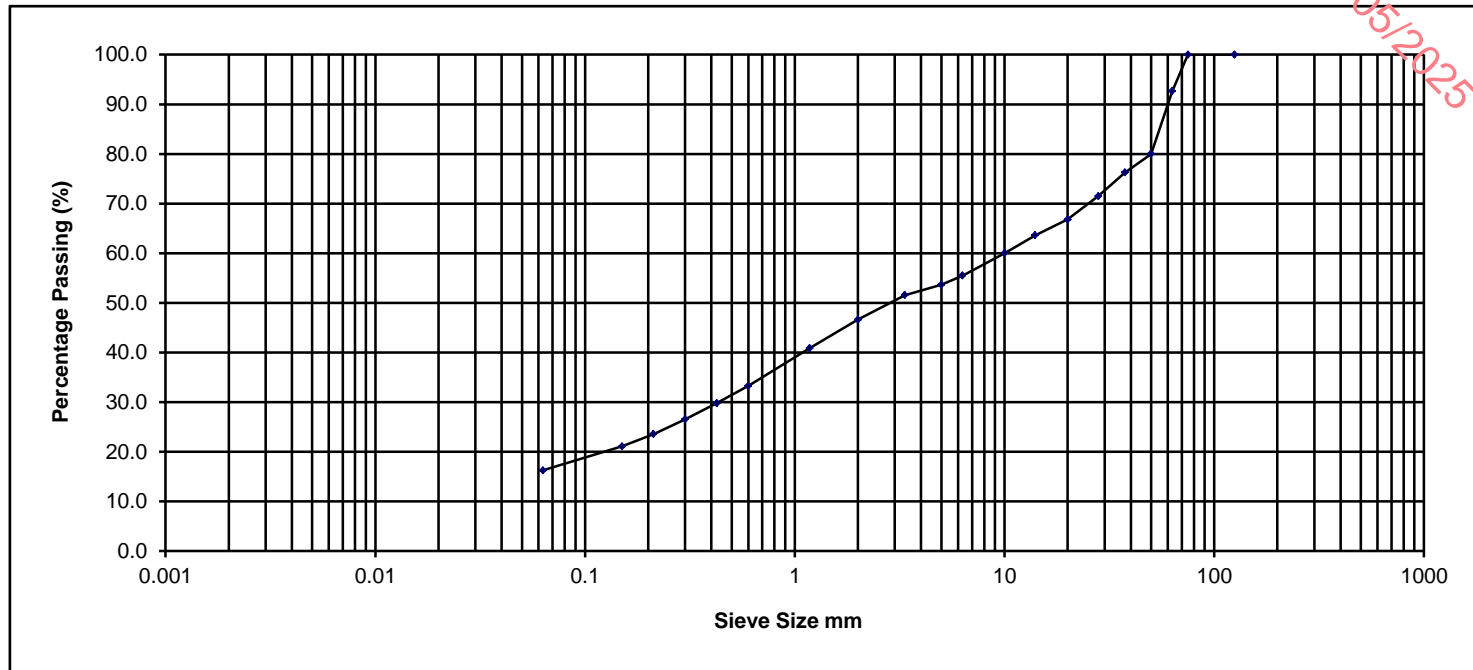
Operator	Bc	Checked	Nc	Approved	Bc	Date sample tested	25/02/2021	Depth	1.0m
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RECEIVED: 15/05/2025

NMTL Ltd

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	92.6
50.000	80.0
37.500	76.2
28.000	71.5
20.000	66.8
14.000	63.6
10.000	60.0
6.300	55.5
5.000	53.6
3.350	51.6
2.000	46.6
1.180	40.9
0.600	33.3
0.425	29.8
0.300	26.5
0.212	23.6
0.150	21.1
0.063	16.3

Determination of Particle Size Distribution
BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine			Medium			Coarse			Cobbles	Boulder
	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse		
	Silt			Sand			Gravel				
	16.3			30.3			46.0			7.4	0.0

Sample Description Brown silty clayey very sandy GRAVEL.

Project No. NMTL 3351

BH/TP No. BH04

Project Greenhills Road

GII PROJECT ID:10299-12-20

Sample No. B

NMTL Ltd

Operator	Bc	Checked	Nc	Approved	Bc	Date sample tested	25/02/2021	Depth	3.0m
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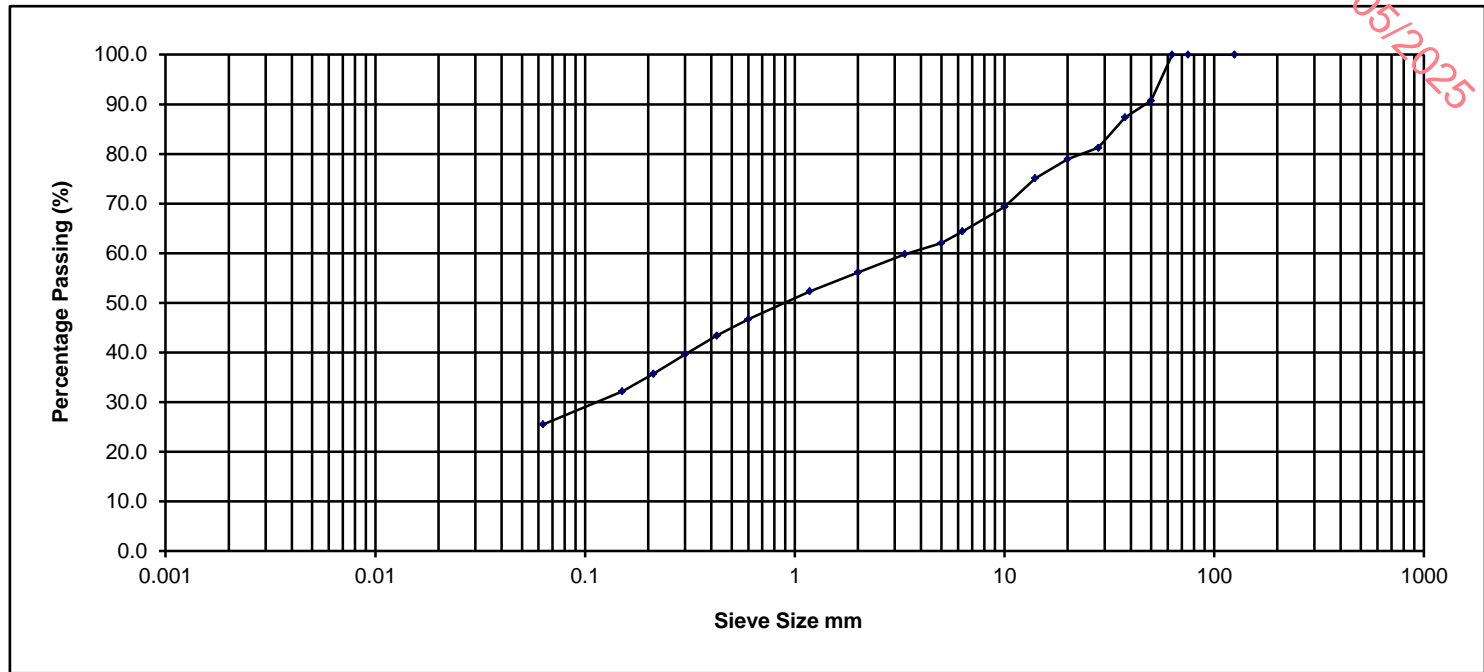
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NMTL Ltd

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	90.7
37.500	87.3
28.000	81.3
20.000	79.0
14.000	75.1
10.000	69.3
6.300	64.4
5.000	62.0
3.350	59.8
2.000	56.1
1.180	52.3
0.600	46.7
0.425	43.4
0.300	39.6
0.212	35.7
0.150	32.1
0.063	25.5

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine			Medium			Coarse			Cobbles	Boulder
	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse		
	Silt			Sand			Gravel			0.0	0.0
	25.5			30.7			43.9				

Sample Description Brown slightly sandy gravelly silty CLAY.

Project No. NMTL 3351

BH/TP No. BH05

Project Greenhills Road

GII PROJECT ID:10299-12-20

Sample No. B

NMTL Ltd

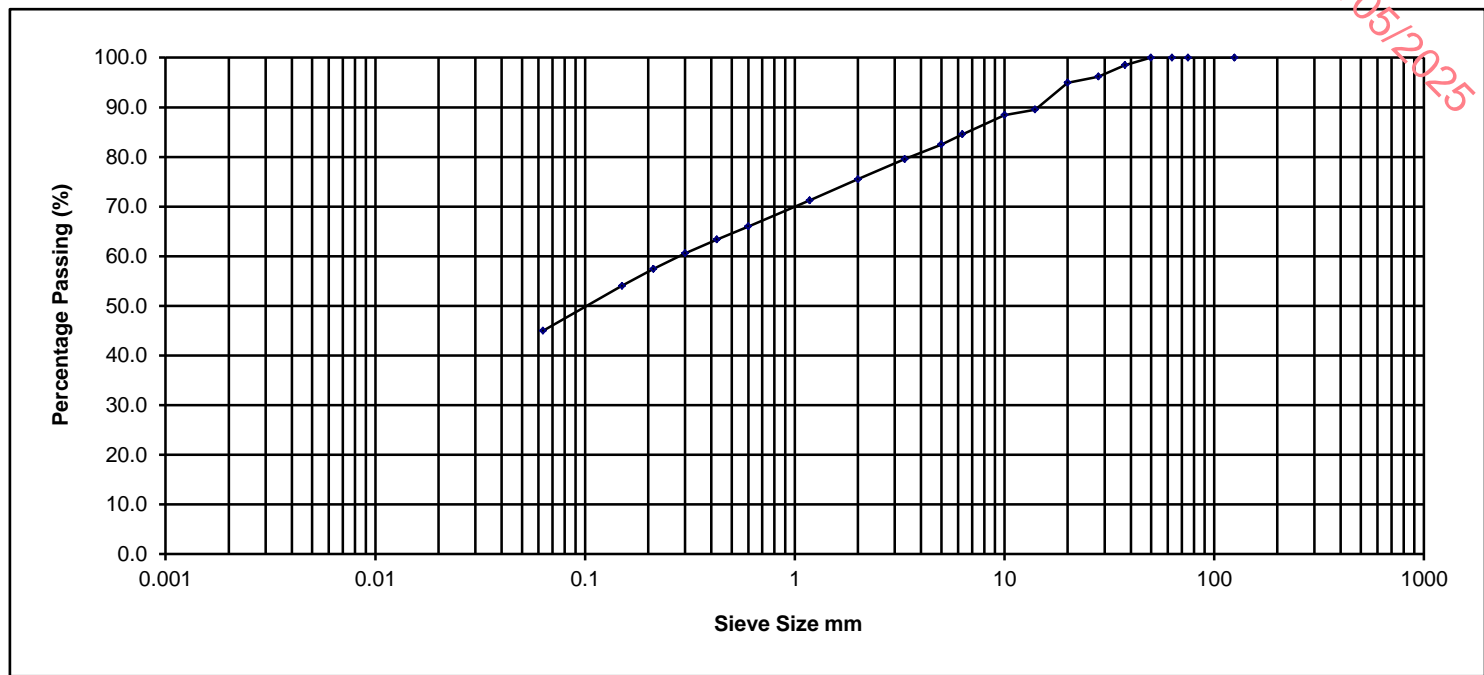
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RECEIVED: 15/05/2025

NMTL Ltd

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	98.5
28.000	96.2
20.000	94.9
14.000	89.5
10.000	88.5
6.300	84.6
5.000	82.5
3.350	79.6
2.000	75.5
1.180	71.3
0.600	66.0
0.425	63.3
0.300	60.6
0.212	57.5
0.150	54.0
0.063	45.0

Determination of Particle Size Distribution BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine			Medium			Coarse			Cobbles	Boulder
	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse		
	Silt			Sand			Gravel			0.0	0.0
	45.0			30.5			24.5				

Sample Description Brown slightly gravelly slightly sandy silty CLAY.

Project No. NMTL 3351

BH/TP No. BH05

Project Greenhills Road

GII PROJECT ID:10299-12-20

Sample No. B

NMTL Ltd

Operator	Bc	Checked	Nc	Approved	Bc	Date sample tested	25/02/2021	Depth	2.00m
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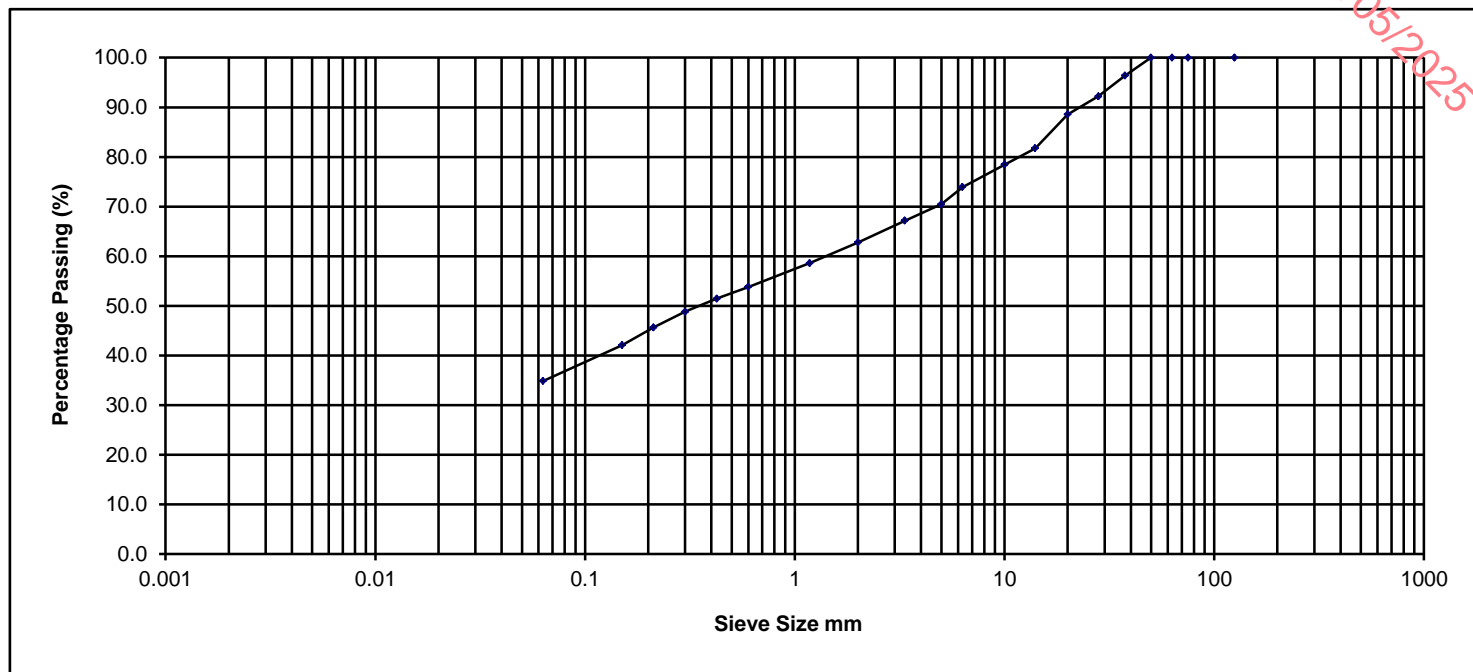
RECEIVED: 15/05/2025

NMTL Ltd

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	96.4
28.000	92.2
20.000	88.6
14.000	81.7
10.000	78.5
6.300	73.9
5.000	70.5
3.350	67.2
2.000	62.8
1.180	58.6
0.600	53.8
0.425	51.5
0.300	48.8
0.212	45.7
0.150	42.1
0.063	34.9

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine			Medium			Coarse			Cobbles	Boulder
	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse		
	Silt			Sand			Gravel			0.0	0.0
	34.9			27.9			37.2				

Sample Description Brown slightly sandy slightly gravelly silty CLAY.

Project No. NMTL 3351

BH/TP No. BH06

Project Greenhills Road

GII PROJECT ID:10299-12-20

Sample No. B

NM
TL
Ltd

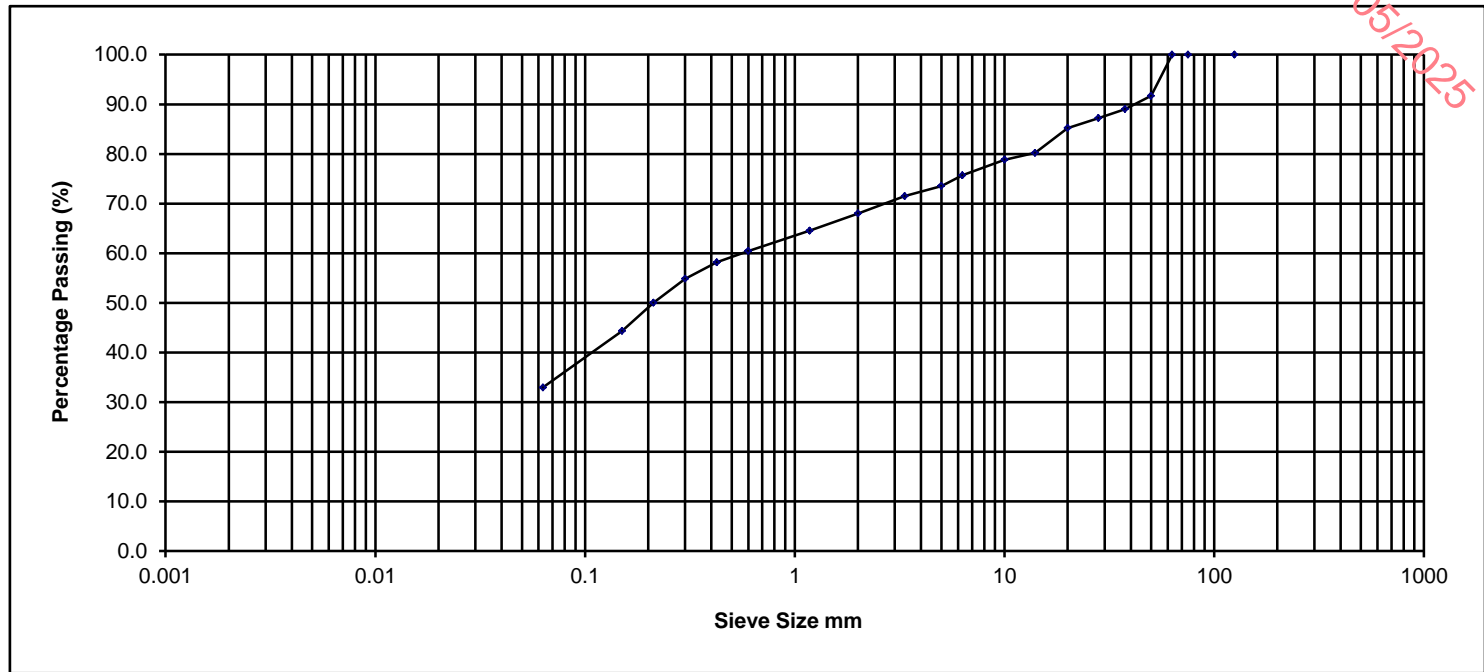
Operator	Bc	Checked	Nc	Approved	Bc	Date sample tested	25/02/2021	Depth	1.0m
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RECEIVED: 15/05/2025

NMTL Ltd

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	91.7
37.500	89.0
28.000	87.2
20.000	85.2
14.000	80.2
10.000	78.8
6.300	75.7
5.000	73.6
3.350	71.5
2.000	68.0
1.180	64.6
0.600	60.4
0.425	58.2
0.300	54.8
0.212	50.0
0.150	44.3
0.063	32.9

Determination of Particle Size Distribution BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine			Medium			Coarse			Cobbles	Boulder
	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse		
	Silt			Sand			Gravel			0.0	0.0
	32.9			35.0			32.0				

Sample Description Brown slightly gravelly sandy silty CLAY.

Project No. NMTL 3351

BH/TP No. BH06

Project Greenhills Road

GII PROJECT ID:10299-12-20

Sample No. B

NM
TL
Ltd

Operator	Bc	Checked	Nc	Approved	Bc	Date sample tested	25/02/2021	Depth	2.0m
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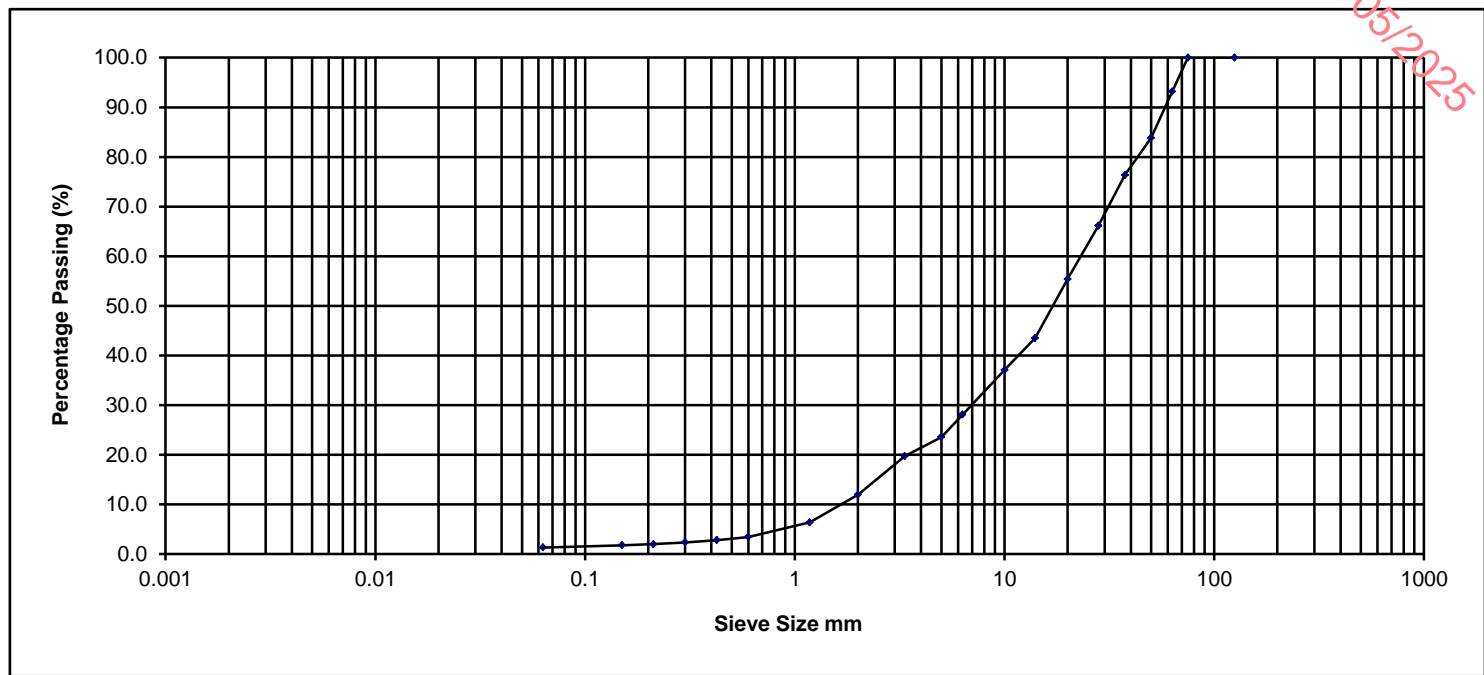
RECEIVED: 15/05/2025

NMTL Ltd

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	93.2
50.000	83.8
37.500	76.4
28.000	66.1
20.000	55.4
14.000	43.5
10.000	37.1
6.300	28.1
5.000	23.6
3.350	19.7
2.000	12.0
1.180	6.4
0.600	3.5
0.425	2.8
0.300	2.4
0.212	2.0
0.150	1.8
0.063	1.3

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine			Medium			Coarse			Cobbles	Boulder
	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse		
	Silt			Sand			Gravel				
	1.3			10.6			81.2			6.8	0.0

Sample Description Grey slightly silty sandy GRAVEL.

