



Environmental Impact Assessment Report

St. Vincent's Hospital Fairview

Volume 2 – EIA Report Appendices

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Prepared for: St. Vincent's Hospital Fairview

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APPENDIX 5.1

NRA CRITERIA FOR RATING THE MAGNITUDE AND SIGNIFICANCE OF IMPACTS AT EIA STAGE

Impact Ratings and Assessment Criteria (Soils, Geology and Hydrogeology)

The NRA criteria for rating the magnitude and significance of impacts at EIA stage on the geological related attributes are also relevant in determining impact assessment and area presented in Table 2 below.

Table 1 Criteria for rating site importance of Geological Features (NRA)

Importance	Criteria	Typical Example
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 high 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.

Table 2 Criteria for rating impact magnitude at EIS stage – Estimation of magnitude of impact on soil / geology attribute (NRA)

Magnitude of Impact	Criteria	Typical Examples
Large Adverse	Results in loss of attribute	Loss of high proportion of future quarry or pit reserves
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Loss of moderate proportion of future quarry or pit reserves
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Loss of small proportion of future quarry or pit reserves
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	No measurable changes in attributes
Minor Beneficial	Results in minor improvement of attribute quality	Minor enhancement of geological heritage feature
Moderate Beneficial	Results in moderate improvement of attribute quality	Moderate enhancement of geological heritage feature
Major Beneficial	Results in major improvement of attribute quality	Major enhancement of geological heritage feature

The NRA criteria for estimation of the importance of hydrogeological attributes at the site during the EIA stage are summarised below.

Table 3 Criteria for rating Site Attributes - Estimation of Importance of Hydrogeology Attributes (NRA)

Magnitude of Impact	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 well fields 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
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

Table 4 Criteria for Rating Impact Significance at EIS Stage – Estimation of Magnitude of Impact on Hydrogeology Attribute (NRA)

Magnitude of Impact	Criteria	Typical Examples
Large Adverse	Results in loss of attribute and /or quality and integrity of attribute	Removal of large proportion of aquifer. Changes to aquifer or unsaturated zone resulting in extensive change to existing water supply springs and wells, river baseflow or ecosystems. Potential high risk of pollution to groundwater from routine run-off. Calculated risk of serious pollution incident >2% annually.
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Removal of moderate proportion of aquifer. Changes to aquifer or unsaturated zone resulting in moderate change to existing water supply springs and wells, river baseflow or ecosystems. Potential medium risk of pollution to groundwater from routine run-off. Calculated risk of serious pollution incident >1% annually.
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Removal of small proportion of aquifer. Changes to aquifer or unsaturated zone resulting in minor change to water supply springs and wells, river baseflow or ecosystems. Potential low risk of pollution to groundwater from routine run-off. Calculated risk of serious pollution incident >0.5% annually.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	Calculated risk of serious pollution incident <0.5% annually.

Table 5 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

Table 6 Criteria for rating impact magnitude at EIS stage – Estimation of magnitude of impact on hydrology attributes (NRA, 2009)

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

Additional examples are provided in the NRA

Guidance Document 1 Refer to Annex 1,

Methods E and F, Annex 1 of HA216/06

1 Refer to Appendix B3 / Annex 1, Method D, Annex 1 of HA216/06

Source: 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the National Roads Authority (NRA, 2009)

Table 7 Criteria for Rating Impact Significance of Hydrological Attributes (NRA, 2009)

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

Source: 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the National Roads Authority (NRA, 2009)

APPENDIX 5.2

SELECTED EXTRACTS FROM THE GROUND INVESTIGATIONS IRELAND ST VINCENT'S FAIRVIEW OCSC GROUND INVESTIGATION REPORT APRIL 2022



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Ground Investigation Report

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DOCUMENT CONTROL SHEET

Project Title	St. Vincent's Hospital, Fairview
Engineer	OCSC
Client	Royalton Developments Ireland
Project No	10927-08-21
Document Title	Ground Investigation Report

Rev.	Status	Author(s)	Reviewed By	Approved By	Office of Origin	Issue Date
A	Interim	M Sutton	A McDonnell	A McDonnell	Dublin	20 December 2021
B	Final	M Sutton	A McDonnell	A McDonnell	Dublin	08 April 2022

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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APPENDICES

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1.0 Preamble

On the instructions of OCSC Engineers, a site investigation was carried out by Ground Investigations Ireland Ltd., between September and November 2021 at the site of the proposed hospital and residential development in St. Vincent's hospital, Fairview.

2.0 Overview

2.1. Background

It is proposed to construct a new residential development and hospital with associated services, access roads and car parking at the proposed site. The eastern part of the site is currently occupied by the existing Fairview hospital and gardens with a greenfield area on the western area of the site. The site is situated in north Dublin city to the north of Richmond Road off Convent Avenue. The proposed construction is envisaged to consist of conventional foundations or piles and pavement make up with some local excavations for services and plant. A basement is proposed as part of the proposed residential scheme which will require excavation of approximately 4m BGL and is understood to be in the northwest part of the site.

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 8 No. Trial Pits to a maximum depth of 3.7m BGL
- Carry out 3 Slit trenches to investigate the presence of existing services.
- Carry out 2 Foundation Pits to investigate existing foundations.
- Carry out 3 No. Soakaways to determine a soil infiltration value to BRE digest 365
- Carry out 22 No. Cable Percussion boreholes to a maximum depth of 10.2m BGL
- Carry out 15 No. Rotary Core follow on Boreholes to a maximum depth of 26m BGL
- Carry out 3 No. Plate Bearing Tests to determine CBR Value.
- Installation of 19 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. Trial Pits

The trial pits were excavated using a JCB 3CX excavator at the locations shown in the exploratory hole location plan in Appendix 1. The locations were checked using a CAT scan to minimise the potential for encountering services during the excavation. The trial pits were sampled, logged and photographed by a Geotechnical Engineer/Engineering Geologist prior to backfilling with arisings. Notes were made of any services, inclusions, pit stability, groundwater encountered and the characteristics of the strata encountered and are presented on the trial pit logs which are provided in Appendix 2 of this Report.

3.1. Slit Trenching

The slit trenches were excavated a JCB 3CX excavator at the locations shown in the exploratory hole location plan in Appendix 1. The locations were checked using a CAT scan to minimise the potential for encountering services during the excavation. The soil was slowly stripped using a spotter on the trench to alert the driver if any services were seen, to avoid damage to any underlying services. The slit trenches were sampled, logged and photographed by a Geotechnical Engineer/Engineering Geologist prior to backfilling with arisings. Notes were made of any services, inclusions, pit stability, groundwater encountered and the characteristics of the strata encountered and are presented on the slit trench records which are provided in Appendix 3 of this Report.

3.2. Foundation Pits

The foundation inspection pits were excavated at the locations shown in the exploratory hole location plan in Appendix 1. The exposed foundations were logged and sketched prior to backfilling and reinstatement. The logs and sketches are provided in Appendix 3 of this Report.

3.3. Soakaway Testing

The soakaway testing was carried out in selected trial pits at the locations shown in the exploratory hole location plan in Appendix 1. These pits were carefully excavated and filled with water to assess the infiltration characteristics of the proposed site. The pits were allowed to drain and the drop in water level was recorded over time as required by BRE Digest 365. The pits were logged prior to completing the

soakaway test and were backfilled with arising's upon completion. The soakaway test results are provided in Appendix 4 of this Report.

3.4. 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 5 of this Report.

3.5. Rotary Boreholes

The rotary coring was carried out by a track mounted T44 Beretta rig at the locations shown on the location plan in Appendix 1. The rotary boreholes were completed from the ground surface or alternatively, where noted on the individual borehole log, from the base of the cable percussion borehole where a temporary liner was installed to facilitate follow-on rotary coring.

The T44 Beretta is equipped with rubber tracks which allow for short travel on pavement surfaces avoiding any damage to the surface. The T44 Beretta utilises a triple tube core barrel system operated using a wireline drilling process. The outer barrel is rotated by the drill rods and at its lower end, carries the coring bit. The inner barrel is mounted on a swivel so that it does not rotate during the process. The third barrel or liner is placed within the second one to retain the core intact and to preserve as much as possible the fabric of the drilling stratum. The core is cut by the coring bit and passes to the inner liner. The core is brought up to the surface within the inner barrel on a small diameter wire rope or line attached to the "overshoot" recovery tool which is then placed into a core box in order of recovery. A drilling fluid, typically air mist or

water flush is passed from the surface through hollow drill rods to the drill bit, and is used to cool the drill bit. Temporary casing is used in some situations to support unstable ground or to seal off fissures or voids. It should be noted that the rotary coring can only achieve limited recovery in overburden, particularly granular or weakly cemented strata due to the flushing medium washing away the cohesive fraction during coring. The recovery achieved, where required is noted on the borehole logs and core photographs are provided to allow assessment of the core recovered. The rotary borehole logs are provided in Appendix 5 of this Report.

3.6. Surveying

The exploratory hole locations have been recorded using a KQ GEO Technologies KQ-M8 System which records the coordinates and elevation of the locations to ITM or Irish National Grid as required by the project specification. The coordinates and elevations are provided on the exploratory hole logs in the appendices of this Report.

3.7. Groundwater/Gas Monitoring Installations

Groundwater and or Gas Monitoring Installation were installed upon the completion of the boreholes to enable sampling and the determination of the equilibrium groundwater level. The typical groundwater monitoring installation consists of a 50mm uPVC/HDPE slotted pipe with a pea gravel response zone and bentonite seal installed to the Engineers specification. Where required the standpipe is sealed with a gas tap and finished with a durable steel cover fixed in place with a concrete surround. The installation details are provided on the exploratory hole logs in the appendices of this Report.

3.8. Insitu Plate Bearing Test

The plate bearing tests were carried out using a 450mm diameter plate at the locations shown on the site plan in Appendix 1. The plate was loaded in increments using a hydraulic jack and an excavator to provide a reaction and the displacement was monitored in accordance with BS1377 Part 9 using independently mounted digital strain gauges. The constrained modulus and equivalent CBR are calculated in accordance with HD29/75 and are provided on the test reports in Appendix 3 of this Report.

3.9. 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.

Chemical testing as required by the specification, including pH and sulphate testing was carried out by Element Materials Technology Laboratory in the UK.

Geotechnical testing consisting of moisture content, Atterberg limits, Particle Size Distribution (PSD), hydrometer, California Bearing Ratio (CBR), tests were carried out in Pro Soils Geotechnical Laboratory in the UK.

Rock strength testing including Point Load (Is_{50}) and Unconfined Compressive Strength (UCS) testing was carried out in Pro Soils Geotechnical Laboratory

The results of the laboratory testing are included in Appendix 7 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 consistent across the site and generally comprised;

- Topsoil/Surfacing
- Made Ground
- Cohesive Deposits
- Granular Deposits
- Bedrock

TOPSOIL: Topsoil was encountered in the majority of exploratory holes and was present to a maximum depth of 0.3m BGL. Tarmac surfacing was present in BH05 and BH05A typically to a depth of 0.10m BGL.

MADE GROUND: Made Ground deposits were encountered beneath the Topsoil/Surfacing in the majority of the trial pits (TP01 to TP08) and boreholes (BH01 to BH04) in the south eastern area of the site and was present to depths of between 0.6m and 1.80m BGL. Made ground deposits were also encountered in some of the boreholes in other areas of the site including BH06, BH08, BH09, BH10, BH12 and BH17 to depths of up to 3m BGL. These deposits were described generally as *brown sandy slightly gravelly CLAY with occasional cobbles and contained occasional fragments of concrete, red brick, glass, ash, ceramic and plastic.*

COHESIVE DEPOSITS: Cohesive deposits were encountered beneath the Made Ground and were described typically as *brown sandy gravelly CLAY with occasional cobbles and boulders* overlying a *stiff dark brown / grey sandy gravelly CLAY with occasional cobbles and boulders*. The secondary sand and gravel constituents varied across the site and with depth, with granular lenses occasionally present in the glacial till matrix. The strength of the cohesive deposits typically increased with depth and was firm and stiff to very stiff below 1.5m to 2m BGL in the majority of the exploratory holes. These deposits had some, occasional or frequent cobble and boulder content where noted on the exploratory hole logs.

GRANULAR DEPOSITS: The granular deposits were encountered within the cohesive deposits at some of the borehole locations and were typically described as *Grey brown clayey sandy sub rounded to sub*

angular fine to coarse GRAVEL with occasional cobbles and rare boulders. The secondary sand/gravel and silt/clay constituents varied across the site and with depth while occasional or frequent 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 or dense. It should be noted that some of the trial pits where granular deposits or groundwater were encountered, experienced instability. This was described either as side wall spalling or as side wall collapse in the remarks section at the base of the trial pit logs. Groundwater strikes were noted in some the boreholes where noted on the logs.

BEDROCK: The rotary core boreholes recovered Medium strong to very strong grey/dark grey fine to medium grained laminated LIMESTONE interbedded with weak black fine grained laminated Mudstone. This is typical of the Calp Formation, which is noted on the geological mapping to the east of the proposed site. Rare visible calcite and pyrite veins were noted during logging which are typically present within the Calp Limestone.

The depth to rock across the site varies from 15.5m BGL in BH13 to a maximum of 22.5m BGL in BH21. To the northern park of the site which has a higher ground level the rock was encountered between 19.0m in BH05A and 22.50m in BH21. On the southern part of the site the rock was encountered between 15.50 in BH13 and 16.50m in BH12. The total core recovery is good, typically 100% with some of the uppermost runs dropping to 80 or 90%. The SCR and RQD both are relatively poor in the upper weathered zone, often recovered as non-intact, however both indices show an increase with depth in each of the boreholes.

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 the majority of the boreholes to allow the equilibrium groundwater level to be determined. The groundwater monitoring is included in Appendix 8 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 18% and 47% generally with fines contents of 34 to 49%.

The Particle Size Distribution test taken on a sample from granular deposits show the material has a percentage of sands of 15%, silt/clay of 9% with a gravel content of 37% and Cobble content of 39%.

The CBR testing on remoulded samples gave results ranging between 0.4% and 4.1% for the cohesive deposits and made ground.

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. Rock Laboratory Testing

The rock testing carried out on samples recovered from the boreholes reported Unconfined Compressive Strength (UCS) values ranging between 16.3 and 49.7 MPa while the point load testing gave Is_{50} values ranging between 1.94 MPa to 8.66 MPa. The Is_{50} results correlate to the UCS values using a factor of approximately 20, giving values of 38.8 MPa and 173.2 MPa. These results correlate to the strength descriptions ranging between of Extremely Weak to Strong and confirming the variability of this stratum and the descriptions on the logs.

The results from the completed laboratory testing is included in Appendix 7 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

5.2.1. Foundations for Hospital (South eastern area of site)

An allowable bearing capacity of 300 kN/m² is recommended for conventional strip or pad foundations on the stiff cohesive deposits at a depth of 2.0m BGL for the proposed construction in the area of BH01-BH04 and TP01-TP08.

A ground bearing floor slab is recommended to be based on the firm to stiff cohesive 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 0.9m then suspended floor slabs should be considered.

5.2.2. Foundations for Residential Buildings (Western area of site)

An allowable bearing capacity of 125 kN/m² is achievable for conventional strip or pad foundations on the firm to stiff / stiff cohesive deposits generally at depths of between 1.0m and 2.70m. An allowable bearing capacity of 250 is achievable on the very stiff cohesive deposits at depths of between 2.3m and 4.0m. Due to the high loading anticipated, piled foundations may be more economically advantageous for the proposed building. 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.

Table 1 below shows the depths where an allowable bearing capacity of 125 kN/m² and 250kN/m² is achievable for conventional strip or pad foundations at each of the borehole locations in the areas where the residential development is proposed. Where the founding strata is deeper than standard depth that conventional foundations would be constructed, lean mix trench fill is recommended to achieve the recommended allowable bearing capacity.

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.

Table 1 - Allowable Bearing Capacities

Allowable Bearing Capacities (ABC) kN/m2							
Dynamic Probe	125 kN/m2 ABC	250 kN/m2 ABC	Comment	Dynamic Probe	125 kN/m2 ABC	250 kN/m2 ABC	Comment
No.	Depth m BGL	Depth m BGL		No.	Depth m BGL	Depth m BGL	
BH01	Boreholes BH01 to BH04 within Hospital Area See section 5.2.1 for foundation recommendations			BH12	3.0	3.0	
BH02				BH13	1.9	4.0	
BH03				BH14	1.0	3.0	
BH04				BH15	2.0	4.0	
BH05A	2.0	2.0		BH16	2.7	4.0	
BH06	2.5	5.5		BH17	4.0	7.0	
BH07				BH18	2.3	3.0	
BH08	2.8	2.8		BH19	1.0	3.0	
BH09	2.0	4.7		BH20	2.0	2.7	
BH10	3.0	3.0		BH21	2.8	2.8	
BH11	2.9	2.9		BH22	2.7	2.7	

A ground bearing floor slab is recommended to be based on the firm to stiff cohesive 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 0.9m 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.

5.3. External Pavements

The proposed pavements are recommended to be designed in accordance with the CBR test results included in the Appendices of this Report. The low CBR test results indicate that a capping layer or a sufficient depth of crushed stone fill may be required. Plate bearing tests are recommended at the time of construction to verify the design assumptions for the proposed pavement make up and to verify adequate compaction has been achieved.

The use of a geogrid and separation membrane may improve the performance of the proposed pavement and enable a more economical pavement design to be achieved, a specialist supplier is recommended to advise of the required strength, depth and type of geotextile for the proposed design.

5.4. 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.

The groundwater and stability noted on the trial pit logs and borehole logs should be consulted when determining the most appropriate construction methods for excavations.

The water level recorded in the boreholes was above the presumed basement level however generally Cohesive deposits were encountered at the proposed location of the basement so it is expected that water inflow will be limited. It should be noted that granular deposits were encountered in areas on the site and generally, where significant excavations are required in water bearing granular deposits a cut-off wall may be more cost effective than extensive dewatering. An assessment by a specialist dewatering contractor is recommended to determine the most cost effective approach to the proposed excavation.

Excavations in the upper cohesive and weathered rock deposits are expected to be excavatable with conventional excavation equipment.

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

5.5. Soakaway Design

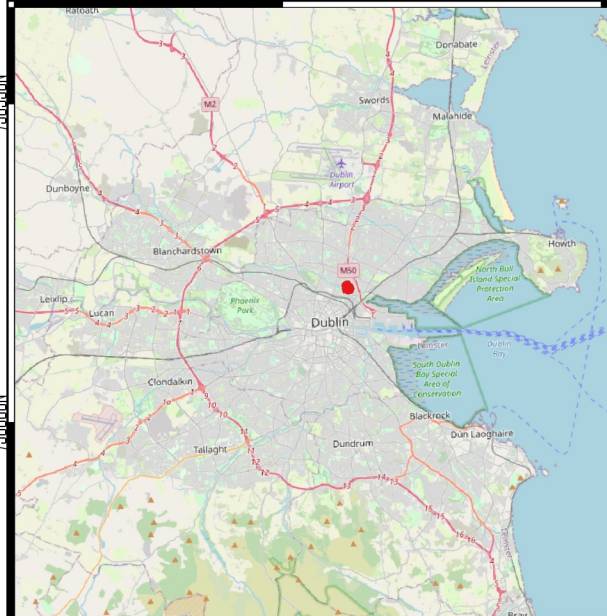
Infiltration rates of $f=9.981 \times 10^{-5}$ m/s, 4.83×10^{-5} m/s and $f=3.71 \times 10^{-5}$ m/s respectively were calculated for the soakaway locations SA01, SA02 and SA03. It should be noted that groundwater was encountered in the soakaway pits and excavation was stopped at this depth to undertake soakaway test. Depth that ground water was encountered in the pit should be considered when determining the design of soakaway areas.

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.

APPENDIX 1 - Site Location Plan



www.gii.ie



- Site Location
- Indicative Site Boundary

Client:



Project Code:

10927-08-21

Project Title:

St Vincents Fairview

Drawing Title:

Figure 1 Site Location



Geotechnical & Environmental

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

0 30 60 90 120 150 m

Drawn By:
Tmcl

Date:
16/11/2021

736800N
736650N
736500N


716700E 716850E 717000E



Legend

- Indicative Site Boundary
- CBR Tests
- Trial Pits
- Soakaways
- Boreholes
- Slit Trenches
- Foundation Pits


Client:



Project Code:
10927-08-21

Project Title:
St. Vincents Fairview

Drawing Title:
SI Locations



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

0 20 40 60 80 m

Drawn By:
Tmcl

Date:
18.11.2021

APPENDIX 2 – Trial Pit Records


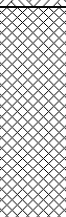













Ground Investigations Ireland Ltd

www.gii.ie

Site St. Vincent's Fairview		Trial Pit Number TP01
Machine : JCB 3CX Method : Trial Pit		Job Number 10927-08-21
Dimensions 2.60 x 0.40 x 3.10		Ground Level (mOD) 5.34
Location 736477.3 E 716878.2 N		Dates 14/09/2021
Client OCSC		Engineer OCSC
		Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B			5.14	(0.20)	Brown slightly sandy slightly gravelly TOPSOIL with rootlets.		
					0.20	MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional subangular to subrounded cobbles ceramic and red brick fragments.		
1.50	B			4.44	(0.70)			
					0.90	Greyish brown sandy clayey angular to subrounded fine to coarse GRAVEL with some angular to subrounded cobbles and occasional boulders.		
					(2.20)			
								
								
								
								
								
								
								
				2.24	3.10	Complete at 3.10m		



**Trial Pit
Number**
TP02

Job Number
10927-08-21

Sheet
1/1

10927-08-21.TP02



Ground Investigations Ireland Ltd

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Site
St. Vincent's Fairview

Trial Pit Number
TP03

Machine : JCB 3CX
Method : Trial Pit

Dimensions
2.90 x 0.50 x 3.50

Ground Level (mOD)
7.16

Client

Job Number
10927-08-21

Location
736544.5 E 716891 N

Dates
14/09/2021

Engineer
OCSC

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B			6.96	(0.20) 0.20	Brown slightly sandy slightly gravelly TOPSOIL with rootlets.		
						MADE GROUND: Brown slightly gravelly silty Clay with ooc. subangular to subrounded cobbles glass metal rubbish and ceramic fragments.		
					(1.55)			
				5.41	1.75	Firm light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.		
2.00	B				(1.35)			
				4.06	3.10	Greyish brown sandy clayey subangular to subrounded fine to coarse GRAVEL with occasional subangular to subrounded cobbles.		
					(0.40)			
				3.66	3.50	Complete at 3.50m		

Plan

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Remarks

No groundwater encountered during excavation.
Trial pit stable.
Trial pit backfilled upon completion.

Scale (approx)

1:25

Logged By

C. Byrne

Figure No.

10927-08-21.TP03



Ground Investigations Ireland Ltd

www.gii.ie

Site
St. Vincent's Fairview

Trial Pit Number
TP04

Machine : JCB 3CX		Dimensions 2.30 x 0.50 x 3.10		Ground Level (mOD) 5.22		Client		Job Number 10927-08-21	
Method : Trial Pit		Location 736508.4 E 716870 N		Dates 14/09/2021		Engineer OCSC		Sheet 1/1	

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B			4.92	0.30	Dark brown slightly sandy slightly gravelly TOPSOIL with rootlets.		
					(0.30)			
					0.30	Light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.		
					(0.90)			
					1.20	Greyish brown sandy clayey angular to subrounded fine to coarse GRAVEL with occasional angular to subrounded cobbles.		
					(1.90)			
					1.90	Gravel becoming wet from 2.00m BGL.		
					2.12			
					3.10	Complete at 3.10m		
2.50	B		Water strike(1) at 3.00m.					

Plan					Remarks			
.	Groundwater encountered at 3.00m BGL.			
.	Slight spalling of trial pit walls.			
.	Trial pit backfilled upon completion.			
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					Scale (approx)		Logged By	Figure No.
					1:25		C. Byrne	10927-08-21.TP04



Site	St. Vincent's Fairview
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**Trial Pit
Number**
TP05

Machine : JCB 3CX
Method : Trial Pit

Dimensions
2.30 x 0.50 x 3.70

Ground Level (mOD)	5.65
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Client	
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Job Number	10927-08-21
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Location	736527.1 E 716910.8 N
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Dates	14/09/2021
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Engineer
OCSC

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water					
0.80	B			5.45	(0.20)	Dark brown slightly sandy slightly gravelly TOPSOIL with rootlets.							
					0.20	MADE GROUND: Grey sandy subangular to subrounded fine to coarse Gravel.							
					(0.20)								
2.00	B			4.45	0.40	MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional cobbles concrete and red brick fragments.							
					(0.80)								
					1.20								
						(2.50)	Gravel becoming wet from 2.70m BGL.						
1.95	3.70	Complete at 3.70m											

Plan

Remarks

Groundwater encountered at 3.50m BGL.
Slight spalling of trial pit walls.
Trial pit backfilled upon completion.

Scale (approx)

1:25

Logged By

C. Byrne

Figure No.

10927-08-21.TP05



Site	St. Vincent's Fairview
-------------	------------------------

**Trial Pit
Number**
TP06

Machine : JCB 3CX
Method : Trial Pit

Dimensions
2.40 x 0.50 x 3.40

Ground Level (mOD)	5.40
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Client	
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Job Number	10927-08-21
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Location
736516.3 E 716938.4 N

Dates	14/09/2021
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Engineer
OCSC

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Dark brown slightly sandy slightly gravelly TOPSOIL with rootlets.		
				5.20	0.20			
				5.05	(0.15)	MADE GROUND: Grey sandy subangular to subrounded fine to coarse Gravel.		
					0.35			
					(0.75)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional cobbles plastic and red brick fragments.		
				4.30	1.10	Greyish brown sandy clayey subangular to subrounded fine to coarse GRAVEL with occasional subangular to subrounded cobbles.		
					(2.30)			
						Gravel becoming wet from 2.80m BGL.		
			Water strike(1) at 3.10m.					Σ1
				2.00	3.40	Complete at 3.40m		

Plan

Remarks

Groundwater encountered at 3.10m BGL.
Slight spalling of trial pit walls.
Trial pit backfilled upon completion.

Scale (approx)

1:25

Logged By

C. Byrne

Figure No.












10927-08-21.TP06



Ground Investigations Ireland Ltd

www.gii.ie

Site St. Vincent's Fairview	Trial Pit Number TP07
Client OCSC	Job Number 10927-08-21
Engineer OCSC	Sheet 1/1

Machine : JCB 3CX Method : Trial Pit		Dimensions 2.30 x 0.50 x 3.20		Ground Level (mOD) 5.18		Client		Job Number 10927-08-21	
		Location 736489.3 E 716930.3 N		Dates 14/09/2021		Engineer OCSC		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend	Water
1.20	B			4.88	0.30	Dark brown slightly sandy slightly gravelly TOPSOIL with rootlets.			
					0.30	MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional cobbles plastic and red brick fragments.			
					0.60				
					0.90	Greyish brown sandy clayey subangular to subrounded fine to coarse GRAVEL with occasional subangular to subrounded cobbles.			
3.20	B		Water strike(1) at 3.00m.	1.98	(2.30)				Σ1
									
									
									
									
									
						Gravel becoming wet from 2.70m BGL.			
									
					3.20	Complete at 3.20m			

Plan					Remarks			
.	Groundwater encountered at 3.00m BGL. Slight spalling of trial pit walls. Trial pit backfilled upon completion.			
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					Scale (approx)	Logged By	Figure No.	
					1:25	C. Byrne	10927-08-21.TP07	



Ground Investigations Ireland Ltd

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Site
St. Vincent's Fairview

Trial Pit Number
TP08

Machine : JCB 3CX Method : Trial Pit		Dimensions 2.50 x 0.50 x 3.20	Ground Level (mOD) 5.15	Client	Job Number 10927-08-21
		Location 736471.8 E 716917.1 N	Dates 14/09/2021	Engineer OCSC	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						Dark brown slightly sandy slightly gravelly TOPSOIL with rootlets.		
						MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional cobbles ceramic and red brick fragments.		
						Greyish brown sandy clayey subangular to subrounded fine to coarse GRAVEL with occasional subangular to subrounded cobbles.		
						Gravel becoming wet from 2.60m BGL.		
			Water strike(1) at 3.00m.			Complete at 3.20m		∇1

Plan					Remarks		
.	Groundwater encountered at 3.00m BGL. Slight spalling of trial pit walls. Trial pit backfilled upon completion.		
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					Scale (approx)	Logged By	Figure No.
					1:25	C. Byrne	10927-08-21.TP08

APPENDIX 5 - Borehole Records





Ground Investigations Ireland Ltd

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Site St. Vincent's Fairview	Borehole Number BH01
Machine : Dando 2000 Method : Cable Percussion	Job Number 10927-08-21
Casing Diameter 200mm cased to 10.20m	Sheet 1/2
Ground Level (mOD) 4.57	
Location 716749.6 E 736508.2 N	
Dates 13/09/2021	
Client OCSC	
Engineer OCSC	

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
1.00-1.45	SPT(C) N=17			4,4/5,4,4,4	4.17	(0.40) 0.40	Brown slightly sandy slightly gravelly TOPSOIL with rootlets.			
1.50	B				3.57	(0.60) 1.00	MADE GROUND: Grey slightly sandy angular fine to coarse Gravel with some angular cobbles (crushed rock fill).			
2.00-2.45	SPT(C) N=41			4,5/5,7,13,16	2.77	(0.80) 1.80	MADE GROUND: Brown sandy slightly gravelly Clay with occasional subangular to subrounded cobbles and red brick fragments.			
2.40	B				2.27	(0.50) 2.30	Stiff brown sandy slightly gravelly CLAY.			
3.00-3.28	SPT(C) 50/125			13,17/20,30		(1.10)	Very stiff brown/grey sandy slightly gravelly CLAY.			
3.70	B			Water strike(1) at 3.40m, rose to 3.37m in 20 mins.	1.17	3.40 (0.20) 3.60	Very stiff greyish brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.			
4.00-4.45	SPT(C) N=47			3,8/12,12,12,11	0.97		Very stiff dark grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.			
4.40	B									
5.00-5.45	SPT(C) N=44			4,6/10,11,13,10						
5.40	B									
6.50-6.86	SPT(C) 50/210			8,11/14,16,20		(6.60)				
6.50	B									
7.50	B									
8.00-8.31	SPT(C) 50/160			10,13/18,22,10						
8.50	B									
9.50-9.80	SPT(C) 50/150			Water strike(2) at 9.12/20,24.6						
9.50	B			9.70m, rose to 9.60m in 20 mins.						