Project No. NMTL 3351

BH/TP No. BH07

Project Greenhills Road

GII PROJECT ID:10299-12-20

Sample No. B

NM
TL
Ltd

Operator	Bc	Checked	Nc	Approved	Bc	Date sample tested	25/02/2021	Depth	2.0m
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RECEIVED: 15/05/2025

NMTL Ltd

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	93.5
37.500	85.6
28.000	77.6
20.000	68.0
14.000	60.5
10.000	55.2
6.300	48.9
5.000	46.6
3.350	43.9
2.000	41.3
1.180	38.9
0.600	35.1
0.425	31.8
0.300	27.0
0.212	22.0
0.150	18.0
0.063	12.0

Determination of Particle Size Distribution
BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine			Medium			Coarse			Cobbles	Boulder
	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse		
	Silt			Sand			Gravel				
	12.0			29.3			58.7			0.0	0.0

Sample Description Grey/brown silty very sandy GRAVEL.

Project No. NMTL 3351

BH/TP No. BH08

Project Greenhills Road

GII PROJECT ID:10299-12-20

Sample No. B

NMTL Ltd

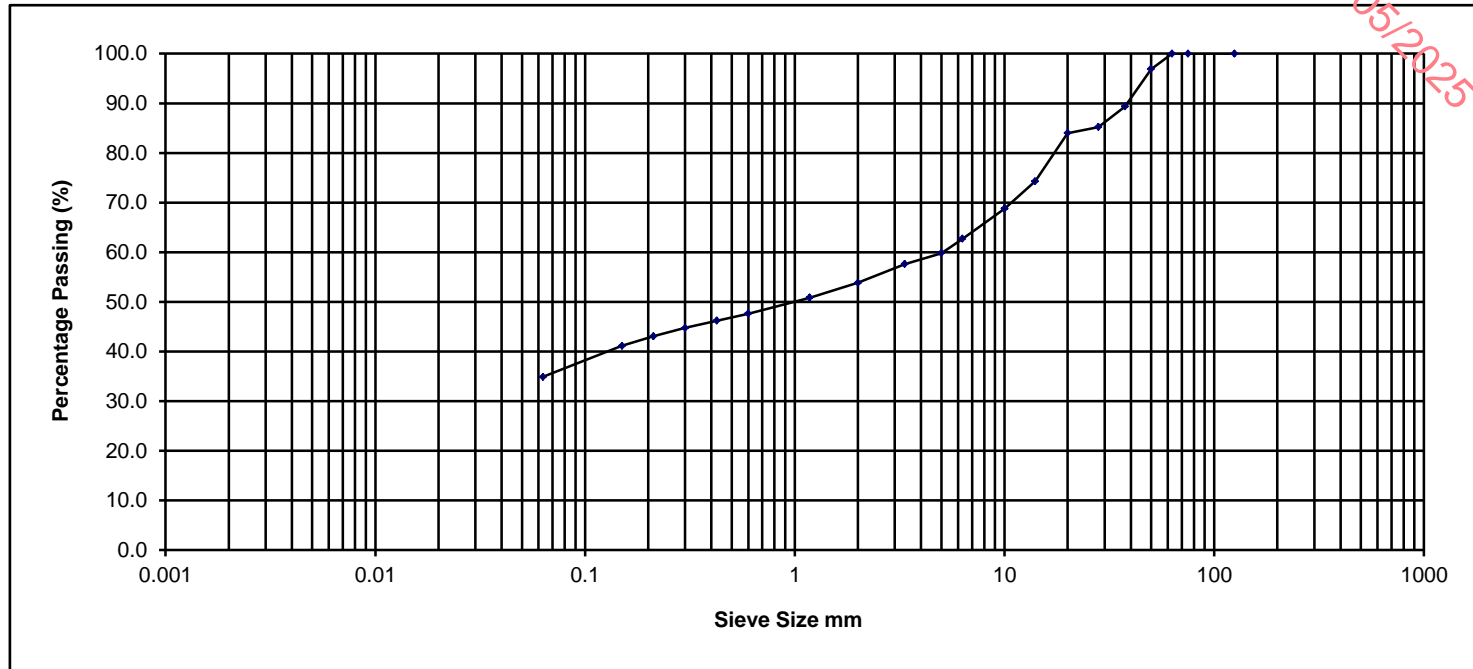
Operator	Bc	Checked	Nc	Approved	Bc	Date sample tested	25/02/2021	Depth	1.00m
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RECEIVED: 15/05/2025

NMTL Ltd

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	96.9
37.500	89.4
28.000	85.2
20.000	84.0
14.000	74.3
10.000	68.8
6.300	62.7
5.000	59.8
3.350	57.6
2.000	53.8
1.180	50.8
0.600	47.6
0.425	46.2
0.300	44.8
0.212	43.1
0.150	41.2
0.063	34.9

Determination of Particle Size Distribution BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Silt			Sand			Gravel			Cobbles	Boulder
	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse		
			34.9			19.0			46.2	0.0	0.0

Sample Description Brown/grey slightly sandy gravelly silty CLAY.

Project No. NMTL 3351

BH/TP No. BH08

Project Greenhills Road

GII PROJECT ID:10299-12-20

Sample No. B

NMTL Ltd

Operator	Bc	Checked	Nc	Approved	Bc	Date sample tested	25/02/2021	Depth	3.0m
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RECEIVED: 15/05/2025

Ground Investigations Ireland
Catherinstown House
Hazelhatch Road
Newcastle
Co. Dublin
Ireland

Attention : Barry Sexton
Date : 8th February, 2021
Your reference : 10299-12-20
Our reference : Test Report 21/925 Batch 1
Location : Greenhills Road
Date samples received : 25th January, 2021
Status : Final report
Issue : 1

Twenty one samples were received for analysis on 25th January, 2021 of which nine were scheduled for analysis. 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.

Authorised By:**Bruce Leslie**
Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 10299-12-20
Location: Greenhills Road
Contact: Barry Sexton
EMT Job No: 21/925

Report : Solid

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

RECEIVED: 15/05/2023

EMT Sample No.	1-3	13-15	22-24	28-29,63	33-35	39-41	45-47	57-59	60-62				
Sample ID	WS01	WS03	WS04	WS05	WS06	WS09	WS10	WS11	WS08A				
Depth	0.50	1.5	1.30	2.10	1.00	1.70	0.50	2.50	1.00				
COC No / misc													
Containers	V J T	V J T	V J T	J T V	V J T	V J T	V J T	V J T	V J T				
Sample Date	18/01/2021	18/01/2021	18/01/2021	19/01/2021	19/01/2021	19/01/2021	20/01/2021	20/01/2021	20/01/2021				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil				
Batch Number	1	1	1	1	1	1	1	1	1				
Date of Receipt	25/01/2021	25/01/2021	25/01/2021	25/01/2021	25/01/2021	25/01/2021	25/01/2021	25/01/2021	25/01/2021				
										LOD/LOR	Units	Method No.	
Antimony	2	1	2	2	2	2	2	2	1	<1	mg/kg	TM30/PM15	
Arsenic #	11.7	6.2	8.5	7.4	5.8	9.4	12.1	9.1	4.0	<0.5	mg/kg	TM30/PM15	
Barium #	67	51	49	43	40	50	66	64	30	<1	mg/kg	TM30/PM15	
Cadmium #	2.1	1.0	1.5	1.6	1.5	1.5	2.2	1.6	1.0	<0.1	mg/kg	TM30/PM15	
Chromium #	51.0	30.9	37.9	24.6	66.4	67.7	42.6	34.8	71.7	<0.5	mg/kg	TM30/PM15	
Copper #	27	14	19	21	15	25	29	22	11	<1	mg/kg	TM30/PM15	
Lead #	35	23	13	12	8	13	18	11	11	<5	mg/kg	TM30/PM15	
Mercury #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM30/PM15	
Molybdenum #	4.6	2.4	3.3	3.1	5.4	5.9	5.1	4.7	5.8	<0.1	mg/kg	TM30/PM15	
Nickel #	34.0	17.6	26.1	25.6	21.7	44.4	37.9	31.3	13.4	<0.7	mg/kg	TM30/PM15	
Selenium #	<1	<1	<1	5	<1	1	1	<1	<1	<1	mg/kg	TM30/PM15	
Zinc #	94	47	72	64	62	87	102	83	45	<5	mg/kg	TM30/PM15	
PAH MS													
Naphthalene #	<0.04	0.08	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8	
Acenaphthylene	<0.03	0.08	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8	
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8	
Fluorene #	<0.04	0.18	<0.04	<0.04	<0.04	<0.04	<0.04	0.06	<0.04	<0.04	mg/kg	TM4/PM8	
Phenanthrene #	<0.03	0.27	<0.03	<0.03	<0.03	<0.03	<0.03	0.06	0.03	<0.03	mg/kg	TM4/PM8	
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8	
Fluoranthene #	0.03	0.11	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.05	<0.03	mg/kg	TM4/PM8	
Pyrene #	0.03	0.11	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.04	<0.03	mg/kg	TM4/PM8	
Benzo(a)anthracene #	<0.06	0.08	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	mg/kg	TM4/PM8	
Chrysene #	0.02	0.07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8	
Benzo(bk)fluoranthene #	<0.07	0.12	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM4/PM8	
Benzo(a)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8	
Indeno(123cd)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8	
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8	
Benzo(ghi)perylene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8	
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8	
PAH 6 Total #	<0.22	0.23	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	mg/kg	TM4/PM8	
PAH 17 Total	<0.64	1.10	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	mg/kg	TM4/PM8	
Benzo(b)fluoranthene	<0.05	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8	
Benzo(k)fluoranthene	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8	
Benzo(j)fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	TM4/PM8	
PAH Surrogate % Recovery	91	95	96	100	97	98	93	108	111	<0	%	TM4/PM8	
Mineral Oil (C10-C40) (EH_CU_1D_Total)	<30	116	<30	<30	<30	<30	<30	225	<30	<30	mg/kg	TM5/PM8/PM16	

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 10299-12-20
Location: Greenhills Road
Contact: Barry Sexton
EMT Job No: 21/925

Report : Solid

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

RECEIVED: 15/05/2023

EMT Sample No.	1-3	13-15	22-24	28-29,63	33-35	39-41	45-47	57-59	60-62			
Sample ID	WS01	WS03	WS04	WS05	WS06	WS09	WS10	WS11	WS08A			
Depth	0.50	1.5	1.30	2.10	1.00	1.70	0.50	2.50	1.00			
COC No / misc												
Containers	V J T	V J T	V J T	J T V	V J T	V J T	V J T	V J T	V J T			
Sample Date	18/01/2021	18/01/2021	18/01/2021	19/01/2021	19/01/2021	19/01/2021	20/01/2021	20/01/2021	20/01/2021			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1			
Date of Receipt	25/01/2021	25/01/2021	25/01/2021	25/01/2021	25/01/2021	25/01/2021	25/01/2021	25/01/2021	25/01/2021			
										LOD/LOR	Units	Method No.
TPH CWG												
Aliphatics												
>C5-C6 (HS_1D_AL) #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL) #	<0.1	0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1	9.1	<0.1	<0.1	<0.1	<0.1	<0.1	2.3	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL) #	<0.2	18.2	<0.2	<0.2	<0.2	<0.2	<0.2	21.8	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL) #	<4	49	<4	<4	<4	<4	<4	90	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL) #	<7	49	<7	<7	<7	<7	<7	85	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL) #	<7	<7	<7	<7	<7	<7	<7	28	<7	<7	mg/kg	TM5/PM8/PM16
>C35-C40 (EH_1D_AL)	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40 (EH+HS_1D_AL)	<26	126	<26	<26	<26	<26	<26	227	<26	<26	mg/kg	TM5/PM8/PM16/PM12/PM15
>C6-C10 (HS_1D_AL)	<0.1	9.6	<0.1	<0.1	<0.1	<0.1	<0.1	2.3	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C25 (EH_1D_AL)	<10	126	<10	<10	<10	<10	<10	206	<10	<10	mg/kg	TM5/PM8/PM16
>C25-C35 (EH_1D_AL)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
Aromatics												
>C5-EC7 (HS_1D_AR) #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR) #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR) #	<0.1	0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR) #	<0.2	14.8	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR) #	<4	50	<4	<4	<4	<4	<4	31	<4	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR) #	<7	49	<7	<7	<7	<7	<7	52	<7	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR) #	<7	15	<7	<7	<7	<7	<7	16	<7	<7	mg/kg	TM5/PM8/PM16
>EC35-EC40 (EH_1D_AR)	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40 (EH+HS_1D_AR)	<26	129	<26	<26	<26	<26	<26	99	<26	<26	mg/kg	TM5/PM8/PM16/PM12/PM15
Total aliphatics and aromatics(C5-40) (EH+HS_CU_1D_Total)	<52	255	<52	<52	<52	<52	<52	326	<52	<52	mg/kg	TM5/PM8/PM16/PM12/PM15
>EC6-EC10 (HS_1D_AR) #	<0.1	0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC25 (EH_1D_AR)	<10	141	<10	<10	<10	<10	<10	84	<10	<10	mg/kg	TM5/PM8/PM16
>EC25-EC35 (EH_1D_AR)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
MTBE #	<5	11	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
Benzene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
Toluene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
Ethylbenzene #	<5	46	<5	<5	<5	<5	<5	15	<5	<5	ug/kg	TM36/PM12
m/p-Xylene #	<5	182	<5	<5	<5	<5	<5	42	<5	<5	ug/kg	TM36/PM12
o-Xylene #	<5	188	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
PCB 28 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 52 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 101 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 118 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 138 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 153 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 180 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	ug/kg	TM17/PM8

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 10299-12-20
Location: Greenhills Road
Contact: Barry Sexton
EMT Job No: 21/925

Report : Solid

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

RECEIVED: 15/05/2023

EMT Sample No.	1-3	13-15	22-24	28-29,63	33-35	39-41	45-47	57-59	60-62				
Sample ID	WS01	WS03	WS04	WS05	WS06	WS09	WS10	WS11	WS08A				
Depth	0.50	1.5	1.30	2.10	1.00	1.70	0.50	2.50	1.00				
COC No / misc													
Containers	V J T	V J T	V J T	J T V	V J T	V J T	V J T	V J T	V J T				
Sample Date	18/01/2021	18/01/2021	18/01/2021	19/01/2021	19/01/2021	19/01/2021	20/01/2021	20/01/2021	20/01/2021				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil				
Batch Number	1	1	1	1	1	1	1	1	1				
Date of Receipt	25/01/2021	25/01/2021	25/01/2021	25/01/2021	25/01/2021	25/01/2021	25/01/2021	25/01/2021	25/01/2021				
										LOD/LOR	Units	Method No.	
Natural Moisture Content	14.2	18.4	7.2	12.5	11.9	8.7	14.3	13.8	6.6	<0.1	%	PM4/PM0	
Moisture Content (% Wet Weight)	12.4	15.5	6.8	11.1	10.7	8.0	12.5	12.1	6.2	<0.1	%	PM4/PM0	
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20	
Chromium III	51.0	30.9	37.9	24.6	66.4	67.7	42.6	34.8	71.7	<0.5	mg/kg	NONE/NONE	
Total Organic Carbon #	0.89	0.61	0.38	0.38	0.36	0.45	0.67	0.35	0.34	<0.02	%	TM21/PM24	
pH #	8.21	7.73	8.61	8.77	8.27	8.41	8.19	8.18	8.55	<0.01	pH units	TM73/PM11	
Mass of raw test portion	0.1016	0.1129	0.0989	0.1031	0.1029	0.1011	0.1136	0.1002	0.0964		kg	NONE/PM17	
Mass of dried test portion	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		kg	NONE/PM17	

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 10299-12-20
Location: Greenhills Road
Contact: Barry Sexton
EMT Job No: 21/925

Report : CEN 10:1 1 Batch

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

RECEIVED: 15/05/2023

EMT Sample No.	1-3	13-15	22-24	28-29,63	33-35	39-41	45-47	57-59	60-62				
Sample ID	WS01	WS03	WS04	WS05	WS06	WS09	WS10	WS11	WS08A				
Depth	0.50	1.5	1.30	2.10	1.00	1.70	0.50	2.50	1.00				
COC No / misc													
Containers	V J T	V J T	V J T	J T V	V J T	V J T	V J T	V J T	V J T				
Sample Date	18/01/2021	18/01/2021	18/01/2021	19/01/2021	19/01/2021	19/01/2021	20/01/2021	20/01/2021	20/01/2021				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil				
Batch Number	1	1	1	1	1	1	1	1	1				
Date of Receipt	25/01/2021	25/01/2021	25/01/2021	25/01/2021	25/01/2021	25/01/2021	25/01/2021	25/01/2021	25/01/2021				
										LOD/LOR	Units	Method No.	
Dissolved Antimony #	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	mg/l	TM30/PM17	
Dissolved Antimony (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17	
Dissolved Arsenic #	<0.0025	0.0127	0.0026	<0.0025	<0.0025	0.0027	<0.0025	<0.0025	<0.0025	<0.0025	mg/l	TM30/PM17	
Dissolved Arsenic (A10) #	<0.025	0.127	0.026	<0.025	<0.025	0.027	<0.025	<0.025	<0.025	<0.025	mg/kg	TM30/PM17	
Dissolved Barium #	0.007	0.053	0.021	0.006	0.003	0.004	0.017	0.005	0.005	<0.003	mg/l	TM30/PM17	
Dissolved Barium (A10) #	0.07	0.53	0.21	0.06	<0.03	0.04	0.17	0.05	0.05	<0.03	mg/kg	TM30/PM17	
Dissolved Cadmium #	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	mg/l	TM30/PM17	
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/kg	TM30/PM17	
Dissolved Chromium #	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	mg/l	TM30/PM17	
Dissolved Chromium (A10) #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	mg/kg	TM30/PM17	
Dissolved Copper #	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	mg/l	TM30/PM17	
Dissolved Copper (A10) #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM30/PM17	
Dissolved Lead #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/l	TM30/PM17	
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM30/PM17	
Dissolved Molybdenum #	0.007	0.047	0.008	0.008	<0.002	0.006	0.012	0.016	0.010	<0.002	mg/l	TM30/PM17	
Dissolved Molybdenum (A10) #	0.07	0.47	0.08	0.08	<0.02	0.06	0.12	0.16	0.10	<0.02	mg/kg	TM30/PM17	
Dissolved Nickel #	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	mg/l	TM30/PM17	
Dissolved Nickel (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	mg/kg	TM30/PM17	
Dissolved Selenium #	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.004	<0.003	<0.003	<0.003	mg/l	TM30/PM17	
Dissolved Selenium (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.04	<0.03	<0.03	<0.03	mg/kg	TM30/PM17	
Dissolved Zinc #	<0.003	0.004	0.003	0.004	0.005	0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17	
Dissolved Zinc (A10) #	<0.03	0.04	<0.03	0.04	0.05	0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17	
Mercury Dissolved by CVAF #	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	mg/l	TM61/PM0	
Mercury Dissolved by CVAF #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	mg/kg	TM61/PM0	
Phenol	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	TM26/PM0	
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM26/PM0	
Fluoride	<0.3	0.3	<0.3	0.4	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/l	TM173/PM0	
Fluoride	<3	<3	<3	4	<3	<3	<3	<3	<3	<3	mg/kg	TM173/PM0	
Sulphate as SO4 #	24.8	<0.5	3.8	2.2	2.6	3.1	20.2	1.4	15.7	<0.5	mg/l	TM38/PM0	
Sulphate as SO4 #	248	<5	38	22	26	31	202	14	157	<5	mg/kg	TM38/PM0	
Chloride #	0.5	2.9	0.6	0.4	0.5	2.8	1.4	<0.3	0.5	<0.3	mg/l	TM38/PM0	
Chloride #	5	29	6	4	5	28	14	<3	5	<3	mg/kg	TM38/PM0	
Dissolved Organic Carbon	4	14	4	3	3	3	5	2	7	<2	mg/l	TM60/PM0	
Dissolved Organic Carbon	40	140	40	30	30	30	50	20	70	<20	mg/kg	TM60/PM0	
pH	8.38	8.29	8.52	8.65	8.44	8.44	8.05	8.13	8.01	<0.01	pH units	TM73/PM0	
Total Dissolved Solids #	103	148	57	41	46	88	245	<35	72	<35	mg/l	TM20/PM0	
Total Dissolved Solids #	1030	1480	570	410	460	880	2451	<350	720	<350	mg/kg	TM20/PM0	

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 10299-12-20
Location: Greenhills Road
Contact: Barry Sexton
EMT Job No: 21/925

Report : EN12457_2

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

RECEIVED: 15/09/2025

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-3	13-15	22-24	28-29,63	33-35	39-41	45-47	57-59	60-62						
Sample ID	WS01	WS03	WS04	WS05	WS06	WS09	WS10	WS11	WS08A						
Depth	0.50	1.5	1.30	2.10	1.00	1.70	0.50	2.50	1.00						
COC No / misc															
Containers	V J T	V J T	V J T	J T V	V J T	V J T	V J T	V J T	V J T						
Sample Date	18/01/2021	18/01/2021	18/01/2021	19/01/2021	19/01/2021	19/01/2021	20/01/2021	20/01/2021	20/01/2021						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1	1	1						
Date of Receipt	25/01/2021	25/01/2021	25/01/2021	25/01/2021	25/01/2021	25/01/2021	25/01/2021	25/01/2021	25/01/2021						
										Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Solid Waste Analysis															
Total Organic Carbon #	0.89	0.61	0.38	0.38	0.36	0.45	0.67	0.35	0.34	3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025	0.416	<0.025	<0.025	<0.025	<0.025	<0.025	0.057	<0.025	6	-	-	<0.025	mg/kg	TM36/PM12
Sum of 7 PCBs #	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	<30	116	<30	<30	<30	<30	<30	225	<30	500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6 #	<0.22	0.23	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	<0.64	1.10	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate															
Arsenic #	<0.025	0.127	0.026	<0.025	<0.025	0.027	<0.025	<0.025	<0.025	0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium #	0.07	0.53	0.21	0.06	<0.03	0.04	0.17	0.05	0.05	20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	2	50	100	<0.07	mg/kg	TM30/PM17
Mercury #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	0.2	2	<0.0001	mg/kg	TM61/PM0
Molybdenum #	0.07	0.47	0.08	0.08	<0.02	0.06	0.12	0.16	0.10	0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.04	<0.03	<0.03	0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc #	<0.03	0.04	<0.03	0.04	0.05	0.03	<0.03	<0.03	<0.03	4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids #	1030	1480	570	410	460	880	2451	<350	720	4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	40	140	40	30	30	30	50	20	70	500	800	1000	<20	mg/kg	TM60/PM0
Dry Matter Content Ratio	88.7	79.8	91.2	87.7	87.5	88.8	79.5	89.6	93.4	-	-	-	<0.1	%	NONE/PM4
pH #	8.21	7.73	8.61	8.77	8.27	8.41	8.19	8.18	8.55	-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	-	-	<0.1	mg/kg	TM26/PM0
Fluoride	<3	<3	<3	4	<3	<3	<3	<3	<3	-	-	-	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	248	<5	38	22	26	31	202	14	157	1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride #	5	29	6	4	5	28	14	<3	5	800	15000	25000	<3	mg/kg	TM38/PM0

Client Name: Ground Investigations Ireland
Reference: 10299-12-20
Location: Greenhills Road
Contact: Barry Sexton

Note:
 Asbestos Screen analysis is 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. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

RECEIVED 15/05/2025

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
21/925	1	WS01	0.50	2	27/01/2021	General Description (Bulk Analysis)	Soil/Stones
					27/01/2021	Asbestos Fibres	NAD
					27/01/2021	Asbestos ACM	NAD
					27/01/2021	Asbestos Type	NAD
					27/01/2021	Asbestos Level Screen	NAD
21/925	1	WS03	1.5	14	27/01/2021	General Description (Bulk Analysis)	Soil/Stones
					27/01/2021	Asbestos Fibres	NAD
					27/01/2021	Asbestos ACM	NAD
					27/01/2021	Asbestos Type	NAD
					27/01/2021	Asbestos Level Screen	NAD
21/925	1	WS04	1.30	23	27/01/2021	General Description (Bulk Analysis)	Soil/Stones
					27/01/2021	Asbestos Fibres	NAD
					27/01/2021	Asbestos ACM	NAD
					27/01/2021	Asbestos Type	NAD
					27/01/2021	Asbestos Level Screen	NAD
21/925	1	WS05	2.10	28	27/01/2021	General Description (Bulk Analysis)	Soil/Stones
					27/01/2021	Asbestos Fibres	NAD
					27/01/2021	Asbestos ACM	NAD
					27/01/2021	Asbestos Type	NAD
					27/01/2021	Asbestos Level Screen	NAD
21/925	1	WS06	1.00	34	27/01/2021	General Description (Bulk Analysis)	Soil/Stones
					27/01/2021	Asbestos Fibres	NAD
					27/01/2021	Asbestos ACM	NAD
					27/01/2021	Asbestos Type	NAD
					27/01/2021	Asbestos Level Screen	NAD
21/925	1	WS09	1.70	40	27/01/2021	General Description (Bulk Analysis)	Soil/Stones
					27/01/2021	Asbestos Fibres	NAD
					27/01/2021	Asbestos ACM	NAD
					27/01/2021	Asbestos Type	NAD
					27/01/2021	Asbestos Level Screen	NAD
21/925	1	WS10	0.50	46	27/01/2021	General Description (Bulk Analysis)	Soil/Stones
					27/01/2021	Asbestos Fibres	NAD
					27/01/2021	Asbestos ACM	NAD

Client Name: Ground Investigations Ireland
Reference: 10299-12-20
Location: Greenhills Road
Contact: Barry Sexton

RECEIVED: 15/05/2025

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
21/925	1	WS10	0.50	46	27/01/2021	Asbestos Type	NAD
					27/01/2021	Asbestos Level Screen	NAD
21/925	1	WS11	2.50	58	27/01/2021	General Description (Bulk Analysis)	soil/stones
					27/01/2021	Asbestos Fibres	NAD
					27/01/2021	Asbestos ACM	NAD
					27/01/2021	Asbestos Type	NAD
					27/01/2021	Asbestos Level Screen	NAD
21/925	1	WS08A	1.00	61	27/01/2021	General Description (Bulk Analysis)	soil/stones
					27/01/2021	Asbestos Fibres	NAD
					27/01/2021	Asbestos ACM	NAD
					27/01/2021	Asbestos Type	NAD
					27/01/2021	Asbestos Level Screen	NAD

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/925

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. Limits of detection for analyses carried out on as received samples are not moisture content corrected. 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.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

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 overestimate 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

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

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.

Please include all sections of this report if it is reproduced

All solid results are expressed on a dry weight basis unless stated otherwise.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) 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.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher, this result is not accredited.
*	Analysis subcontracted to an Element Materials Technology 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

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HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics extracted.
#2	EU_Total but with fatty acids extracted.
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

RECEIVED: 15/05/2025

EMT Job No: 21/925

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	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 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of 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 8270D v5:2014 method for the solvent extraction and determination of 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 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM17	Modified US EPA method 8270D v5:2014. 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 160.1/3 (TDS/TS: 1971) Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 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. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	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

EMT Job No: 21/925

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
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 Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry); WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP	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 Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry); WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP	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 Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry); WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP	PM17	Modified method BS EN12457-2:2002 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
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993 (comparabl	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993 (comparabl	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	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM61	Determination of Mercury by Cold Vapour Atomic Fluorescence - WATERS: Modified USEPA Method 245.7, Rev 2, Feb 2005. SOILS: Modified USEPA Method 7471B, Rev.2, Feb 2007	PM0	No preparation is required.	Yes		AR	Yes

EMT Job No: 21/925

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15/05/2025

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM65	Asbestos Bulk Identification method based on HSG 248 First edition (2006)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. 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 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	Yes
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. 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 9214 - 340.2 (EPA 1998)	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes
NONE	No Method Code	PM17	Modified method BS EN12457-2:2002 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 11465:1993(E) and BS1377-2:1990.			AR	

RECEIVED: 15/05/2025

Ground Investigations Ireland
Catherinstown House
Hazelhatch Road
Newcastle
Co. Dublin
Ireland

Attention : Barry Sexton

Date : 17th February, 2021

Your reference : 10299-12-20

Our reference : Test Report 21/925 Batch 2

Location : Greenhills Road

Date samples received : 28th January, 2021

Status : Final report

Issue : 1

Five samples were received for analysis on 28th January, 2021 of which four were scheduled for analysis. 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.

Authorised By:**Bruce Leslie**
Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Ground Investigations Ireland
 Reference: 10299-12-20
 Location: Greenhills Road
 Contact: Barry Sexton
 EMT Job No: 21/925

Report : EN12457_2

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

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Please see attached notes for all abbreviations and acronyms

EMT Sample No.	64-66	67-69	70-72	73-75															
Sample ID	BH01	BH03	BH07	BH08															
Depth	0.20	1.00	1.00	2.00															
COC No / misc																			
Containers	V J T	V J T	V J T	V J T															
Sample Date	27/01/2021	27/01/2021	27/01/2021	27/01/2021															
Sample Type	Soil	Soil	Soil	Soil															
Batch Number	2	2	2	2															
Date of Receipt	28/01/2021	28/01/2021	28/01/2021	28/01/2021															
										Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.				
Solid Waste Analysis																			
Total Organic Carbon #	0.34	0.32	0.30	0.29						3	5	6	<0.02	%	TM21/PM24				
Sum of BTEX	<0.025	<0.025	<0.025	<0.025						6	-	-	<0.025	mg/kg	TM36/PM12				
Sum of 7 PCBs #	<0.035	<0.035	<0.035	<0.035						1	-	-	<0.035	mg/kg	TM17/PM8				
Mineral Oil	73	<30	<30	<30						500	-	-	<30	mg/kg	TM5/PM8/PM16				
PAH Sum of 6 #	<0.22	<0.22	<0.22	<0.22						-	-	-	<0.22	mg/kg	TM4/PM8				
PAH Sum of 17	<0.64	<0.64	<0.64	<0.64						100	-	-	<0.64	mg/kg	TM4/PM8				
CEN 10:1 Leachate																			
Arsenic #	<0.025	<0.025	<0.025	<0.025						0.5	2	25	<0.025	mg/kg	TM30/PM17				
Barium #	<0.03	0.05	<0.03	0.04						20	100	300	<0.03	mg/kg	TM30/PM17				
Cadmium #	<0.005	<0.005	<0.005	<0.005						0.04	1	5	<0.005	mg/kg	TM30/PM17				
Chromium #	<0.015	<0.015	<0.015	<0.015						0.5	10	70	<0.015	mg/kg	TM30/PM17				
Copper #	<0.07	<0.07	<0.07	<0.07						2	50	100	<0.07	mg/kg	TM30/PM17				
Mercury #	<0.0001	<0.0001	<0.0001	<0.0001						0.01	0.2	2	<0.0001	mg/kg	TM61/PM0				
Molybdenum #	0.06	0.13	0.07	0.04						0.5	10	30	<0.02	mg/kg	TM30/PM17				
Nickel #	<0.02	<0.02	<0.02	<0.02						0.4	10	40	<0.02	mg/kg	TM30/PM17				
Lead #	<0.05	<0.05	<0.05	<0.05						0.5	10	50	<0.05	mg/kg	TM30/PM17				
Antimony #	<0.02	<0.02	<0.02	<0.02						0.06	0.7	5	<0.02	mg/kg	TM30/PM17				
Selenium #	<0.03	<0.03	<0.03	<0.03						0.1	0.5	7	<0.03	mg/kg	TM30/PM17				
Zinc #	<0.03	<0.03	0.04	<0.03						4	50	200	<0.03	mg/kg	TM30/PM17				
Total Dissolved Solids #	<350	<350	<350	520						4000	60000	100000	<350	mg/kg	TM20/PM0				
Dissolved Organic Carbon	<20	<20	30	<20						500	800	1000	<20	mg/kg	TM60/PM0				
Dry Matter Content Ratio	92.2	88.2	86.9	73.4						-	-	-	<0.1	%	NONE/PM4				
pH #	8.78	8.73	8.60	8.09						-	-	-	<0.01	pH units	TM73/PM11				
Phenol	<0.1	<0.1	<0.1	<0.1						1	-	-	<0.1	mg/kg	TM26/PM0				
Fluoride	<3	<3	<3	<3						-	-	-	<3	mg/kg	TM173/PM0				
Sulphate as SO4 #	17	11	7	14						1000	20000	50000	<5	mg/kg	TM38/PM0				
Chloride #	<3	<3	5	<3						800	15000	25000	<3	mg/kg	TM38/PM0				

Client Name: Ground Investigations Ireland
Reference: 10299-12-20
Location: Greenhills Road
Contact: Barry Sexton

Note:

Asbestos Screen analysis is 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. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

RECEIVED 15/05/2025

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
21/925	2	BH01	0.20	65	09/02/2021	General Description (Bulk Analysis)	Soil/Stone
					09/02/2021	Asbestos Fibres	NAD
					09/02/2021	Asbestos ACM	NAD
					09/02/2021	Asbestos Type	NAD
					09/02/2021	Asbestos Level Screen	NAD
21/925	2	BH03	1.00	68	09/02/2021	General Description (Bulk Analysis)	Soil/Stone
					09/02/2021	Asbestos Fibres	NAD
					09/02/2021	Asbestos ACM	NAD
					09/02/2021	Asbestos Type	NAD
					09/02/2021	Asbestos Level Screen	NAD
21/925	2	BH07	1.00	71	09/02/2021	General Description (Bulk Analysis)	Soil/Stone
					09/02/2021	Asbestos Fibres	NAD
					09/02/2021	Asbestos ACM	NAD
					09/02/2021	Asbestos Type	NAD
					09/02/2021	Asbestos Level Screen	NAD
21/925	2	BH08	2.00	74	09/02/2021	General Description (Bulk Analysis)	Soil/Stone
					09/02/2021	Asbestos Fibres	NAD
					09/02/2021	Asbestos ACM	NAD
					09/02/2021	Asbestos Type	NAD
					09/02/2021	Asbestos Level Screen	NAD

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/925

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. Limits of detection for analyses carried out on as received samples are not moisture content corrected. 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.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

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 overestimate 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

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

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.

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REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

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BS	AQC Sample
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OC	Outside Calibration Range

RECEIVED: 15/05/2025

HWOL ACRONYMS AND OPERATORS USED

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AR	Aromatics only.
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#1	EH_Total but with humics extracted.
#2	EU_Total but with fatty acids extracted.
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

RECEIVED: 15/05/2025

EMT Job No: 21/925

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TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM17	Modified US EPA method 8270D v5:2014. 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 160.1/3 (TDS/TS: 1971) Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 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. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	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

EMT Job No: 21/925

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
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 Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry); WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP	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 Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry); WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP	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 Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry); WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP	PM17	Modified method BS EN12457-2:2002 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
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	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	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM61	Determination of Mercury by Cold Vapour Atomic Fluorescence - WATERS: Modified USEPA Method 245.7, Rev 2, Feb 2005. SOILS: Modified USEPA Method 7471B, Rev.2, Feb 2007	PM0	No preparation is required.	Yes		AR	Yes

EMT Job No: 21/925

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Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM65	Asbestos Bulk Identification method based on HSG 248 First edition (2006)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. 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 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	Yes
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. 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 9214 - 340.2 (EPA 1998)	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes
NONE	No Method Code	PM17	Modified method BS EN12457-2:2002 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 11465:1993(E) and BS1377-2:1990.			AR	

RECEIVED: 15/05/2025

Ground Investigations Ireland
Catherinstown House
Hazelhatch Road
Newcastle
Co. Dublin
Ireland

Attention : Barry Sexton
Date : 3rd March, 2021
Your reference : 10299-12-20
Our reference : Test Report 21/1882 Batch 1
Location : Greenhills Road
Date samples received : 11th February, 2021
Status : Final report
Issue : 2

Eleven samples were received for analysis on 11th February, 2021 of which six were scheduled for analysis. 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.

Authorised By:**Bruce Leslie**
Project Manager

Please include all sections of this report if it is reproduced

Client Name: Ground Investigations Ireland
Reference: 10299-12-20
Location: Greenhills Road
Contact: Barry Sexton

Note:

Asbestos Screen analysis is 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. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

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EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
21/1882	1	BH-02A	0.00-0.50	2	12/02/2021	General Description (Bulk Analysis)	Soil/Stones
					12/02/2021	Asbestos Fibres	NAD
					12/02/2021	Asbestos ACM	NAD
					12/02/2021	Asbestos Type	NAD
					12/02/2021	Asbestos Level Screen	NAD
21/1882	1	BH-04	0.00-1.70	8	12/02/2021	General Description (Bulk Analysis)	soil.stones
					12/02/2021	Asbestos Fibres	NAD
					12/02/2021	Asbestos ACM	NAD
					12/02/2021	Asbestos Type	NAD
					12/02/2021	Asbestos Level Screen	NAD
21/1882	1	BH-05	0.50-2.40	17	12/02/2021	General Description (Bulk Analysis)	Soil/Stones
					12/02/2021	Asbestos Fibres	NAD
					12/02/2021	Asbestos ACM	NAD
					12/02/2021	Asbestos Type	NAD
					12/02/2021	Asbestos Level Screen	NAD
21/1882	1	BH-06	3.00-3.30	32	12/02/2021	General Description (Bulk Analysis)	Soil/Stones
					12/02/2021	Asbestos Fibres	NAD
					12/02/2021	Asbestos ACM	NAD
					12/02/2021	Asbestos Type	NAD
					12/02/2021	Asbestos Level Screen	NAD

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/1882

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. Limits of detection for analyses carried out on as received samples are not moisture content corrected. 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.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

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 overestimate 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

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

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.

Please include all sections of this report if it is reproduced

All solid results are expressed on a dry weight basis unless stated otherwise.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) 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.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher, this result is not accredited.
*	Analysis subcontracted to an Element Materials Technology 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

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HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics extracted.
#2	EU_Total but with fatty acids extracted.
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

RECEIVED: 15/05/2025

EMT Job No: 21/1882

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15/05/2025

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	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 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of 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 8270D v5:2014 method for the solvent extraction and determination of 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 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM17	Modified US EPA method 8270D v5:2014. 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.			AR	Yes
TM17	Modified US EPA method 8270D v5:2014. 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 160.1/3 (TDS/TS: 1971) Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.			AR	Yes

EMT Job No: 21/1882

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
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TM21	Modified BS 7755-3:1995, ISO10694:1995 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. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 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. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	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 Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry); WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP	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
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TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry); WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP	PM17	Modified method BS EN12457-2:2002 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	Yes
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TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes

EMT Job No: 21/1882

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.			AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	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 Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	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.			AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	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	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM61	Determination of Mercury by Cold Vapour Atomic Fluorescence - WATERS: Modified USEPA Method 245.7, Rev 2, Feb 2005. SOILS: Modified USEPA Method 7471B, Rev.2, Feb 2007	PM0	No preparation is required.			AR	Yes
TM61	Determination of Mercury by Cold Vapour Atomic Fluorescence - WATERS: Modified USEPA Method 245.7, Rev 2, Feb 2005. SOILS: Modified USEPA Method 7471B, Rev.2, Feb 2007	PM0	No preparation is required.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 First edition (2006)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. 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 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	Yes

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Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. 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.			AR	No
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. 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 9214 - 340.2 (EPA 1998)	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes
NONE	No Method Code	PM17	Modified method BS EN12457-2:2002 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 11465:1993(E) and BS1377-2:1990.			AR	

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Ground Investigations Ireland
Catherinstown House
Hazelhatch Road
Newcastle
Co. Dublin
Ireland

Attention : Barry Sexton
Date : 17th February, 2021
Your reference : 10299-12-20
Our reference : Test Report 21/925 Batch 3
Location : Greenhills Road
Date samples received : 8th February, 2021
Status : Final report
Issue : 1

Three samples were received for analysis on 8th February, 2021 of which three were scheduled for analysis. 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.

Authorised By:**Bruce Leslie**
Project Manager

Please include all sections of this report if it is reproduced

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/925

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. Limits of detection for analyses carried out on as received samples are not moisture content corrected. 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.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

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 overestimate 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

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

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.

Please include all sections of this report if it is reproduced

All solid results are expressed on a dry weight basis unless stated otherwise.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) 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.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher, this result is not accredited.
*	Analysis subcontracted to an Element Materials Technology 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
AA	x50 Dilution

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HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics extracted.
#2	EU_Total but with fatty acids extracted.
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

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Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details	Yes			
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.				
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.	Yes			
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			

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Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM0	No preparation is required.				
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM0	No preparation is required.	Yes			
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM76	Modified US EPA method 120.1 (1982). Determination of Specific Conductance by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM0	No preparation is required.	Yes			


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APPENDIX 5 – Groundwater and Gas Monitoring




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Ground Investigations Ireland Groundwater Monitoring Field Sheet											
 GROUND INVESTIGATIONS IRELAND <small>Geotechnical & Environmental</small>	Project Number			10299-12-20			Sample Date		04/02/2021		
	Client			Lohan Donnelly			Current Weather		Dry		
	Site Name			Greenhills Road			Weather Prev 24 hours		Wet		
	Sampler I.D.			NM			Sampling Method/Type		Pump/Bailer		
Sample I.D.	BH04	BH06	BH08								
Casing Diameter (mm)	N/A	N/A	N/A								
Standpipe Diameter (mm)	50	50	50								
Stick Up (mm)	-	-	-								
Cover Condition	Good	Good	Good								
Standpipe Type uPVC etc.	PVC	PVC	PVC								
Total Well Depth (m)	3.33	3.2	3.42								
Water Level (mBGL)	2.45	1.65	2.7								
Odour	HC Odour	None	HC Odour								
Time Purging Start	12:20	10:50	11:15								
Timer Purging End	12:20	10:55	11:15								
Purge Volume (litres)	0	2	0								
Sampling Time	12:30	11:10	11:30								
Litres Purged	0	2	0								
Ph (pH Units)	7.65	7.79	7.8								
EC (mS/cm)	0.57	0.88	0.69								
Temp (Degrees)	10.5	12.7	11.2								
ORP (mV)	166	173	77								
DO (mg/l)											
Colour	Brown	Brown	Brown								
Odour	HC Odour	None	HC Odour								
Additional Comments											

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Ground Investigations Ireland Groundwater Monitoring Field Sheet											
 GROUND INVESTIGATIONS IRELAND <small>Geotechnical & Environmental</small>	Project Number			10299-12-20			Sample Date		12/02/2021		
	Client			Lohan Donnelly			Current Weather		Dry		
	Site Name			Greenhills Road			Weather Prev 24 hours		Dry		
	Sampler I.D.			NM			Sampling Method/Type		N/A		
Sample I.D.	BH04	BH06	BH08								
Casing Diameter (mm)	N/A	N/A	N/A								
Standpipe Diameter (mm)	50	50	50								
Stick Up (mm)	-	-	-								
Cover Condition	Good	Good	Good								
Standpipe Type uPVC etc.	PVC	PVC	PVC								
Total Well Depth (m)	3.33	3.2	3.42								
Water Level (mBGL)	2.71	1.87	Gas Tap Sealed								
Odour	HC Odour	None									
Time Purging Start	N/A	N/A	N/A								
Timer Purging End	N/A	N/A	N/A								
Purge Volume (litres)	N/A	N/A	N/A								
Sampling Time	N/A	N/A	N/A								
Litres Purged	N/A	N/A	N/A								
Ph (pH Units)	N/A	N/A	N/A								
EC (mS/cm)	N/A	N/A	N/A								
Temp (Degrees)	N/A	N/A	N/A								
ORP (mV)	N/A	N/A	N/A								
DO (mg/l)	N/A	N/A	N/A								
Colour	N/A	N/A	N/A								
Odour	N/A	N/A	N/A								
Additional Comments											

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Ground Investigations Ireland Groundwater Monitoring Field Sheet											
 GROUND INVESTIGATIONS IRELAND <small>Geotechnical & Environmental</small>	Project Number			10299-12-20			Sample Date		15/02/2021		
	Client			Lohan Donnelly			Current Weather		Wet		
	Site Name			Greenhills Road			Weather Prev 24 hours		Wet		
	Sampler I.D.			NM			Sampling Method/Type		N/A		
Sample I.D.	BH04	BH06	BH08								
Casing Diameter (mm)	N/A	N/A	N/A								
Standpipe Diameter (mm)	50	50	50								
Stick Up (mm)	-	-	-								
Cover Condition	Good	Good	Good								
Standpipe Type uPVC etc.	PVC	PVC	PVC								
Total Well Depth (m)	3.33	3.2	3.42								
Water Level (mBGL)	2.76	1.94	Gas Tap Sealed								
Odour	HC Odour	None									
Time Purging Start	N/A	N/A	N/A								
Timer Purging End	N/A	N/A	N/A								
Purge Volume (litres)	N/A	N/A	N/A								
Sampling Time	N/A	N/A	N/A								
Litres Purged	N/A	N/A	N/A								
Ph (pH Units)	N/A	N/A	N/A								
EC (mS/cm)	N/A	N/A	N/A								
Temp (Degrees)	N/A	N/A	N/A								
ORP (mV)	N/A	N/A	N/A								
DO (mg/l)	N/A	N/A	N/A								
Colour	N/A	N/A	N/A								
Odour	N/A	N/A	N/A								
Additional Comments											

APPENDIX 7.1

NRA/TII Criteria for Rating the Magnitude and Significance of Impacts at EIA Stage National Roads Authority (NRA/ TII, 2009)

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APPENDIX 7.1 - NRA/TII Criteria for Rating the Magnitude and Significance of Impacts at EIA Stage National Roads Authority (NRA/ TII, 2009)

Table 1: Criteria for Rating Site Attributes – Estimation of Importance of Hydrological Attributes (NRA)

Importance	Criteria	Typical Examples
Extremely High	Attribute has a high quality or value on an international scale	River, wetland or surface water body ecosystem protected by EU legislation e.g. 'European sites' designated under the Habitats Regulations, or 'Salmonid waters' designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988.
Very High	Attribute has a high quality or value on a regional or national scale	River, wetland or surface water body ecosystem protected by national legislation – NHA status. Regionally important potable water source supplying >2500 homes. Quality Class A (Biotic Index Q4, Q5). Flood plain protecting more than 50 residential or commercial properties from flooding. Nationally important amenity site for wide range of leisure activities.
High	Attribute has a high quality or value on a local scale	Salmon fishery. Locally important potable water source supplying >1000 homes. Quality Class B (Biotic Index Q3-4). Flood plain protecting between 5 and 50 residential or commercial properties from flooding. Locally important amenity site for wide range of leisure activities.
Medium	Attribute has a medium quality or value on a local scale	Coarse fishery. Local potable water source supplying >50 homes. Quality Class C (Biotic Index Q3, Q2- 3). Flood plain protecting between 1 and 5 residential or commercial properties from flooding.
Low	Attribute has a low quality or value on a local scale	Locally important amenity site for small range of leisure activities. Local potable water source supplying <50 homes Quality Class D (Biotic Index Q2, Q1). Flood plain protecting 1 residential or commercial property from flooding. Amenity site used by small numbers of local people.