Remarks Groundwater encountered at 3.40m and 9.70m BGL. Borehole complete at 10.20m BGL. Slotted standpipe with gravel filter zone installed from 10.20m to 2.00m BGL with plain pipe and bentonite seal from 2.00m BGL to GL. Finished with a raised cover. Chiselling from 2.60m for 0.5 hours. Chiselling from 3.30m for 1 hour. Chiselling from 6.70m for 0.5 hours. Chiselling from 8.90m for 0.5 hours.	Scale (approx) 1:50	Logged By C. Byrne
Figure No. 10927-08-21.BH01		



Site	St. Vincent's Fairview
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**Borehole
Number
BH01**

Machine : Dando 2000
Method : Cable Percussion

Casing Diameter	200mm cased to 10.20m
------------------------	-----------------------

Ground Level (mOD)
4.57

Client	
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Job Number 10927-08-21

Location
716749.6 E 736508.2 N

Dates	13/09/2021
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Engineer
OCSC

Sheet
2/2

Remarks	Scale (approx)	Logged By
	1:50	C. Byrne
	Figure No. 10927-08-21.BH01	



Ground Investigations Ireland Ltd

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Site
St. Vincent's Fairview

Borehole Number
BH02

Machine : Dando 2000 Method : Cable Percussion	Casing Diameter 200mm cased to 1.60m	Ground Level (mOD) 5.77	Client	Job Number 10927-08-21
	Location 716947.6 E 736441.3 N	Dates 14/09/2021- 15/09/2021	Engineer OCSC	Sheet 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B				5.57	(0.20)	Brown slightly sandy slightly gravelly TOPOSIL with rootlets.		
						0.20			
					5.27	(0.30)	MADE GROUND: Light brown slightly sandy slightly gravelly Clay.		
						0.50			
						(0.50)	Grey sandy gravelly CLAY with occasional subangular to subrounded cobbles and boulders.		
1.00-1.00	SPT(C) 25*/0 50/0			25/50	4.77	1.00	Dense greyish brown sandy clayey angular to subrounded fine to coarse GRAVEL with occasional subangular to subrounded cobbles and boulders.		
						(0.60)			
1.60-1.60	SPT(C) 25*/0 50/0			25/50	4.17	1.60	Obstruction: Boulders.		
							Refusal at 1.60m		

Remarks No groundwater encountered during drilling. Borehole complete at 1.60m BGL. Borehole refused at 1.60m due to obstruction. Chiselling from 1.00m for 1 hour. Chiselling from 1.60m for 1 hour.	Scale (approx) 1:50	Logged By C. Byrne
	Figure No. 10927-08-21.BH02	



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Site
St. Vincent's Fairview

Borehole
Number
BH02A

Machine : Dando 2000		Casing Diameter 200mm cased to 7.50m		Ground Level (mOD) 5.12		Client		Job Number 10927-08-21	
Method : Cable Percussion		Location 736444.2 E 716909 N		Dates 20/09/2021		Engineer OCSC		Sheet 1/1	

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						(0.30)	Dark brown slightly sandy slightly gravelly TOPSOIL with rootlets.			
					4.82	0.30				
					4.52	(0.30)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional subangular to subrounded cobbles ceramic and red brick fragments.			
						0.60				
						(1.40)	Greyish brown sandy clayey angular to subrounded fine to coarse GRAVEL with some angular to subrounded cobbles and occasional boulders.			
					3.12	2.00				
						(1.00)	Brownish grey very sandy slightly clayey subangular to subrounded fine to coarse GRAVEL with occasional subangular to subrounded cobbles.			
2.80	B									
3.00-3.45	SPT(C) N=47			4,9/12,12,11,12	2.12	3.00				
3.20	B						Very stiff dark grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.			
3.50	B					(1.30)				
4.00-4.38	SPT(C) 50/225			8,11/12,16,18,4						
					0.82	4.30				
4.50	B						Dense dark grey sandy angular to subrounded fine to coarse GRAVEL with occasional angular to subrounded cobbles.			
5.00-5.45	SPT(C) 50/295			7,10/13,14,12,11		(1.80)				
5.50	B									
6.00-6.45	SPT(C) N=46			9,11/9,10,13,14	-0.98	6.10				
6.30	B					(1.40)	Dense dark grey sandy angular to subrounded fine to coarse GRAVEL with occasional angular to subrounded cobbles and pockets of clay.			
7.00-7.26	SPT(C) 50/110			10,13/25,25						
					-2.38	7.50				
							Obstruction: Boulder.			
							Refusal at 7.50m			

Remarks

Borehole drilled through TP02.
Groundwater encountered at 3.30m and 4.30m BGL.
Borehole complete at 7.50m BGL.
Slotted standpipe with gravel filter zone installed from 7.40m to 2.00m BGL with plain pipe and bentonite seal from 2.00m BGL to GL. Finished with a raised cover.
Chiselling from 1.40m for 0.5 hours. Chiselling from 2.50m for 0.75 hours. Chiselling from 5.60m for 0.75 hours. Chiselling from 6.20m for 0.5 hours. Chiselling from 6.90m for 1 hour. Chiselling from 7.50m for 1 hour.

Scale (approx)

1:50

Logged By

C. Byrne

Figure No.

10927-08-21.BH02A



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Site
St. Vincent's Fairview

Borehole
Number
BH03

Machine : Dando 2000 Method : Cable Percussion	Casing Diameter 200mm cased to 5.30m	Ground Level (mOD) 5.74	Client	Job Number 10927-08-21
	Location 716880.7 E 736547.3 N	Dates 15/09/2021	Engineer OCSC	Sheet 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
1.00-1.45 1.00	SPT(C) N=49 B			9,13/18,9,11,11	5.64 5.44	0.10 (0.20) 0.30	Brown slightly sandy slightly gravelly TOPSOIL with rootlets.			
							MADE GROUND: Brown gravelly fine Sand.			
						(0.70)	MADE GROUND: Light brown sandy slightly gravelly Clay with red brick fragments.			
2.00-2.45 2.00	SPT(C) N=49 B			8,8/10,13,12,14	4.74	1.00	Very stiff brown sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.			
						(1.60)				
3.00-3.23 3.00	SPT(C) 50/75 B			14,17/20,30	3.14	2.60	Dense brown slightly gravelly fine to coarse SAND with occasional subangular to subrounded cobbles and boulders.			
						(1.60)				
4.00-4.45 4.20	SPT(C) N=45 B			10,12/10,12,11,12 Water strike(1) at 4.20m, rose to 4.00m in 20 mins.	1.54	4.20	Very stiff dark grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles and boulders.		▼1 ▽1	
						(1.10)				
5.00-5.30	SPT(C) 50/150			13,14/16,20,14	0.44	5.30	Obstruction: Boulders.			
							Complete at 5.30m			

Remarks

Groundwater encountered at 4.20m BGL.
Borehole complete at 5.30m BGL.
Slotted standpipe with gravel filter zone installed from 1.50m to 0.50m BGL with plain pipe and bentonite seal from 0.50m BGL to GL. Finished with a raised cover.
Chiselling from 2.70m for 1 hour. Chiselling from 3.50m for 0.75 hours. Chiselling from 4.10m for 1 hour.

Scale
(approx)
1:50

Logged
By
C. Byrne

Figure No.
10927-08-21.BH03



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Site
St. Vincent's Fairview

Borehole
Number
BH04

Machine : Dando 2000 Method : Cable Percussion	Casing Diameter 200mm cased to 7.00m	Ground Level (mOD) 4.57	Client	Job Number 10927-08-21
	Location 716857.5 E 736497.9 N	Dates 16/09/2021- 17/09/2021	Engineer OCSC	Sheet 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
1.00-1.23 1.00	SPT(C) 50/75 B			15,17/20,30	4.27	(0.30) 0.30	TOPSOIL			
2.00-2.15 2.00	SPT(C) 50/0 B			10,25/50		(2.50)	Very stiff brown slightly sandy slightly gravelly CLAY with fine to coarse subrounded to subangular gravel and subangular cobbles.			
3.00-3.25 3.00	SPT(C) 50/95 B			8,20/30,20	1.77	2.80	Very stiff dark brown slightly sandy slightly gravelly CLAY with fine to coarse subrounded to subangular gravels.			
4.00-4.30 4.00	SPT(C) 50/150 B			7,10/17,23,10 Water strike(1) at 4.30m, fell to 4.50m in 20 mins.		(4.20)			▽1 ▼1	
5.00-5.30 5.00	SPT(C) 50/150 B			8,10/13,19,18						
6.00	B									
6.50-6.80	SPT(C) 50/150			10,12/18,22,10	-2.43	7.00	Complete at 7.00m			

Remarks
Groundwater encountered at 4.30m BGL.
Borehole complete at 7.00m BGL.
Slotted standpipe with gravel filter zone installed from 7.00m to 2.00m BGL with plain pipe and bentonite seal from 2.00m BGL to GL. Finished with a raised cover.
Chiselling from 1.70m for 1 hour. Chiselling from 2.30m for 1 hour. Chiselling from 2.70m for 1 hour. Chiselling from 4.40m for 1 hour. Chiselling from 5.70m for 0.75 hours. Chiselling from 7.00m for 1 hour.

Scale (approx)
1:50

Logged By
C. Byrne

Figure No.
10927-08-21.BH04



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Site
St. Vincent's Fairview

Borehole
Number
BH05

Machine : Dando 150 Method : Cable Percussion	Casing Diameter 200mm cased to 0.90m	Ground Level (mOD) 9.40	Client	Job Number 10927-08-21
	Location 716981.1 E 736578.8 N	Dates 12/10/2021- 13/11/2021	Engineer OCSC	Sheet 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B				9.30 8.90	0.10 (0.40) 0.50	MADE GROUND: Tarmacadam MADE GROUND: brown slightly sandy gravelly clay with occasional grass rootlets and fine to coarse round to subangular gravel. Complete at 0.90m		

Remarks

No groundwater encountered during drilling.
Borehole refusal at 0.90m BGL due to obstruction, possible concrete.
Borehole backfilled upon completion.
Chiselling from 0.90m to 0.90m for 0.01 hours.

Scale (approx)
1:50

Logged By

Figure No.
10927-08-21.BH06



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Site
St. Vincent's Fairview

Borehole Number
BH05A

Machine : Beretta T44 Flush : Water Core Dia : 63.5 mm Method : Rotary Core	Casing Diameter 96mm cased to 21.50m	Ground Level (mOD)	Client	Job Number 10927-08-21
	Location	Dates 01/11/2021	Engineer OCSC	Sheet 1/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00							(0.20) 0.20	TARMACADOM			
	10						(1.80)	Poor recovery. Recovery consists of MADE GROUND. Firm slightly gravelly sandy Clay with tarmac and occasioanal subangular cobble. Gravel is angular to subangular fine to medium.			
2.00 2.00-2.45	27				5,4/5,5,9,14 SPT N=33		2.00	Very stiff grey gravelly slightly sandy CLAY. Gravel is subangular to subrounded fine to coarse.			
3.50 3.50-3.95	23				4,4/6,6,8,12 SPT N=32		(4.50)				
5.00 5.00-5.23	23				10,14/14,36 SPT 50/75						
6.50 6.50-6.58	87				18,7/50 SPT 25*/75 50/0		6.50	Very stiff grey slightly gravelly slightly sandy CLAY. Gravel is subangular to subrounded fine to coarse.			
8.00 8.00-8.00	47				25/50 SPT 25*/0 50/0		(3.00)				
9.50 9.50-9.58					25/50 SPT 25*/75 50/0		9.50	Poor recovery. Recovery consist of dense grey subangular medium to coarse GRAVELS with cobbles. (Dense) [Driller's notes: grey sands and gravels].			

Remarks No groundwater encountered during drilling Rotary core drilling complete from GL to 21.50m BGL. Slotted standpipe installed from 21.50m to 13.50m BGL with plain pipe from 13.50m BGL to GL finished with a flush cover. Gravel filter zone from 21.50m to 13.50m BGL with bentonite sealed from 13.50m BGL to GL. Finished with a flush cover.	Scale (approx) 1:50	Logged By RM
	Figure No. 10927-08-21.BH05A	



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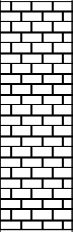
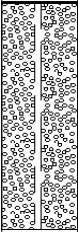
Site
St. Vincent's Fairview

Borehole Number
BH05A

Machine : Beretta T44 Flush : Water Core Dia: 63.5 mm Method : Rotary Core			Casing Diameter 96mm cased to 21.50m			Ground Level (mOD)		Client			Job Number 10927-08-21
			Location			Dates 01/11/2021		Engineer OCSC			Sheet 2/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.00 11.00-11.15	7				11,18/50 SPT 50/0		(2.50)				
12.50 12.50-12.58	41				21,4/50 SPT 25*/75 50/0		12.00 (2.00)	Very stiff slightly sandy slightly gravelly CLAY with occasional subangular cobbles. Gravel is subangular to subrounded fine to coarse.			
14.00 14.00-14.08	10				18,7/50 SPT 25*/75 50/0		14.00 (1.50)	Poor recovery. Recovery consists of subangular coarse GRAVEL. (Dense) [Driller's notes: brown slightly sandy slightly gravelly clay].			
15.50 15.50-15.58	50				22,3/50 SPT 25*/75 50/0		15.50	Very stiff grey slightly sandy gravelly CLAY. Gravel is subangular to subrounded medium to coarse.			
17.00 17.00-17.00	50				25/50 SPT 25*/0 50/0		(3.50)				
18.50 18.50-18.65	60	33	9	41	18,18/50 SPT 50/0		19.00	Medium strong to strong dark grey LIMESTONE interbedded with weak grey MUDSTONE. Partially to distinctly weathered.			
20.00								1 set of fractures. F1 0-20 degrees extremely closely to medium spaced undulating rough with occasional clay smearing.			

Remarks									Scale (approx)		Logged By
									1:50		
									Figure No. 10927-08-21.BH05A		

 Ground Investigations Ireland Ltd www.gii.ie							Site St. Vincent's Fairview			Borehole Number BH05A	
Machine : Beretta T44 Flush : Water Core Dia: 63.5 mm Method : Rotary Core			Casing Diameter 96mm cased to 21.50m		Ground Level (mOD)		Client		Job Number 10927-08-21		
			Location		Dates 01/11/2021		Engineer OCSC		Sheet 3/3		
Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
21.50	92	80	47	25			(2.50)				
							21.50	Complete at 21.50m			
Remarks									Scale (approx)	Logged By	
									1:50	RM	
									Figure No. 10927-08-21.BH05A		



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Site
St. Vincent's Fairview

Borehole Number
BH06

Machine : Dando 150 + Beretta T44	Casing Diameter 200mm cased to 5.10m 96mm cased to 12.50m	Ground Level (mOD) 8.75	Client	Job Number 10927-08-21
Method : Cable Percussion with rotary core follow on				
	Location 716986.4 E 736630.9 N	Dates 12/10/2021- 13/11/2021	Engineer OCSC	Sheet 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.50	B				8.25	(0.50) 0.50	MADE GROUND: Brown sightly sandy slightly gravelly Clay with grass, red brick, ceramic, ash, plaster and few very small pieces of glass.			
1.00-1.45 1.00	SPT(C) N=6 B			1,1/1,1,2,2		(2.00)	MADE GROUND: Dark brown slightly sandy slightly gravelly Clay with occasional rootlets and ash. Gravel is subangular to subrounded fine to coarse.			
2.00-2.45 2.00	SPT(C) N=8 B			1,2/2,2,2,2						
3.00-3.45 3.00	SPT(C) N=14 B			2,2/3,3,4,4	6.25	2.50	Firm to stiff brown slightly gravelly sandy CLAY. Gravel is angular to subrounded fine to coarse.			
4.00-4.45 4.00	SPT(C) N=14 B			3,3/3,4,4,3		(3.00)				
5.00 5.00-5.00	B SPT 25*/0 50/0			25/50						
5.50	TCR	SCR	RQD	FI	3.25	5.50	Very stiff brown slightly sandy slightly gravelly CLAY with occasional cobbles. Gravel is subangular to subrounded fine to coarse.			
6.50-6.65 6.50	82			11,13/50 SPT 50/0		(2.50)				
8.00-8.15 8.00	39			12,13/50 SPT 50/0	0.75	8.00	Very stiff brown slightly sandy slightly gravelly CLAY with occasional cobbles. Gravel is subangular to subrounded fine to coarse.			
9.50-9.58 9.50	58			18,7/50 SPT 25*/75 50/0	-0.75	9.50	Poor recovery. Recovery consists of: Brown slightly gravelly SAND. Gravel is subangular fine to coarse. [Driller notes sandy gravelly Clay]			

Remarks

No groundwater encountered during drilling.
Cable percussion drilling complete at 5.10m with Rotary follow on complete at 12.50m.
Slotted standpipe installed from 12.50m to 9.50m BGL with plain pipe from BGL to GL. Gravel filter zone 12.50 to 9.50m BGL with bentonite sealed from 9.50m BGL to GL. Finished with a flush cover.
Chiselling from 5.00m to 5.10m for 1 hour.

Scale (approx)
1:50

Logged By
RM

Figure No.
10927-08-21.BH06



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Site
St. Vincent's Fairview

Borehole
Number
BH06

Machine : Dando 150 + Beretta T44
Flush : water
Core Dia: 63.5 mm
Method : Cable Percussion with rotary core follow on

Casing Diameter
200mm cased to 5.10m
96mm cased to 12.50m

Ground Level (mOD)
8.75

Client

Job Number
10927-08-21

Location
716986.4 E 736630.9 N

Dates
12/10/2021-
13/11/2021

Engineer
OCSC

Sheet
2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.00	30						(1.50)				
						-2.25	11.00	Poor recovery. Recovery consists of: grey slightly sandy slightly gravelly CLAY with occasional subangular cobbles. Gravel is subangular to subrounded fine to coarse.			
	27						(1.50)				
12.50						-3.75	12.50	Complete at 12.50m			

Remarks

Scale (approx)
1:50

Logged By
RM

Figure No.
10927-08-21.BH06



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Site
St. Vincent's Fairview

Borehole
Number
BH07

Machine : Berretta T44	Casing Diameter 96mm to 14.00m	Ground Level (mOD) 9.67	Client	Job Number 10927-08-21
Flush : water	Location 716906.4 E 736644.1 N	Dates 01/10/2021- 01/11/2021	Engineer OCSC	Sheet 1/2
Core Dia: mm				
Method : Rotary Cored				

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
1.20							(1.20)	Hand pit dug to 1.20m.			
2.00	31				3,4/4,6,7,11 SPT N=28	8.47	1.20	Firm to stiff light brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subangular to subrounded.			
2.00-2.45							(2.30)				
3.50	27				4,4/7,11,12,12 SPT N=42	6.17	3.50	Very stiff grey slightly sandy slightly gravelly CLAY with occasional cobbles. Gravel is fine to coarse angular to subangular.			
3.50-3.95											
5.00	72				8,13/19,31 SPT 50/150						
5.00-5.30							(4.50)				
6.50	43				8,8/14,36 SPT 50/150						
6.50-6.80											
8.00	90				10,15/50 SPT 25*/75 50/0	1.67	8.00	Poor recovery: Recovery consists of dense fine to coarse angular to subangular GRAVEL and occasional subangular cobbles. (Dense) [Driller notes gravelly clay with sand bands]			
8.00-8.08											
9.50	13				12,17/50 SPT 50/0		(3.00)				
9.50-9.65											

Remarks No groundwater encountered during drilling. Borehole complete at 14.00m BGL.									Scale (approx) 1:50	Logged By RM
									Figure No. 10927-08-21.BH07	



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Site
St. Vincent's Fairview

Borehole
Number
BH07

Machine : Berretta T44		Casing Diameter 96mm to 14.00m		Ground Level (mOD) 9.67	Client	Job Number 10927-08-21
Flush : water		Location 716906.4 E 736644.1 N		Dates 01/10/2021- 01/11/2021	Engineer OCSC	Sheet 2/2
Core Dia: mm						
Method : Rotary Cored						

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.00	30										
11.00-11.08					15,10/50 SPT 25*/75 50/0	-1.33	11.00	Very stiff brown slightly sandy slightly gravelly CLAY with occasional cobbles. Gravel is subangular fine to coarse.			
	38						(1.50)				
12.50					9,17/50 SPT 50/0	-2.83	12.50	Poor recovery: Recovery consists of subangular to subrounded fine to coarse GRAVEL. [Driller notes sandy gravelly Clay]			
12.50-12.65							(1.50)				
	10										
14.00						-4.33	14.00	Complete at 14.00m			

Remarks	Scale (approx)	Logged By
	1:50	RM
	Figure No. 10927-08-21.BH07	



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Site
St. Vincent's Fairview

Borehole Number
BH08

Machine : Dando 150		Casing Diameter 200mm cased to 5.70m		Ground Level (mOD) 4.93	Client	Job Number 10927-08-21
Method : Cable Percussion		Location 716762.4 E 736520.4 N		Dates 01/11/2021	Engineer OCSC	Sheet 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B						MADE GROUND: brown slightly sandy slightly gravelly Clay with occasional rootlets and red brick.		
1.00-1.45 1.00	SPT N=6 B			1,2/2,1,1,2		(2.80)			
2.00-2.45 2.00	SPT N=7 B			2,3/2,1,2,2					
3.00-3.45 3.00	SPT N=48 B			4,6/7,10,15,16	2.13	2.80 (1.20)	Very stiff dark brown slightly clayey slightly sandy CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to medium.		
4.00-4.45 4.00	SPT N=50 B			6,8/9,12,15,14	0.93	4.00 (1.70)	Very stiff dark brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium.		
5.00-5.38 5.00	SPT 50/225 B			8,11/15,19,16	-0.77	5.70	Complete at 5.70m		

Remarks No groundwater encountered during cable percussion drilling Cable percussion drilling complete at 5.70m. Chiselling from 5.70m to 5.70m for 1.0 hour.								Scale (approx) 1:50	Logged By RM
								Figure No. 10927-08-21.BH08	



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Site
St. Vincent's Fairview

Borehole Number
BH09

Machine : Dando 150	Casing Diameter 200mm cased to 5.50m	Ground Level (mOD) 5.77	Client	Job Number 10927-08-21
Method : Cable Percussion	Location 716787.9 E 736578.6 N	Dates 01/11/2021	Engineer OCSC	Sheet 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B					(0.80)	MADE GROUND. Brown slightly sandy slightly gravelly Clay with grass and subangular to subrounded fine to coarse gravel and occasional subangular cobbles.		
1.00-1.45 1.00	SPT N=13 B			2,3/3,3,3,4	4.97	0.80 (1.20)	Firm to stiff light brown slightly sandy slightly gravelly CLAY with occasional rootlets. Gravel is subangular to subrounded fine to coarse.		
2.00-2.45 2.00	SPT N=17 B			2,3/4,4,5,4	3.77	2.00	Stiff light brown slightly sandy slightly gravelly CLAY with occasional rootlets. Gravel is subangular to subrounded fine to coarse.		
3.00-3.45 3.00	SPT N=16 B			3,3/4,4,4,4		(2.70)			
4.00-4.45 4.00	SPT N=21 B			3,4/5,5,5,6					▼1
5.00-5.38 5.00	SPT 50/225 B			Water strike(1) at 4.50m, rose to 4.00m in 20 mins. 6,9/12,17,21	1.07	4.70 (0.80)	Very stiff dark brown slightly sandy gravelly CLAY with subrounded cobbles. Gravel is angular to subrounded fine to coarse.		▼1
					0.27	5.50	Complete at 5.50m		

Remarks Groundwater encountered 4.5m BGL during drilling. Cable percussion drilling complete at 5.50m BGL. Chiselling from 5.50m to 5.50m for 1.0 hour.	Scale (approx)	Logged By
	1:50	RM
	Figure No. 10927-08-21.BH09	



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Site St. Vincent's Fairview	Borehole Number BH10
Machine : Dando 150 + Beretta T44 Method : Cable Percussion with Rotary core follow on	Job Number 10927-08-21
Casing Diameter 200mm cased to 5.10m 96mm cased to 23.00m	Sheet 1/3
Ground Level (mOD) 10.44	Engineer OCSC
Location 716811.8 E 736630.1 N	Dates 12/10/2021- 13/11/2021

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.50	B						MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional subangular cobbles and rootlets. Gravel is subangular to subrounded fine to coarse.			
1.00-1.45 1.00	SPT(C) N=5 B			1,1/1,2,1,1		(1.90)				
2.00-2.45 2.00	SPT(C) N=12 B			2,2/2,3,3,4	8.54	1.90	Firm to stiff dark brown slightly sandy slightly gravelly CLAY. Gravel is angular to subangular fine to medium.			
3.00-3.45 3.00	SPT(C) N=30 B			3,4/6,7,7,10	7.44	3.00	Very stiff dark brown slightly sandy slightly gravelly CLAY. Gravel is angular to subangular fine to medium.			
4.00-4.45 4.00	SPT(C) N=50 B			5,7/9,13,13,15		(2.00)				
5.00-5.08 5.00				13,12/50 50/0 SPT(C) 25*/75 B	5.44	5.00				
5.10	TCR	SCR	RQD	FI	5.34	5.10	Slightly sandy slightly clayey GRAVEL. Gravel is subrounded to subangular fine to coarse.			
	30						Stiff dark brown slightly sandy gravelly CLAY and subangular to subrounded cobbles. Gravel is subrounded to subangular medium to coarse.			
6.50-6.88 6.50				5,8/9,17,24 SPT(C) 50/225						
8.00-8.38 8.00				13,14/14,16,20 SPT(C) 50/225		(5.90)				
9.50-9.80 9.50				10,15/18,32 SPT(C) 50/150						

Remarks

No groundwater encountered during drilling.
Cable percussion drilling complete at 5.10m BGL with Rotary follow on complete at 23.00m BGL.
Slotted standpipe installed from 2.00m BGL to 1.50m BGL with plain pipe from 1.50m BGL to GL. Gravel filter zone from 2.00m BGL to 1.5m BGL with bentonite sealed from 1.50m BGL to GL. Finished with a raised cover.
Chiselling from 5.10m to 5.10m for 1 hour.

Scale (approx) 1:50	Logged By RM
Figure No. 10927-08-21.BH10	



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Site
St. Vincent's Fairview

Borehole Number
BH10

Machine : Dando 150 + Beretta T44 Flush : water Core Dia : 63.5 mm Method : Cable Percussion with Rotary core follow on	Casing Diameter 200mm cased to 5.10m 96mm cased to 23.00m	Ground Level (mOD) 10.44	Client OCSC	Job Number 10927-08-21
	Location 716811.8 E 736630.1 N	Dates 12/10/2021- 13/11/2021	Engineer OCSC	Sheet 2/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.00-11.30 11.00	63				10, 14/14, 36 SPT(C) 50/150	-0.56	11.00	Poor recovery: Recovery consists of dense subangular to subrounded cobbles.			
12.50-12.58 12.50	35				18, 7/50 SPT(C) 25*/75 50/0	-2.21	12.65 (1.65)	Very stiff brown slightly sandy gravelly CLAY. Gravel is subangular to subrounded fine to medium.			
14.00-14.15 14.00	39				14, 17/50 SPT(C) 50/0	-3.66	14.10 (1.45)	Poor recovery: Recovery consists of grey coarse subangular gravel. Clay likely washed away. (Stiff) [Driller's notes: gravelly sandy clay]			
15.50-15.58 15.50	17				19, 6/50 SPT(C) 25*/75 50/0		(2.90)				
17.00-17.08 17.00	13				18, 7/50 SPT(C) 25*/75 50/0	-6.56	17.00 (1.50)	Poor recovery: Recovery consists of very stiff brown slightly sandy slightly gravelly CLAY with occasional cobbles. Sand and silt washed away.			
18.50-18.50 18.50	10				25/50 SPT(C) 25*/0 50/0	-8.06	18.50 (2.30)	Very stiff brown slightly sandy gravelly CLAY. Gravel is subrounded to subangular medium to coarse.			
20.00	27										

Remarks	Scale (approx)	Logged By
	1:50	RM
	Figure No. 10927-08-21.BH10	



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Site
St. Vincent's Fairview

Borehole
Number
BH10

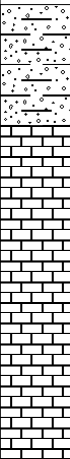
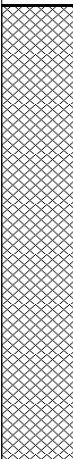
Machine : Dando 150 + Beretta T44
Flush : water
Core Dia: 63.5 mm
Method : Cable Percussion with Rotary core follow on

Casing Diameter
200mm cased to 5.10m
96mm cased to 23.00m
Location
716811.8 E 736630.1 N

Ground Level (mOD)
10.44
Dates
12/10/2021-
13/11/2021

Client
Engineer
OCSC

Job Number
10927-08-21
Sheet
3/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
21.50	54	33	23	10		-10.36	20.80	Medium strong to strong thinly to medium bedded dark grey to black fine to medium grained LIMESTONE with occasional calcite veins inter-bedded with weak to medium strong thinly laminated dark grey fine grained MUDSTONE. Partially weathered. (20.8-23.00m) 2 sets of fractures. F1 10-15 degrees. Very closely to medium spaced rough occasionally open with clay smearing. F2 70-90 degrees. Medium spaced undulating rough with occasional clay smearing.			
	90	87	44	16			(2.20)				
23.00						-12.56	23.00	Complete at 23.00m			

Remarks

Scale (approx)
1:50
Logged By
RM
Figure No.
10927-08-21.BH10



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Site
St. Vincent's Fairview

Borehole Number
BH11

Machine : Dando 2000 Method : Cable Percussion	Casing Diameter 200mm cased to 5.60m	Ground Level (mOD) 10.61	Client	Job Number 10927-08-21
	Location 716831.1 E 736673.4 N	Dates 01/11/2021	Engineer OCSC	Sheet 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B				10.41	(0.20) 0.20	TOPSOIL		
1.00-1.45 1.00	SPT N=13 B			2,3/3,3,3,4		(2.70)	Firm brown slightly sandy slightly gravelly CLAY with rootlets. Gravel is subrounded to subangular fine to coarse gravel.		
2.00-2.45 2.00	SPT N=10 B			2,2/2,2,3,3					
3.00-3.45 3.00	SPT N=30 B			3,5/6,7,7,10	7.71	2.90 (1.10)	Stiff greyish brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse.		
4.00-4.45 4.00	SPT N=48 B			5,8/11,12,12,13	6.61	4.00 (1.60)	Very stiff greyish brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse.		
5.00-5.38 5.00	SPT 50/225 B			7,10/13,17,20	5.01	5.60	Complete at 5.60m		

Remarks Chiselling from 5.60m to 5.60m for 1.0 hour.								Scale (approx) 1:50	Logged By RM
								Figure No. 10927-08-21.BH11	



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Site
St. Vincent's Fairview

Borehole Number
BH12

Machine : Dando 2000 + Beretta T44 Method : Cable Percussion with Rotary follow on	Casing Diameter 200mm cased to 3.70m 90mm cased to 19.50m	Ground Level (mOD) 4.65	Client	Job Number 10927-08-21
	Location 716726.9 E 736508.6 N	Dates 14/09/2021- 15/09/2021	Engineer OCSC	Sheet 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.50	B				4.45	(0.20) 0.20	Dark brown TOPSOIL			
1.00-1.45 1.00	SPT(C) N=7 B			1,1/2,2,2,1	3.65	(0.80) 1.00	MADE GROUND: Brown sandy gravelly Clay with ash and plaster fragments and subangular to subrounded fine to coarse gravel			
2.00-2.45 2.00	SPT(C) N=13 B			2,3/3,4,3,3		(1.60)	MADE GROUND: Brown sandy clayey angular to subangular fine to coarse Gravel.			
3.00-3.45 3.00	SPT(C) N=43 B			3,4/5,8,13,17	2.05	2.60	Very stiff grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium.			
3.70	TCR	SCR	RQD	FI	0.95	3.70	Poor recovery. Recovery consists of slightly sandy GRAVEL. Gravel is subangular to subrounded fine to coarse.			
	38					(1.50)				
5.00-5.08 5.00				19,6/50 SPT 25*/75 50/0	-0.55	5.20	Very stiff brown slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse.			
6.50-6.65 6.50	30			15,15/50 SPT 50/0			(6.50-8.00m) Driller's notes: Bands of sand and gravel.			
8.00-8.30 8.00	13			7,7/16,34 SPT 50/150		(4.30)				
9.50-9.65 9.50	71			10,15/50 SPT 50/0	-4.85	9.50	Very stiff dark grey slightly sandy slightly gravelly CLAY with occasional cobbles and bands of gravel. Gravel is subangular to angular fine to coarse.			