Table 2: Criteria for Rating Impact Significance at EIS Stage – Estimation of Magnitude of Impact on Hydrological Attribute (NRA)

Magnitude of Impact	Criteria	Typical Examples
Large Adverse	Results in loss of attribute	Loss or extensive change to a waterbody or water dependent habitat. Increase in predicted peak flood level >100mm. Extensive loss of fishery. Calculated risk of serious pollution incident >2% annually. Extensive reduction in amenity value.
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Increase in predicted peak flood level >50mm. Partial loss of fishery. Calculated risk of serious pollution incident >1% annually. Partial reduction in amenity value.
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Increase in predicted peak flood level >10mm. Minor loss of fishery. Calculated risk of serious pollution incident >0.5% annually. Slight reduction in amenity value.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	Negligible change in predicted peak flood level. Calculated risk of serious pollution incident <0.5% annually.
Minor Beneficial	Results in minor improvement of attribute quality	Reduction in predicted peak flood level >10mm. Calculated reduction in pollution risk of 50% or more where existing risk is <1% annually.
Moderate Beneficial	Results in moderate improvement of attribute quality	Reduction in predicted peak flood level >50mm. Calculated reduction in pollution risk of 50% or more where existing risk is >1% annually.
Major Beneficial	Results in major improvement of attribute quality	Reduction in predicted peak flood level >100mm

Table 3: Rating of Significant Environmental Impacts at EIS Stage (NRA)

Importance of Attribute	Magnitude of Importance			
	Negligible	Small Adverse	Moderate Adverse	Large Adverse
Extremely High	Imperceptible	Significant	Profound	Profound
Very High	Imperceptible	Significant/moderate	Profound/Significant	Profound
High	Imperceptible	Moderate/Slight	Significant/moderate	Profound/Significant
Medium	Imperceptible	Slight	Moderate	Significant
Low	Imperceptible	Imperceptible	Slight	Slight/Moderate

APPENDIX 10.1

TRAFFIC & TRANSPORT ASSESSMENT

incl.

**Preliminary Travel Plan,
DMURS Statement of Consistency,
Stage 1 Road Safety Audit and
Quality Audit, &
Public Transport Demand /
Capacity Report, Construction
Traffic Management Plan.**

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consulting
engineers

NRB

**Traffic and Transport
Assessment Report**

incl.

*Preliminary Travel Plan,
DMURS Statement of Consistency,
Stage 1 Road Safety Audit and
Quality Audit, &
Public Transport Demand /
Capacity Report, Construction
Traffic Management Plan.*

For

**Proposed Green Vale
Large Scale Residential
Development**

At

***Former Chadwicks Builders
Merchant Development,
Greenhills Rd,
Walkinstown,
Dublin 12.***

SUBMISSION ISSUE

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7	2.0	Development Proposals, Existing Conditions, Car Parking & Access Junction Design.
32	3.0	Trip Generation Assignment and Distribution
34	4.0	Traffic Impact - Traffic Capacity Analysis
40	5.0	Response to SDCC Opinion
46	6.0	Conclusions

Appendices

A	Proposed Development – Layout & Access Arrangement
B	Traffic Survey Data Output
C	TRICS Trip Generation Output - Residential Apartments
D	Existing Traffic Flows, Trip Distribution & Network Traffic Flow Diagrams
E	Predicted Future Traffic Network, Trip Distribution & Network Traffic Flow Diagrams
F	<i>PiCADY Output (Site Access Junction Operation)</i>
G	<i>PiCADY Output (Greenhill Roads / Greenhill Industrial Estate / Builders Suppliers)</i>
H	<i>PiCADY Output (Greenhill Roads / Mulcahy Keane Estate)</i>
I	<i>LiNSiG (Calmount Road / Calmount Avenue Signal Controlled Junction)</i>
J	Preliminary Mobility Management Plan (Travel Plan)
K	DMURS Statement of Consistency
L	Stage 1 Quality/Safety Audit (& Designer Feedback Form)
M	Public Transport Demand/Capacity Study
N	Construction Traffic Management Plan
O	Letter to NTA 16 th June 2023 - Proposed Access Strategy
P	Letter to NTA 08 th December 2023 - Response to the NTA's Email
Q	Letter to NTA 08 th February 2024 - Response to the NTA's Email
R	Email from the NTA 12 th February 2025 – NTA Sign Off

EXECUTIVE SUMMARY

NRB Consulting Engineers Ltd were appointed to address the Traffic/Transportation issues associated with a planning application by Elkstone for a Large Scale Residential Development (LRD) on lands at Greenhills Road, Walkinstown, Dublin 12. This report assesses the impact of 588 no. Apartment units on the site (Refer to Development Description included within Section 2.0 herein).

All traffic and transport issues previously raised in relation to the earlier SHD planning application on this site (Planning Ref. ABP-313129-22), including by the National Transport Authority (NTA) have been addressed in the new layout and are as outlined in this report. Furthermore, NRB and the design team have engaged with the NTA in relation to this new application to ensure that the development proposals are in compliance with the requirements of the NTA, ensuring that the Bus-Connects proposals are facilitated with the design. Letters issued to the NTA are provided in **Appendix O, Appendix P & Appendix Q**, with the NTA noting by email that they “are satisfied that the drawings now reflect the current approved Core Bus Corridor alignment for the Tallaght/ Clondalkin to City Centre Scheme”, as attached in **Appendix R**. The NTA has now received notification of planning approval by An Bord Pleanála for the Tallaght/Clondalkin to City Centre Scheme¹.

The subject scheme has been carefully considered and designed to respond to both the existing Greenhills Road and the accommodation of the future Bus Connects scheme.

The proposed new LRD development provides for 588 no. residential apartments, and a mix of commercial & communal units over 4 blocks within the site development area. The vehicular access arrangement is by way of a simple priority junction from the Greenhills Road.

Being located adjacent a busy Bus Corridor, with pedestrian and cyclist provision, the site is very well placed to take advantage of non-car modes of travel to support the development.

This Traffic and Transport Assessment Report (TTA) has been prepared to address the traffic and transportation issues associated with the proposal, and the capacity of the existing road network and the future road network. An assessment of current and future alternative transportation modes has also been undertaken and is included as **Section 2**. The report has been prepared in accordance with TII’s Traffic & Transport Assessment Guidelines and addresses the worst-case traffic impact of the proposal locally.

This TTA addresses the adequacy of the existing and future road network to safely and appropriately accommodate the worst-case transport demands with the development fully occupied, taking account of the existing traffic demands locally and the proposed new access.

Comprehensive classified turning movement surveys of the existing affected roads and junctions were carried out by specialist data collection company. Furthermore, predicted future network traffic flows were established based on all traffic rerouting from the Greenhills Road to the new Ballymount Avenue and Calmount Road, with the proposed Tallaght to City Centre BusConnects scheme in place.

The comprehensive traffic surveys together formed the basis of the study. The analysis includes the effects of the existing traffic on the local roads and assesses the impact during the traditional peak commuter peaks periods.

The TTA confirms that the road network and the vehicular access junction are more than adequate to accommodate the worst-case traffic associated with the development. The assessment confirms that the full occupation of the scheme will have a negligible and unnoticeable impact upon the operation of the adjacent road network.

The assessment includes a Preliminary Mobility Management Plan for the site which is included herein as a separate report as **Appendix J**. A Statement of Consistency with DMURS has also been prepared, which confirms that the internal layout is compliant with the DMURS requirements, and this is included as a separate report as **Appendix K**. An independent Quality Audit, including a Stage 1 Quality & Road Safety Audit, together with the Designer Feedback form, has been undertaken and is included as a separate report as **Appendix L**. A Public Transport Demand/Capacity Study is included as **Appendix M** and this addresses capacity on alternative travel networks. A Construction Traffic Management Plan is included as **Appendix N**.

Based on all of these studies, it is concluded that there are no adverse traffic/transportation capacity or operational issues associated with the occupation of the proposed 588 no. Unit Residential apartment development and ancillary uses that would prevent planning permission being granted by South Dublin County Council (SDCC).

1.0 INTRODUCTION

- 1.1 This Traffic and Transport Assessment (TTA) has been prepared by NRB Consulting Engineers Ltd and addresses the traffic and transportation issues arising from the proposed residential apartment development on the former Chadwicks Builders Merchant site (with the existing site comprising of 1 x two-storey office building and 9 x storage / warehouse buildings, at Greenhills Road, Walkinstown, Dublin 12).
- 1.2 The proposed development consists of a mixed-use residential and commercial development comprising 588 no. apartment units (291 one-beds, 238 two-beds and 59 three-beds), 1 childcare facility and 6 no. commercial units in 4 blocks. Vehicular access is proposed via a simple priority junction on the Greenhills Road.
- 1.3 The subject site, was a long-established destination, containing office, commercial, and warehousing developments, but has been closed for a number of years. The proposed development on zoned lands, identified for enterprise and/or residential-led regeneration in the SDCC LAP, should be considered in this context. A site location plan for the site is included below as **Figure 1.1**.



Figure 1.1 - Site Location

- 1.4 This report addresses the impact of the complete proposed development, totalling 588 no. apartment units, an ancillary childcare facility and 6no. commercial units and the implications for the adjacent road network for the weekday AM and PM Peak Hours, taking account of existing traffic conditions factored to projected opening and design year.
- 1.5 The site is considered to represent a highly sustainable location, for primarily residential development of the nature proposed, given its proximity to Walkinstown and local services. Sustainability will be further promoted through the implementation of a working Mobility Management Plan.
- 1.6 In describing the Receiving Environment and the Proposed Future Environment, this report addresses the following aspects of the proposed development:
- Relative Small Scale of the development in the context of Greenhills and the busy road network (Reflected in the Low Traffic Generation of the Development),
 - Location of the development on a Bus Corridor,
 - Traffic & Transportation impact,
 - Proposed access junction,
 - Capacity of the proposed vehicular access arrangement to accommodate the worst-case development traffic flows associated with 588 no. Units,
 - Pedestrian and cyclist permeability and promotion,
 - Capacity of the Existing Road Network.
- 1.7 The recommendations contained within this TTA are based on the following sources of information and industry-standard practices; -
- South Dublin County Development Plan 2022-2028,
 - TII Traffic & Transport Assessment Guidelines,
 - Design Manual for Urban Roads and Streets,
 - Recent Traffic Survey Data commissioned 2022,
 - Relevant Design Guidance,
 - Our experience in assessing the impact of Developments of this Nature, and
 - Site Visits and Observations.

- 1.8 The Report has been prepared in accordance with the requirements of the TII's Traffic & Transport Assessment Guidelines. These are the professional Guidelines used to assess the impact of developments on public roads.
- 1.9 The assessment includes a Preliminary Mobility Management Plan for the site which is included herein as a separate report as **Appendix J**.
- 1.10 We have prepared a Statement of Consistency with DMURS and confirm that the internal layout is compliant with the requirements, and this is included as a separate report as **Appendix K**.
- 1.11 An independent Quality Audit, including a Stage 1 Quality & Road Safety Audit, together with the Designer Feedback form, has been undertaken and is included as a separate report as **Appendix L**. A Public Transport Demand/Capacity Study is included as **Appendix M**. A Construction Traffic Management Plan is included as **Appendix N**.

2.0 DEVELOPMENT PROPOSALS, EXISTING & PROPOSED ROAD NETWORK, CAR / CYCLE ACCESS & INFRASTRUCTURE, CYCLE & CAR PARKING

Subject Development Proposals

2.1 The Proposed Development, as set out on the Architects layout Plans, comprising a mixed-use residential and commercial development comprising 588 no. residential apartment units (291 no. one-beds, 238no. two-beds and 59 no. three-beds), 1 no. 570.91sqm (443sqm indoor space) childcare facility and 6no. no. commercial/retail units in 4 no. blocks (A-D) ranging in height from 5 to 12 storeys as follows:

- Block A comprises 170 no. apartments (103 no. 1 bed-units, 59 no. 2 bed-units and 8 no. 3- bed units) measuring 8 storeys in height.
- Block B comprises 197 no. apartments (89 no. 1 bed-units, 92 no. 2 bed-units and 16 no. 3 bed-units) measuring 10 storeys in height.
- Block C comprises 81 no. apartments (44 no. 1-bed units, 16 no. 2-bed units and 21 no. 3-bed units) measuring 12 storeys in height.
- Block D comprises 140 no. apartments (55 no. 1 bed-units, 71 no. 2 bed-units and 14 no. 3 bed-units) measuring 8 storeys in height.

2.2 All apartments will be provided with private balconies/terraces. The development includes provision of indoor communal residential amenity (614.14 sq.m.) at ground and first floors of Block A, B, C, and the construction of 1 no. childcare facility of c. 443 m² with dedicated outdoor play area located at ground floor of Block B.

2.3 The commercial elements of the development have been carefully considered to entice and engage the public to utilize the public spaces and aid in stimulating movement and permeability across the scheme. Approximately 6 units, totally c.1,814m² are proposed. These spaces are intended as business spaces (ranging from mixed light industrial, storage, offices, innovation, workshops and business startups), as opposed to retail opportunities, offering local employment.

2.4 The application site involves the Former Chadwick's site which is located south of Greenhills Road. The site forms part of the Greenhill Industrial Estate. There are existing low-rise disused warehouse units on the subject site which are proposed for demolition as part of the subject proposal. The site is currently accessed off a road within the Greenhill Industrial Estate, with 3 no. vehicular accesses featuring along the site's southern boundary. This site had significant traffic/transportation demands as both an employment and retail destination. The transportation demands identified herein associated with the

now-proposed residential scheme should be considered in this context, being a replacement for established busy uses.

- 2.5 The site is located off the Greenhills Road in Walkinstown, 350m south-west of the Walkinstown Roundabout.
- 2.6 Walkinstown is the closest village to the subject site and offers a range of amenities and services including supermarkets, restaurants, pubs, chemist's shop, hairdresser among other services. The Ashleaf shopping centre is located c.1.2km from the subject site. A Lidl supermarket is located 500m to the west.
- 2.7 The Greenhill Industrial Estate and the surrounding areas are expected to be the subject of extensive urban renewal in the coming years, with existing industrial buildings being replaced with higher density development. This is set out in the City Edge project, a regeneration project for an area including the Naas Road, Ballymount and Park West areas of Dublin (including the subject site). It is a joint initiative between South Dublin County Council (SDCC) and Dublin City Council (DCC) to create a new liveable, sustainable and attractive urban extension of the city, where more people will be able to live, work, and socialise. A visualisation of the future Calmount Road, adjacent to the proposed site, from the City Edge Strategic Framework (August 2022) is shown below in **Figure 2.1**.



Figure 2.1 – Visualisation of Calmount Road local high street
 (Source: City Edge Strategic Framework SDCC & DCC)

Existing Road Network

- 2.8 **R819 Greenhills Road** - The road along the northern boundary of the site, the R819 Greenhills Road, is a Regional Road, one of the city's main commuter routes also serving one of Dublin's largest suburbs to the southwest of the city, Tallaght. Adjacent to the site, the road is single carriageway, with a traffic lane and advisory cycle lane in each direction. The road width is approximately 7.6m-7.8m wide. A footpath is provided on the northern side of the road, but none is provided on the southern side. There is a change in the speed limit from 60km/hr to 50km/hr on Greenhills Road to the west of the proposed site access, with the site access located in the 50km/hr zone.
- 2.9 The Greenhills Road carries a weekday AM Peak Hour 2-way flow of approximately 1,278 PCUs and a weekday PM Peak Hour 2-Way flow of approximately 1,343 PCUs, and in these terms, it can be considered as moderately trafficked.
- 2.10 **Site 1: Walkinstown Roundabout:** This is a 60m diameter roundabout, famously with 6 arms. These include the R819 Greenhills Road, Ballymount Road, R112 Walkinstown Avenue, R819 Walkinstown Road, R818 Cromwellsfort Road, R112 St. Peter's Road. Each entry arm has a flared approach, the majority with 3 lanes at the entry to the roundabout, apart from the Ballymount Road, which has 2 lanes. Currently, there are uncontrolled pedestrian crossings on all arms. There are no cycle facilities on any of the approaches. The AM peak hour shows a total AADT of 4,084 PCU, while the PM is slightly lower at 3,621 PCU.
- 2.11 **Site 2: Greenhills Road / Mulcahy Keane Estate:** This a 3-arm priority junction which provides access to the Mulcahy Keane Industrial Estate. The R819 Greenhills Road has one traffic lane and advisory cycle lane in each direction, approximately 10.0m wide. There is a westbound bus layby to the west of the junction. The Mulcahy Keane Industrial Estate has a single lane exit. Footpaths are provided on the northern and southern sides of this junction.
- 2.12 **Site 3: Greenhills Road / Greenhills Industrial Estate / Builders Suppliers Access:** This a 4-arm staggered junction which provides access to a Builders Suppliers on the northern arm and access to the Greenhills Industrial Estate to the south. The R819 Greenhills Road has one traffic lane and an advisory cycle lane in each direction, approximately 9.0m wide. The minor arms have a single lane approach to the major arm. Footpaths are provided on the northern and south-eastern sides of this junction, but not on the south-western side.

- 2.13 **Site 4: Internal Greenhills Industrial Estate Junction:** This a 3-arm priority junction. There is a sharp turn on the major arm at the junction. The road width is approximately 7.0m wide. The minor road has a single lane exit.
- 2.14 **Site 5: Calmount Road / Calmount Avenue Priority Junction:** This a 3-arm priority junction, with Calmount Road having one lane in each direction, approximately 9.0m wide. Calmount Avenue has a single lane approach to Calmount Road. Footpaths are provided on all arms, located behind a wide verge. There are no cycle facilities at this junction.
- 2.15 **Site 6: Calmount Road / Ballymount Avenue Roundabout:** This is a 4-arm 40m diameter roundabout. These includes the Calmount Road (east and west) and Ballymount Avenue (north and south). Each entry arm has a single lane approach. There are uncontrolled pedestrian crossings on all arms. There are no cycle facilities on any of the approaches.
- 2.16 The location of these local road network junctions is highlighted in **Figure 2.2** below.

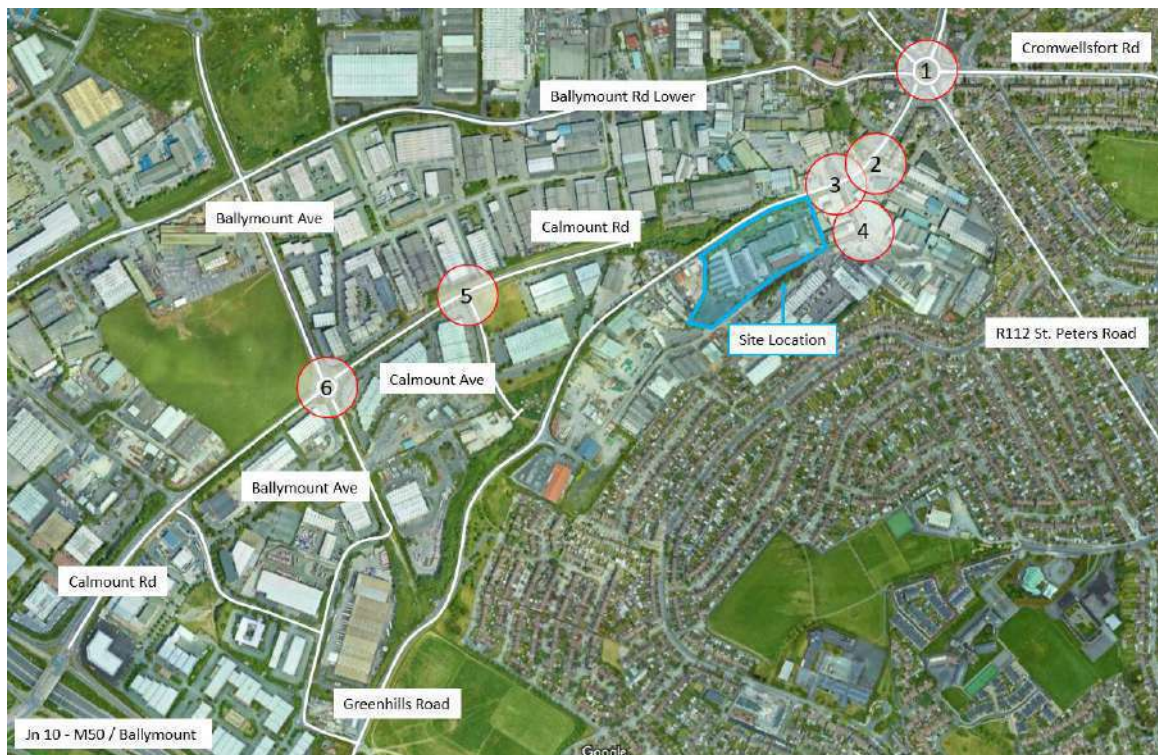


Figure 2.2 – Local Network Junctions

Proposed Road Network

- 2.17 The site is situated within the immediate vicinity of the National Transport Authority’s Bus Connects scheme, Tallaght to City Centre along the Greenhills Road, as illustrated in **Figure 2.3**. The NTA has received notification of planning approval by An Bord Pleanála for the Tallaght/Clondalkin to City Centre Scheme¹. The proposed objectives of Bus

¹ <https://busconnects.ie/planning-approval-received-for-tallaght-clondalkin-to-city-centre-core-bus-corridor-scheme/>

Connects are to “provide a continuous bus lane in each direction as well as maintaining two general lanes”. In addition, “to provide safe cycling facilities, segregated where possible from other vehicular traffic”. The benefits of the NTA scheme are noted as follows:

- Journey Time Savings;
- Accessibility for All;
- Better Cycling Facilities
- Pedestrian and Local Urban Centres; and,
- Building a sustainable city and addressing climate change.

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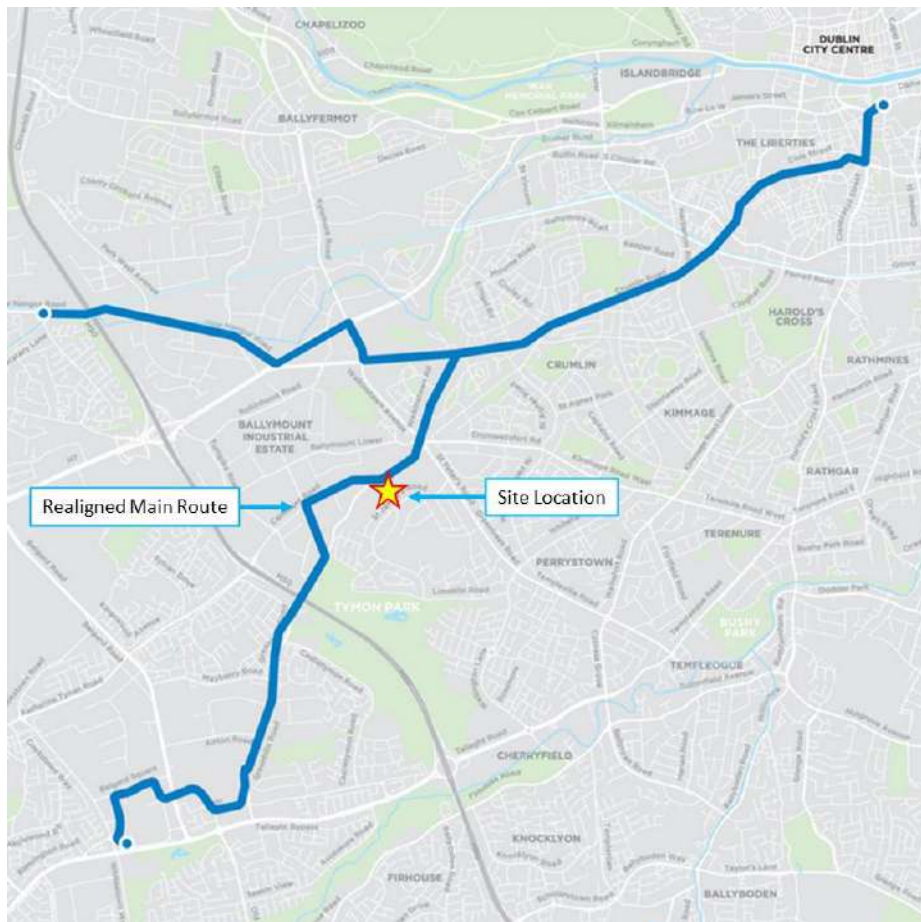


Figure 2.3 – Proposed BusConnects Route

2.18 It is proposed to realign the existing Greenhills Road through the Ballymount Industrial Estate by way of extending both Ballymount Avenue and Calmount Road to connect to the existing Greenhills Road. Mainline traffic will be directed via the new link to Ballymount Avenue. The new link road will connect back into the existing road network at Greenhills Road, adjacent to the proposed site.

2.19 The Ballymount Avenue / Calmount Road junction will be upgraded from a roundabout to a signal-controlled junction. The Calmount Road / Calmount Avenue junction will be

upgraded from a priority junction to a signal-controlled junction. Both the Ballymount Avenue and the Calmount Road are intended to be widened to incorporate bus and cycle lanes. The proposed changes to the road network, due to the BusConnects proposals is highlighted in **Figure 2.4** below.

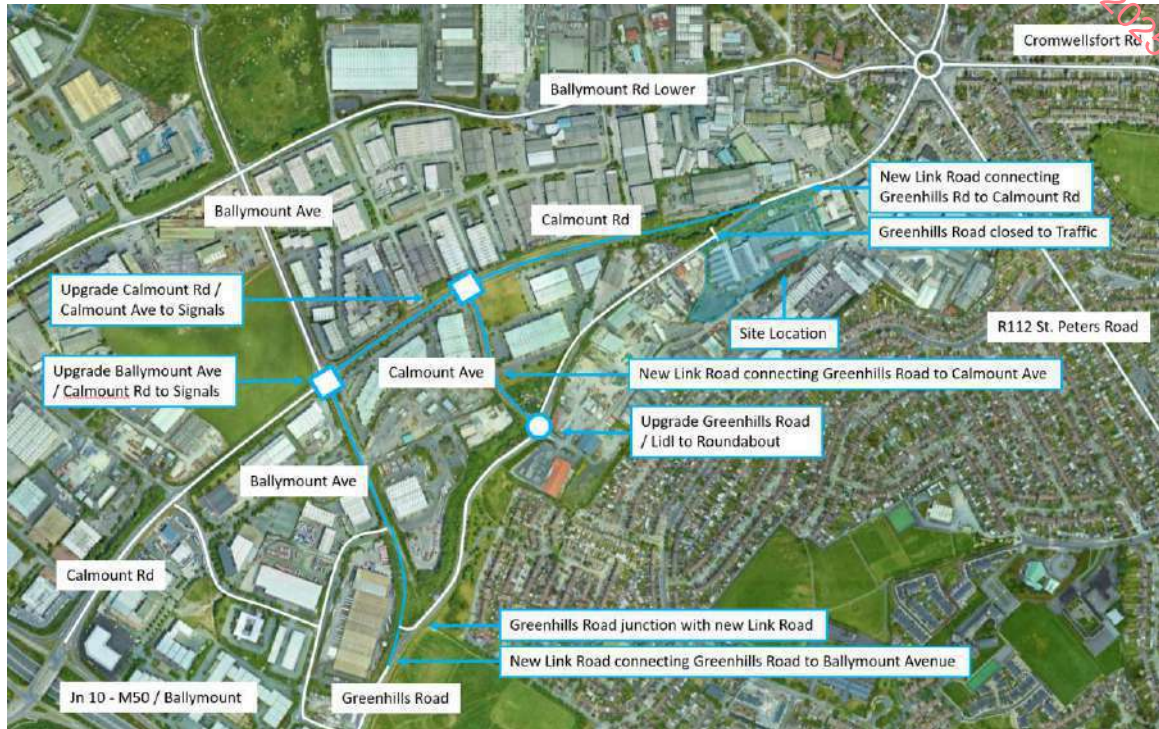


Figure 2.4 – Proposed Upgraded Road Network

2.20 As part of the BusConnects proposals, it is also intended to connect the existing Greenhills Road to Calmount Road, with a new link through Calmount Avenue, with a new roundabout constructed at the existing priority junction at Lidl. The current BusConnects proposals at this location are shown in **Figure 2.5** below.



Figure 2.5 – Proposed BusConnects Route (Source: Tallaght to City Centre Sheet 15)

2.21 As noted above, the new link road will connect back into the existing road network at Greenhills Road, adjacent to the proposed site, with the current BusConnects Proposals shown in **Figures 2.6** and **2.7** below, with the proposed site highlighted.

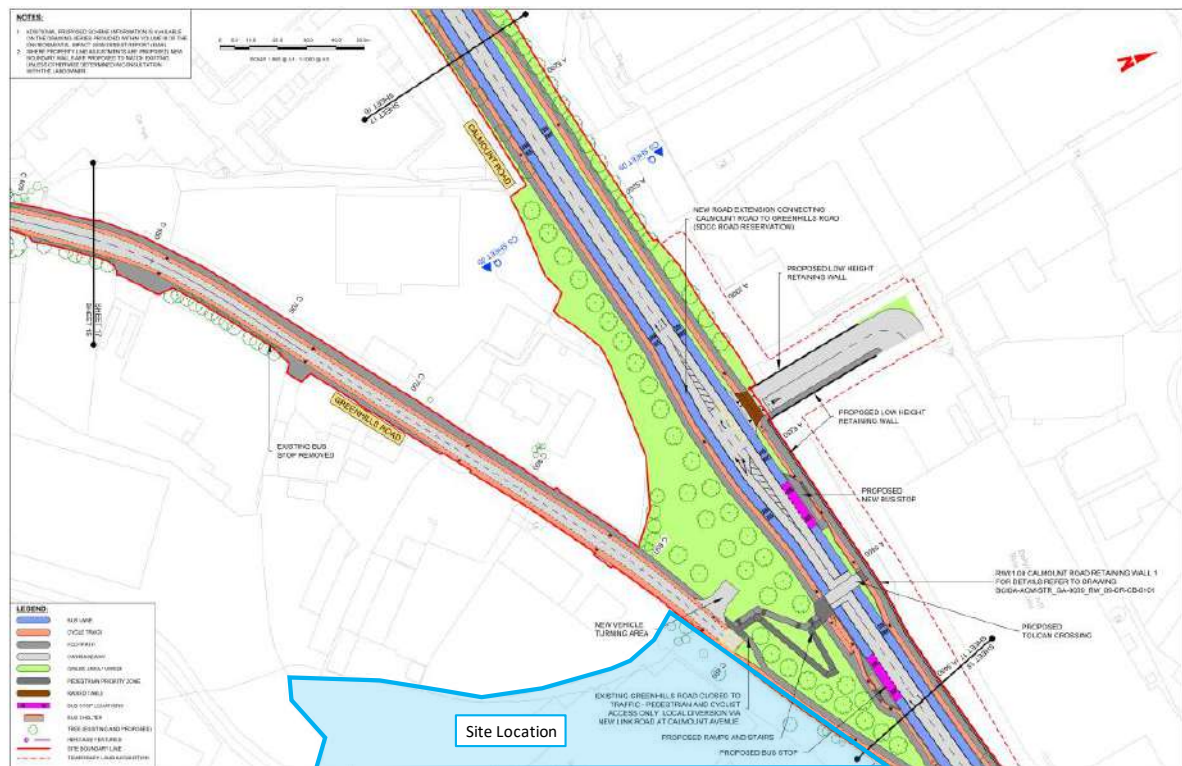


Figure 2.6 – Proposed BusConnects Route (Source: Tallaght to City Centre Sheet 17)

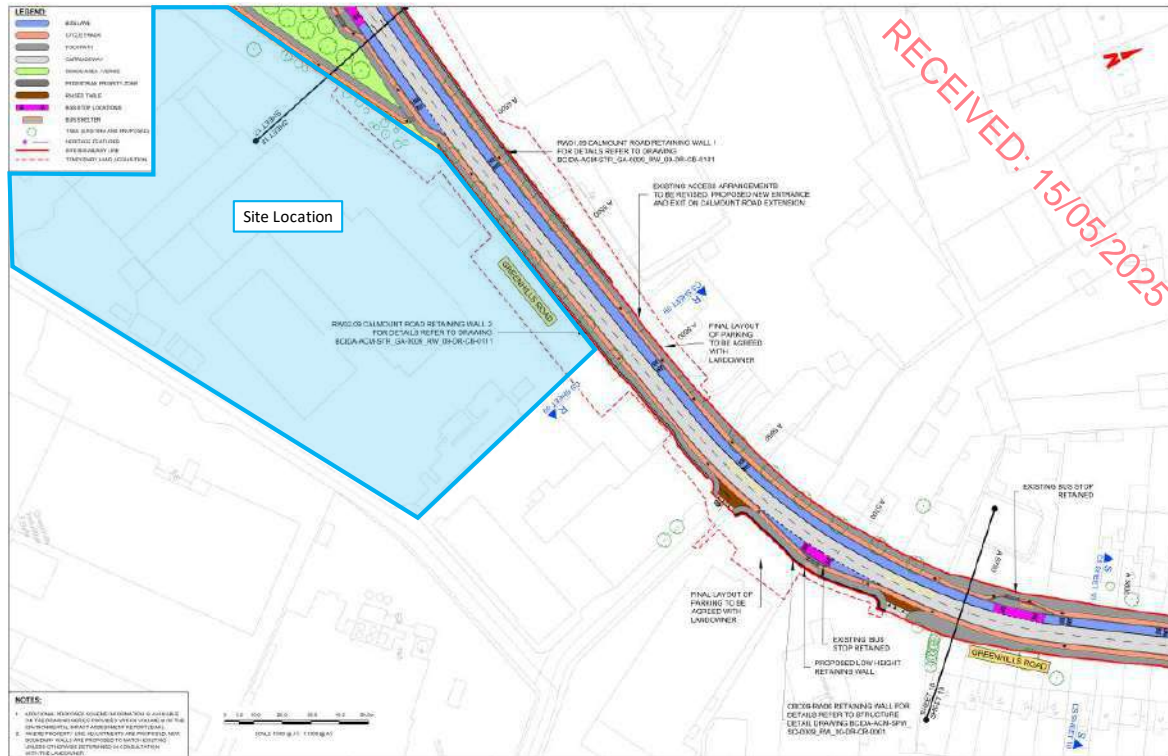


Figure 2.7 – Proposed BusConnects Route (Source: Tallaght to City Centre Sheet 18)

Subject Development Car and Cycle Access Proposals

- 2.22 It is proposed that the access is provided to the east of the site, via a simple priority junction. This junction has been designed to facilitate access off the current Greenhills Road, with appropriate visibility provided, while also facilitating the proposed BusConnects Scheme in the future scenario. The proposed road, cycle and pedestrian infrastructure **do not compromise** the BusConnects Scheme in any way.

- 2.23 An access road is proposed on the **eastern section** of the site, which connects to the the Beechlaw Industrial Estate Road, with two entrances provided on this existing road (as shown in **Figure 2.8**). The Beechlaw Industrial Estate Road will have cycle and pedestrian facilities provided on the northern side of the road, within the applicant’s site boundary.

- 2.24 The applicant has provided for pedestrians and cyclists along the southern boundary, by providing a minimum 2.0m wide footpath (average 3.0m and up to 4.2m), a 2.0m wide cycle track, and a landscape buffer, within the applicant’s site boundary. The new footpaths and cycle track deliver significant improvements to the existing Active Travel provision on the southern boundary, which currently only include a pedestrian footpath on the northern side of the Beechlaw Industrial Estate Road.

- 2.25 The existing road width of the Beechlawn Road will not be impacted by the proposed development, with the current 5.5m wide road, and 1.5m wide footpath remaining in place, except where vehicle access is proposed.
- 2.26 Due to the reductions in the parking provision requested by SDCC (with a parking ratio of 0.43 requested), the applicant has included removal of the parking on the Beechlawn Industrial Estate Road. The proposed landscaping strip, within the applicant's site, can be upgraded to car parking in the future, as part of the City Edge Scheme.
- 2.27 A loading bay is provided on the Beechlawn Industrial Estate Road, with delivery vehicles, such as Panel Vans can access. Autotracking drawings of Fire Tenders, Refuse Vehicles and Panel Vans are provided in **Appendix A**.

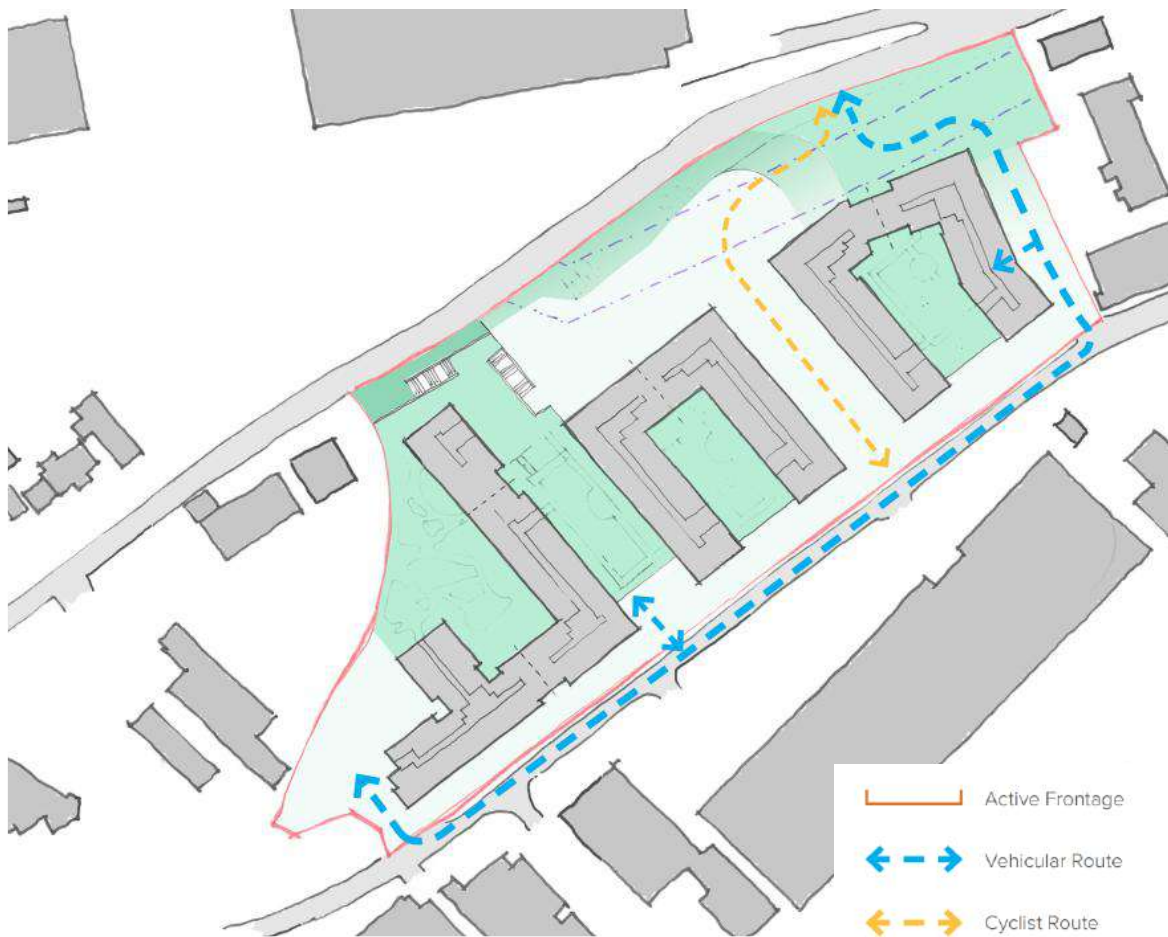


Figure 2.8 – Proposed Access Strategy

- 2.28 The proposed site access junction off the Greenhills Road is located on the eastern side of the site. The proposed site access junction has been designed to accommodate the future BusConnects proposals and has been set back to accommodate a future cycle lane and pedestrian footpath within the applicant's lands.

- 2.29 Given that the proposed development site, is located adjacent to the proposed BusConnects Tallaght to City Centre CBC scheme, the applicant's Design Team has worked closely with the NTA to ensure that the proposed layout responds to the existing Greenhills Road layout, but also does not impact on the future BusConnects Scheme. All drawings have been carefully co-ordinated in line with BusConnects scheme drawings to ensure the widening of Greenhills Road can be accommodated.
- 2.30 A site layout plan showing the development arrangement in relation to the proposed access and existing Greenhills Road is included herein as **Appendix A** along with further details. The proposed development site access junction shown below in **Figure 2.9**, is a simple priority junction off the Greenhills Road. The applicant will upgrade the existing footpath on the opposite side of Greenhills Road for 80m. Furthermore, as requested by SDCC, the design has been updated to provide a controlled Toucan Crossing which also accommodates cyclists. The access road includes a proposed dwell area, and a flat section at the junction, 12m long. This will also facilitate the proposed land-take required by the BusConnects scheme, which will require c.5m of land taken from the site frontage, so in the future situation, there will be a dwell area of c.7m at the development access, the design of which at 7m remains in accordance with TII roads design standards. The site facilitates and does not compromise the BusConnects Plans.
- 2.31 This vehicular access arrangement includes for tactile paving and dropped kerbs. The vehicle lanes and geometry internally have been designed in line with the Design Manual for Urban Road and Streets (DMURS) to provide for shortened crossing distances and a safer environment for cyclists and pedestrians.

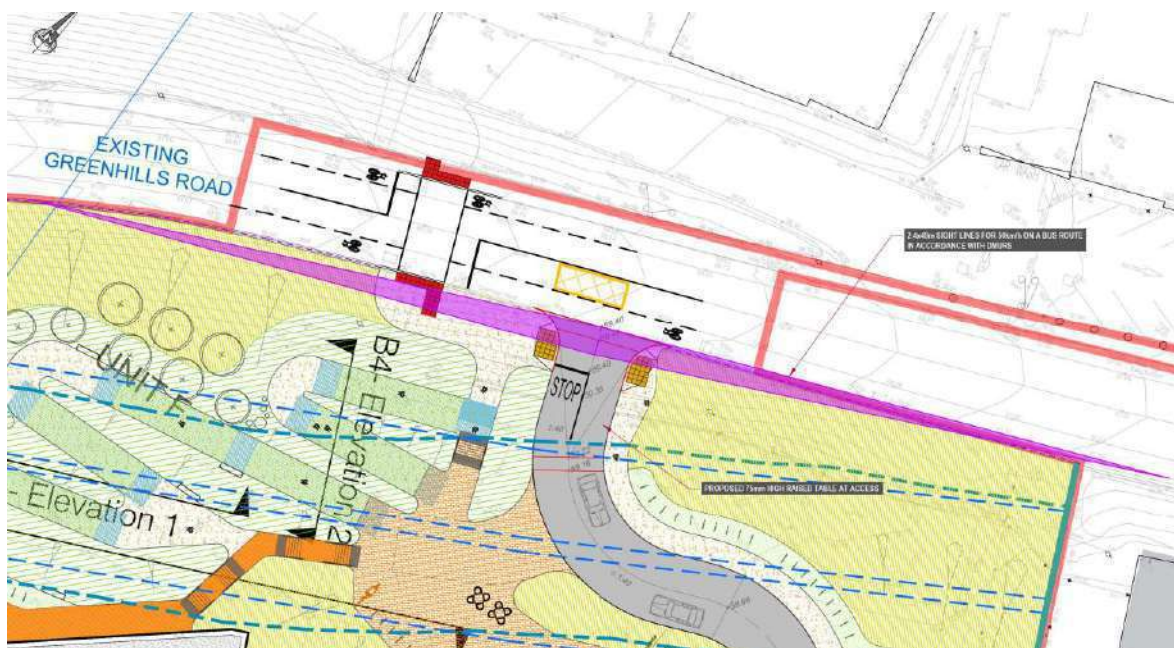


Figure 2.9: Proposed Greenhills Road Site Access Junction (NRB-TA-002)

- 2.32 A site layout plan showing the development access arrangement with the future BusConnects Proposals are included herein as **Appendix A**. The proposed development site access junction is provided below in **Figure 2.10** and shows how the site access will tie in with the footpath and cycle track link of the future BusConnects scheme. Importantly, no retaining infrastructure has been proposed as part of the site access junction, which would then later require removal for the BusConnects Scheme.
- 2.33 The access junction has been designed in accordance with DMURS, the National Cycle Manual and the BusConnects design standards and will be to the same standard and design as all the other priority junctions along the BusConnects route.
- 2.34 A raised table is proposed for pedestrians and a raised cycle track is proposed for cyclists passing the site access. These road safety features will provide an increased level of protection for vulnerable road users (VRUs) past the site and will provide a safe junction layout.
- 2.35 Therefore, the applicant has future-proofed the site, by designing the access road and pedestrian and cycle infrastructure to tie into the approved Core Bus Corridor alignment. Letters issued to the NTA are provided in **Appendix O, Appendix P & Appendix Q**, with the NTA noting by email that they “are satisfied that the drawings now reflect the current approved Core Bus Corridor alignment for the Tallaght/ Clondalkin to City Centre Scheme”, as attached in **Appendix R**.