Remarks No groundwater encountered during drilling. Cable percussion drilling complete at 3.70m with rotary follow on complete at 19.50m BGL. Slotted standpipe with gravel filter zone installed from 19.50m to 16.50m BGL with plain pipe and bentonite seal from 16.50m BGL to GL. Finished with a raised cover. Chiselling from 3.70m for 1 hour.	Scale (approx)	Logged By
	1:50	C. Byrne
	Figure No. 10927-08-21.BH12	



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Site
St. Vincent's Fairview

Borehole Number
BH12

Machine : Dando 2000 + Beretta T44 Flush : Core Dia : mm Method : Cable Percussion with Rotary follow on	Casing Diameter 200mm cased to 3.70m 90mm cased to 19.50m	Ground Level (mOD) 4.65	Client	Job Number 10927-08-21
	Location 716726.9 E 736508.6 N	Dates 14/09/2021-15/09/2021	Engineer OCSC	Sheet 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.00-11.08 11.00	32				25/50 SPT 25*/75 50/0	-6.35	(1.50) 11.00	Very stiff dark grey slightly sandy gravelly CLAY with occasional cobbles and bands of gravel. Gravel is subangular to subrounded fine to coarse.			
12.50-15.65 12.50	83				17,8/50 SPT 50/0						
14.00-14.00 14.00	80				25/50 SPT 25*/0 50/0		(5.50)				
15.50								Medium strong to strong grey/black thinly to medium bedded fine to medium grained LIMESTONE interbedded with weak grey MUDSTONE with clay lenses and smearing. Partially weathered. (16.5-19.5m) 2 fracture sets: F1 5-20 degrees very closely to medium spaced, undulating, rough with occasional clay smearing. F2 70-87 degrees medium spaced undulating rough with clay smearing.			
17.00	90	31	20			-11.85	16.50				
18.50	97	93	44	13			(3.00)				
19.50	100	74	26	14		-14.85	19.50	Complete at 19.50m			

Remarks

Scale (approx)
1:50

Logged By
C. Byrne

Figure No.
10927-08-21.BH12



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Site
St. Vincent's Fairview

Borehole Number
BH13

Machine : Dando 2000 & Beretta T44 Method : Cable Percussion with Rotary core follow on	Casing Diameter 200mm cased to 8.20m 96mm cased to 8.00m	Ground Level (mOD) 4.16	Client	Job Number 10927-08-21
	Location 716746.9 E 736559.4 N	Dates 14/09/2021-15/09/2021	Engineer OCSC	Sheet 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.50	B					(0.30) 3.86 0.30	Brown sandy TOPSOIL			
1.00-1.45 1.00	SPT(C) N=11 B			1,2/2,3,3,3		(1.60)	Firm brown slightly sandy slightly gravelly CLAY with occasional rootlets. Gravel is subangular to subrounded fine to medium			
2.00-2.45 2.00	SPT(C) N=20 B			2,3/4,5,5,6		2.26 1.90	Stiff dark brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse.			
3.00-3.45 3.00	SPT(C) N=28 B			3,5/5,7,8,8		(2.10)				
4.00-4.45 4.00	SPT(C) N=48 B			5,7/9,11,13,15		0.16 4.00	Very stiff dark brown slightly sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse.			
5.00-5.45 5.00	SPT(C) N=44 B			5,8/9,9,12,14						
6.00-6.38 6.00	SPT(C) 50/225 B			5,8/11,13,15,11		(4.20)				
7.00-7.38 7.00	SPT(C) 50/225 B			7,9/13,17,19,1						
8.00 8.00-8.15 8.00	TCR SCR RQD FI			9,19/50 B SPT(C) 50/0						
	65					-4.04 8.20	Very stiff greyish brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.			
9.50-9.58 9.50				11/50 SPT 11*/75 50/0		-5.34 9.50	Very stiff dark grey slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles.			

Remarks No groundwater encountered during cable percussion drilling. Slotted standpipe with gravel filter zone installed from 18.50m to 15.50m BGL with plain pipe and bentonite seal from 15.50m BGL to GL. Finished with a raised cover. Chiselling from 8.20m for 1 hour.	Scale (approx)	Logged By
	1:50	C. Byrne
	Figure No. 10927-08-21.BH13	



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Site
St. Vincent's Fairview

Borehole Number
BH13

Machine : Dando 2000 & Beretta T44 Flush : water Core Dia: mm Method : Cable Percussion with Rotary core follow on	Casing Diameter 200mm cased to 8.20m 96mm cased to 8.00m	Ground Level (mOD) 4.16	Client	Job Number 10927-08-21
	Location 716746.9 E 736559.4 N	Dates 14/09/2021- 15/09/2021	Engineer OCSC	Sheet 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.00-11.23 11.00	67				12,17/50 SPT 50/75						
12.50-12.58 12.50	77				18/50 SPT 18*/75 50/0		(6.00)				
14.00-14.00 14.00	83				25/50 SPT 25*/0 50/0						
15.50-15.50 15.50	100				25/50 SPT 25*/0 50/0	-11.34	15.50	Medium-strong to strong thinly to thickly laminated grey fine to medium grained argillaceous LIMESTONE interbedded with weak to medium-strong thinly laminated dark grey fine-grained MUDSTONE with occasional calcite veins and pyrite. Partially weathered to unweathered.			
17.00	97	72	50	12			(3.00)	2 sets of fractures. F1 5-15 degrees. Very close to medium spaced undulating rough occasionally open with clay smearing. F2 70-80 degrees. Medium spaced undulating rough open with clay staining.			
18.50	100	85	43	10		-14.34	18.50	Complete at 18.50m			

Remarks

Scale (approx)
1:50

Logged By
C. Byrne

Figure No.
10927-08-21.BH13



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Site
St. Vincent's Fairview

Borehole Number
BH14

Machine : Dando 2000 + Beretta T44		Casing Diameter 200mm cased to 1.60m 96mm cased to 15.00m		Ground Level (mOD) 4.86	Client	Job Number 10927-08-21
Method : Cable percussion with Rotary follow on.		Location 716762.3 E 736588.4 N		Dates 14/09/2021- 15/09/2021	Engineer OCSC	Sheet 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.50	B				4.36	(0.50) 0.50	Brown slightly sandy slightly gravelly clay. TOPSOIL with grass and rootlets and fine to coarse subangular to subrounded gravel			
1.00-1.45 1.00	SPT(C) N=15 B			2,3/3,4,4,4		(1.80)	Firm to stiff light brown slightly sandy slightly gravelly CLAY with occasional rootlets. Gravel is angular to subangular fine to coarse.			
2.00-2.45 2.00	SPT(C) N=20 B			2,3/4,5,5,6	2.56	2.30	Stiff grey slightly gravelly sandy CLAY. Gravel is subangular fine to coarse.			
3.00-3.45 3.00	SPT(C) N=28 B			4,5/5,7,7,9		(1.70)				
4.00-4.45 4.00	SPT(C) N=50 B			5,7/10,13,14,13	0.86	4.00	Very stiff grey slightly gravelly sandy CLAY. Gravel is subangular fine to coarse.			
5.00-5.38 5.00	SPT(C) 50/225 B			6,9/13,16,19,2		(1.50)				
5.50	TCR 19	SCR	RQD	FI	-0.64	5.50	Poor recovery. Recovery consists of soft dark brown slightly gravelly sandy CLAY. Gravel is fine to coarse subangular to subrounded.			
6.50	60				-1.64	6.50	Stiff dark brown slightly sandy slightly gravelly CLAY.			
8.00	57				-3.14	8.00	Stiff dark brown slightly sandy gravelly CLAY with a band of light brown firm to stiff clay at the bottom.			
9.50					-4.39	9.25	Stiff brown slightly sandy slightly gravelly CLAY.			

Remarks No groundwater encountered during cable percussion drilling. Cable percussion borehole complete at 5.50m BGL with Rotary follow on complete at 15.00m BGL. Slotted standpipe with gravel filter zone installed from 15.00m to 12.00m BGL with plain pipe and bentonite seal from 12.00m BGL to GL. Finished with a raised cover. Chiselling from 5.40m to 5.50m for 1 hour.								Scale (approx) 1:50	Logged By RM
								Figure No. 10927-08-21.BH14	



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Site
St. Vincent's Fairview

Borehole Number
BH14

Machine : Dando 2000 + Beretta T44 Flush : Core Dia : 63.5 mm Method : Cable percussion with Rotary follow on.	Casing Diameter 200mm cased to 1.60m 96mm cased to 15.00m	Ground Level (mOD) 4.86	Client	Job Number 10927-08-21
	Location 716762.3 E 736588.4 N	Dates 14/09/2021-15/09/2021	Engineer OCSC	Sheet 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.00	21						(1.75)				
						-6.14	11.00	Grey slightly clayey sandy subrounded to subangular GRAVEL with occasional subangular cobbles			
12.50	33						(3.00)				
14.00	40										
						-9.14	14.00	Stiff dark grey slightly sandy slightly gravelly CLAY. Gravel is subangular fine to coarse.			
15.00	45						(1.00)				
						-10.14	15.00	Complete at 15.00m			

Remarks	Scale (approx)	Logged By
	1:50	RM
Figure No. 10927-08-21.BH14		



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Site
St. Vincent's Fairview

Borehole Number
BH15

Machine : Dando 2000 + Beretta T44 Method : Cable Percussion with Rotary follow on	Casing Diameter 200mm cased to 8.60m 96mm cased to 15.50m	Ground Level (mOD) 10.28	Client	Job Number 10927-08-21
	Location 716770.6 E 736637.2 N	Dates 27/09/2021-13/10/2021	Engineer OCSC	Sheet 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
1.00-1.45 1.00	SPT(C) N=10 B			1,2/2,3,2,3	10.08	(0.20) 0.20	TOPSOIL. Firm greyish-brown slightly sandy slightly gravelly CLAY with rootlets. Gravel is sub-angular to sub-rounded medium to coarse.			
2.00-2.45 2.00	SPT(C) N=14 B			2,3/3,3,4,4		(2.40)				
3.00-3.45 3.00	SPT(C) N=28 B			3,5/5,7,8,8	7.68	2.60	Stiff grey slightly sandy slightly gravelly CLAY with rootlets. Gravel is subangular to subrounded fine to coarse.			
4.00-4.45 4.00	SPT(C) N=35 B			4,6/6,8,10,11	6.28	4.00	Very stiff grey slightly sandy slightly gravelly CLAY with rootlets. Gravel is subangular to subrounded fine to coarse.			
5.00-5.45 5.00	SPT(C) N=50 B			5,8/10,13,15,12						
6.00-6.45 6.00	SPT(C) N=50 B			5,9/12,14,14,10		(4.60)				
7.00-7.45 7.00	SPT(C) N=50 B			7,10/14,17,19						
8.00-8.45 8.00	SPT(C) N=50 B			6,11/14,18,18						
8.70	TCR	SCR	RQD	FI	1.68	8.60	Very stiff grey slightly sandy slightly gravelly CLAY with occasional cobbles. Gravel is angular to subangular and fine to coarse.			
	50					(0.90)				
9.50-9.95 9.50				18/50 SPT N=50	0.78	9.50	Dense grey clayey sandy sub angular to sub rounded fine to coarse GRAVEL.			

Remarks

No Groundwater encountered during cable percussion drilling.
Cable percussion drilling complete at 8.6m BGL with rotary follow on complete at 15.50m BGL.
Slotted standpipe with gravel filter zone installed from 10.7m to 7.7m BGL with plain pipe and bentonite seal from 7.7m BGL to GL. Finished with a raised cover.
Chiselling from 8.40m to 8.60m for 1 hour.

Scale (approx)
1:50

Logged By
C. Byrne

Figure No.
10927-08-21.BH15



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Site
St. Vincent's Fairview

Borehole
Number
BH15

Machine : Dando 2000 + Beretta T44 Flush : water Core Dia : 63.5 mm Method : Cable Percussion with Rotary follow on	Casing Diameter 200mm cased to 8.60m 96mm cased to 15.50m	Ground Level (mOD) 10.28	Client	Job Number 10927-08-21
	Location 716770.6 E 736637.2 N	Dates 27/09/2021-13/10/2021	Engineer OCSC	Sheet 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.00-11.00	66				25/50 SPT 25*/0 50/0	-0.32	(1.10) 10.60	Very stiff brown slightly sandy slightly gravelly CLAY with occasional cobbles. Gravel is sub angular to sub rounded fine to coarse.			
12.50-12.58	37				16/50 SPT 16*/75 50/0		(3.40)				
14.00-14.08	100				17/50 SPT 17*/75 50/0	-3.72	14.00	Very stiff light brown slightly sandy slightly gravelly CLAY with occasional sub angular to sub rounded cobbles. Gravel is subangular fine to coarse.			
14.00	30					-4.22	14.50	Poor recovery. Recovery consists of subangular fine to coarse GRAVEL with occasional subangular cobbles. (Driller notes sand and gravel)			
15.50						-5.22	15.50	Complete at 15.50m			

Remarks

Scale (approx)
1:50
Logged By
C. Byrne

Figure No.
10927-08-21.BH15



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Site
St. Vincent's Fairview

Borehole Number
BH16

Machine : Dando 2000 + Beretta T44 Method : Cable Percussion with Rotary follow on	Casing Diameter 200mm cased to 5.20m	Ground Level (mOD) 10.02	Client	Job Number 10927-08-21
	Location 716737.3 E 736658.1 N	Dates 01/11/2021	Engineer OCSC	Sheet 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.50	B				9.92	0.10	TOPSOIL			
1.00-1.45 1.00	SPT N=11 B			2,3/3,2,3,3	9.02	1.00	Brown slightly sandy slightly gravelly CLAY. Gravel is Sub-angular to sub-rounded fine to coarse.			
2.00-2.45 2.00	SPT N=13 B			2,3/3,3,3,4		(1.70)	Firm light brown slightly sandy slightly gravelly CLAY. Gravel is sub-angular to sub-rounded fine to medium.			
3.00-3.45 3.00	SPT N=25 B			3,5/5,6,7,7	7.32	2.70	Stiff greyish brown slightly sandy slightly gravelly CLAY. Gravel is sub-angular to sub-rounded fine to coarse.			
4.00-4.45 4.00	SPT N=41 B			5,7/9,10,11,11		(2.40)				
5.00-5.30 5.00	SPT 50/150 B			7,11/21,29	4.92	5.10	Dense grey slightly gravelly SAND with occasional subangular cobbles. Gravel is subangular and fine to coarse.			
5.50	TCR	SCR	RQD	FI						
	70									
6.50-6.65 6.50				12,15/50 SPT 50/0						
	11									
8.00-8.38 8.00				10,10/12,17,21 SPT 50/225		(5.90)				
	43									
9.50-9.58 9.50				19,6/50 SPT 25*/75 50/0						

Remarks

No groundwater encountered during drilling
Cable percussion drilling complete at 5.30m BGL with rotary follow on complete at 15.00m BGL.
Slotted standpipe installed from 15.00m BGL to 12.00m BGL with plain pipe from 12.00m BGL to GL. Finished with a raised cover.
Chiselling from 5.10m to 5.30m for 1 hour.

Scale (approx)
1:50

Logged By

Figure No.
10927-08-21.BH16



Ground Investigations Ireland Ltd

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Site
St. Vincent's Fairview

Borehole Number
BH16

Machine : Dando 2000 + Beretta T44 Flush : water Core Dia : 63.5 mm Method : Cable Percussion with Rotary follow on	Casing Diameter 200mm cased to 5.20m	Ground Level (mOD) 10.02	Client	Job Number 10927-08-21
	Location 716737.3 E 736658.1 N	Dates 01/11/2021	Engineer OCSC	Sheet 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.00-11.38 11.00	13				8,11/14,19,17 SPT 50/225	-0.98	11.00	Very stiff light brown slightly sandy slightly gravelly CLAY with occasional subangular cobbles. Sand into clay. Gravel is subangular fine to coarse.			
	27						(1.50)				
12.50-12.58 12.50					15,10/50 SPT 25*/75 50/0	-2.48	12.50	Very stiff light brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse.			
	68						(1.50)				
14.00-14.00 14.00	10				25/50 SPT 25*/0 50/0	-3.98	14.00	Poor recovery: Recovery consists of very stiff light brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse. (Driller notes sandy gravelly Clay)			
							(1.00)				
15.00						-4.98	15.00	Complete at 15.00m			

Remarks	Scale (approx) 1:50	Logged By
	Figure No. 10927-08-21.BH16	



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Site
St. Vincent's Fairview

Borehole Number
BH17

Machine : Dando 2000 + Beretta T44 Method : Cable Percussion with Rotary follow on	Casing Diameter 200mm cased to 8.30m 96mm cased to 25.30m	Ground Level (mOD) 10.14	Client	Job Number 10927-08-21
	Location 716689.9 E 736669.7 N	Dates 01/11/2021	Engineer OCSC	Sheet 1/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.50	B						MADE GROUND: Brown slightly sandy slightly gravelly Clay with ash and fragments of brick and ceramic. Gravel is sub-angular to sub-rounded medium to coarse.			
1.00-1.45 1.00	SPT N=9 B			1,2/2,2,2,3		(3.00)				
2.00-2.45 2.00	SPT N=10 B			2,1/2,2,3,3						
3.00-3.45 3.00	SPT N=13 B			2,3/3,4,3,3	7.14	3.00	Firm to stiff light brown slightly sandy slightly gravelly CLAY with sub-angular to sub-rounded medium to coarse gravel.			
4.00-4.45 4.00	SPT N=17 B			2,3/4,4,5,4		(3.50)				
5.00-5.45 5.00	SPT N=14 B			2,3/3,3,4,4						
6.00-6.45 6.00	SPT N=18 B			3,4/5,4,4,5						
7.00-7.45 7.00	SPT N=50 B			5,8/10,13,16,11	3.64	6.50	Stiff greyish-brown sandy gravelly CLAY with occasional cobbles. Gravel is sub-angular to sub-rounded medium to coarse.			
7.40	TCR	SCR	RQD	FI		(1.50)	(7.40-8.30m) Redrill of collapsed material from cable percussion hole.			
8.00-8.08 8.00 8.00	50			14,11/50 SPT 25*/75 50/0 B	2.14	8.00 (0.30)	Grey slightly sandy GRAVEL. Sub-angular to rounded fine to coarse gravel.			
	23				1.84	8.30	Poor recovery: Recovery consist of grey slightly gravelly sandy CLAY. Gravel is subangular fine to coarse. (Very stiff).			
9.50-9.80 9.50				9,9/12,38 SPT 50/150	0.64	9.50	Poor recovery: Recovery consists of brown slightly sandy slightly gravelly CLAY. Gravel is subangular and subrounded fine to coarse. [Driller's notes: sands, gravels and clay] (Very stiff).			

Remarks

No groundwater encountered during cables percussion drilling
Cable percussion drilling complete at 8.30mBGL with rotary drilling complete at 25.30m BGL.
Slotted standpipe installed from 25.30m BGL to 22.30m BGL with plain pipe from 22.30m BGL to GL. Finished with a raised cover.
Chiselling from 8.10m to 8.30m for 1.0 hour.

Scale (approx)
1:50

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RM

Figure No.
10927-08-21.BH17



Ground Investigations Ireland Ltd

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Site
St. Vincent's Fairview

Borehole Number
BH17

Machine : Dando 2000 + Beretta T44 Flush : water Core Dia : 63.5 mm Method : Cable Percussion with Rotary follow on	Casing Diameter 200mm cased to 8.30m 96mm cased to 25.30m	Ground Level (mOD) 10.14	Client	Job Number 10927-08-21
	Location 716689.9 E 736669.7 N	Dates 01/11/2021	Engineer OCSC	Sheet 2/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.00-11.08 11.00	17				21,4/50 SPT 25*/75 50/0						
12.50-12.50 12.50	17				25/50 SPT 25*/0 50/0		(4.50)				
14.00-14.08 14.00	13				19,6/50 SPT 25*/75 50/0	-3.86	14.00	Very stiff brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded medium to coarse.			
15.50-15.50 15.50	30				25/50 SPT 25*/0 50/0	-5.36	15.50	Poor recovery: Recovery consists of clayey gravelly SAND. Gravel is subangular fine to coarse. [Driller's notes: Black sands and gravels] (Dense)			
17.00-17.00 17.00	17				25/50 SPT 25*/0 50/0		(2.40)				
18.50-18.50 18.50	37				25/50 SPT 25*/0 50/0	-7.76	17.90	Very stiff brownish-grey slightly sandy gravelly CLAY. Gravel is subangular fine to coarse.			
20.00	60						(2.10)				

Remarks

Scale (approx)
1:50

Logged By
RM

Figure No.
10927-08-21.BH17



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Site
St. Vincent's Fairview

Borehole
Number
BH17

Machine : Dando 2000 + Beretta T44 Flush : water Core Dia : 63.5 mm Method : Cable Percussion with Rotary follow on	Casing Diameter 200mm cased to 8.30m 96mm cased to 25.30m	Ground Level (mOD) 10.14	Client OCSC	Job Number 10927-08-21
	Location 716689.9 E 736669.7 N	Dates 01/11/2021	Engineer OCSC	Sheet 3/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
21.50-21.50 21.50	50				25/50 SPT 25*/0 50/0	-9.86	20.00	Very stiff grey slightly sandy slightly gravelly CLAY with subangular cobbles. Gravel is subangular to subrounded fine to coarse.			
22.00	65	37	45	9		-11.86	22.00	Medium-strong to strong dark grey medium grained LIMESTONE interbedded with weak to medium-strong MUDSTONE with some clay smearing. Partially weathered. (22.0-25.30) 2 sets of fractures. F1 0-30 degrees very thinnely to medium spaced undulating rough. F2 75-90 degrees medium spaced undulating rough, occasionally stepped.			
23.00	83	57	29	19			(3.30)				
24.50	96	93	84	9							
25.30						-15.16	25.30	Complete at 25.30m			

Remarks

Scale (approx)
1:50

Logged By
RM

Figure No.
10927-08-21.BH17



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Site
St. Vincent's Fairview

Borehole Number
BH18

Machine : Dando 150 + Berretta T44.

Casing Diameter
200mm cased to 5.50m
96mm cased to 15.00m

Ground Level (mOD)
11.09

Client

Job Number
10927-08-21

Method : Cable percussion with Rotary follow on.

Location
716713.8 E 736746.7 N

Dates
01/10/2021-
01/11/2021

Engineer
OCSC

Sheet
1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.50	B				10.79	(0.30) 0.30	Slightly gravelly TOPSOIL with occasional rootlets			
1.00-1.45 1.00	SPT(C) N=13 B			2,3/3,4,3,3		(2.00)	Firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse			
2.00-2.45 2.00	SPT(C) N=31 B			3,6/7,7,6,11	8.79	2.30	Stiff greyish brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse.			
3.00-3.45 3.00	SPT(C) N=36 B			4,5/7,8,9,12	8.09	3.00	Very stiff dark brown slightly gravelly sandy CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse.			
4.00-4.45 4.00	SPT(C) N=49 B			5,8/9,12,13,15		(2.00)				
5.00 4.70 5.00-5.30 5.00	TCR 73	RQD	FI	B 6,11/15,35 SPT(C) 50/150	6.09	5.00	(4.70-5.50m) Redrill of collaosed cable percussion hole.			
6.50-6.65 6.50	67			21,4/50 SPT 50/0			Very stiff light brown slightly sandy slightly gravelly slightly silty CLAY. Gravel is subrounded to subangular fine to coarse.			
8.00-8.08 8.00	100			6,19/50 SPT 25*/75 50/0						
9.50-9.50 9.50	47			25/50 SPT 25*/0 50/0						

Remarks

Cable percussion drilling complete at 5.5mBGL with rotary drilling complete at 15.00m BGL.
No groundwater encountered during drilling.
Slotted standpipe installed from 15.00m BGL to 12.00m BGL with plain pipe from 12.00m BGL to GL. Finished with a raised cover.
Chiselling from 5.40m to 5.50m for 1 hour.

Scale (approx)

1:50

Logged By

RM

Figure No.

10927-08-21.BH17



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Site
St. Vincent's Fairview

Borehole
Number
BH18

Machine : Dando 150 + Berretta T44. Flush : water Core Dia : 63.5 mm Method : Cable percussion with Rotary follow on.	Casing Diameter 200mm cased to 5.50m 96mm cased to 15.00m	Ground Level (mOD) 11.09	Client	Job Number 10927-08-21
	Location 716713.8 E 736746.7 N	Dates 01/10/2021- 01/11/2021	Engineer OCSC	Sheet 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.00-11.00	100				25/50 SPT 25*/0 50/0		(10.00)				
11.00											
12.50-12.58	100				21,4/50 SPT 25*/75 50/0						
12.50											
14.00-14.00	100				25/50 SPT 25*/0 50/0						
14.00											
15.00	85					-3.91	15.00	Complete at 15.00m			

Remarks No groundwater encountered during drilling.	Scale (approx) 1:50	Logged By RM
	Figure No. 10927-08-21.BH17	



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Site
St. Vincent's Fairview

Borehole Number
BH19

Machine : Dando 150 + Beretta T44

Method : Cable Percussion with Rotary follow on

Casing Diameter
200mm cased to 5.00m
96mm cased to 5.50m

Ground Level (mOD)
10.66

Client

Job Number
10927-08-21

Location
716757.2 E 736718.3 N

Dates
12/10/2021-
13/11/2021

Engineer
OCSC

Sheet
1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.50	B				10.36	(0.30)	TOPSOIL			
1.00-1.45	SPT(C) N=14			2,3/3,3,4,4	10.16	0.30 (0.20) 0.50	Firm brown slightly sandy slightly gravelly CLAY with occasional rootlets. Gravel is subangular fine to medium.			
2.00-2.45	SPT(C) N=14			2,3/4,4,3,3		(2.50)	Firm to stiff brown slightly sandy slightly gravelly CLAY.			
3.00-3.45	SPT(C) N=40			5,7/8,8,11,13	7.66	3.00	Very stiff dark brown/grey slightly gravelly sandy CLAY. Gravel is subangular to subrounded medium to coarse.			
4.00-4.45	SPT(C) N=62			7,10/14,15,15,18		(2.00)				
5.00-5.00	TCR	RQD	FI	25/50 B SPT(C) 25*/0 50/0	5.66	5.00	Very stiff brown slightly sandy gravelly CLAY with occasional cobbles. Gravel is subangular to subrounded fine to coarse.			
6.50-6.58	100			12,13/50 SPT 25*/75 50/0						
8.00-8.00	100			25/50 SPT 25*/0 50/0						
9.50						(8.40)				

Remarks

No Groundwater encountered during cable percussion drilling
Cable percussion drilling complete at 5.00m BGL with Rotary follow on complete at 15.00m BGL.
Gravel filter zone from 15.00m BGL to 12.00m BGL with bentonite sealed from 12.00m BGL to GL. Finished with a flush cover.
Chiselling from 5.00m to 5.00m for 1.0 hour.

Scale (approx)

1:50

Logged By

RM

Figure No.