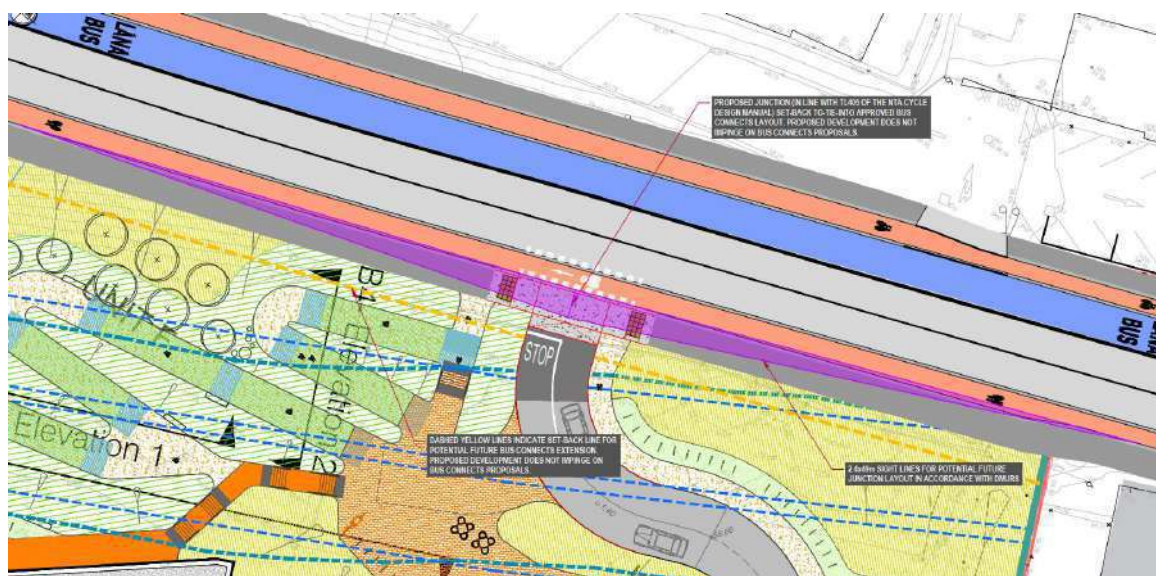


Figure 2.10: Proposed Future Greenhills Road Site Access Junction (NRB-TA-008)

- 2.36 The applicant has demonstrated a major commitment to helping deliver the proposed BusConnects scheme. As seen in **Figure 2.5**, Sheet 18 of the Tallaght/Clondalkin to City

Centre Core Bus Corridor Scheme, a proposed new boundary is required in order to deliver the road width required to provide the BusConnects proposals. The Applicant has agreed to allow cycle and pedestrian facilities within their development site boundary, in order to deliver the required road width, and has designed the access road and pedestrian and cycle infrastructure to tie into the future BusConnects Scheme.

2.37 A separate cycle access has been proposed, which integrates into the landscaping design adjacent to Greenhills Road. This provides cyclists with a direct access to a secure parking facility located within the site.

2.38 The cycle access and ramp to the bicycle parking store is highlighted in **Figure 2.11** below.

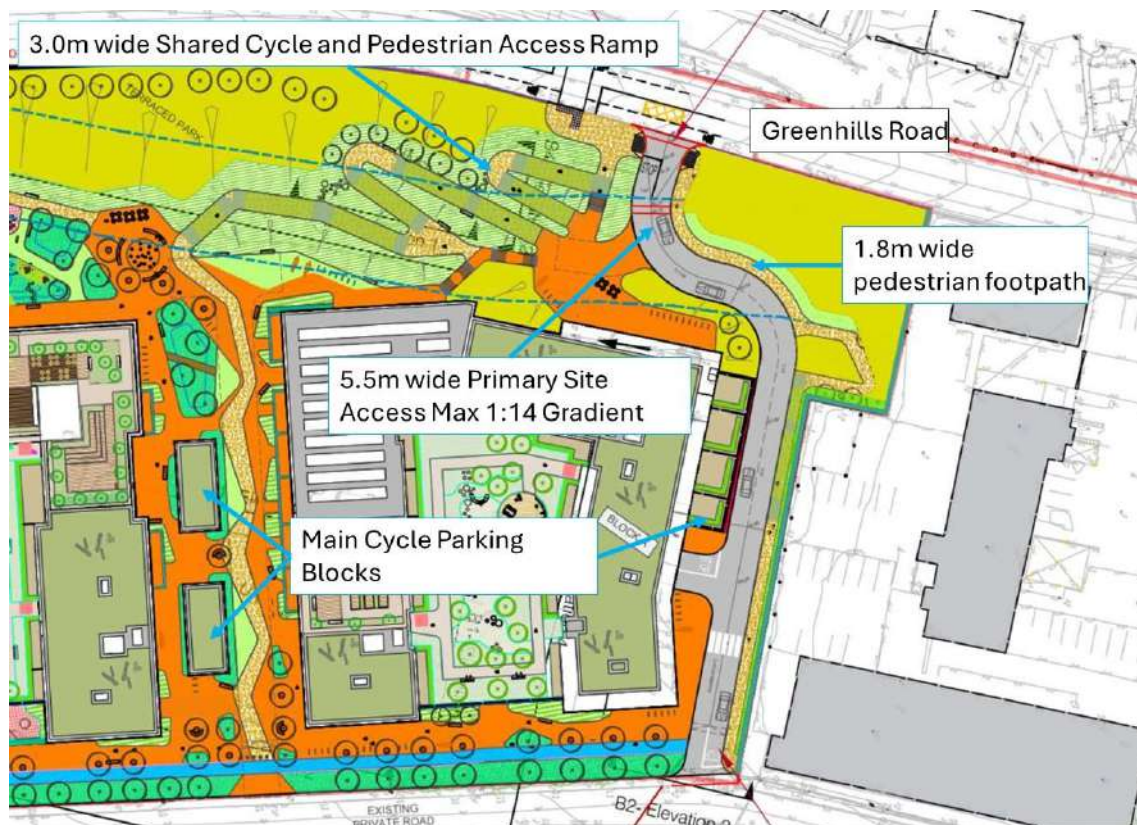


Figure 2.11: Proposed Cycle Access and Primary Site Access (NRB-TA-001)

Pedestrian Infrastructure

2.39 At present, pedestrian activity to the existing site is served by an extensive network of footpaths connecting the site to Walkinstown and providing direct links to the high-quality public transport services locally and within the wider catchment area.

2.40 Prior to the provision of BusConnects, pedestrian access to the site will be facilitated via two uncontrolled pedestrian crossings from the existing footpath on the northern side of the road, to a small pedestrian area/footpaths on the southern side (with appropriate visibility). The uncontrolled crossing at the site access will provide access to a pedestrian

public realm which will be a terraced landscape with planting. The uncontrolled crossing on the western side of the site will provide access to pedestrian steps which will provide access to the site which is on a lower level.

- 2.41 A pedestrian footpath is not proposed along the full length of the site boundary, as there is a large level difference between the existing road edge and the site, and this would require significant structures to provide a footpath in the short term. This short-term footpath would have no pedestrian connectivity to the east or west of the site, as there are no footpaths on the southern side of the road either side of the site and would really serve little purpose nor carry any pedestrian traffic.
- 2.42 However, it is proposed to accommodate pedestrians along the site boundary in the long term. It is proposed to accommodate the BusConnects pedestrian and cycle facilities within the applicants site boundary, which also facilitates the additional road width required for the proposed BusConnects scheme.
- 2.43 With the BusConnects proposals in place, pedestrian and cycle facilities can then be continued on the Greenhills Road carriageway, as per the existing BusConnects Proposals, shown in **Figures 2.6 and 2.7**. Therefore, we consider that there will be adequate and safe pedestrian facilities provided at the site in both the short-term and long-term scenarios.
- 2.44 Pedestrian connectivity links are proposed throughout the site, including generous wide footpaths and a pedestrian plaza / terraced landscape connecting to existing Greenhills Road.

Cycle Infrastructure

- 2.45 At present, cycle traffic at/to the existing site is served by an extensive network of dedicated cycle lanes/facilities, including the cycle lane on Greenhills Road. These facilities are continually improving, and of course the nature of the area and current practices by the Dublin Local Authorities is that the GDA cycle network will be rolled out within a short timeframe. The site is clearly ideally placed in terms of the NTA's GDA Cycle Network Plan for this area of Dublin. An extract from the plan is included and illustrated in **Figure 2.12** below. The site is served by a Primary Route and a Secondary Route. These links ensure that the site is highly accessible by bicycle to Dublin City and environs. The Cycle Infrastructure planned for the site feeds into the overall GDA Network Plan.

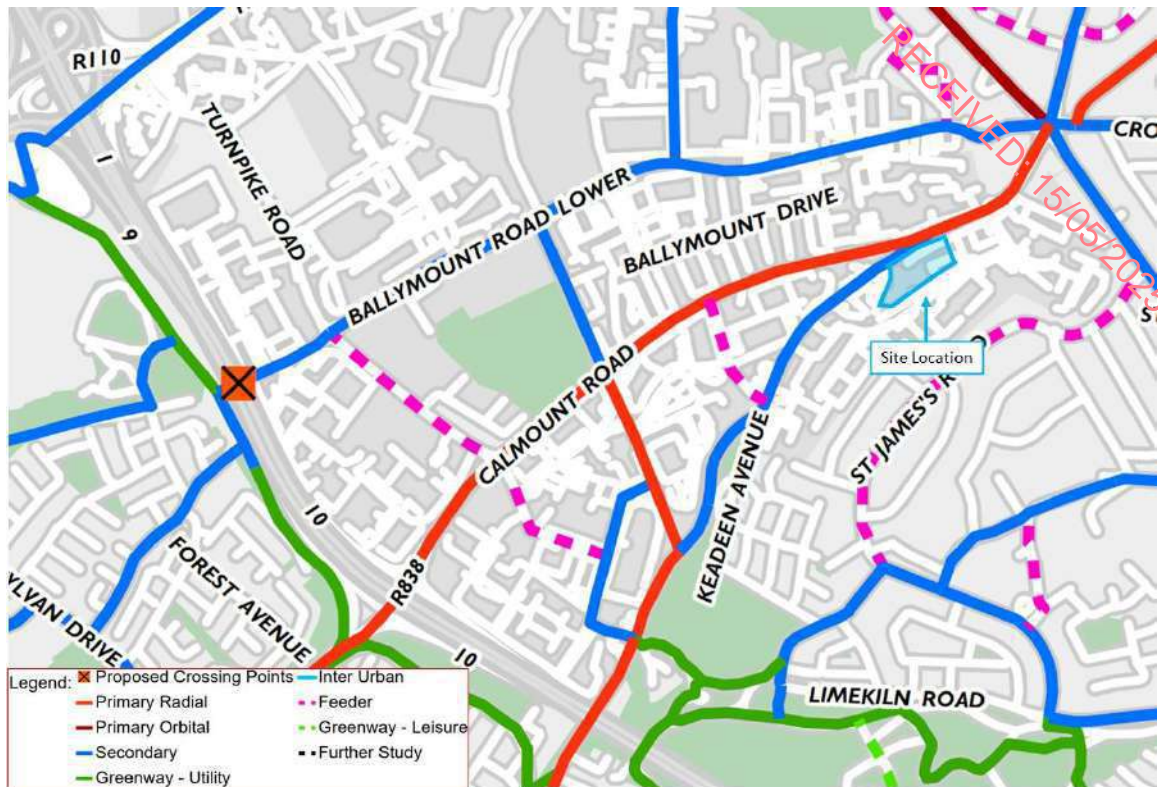


Figure 2.12: Proposed Local Cycle Network – GDA Cycle Network Plan

- 2.46 The applicant has demonstrated a major commitment to helping meet National and Local modal shift targets, by facilitating the upgrading of the pedestrian and cycling infrastructure on the Greenhills Road (by accommodating pedestrian facilities and a cycle track within the applicants site boundary), which also facilitates the additional road width required for the proposed BusConnects scheme.
- 2.47 The provision of these pedestrian and cycle facilities will encourage people living in the proposed development to travel by active modes rather than by private car and will provide a safe area for people travelling by foot or bike to Walkinstown or the wider area.
- 2.48 The new cycle tracks/lanes deliver a significant section of the local cycle network, as set out in the Greater Dublin Area Cycle Network Plan, particularly given the existing local road network pinch point at this location.

Cycle Parking

- 2.49 The key to cycle accessibility is convenient safe links, with secure and carefully sited cycle parking. The proposed development consists of a mix of internal & secure bike storage within the buildings or in secure external bicycle stores, and visitor cycle parking. (Refer to Architects Drawings illustrating same and the annotated site layout drawing included herein as **Appendix A**).

2.50 It is expected that a significant number of residents of the proposed development will be willing to cycle to work with safe links and secure parking put in place, and that is reflected in the provision of a total of 1,269 new dedicated cycle parking spaces. There are 962 no. secure long-term bicycle spaces at ground level (including 10no. cargo spaces) and 307 short-term bicycle spaces located throughout the development's public realm (including 16no. non-standard cycle spaces including cargo spaces etc.), with the bicycle parking allocation and distribution as outlined in **Table 2.1** below.

Table 2.1; Bicycle Parking Allocation Throughout Site

TOTAL BICYCLE PARKING SPACES PROVIDED				
	BLOCK A	BLOCK B	BLOCK C-D	Total
Resi (Standard Provided)	245	321	386	952
Resi (cargo Provided)	2	2	6	10
Visitor (Provided)	307 (294 [apartments]+5 [creche]+8 [commerical])			

2.51 The 'Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities' and the SDCC Development Plan have the same standards for the minimum number of bicycle standards, which requires a provision of 1 residential bicycle parking space per bedroom PLUS 1 visitor bicycle parking space per 2 residential units. In this case there are a total of 944 bedrooms, requiring 944 residential (or long term) bicycle parking spaces and with 588 units, requiring 294 visitor bicycle parking spaces. This is a total requirement of 1,238, for the residential units.

2.52 There are additional cycle parking requirements for the Creche and the Commercial elements of the proposed scheme. A Creche requires a provision of 1 staff bicycle parking space per 5 staff members, plus a short term visitor cycle parking per 10 children. Estimating there will be a total of 12 staff members, given the number of classrooms proposed, this requires 2 staff (or long term) bicycle parking spaces and estimating there will be approximately 50 children, this will require 5 visitor (short term) bicycle parking spaces.

2.53 An office requires a provision of 1 staff bicycle parking space per 200sqm, plus a short term visitor cycle parking per 200 sqm. In this case there are a total of 1,814sqm of Commercial Space, requiring 9 staff (or long term) bicycle parking spaces and 9 visitor bicycle parking spaces.

2.54 No provision has been made for the proposed Communal Space within the site, as this communal space is for the local residents and therefore, the provision for residents has

already been included. In total, the bicycle requirement for the apartments, creche and commercial elements is 962 long-term spaces (including 10 no. cargo spaces), and a total of 307 short term spaces. With a total of 1,269 bicycle spaces proposed, this exceeds the minimum guideline provision.

Car Parking & Accessibility

2.55 The development includes a provision of 270 No. dedicated Car Parking spaces, divided between Surface and Under-croft car parking, with the breakdown as shown in **Table 2.2** below.

Table 2.2; Car Parking Allocation Throughout Site

Parking Spaces Provided (Excluding Accessible):	240	Accessible Parking Spaces:	13
Loading Bays	2	Commercial/ Dropoff/ Parking	15
Total:	270		
Motor Bike:	8		

2.56 13 no. mobility impaired spaces are provided, being 5% of the total. The parking will include 6 no. spaces dedicated to Car Sharing. 1 no. loading space has been provided for the commercial uses on the Beechlawn Industrial Estate Road, with a further 16 no. spaces provided on the access road between Blocks B&C (including 1 for loading (amazon vans etc., and 15 no. for commercial, drop off and creche parking). A total of 54 EV charging spaces are shown distributed around the site, being 20% of the total number of residential spaces. Notwithstanding, all of the car parking spaces have been provided with electrical ducting to allow for the provision of future charging points and can easily be upgraded to allow conversion for Electric Vehicles. Within the under-croft parking areas, conduits will be run on the walls where charging points can also be mounted.

Maximum Car Parking Standards

2.57 The **Car Parking** standards to be applied in new residential developments in South Dublin County Council are set out in Table 12.26 of the County Development Plan (2022-2028). These standards are defined as "Maximum" requirements, with parking rates divided into two main categories, Zones 1 and 2. Zone 2 (residential) has a more restrictive rate for "lands zoned REGEN, and brownfield / infill sites within Dublin City and Suburbs settlement boundary within 400-500 metres of a high-quality public transport service (includes a train station, Luas station or bus stop with a high quality service)".

2.58 In the case of the subject site, there are 588 quality residential apartments proposed immediately beside an existing high frequency bus route and the future Greenhills to City

Centre Core Bus Corridor. In addition, there are high quality walking and cycling links between the site and the city centre. In these terms, the development site location is considered to be very highly sustainable. Therefore, the proposed development falls under the more restrictive parking Zone 2.

- 2.59 A total of 270 no. private car parking spaces are being provided as part of the development for the residential units, with 17 no. spaces provided for commercial/ unloading/ drop-off and 253 no. provided for residents. With 588 apartments, this represents a **car parking 'Ratio' of 0.43** parking spaces per unit. This level of parking is considered appropriate given the highly sustainable location characteristics of the apartment scheme, and in consideration of National Guidance.
- 2.60 The 'Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities', updates previous guidance in the context of greater evidence and knowledge of current and likely future housing demand in Ireland taking account of the Housing Agency National Statement on Housing Demand and Supply, the Government's action programme on housing and homelessness Rebuilding Ireland and Project Ireland 2040 and the National Planning Framework.
- 2.61 These guidelines address Apartment Design Parameters, including car and cycle parking. Under Car Parking - Section 4.20 the guidelines acknowledge that the quantum of car parking or the requirement for any such provision for apartment developments will vary, having regard to the types of location in cities and towns that may be suitable for apartment development, broadly based on proximity and accessibility criteria.
- 2.62 Under Section 4.21 the guidelines note that in larger scale and higher density developments, comprising wholly of apartments in more central locations that are well served by public transport, the default policy is for car parking provision to be wholly eliminated or substantially reduced. Specifically, Paragraphs 4.21 and 4.22 state; -

Central and/or Accessible Urban Locations

In larger scale and higher density developments, comprising wholly of apartments in more central locations that are well served by public transport, the default policy is for car parking provision to be minimised, substantially reduced or wholly eliminated in certain circumstances. The policies above would be particularly applicable in highly accessible areas such as in or adjoining city cores or at a confluence of public transport systems such rail and bus stations located in close proximity.

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These locations are most likely to be in cities, especially in or adjacent to (i.e. within 15 minutes walking distance of) city centres or centrally located employment locations. This includes 10 minutes walking distance of DART, commuter rail or Luas stops or within 5 minutes walking distance of high frequency (min 10 minute peak hour frequency) bus services.

2.63 Furthermore, under Section 4.23, the guidelines note that in higher density developments (greater than 45 dwellings per hectare), close to town centres or employment areas, the default policy is for planning authorities to consider a reduced overall car parking standard. Specifically, Paragraph 4.23 states; -

Intermediate Urban Locations

In suburban/urban locations served by public transport or close to town centres or employment areas and particularly for housing schemes with more than 45 dwellings per hectare net (18 per acre), planning authorities must consider a reduced overall car parking standard and apply an appropriate maximum car parking standard.

2.64 In terms of the stated Policy, the subject site meets all the requirements for significantly reducing the provision of Private Car Parking, under the headings;

- High Density Development** ✓
- Comprising Wholly of Apartments** ✓
- Proximity to Town Centre** ✓
- Well Served by Public Transport** ✓
- High Frequency Bus Services** ✓
- Implementation of Travel Plan** ✓

2.65 The National Apartment Guidance states (Paragraph 4.25);

For all types of location, where it is sought to eliminate or reduce car parking provision, it is necessary to ensure, where possible, the provision of an appropriate number of drop off, service, visitor parking spaces and parking for the mobility impaired. Provision is also to be made for alternative mobility solutions including facilities for car sharing club vehicles and cycle parking and secure storage. It is

also a requirement to demonstrate specific measures that enable car parking provision to be reduced or avoided.

1.12 These requirements are now supplemented by Table 3.1 of the recent Compact Settlement Guidelines (CSG) which set out the three different areas and density categories for Dublin City, namely City Centre, City- Urban Neighbourhoods and City - Suburban / Urban Extension. Having reviewed the site location we believe that the site, falls within a City-Urban Neighbourhoods (as defined in Table 3.8).

1.13 The relevant extract is included below as **Figure 2.13**.

(ii) Table 3.1 - Areas and Density Ranges Dublin and Cork City and Suburbs

<p>City - Centre</p> <p>The city centres of Dublin and Cork, comprising the city core and immediately surrounding neighbourhoods⁶, are the most central and accessible urban locations nationally with the greatest intensity of land uses, including higher order employment, recreation, cultural, education, commercial and retail uses. It is a policy and objective of these Guidelines that residential densities in the range 100 dph to 300 dph (net) shall generally be applied in the centres of Dublin and Cork.</p>
<p>City - Urban Neighbourhoods</p> <p>The city urban neighbourhoods category includes: (i) the compact medium density residential neighbourhoods around the city centre that have evolved overtime to include a greater range of land uses, (ii) strategic and sustainable development locations⁷, (iii) town centres designated in a statutory development plan, and (iv) <u>lands around existing or planned high-capacity public transport nodes or interchanges (defined in Table 3.8) – all within the city and suburbs area</u>. These are highly accessible urban locations with good access to employment, education and institutional uses and public transport. It is a policy and objective of these Guidelines that residential densities in the range 50 dph to 250 dph (net) shall generally be applied in urban neighbourhoods of Dublin and Cork.</p>
<p>City - Suburban/Urban Extension</p> <p>Suburban areas are the lower density car-orientated residential suburbs constructed at the edge of cities in the latter half of the 20th and early 21st century, while urban extension refers to the greenfield lands at the edge of the existing built up footprint that are zoned for residential or mixed-use (including residential) development⁸. It is a policy and objective of these Guidelines that residential densities in the range 40 dph to 80 dph (net) shall generally be applied at suburban and urban extension locations in Dublin and Cork, and that densities of up to 150 dph (net) shall be open for consideration at 'accessible' suburban / urban extension locations (as defined in Table 3.8).</p>

Figure 2.13 – Extract Table 3.1 – Areas and Density Ranges from the CSG

1.14 Examination of the frequency of both Existing and Proposed Bus Services confirms that the site can best be described as an “Urban Neighbourhood” solely in the context of the CSG definitions for calculating appropriate car parking provision. We include below the associated Parking Provision SPPR – Car Parking extract from the CSG as **Figure 2.14**.

Table 3.8 defines 'Accessible', 'Intermediate' and 'Peripheral' Locations. These definitions should form the basis for the approach to car parking.