10927-08-21.BH19



Site	St. Vincent's Fairview
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**Borehole
Number
BH19**

Machine : Dando 150 + Beretta
T44
Flush : water
Core Dia: 64 mm
Method : Cable Percussion
with Rotary follow on

Casing Diameter	200mm cased to 5.00m 96mm cased to 5.50m
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Ground Level (mOD)
10.66

Client	
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Job Number	10927-08-21
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Location	716757.2 E 736718.3 N
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Dates	12/10/2021- 13/11/2021
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Engineer
OCSC

Sheet
2/2

Remarks	Scale (approx)	Logged By
	1:50	RM
	Figure No. 10927-08-21.BH19	



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Site
St. Vincent's Fairview

Borehole Number
BH20

Machine : Dando 150 + Beretta T41
Method : Cable Percussion with Rotary follow on

Casing Diameter
200mm cased to 5.50m
96mm cased to 21.50m

Ground Level (mOD)
10.47

Client

Job Number
10927-08-21

Location
716829.8 E 736724.8 N

Dates
12/10/2021-
13/11/2021

Engineer
OCSC

Sheet
1/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.50	B				10.27	(0.20) 0.20	TOPSOIL			
1.00-1.45 1.00	SPT(C) N=11 B			1,2/2,3,3,3		(2.50)	Firm brown slightly sandy slightly gravelly CLAY with grass rootlets. Gravel is subangular to subrounded fine to coarse.			
2.00-2.45 2.00	SPT(C) N=14 B			2,3/4,3,3,4						
3.00-3.45 3.00	SPT(C) N=35 B			3,5/7,9,9,10	7.77	2.70	Very stiff dark brown/grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse.			
4.00-4.45 4.00	SPT(C) N=47 B			6,8/9,12,13,13		(2.80)				
5.00-5.45 5.00	SPT(C) N=33 B			8,11/14,19						
5.50	TCR	SCR	RQD	FI	4.97	5.50	Very stiff brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse.			
6.50-6.65 6.50	97			12,17/50 SPT 50/0						
8.00-8.15 8.00	60			9,18/50 SPT 50/0						
9.50-9.50 9.50	17			25/50 SPT 25*/0 50/0						

Remarks

Cable percussion drilling completed at 5.50m BGL with Rotary follow on complete at 21.50m BGL.
No groundwater encountered during drilling
Slotted standpipe installed from 21.50m to 18.5m BGL. Finished with a raised cover.
Chiselling from 5.40m to 5.50m for 1.0 hour.

Scale (approx)

1:50

Logged By

RM

Figure No.

10927-08-21.BH20



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Site
St. Vincent's Fairview

Borehole Number
BH20

Machine : Dando 150 + Beretta T41 Flush : water Core Dia : 63.5 mm Method : Cable Percussion with Rotary follow on	Casing Diameter 200mm cased to 5.50m 96mm cased to 21.50m	Ground Level (mOD) 10.47	Client	Job Number 10927-08-21
	Location 716829.8 E 736724.8 N	Dates 12/10/2021- 13/11/2021	Engineer OCSC	Sheet 2/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.00-11.08 11.00	100				21,4/50 SPT 25*/75 50/0		(10.00)				
12.50-12.50 12.50	97				25/50 SPT 25*/0 50/0						
14.00-14.08 14.00	92				12,13/50 SPT 25*/75 50/0						
15.50-15.65 15.50	33				17,17/50 SPT 50/0	-5.03	15.50	Poor recovery: Recovery consists of subrounded to subangular medium to coarse GRAVELS. (Dense) [Driller notes: grey sand and gravel.			
17.00-17.08 17.00	25				20,5/50 SPT 25*/75 50/0	-6.53	17.00	Very stiff dark grey slightly sandy gravelly CLAY with occasional subangular cobbles. Gravel is fine to coarse subangular and subrounded.			
18.50-18.58 18.50	56				26/50 SPT 26*/75 50/0	-8.03	18.50 (0.35)	Very weak fine to medium grained grey LIMESTONE. Highly weathered, mostly non-intact.			
20.00	80	73	72	NI		-8.38	18.85	Medium-strong to strong thinly to thickly laminated grey fine to medium grained argillaceous LIMESTONE with calcite veins interbedded with medium to strong thinly laminated dark grey medium to fine grained MUDSTONE. Partially weathered. 2 sets of fractures. F1 5-15 degrees closely to medium spaced undulating rough occasionally open with clay smearing. F2			

Remarks No groundwater encountered during drilling	Scale (approx)	Logged By
	1:50	RM
	Figure No. 10927-08-21.BH20	



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Site
St. Vincent's Fairview

Borehole
Number
BH20

Machine : Dando 150 + Beretta
T41
Flush : water
Core Dia: 63.5 mm
Method : Cable Percussion
with Rotary follow on

Casing Diameter
200mm cased to 5.50m
96mm cased to 21.50m

Ground Level (mOD)
10.47

Client

Job
Number
10927-08-21

Location
716829.8 E 736724.8 N

Dates
12/10/2021-
13/11/2021

Engineer
OCSC

Sheet
3/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
21.50	100	86	65	5		-11.03	(2.65) 21.50	70-80 degrees medium spaced undulating occasionally stepped rough with occasional clay smearing.			
								Complete at 21.50m			

Remarks
No groundwater encountered during drilling

Scale
(approx)
1:50

Logged
By
RM

Figure No.
10927-08-21.BH20



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Site
St. Vincent's Fairview

Borehole Number
BH21

Machine : Dando 150 + Bertta T44
Method : Cable Percussion with Rotary follow on.

Casing Diameter
200mm cased to 5.10m
96mm cased to 26.00m

Ground Level (mOD)
11.18

Client

Job Number
10927-08-21

Location
716766.1 E 736771.7 N

Dates
12/10/2021-
13/11/2021

Engineer
OCSC

Sheet
1/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.50	B				10.88	(0.30) 0.30	Brown sandy TOPSOIL			
1.00-1.45 1.00	SPT N=10 B			1,2/2,2,3,3		(1.70)	Firm brown slightly sandy slightly gravelly CLAY with rootlets. Gravel is subangular to subrounded fine to coarse.			
2.00-2.45 2.00	SPT N=11 B			2,3/2,2,3,4	9.18	2.00	Firm light brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse.			
3.00-3.45 3.00	SPT N=34 B			4,5/7,8,9,10	8.38	2.80	Very stiff dark greyish brown slightly sandy slightly gravelly CLAY with subangular fine to coarse gravels.			
4.00-4.45 4.00	SPT N=50 B			7,10/14,16,19,1		(2.30)				
5.00-5.38 5.00	TCR	SCR	RQD	FI						
5.10	32			13,12/50 SPT 50/225 B	6.08	5.10	Very stiff grey slightly sandy gravelly CLAY with subangular cobbles. Gravel is subangular to subrounded fine to coarse.			
6.50-6.88 6.50	53			6,6/8,14,17,11 SPT 50/225		(2.90)				
8.00-8.15 8.00	100			12,12/50 SPT 50/0	3.18	8.00	Very stiff brown slightly sandy slightly gravelly CLAY with occasional subangular cobbles.			
9.50-9.58 9.50				22,3/50 SPT 25*/75 50/0						

Remarks

No groundwater encountered during drilling.
Cable percussion drilling complete at 5.10m BGL with Rotary follow on complete at 26.00m BGL.
Slotted standpipe installed from 6.50m BGL to 13.50m BGL with plain pipe from 13.50m BGL to GL. Finished with a raised cover.

Scale (approx)
1:50

Logged By
RM

Figure No.
10927-08-21.BH21



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Site
St. Vincent's Fairview

Borehole
Number
BH21

Machine : Dando 150 + Bertta T44 Flush : water Core Dia : 63.5 mm Method : Cable Percussion with Rotary follow on.	Casing Diameter 200mm cased to 5.10m 96mm cased to 26.00m	Ground Level (mOD) 11.18	Client	Job Number 10927-08-21
	Location 716766.1 E 736771.7 N	Dates 12/10/2021- 13/11/2021	Engineer OCSC	Sheet 2/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.00-11.00	99				25/50 SPT 25*/0 50/0		(4.50)				
12.50-12.88	40				5,10/12,25,13 SPT 50/225	-1.32	12.50	Poor recovery. Recovery consists of brown slightly sandy gravelly CLAY. Gravel is medium to coarse subangular.(Very stiff) [Driller's notes: yellow brown silty sandy gravels]			
14.00-14.38	9				8,14/14,21,15 SPT 50/225	-2.82	14.00	Poor recovery. Recovery consists of firm slightly sandy gravelly CLAY. (Dense) [Driller's notes: Grey sands and gravels]			
15.50-15.65	10				14,15/18,32 SPT 29*/0 50/150	-4.32	15.50	Poor recovery. Recovery consists of firm slightly sandy slightly gravelly CLAY with occasional subangular cobble. Gravel is subangular medium to coarse. (Very stiff) [Driller's notes: sandy gravelly CLAY]			
17.00-17.15	20				17,15/50 SPT 50/0	-5.82	17.00	Firm to stiff dark grey slightly sandy gravelly CLAY with some subangular cobbles. Gravel is subangular to subrounded fine to coarse.			
18.50-18.58	30				22,4/50 SPT 26*/75 50/0						
20.00	49						(5.50)				

Remarks

Scale (approx)
1:50

Logged By
RM

Figure No.
10927-08-21.BH21



Ground Investigations Ireland Ltd

www.gii.ie

Site
St. Vincent's Fairview

Borehole Number
BH21

Machine : Dando 150 + Bertta T44 Flush : water Core Dia : 63.5 mm Method : Cable Percussion with Rotary follow on.	Casing Diameter 200mm cased to 5.10m 96mm cased to 26.00m	Ground Level (mOD) 11.18	Client OCSC	Job Number 10927-08-21
	Location 716766.1 E 736771.7 N	Dates 12/10/2021- 13/11/2021	Engineer OCSC	Sheet 3/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
20.00-20.00					SPT 25*/0 25/50 50/0						
	47	9									
21.50-21.50					25/50 SPT 25*/0 50/0						
21.50											
	60	36	13								
22.50						-11.32	22.50	Weak to medium strong grey LIMESTONE with calcite veins interbedded with weak MUDSTONE. Distinctly weathered.			
23.00							(1.60)	2 sets of fractures. F1: 0-15 degrees very closely to closely spaced undulating rough with clay smearing. F2: 45-90 degrees medium spaced undulating rough with occasional clay smearing.			
	93	29	13	30							
						-12.92	24.10	Strong grey LIMESTONE with pyrite and calcite veins interbedded with weak to medium strong MUDSTONE. Partially weathered.			
24.50							(1.90)	2 sets of fractures. F1 5-20 degrees extremely closely to closely spaced undulating rough occasionally stepped with clay smearing. F2 70-90 degrees very closely to medium spaced undulating rough.			
	100	67	28	31							
26.00						-14.82	26.00	Complete at 26.00m			

Remarks	Scale (approx)	Logged By
	1:50	RM
	Figure No. 10927-08-21.BH21	



Ground Investigations Ireland Ltd

www.gii.ie

Site St. Vincent's Fairview	Borehole Number BH22
Machine : Dando 150 + Beretta T44 Method : Cable percussion with Rotary follow on	Client OCSC
Casing Diameter 200mm cased to 5.50m 96mm cased to 15.50m	Job Number 10927-08-21
Location 716829.1 E 736765.6 N	Sheet 1/2
Ground Level (mOD) 10.52	Dates 12/10/2021- 13/11/2021

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
1.00-1.45	SPT N=12			2,2/3,3,3,3	10.32	(0.20) 0.20	Brown sandy TOPSOIL.			
2.00-2.45	SPT N=13			2,3/3,4,3,3		(2.50)	Firm brown slightly sandy slightly gravelly CLAY with rootlets. Gravel is angular to subangular fine to coarse.			
3.00-3.45	SPT N=33			4,5/5,7,10,11	7.82	2.70	Very stiff dark greyish brown slightly sandy slightly gravelly CLAY. Gravel is subrounded to angular fine to coarse.			
4.00-4.45	SPT N=54			6,9/10,13,15,16		(2.30)				
5.00-5.45	SPT N=36			Water strike(1) at 4.80m, rose to 4.30m in 20 mins. 8,11/17,19	5.52	5.00	Dense brown slightly clayey slightly sandy GRAVEL. Gravel is fine to coarse subangular to subrounded.		▼1	
5.50	TCR	SCR	RQD	FI		(1.10)				
6.50-6.58	47			8,17/50 SPT 25*/75 50/0	4.42	6.10	Very stiff brown slightly sandy slightly gravelly CLAY with occasional subangular cobbles. Gravel is subrounded to subangular fine to coarse.			
8.00-8.08	80			19/50 SPT 19*/75 50/0		(3.00)				
9.50-9.65	68			17,18/50 SPT 50/0	1.42	9.10	Very stiff dark brown slightly sandy gravelly CLAY with occasional subangular cobbles. Gravel is subrounded and subangular fine to coarse.			
9.50										

Remarks

No groundwater encountered during drilling.
Cable percussion drilling complete at 5.50m BGL with Rotary follow on complete at 15.50m BGL.
Slotted standpipe installed from 15.00m BGL to 12.00m BGL with plain pipe from 12.00m BGL to GL. Finished with a raised cover.

Scale (approx)
1:50

Logged By
RM

Figure No.
10927-08-21.BH22



Ground Investigations Ireland Ltd

www.gii.ie

Site
St. Vincent's Fairview

Borehole Number
BH22

Machine : Dando 150 + Beretta T44
Flush : water
Core Dia: 63.5 mm
Method : Cable percussion with Rotary follow on

Casing Diameter
200mm cased to 5.50m
96mm cased to 15.50m

Ground Level (mOD)
10.52

Client

Job Number
10927-08-21

Location
716829.1 E 736765.6 N

Dates
12/10/2021-
13/11/2021

Engineer
OCSC

Sheet
2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.00-11.08 11.00	83				21,4/50 SPT 25*/75 50/0		(2.90)				
12.50-12.80 12.50	43				15,12/17,33 SPT 50/150	-1.48	12.00 (0.50)	Very stiff light brown slightly sandy slightly gravelly CLAY with occasional subangular cobbles. Gravel is subrounded and subangular fine to coarse.			
14.00-14.08 14.00	30				18/50 SPT 18*/75 50/0	-1.98	12.50 (1.50)	Dense sandy subangular fine to coarse GRAVEL with subrounded to subangular cobbles.			
15.50	17					-3.48	14.00 (1.50)	Poor recovery. Recovery consists of: Subangular to subrounded fine to coarse GRAVEL. (Dense) [Driller's notes: Sands and gravels]			
						-4.98	15.50	Complete at 15.50m			

Remarks

Scale (approx)
1:50

Logged By
RM

Figure No.
10927-08-21.BH22

APPENDIX 8 – Groundwater Monitoring





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GROUNDWATER MONITORING

St. Vincent's Hospital, Fairview

BOREHOLE	DATE	TIME	GROUNDWATER (m BGL)	Comments
BH01	14/12/2021	09:23	3.38	
BH02	14/12/2021	09:19	2.87	
BH05	14/12/2021	09:29	6.05	
BH06	14/12/2021	09:34	3.41	
BH07	14/12/2021	09:40	4.63	
BH10	14/12/2021	10:09	DRY	Base of pipe at 2.0m BGL
BH12	14/12/2021	09:50	1.78	
BH13	14/12/2021	10:00	+0.24	
BH14	14/12/2021	10:04	0.00	
BH15	14/12/2021	10:12	5.14	
BH16	14/12/2021	10:15	4.88	
BH17	14/12/2021	10:19	5.10	
BH18	14/12/2021	10:28	1.85	
BH19	14/12/2021	10:25	1.95	
BH20	14/12/2021	10:42	5.62	
BH21	14/12/2021	10:33	6.03	
BH22	14/12/2021	10:38	4.66	



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GROUNDWATER MONITORING

St. Vincent's Hospital, Fairview

BOREHOLE	DATE	TIME	GROUNDWATER (m BGL)	Comments
BH01	05/04/2022	09:33	3.32	
BH02	05/04/2022	08:51	2.78	Logger installed
BH03				Blocked at 1.40m
BH04	05/04/2022	09:49	2.03	Logger installed
BH05	05/04/2022	09:29	5.93	
BH06	05/04/2022	09:25	3.30	
BH07	05/04/2022	09:09	4.42	Logger installed
BH10	05/04/2022	10:32	DRY	Base of pipe at 2.0m BGL
BH12	05/04/2022	10:11	1.75	Logger installed
BH13	05/04/2022	10:00	Above GL	
BH14	05/04/2022	10:27	Above GL	Logger installed
BH15	05/04/2022	10:51	4.57	
BH16	05/04/2022	11:01	4.06	
BH17	05/04/2022	10:51	4.90	
BH18	05/04/2022	10:46	1.23	
BH19	05/04/2022	10:49	1.05	
BH20	05/04/2022	10:37	5.39	
BH21	05/04/2022	10:44	5.66	
BH22	05/04/2022	10:41	4.24	

APPENDIX 6.1

CRITERIA FOR RATING SITE ATTRIBUTES – ESTIMATION OF IMPORTANCE OF HYDROLOGY ATTRIBUTES

NATIONAL ROADS AUTHORITY (NRA, 2009)

Table 1 Criteria for rating Site Attributes - Estimation of Importance of Hydrology 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

APPENDIX 6.2

**WATER FRAMEWORK DIRECTIVE (WFD) SCREENING ASSESSMENT FOR ST.
VINCENT'S HOSPITAL, RICHMOND ROAD AND CONVENT AVENUE, FAIRVIEW,
DUBLIN 3**

PREPARED BY AWN CONSULTING

WATER FRAMEWORK DIRECTIVE (WFD) SCREENING ASSESSMENT FOR ST. VINCENT'S HOSPITAL, RICHMOND ROAD AND CONVENT AVENUE, FAIRVIEW, DUBLIN 3

Report Prepared For
St. Vincents Hospital

Report Prepared By

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Our Reference

MA/217501.0888/WR01

Date of Issue

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Document History

Document Reference		Original Issue Date	
MA/217501.0888/WR01		28 March 2023	
Revision Level	Revision Date	Description	Sections Affected

Record of Approval



Details	Written by	Approved by
Signature		
Name	Marcelo Allende	Teri Hayes
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Date	28 March 2023	28 March 2023

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APPENDICES

Appendix A	Water Framework Directive Matrix
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1.0 INTRODUCTION

AWN Consulting Limited (AWN) has prepared this Water Framework Directive (WFD) Screening as part of the Environmental Impact Assessment Report (EIAR) associated with the proposed development at St. Vincent's Hospital, Richmond Road and Convent Avenue, Fairview, Dublin 3.

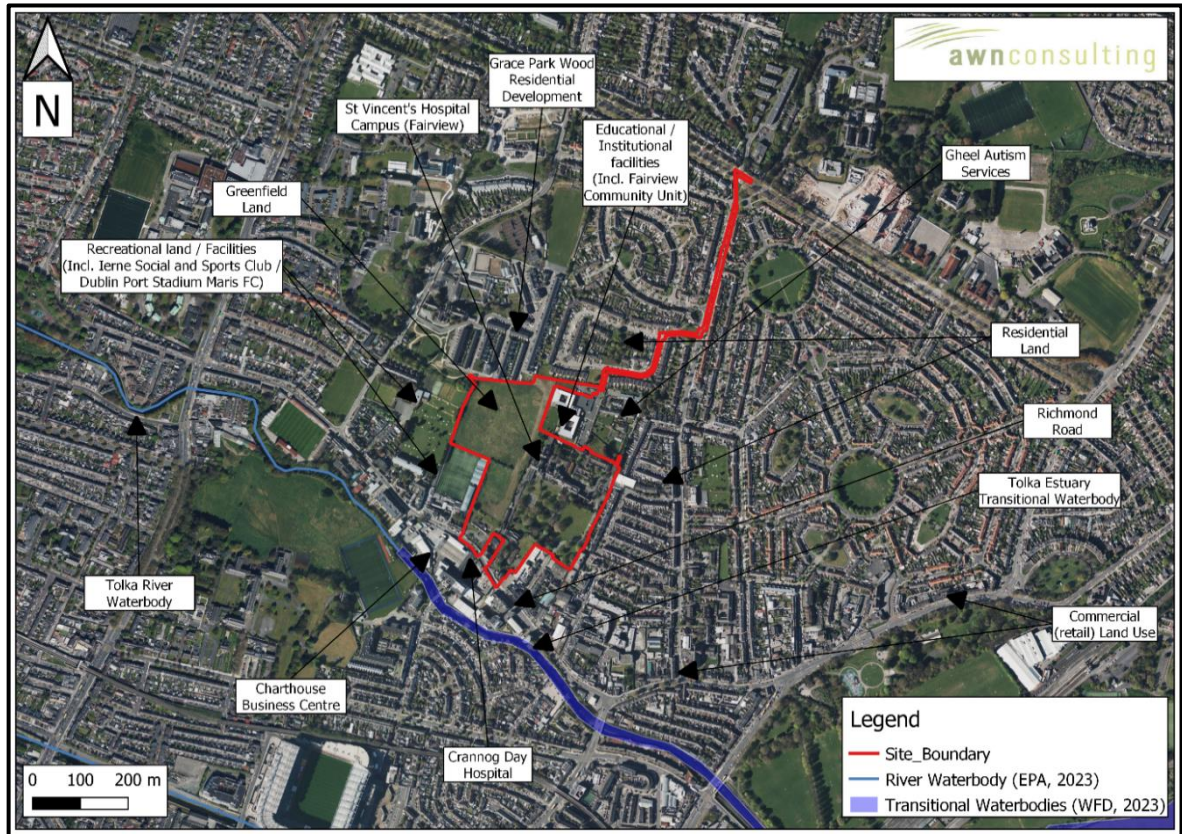


Figure 1.1 Site Location Map with hydrological environment

A **ten year planning permission** is sought for the proposed development comprising of the following (see public notices for the detailed description):

- Provision of a new part two and part three storey hospital building, providing mental health services, accommodating 73 no. beds, associated facilities, a single storey facilities management building, plant rooms and service areas, associated car and cycle parking, access roads, and open space, all on a proposed hospital site of c. 2.67 ha.
- Refurbishment and repurposing of existing buildings on site including Brooklawn (RPS Ref.: 8789), Richmond House, including chapel and outbuildings (RPS Ref.: 8788), the Laundry building and Rose Cottage for ancillary uses associated with the new hospital. The existing gate lodge building will remain in residential use and used by visiting members of staff to the new hospital.
- Change of use, refurbishment, alterations and extensions, to the existing hospital building (part protected structure under RPS Ref.: 2032), to provide residential amenity areas, a gym, a café, co-working space, a library, a childcare facility, and a community hall (referred to as Block K).
- The proposal includes the demolition of existing structures on site with a GFA of 5,872 sq.m, including the (1) westernmost range of the hospital building,

which includes St. Teresa's and the Freeman Wing, (2) extensions to the south and north of the main hospital building, including the conservatory extension, toilet block extension, an external corridor, toilet core, lift core, and stair core (which are all part of / within the curtilage of RPS Ref.: 2032), (4) hospital buildings and outbuildings located to the north of the existing main hospital building (5) St. Joseph's Adolescent School located in the southeast of the site, (6) Crannog Day Hospital located in the southwest of the site, and (7) extensions to the Old Laundry Building and Rose Cottage.

- Provision of 9 no. residential buildings (Blocks A, B, C, D-E, F, G, H, J, and L) providing a total of 811 no. residential units, including 494 no. standard designed apartments (in Blocks A, B, C, G, H, J, and L) and 317 no. Build to Rent apartments (in Blocks D-E and F). Residential amenities and facilities are proposed in Block C, D-E, J and K. A retail unit is proposed in Block A and a café in Block F. Block J is proposed as an extension of the existing hospital buildings (protected structure RPS Ref.: 2032- referred to as Block K).
- The building heights of the proposed residential blocks range from part 2 to part 13 storeys. A proposed basement / lower ground level, containing car and cycle parking and plant areas, is located below and accessed via Blocks C, D-E and F.
- Access to the new hospital and associated grounds is provided from Richmond Road and Convent Avenue, with separate internal access points. A separate vehicular access to the residential development is provided from Richmond Road. The development includes a proposed pedestrian / cycle connection to Griffith Court, requiring alterations to the service yard of the Fairview Community Unit, pedestrian / cycle connections to the Fairview Community Unit campus to the north (providing an onward connection to Griffith Court), a pedestrian / cycle connection to Grace Park Wood, and makes provision internally within the site for a potential future connection to Lomond Avenue / Inverness Road.
- The proposal includes public open space, including allotments, children's play areas, a central park, a linear park and an entrance plaza, with a set down area at Richmond Road, and communal open space at surface level. The proposal includes communal roof terraces on Block C and Blocks D-E and private balconies / terraces for the apartments.
- The proposal also includes provision of internal access roads, car and cycle parking, pedestrian and cycle infrastructure, associated set down areas, alterations to existing landscape features, landscaping, boundary treatments, lighting, telecommunications infrastructure at roof level of Block B, green roofs, lift overruns and plant at roof level, site services, including a watermain connection / upgrade via Griffith Court, Philipsburgh Avenue and Griffith Avenue, site clearance, and all associated site works.

A detailed description of the proposed development is set out in Chapter 2 of this EIAR (Description of the Proposed Development).

2.0 METHODOLOGY

This WFD Screening Assessment has been prepared in response to the requirements of the Water Framework Directive. This WFD Screening Assessment relies on information provided in the Land, Soils, Geology, and Hydrogeology Chapter (Chapter 5) and Hydrology (Chapter 6) of the EIAR and should, therefore, be read in conjunction with these chapters.

This report was prepared by Marcelo Allende (BSc, BEng), and Teri Hayes (BSc MSc PGeol EurGeol). Marcelo is a Water Resources Engineer with over 15 years of experience in environmental consultancy and water resources studies. Marcelo is an Environmental Consultant with AWN Consulting, a member of the International Association of Hydrogeologists (Irish Group) and a member of Engineers Ireland (MIEI). Teri is a hydrogeologist with over 25 years of experience in water resource management and impact assessment. She has a Masters in Hydrogeology and is a former President of the Irish Group of the Association of Hydrogeologists (IAH) and has provided advisory services on water related environmental and planning issues to both public and private sector bodies. She is qualified as a competent person as recognised by the EPA in relation to contaminated land assessment (IGI Register of competent persons www.igi.ie). Her specialist area of expertise is water resource management eco-hydrogeology, hydrological assessment and environmental impact assessment.

2.1 DETERMINATION OF WATER BODY STATUS

2.1.1 WFD Risk Status

The WFD Risk score is the risk for each waterbody of failing to meet their WFD objectives by 2027. The risk of not meeting WFD objectives has been determined by assessment of monitoring data, data on the pressures and data on the measures that have been implemented. Waterbodies that are At Risk are prioritised for implementation of measures. This assessment was completed in 2020 by the EPA Catchments Unit in conjunction with other public bodies and was primarily based on monitoring data up to the end of 2018. The three risk categories are:

- Waterbodies that are 'At Risk' of not meeting their Water Framework Directive objectives. For these waterbodies an evidence-based process was undertaken to identify the significant pressures; once a pressure is designated as 'significant', measures and accompanying resources are needed to mitigate the impact(s) from this pressure. These 'At Risk' waterbodies require not only implementation of the existing measures described in the various regulations, e.g. the Good Agricultural Practices Regulations, but also in many instances more targeted supplementary measures.
- Waterbodies that are categorised as 'Review' either because additional information is needed to determine their status before resources and more targeted measures are initiated or the measures have been undertaken, e.g. a wastewater treatment plant upgrade, but the outcome hasn't yet been measured/monitored.
- Waterbodies that are 'Not at Risk' and therefore are meeting their Water Framework Directive objectives. These require maintenance of existing measures to protect the satisfactory status of the water bodies.

2.1.2 Background to Surface Water Body Status

Under the WFD, surface water body status is classified on the basis of chemical and ecological status or potential. Ecological status is assigned to surface water bodies that are natural and considered by the EPA not to have been significantly modified for anthropogenic purposes (i.e., culverting). Ecological potential is assigned to artificial and man-made water bodies (such as canals), or natural water bodies that have undergone significant modification. The term 'ecological potential' is used as it may be impossible to achieve good ecological status because of modification for a specific use, such as navigation or flood protection. The ecological potential represents the

degree to which the quality of the water body approaches the maximum it could achieve. The worst-case classification is assigned as the overall surface water body status, in a 'one-out all-out' system (i.e., by taking the worst case of all the combined risk outcomes). This system is summarised below in Figure 2.1.

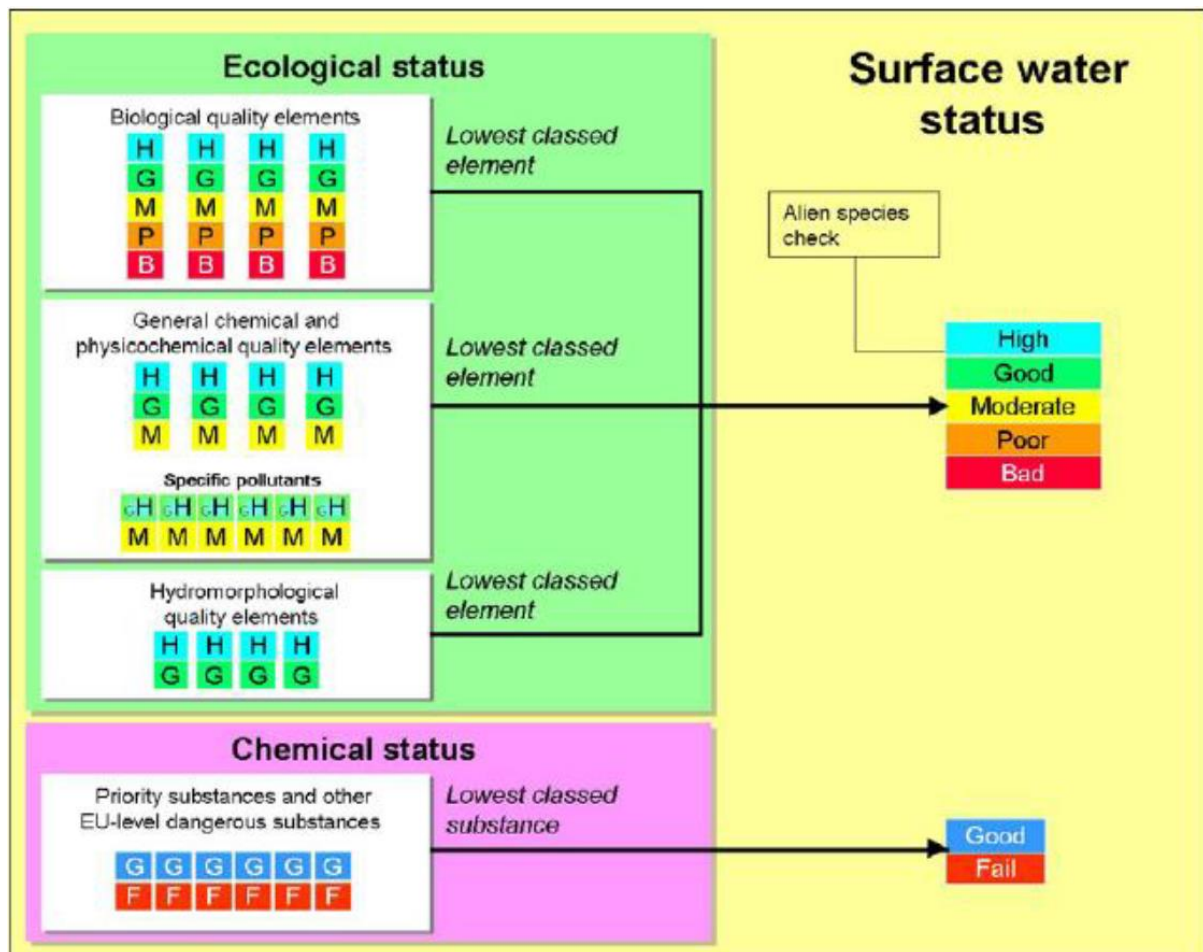


Figure 2.1 WFD classification elements for surface water body status (Environmental Agency, 2015)

Chemical Status

Chemical status is defined by compliance with environmental standards for chemicals that are priority substances and/or priority hazardous substances, in accordance with the Environmental Quality Standards Directive (2008/105/EC). This is assigned on a scale of good or fail. Surface water bodies are only monitored for priority substances where there are known discharges of these pollutants; otherwise, surface water bodies are reported as being at good chemical status.

Ecological Status

Ecological status or potential is defined by the overall health or condition of the watercourse. This is assigned on a scale of High, Good, Moderate, Poor or Bad, and on the basis of four classification elements or 'tests', as follows:

- **Biological:** This test is designed to assess the status indicated by a biological quality element such as the abundance of fish, invertebrates or algae and by the presence of invasive species. The biological quality elements can influence an overall water body status from Bad through to High.

- **Physico-chemical:** This test is designed to assess compliance with environmental standards for supporting physicochemical conditions, such as dissolved oxygen, phosphorus and ammonia. The physicochemical elements can only influence an overall water body status from Moderate through to High.
- **Specific pollutants:** This test is designed to assess compliance with environmental standards for concentrations of specific pollutants, such as zinc, cypermethrin or arsenic. As with the physico-chemical test, the specific pollutant assessment can only influence an overall water body status from Moderate through to High.
- **Hydromorphology:** For natural, this test is undertaken when the biological and physicochemical tests indicate that a water body may be of High status. It specifically assesses elements such as water flow, sediment composition and movement, continuity, and structure of the habitat against reference or 'largely undisturbed' conditions. If the hydromorphological elements do not support High status, then the status of the water body is limited to Good overall status. For artificial or highly modified waterbodies, hydromorphological elements are assessed initially to determine which of the biological and physico-chemical elements should be used in the classification of ecological potential. In all cases, assessment of baseline hydromorphological conditions are an important factor in determining possible reasons for classifying biological and physicochemical elements of a water body as less than Good, and hence in determining what mitigation measures may be required to address these failing water bodies.

2.1.3 Background to Groundwater Body Status

Under the WFD, groundwater body status is classified on the basis of quantitative and chemical status. Status is assessed primarily using data collected from the EPA monitoring network; therefore, the scale of assessment means that groundwater status is mainly influenced by larger scale effects such as significant abstraction or widespread/ diffuse pollution. The worst-case classification is assigned as the overall groundwater body status, in a 'one-out all-out' system. This system is summarised in Figure 2.2 below.

Quantitative Status

Quantitative status is defined by the quantity of groundwater available as baseflow to watercourses and water-dependent ecosystems, and as 'resource' available for use as drinking water and other consumptive purposes. This is assigned on a scale of Good or Poor, and on the basis of four classification elements or 'tests' as follows:

- **Saline or other intrusions:** This test is designed to identify groundwater bodies where the intrusion of poor quality water, such as saline water or water of different chemical composition, as a result of groundwater abstraction is leading to sustained upward trends in pollutant concentrations or significant impact on one or more groundwater abstractions.
- **Surface water:** This test is designed to identify groundwater bodies where groundwater abstraction is leading to a significant diminution of the ecological status of associated surface water bodies.
- **Groundwater Dependent Terrestrial Ecosystems (GWDTEs):** This test is designed to identify groundwater bodies where groundwater abstraction is leading to "significant damage" to associated GWDTEs (with respect to water quantity).
- **Water balance:** This test is designed to identify groundwater bodies where groundwater abstraction exceeds the "available groundwater resource",

defined as the rate of overall recharge to the groundwater body itself, as well as the rate of flow required to meet the ecological needs of associated surface water bodies and GWDTEs.

Chemical Status

Chemical status is defined by the concentrations of a range of key pollutants, by the quality of groundwater feeding into watercourses and water-dependent ecosystems and by the quality of groundwater available for drinking water purposes. This is assigned on a scale of Good or Poor, and on the basis of five classification elements or 'tests' as follows:

- **Saline or other intrusions:** This test is designed to identify groundwater bodies where the intrusion of poor-quality water, such as saline water or water of different chemical composition, as a result of groundwater abstraction is leading to sustained upward trends in pollutant concentrations or significant impact on one or more groundwater abstractions.
- **Surface water:** This test is designed to identify groundwater bodies where groundwater abstraction is leading to a significant diminution of the chemical status of associated surface water bodies.
- **Groundwater Dependent Terrestrial Ecosystems (GWDTEs):** This test is designed to identify groundwater bodies where groundwater abstraction is leading to "significant damage" to associated GWDTE's (with respect to water quality).
- **Drinking Water Protected Areas (DrWPAs):** This test is designed to identify groundwater bodies failing to meet the DrWPA objectives defined in Article 7 of the WFD or at risk of failing in the future.
- **General quality assessment:** This test is designed to identify groundwater bodies where widespread deterioration in quality has or will compromise the strategic use of groundwater.

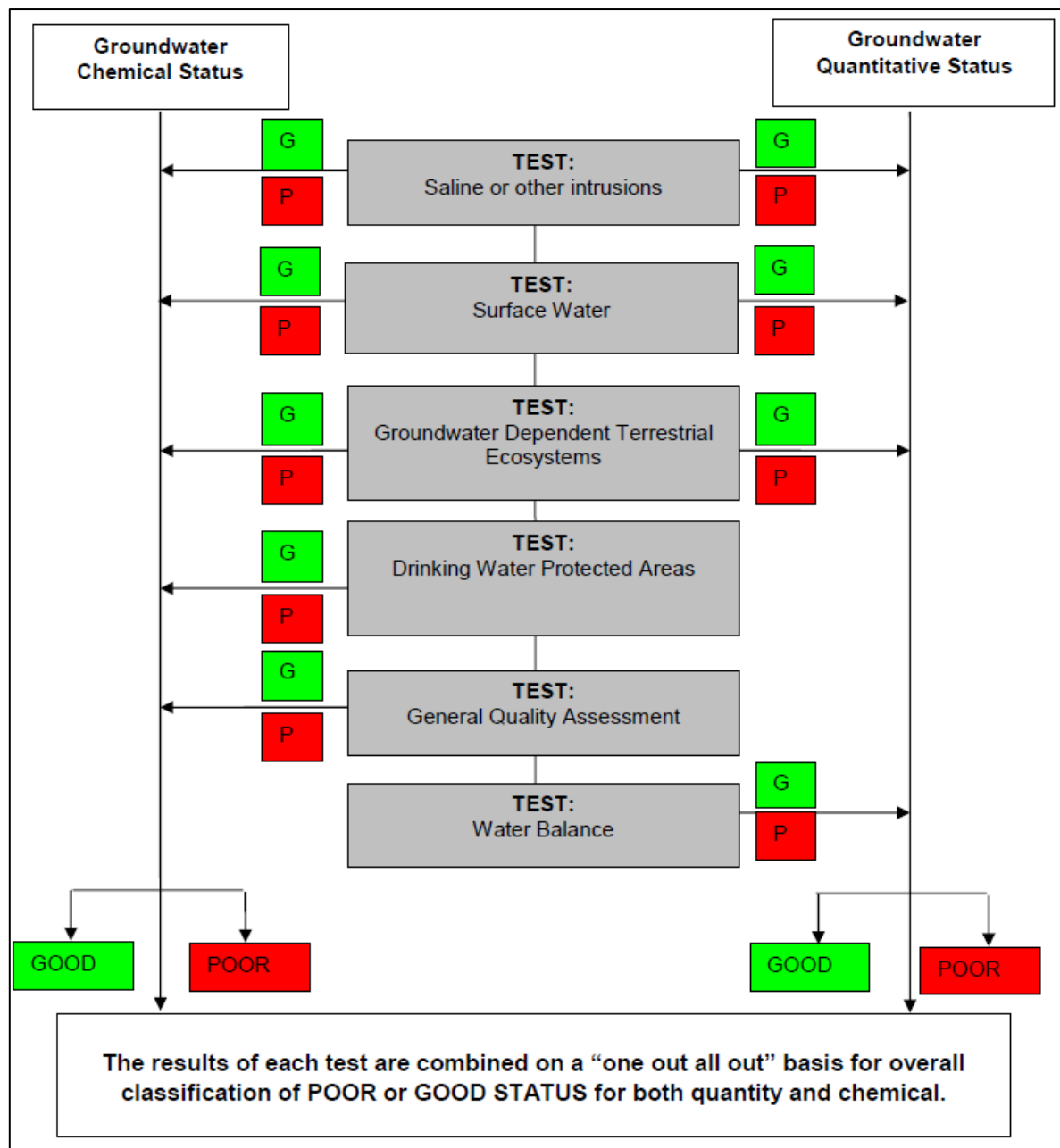


Figure 2.2 WFD classification elements for groundwater body status (Environmental Agency, 2015)

2.2 DETERMINATION OF NO DETERIORATION ASSESSMENT

Proposed developments that have the potential to impact on current or predicted WFD status are required to assess their compliance against the objectives defined for potentially affected water bodies.

2.3.1 Surface Water No Deterioration Assessment

Table 2.1 below presents the matrix developed by AWN and used to assess the effect of the proposed development on surface water status or potential class. It ranges from a major beneficial effect (i.e., a positive change in overall WFD status) through no effect

to deterioration in overall status class. The colour coding used in Table 2.1 is applied to the spreadsheet assessment in Appendix A of this report.

Table 2.1 Surface Water Assessment Matrix

Effect	Description/ Criteria	Outcome
Major Beneficial	Impacts that taken on their own or in combination with others have the potential to lead to the improvement in the ecological status or potential of a WFD quality element for the entire waterbody	Increase in status of one or more WFD element giving rise to a predicted rise in status class for that waterbody.
Minor/ localised beneficial	Impacts when taken on their own or in combination with others have the potential to lead to a minor localised or temporary improvement that does not affect the overall WFD status of the waterbody or any quality elements	Localised improvement, no change in status of WFD element
No Impact	No measurable change to any quality elements.	No change
Localised / temporary adverse effect	Impacts when taken on their own or in combination with others have the potential to lead to a minor localised or temporary deterioration that does not affect the overall WFD status of the waterbody or any quality elements. Consideration will be given to habitat creation measures.	Localised deterioration, no change in status of WFD element when balanced against mitigation measures embedded in the project.
Adverse effect on class of WFD element	Impacts when taken on their own or in combination with others have the potential to lead to the deterioration in the WFD status class of one or more biological quality elements, but not in the overall status of the waterbody. Consideration will be given to habitat creation measures.	Decrease in status of WFD element when balanced against positive measures embedded in the project.
Adverse effect on overall WFD class of waterbody	Impacts when taken on their own or in combination with others have the potential to lead to the deterioration in the ecological status or potential of a WFD quality element, which then lead to a deterioration of status/potential of waterbody.	Decrease in status of overall WFD waterbody status when balanced against positive measures embedded in the project.

2.2.2 Groundwater No Deterioration Assessment

Table 2.2 below presents the matrix used to assess the effect of the proposed development on groundwater status class. It ranges from a beneficial effect but no change in status to deterioration in overall status class. The colour coding used in Table 2.2 is applied to the final 'No Deterioration Assessment' spreadsheet in Appendix A of this report.

Table 2.2 Groundwater Assessment Matrix

Magnitude of Impact of the proposed development on WFD Element	Effect on WFD Element within the assessment boundary	Effect on Status of WFD element at the Groundwater Body Scale
Impacts lead to beneficial effect	Combined impacts have the potential to have a beneficial effect on the WFD element.	Improvement but no change to status of WFD element
No measurable change to groundwater levels or quality.	No measurable change to WFD elements.	No change and no deterioration in status of WFD element
Impacts when taken on their own have the potential to lead to a minor localised or temporary effect	Combined impacts have the potential to lead to a minor localised or temporary adverse effect on the WFD element.	Combined impacts have the potential to lead to a minor localised or temporary effect on the WFD element. No change to status of WFD element and no significant deterioration at groundwater body scale.
Impacts when taken on their own have the potential to lead to a widespread or prolonged effect.	Combined impacts have the potential to have an adverse effect on the WFD element.	Combined impacts have the potential to have an adverse effect on the WFD element, resulting in significant deterioration but no change in status class at groundwater body scale.
Impacts when taken on their own have the potential to lead to a significant effect.	Combined impacts in combination with others have the potential to have a significant adverse effect on the WFD element.	Combined impacts in combination with others have the potential to have an adverse effect on the WFD element AND change its status at the groundwater body scale

2.2.2 Assessment against Future Status Objectives

River Basin Management Plans are used to outline water body pressures and the actions that are required to address them. The future status objective assessment considers the ecological potential of a surface water body and the mitigation measures that defined the ecological potential. Assessments are based on the project (including mitigation measures) risks (construction and operation) with regard to the objectives for achieving good status as set out in the 2nd Cycle RBMP 2018-2021 and *draft* 3rd Cycle RBMP 2022-2027. The assessment considers whether the proposed development has the potential to prevent the implementation or impact the effectiveness of the defined measures in these plans.

2.3 SOURCES OF INFORMATION

The following sources of information were used in the preparation of this report:

- Geological Survey of Ireland- online mapping (GSI, 2023).
- GSI - Geological Heritage Sites & Sites of Special Scientific Interest.
- Ordnance Survey of Ireland (OSI).
- Teagasc subsoil database.
- National Parks and Wildlife services (NPWS, 2023).
- Environmental Protection Agency (EPA) – website mapping and database information. Envision water quality monitoring data for watercourses in the area.
- 3rd Cycle Draft Erne Catchment Report (HA 36) (EPA, 2021).
- River Basin Management Plan for Ireland 2018-2021.
- Draft River Basin Management Plan for Ireland 2022-2027.
- Dublin County Council Development Plan 2022-2028.
- The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW)).
- Office of Public Works (OPW) flood mapping data (www.floodmaps.ie)
- South Dublin City Council (2005), Greater Dublin Strategic Drainage Study: Technical Documents of Regional Drainage Policies. Dublin: Dublin City Council.
- 'Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors' (CIRIA 532, 2001).
- National Parks and Wildlife Services (NPWS) – Protected Site Register.

This WFD assessment was based on desktop review of the Environmental Protection agency (EPA) and Local Authority Waters Programme water quality records which were obtained from the portal www.catchments.ie (accessed on 20 February 2023). From the aforementioned source of information, the WFD Status classification and Risk score were obtained for the identified water bodies.

The River Waterbody Status have been estimated in accordance with European Communities (Water Policy) Regulations 2003 (SI no. 722/2003). The regulation objectives include the attainment of good status in waterbodies that are of lesser status at present and retaining good status or better where such status exists.

3.0 DESCRIPTION OF EXISTING HYDROLOGICAL AND HYDROGEOLOGICAL ENVIRONMENT

3.1 HYDROLOGY

The proposed development site is located within the former Eastern River Basin District (ERBD, now the Irish River Basin District), as defined under the European Communities Directive 2000/60/EC, establishing a framework for community action in the field of water policy – this is commonly known as the Water Framework Directive (WFD).

According to the EPA maps, the proposed development site lies within the Liffey and Dublin Bay Catchment (Catchment ID: 09) and the Tolka_SC_020 WFD Sub-Catchment 09-4 (Tolka_060 WFD River Sub Basin; EPA, 2023). The current EPA watercourse mapping does not include any existing streams within the proposed development site boundaries, a review of the historical mapping records provided within the GeoHive website do not indicate any watercourses within the proposed development site.

The nearest surface water feature to the proposed development site is the Tolka River. The majority of rainwater from the existing hardstanding areas and rooftops is discharged to the combined infrastructure, with minor areas of the site discharge to the storm water sewer on Richmond Road. Rainfall is also currently allowed to infiltrate naturally from the greenfield areas. Public records indicate an existing 525 mm concrete storm water sewer within the site boundary. This sewer flows in the southerly direction towards Richmond Road before discharging to the 1350 mm sewer on Richmond Road. This sewer discharges to the Tolka River immediately downstream of the site.

Figure 3.1 below presents the EPA water quality monitoring points in the context of the site and other regional drainage settings.

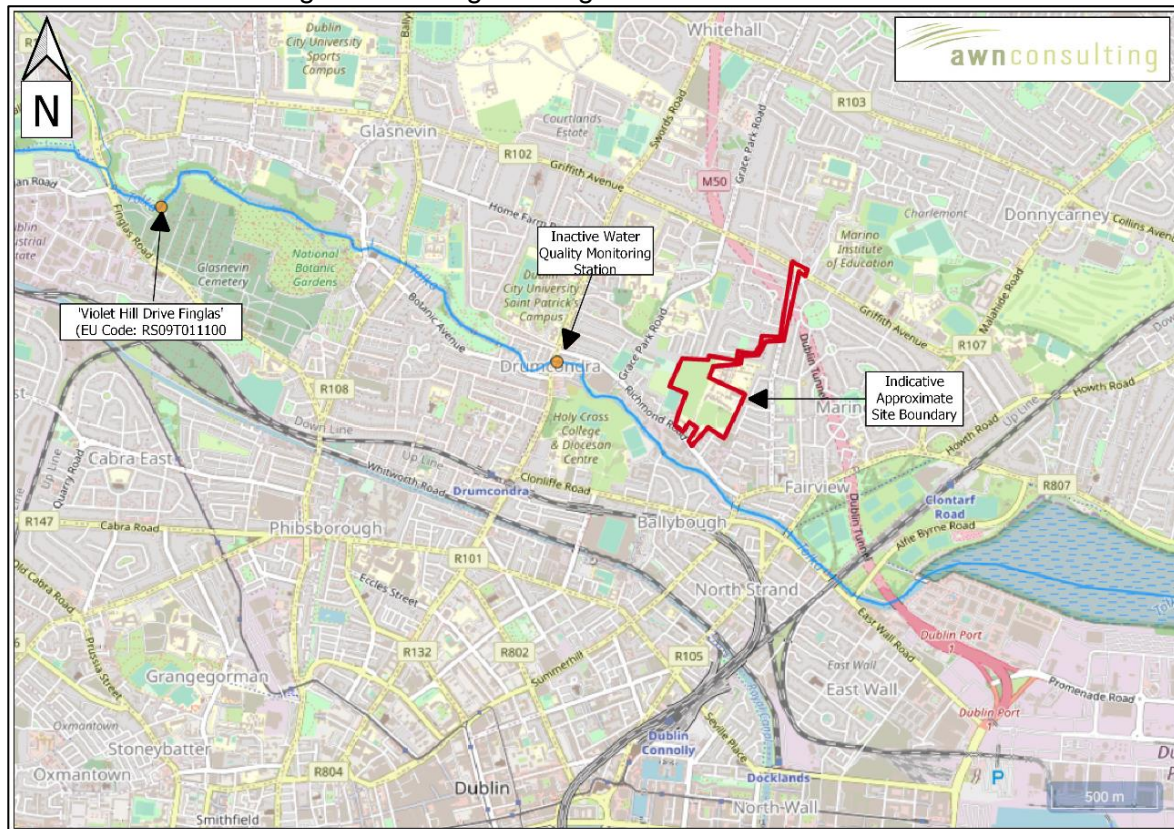


Figure 3.1 Surface Water Quality Monitoring Point (EPA, 2023) (Site location approximated, indicative only)

Surface water quality is monitored periodically by the EPA at various regional locations along principal and other smaller watercourses. With reference to the site setting, the nearest active EPA monitoring station is situated along the Tolka River upstream to the proposed development (Violet Hill Drive Finglas, c. 2.9 km upstream which belongs to Tolka_050 water body). The EPA assess the water quality of rivers and streams across Ireland using a biological assessment method, which is regarded as a representative indicator of the status of such waters and reflects the overall trend in conditions of the watercourse. The biological indicators range from Q5 - Q1. Level Q5 denotes a watercourse with good water quality and high community diversity, whereas Level Q1 denotes very low community diversity and bad water quality.

The most recent status recorded by the EPA in the water quality monitoring station located on the Tolka River mentioned above is Q3 – Poor Status (2022).

In accordance with the WFD, each river catchment within the former RBD was assessed by the EPA and a water management plan detailing the programme of measures was put in place for each. Currently, the EPA classifies the WFD Ecological Status for the Tolka River (Tolka_060 WFD) waterbody as having 'Poor' (2016-2021) with a current WFD River Waterbody risk score of 1a, 'At risk of not achieving good status'. The Tolka Estuary River located 110m to the south of the development site has a WFD status and risk score 'Poor' and 'At risk of not achieving good status', respectively.

Figure 3.2 below presents the river and transitional waterbody risk EPA map.

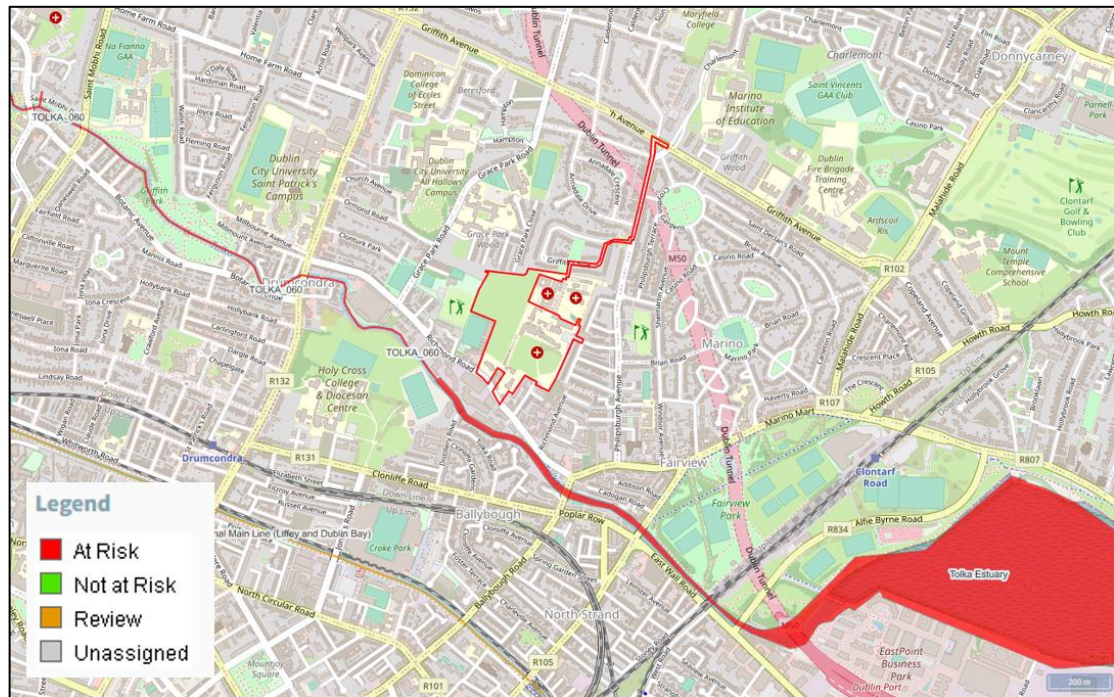


Figure 3.2 River Waterbody Score - 1a 'At risk of not achieving good status, WFD Ecological Status: Poor (Site red boundary approximated, indicative only).

As a whole, the Tolka Subcatchment (Tolka_SC_020) is considered to have an ecological status of 'Poor'. This is based on current monitoring carried out at this catchment level along the Tolka River. The Tolka_060 and Tolka Estuary waterbody are examined in terms of water quality as these sections of waterbodies are indirectly connected to the proposed development site. Both waterbodies are considered to have an ecological status of 'Poor' due to their ecological / biological conditions. Refer to Figure 3.3 and Figure 3.4 below.















Waterbody: TOLKA_060			
Name:	TOLKA_060	Code:	IE_EA_09T011150
Subcatchments:	09 4 Tolka_SC_020	Catchments:	09 Liffey and Dublin Bay
Latitude:	53.3718803	Longitude:	-6.2643401
Cycle 1 RBD:	Eastern	Local Authority:	Dublin City Council
Waterbody Category:	River	WFD Risk:	At risk
Protected Area:	Yes	High Status Objective:	No
Heavily Modified:	Unknown	Artificial:	Unknown
Area (Km ²):	N/A	Length (Km):	3.00
Transboundary:	No	Canal:	No
SW 2016-2021			
Status	Assessment Technique	Status Confidence	Value
▼ Ecological Status or Potential	Modelling	low confidence	Poor 
▼ Supporting Chemistry Conditions			Good 
▼ General Conditions			Good 
▼ Oxygenation Conditions			Pass 
Dissolved Oxygen (% Sat)			Pass 
Other determinand for oxygenation conditions			High 
Acidification Conditions			Pass 
pH			Pass 
Nutrient Conditions			Good 
Nitrogen Conditions			Good 
Nitrate			Good 
Ammonium			Good 
Phosphorous Conditions			Good 
Orthophosphate			Good 

Figure 3.3 Surface Water Quality for the Tolka_060 waterbody, EPA, 2023.













Waterbody: Tolka Estuary			
Name:	Tolka Estuary	Code:	IE_EA_090_0200
Catchments:	09 Liffey and Dublin Bay		
Latitude:	53.3611	Longitude:	-6.17673
Cycle 1 RBD:	Eastern	Local Authority:	Dublin City Council
Waterbody Category:	Transitional	WFD Risk:	At risk
Protected Area:	Yes	High Status Objective:	No
Heavily Modified:	No	Artificial:	No
Area (Km²):	3.57	Length (Km):	N/A
Transboundary:	No		
SW 2016-2021			
Status	Assessment Technique	Status Confidence	Value
▼ Ecological Status or Potential	Monitoring	high confidence	Poor 
▼ Biological Status or Potential			Poor 
Phytoplankton Status or Potential			Moderate 
Invertebrate Status or Potential			Moderate 
Hydromorphological Conditions			Good 
▼ Supporting Chemistry Conditions			Moderate 
▼ General Conditions			Moderate 
▼ Oxygenation Conditions			Moderate 
Dissolved Oxygen (% Sat)			Moderate 
Other determinand for oxygenation conditions			Good 
▼ Nutrient Conditions			Moderate 
Phosphorous Conditions			Moderate 

Figure 3.4 Surface Water Quality for the Tolka Estuary waterbody, EPA, 2023.

According to the sub-catchment assessment of the Tolka subcatchment (Tolka_SC_020) carried out by the EPA in January 2019, there are a number of pressures within this sub-catchment that impact on the hydrological environment (refer to www.catchments.ie). All the water bodies within this subcatchment are 'At Risk' (Tolka Estuary, Liffey Estuary Lower & Upper, Tolka_040, Tolka_050 and Tolka_060) due to poor biological status (driven by invertebrates) and hydromorphological conditions (in the case of Liffey Estuary).

Tolka_060 and Tolka Estuary waterbodies are 'At Risk' due to diffuse urban run-off and combined sewer overflows. There are a lot of industrial pressures throughout the sub-catchment, but urban diffuse and misconnections are providing the majority of the problems. There have been misconnection studies initiated and extensive studies throughout the Tolka Valley Park area. Illegal dumping is also an issue in the Dunsink Lane area.

The below list is a list of all significant pressures identified in the sub-catchment (Figure 3.5).

Code	Name	WFD Risk	Pressure Category	Pressure Sub Category
IE_EA_090_0200	Tolka Estuary	At risk	Urban Waste Water	Combined Sewer Overflows
IE_EA_090_0300	Liffey Estuary Lower	At risk	Urban Waste Water	Agglomeration PE > 10,000
IE_EA_090_0300	Liffey Estuary Lower	At risk	Urban Waste Water	Combined Sewer Overflows
IE_EA_090_0400	Liffey Estuary Upper	At risk	Urban Waste Water	Combined Sewer Overflows
IE_EA_09T011000	TOLKA_040	At risk	Urban Run-off	Diffuse Sources Run-Off
IE_EA_09T011100	TOLKA_050	At risk	Urban Run-off	Diffuse Sources Run-Off
IE_EA_09T011100	TOLKA_050	At risk	Urban Waste Water	Combined Sewer Overflows
IE_EA_09T011150	TOLKA_060	At risk	Urban Run-off	Diffuse Sources Run-Off
IE_EA_09T011150	TOLKA_060	At risk	Urban Waste Water	Combined Sewer Overflows

Figure 3.5 List of main pressures for all waterbodies within the Tolka Subcatchment (Tolka_SC_020).

3.2 HYDROGEOLOGY

3.2.1 Aquifer Classification

The GSI has devised a system for classifying the bedrock aquifers in Ireland. The aquifer classification for bedrock depends on a number of parameters including, the area extent of the aquifer (km²), well yield (m³/d), specific capacity (m³/d/m) and groundwater throughput (mm³/d). There are three main classifications: regionally important, locally important and poor aquifers. Where an aquifer has been classified as regionally important, it is further subdivided according to the main groundwater flow regime within it. This sub-division includes regionally important fissured aquifers (Rf) and regionally important karstified aquifers (Rk). Locally important aquifers are subdivided into those that are generally moderately productive (Lm) and those that are generally moderately productive only in local zones (LI). Similarly, poor aquifers are classed as either generally unproductive except for local zones (PI) or generally unproductive (Pu).

The bedrock aquifer underlying the site according to the GSI (www.gsi.ie/mapping) National Draft Bedrock Aquifer Map is classified as a (LI) *Locally Important Aquifer – Moderately Productive only in Local Zones*.

Aquifer vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated generally by human activities. Due to the nature of the flow of groundwater through bedrock in Ireland, which is almost completely through fissures/fractures, the main feature that protects groundwater from contamination, and therefore the most important feature in the protection of groundwater, is the subsoil (which can consist solely of/ or of mixtures of peat, sand, gravel, glacial till, clays or silts).

Groundwater Vulnerability is a term used to represent the natural ground characteristics that determine the ease with which groundwater may be contaminated by human activities. The GSI currently classifies the aquifer vulnerability in the region of the subject site as 'Low (L)' to which indicates an overburden depth greater than 10m of low permeability soil present.