SPPR 3 - Car Parking

It is a specific planning policy requirement of these Guidelines that:

- (i) In city centres and urban neighbourhoods of the five cities, defined in Chapter 3 (Table 3.1 and Table 3.2) car-parking provision should be minimised, substantially reduced or wholly eliminated. The maximum rate of car parking provision for residential development at these locations, where such provision is justified to the satisfaction of the planning authority, shall be 1 no. space per dwelling.
- (ii) In accessible locations, defined in Chapter 3 (Table 3.8) car- parking provision should be substantially reduced. The maximum rate of car parking provision for residential development, where such provision is justified to the satisfaction of the planning authority, shall be 1.5 no. spaces per dwelling.
- (iii) In intermediate and peripheral locations, defined in Chapter 3 (Table 3.8) the maximum rate of car parking provision for residential development, where such provision is justified to the satisfaction of the planning authority, shall be 2 no. spaces per dwelling

Applicants should be required to provide a rationale and justification for the number of car parking spaces proposed and to satisfy the planning authority that the parking levels are necessary and appropriate, particularly when they are close to the maximum provision. The maximum car parking standards do not include bays assigned for use by a car club, designated short stay on-street Electric Vehicle (EV) charging stations or accessible parking spaces. The maximum car parking standards do include provision for visitor parking.

This SPPR will not apply to applications made in a Strategic Development Zone until the Planning Scheme is amended to integrate changes arising from the SPPR. Refer to Section 2.1.2 for further detail.

Figure 2.14 – NRB Annotated Extract SPPR of CSG Parking Provision

1.15 Note that the parking provision in the CSG does NOT include car club spaces, set down spaces, public EV Spaces or Accessible spaces, but does include visitor provision. Based on the above, applying the CSG to the Apartments would strictly allow a maximum of the following:

- o 1 x Car Parking Space per Residential Apartment (588 Spaces),

2.66 Conscious that the scheme is intended to be actively marketed as Reduced Car Dependency, the layout has been designed with the above issues in mind. For the proposed development it is anticipated that there will be an associated lower car ownership and dependency. Given the restrictions on the number of spaces being provided, the entire scheme will be actively marketed and promoted as a "**Reduced Car Dependency**"

scheme, and this will be communicated from the outset as part of sales and marketing. The development will also be managed on an on-going basis to ensure that the Reduced Car Dependency nature of the development is continually promoted and enhanced.

2.67 The development will be managed and operated by a Management Company. Car parking will not be an automatic entitlement with the apartments. Parking will be allocated to residents mainly on a first come first served basis by the Management Company and will be continually managed in these terms.

2.68 Some parking spaces will be reserved for visitors. The allocation of car parking spaces will be reviewed/renewed on an annual/ongoing basis to suit demand.

2.69 In terms of **specific measures** to enable car parking provision to be reduced to the level proposed, with a parking ratio of 0.43, the specific measures are:

- The Active Management and Marketing of the Development from the outset as 'Reduced Car Dependency',
- Restricted Dedicated Car Parking is intended to be provided to Residents and will be specifically associated with specific private rental properties (and same will be Specified in associated Rental Agreements),
- The Location within walking/cycling distance of a wide range of services, amenities, shops and schools,
- Associated Employment Opportunities locally,
- Bus Services 'on the doorstep' of the site,
- Being on a Core Bus Corridor,
- 6 No. Dedicated Car Share spaces/cars can be provided within the development,
- Plentiful Cycle Parking and Cycle Storage (Refer Above),
- On site security & management by permanent staff and by way of CCTV that will ensure the car parking areas are monitored and policed (with a clamping system in operation, so that the car parking restrictions are closely controlled and enforced), and,
- The Implementation of a working Travel Plan / Mobility Management Plan.

2.70 Following our review of the scheme design and location, in light of the above and our interpretation of National Policy, we believe that the provision of 270 managed parking spaces to serve the residential elements of this development is appropriate.

Public Transport

- 2.71 The site is located off the Greenhills Road, located in Walkinstown, 350m south-west of the Walkinstown Roundabout, within easy walking distance of Dublin Bus Stops (200m), and is therefore ideally placed to accommodate the Transportation Demands associated with this scale of development.
- 2.72 In the short term there are bus stops located immediately at the site, with service numbers 27 and 77a passing the site. For reference, Service No. 27 is a cross-city service (Clarehall-Jobstown-Clarehall), with a commuter peak hour frequency of c10 mins. Service No.77a (Ringsend-Citywest-Ringsend) also has a commuter peak hour frequency of c10 mins. These bus services combined represent a high frequency service.
- 2.73 In addition, the site is within an approximate 350m distance of Walkinstown Roundabout, which is a transport node that is crossed by a number of additional existing bus services, including the No. 9 and 56a Dublin Bus Routes. The frequency of each bus route is shown below in **Table 2.3**, and **Figure 2.15**.

Table 2.3; Existing Public Transport Frequency

Service Number	Operator	Peak Frequency (2-way services per hour)	To / From
9	Dublin Bus	10	From/To Charlestown to/from Limekiln Ave
27	Dublin Bus	12	From/To Clarehall to/from Jobstown
56a	Dublin Bus	1	From/To Ringsend Road to/from Tallaght
77a	Dublin Bus	8	From/To Ringsend Road to/from Citywest
Total		31	To / From City Centre

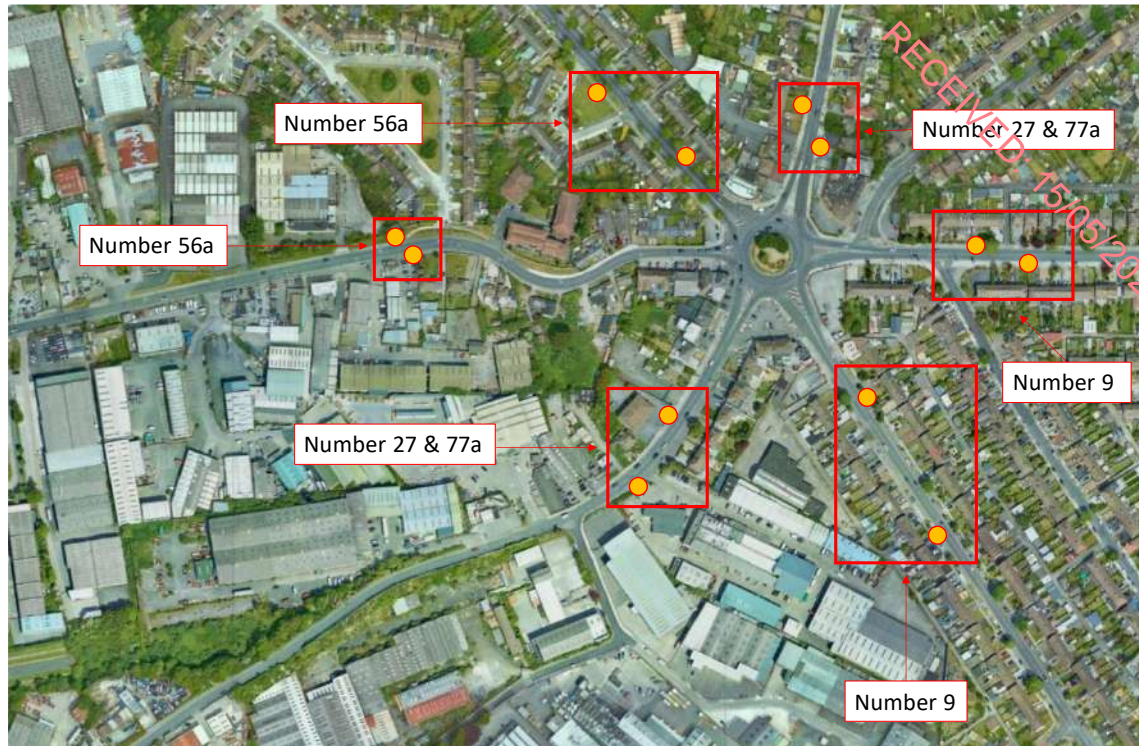


Figure 2.15: Existing Bus Routes 9, 27, 56A 77A.

- 2.74 In the longer term, the site is ideally placed to both benefit from, and contribute to, services on Corridor 9 Greenhills to City Centre. This Core Bus network plan shows that the site’s accessibility to bus services will be further enhanced, with a high frequency and permeable service passing the site. The site will be served by very frequent services, with Spines D2 D3 and D4 passing the site. In addition to Spine Route F3 & Feeder Service 71 which are planned to cross the Walkinstown Roundabout.
- 2.75 The planned frequency of service for the D Spine Routes is a bus every 4 minutes. Extracts from the NTA Bus Frequency Tables are included below as **Figure 2.16** & **Figure 2.17**. The number in each box is the expected time in minutes between buses.

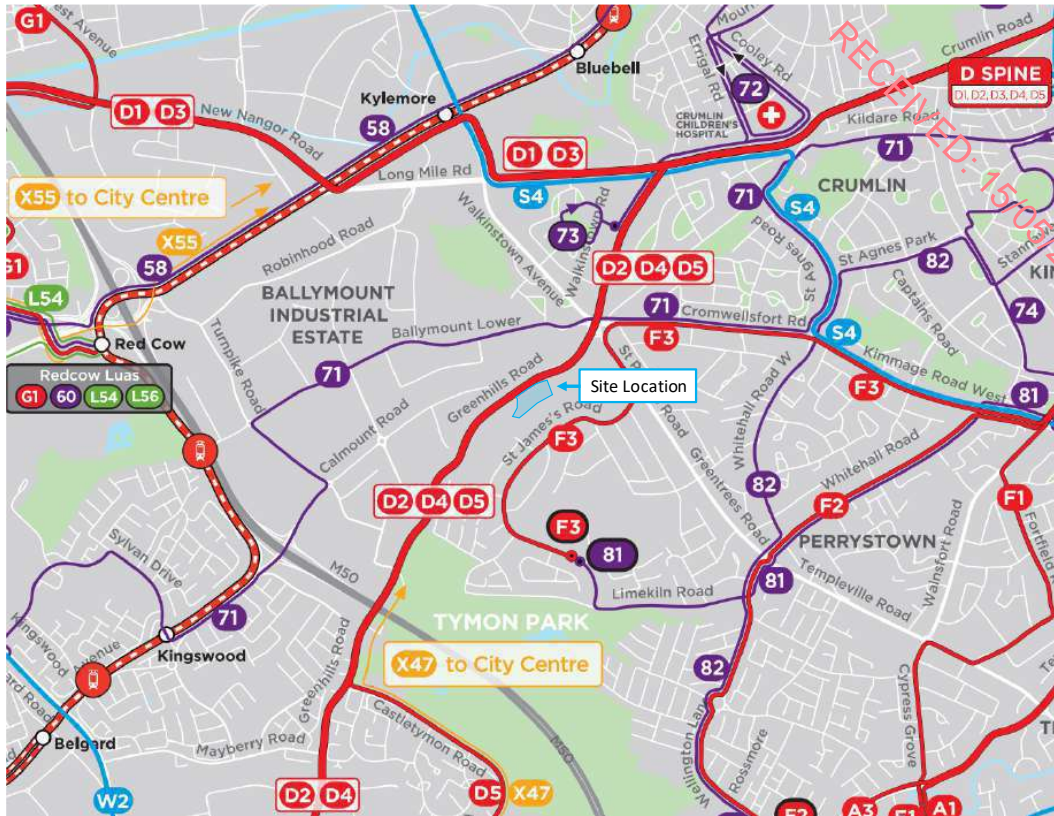


Figure 2.16: Bus Connects Revised Bus Network

Spine frequency tables

The number in each box is the expected time in minutes between buses. It is subject to adjustment in

Spines & Branches		Weekday																		
Route no.	To and From	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11
D-SPINE	Malahide Rd - City Centre - Crumlin	8	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	8
D1	Clongriffin - City Centre - Grange Castle	30	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	30
D2	Clare Hall - City Centre - Citywest	30	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	30
D3	Clongriffin - City Centre - Clondalkin	30	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	30
D4	Swords Road - City Centre - Killinarden	60	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	60	
D5	Edenmore - City Centre - Tallaght	60	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	60
F-SPINE	Finglas - City Centre - Kimmage	10	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	10
F1	Charlestown - Finglas Bypass - City Centre - Tallaght	30	15	10	10	15	15	15	15	15	15	10	10	10	15	15	15	15	15	30
F2	Charlestown - Finglas NW - City Centre - Templeogue	30	15	10	10	15	15	15	15	15	15	10	10	10	15	15	15	15	15	30
F3	Charlestown - Finglas SW - City Centre - Greenhills	30	15	10	10	15	15	15	15	15	15	10	10	10	15	15	15	15	15	30

Radial Routes		Weekday																		
Route no.	To and From	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11
71	Tallaght - Ballymount - Warrenmount - East Wall		30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	60

Figure 2.17 – NTA Core Bus Extract –Route Frequency

2.76 The site is therefore ideally placed in terms of current and future high frequency bus availability.

2.77 Further details of measures to encourage the use of alternative modes of transport are set out in the separate Preliminary Travel Plan (Mobility Management Plan or MMP) as **Appendix J**. The enclosed MMP should be read in conjunction with the content of the TA Report, as an integral part. In addition, a detailed Public Transport and Demand Study has also been prepared and is included as **Appendix M**. A Construction Traffic Management Plan is included as **Appendix N**.

3.0 TRIP GENERATION, ASSIGNMENT & DISTRIBUTION

3.1 The Trip Rate Information Computer System (TRICS) database is ordinarily used to ascertain vehicular trip generation associated with the use of any particular site. This represents industry standard practice for Traffic and Transport Assessments in Ireland. In this case the worst-case assessment is based on Residential Apartment Developments, Office (Commercial Units), and a Creche from within TRICS.

3.2 A robust and onerous assessment has been undertaken of the impact along the Greenhills Road Corridor in order to ensure that we thoroughly assess the impact, in terms of stress testing the access junction and the road capacity impact of the scheme on the important local link to and from the city. The Trip Rates applied for the development in this case are as set out below as **Table 3.1**. It should be noted that the ancillary offices (Commercial) and Creche have been considered. The majority of these trips will be linked to the residential apartments, but they have been assigned as 100% primary trips for the purposes of an onerous and robust assessment.

Table 3.1; - TRICS Data Summary, 588 No. Residential Apartments, Commercial and Creche

588 per unit	Arrivals (PCUs)		Departures (PCUs)		Total 2-Way Vehicular Traffic Generated
Network Hour	per unit	Dev	per unit	Dev	
Weekday AM Peak Hr 8-9	0.069	41	0.210	123	163
Weekday PM Peak Hr 5-6	0.168	99	0.091	54	152
24 Hours	1.121	659	1.216	715	1374
1814 Commercial	Arrivals (PCUs)		Departures (PCUs)		Total 2-Way Vehicular Traffic Generated
Network Hour	per unit	Dev	per unit	Dev	
Weekday AM Peak Hr 8-9	1.006	18	0.153	3	21
Weekday PM Peak Hr 5-6	0.102	2	0.892	16	18
24 Hours	3.825	69	3.789	69	138
347 Creche	Arrivals (PCUs)		Departures (PCUs)		Total 2-Way Vehicular Traffic Generated
Network Hour	per unit	Dev	per unit	Dev	
Weekday AM Peak Hr 8-9	3.559	16	2.864	13	28
Weekday PM Peak Hr 5-6	2.807	12	3.597	16	28
24 Hours	16.539	73	17.305	77	150

Total Scheme	Arrivals (PCUs)		Departures (PCUs)		Total 2-Way Vehicular Traffic Generated
Network Hour	per unit	Dev	per unit	Dev	
Weekday AM Peak Hr 8-9	75		139		214
Weekday PM Peak Hr 5-6	113		86		199
24 Hours	802		860		1662

3.3 We have included herein as **Appendix C** the TRICS data output for Residential Apartments, ancillary offices (Commercial) and Creche upon which the above is based.

Assignment/Distribution - Future Year Traffic

- 3.4 We have used industry standard hand assignment techniques, with the worst-case traffic as outlined assigned to the roads based on the observed established traffic patterns.
- 3.5 The standard methodology applied was to firstly ascertain the base background traffic conditions for both the weekday AM and weekday PM Commuter Peak periods. We then used the TII PE-PAG-02017 Project Appraisal Guidelines for National Roads Unit 5.3 to establish selected completion/opening year 2026 and design year 2041 traffic conditions on the local road network.

Future Year Scenario with Bus Connects

- 3.6 For the future year scenario (2041) we have assigned 100% of all traffic onto the extended Calmount Avenue. We have reduced through-traffic in each direction, based on the assumptions in the BusConnects traffic modelling. The BusConnects modelling predicts a significant reduction in road traffic with the Core Bus Corridor in place, as shown in **Figure 3.1**.

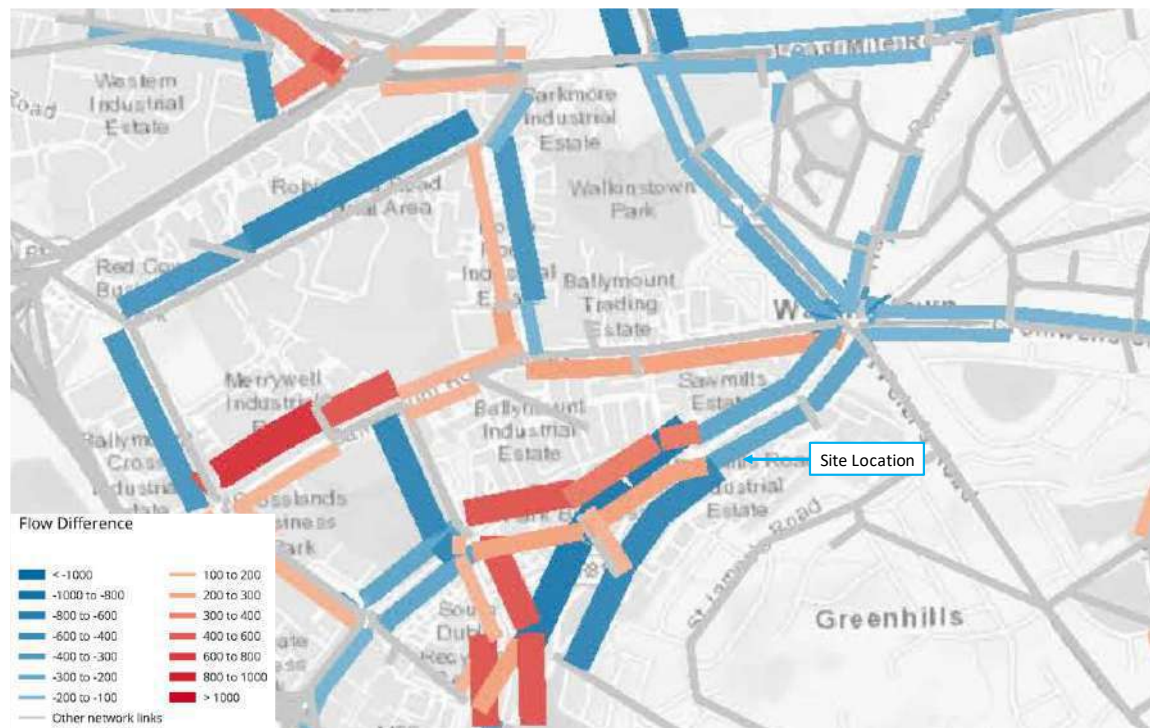


Figure 3.1: Greenhills to City Centre Draft Transport Modelling Report (November 2020)

4.0 **TRAFFIC IMPACT - TRAFFIC CAPACITY ANALYSIS & CONSTRUCTION TRAFFIC**

- 4.1 Both the Institution of Highways and Transportation (IHT) Guidelines for Traffic Impact Assessment and the TII Traffic and Transport Assessment Guidelines sets out a mechanism for assessment of developments of this nature and determining whether further assessment is indeed required.
- 4.2 The TII Traffic and Transport Assessment Guidelines requires a **Threshold Assessment** of the impact on the local roads to be provided in order to determine whether further, more detailed modelling and assessment of critical junctions is necessary. This is important in this case as the development is located in proximity to an important arterial route for the city.
- 4.3 The professional guidance referenced above sets out specific increases in traffic volume associated with new development, which, if breeched, requires further detailed analysis to be undertaken. The recommendation is that, if the expected increase is 5% for networks that are considered heavily trafficked or congested, then further analysis is warranted. In this case, given the proximity to the Greenhills Road, the 5% threshold has been applied.
- 4.4 In this regard, it is demonstrated herein that the proposed addition of the occupation of the residential development, with very low volumes of traffic added to a busy network, will not result in any significant level of new trips on the local roads, with all anticipated traffic increases at and beyond the site access expected to be well below the Industry-Standard levels above which further assessment is required.
- 4.5 Our assessment has been undertaken under two road network scenarios including the existing road network and the future road network with the BusConnects road proposals in place.
- 4.6 Our assessments, included within **Appendix D** (Refer Pages 6 & 13 of Appendix D) & **E** (Refer Pages 7 & 15 of Appendix E), confirms that the absolute worst case traffic increase at the adjacent road network and at the priority controlled access junction (with all traffic considered as "New" and ignoring and linked/shared trips for robustness) is as summarised below as **Table 4.1** and **Table 4.2**.

Table 4.1; - Threshold Assessment, Worst-Case Impact of Development - Existing Network

Assessed Junction	Traffic Increase %		COMMENT
	AM Pk Hr	PM Pk Hr	
Site 1 Walkinstown Roundabout	2.7%	2.8%	<5% No Further Assessment Required
Site 2 Greenhills Rd/Mulcahy Keane Est	8.1%	7.1%	>5%, Assessment Required
Site 3. Greenhills Road / Greenhills Industrial Estate / Builders Suppliers Access	7.7%	7.0%	>5%, Assessment Required
Site 4. Internal Greenhills Industrial Estate Junction	0.0%	0.0%	<5% No Further Assessment Required
Site 5. Calmount Road / Calmount Avenue Priority Junction	0.0%	0.0%	<5% No Further Assessment Required
Site 6. Calmount Road / Ballymount Avenue Roundabout	0.5%	0.4%	<5% No Further Assessment Required

Table 4.2; - Threshold Assessment, Worst-Case Impact of Development - Future Network

Assessed Junction	Traffic Increase %		COMMENT
	AM Pk Hr	PM Pk Hr	
Site 1 Walkinstown Roundabout	2.7%	2.8%	<5% No Further Assessment Required
Site 2 Greenhills Rd/Mulcahy Keane Est	8.1%	7.1%	>5%, Assessment Required
Site 3. Greenhills Road / Greenhills Industrial Estate / Builders Suppliers Access	7.7%	7.0%	>5%, Assessment Required
Site 4. Internal Greenhills Industrial Estate Junction	0.0%	0.0%	<5% No Further Assessment Required
Site 5. Calmount Road / Calmount Avenue Signal Controlled Junction	5.3%	4.9%	>5%, Assessment Required
Site 6. Calmount Road / Ballymount Avenue Signal Controlled	3.7%	3.9%	<5% No Further Assessment Required

EXISTING ROAD NETWORK

Greenhill Roads - Site Vehicular Access Priority Controlled Junction

- 4.7 We have used the TII-approved software package 'Junctions 10' PiCADY' (**P**riority **I**ntersection **C**apacity **A**nd **D**elay) software package (as part of the TRL Package 'Junction 10') to assess the capacity of the junction. PiCADY produces results based on a ratio of flow to capacity (RFC) and queue length. An RFC greater than 1.00 indicates that a junction is operating at or above capacity, with 0.85 considered to be the optimum RFC value.
- 4.8 We have undertaken the detailed assessment of the capacity of the site access junction, with the entire subject development in place and fully occupied. The detailed output of the models are included herein as **Appendix F**, and is summarised below as **Table 4.3**.