The aquifer vulnerability classification is consistent with data obtained from the site investigations carried out by (GII) between September and November 2021 (GII, 2022) at the proposed development site. The depth to rock across the site varies from 15.5m to a maximum of 22.5m below ground level. Refer to Chapter 5 of the EIAR (Land, Soils, Geology and Hydrogeology), and Appendix 5.2 of the EIAR for further details.

3.2.2 Groundwater Quality

The Water Framework Directive (WFD) 2000/60/EC was adopted in 2000 as a single piece of legislation covering rivers, lakes, groundwater, transitional (estuarine) and coastal waters. In addition to protecting said waters, its objectives include the attainment of 'Good Status' in water bodies that are of lesser status at present and retaining 'Good Status' or better where such status exists at present. 'Good Status' was to be achieved in all waters by 2015, as well as maintaining 'high status' where the status already exists. The EPA co-ordinates the activities of the River Basin Districts, local authorities and state agencies in implementing the directive, and operates a groundwater quality monitoring programme undertaking surveys and studies across the Republic of Ireland.

The Groundwater Body (GWB) underlying the site is the Dublin GWB (EU Groundwater Body Code: IE_EA_G_008). Currently, the EPA (2023) classifies the Dublin GWB as having 'Good Status', and its Ground Waterbody Risk score is currently 'Under Review'. The Dublin GWB has a Good Status for chemical and quantitative categories. Therefore, the overall status is considered Good.

3.3 PROJECT DETAILS

The surface water assessment and the groundwater assessment both examine the potential effects of the proposed development, which includes the construction and operation of the proposed development.

3.3.1 Construction Phase

The key activities for the WFD assessment are as follows:

- **Ground Works:** It is known that ground works will comprise excavation and levelling for foundations, basement and piling and laying of associated services for the data centre buildings and movement of soil for landscaping purposes.
- **Dewatering:** It is expected that localised and temporary groundwater dewatering will be required as part of the excavation works. Given the depth of bedrock underlying the site (15.5 – 22.5 m below ground level) and the projected excavation levels (up to 4.5 m below ground level), the expected dewatering will be associated with perched groundwater within the subsoils and not with the regional aquifer within the bedrock.
- **Surface Water Run-off:** Surface water run-off and dewatering from excavations will be discharged to ground or sewer following settlement and treatment (if required).

The potential effects identified are as a result of:

- Permanent land take (increased hardstanding area) during the operational phase.
- Suspended solids (muddy water with increased turbidity (measure of the degree to which the water loses its transparency due to the presence of

- suspended particulates) – arising from dewatering, excavation and ground disturbance;
- Cement/concrete (increase turbidity and pH) – arising from construction materials;
 - Hydrocarbons (ecotoxic) – accidental spillages from construction plant or onsite storage;
 - Wastewater (nutrient and microbial rich) – arising from poor on-site toilets and washrooms.
 - Temporary land-take during the construction phase (excavation works); Excavation of c. 110,000m³ of top soil, subsoils and stones will be required for foundations, piling and basement and for levelling of the site. Local removal and reinstatement (including infilling) of the 'protective' topsoil and subsoil cover across the development area at the site will not change the overall vulnerability category for the site which is already 'Low'. Capping of significant areas of the site by hardstand/ building following construction and installation of drainage will minimise the potential for contamination of the aquifer beneath the site.
 - Piling and below ground working causing mobilisation of contaminants during the construction and operational phases.

3.3.2 Operational Phase

There is no abstraction of groundwater proposed. In the design and storage calculations, discharge to ground has been accounted for, taking into consideration the favourable infiltration conditions across the site. Infiltration is facilitated at the base of the attenuation tanks and pervious paving surfaces, which significantly contributes to the approval of the use of underground attenuation systems by DCC.

There is no bulk chemical or fuels required during operation. As such the only potential for a leak or spill of petroleum hydrocarbons is from vehicles. Unmitigated spills may lead to local contamination of soil. However, it is noted that during the operational phase any accidental discharge will more likely impact stormwater drainage due to the hardstand and drainage infrastructure proposed and any releases to drainage will be mitigated through petrol interceptors.

The proposed incorporation of hardstand area and the use of SUDs design measures will have a minor effect on local recharge to ground; however, the impact on the overall groundwater regime will be insignificant considering the proportion of the site area in relation to the total aquifer area. It is noted that a significant proportion of the site is unpaved, and recharge will continue as current. SuDS measures have been incorporated in the design to facilitate recharge to ground.

3.4 MITIGATION AND DESIGN MEASURES

The design has taken account the potential impacts of the proposed development on the hydrological environment local to the area where construction is taking place. The only potential for impact during construction is accidental releases and there is limited potential for any contaminant release during operation.

3.4.1 Construction Phase

The following mitigation measures will be implemented during the construction phase.

Suspended solids management.

As there is potential for run-off to indirectly discharge / recharge to a watercourse / groundwater (Tolka River/ Dublin GWB) underlying the site and in order to manage the potential impact associated with sediment and sediment runoff the following mitigation measures will be implemented during the construction phase.

- During earthworks and excavation works care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts.
- Run-off water containing silt will be contained on site via settlement tanks and treated to ensure adequate silt removal.
- Silt reduction measures on site will include a combination of silt fencing and settlement measures (silt traps, silt sacks and settlement tanks/ponds).
- Any hard surface site roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.
- A power washing facility or wheel cleaning facility will be installed near to the site compound for use by vehicles exiting the site when appropriate,
- A stabilised entranceway consisting of an aggregate on a filter cloth base that is located at any entry or exit point of the construction site.
- Aggregate will be established at the site entrance points from the construction site boundary extending for at least 10 m.
- The temporary storage of soil will be carefully managed. Stockpiles will be tightly compacted to reduce runoff and graded to aid in runoff collection.
- Construction materials, including aggregates etc. will be stored a minimum of 20-meter buffer distance from any surface water bodies and surface water drainage points.
- Aggregate materials such as sands and gravels will be stored in clearly marked receptacles within a secure compound area to prevent contamination.
- Movement of material will be minimised to reduce the degradation of soil structure and generation of dust.
- Excavations will remain open for as little time as possible before the placement of fill. This will help to minimise the potential for water ingress into excavations.
- Weather conditions will be considered when planning construction activities to minimise the risk of run-off from the site.
- Any surface water run-off collecting in excavations will likely contain a high sediment load. This will not be allowed to directly discharge directly to the stormwater sewer, Tolka River.

In addition to the measures above, all excavated materials will be visually assessed by suitably qualified persons for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

Surface water discharge from the site will be managed and controlled for the duration of the construction works until the permanently attenuated surface water drainage system of the proposed site is complete. A temporary drainage system shall be established prior to the commencement of the initial infrastructure construction works to collect and discharge any treated construction water during construction.

Cement/concrete works

Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil.

No wash-down or wash-out of ready-mix concrete vehicles during the construction works will be carried out at the site within 10 meters of an existing surface water drainage point. Washouts will only be allowed to take place in designated areas with an impervious surface where all wash water is contained and removed from site by road tanker or discharged to foul sewer submit to agreement with Irish Water / DCC.

The construction contractor will be required to implement emergency response procedures, and these will be in line with industry guidance. All personnel working on the Site will be suitably trained in the implementation of the procedures.

Hydrocarbons and other construction chemicals

The following mitigation measures will be implemented during the construction phase in order to prevent any spillages to ground of fuels and other construction chemicals and prevent any resulting to surface water and groundwater systems:

- Designation of bunded refuelling areas on the Site.
- Provision of spill kit facilities across the Site.
- Where mobile fuel bowers are used, the following measures will be taken:
 - Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use.
 - The pump or valve will be fitted with a lock and will be secured when not in use.
 - All bowers to carry a spill kit and operatives must have spill response training.
 - Portable generators or similar fuel containing equipment will be placed on suitable drip trays.

In the case of drummed fuel or other potentially polluting substances which may be used during the construction phase, the following measures will be adopted:

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area;
- Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be stored within temporary bunded areas, doubled skinned tanks or bunded containers to a volume of 110% of the capacity of the largest tank/container. Drainage from the bunded area(s) shall be diverted for collection and safe disposal.
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage.
- All drums to be quality approved and manufactured to a recognised standard.
- If drums are to be moved around the Site, they will be secured and on spill pallets; and
- Drums will be loaded and unloaded by competent and trained personnel using appropriate equipment.

Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in a designated area or within the construction compound (or where possible off the site) which will be away from surface water gulleys or drains (minimum 20 m buffer zone). In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) will be complied with.

The construction contractor will be required to implement emergency response procedures, and these will be in line with industry guidance. All personnel working on the Site will be suitably trained in the implementation of the procedures.

Disposal of collected water (rainfall run-off and perched water)

Rainfall at the construction site will be managed and controlled for the duration of the construction works until the permanently intercepted and attenuated surface water drainage system of the proposed site is complete. Dewatering water from excavation works within overburden deposits will be contained within the site, treated (if required) and discharged. Depending on the quality of this water the discharge of this treated water will occur to either; to surface water (via the storm water network to the Tolka River); or to Ringsend WWTP (via the combined foul wastewater network).

A staged treatment system (treatment-train) will be in place during construction works that will ensure the quality of the discharge water to foul sewer and storm sewer is maintained in accordance with discharge permit conditions. The dewatering will occur via suitably installed dewatering wells/sumps containing pumps to abstract groundwater and surface water (rainfall landing on the site) into a flocculation system and settlement and floating oil adsorption lined pond system from which compliant water will be abstracted via floating pumps that take water preferentially from near the surface. The system will contain sensors that will record live data to monitor discharge rate (Flow), cumulative volume, pH, temperature, turbidity (proxy for suspended solids), rainfall and water level which will display on a remotely monitored telemetry and integrated automation system. This system contains automatic controls to switch on and off pumps remotely based on the live data received from sensors on the site, meaning it can detect the water quality in the treatment system and divert the discharge to either the foul sewer, the storm sewer or cease pumping depending on compliance with the discharge licence conditions (i.e. if pH approaches pH 9, then flow will divert from storm to foul, if flow approaches pH 10, discharge ceases or pumping ceases from certain areas of the site only until suitable mitigation or treatment is applied. The telemetry system will also be monitored by a competent person who also checks the CCTV cameras that are installed in the system to monitor water quality. Water samples will be taken at the frequency that the discharge licence dictates and sent to an accredited laboratory for analysis. Weekly discharge licence reports will be submitted to the licensing authorities containing details of emission limit value compliance and flows. The aim of employing this technology is to assist in achieving a 100% Dry Compliant Site.

The treatment system will ensure that the discharge to foul sewer does not exceed the following parameters (or otherwise stipulated by discharge permit conditions); Temperature (Maximum 35 degrees C), pH (6-10 pH units), Suspended Solids (24hr Average 100mg/l, Maximum 200mg/l), BOD (24hr Average 100mg/l, Maximum 200mg/l), COD-Cr (24hr Average 200mg/l, Maximum 400mg/l), Total Petroleum Hydrocarbons (24hr Average 5mg/l, Maximum 5mg/l), Mineral Oils (24hr Average

10mg/l, Maximum 10mg/l). Maximum allowable daily load (kg/day) will also be stipulated for each of the emission limit values (apart from pH and temperature).

The treatment system will ensure that the discharge to storm sewer does not exceed the following parameters (or otherwise stipulated by discharge permit conditions); Temperature (Maximum 25 degrees C), pH (6-9 pH units), Suspended Solids (24hr Average 20mg/l, Maximum 30mg/l), BOD (24hr Average 5mg/l, Maximum 10mg/l), COD (24hr Average 20mg/l, Maximum 40mg/l), Phosphates (as PO₄-P) (Maximum 1mg/l), Sulphates (as SO₄) (Maximum 100mg/l), Ammonium as N (1mg/l), Nitrates as N (Maximum 10mg/l N), Total petroleum hydrocarbons (Maximum 1mg/l). Maximum allowable daily load (kg/day) will also be stipulated for each of the emission limit values (apart from pH and temperature).

The discharge to surface water sewer is subject to agreement with Dublin City Council (DCC); and the discharge to the combined foul sewer are subject to agreement with Irish Water (IW).

The quality of discharged water to the foul and storm network is expected to be compliant with respective licence conditions following treatment and management. In case of any exceedances of the above parameters (or otherwise stipulated by discharge permit conditions), water will be retreated on site, or disposed of to a licenced facility. The discharges to storm water and combined foul water network shall comply with the requirements established in the discharge licence to Dublin City Council (for storm water network) and/or Irish Water (for foul water network).

Wastewater Management

Foul wastewater discharge from the site will be managed and controlled for the duration of the construction works.

Site welfare facilities will be established to provide sanitary facilities for construction workers on site. The main contractor will ensure that sufficient facilities are available at all times to accommodate the number of employees on site. Foul water from the offices and welfare facilities on the site will discharge into the existing sewer on site (the cabins may initially need to have the foul water collected by a licensed waste sewerage contractor before connection to the sewer line can be made).

The construction contractor will implement emergency response procedures, and these will be in line with industry guidance. All personnel working on the Site will be suitably trained in the implementation of the procedures.

Management of Surface Water Flow Paths

During construction a site drainage and protection system will be built to reduce the flow of run-off from the site, prevent soil erosion, and protect water quality in the Tolka River. Temporary excavated channels, bunds, or ridges or a combination of the three, may be constructed to divert sediment-laden water to an appropriate sediment retention structure. These will be installed to provide permanent diversion of clean stormwater away from erosion exposed soil areas, or to provide a barrier between exposed areas and unexposed areas of the construction site. Runoff diversion channels/bunds need regular maintenance to keep functioning throughout their life.

Silt fences will be installed around the perimeter of the site where construction is proposed to detain flows from runoff so that deposition of transported sediment can occur through settlement. Inspection and maintenance of the silt fences during

construction phase is crucial to ensuring that they work as intended. They will remain in place throughout the entire construction phase.

It is envisaged that a number of geotextile lined settling basins and temporary mounding's and/or silt fences will be installed to ensure silts do not flow off site during the construction stage. This temporary surface water management facility will throttle runoff and allow suspended solids to be settled out and removed. All inlets to the settling basins will be 'riprapped' to prevent scour and erosion in the vicinity of the inlet.

Surface water discharge from the site will be managed and controlled for the duration of the construction works until the permanently attenuated surface water drainage system of the proposed site is complete. A temporary drainage system shall be established prior to the commencement of the initial infrastructure construction works to collect and discharge any treated construction water during construction.

3.4.2 Operational Phase

The proposed development stormwater drainage network design includes sustainable drainage systems (SuDS) these measures by design ensure the stormwater leaving the site is to be attenuated and treated within the new development site boundary to ensure suitable quality, before discharging to the existing public surface water network on Richmond Road, which subsequently outfalls to the nearby Tolka River.

The purpose of the proposed design is to:

- Treat runoff and remove pollutants to improve quality.
- Restrict outflow and to control quantity.
- Increase amenity value.

The layout of the proposed surface water drainage network is shown on OCSC Drawing Set included with this Application. It is proposed to separate the surface water and wastewater drainage networks, which will serve the proposed development, and provide independent connections to the local public surface water and wastewater sewer networks respectively.

3.5 ASSESSMENT OF SOURCE PATHWAY LINKAGES

This section presents the information related to the current waterbody status identified in the development area.

The proposed development site lies within the Liffey and Dublin Bay Catchment (Catchment ID: 09) and the Tolka_SC_020 WFD Sub-Catchment 09-4 (Tolka_060 WFD River Sub Basin; EPA, 2023).

The Groundwater Body (GWB) underlying the site is the Dublin GWB (EU Groundwater Body Code: IE_EA_G_008).

This WFD Screening has identified two (2) no. WFD surface water bodies and one (1) no. WFD groundwater bodies of relevance due to the close proximity and connection of these waterbodies during the construction and operation of the proposed development.

The water bodies are listed in Table 3.1

Table 3.1 WFD water bodies located within the study area

Type	WFD Classification	WFD Status (2016-2021)	WFD Risk	Waterbody Name / ID	Location
Surface Water	River	Poor	At Risk of Not Achieving Good Status	Tolka River Tolka_060 (IE_EA_09T011150)	Located 180 m to the west of the proposed development site.
	Transitional	Poor	At Risk of Not Achieving Good Status	Tolka Estuary (IE_EA_090_0200)	Located 110 m to the south of the proposed development site.
Groundwater	Groundwater	Good	<i>Under Review</i>	Dublin Groundwater Body (GWB) (IE_EA_G_008)	Groundwater body immediately underlying the proposed development site.

During the construction phase, there will be an indirect connection to the via surface water to the Tolka River, and to the South Dublin Bay through discharge to sewer (following settlement and treatment where required). During operational phase, there is an indirect connection to the Tolka Estuary transitional body through the projected stormwater drainage. There is no connection to the Tolka_060 waterbody as it is located upstream of the proposed development and the discharge from the public stormwater sewer.

There will also be indirect hydrological connection to Liffey River Estuary Lower transitional waterbody through the foul water discharge which will be treated off site at Ringsend Waste Water Treatment Plant (WWTP). However, this waterbody has been excluded from the assessment due to their distance from the subject site, the potential loading of contaminant from the site and significant dilution through its pathway.

The table below (Table 3.2) describes the S-P-R model for the site and includes the robust mitigation and design measures which will be incorporated into the proposed development throughout the construction and operational phases.

Table 3.2 Pollutant Linkage Assessment (with mitigation)

Source	Pathways	Receptors considered	Risk of Impact	Mitigation Measures
Construction Impacts (Summary)				
Discharge to ground of runoff and dewatering. Unmitigated leak from an oil tank to ground/ unmitigated leak from construction vehicle (1,000 litres worst case scenario).	Bedrock protected by >10m low permeability overburden. Low fracture connectivity within the limestone will limit any potential for offsite migration.	Limestone bedrock aquifer (Locally Important Aquifer)	Low risk of migration through poorly connected fracturing within the limestone rock mass. No likely impact on the status of the aquifer/off site migration due to mitigation measures (i.e. CEMP), low potential loading, natural attenuation within overburden and discrete nature of fracturing reducing off site migration.	Only potential for temporary impacts due to accidental releases. A CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIA Report and any subsequent conditions relevant to the proposed development. These include management of soils, re-fuelling of machinery and chemical handling, control of water during the construction phase and treatment of discharge water where required.
Discharge to ground of runoff water with High pH from cement process/ hydrocarbons from construction vehicles/run-off containing a high concentration of suspended solids	Indirect pathway to hydrological environment via stormwater drainage	Hydrological environment (Tolka River)	No perceptible risk due to the implementation of the mitigation measures	
Operational Impacts (Summary)				
Discharge of untreated water off-site	Indirect pathway to hydrological environment via surface water drainage system	Hydrological environment (Tolka River)	No perceptible risk due to the implementation of the mitigation and design measures which includes SuDS techniques and the use of interceptors along the drainage system.	The proposed development is designed to ensure the protection of the hydrological environment such as delivery and distribution and use of oil interceptors on the stormwater system and the use of SuDS techniques. In order to limit the surface water discharge from the site to pre-development, greenfield rates, and to ensure improvement in the overall surface water quality before ultimate discharge the principles of Sustainable Drainage Systems, (SuDS) are to be implemented.
Discharge of foul water to the Ringsend Waste Water Treatment Plant (WWTP)	Indirect pathway to Liffey Estuary Lower through public foul sewer post treatment at the WWTP.	Hydrological environment (Liffey Estuary Lower)	No perceptible risk to the hydrological environment and the WWTP as Irish Water (IW) have confirmed that there is adequate capacity for the proposed wastewater discharge.	Irish Water (IW) have confirmed that there is adequate capacity for the proposed wastewater discharge outlined in the pre-connection enquiry (CDS22004338) in their response letter dated 31 January 2023.

4.0 NO DETERIORATION ASSESSMENT

4.1 HYDROLOGICAL ENVIRONMENT

The proposed development has an indirect hydrological connection to the Tolka River (Tolka Estuary WFD Surface Water Body) as the proposed stormwater drainage discharges into an existing public sewer which ultimately discharges to the Tolka River c. 110 m downstream.

There are mitigation and design measures which will be implemented during the construction phase to protect the hydrological and hydrogeological environment. There is a potential of accidental discharges during the construction phase, however these are temporary short-lived events that will not impact on the water status of waterbodies long-term and as such will not impact on trends in water quality and overall status assessment.

It is expected that localised groundwater dewatering will be required as part of the excavation works; however, it will be associated with perched groundwater within the subsoils and not with the regional aquifer within the bedrock. As such the proposed development will not have an impact on the quantitative aspects in consideration of water body status such as baseflow for the hydrological waterbodies.

The project-specific OCMP which the works Contractor will develop will implement strict mitigation measures to ensure the protection of the hydrological (and hydrogeological) environment during construction which will ensure that there will be no negative impact on the quantitative or qualitative or morphology of the nearby watercourses.

There are limited indirect discharges of water during the operational phase to open waterbody/ watercourse and no long-term groundwater dewatering for the proposed development. The discharges will be adequately treated via SuDS measures, hydrobrake (or equivalent) and oil/water interceptor to ensure there is no long-term negative impact to the WFD water quality status of the receiving watercourse. The SuDS and proposed measures have been designed in detail with the ultimate aim of protecting the hydrological (& hydrogeological) environment. The SuDS and project design measures will be maintained correctly as per specifications to ensure long-term/ on-going integrity of same.

There are no changes to the overall hydrological and hydrogeological regime as a result of the proposed development. There are no proposed diversions of any drainage ditches or waterbodies as part of the proposed development.

Overall, the potential effects on the current status of the waterbodies are considered *no impact i.e. no change to the WFD status or elements in terms of the hydrological environment*.

4.2 HYDROGEOLOGICAL ENVIRONMENT

As mentioned above, the proposed development will involve dewatering of the perched groundwater within the subsoils and not with the Dublin Groundwater Body which is confined within bedrock. As such the proposed development will not have an impact on the quantitative aspects in consideration of water body status such as baseflow for

the hydrological waterbodies. During operation there is no current proposal for dewatering.

For the construction phase, there are mitigation and design measures which will be implemented during this phase to protect the hydrogeological environment. There is a potential of accidental discharges during the construction phase, however these are temporary short-lived events that will not impact on the water status of the underlying bedrock aquifer long-term and as such will not impact on trends in water quality and over all status assessment.

The project-specific OCMP which the works Contractor will develop will implement strict mitigation measures to ensure the protection of the hydrogeological environment during construction which will ensure that there will be no negative impact on the quantitative or qualitative of the underlying bedrock limestone aquifer (Dublin GWB).

In terms of the operational phase, the risk to the aquifer is considered to be low due to the use of oil interceptors on the stormwater system prior to discharge from the site.

Overall, the potential effects on the WFD status to the waterbodies are considered no impact i.e. no change to the current status or elements in terms of the underlying hydrogeological environment.

4.3 ASSESSMENT IN TERMS OF FUTURE GOOD STATUS

The Tolka Estuary and Dublin GWB are examined in terms of water quality as these sections of waterbodies are indirectly connected to the proposed development site. Currently, the EPA classifies the WFD Ecological Status for the Tolka Estuary waterbody as having 'Poor Status' (2016-2021) based on current monitoring with a current WFD River Waterbody risk score of 1a, '*At risk of not achieving good status*'. Therefore, the objective is currently not being achieved.

According to the sub-catchment assessment of the Tolka catchment (Tolka_SC_020) carried out by the EPA in January 2019, there are a number of pressures within this sub-catchment that impact on the hydrological environment. Diffuse urban run-off and combined sewer overflows were identified as the likely significant pressure within Tolka Estuary. The EPA classifies the WFD Ecological Status for the Dublin groundwater body as having '*Good Status*' (2016-2021) and its WFD Waterbody risk score is '*under review*' (refer to www.catchments.ie).

As mentioned above, the main pressure for obtaining good status is urban run-off and wastewater. The discharges associated with the proposed development will be treated and attenuated prior to discharge off-site. Foul water will be discharged and treated by the Ringsend WWTP which is licensed by the EPA. Therefore, the proposed development will not have any discharges which will hinder catchment improvement measures.

The 2nd cycle of the RBMP 2018-2021 does not include the Tolka River Subcatchment as an Area for Action (but it does include the Upper Tolka catchment), and therefore has not been highlighted for restoration by the *draft* 3rd cycle of the RBMP 2022-2027. However, the key objective for this waterbody is to have a *Good* status by 2027.

The objective of the Dublin GWB is Good for 2021. Therefore, the objective is currently being met.

At present there are no local targeted measures within the catchments to maintain or achieve improvements to the status of the water bodies. However, the following are some pressures associated with waterbody catchments:

- Physical Modifications.
- Management of pollution from agricultural activities.
- Management of pollution from sewage and waste water.
- Management of pollution from urban environments.
- Changes to natural flow and levels of water.
- Managing invasive non-native species.

Based on the above information it is not considered that any of the aspects of the proposed development will prevent the WFD objectives from being achieved or to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

5.0 CONCLUSIONS

Appendix A contains the surface water and groundwater assessments where the above potential effects are considered. The colour coded system referred to in Table 2-1 and Table 2-2 above is used to give a visual impression of the assessment.

The WFD assessment indicates that, based on the current understanding of the proposed development, there is no potential for adverse or minor temporary/ long-term or localised effects on the Tolka Estuary surface water body. Therefore, it has been assessed that the proposed development will not cause any significant deterioration or change in water body status or prevent attainment, or potential to achieve, future good status or to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

The WFD assessment indicates that there is no potential for adverse or minor temporary or localised effects on the Dublin groundwater body. Therefore, it has been assessed that it is unlikely that the proposed development will cause any significant deterioration or change on its water body status or prevent attainment, or potential to achieve the WFD objectives or to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

No further assessment of WFD is recommended given that no significant deterioration or change in water body status is expected based on the current understanding of the proposed development during construction and operation.

6.0 STUDY LIMITATIONS

The conclusions and recommendations listed above are based on our current understanding of the site. This has been formed from review of historical maps, review of current and previous environmental and engineering reports for the proposed development site. This information is taken as being accurate and true.

Public databases held by the EPA, GSI, OPW, NPWS and OSI have been consulted and the most recent available data has been referenced.

No subsurface or destructive testing was carried out as part of this assessment.

7.0 REFERENCES

- EPA, (2023). Environmental Protection Agency, on-line mapping; Available on-line at: <http://gis.epa.ie/Envision> [Accessed: 20-02-2023].
- GSI, (2023). Geological Survey of Ireland; Available on-line at: www.gsi.ie [Accessed: 20-02-2023].
- NPWS, (2023). National Parks & Wildlife Service; Available on-line at: www.npws.ie [Accessed: 20-02-2023].
- OPW, (2020). The National Preliminary Flood Risk Assessment (PFRA) Overview Report; Flood Relief & Risk Management Division, Engineering Services, Office of Public Works (OPW).
- OPW, (2023). Office of Public Works; Available on-line at: www.opw.ie [Accessed: 20-02-2023].
- Ordnance Survey of Ireland (OSI).
- Teagasc subsoil database.
- 3rd Cycle Draft Erne Catchment Report (HA 36) (EPA, 2021).
- River Basin Management Plan for Ireland 2018-2021.
- River Basin Management Plan for Ireland 2018-2021.
- Draft River Basin Management Plan for Ireland 2022-2027.
- Dublin County Development Plan 2022-2028.

APPENDIX A
WATER FRAMEWORK DIRECTIVE ASSESSMENT MATRIX

Risk screening of potential to cause deterioration of current WFD status										
	Surface Water	Scheme Elements	Proposed Development						Mitigation Measures	Overall Impact with mitigation measures
	Tolka Estuary Transitional Waterbody IE_EA_090_0200	Phase (Construction/ Operation)	Construction	Construction	Construction	Construction	Operation	Operation		
		Identified Quantitative Impacts	Increased run-off and sediment loading	Temporary land-take during the construction phase	Pollution due to accidental discharges or spillages during the construction phase	Scour during the construction phase	Increase in Hardstanding	Storage of Fuel		
WFD Status	Macrophytes and phytobenthos - combined	Predicted change to status elements (green = none, amber = possibly, red = likely)	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	Construction: The project-specific CEMP will include robust mitigation measures to protect the underlying hydrogeological environment. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIA Report and any subsequent conditions relevant to the proposed development. These include management of soils, re-fuelling machinery and chemical handling and control of water during the construction phase.	No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Macroinvertebrates		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Fish		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
Physio-Chemical Status	Total Ammonia	Predicted change to status elements (green = none, amber = possibly, red = likely)	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Total Nitrogen		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Ortho-Phosphate		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
Hydromorphological Elements	Quantity and dynamics of river flow	Predicted change to status elements (green = none, amber = possibly, red = likely)	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	Operation: The proposed development is designed to ensure the protection of the hydrological environment such as delivery and distribution and use of oil interceptors on the stormwater system and the use of SuDS techniques. In order to limit the surface water discharge from the site to pre-development, greenfield rates, and to ensure improvement in the overall surface water quality before ultimate discharge the principles of Sustainable Drainage Systems, (SuDS) are to be implemented. The area surrounding the underground foul tank will be landscaped in order to provide a localised temporary detention basin to contain the receiving peak flow in case of the pumping system fail. Details are to be agreed with Monaghan CC	No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Connection to Groundwater		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	River continuity		Not Applicable.	Not Applicable.	Not Applicable.	Not Applicable.	Not Applicable.	Not Applicable.		Not Applicable.
	River depth and width variation bed		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Structure and substrate of river bed		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Structure of riparian zone		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status

Risk screening of potential to cause deterioration of current WFD status								
	Groundwater	Scheme Elements	Proposed Development				Mitigation Measures	Overall Impact
	IE_EA_G_008	Phase (Construction/Operation)	Construction	Construction	Operation	Operation		
	Dublin GWB	Identified Quantitative Impacts	Increased run-off and sediment loading	Pollution due to accidental discharges or spillages during the construction phase	Increase in Hardstanding	Storage of Fuel		
Quantitative Elements	Saline or other intrusions. To identify groundwater bodies where the intrusion of poor quality water as a result of groundwater abstraction is leading to sustained upward trends in pollutant concentrations or significant impact on one or more groundwater abstractions.	Predicted change to status elements (green = none, amber = possibly, red = likely)	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	Construction: The project-specific CEMP will include robust mitigation measures to protect the underlying hydrogeological environment. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIA Report and any subsequent conditions relevant to the proposed development. These include management of soils, re-fuelling machinery and chemical handling and control of water during the construction phase. No significant dewatering is required which could impact on quantitative status.	No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Surface water. To assess the impact of groundwater abstractions on the ecological status of surface water bodies.		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Groundwater Dependent Terrestrial Ecosystems (GWDTE's) To assess the impact of groundwater abstractions on the condition of GWDTE'S.		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Water balance To identify groundwater bodies where abstractions exceed the available resource.		Not Applicable (no dewatering anticipated)	Not Applicable (no dewatering anticipated)	Not Applicable (no water supply from borehole anticipated)	Not Applicable (no water supply from borehole anticipated)		Not Applicable
Chemical Elements	Saline or other intrusions. To identify groundwater bodies where the intrusion of poor quality water as a result of groundwater abstraction is leading to sustained upward trends in pollutant concentrations or significant impact on one or more groundwater abstractions.	Predicted change to status elements (green = none, amber = possibly, red = likely)	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	Operation: The proposed development is designed to ensure the protection of the underlying hydrogeological environment such as use of oil interceptors on the stormwater system and prior to discharge from the site and the use of SuDS techniques. In order to limit the surface water discharge from the site to pre-development, greenfield rates, and to ensure improvement in the overall surface water quality before ultimate discharge the principles of Sustainable Drainage Systems, (SuDS) are to be implemented. No significant abstraction is required which could impact on quantitative status.	No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Surface water. To assess the impact of groundwater abstractions on the ecological status of surface water bodies.		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Groundwater Dependent Terrestrial Ecosystems (GWDTE's) To assess the impact of nutrient concentrations in groundwater (primarily phosphates) on GWDTE's.		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Drinking Water Protected Areas (DrWPAs) To identify groundwater bodies failing to meet the DrWPA objectives defined in Article 7 of the WFD or at risk of failing in the future.		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	General quality assessment To identify groundwater bodies where widespread deterioration in quality has or will compromise the strategic use of groundwater.		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status

APPENDIX 7.1.