Table 4.3; Greenhills Road / Site Access Junction - Summary PICADY Results

Modelled Scenario	Period Max RFC	Period Mean Max Q (PCUs)
Opening Year 2026 AM Peak Hr	0.50	1.0
Opening Year 2026 PM Peak Hr	0.36	0.5
*Design Year 2041 AM Peak Hr	0.56	1.2
*Design Year 2041 PM Peak Hr	0.42	0.7

*While the BusConnects Proposals are planned to be in place by 2041, these results are provided for completeness

- 4.9 The results of the modelling clearly show that the junction will have more than adequate capacity to accommodate the worst case traffic associated with the fully complete and occupied scheme in opening and design years.

Greenhill Roads / Greenhill Industrial Estate / Builders Suppliers Priority Controlled Staggered 4-arm junction

- 4.10 We have used the TII-approved software package 'Junctions 10' PiCADY' (Priority Intersection Capacity And Delay) software package (as part of the TRL Package 'Junction 10') to assess the capacity of the junction. PiCADY produces results based on a ratio of flow to capacity (RFC) and queue length. An RFC greater than 1.00 indicates that a junction is operating at or above capacity, with 0.85 considered to be the optimum RFC value.
- 4.11 We have undertaken the detailed assessment of the capacity of the junction, with the entire subject development in place and fully occupied. The detailed output of the models are included herein as **Appendix G**, and is summarised below as **Table 4.4**.

Table 4.4; Greenhills Road / Greenhill Industrial Estate - Summary PICADY Results

Modelled Scenario	Period Max RFC	Period Mean Max Q (PCUs)
Opening Year 2026 AM Peak Hr	0.33	1.3
Opening Year 2026 PM Peak Hr	0.51	1.0
*Design Year 2041 AM Peak Hr	0.42	2.1
*Design Year 2041 PM Peak Hr	0.66	1.8

*While the BusConnects Proposals are planned to be in place by 2041, these results are provided for completeness

- 4.12 The results of the modelling clearly show that the junction will have more than adequate capacity to accommodate the worst case traffic associated with the fully complete and occupied scheme in opening and design years.

Greenhill Roads / Mulcahy Keane Estate Priority Controlled T-Junction

- 4.13 We have used the TII-approved software package 'Junctions 10' PiCADY' (Priority Intersection Capacity And Delay) software package (as part of the TRL Package 'Junction 10') to assess the capacity of the junction. PiCADY produces results based on a ratio of flow to capacity (RFC) and queue length. An RFC greater than 1.00 indicates that a junction is operating at or above capacity, with 0.85 considered to be the optimum RFC value.
- 4.14 We have undertaken the detailed assessment of the capacity of the junction, with the entire subject development in place and fully occupied. The detailed output of the models are included herein as **Appendix H**, and is summarised below as **Table 4.5**.

Table 4.5; Greenhills Road / Mulcahy Keane Estate - Summary PICADY Results

Modelled Scenario	Period Max RFC	Period Mean Max Q (PCUs)
Opening Year 2026 AM Peak Hr	0.08	0.1
Opening Year 2026 PM Peak Hr	0.28	0.4
*Design Year 2041 AM Peak Hr	0.10	0.1
*Design Year 2041 PM Peak Hr	0.36	0.6

*While the BusConnects Proposals are planned to be in place by 2041, these results are provided for completeness

- 4.15 The results of the modelling clearly show that the junction will have more than adequate capacity to accommodate the worst case traffic associated with the fully complete and occupied scheme in opening and design years.

FUTURE ROAD NETWORK WITH BUSCONNECTS IN PLACE

Future Site Access Priority Controlled Junction

- 4.16 We have used the TII-approved software package 'Junctions 10' PiCADY' (Priority Intersection Capacity And Delay) software package (as part of the TRL Package 'Junction 10') to assess the capacity of the junction. PiCADY produces results based on a ratio of flow to capacity (RFC) and queue length. An RFC greater than 1.00 indicates that a junction is operating at or above capacity, with 0.85 considered to be the optimum RFC value.
- 4.17 We have undertaken the detailed assessment of the capacity of the site access junction, with the entire subject development in place and fully occupied. The detailed output of the models are included herein as **Appendix F**, and is summarised below as **Table 4.6**.

Table 4.6; Future Greenhills Road / Site Access Junction - Summary PICADY Results

Modelled Scenario	Period Max RFC	Period Mean Max Q (PCUs)
*Opening Year 2026 AM Peak Hr	0.53	1.1
*Opening Year 2026 PM Peak Hr	0.39	0.6
Design Year 2041 AM Peak Hr	0.39	0.6
Design Year 2041 PM Peak Hr	0.27	0.4

*While the BusConnects Proposals are planned to be in place by 2041, these results are provided for completeness

4.18 The results of the modelling clearly show that the junction will have more than adequate capacity to accommodate the worst case traffic associated with the fully complete and occupied scheme in opening and design years with the BusConnects proposals in place.

Future Greenhill Roads / Greenhill Industrial Estate / Builders Suppliers Priority Controlled Staggered 4-arm junction

4.19 We have used the TII-approved software package 'Junctions 10' PiCADY' (Priority Intersection Capacity And Delay) software package (as part of the TRL Package 'Junction 10') to assess the capacity of the junction. PiCADY produces results based on a ratio of flow to capacity (RFC) and queue length. An RFC greater than 1.00 indicates that a junction is operating at capacity, with 0.85 considered to be the optimum RFC value.

4.20 We have undertaken the detailed assessment of the capacity of the junction, with the entire subject development in place and fully occupied. The detailed output of the models are included herein as **Appendix G**, and is summarised below as **Table 4.7**.

Table 4.7; Greenhills Road / Greenhill Industrial Estate - Summary PICADY Results

Modelled Scenario	Period Max RFC	Period Mean Max Q (PCUs)
*Opening Year 2026 AM Peak Hr	0.33	1.3
*Opening Year 2026 PM Peak Hr	0.51	1.0
Design Year 2041 AM Peak Hr	0.26	0.8
Design Year 2041 PM Peak Hr	0.46	0.8

*While the BusConnects Proposals are planned to be in place by 2041, these results are provided for completeness

4.21 The results of the modelling clearly show that the junction will have more than adequate capacity to accommodate the worst case traffic associated with the fully complete and occupied scheme in opening and design years with the BusConnects proposals in place.

Future Greenhill Roads / Mulcahy Keane Estate Priority Controlled T-Junction

4.22 We have used the TII-approved software package 'Junctions 10' PiCADY' (Priority Intersection Capacity And Delay) software package (as part of the TRL Package 'Junction 10') to assess the capacity of the junction. PiCADY produces results based on a ratio of flow to capacity (RFC) and queue length. An RFC greater than 1.00 indicates that a

junction is operating at or above capacity, with 0.85 considered to be the optimum RFC value.

- 4.23 We have undertaken the detailed assessment of the capacity of the junction, with the entire subject development in place and fully occupied. The detailed output of the models are included herein as **Appendix H**, and is summarised below as **Table 4.8**.

Table 4.8; Future Greenhills Road / Mulcahy Keane Estate - Summary PICADY Results

Modelled Scenario	Period Max RFC	Period Mean Max Q (PCUs)
*Opening Year 2026 AM Peak Hr	0.10	0.1
*Opening Year 2026 PM Peak Hr	0.36	0.5
Design Year 2041 AM Peak Hr	0.08	0.1
Design Year 2041 PM Peak Hr	0.28	0.4

*While the BusConnects Proposals are planned to be in place by 2041, these results are provided for completeness

- 4.24 The results of the modelling clearly show that the junction will have more than adequate capacity to accommodate the worst case traffic associated with the fully complete and occupied scheme in opening and design years with the BusConnects proposals in place.

Future Calmount Road / Calmount Avenue Signal Controlled Junction

- 4.25 We have used the TII-approved software package **LiNSIG** (Linked Signal Design) software package to assess the capacity of the proposed junction with the entire completed development. LiNSIG produces results based on a Degrees of Saturation (DoS) and Mean Max Queues. A DoS greater than 100% indicates that a junction is operating at or above maximum capacity, with 90% considered to be the optimum DoS value for signal junction operation.

- 4.26 We have undertaken the detailed assessment of the capacity of the junction, with the entire subject development in place and fully occupied. The detailed output of the models are included herein as **Appendix I**, and is summarised below as **Table 4.9**.

Table 4.9; Calmount Road / Calmount Avenue - Summary LiNSig Results

Modelled Scenario	Period Max DoS	Period Mean Max Q (PCUs)
Opening Year 2026 AM Peak Hr	77.4%	22.6
Opening Year 2026 PM Peak Hr	78.2%	24.2
Design Year 2041 AM Peak Hr	66.4%	15.0
Design Year 2041 PM Peak Hr	67.7%	17.6

- 4.27 The results of the modelling clearly show that the junction will have more than adequate capacity to accommodate the worst-case traffic associated with the fully complete and occupied scheme in opening and design years with the BusConnects proposals in place.

5.0 RESPONSE TO SDCC OPINION

- 5.1 We include below the extract from the SDCC Opinion received in connection with the above application, regarding Transportation/Roads & Access issues within Appendix 8 of the Opinion, and we set out thereafter our response to each item in turn.

Footpath Improvements to the Greenhills Road

A pedestrian footpath is not proposed along the full length of the site boundary, as there is a large level difference between the existing road edge and the site, and this would require significant structures to provide a footpath in the short term. This short-term footpath would have no pedestrian connectivity to the east or west of the site, as there are no footpaths on the southern side of the road either side of the site. The footpath on the northern side of the Greenhills Road is in very poor condition. This development will rely on pedestrians crossing the road to use this to travel east and west. Considering this is the only pedestrian desire line, the applicant is requested to improve the 1.5m wide footpath on the opposite side of the Greenhills Road. Should the proposed development be delivered before the Bus Connects project is delivered, SDCC Roads section recommend that the redline be extended to include the footpath. The extent of the upgrades shall be from the opposite side of the junction at Beechlawn Industrial estate west for approximately 80m. Because of the desire lines and the lack of pedestrian facilities on the southern side, the use of the pedestrian crossings will be increased. For this reason, one of the crossings should be change to a controlled crossing.

- 5.2 The applicant will upgrade the existing footpath on the opposite side of Greenhills Road for 80m, as shown on Drawing no. NRB-TA-002.

Controlled Crossing

A pedestrian footpath is not proposed along the full length of the site boundary, as there is a large level difference between the existing road edge and the site, and this would require significant structures to provide a footpath in the short term. This short-term footpath would have no pedestrian connectivity to the east or west of the site, as there are no footpaths on the southern side of the road either side of the site. The footpath on the northern side of the Greenhills Road is in very poor condition. This development will rely on pedestrians crossing the road to use this to travel east and west. Considering this is the only pedestrian desire line, the applicant is requested to improve the 1.5m wide footpath on the opposite side of the Greenhills Road. Should the proposed development be delivered before the Bus Connects project is delivered, SDCC Roads section recommend that the redline be extended to include the footpath. The extent of the upgrades shall be from the opposite side of the junction at Beechlawn Industrial estate west for approximately 80m. Because of the desire lines and the lack of pedestrian facilities on the southern side, the use of the pedestrian crossings will be increased. For this reason, one of the crossings should be change to a controlled crossing.

- 5.3 The design has been changed to provide a controlled Toucan Crossing on the Western site access, as shown on Drawing no. NRB-TA-002.

Southern Boundary

The southern boundary shows a 1.8m wide footpath and 2.0m wide cycle-way with a 0.8m buffer strip between the parking. The applicant is requested to ensure that enough carriageway width remains to allow a two-way road to be constructed along Beechlawn Industrial estate and allow ample pedestrian facilities on the southern side of this road.

- 5.4 The applicant has provided for pedestrians and cyclists along the southern boundary, by providing a minimum 2.0m wide footpath (average 3.0m and up to 4.2m), a 2.0m wide cycle track, and a landscape buffer, within the applicant's site boundary. The new footpaths and cycle track deliver significant improvements to the existing Active Travel provision on the southern boundary, which currently only include a pedestrian footpath on the northern side of the Beechlawn Industrial Estate Road.

- 5.5 Due to the reductions in the parking provision requested by SDCC (addressed below), the applicant has included removal of the parking on the Beechlawn Industrial Estate Road.

- 5.6 The existing road width of the Beechlawn Road will not be impacted by the proposed development, with the current 5.5m wide road, and 1.5m wide footpath remaining in place, except where vehicle access is proposed.

- 5.7 Given that a footpath is proposed along the north side of the Beechlawn Industrial Estate Road within the applicant's site, the existing footpath can be relocated to the southern side. When the Beechlawn Industrial Estate is upgraded as part of the City Edge Scheme, the road can be narrowed to a 5.0m width (in accordance with DMURS), with a 2.0m footpath provided on the southern side of the road.

- 5.8 As this is a private road, upgrading the surface course is outside the control or scope of the applicant, it would be the responsibility of either SDCC or the developer of the lands to the south of the Beechlawn Industrial Estate to develop the southern footpath. If cycle lanes are to be developed, they can be facilitated with the site to the south, as we have facilitated them within the applicants proposed site side.

- 5.9 The proposed landscaping strip, within the applicant's site, can be upgraded to car parking in the future, as part of the City Edge Scheme.

Car Parking

The applicant contends that 50% of the maximum allowable parking is sufficient. The roads department would like to see 43% parking rate for the development.

- 5.10 The Car Parking was reduced specifically to reflect the changes requested by SDCC. 588 no. Apartment units are proposed on site. A parking ratio of 0.43 per unit results in 253 car parking spaces. 15 no. spaces are provided for visitor / crèche and 2 no. loading bays, giving a total of 270 no. spaces.
- 5.11 The car parking reduction has been achieved through the removal of car parking spaces on the Beechlawn Industrial Estate Road, replacing the car parking spaces with landscaping, except for one location, where no footpath is currently provided (at the old site access junction), where it is proposed to provide a loading bay.
- 5.12 The car parking spaces on the Beechlawn Industrial Estate Road were principally provided to serve the commercial units and creche on the southern side of the development. Therefore, 16 no. spaces on the access road, between Blocks B & C, have been re-purposed from residential use to commercial / creche use. Including car parking spaces within the development creates a safer road environment for all users, as opposed to parking on Beechlawn Industrial Estate Road, which would have higher vehicle speeds. The number of car parking spaces has also been reduced on this access road, to ensure that the total number of spaces is reduced to 270 no. as requested.

Resurfacing of Beechlawn Industrial Estate Road

1. The applicant shall be required to upgrade the surface course and any drainage of the existing Beechlawn Industrial estate road along the entire southern boundary of the development.

- 5.13 As noted above, no road works are proposed on the Beechlawn Industrial Estate Road, except for the works required to facilitate the Main Vehicle Access Road to the east of the site, and the three proposed access junctions. As this is a private road, upgrading the surface course is outside the scope or control of the applicant. If the proposals impact the drainage at the access junctions, these will be repaired as necessary.

Car Parking

2. The applicant should consider the reduction in car parking numbers, particularly the proximity to high frequency bus routes. The City Edge parking regime may differ from the County Development plan and the reduction or repurpose of car parking spaces maybe warranted.

- 5.14 The Car Parking has been reduced to reflect the changes requested by SDCC. 588 no. Apartment units are proposed on site. A parking ratio of 0.43 per unit results in 253 car parking spaces. 15 no. spaces are provided for visitor / crèche and 2 no. loading bays, giving a total of 270 no. spaces.

Electric Vehicle Parking

3. The proposed development shall make provision for the charging of electric vehicles. In the case of on-surface parking, 100% of spaces must be provided with electrical connections, to allow for the provision of future charging points. In the case of surface car parking spaces and basement car parking spaces, 100% of spaces must be provided with electrical ducting and termination points to allow for the provision of future charging points, and 20% of surface car parking spaces must be provided with electric vehicle charging points initially. Details of how it is proposed to comply with these requirements including details of the design of, and signage for, the electric charging points (where they are not in areas to be taken in charge) shall be submitted to, and agreed in writing with, the planning authority prior to commencement of development. REASON: In the interest of sustainable transport.

5.15 A total of 54 EV charging spaces are shown distributed around the site, being 20% of the total number of residential spaces. Notwithstanding, all of the car parking spaces have been provided with electrical ducting to allow for the provision of future charging points and can easily be upgraded to allow conversion for Electric Vehicles. Within the under-croft parking areas, conduits will be run on the walls where charging points can also be mounted.

Cycle Parking

4. SDCC road department is happy with the cycling parking provision. All external bicycle parking spaces shall be covered.

5.16 All external bicycle parking spaces will be covered.

Mobility Management Plan

5. A Mobility Management Plan is to be completed within six months of opening of the proposed development. The Mobility Management Plan shall be agreed with the roads department and the agreed plan, along with the written agreement of the roads department shall be lodged to the planning file. The written commitment of the developer to implement the agreed plan shall also be lodged to the file.

5.17 A Preliminary Travel Plan has been provided as part of this application, here-with. The Applicant has agreed that a Final Mobility Management Plan be set in motion in 6 months of opening.

Public Lighting

6. the Public Lighting Design for the development must be agreed by the Public Lighting team of SDCC.

5.18 Agreed.

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Utility Poles

7. Any utility poles to be relocated to rear of verge. Cost of such relocation to be borne solely by the applicant.

5.19 Agreed.

Relocation of Traffic Signs

8. The relocation of the traffic signs outside of the property is to be agreed with the roads department. Cost of such relocation to be borne solely by the applicant.

5.20 Agreed.

Construction Traffic Management Plan

9. The applicant shall submit the Construction Traffic Management Plan for the written agreement of the Planning Authority.

5.21 A preliminary Construction Traffic Management Plan has been submitted with this application, in **Appendix N**.

Taking In Charge

10. All items and areas for taking in charge shall be undertaken to a taking in charge standard. Prior to development the applicant shall submit construction details of all items to be taken in charge. No development shall take place until these items have been agreed.

5.22 Agreed.

Taking In Charge Map

11. The applicant is to provide a Taking In Charge Map that distinguishes between all areas to be offered to SDCC.

5.23 A Taking in Charge Map has been provided as part of this application reference.

Road Safety Audit

12. The applicant shall submit a Stage 1 Road Safety Audit.

5.24 An independent Stage 1 Road Safety Audit of the scheme proposals, together with the associated Designer Feedback form, has been undertaken and is included as part of the application, herewith. All problems raised by the auditor were addressed and signed off by the Road Safety Auditor and are incorporated and addressed in the latest layout plans included with the application.

5.25 The development is acceptable from a traffic and pedestrian safety perspective, as confirmed in the Independent Audit which accompanies the application.

Letter of Consent

13. The works on the public road will be undertaken by the applicant as part of the overall planning permission. The area of the public road would be included with the application site with a letter of consent from the Council to accompany the application.

- 5.26 A Letter of Consent was received from SDCC and is provided as part of this application.

Footpath Improvements to the Greenhills Road

14. The public footpath shall be repaired/replaced along the northern edge of the Greenhills Road, at the western end of the development for approximately 80m. the footpath shall be made good to a taking in charge standard and at the applicant's expense.

- 5.27 The applicant will upgrade the existing footpath on the opposite side of Greenhills Road for 80m, as shown in Drawing no. NRB-TA-002.

Controlled Crossing

15. the location, design, and construction details of the controlled pedestrian crossings to be constructed by the applicant/developer and at their own expense shall be for the written agreement of the Planning Authority. The agreed plan, along with the written agreement of the roads department shall be lodged to the planning file. The written commitment of the developer to implement the agreed plan shall also be lodged to the file.

- 5.28 The design has been changed to provide a controlled Toucan Crossing on the Western site access, as shown in Drawing no. NRB-TA-002.

6.0 CONCLUSIONS

- 6.1 NRB Consulting Engineers Ltd were appointed to address the Traffic/Transportation issues associated with a planning application by Elkstone for a Large Scale Residential Development (LRD) on lands at Greenhills Road, Walkinstown, Dublin 12.
- 6.2 The TTA Report itself has been prepared in accordance with TII's Traffic and Transport Assessment Guidelines and addresses the traffic impact of the proposal. The assessment is based on comprehensive weekday AM & PM Peak classified traffic interval movement surveys of the adjacent road network. This traffic survey data, undertaken by specialist 3rd party data collection company, forms the basis for this study.
- 6.3 The proposed development is ideally located adjacent a busy Bus Corridor and with a short walk of Walkinstown. The site is well placed to take advantage of non-car modes of travel with the current and future BusConnects facilities as detailed and set out within Section 2.0 of this report.
- 6.4 This report demonstrates that the proposed Development will have an unnoticeable impact upon the established local traffic conditions and can easily be accommodated on the road network without any capacity concerns arising. The assessment also confirms that the proposed site access junction is of sufficient size and is of more than adequate capacity to accommodate the worst case traffic associated with the proposed development.
- 6.5 The assessment includes a Preliminary Mobility Management Plan for the site which is included herein as a separate report as **Appendix J**. We have prepared a Statement of Consistency with DMURS and confirm that the internal layout is compliant with the requirements, and this is included as a separate report as **Appendix K**. An independent Quality Audit, including a Stage 1 Quality & Road Safety Audit, together with the Designer Feedback form, has been undertaken and is included as a separate report as **Appendix L**. A Public Transport/Demand Study is included as **Appendix M**. A Construction Traffic Management Plan is included as **Appendix N**.
- 6.6 We believe that the proposed development layout represents good sustainable design for residential developments of the nature proposed in terms of accessibility to alternative non-car modes of travel.
- 6.7 It is considered that there are no significant Operational Transportation, Traffic Safety or Road Capacity issues that prevent a positive determination of the application by SDCC.

ⁱ <https://busconnects.ie/planning-approval-received-for-tallaght-clondalkin-to-city-centre-core-bus-corridor-scheme/>

APPENDICES - CONTENT

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A	Proposed Development – Layout & Access Arrangement
B	Traffic Survey Data Output
C	TRICS Trip Generation Output - Residential Apartments
D	Existing Traffic Network, Trip Distribution & Network Traffic Flow Diagrams
E	Predicted Future Network, Trip Distribution & Network Traffic Flow Diagrams
F	<i>PiCADY Output (Site Access Junction Operation)</i>
G	<i>PiCADY Output (Greenhill Roads / Greenhill Industrial Estate / Builders Suppliers)</i>
H	<i>PiCADY Output (Greenhill Roads / Mulcahy Keane Estate)</i>
I	<i>LiNSiG (Calmount Road / Calmount Avenue Signal Controlled Junction)</i>
J	Preliminary Mobility Management Plan (Travel Plan)
K	DMURS Statement of Consistency
L	Stage 1 Quality/Safety Audit (& Designer Feedback Form)
M	Public Transport Demand/Capacity Study
N	Construction Traffic Management Plan
O	Letter to NTA 16 th June 2023 - Proposed Access Strategy
P	Letter to NTA 08 th December 2023 - Response to the NTA's Email
Q	Letter to NTA 08 th February 2024 - Response to the NTA's Email
R	Email from the NTA 12 th February 2025 – NTA Sign Off

APPENDIX A

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**Proposed Development -
Layout & Access Arrangement**