BAT FAUNA IMPACT ASSESSMENT

ALTEMAR ENVIRONMENTAL CONSULTANTS



**Bat Fauna Impact Assessment for a Proposed Redevelopment
at St. Vincent's Hospital, Richmond Road and Convent Avenue,
Fairview, Dublin 3**



23rd March 2023

Prepared by: Bryan Deegan (MCIEEM) of Altemar Ltd.
On behalf of: St. Vincent's Hospital

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Document Control Sheet			
Client	St. Vincent's Hospital		
Project	Bat fauna impact assessment for a proposed redevelopment at St. Vincent's Hospital, Richmond Road and Convent Avenue, Fairview, Dublin 3.		
Report	Bat Fauna Assessment		
Date	23 rd March 2023		
Version	Author	Reviewed	Date
Planning	Bryan Deegan		23 rd March 2023

SUMMARY

Structure:	Mixed greenfield and brownfield site bordered by trees and hedgerows. Demolition works on site include the demolition of various 20 th Century buildings and the St Theresa's and Freeman Wing.
Location:	St. Vincent's Hospital, Richmond Road and Convent Avenue, Fairview, Dublin 3.
Bat species present:	Leisler's Bat (<i>Nyctalus leisleri</i>), Soprano Pipistrelle (<i>Pipistrellus pygmaeus</i>) and Common pipistrelle (<i>Pipistrellus pipistrellus sensu stricto</i>). None roosting within buildings.
Proposed work:	Proposed demolition, redevelopment and construction of new buildings.
Impact on bats:	<p>No bats were noted roosting on site. No bats were noted emerging from buildings on site. Minor foraging was noted on site. Lighting from construction could potentially lead to a reduction of foraging on site. Operational lighting design has been carried out in consultation with the project ecologists.</p> <p>The proposed development will change the local environment as new structures are to be erected and some of the existing vegetation will be removed. No bat roosts will be lost due to this development. The proposed development is within a dense urban area and is not proximate to an important bat area. Minor bat activity was noted on site. The buildings would not be seen to cause a negative impact on the flightlines of bats given the low activity of bats on site. A sensitive lighting strategy has been developed. Bat roosting opportunities will be included within the proposed development in the darker areas of the site. Additional landscaping measures will be in place to improve insect activity on site.</p> <p>Potential Effects: Neutral-slight positive / site / Not significant / long term/likely.</p>
Survey by:	Bryan Deegan MCIEEM
Survey date:	27 th April 2021, 16 th September 2021, 28 th September 2022 (Static Detector 16-24 th September 2021)

DESCRIPTION OF THE PROPOSED PROJECT

A ten year planning permission is sought for the proposed development comprising of the following (see public notices for the detailed description):

- Provision of a new part two and part three storey hospital building, providing mental health services, accommodating 73 no. beds, associated facilities, a single storey facilities management building, plant rooms and service areas, associated car and cycle parking, access roads, and open space, all on a proposed hospital site of c. 2.67 ha.
- Refurbishment and repurposing of existing buildings on site including Brooklawn (RPS Ref.: 8789), Richmond House, including chapel and outbuildings (RPS Ref.: 8788), the Laundry building and Rose Cottage for ancillary uses associated with the new hospital. The existing gate lodge building will remain in residential use and used by visiting members of staff to the new hospital.
- Change of use, refurbishment, alterations and extensions, to the existing hospital building (part protected structure under RPS Ref.: 2032), to provide residential amenity areas, a gym, a café, co-working space, a library, a childcare facility, and a community hall (referred to as Block K).
- The proposal includes the demolition of existing structures on site with a GFA of 5,872 sq.m, including the (1) westernmost range of the hospital building, which includes St. Teresa's and the Freeman Wing, (2) extensions to the south and north of the main hospital building, including the conservatory extension, toilet block extension, an external corridor, toilet core, lift core, and stair core (which are all part of / within the curtilage of RPS Ref.: 2032), (4) hospital buildings and outbuildings located to the north of the existing main hospital building (5) St. Joseph's Adolescent School located in the southeast of the site, (6) Crannog Day Hospital located in the southwest of the site, and (7) extensions to the Old Laundry Building and Rose Cottage.
- Provision of 9 no. residential buildings (Blocks A, B, C, D-E, F, G, H, J, and L) providing a total of 811 no. residential units, including 494 no. standard designed apartments (in Blocks A, B, C, G, H, J, and L) and 317 no. Build to Rent apartments (in Blocks D-E and F). Residential amenities and facilities are proposed in Block C, D-E, J and K. A retail unit is proposed in Block A and a café in Block F. Block J is proposed as an extension of the existing hospital buildings (protected structure RPS Ref.: 2032- referred to as Block K).
- The building heights of the proposed residential blocks range from part 2 to part 13 storeys. A proposed basement / lower ground level, containing car and cycle parking and plant areas, is located below and accessed via Blocks C, D-E and F.
- Access to the new hospital and associated grounds is provided from Richmond Road and Convent Avenue, with separate internal access points. A separate vehicular access to the residential development is provided from Richmond Road. The development includes a proposed pedestrian / cycle connection to Griffith Court, requiring alterations to the service yard of the Fairview Community Unit, pedestrian / cycle connections to the Fairview Community Unit campus to the north (providing an onward connection to Griffith Court), a pedestrian / cycle connection to Grace Park Wood, and makes provision internally within the site for a potential future connection to Lomond Avenue / Inverness Road.
- The proposal includes public open space, including allotments, children's play areas, a central park, a linear park and an entrance plaza, with a set down area at Richmond Road, and communal open space at surface level. The proposal includes communal roof terraces on Block C and Blocks D-E and private balconies / terraces for the apartments.
- The proposal also includes provision of internal access roads, car and cycle parking, pedestrian and cycle infrastructure, associated set down areas, alterations to existing landscape features, landscaping, boundary treatments, lighting, telecommunications infrastructure at roof level of Block B, green roofs, lift overruns and plant at roof level, site services, including a watermain connection / upgrade via Griffith Court, Philipsburgh Avenue and Griffith Avenue, site clearance, and all associated site works.

The proposed site outline, location, and site plan are demonstrated in Figures 1-3.

Landscape

The landscape strategy for the proposed development has been designed by Niall Montgomery + Partners to accompany this planning application. As outlined in the Landscape Design Statement 'An awareness and the enhancement of the site's existing natural features will inform the character of vegetation and the sense of place it derives from this character. In turn, there will be a net gain in biodiversity by planting native tree species, coupled with plants selected from a list of pollinator friendly species and maintained to increase the availability of flowering plants in the shoulder months. The loss of habitat will be negated by the inclusion of native tree- & plant species within the vegetation palette and complimented with habitat boxes, etc.

The proposed landscape incorporates measures to enhance biodiversity in an urban setting, with introduction of built-in bat & -swift boxes incorporated within the buildings located high up, where possible. Free-standing wooden bird boxes will be located in the trees throughout the development. The planting proposed will greatly enhance the biodiversity resource on the proposed development by creating new, pollinator friendly habitats and inclusion of pollinator nesting boxes. The biodiversity enhancements have been co-ordinated with the Environmental Consultant.'

'In addition, it is anticipated that the development will offer a net gain to biodiversity through the development of additional habitat connecting existing surrounding ecological stands with continuous tree canopies for bat and bird roosting and provision of specific plants for wildlife to forage through. an increased number of trees, areas for surface water treatment and wildflower meadows, coupled with best practice maintenance will ensure a sustainable landscape for the future. Edge conditions and relationships with neighbouring developments are sensitively integrated and screened.'

The proposed landscape general arrangement plan is demonstrated in Figure 4 and the proposed location of a selection of the bat boxes (blue) on the new buildings is seen below:



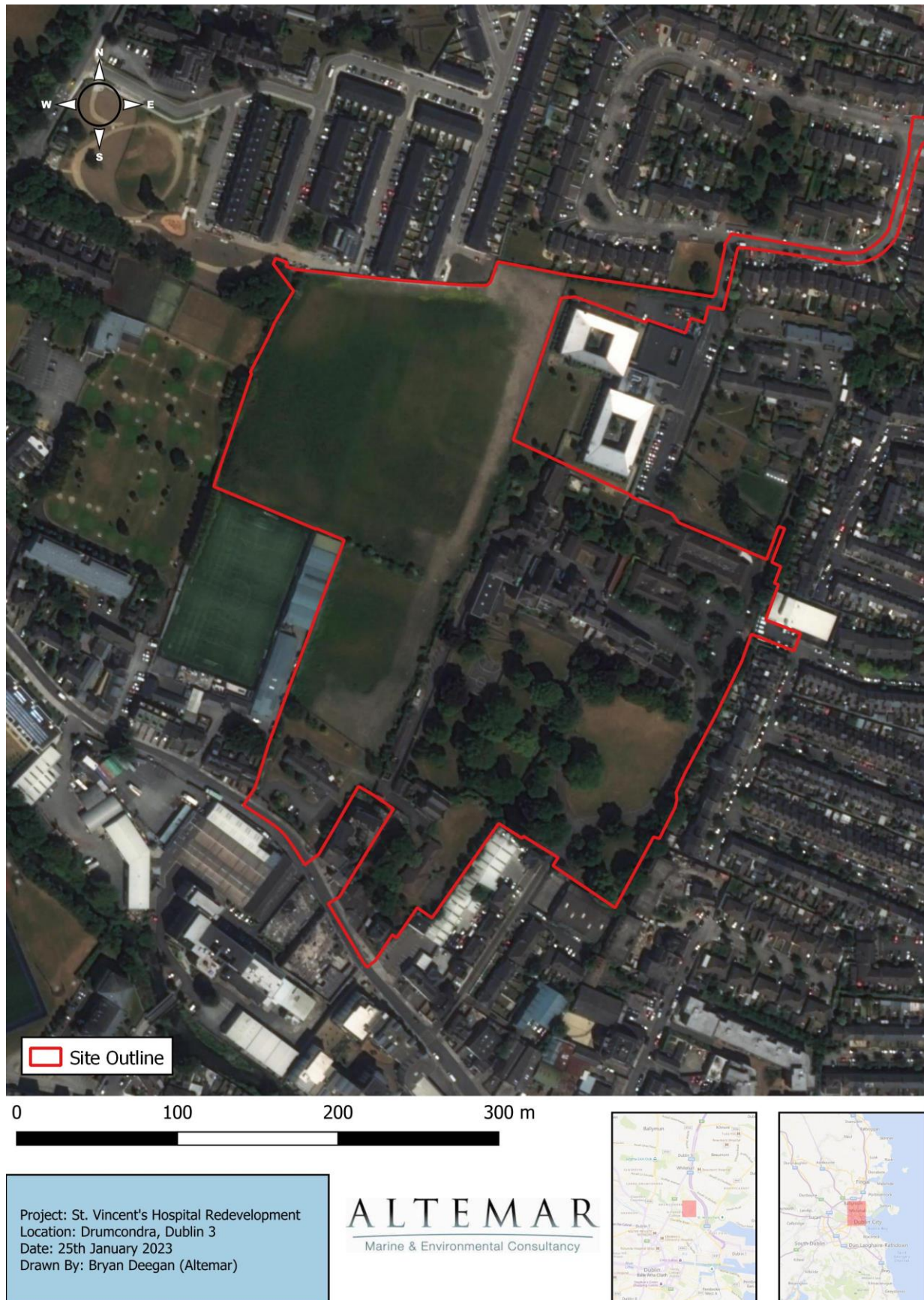


Figure 1. Southern portion of Subject site (outline in red)

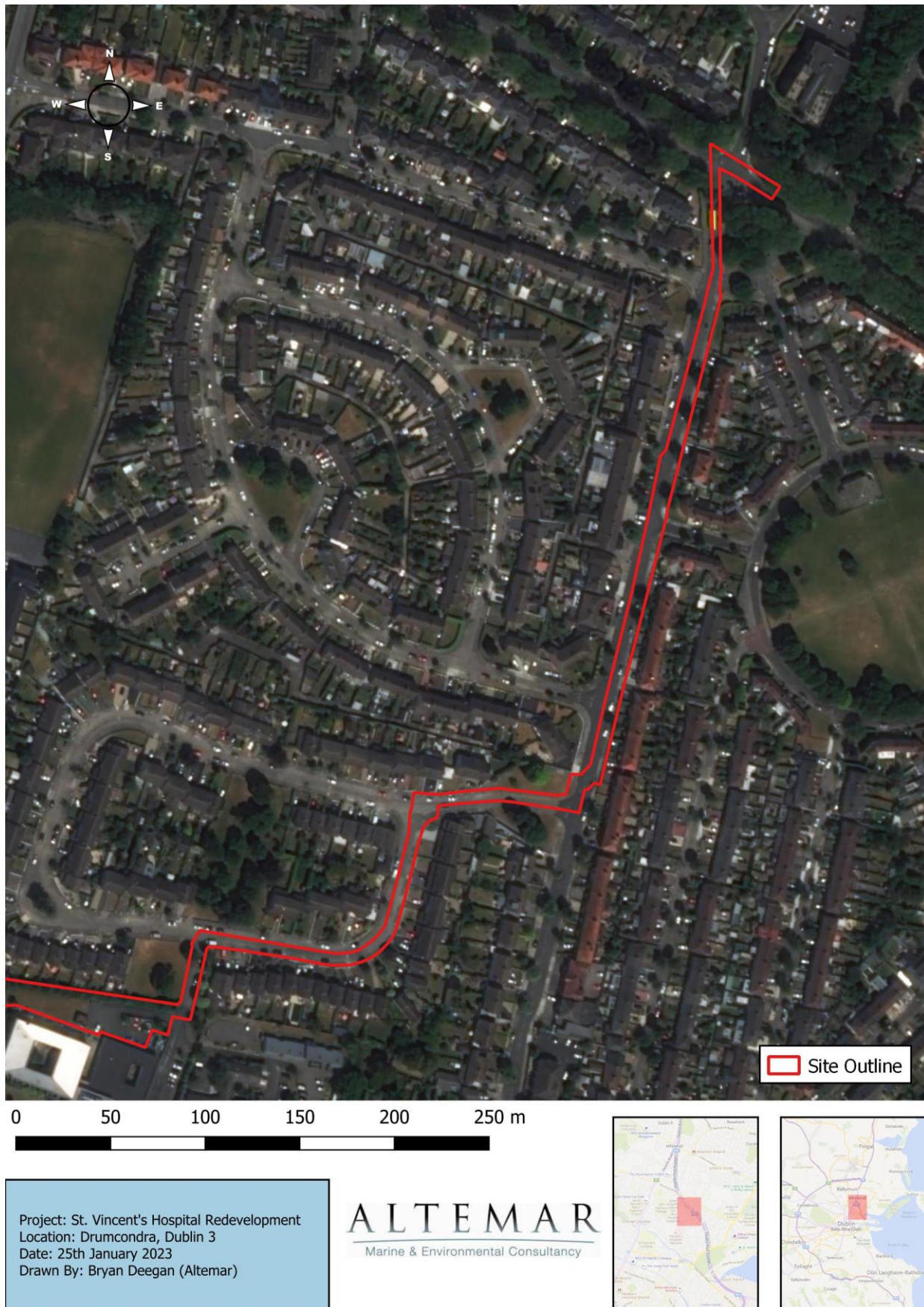
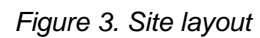


Figure 2. Northern portion of Subject site (outline in red)





Arborist

CMK Hort + Arb Ltd. were commissioned by St Vincent's Hospital to undertake an arboricultural assessment of trees on a site located inside the lands located within St. Vincent's Hospital, Richmond Road, Fairview, Dublin 3. The proposed plans (refer to drawings

TSTV001 104-109) include a new two storey mental health facility, associated

infrastructure and open space areas. A total of 9 residential blocks are proposed with associated communal open space areas including a central park, a linear park and an entrance plaza, with set down area, at Richmond Road. The proposal also includes car parking (surface and basement level).

This development will necessitate the removal of 122 trees. A further 17 category 'U' trees should be removed as they have either failed or in a state of advanced decline. The greatest impact on higher value trees is within the area marked area 2 (image 1), where the new two storey mental health facility building is proposed. The area marked area 3 (image 1), the historic walled garden, which contains the highest concentration of high value trees will be largely unaffected by the proposed development.

All 13 category 'A' mature trees located here will be retained under the proposed plans. The tree constraints plan and tree protection plan is demonstrated in Figure 5 & 6.

In relation to bats the report outlines the following:

'Trees may contain bats. Bats are afforded legal protection under Irish and EU legislation and agreements (Wildlife Act (1976), Wildlife (Amendment) Act (2000), S.I. No. 94 of 1997 and S.I. No. 378 OF 2005 implementing the EU Habitats Directive, Bonn Convention (The Convention on the Conservation of Migratory Species of Wild Animal) and the Bern Convention (Convention on the Conservation of European Wildlife and Natural Habitats).'

Trees provide roosting opportunities for bats. Mature trees are the most likely to have potential as roost sites. This may be provided by cavities, crevices, limb fractures, storm damage or mechanical damage and may even be by way of loose bark. Felling of mature trees and even surgery to large limbs may place bats at risk and both procedures remove roosting sites for bats. Professional advice from a licenced surveyor should be sought prior to any works commencing on trees. Altamar Ltd. environmental consultancy have undertaken a bat survey with inputs from CMK Hort + Arb Ltd.'

Site Lighting

A Site Lighting Report was prepared by IN2. The bat lighting report was prepared and lighting was designed to achieve the performance requirements as set out in the following standards:

- Bats and Lighting – Guidance Notes for Planners, Engineers, Architects and Developers (Bat Conservation Ireland, 2010);
- Bats and Lighting in the UK – Bats and the Built Environment Series (Institute of Lighting Professionals, September 2018).

Calculations were carried out across the whole site to determine the lux levels at 5 and 3 metres in order to identify the impacts that the proposed lighting scheme may have on existing habitats within the site. The average lighting across the site at 5m was 1 lux and at 3m was 5 lux.

Lighting is designed as warm lighting a 3000°K in compliance with bat lighting guidelines.



Figure 5. Tree constraints



Figure 6. Tree impact drawing (Trees to be retained (green). Trees to be removed (blue)

COMPETENCY OF ASSESSOR

This report has been prepared by Bryan Deegan MSc, BSc (MCIEEM). Bryan has over 28 years of experience providing ecological consultancy services in Ireland. He has extensive experience in carrying out a wide range of bat surveys including dusk emergence, dawn re-entry and static detector surveys. He also has extensive experience reducing the potential impact of projects that involve external lighting on Bats. Bryan trained with Conor Kelleher author of the Bat Mitigation Guidelines for Ireland (Kelleher and Marnell (2022)) and Bryan is currently providing bat ecology (impact assessment and enhancement) services to Dun Laoghaire Rathdown County Council primarily on the Shanganagh Park Masterplan. The desk and field surveys were carried out having regard to the guidance: Bat Surveys for Professional Ecologists – Good Practice Guidelines 3rd Edition (Collins, J. (Ed.) 2016) and Marnell, Kelleher and Mullen (2022), Bat Mitigation Guidelines for Ireland V2 (which update and replace the Bat Mitigation Guidelines for Ireland published in 2006).

LEGISLATIVE CONTEXT

Wildlife Act 1976 (as amended by, inter alia, the Wildlife (Amendment) Act 2000).

Bats in Ireland are protected by the Wildlife (Amendment) Act 2000. Based on this legislation it is an offence to wilfully interfere with or destroy the breeding or resting place of any species of bat. Under this legislation it is an offence to “*Intentionally kill, injure or take a bat, possess or control any live or dead specimen or anything derived from a bat, wilfully interfere with any structure or place used for breeding or resting by a bat, wilfully interfere with a bat while it is occupying a structure or place which it uses for that purpose.*”

Habitats Directive- Council Directive 92/43/EEC 1992 on the conservation of natural habitats and of wild fauna and flora has been transposed into Irish Law, including, via, *inter alia*, the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended). See Art.73 of the 2011 Regulations which revokes the 1997 Regulations.

Annex II of the Council Directive 92/43/EEC 1992 on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive) lists animal and plant species of Community interest, the conservation of which requires the designation of Special Areas of Conservation (SACs); Annex IV lists animal and plant species of Community interest in need of strict protection. All bat species in Ireland are listed on Annex IV of the Directive, while the Lesser Horseshoe Bat (*Rhinolophus hipposideros*) is protected under Annex II which related to the designation of Special Areas of Conservation for a species.

Under the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended), all bat species are listed under the First Schedule and, pursuant to, *inter alia*, Part 6 and Regulation 51, it is 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.

BAT SURVEY

This report presents the results of site visit by Bryan Deegan (MCIEEM) on 27th April 2021, 16th September 2021, 28th September 2022. (Static Detector 16-24th September 2021). Internal and external inspections of buildings to be demolished were carried out. Bat emergent and detector surveys were also carried out. Trees on site were examined for bat roosting potential. It should be noted that the proposed development is within an extended urban environment. Existing lighting is noted in the areas proximate to buildings and roads on site and in adjacent streets.

SURVEY METHODOLOGY

As outlined in Marnell et al. 2022 *'The presence of a large maternity roost can normally be determined on a single visit at any time of year, provided that the entire structure is accessible and that any signs of bats have not been removed by others. However, most roosts are less obvious. A visit during the summer or autumn has the advantage that bats may be seen or heard. Buildings (which for this definition exclude cellars and other underground structures) are rarely used for hibernation alone, so droppings deposited by active bats provide the best clues. Roosts of species which habitually enter roof voids are probably the easiest to detect as the droppings will normally be readily visible. Roosts of crevice-dwelling species may require careful searching and, in some situations, the opening up of otherwise inaccessible areas. If this is not possible, best judgement might have to be used and a precautionary approach adopted. Roosts used by a small number of bats, as opposed to large maternity sites, can be particularly difficult to detect and may require extensive searching backed up by bat detector surveys (including static detectors) or emergence counts.'* In relation to the factors influencing survey results the guidelines outlines the following *'During the winter, bats will move around to find sites that present the optimum environmental conditions for their age, sex and bodyweight and some species will only be found in underground sites when the weather is particularly cold. During the summer, bats may be reluctant to leave their roost during heavy rain or when the temperature is unseasonably low, so exit counts should record the conditions under which they were made. Similarly, there may be times when females with young do not emerge at all or emerge only briefly and return while other bats are still emerging thus confusing the count. Within roosts, bats will move around according to the temperature and may or may not be visible on any particular visit. Bats also react to disturbance, so a survey the day after a disturbance event, may give a misleading picture of roost usage.'*

The survey involved the methodologies outlined in Collins (2016) which included the roost inspection methodologies i.e. external methodology outlined in section 5.2.4.1 and the internal survey outlines in section 5.2.4.2 of the guidelines. In addition, the methodologies for Presence absence surveys (Section 7) was carried out for dust emergent surveys.'

As outlined in Collins (2016) 'The bat active period is generally considered to be between April and October inclusive (although the season is likely to be shorter in northern latitudes). However, because bats wake up during mild conditions, bat activity can also be recorded during winter months.'

SURVEY RESULTS

Trees as potential bat roosts

A ground level roost assessment was carried and used to examine the trees on site for features that could form bat roosts. Potential roosting features include heavy ivy growth, broken limbs, areas of decay, vertical or horizontal cracks, cracks in bark etc. None of the trees on site had features that would be considered to be of high importance to roosting bats. All trees on site were assessed. No bats, evidence of bats or bat roost were identified in any of the onsite trees. A derogation license is therefore not required for the removal of trees on site. Trees of low/moderate bat roosting potential are noted as follows:

Tree No	Importance	Reason	Retained/Removed
1676 Common Lime	Low-Medium	Heavy Ivy growth	Retained
1681 Common Lime	Low-Medium	Heavy Ivy growth	Retained
1697 Sycamore	Low-Medium	Heavy Ivy growth	Retained
1700 Ash	Low-Medium	Heavy Ivy growth	Removed
1709 Lombardy poplar	Low-Medium	Heavy Ivy growth	Removed
1711 Lombardy poplar	Low-Medium	Heavy Ivy growth	Removed
1770 Copper beech	Low-Medium	Heavy Ivy growth	Retained

Building Inspections

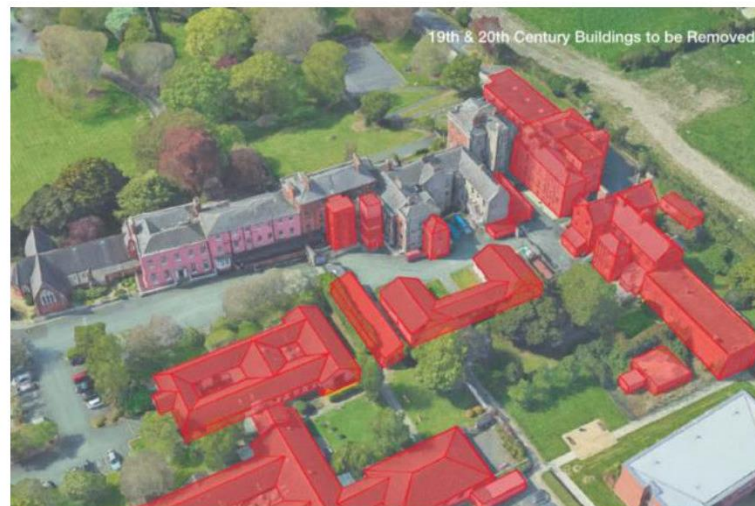
As outlined in the Construction Environmental Management Plan (CEMP) the buildings seen in Plate 1 are to be demolished as part of the proposed development.

20th Century Buildings to be demolished

These buildings were constructed in the 20th century and are assumed to be of no historical significance. These are all single story structures assumed to be constructed of brick and masonry external leaf with plastered ceilings under cut timber slated roof and ground floor consisting of a concrete slab on ground. Foundations are assumed to be of traditional strip foundations.

St Theresas and Freeman Wing

St Theresa's was designed by Ralph Byrne of W.H. Byrne and Sons in 1910. It was extended with a concert hall in 1930. This building is currently unoccupied and is assumed to be constructed of brick and masonry external leaf with timber joist floors under T and G flooring with plastered ceilings, cut timber slated roof and ground floor consisting of a concrete slab on ground. Foundations are assumed to be of splayed brick or corbelling brick if they occur at all. The Freeman Wing was built in 1979 onto the end of the Hospital Phase 2 and was refurbished in 2011.



Proposed 19th and 20th century structure demolition



Proposed protected structures to be demolished

These buildings were inspected for evidence bat presence. As the buildings were in daily use inspections concentrated in unused areas, accessible attic spaces and voids. Additional

inspections took place within other buildings on site including the workshops (Plate 2). No evidence of bat presence was noted internally or externally of these buildings.

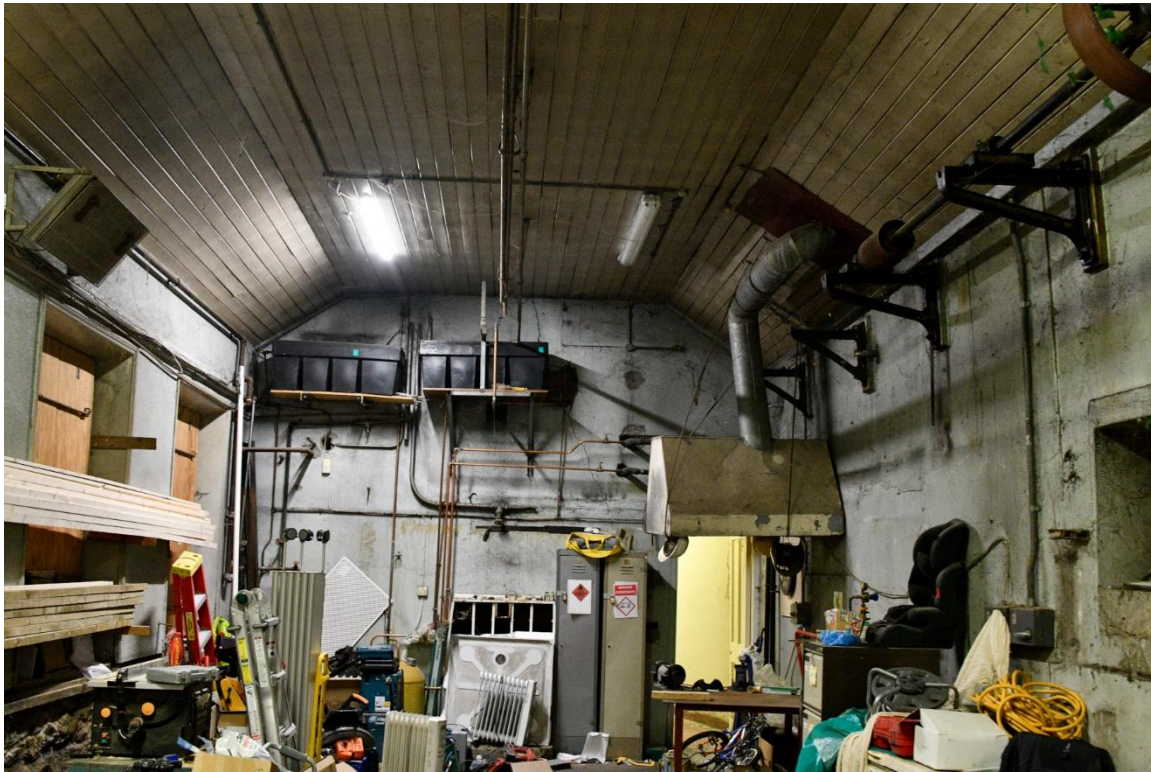


Plate 2. Workshop interior.

Emergent / detector surveys

The detector surveys were undertaken within the active bat season and the transects covered the entire site multiple times during the night. Weather conditions were good with mild temperatures of greater than 10°C after sunset during all surveys. Winds were light and there was no rainfall. Insects were observed in flight during the surveys.

As outlined in Collins (2016) in relation to weather conditions '*The aim should be to carry out surveys in conditions that are close to optimal (sunset temperature 10°C or above, no rain or strong wind.), particularly when only one survey is planned.... Where surveys are carried out when the temperature at sunset is below 10°C should be justified by the ecologist and the effect on bat behaviour considered.*' There were no constraints in relation to the surveys carried out. All areas of the site were accessible and weather conditions were optimal for bat assessments.

At dusk, bat detector surveys were carried out onsite using an *Echo meter touch 2 Pro* detector to determine bat activity. Bats were identified by their ultrasonic calls coupled with behavioural and flight observations.

BAT ASSESSMENT FINDINGS

Review of local bat records

The review of existing bat records (sourced from Bat Conservation Ireland's National Bat Records Database) within a 2km² grid (Reference grid O13T) encompassing the study area reveals that none of the nine known Irish species have been observed locally. The National Biodiversity Data Centre's online viewer was consulted in order to determine whether there have been recorded bat sightings in the wider area. This is visually represented in Figures 7-9. The following species were noted in the wider area: Nathusius's Pipistrelle (*Pipistrellus nathusii*), Soprano Pipistrelle (*Pipistrellus pygmaeus*), Daubenton's Bat (*Myotis daubentonii*), Lesser Noctule (*Nyctalus leisleri*), and Whiskered Bat (*Myotis mystacinus*) (Figures 7-9).

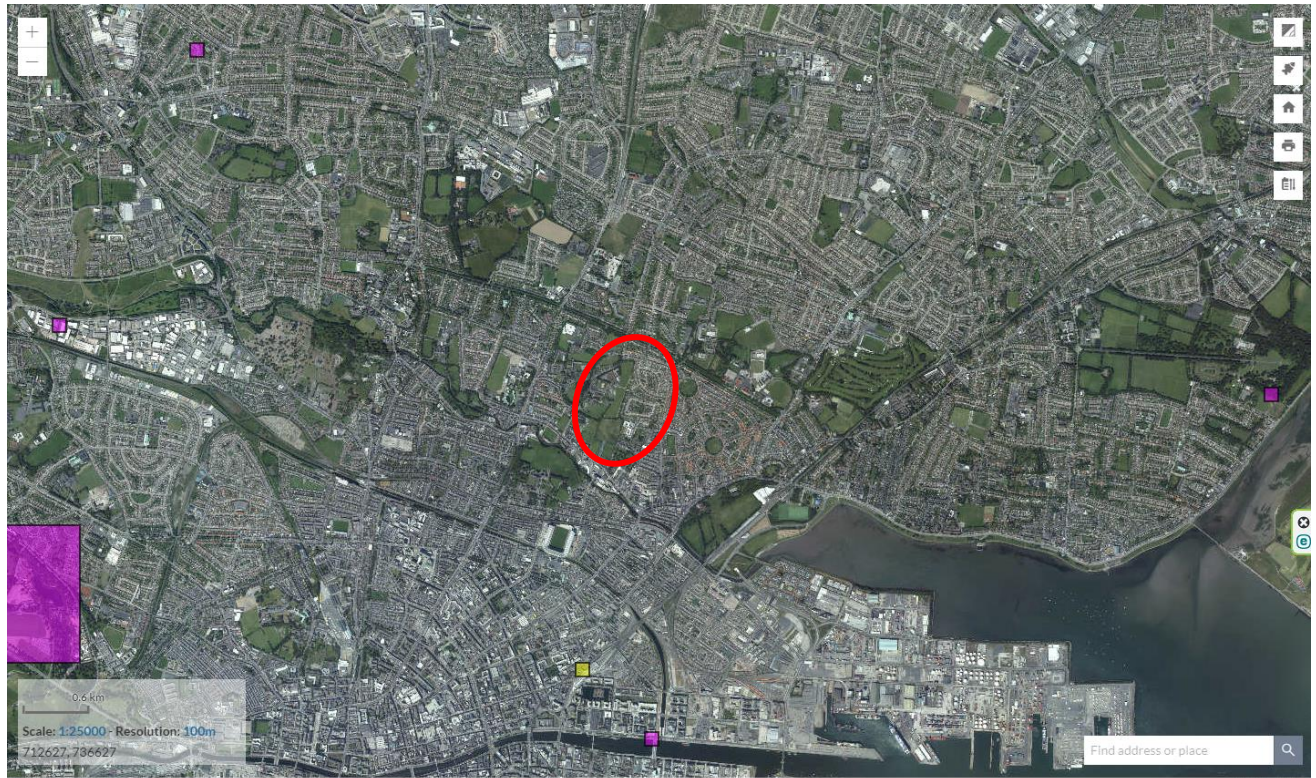


Figure 7. Nathusius's Pipistrelle (*Pipistrellus nathusii*) (yellow) and Soprano Pipistrelle (*Pipistrellus pygmaeus*) (purple) (Source NBDC) (Site location – red circle)

Detector survey

Foraging activity on site was relatively low on site with common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*) and Leisler's bats (*Nyctalus leisleri*) foraging on site. Foraging activity was concentrated along hedgerow boundaries in the areas of scattered trees and parkland (Figure 10).

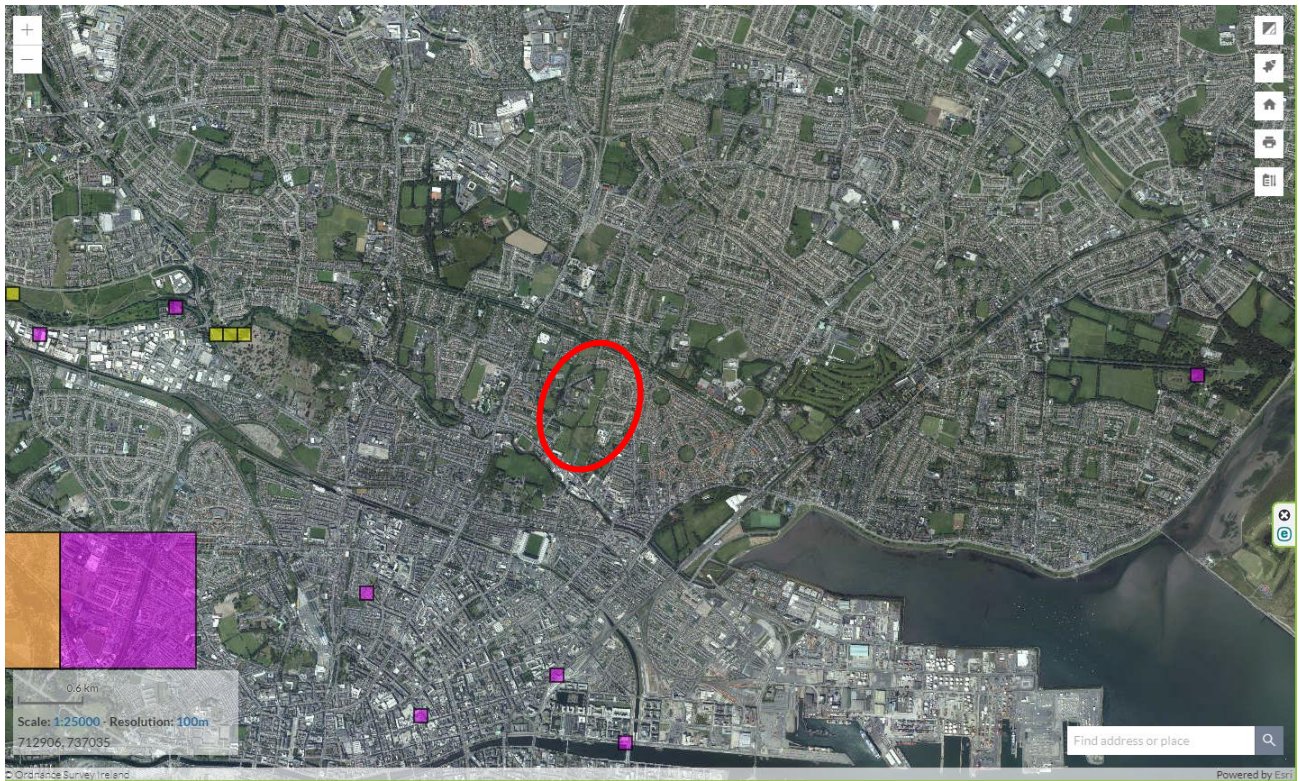
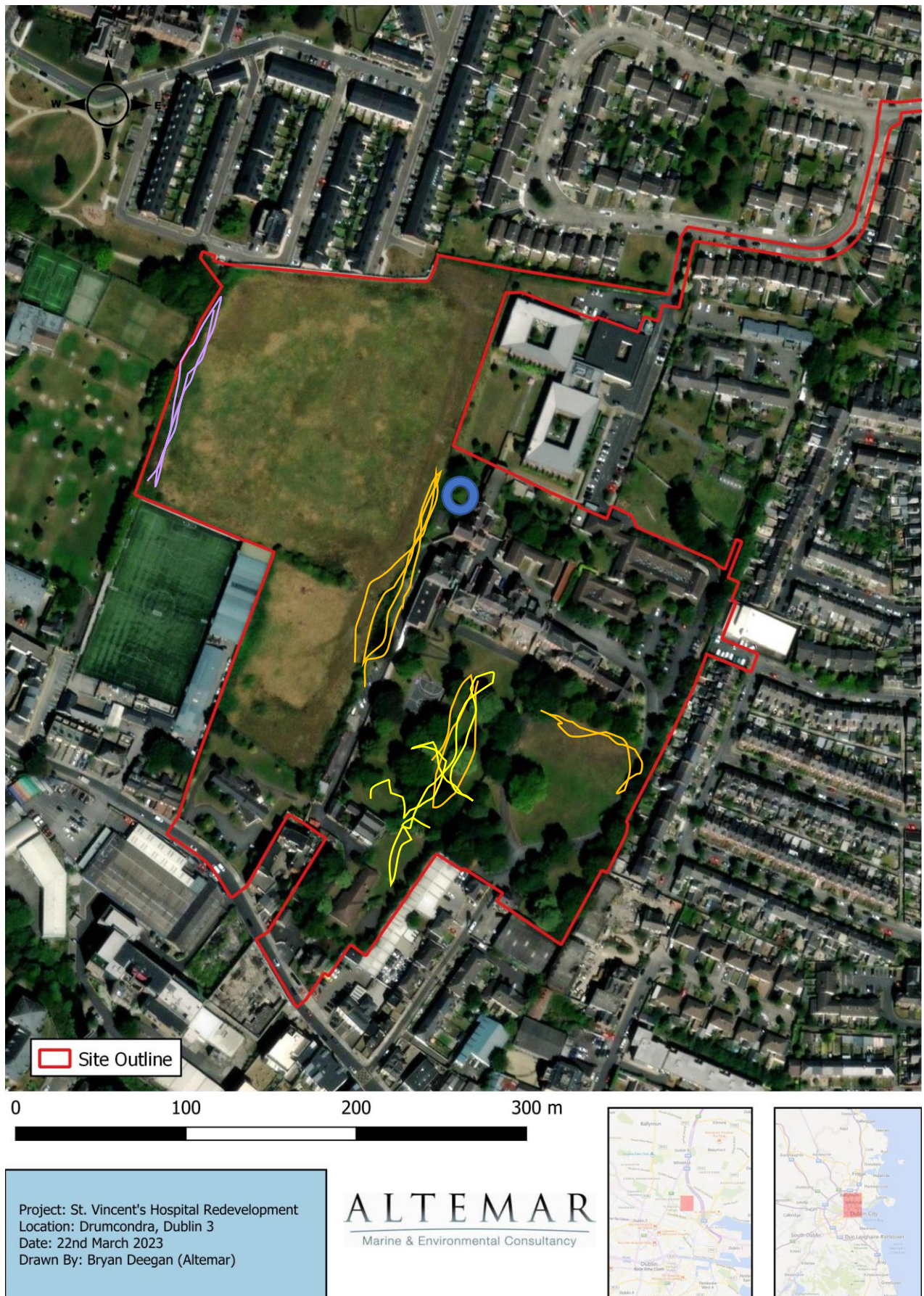


Figure 8. Daubenton's Bat (*Myotis daubentonii*) (yellow), Lesser Noctule (*Nyctalus leisleri*) (purple), and both Daubenton's Bat and Lesser Noctule (orange) (Source NBDC) (Site location – red circle)



Figure 9. Whiskered Bat (*Myotis mystacinus*) (Source NBDC) (Site location – red circle)



EVALUATION OF RESULTS

The bat surveys comply with bat survey guidance documentation including Marnell et al (2022) and Collins (2016). No bats were observed emerging from trees or buildings on site. No evidence of bats roosting in buildings was noted. Minor bat activity was noted on site by soprano pipistrelle and common pipistrelle and Leisler's Bat (yellow). The site is of relatively low importance to the local bat population. However, the areas within the vicinity of the scattered trees and parkland would be of site importance.

POTENTIAL IMPACT OF THE DEVELOPMENT ON BATS

Three species of bat were noted on site. No bats were noted roosting on site. No trees of high roosting potential are noted on site. The proposed development will change the local environment as new structures are to be erected and some of the existing vegetation will be removed. The development is likely to displace bats from foraging at the site during construction. In the medium to long term foraging on site would potentially improve with the increased pollinator friendly landscaping on site and sensitive lighting strategy. The area of scattered trees and parkland where Leisler bat foraging was noted is to be retained.

Based on the small number of common species found using the site, the displacement from this site during construction and in the short term will not have any significant effect on local bat populations, and that any such effect will be only significant at the local level. No bat roosts or potential bat roosts will be lost due to this development and the species expected to occur onsite should persist. The lighting plan has been designed to comply with bat lighting guidelines. However, foraging activity on site may be reduced in the short-medium term until the landscaping matures. The proposed development is within a dense urban environment and is not in proximity to sensitive bat areas. The potential for collision risk and impact on flight paths in relation to bats is considered low due to the low level of bat activity on site and the buildings would be deemed to be clearly visible to bats. The landscape and architectural plans have been designed in consultation with Altermar. Biodiversity enhancement measures have been included within the design include the provision of bat boxes within the façade of the as previously outlined. As outlined in the landscape strategy *'it is anticipated that the development will offer a net gain to biodiversity through the development of additional habitat connecting existing surrounding ecological stands with continuous tree canopies for bat and bird roosting and provision of specific plants for wildlife to forage through an increased number of trees, areas for surface water treatment and wildflower meadows, coupled with best practice maintenance will ensure a sustainable landscape for the future.'*

MITIGATION MEASURES

As outlined in Marnell et al. (2022) *"Mitigation should be proportionate. The level of mitigation required depends on the size and type of impact, and the importance of the population affected."* In addition as outlined in Marnell et. al (2022) *'Mitigation for bats normally comprises the following elements:*

- *Avoidance of deliberate, killing, injury or disturbance – taking all reasonable steps to ensure works do not harm individuals by altering working methods or timing to avoid bats. The seasonal occupation of most roosts provides good opportunities for this*
- *Roost creation, restoration or enhancement – to provide appropriate replacements for roosts to be lost or damaged*
- *Long-term habitat management and maintenance – to ensure the population will persist*
- *Post-development population monitoring – to assess the success of the scheme and to inform management or remedial operations.'*

However, no bats were noted roosting on site. No trees of high bat roosting potential are noted on site. The level of activity on site is low with common bat species foraging on site. As a result, the following mitigation will be implemented:

Construction Phase

- A project ecologist will be appointed and consulted in relation to all onsite mitigation.
- No bats were found roosting on site during on site surveys. However, bats may roost on site between the initial surveys and the commencement of the project. A pre-construction inspection for bats will be carried out on buildings to be demolished or existing buildings that are to be upgraded. If bats are found roosting on site during the pre-construction inspection a derogation licence will be required from the NPWS.
- In order to reduce the potential for light spill from construction works impacting on bat foraging on site, lighting on site during construction will be subject to approval of the project ecologist.
- A total of 10 bat boxes will be placed on site as an enhancement measure. The position of these boxes will be carried out in consultation with an ecologist and where indicated in the landscape strategy.

Operational Phase

- The landscaping will be carried out as per landscaping plan and will be maintained to maintain biodiversity enhancement measures on site.
- A post construction bat survey will be carried out and lighting on site will be assessed by an ecologist post construction.

PREDICTED RESIDUAL IMPACT OF PROPOSED DEVELOPMENT ON BATS

The present survey found no evidence of roosting bats in any onsite tree or structures therefore the proposed development will not result in the loss of any bat roost. Mitigation measures are in place to carry out pre construction inspections of buildings and trees. The project has been designed to include features to enhance bat activity on site and provide additional foraging roosting opportunities.

The proposed development will change the local environment as existing buildings are to be demolished and vegetation removed. There would be expected to be a short term reduction in foraging until the landscaping and in particular the trees within the landscaping proposal mature. Based on the small number of common species found using the site the displacement from this site it will not have any significant effect on local bat populations, and that any such effect will be only significant at the local level.

All lighting is set at 3000°K in compliance with bat lighting guidelines. In the medium-long term bat foraging would be expected to continue and potentially improve on site and no significant effect would be foreseen.

Potential Effects on bats: Neutral-slight positive / site / Not significant / long term/likely.

APPENDIX 7.2(a)

WINTER BIRD SURVEYS SEPTEMBER TO MARCH 2021-2022

HUGH DELANEY

REPORT ON WINTER BIRD SURVEYS CONDUCTED AT ST. VINCENT'S HOSPITAL FAIRVIEW, CO. DUBLIN

SEPTEMBER TO MARCH 2021-2022

PREPARED BY HUGH DELANEY

Introduction

Between September 2021 and March 2022 14 winter bird surveys (two per month) were undertaken at lands at St Vincent's Hospital, in Fairview, North County Dublin, by Hugh Delaney, a freelance Ecologist (Birds primarily) having completed work on numerous sites with ecological consultancies over 10+ years. Hugh is local to the Dun Laoghaire-Rathdown area in Dublin and is especially familiar with the bird life and its ecology in the environs going back over 30 years.

Winter Bird Survey Methodology

Winter bird surveys are conducted from soon after sunrise until late in the afternoon before sunset, the site is monitored throughout the day and all bird species utilizing the site recorded, including species flying through overhead. Checks are also made on suitable habitat nearby or adjacent the site for comparative purposes and to monitor any interchange of birds between sites. Target species (species of more special interest) utilizing the site will be mapped and estimates of the time these species frequented the site recorded.

Site Location

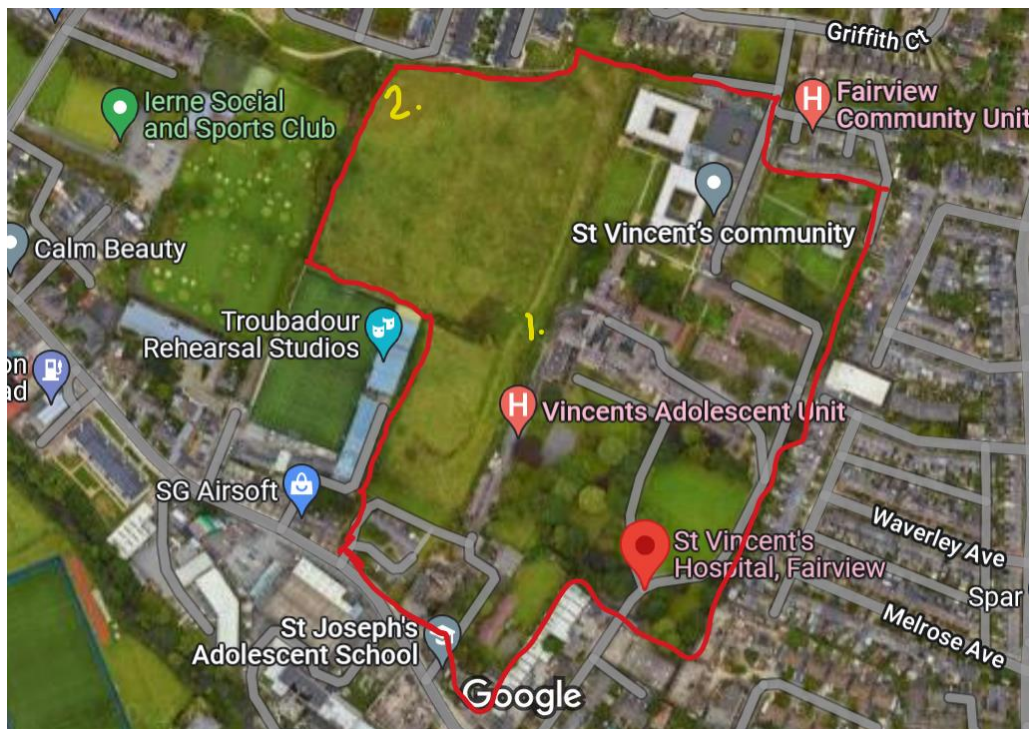


Fig. 1 St Vincent's Hospital Fairview, survey site outlined in red. Green area at west of site being a primary focus of the surveys with the vantage points marked in yellow (Vantage points 1 & 2).

Site Description

Site located in urban north Dublin city, site comprising of larger buildings in east with some small areas of greens and small patches of mixed mature trees. Two areas area of more substantial rough grassland are situated at the west side of the site

Specific site survey methodology

Vantage point observations were undertaken at locations at the west side of the site these giving optimal views of species passing over the site and also to note any species foraging in this area. Vantage points 1 and 2 were monitored alternately each hour, recording all species passing through and foraging on-site. Additionally, the entire site was traversed over generally in the middle of the day to collect further data on species utilizing the site.

Survey Results

September 19th, 2021

Sunrise- 07.06hrs/Sunset 19.31hrs. Weather – Wind F3 West, Cloud 3/8, Dry, 15c, Excellent visibility. On-site 07.30hrs – 16.30hrs.

Species recorded – Robin, Dunnock, Wren, Woodpigeon, Herring Gull, Black-headed Gull, Chiffchaff, Goldcrest, Chaffinch, Goldfinch, Greenfinch, Linnet, Blue Tit, Coal Tit, Great Tit, Blackbird, Swallow, Starling, Grey Wagtail, Meadow Pipit, Buzzard, Hooded Crow, Magpie, Rook, Jackdaw, Feral Pigeon.

07.30hrs-12.00hrs – Alternated hourly between VP.1 and VP.2 at north field at west of site until 11.30hrs. Single Buzzard noted soaring over north field at 10.10hrs and 11.25hrs. Passage of Meadow Pipit (<6) noted passing south over the site during the morning. Small numbers of Herring Gull (<22 in total) and Black-headed Gull (<10 in total) noted passing over the site (fields and buildings to east), none noted foraging on-site. Swallow (<4), Greenfinch (<2) and Chiffchaff (<2) were the only more notable observations foraging on-site.

12.00hrs-16.30hrs – A walk over the entire site (north & south field, Hospital complex, playground, graveyard area and east area etc.) from 11.40-13.00hrs added a few extra species to site list including Goldcrest and Grey Wagtail. Hourly VP's (1 & 2) observed from alternately from 13.00hrs to 16.30hrs, small numbers of Herring Gull (<18) and Black-headed Gull (<7) observed passing over the site, not observed foraging on-site, occasional Herring Gull landing on Hospital buildings observed only. Two Meadow Pipit noted intermittently foraging on north field during afternoon, no other target species recorded.

September 30th, 2021

Sunrise- 07.25hrs/Sunset 19.04hrs. Weather – Wind F4 West, Cloud 8/8, 16c, Occasional light drizzle, Excellent visibility. On-site 07.45hrs – 17.00hrs.

Species recorded – Robin, Dunnock, Wren, Woodpigeon, Collared Dove, Herring Gull, Lesser black-backed Gull, Black-headed Gull, Chiffchaff, Blackcap, Goldcrest, Chaffinch, Goldfinch, Greenfinch, Bullfinch, Blue Tit, Coal Tit, Blackbird, Song Thrush, Ring-necked Parakeet, Starling, Grey Wagtail, Pied Wagtail, Meadow Pipit, Sparrowhawk, Grey Heron, Little Egret, Hooded Crow, Magpie, Rook, Jackdaw, Feral Pigeon.

07.45hrs-12.00hrs – Observed from VP. 1 from 07.30-08.45hrs, no target species recorded, Herring Gull (<14) and Black-headed Gull (<8) noted passing over the site mainly moving west. A Sparrowhawk was noted hunting in playground area at 09.27hrs. Two Herring Gull were noted foraging at the green area at Convent Avenue entrance of hospital from 09.10-09.25hrs. A Ring-necked Parakeet was noted calling from the southwest field of site from

10.35-10.45hrs. Grey Heron was noted flying north from VP. 1 following Tolka river (off-site) at 11.15hrs.

12.00hrs – 17.00hrs – Alternately observed from V.P. 1 & 2 from 12.00hrs-16.00hrs, site walked over from 16.00hrs-17.00hrs. Herring Gull (<22), Black-headed Gull (<13) and Lesser black-backed Gull noted passing over the site, none observed foraging on-site. Little Egret noted flying north along Tolka river at 12.40hrs (trajectory off-site). Bullfinch, Greenfinch, Goldfinch, Chaffinch, and Blackcap noted foraging in small numbers in rank vegetation on the main field at west side of site. Grey Wagtail noted foraging on hospital roofs at the south and east side of the site. No target species recorded.

October 9th, 2021

Sunrise- 07.41hrs/Sunset 18.42hrs. Weather – Wind F2 North backing to west, Cloud 6/8, Dry, 15c, Excellent visibility. On-site 07.45hrs – 16.30hrs.

Species recorded – Robin, Dunnock, Wren, Woodpigeon, Herring Gull, Lesser black-backed Gull, Black-headed Gull, Blackcap, Goldcrest, Chaffinch, Goldfinch, Linnet, Blue Tit, Coal Tit, Great Tit, Blackbird, Song Thrush, Mistle Thrush, Ring-necked Parakeet, Starling, Grey Wagtail, Pied Wagtail, Meadow Pipit, Buzzard, Grey Heron, Little Egret, Hooded Crow, Magpie, Rook, Jackdaw, Feral Pigeon.

07.45hrs-12.00hrs – Observed alternatively from VP 1 & 2 from 07.45hrs-11.45hrs. Herring Gull (<45), Black-headed Gull (<15) and Lesser black-backed Gull (<5) noted passing over the site mainly at south side of site moving west. Occasional Herring Gull noted landing onto hospital buildings, none observed foraging on-site. One Grey Heron noted passing the south side of the site moving east at 09.35hrs. A Ring-necked Parakeet was noted flying east over VP. 1 and landed into the hospital grounds (playground area) at 10.05hrs. No other target species recorded.

12.00hrs-16.30hrs – Site traversed in entirety from 12.00-13.15hrs. Single Herring Gull noted foraging at the Convent Road entrance to site from 12.20-12.45hrs. Buzzard noted passing east over the south of site at 12.50hrs. VP. 1 & 2 occupied alternatively from 13.30hrs-16.30hrs, Herring Gull (<34), Black-headed Gull (<14) and Lesser black-backed Gull (<2) noted passing over site, none observed foraging on-site. Meadow Pipit (<3) noted foraging on the main west field intermittently during the afternoon. Two Buzzard noted soaring over the west side of the site at 14.45hrs, no other target species recorded.

October 21st, 2021

Sunrise- 08.03hrs/Sunset 18.15hrs. Weather – Wind F3 Northwest, Cloud 3/8, Dry, 8c, Excellent visibility. On-site 08.00hrs – 17.00hrs.

Species recorded – Robin, Dunnock, Wren, Woodpigeon, Herring Gull, Lesser black-backed Gull, Black-headed Gull, Goldcrest, Chaffinch, Goldfinch, Bullfinch, Linnet, Blue Tit, Coal Tit, Long-tailed Tit, Blackbird, Song Thrush, Mistle Thrush, Starling, Grey Wagtail, Pied Wagtail, Meadow Pipit, Sparrowhawk, Buzzard, Grey Heron, Little Egret, Cormorant, Hooded Crow, Magpie, Rook, Jackdaw, Feral Pigeon.

08.00hrs-12.00hrs – Observing from VP.1 & VP.2 from 08.00hrs to 12.00hrs, Herring Gull (<65), Black-headed Gull (<25) and Lesser black-backed Gull (<8) recorded passing over site, mainly to east to west over the south side of the site at heights averaging c.30m. A Cormorant was noted following the Tolka going west at 10.42hrs (off-site) and 2 Little Egret were also following same route at 11.15hrs (off-site). Linnet (<15), Meadow Pipit (<4) and Bullfinch (<2) were noted foraging around the green area at the VP's. No other target species recorded.

12.00hrs-17.00hrs – Entire site fully traversed from 12.15-13.30hrs, variety of passerine species similar to that previously recorded, Goldcrest (<4), Grey Wagtail (<2), Mistle Thrush (<2) noted foraging at the east side of the site. A Sparrowhawk was noted hunting at the northeast of the site at 12.50hrs. Small numbers of Herring (<20) and Black-headed Gulls noted passing over the site. Observations at the VP's resumed from 13.45hrs to 17.00hrs, Herring Gull (<30), Black-headed Gull (<15) and Lesser black-backed Gull recorded passing over the site, most birds moving east over the south side of the site. Grey Heron (<1) noted following Tolka river east at 14.05hrs and Little Egret following river at 14.30hrs (both off-site). A Buzzard was noted soaring over the north side of the site at 15.10hrs. No other target species recorded.

November 5th, 2021

Sunrise- 07.31hrs/Sunset 16.44hrs. Weather – Wind F42 Southwest, Cloud 6/8, Dry, 8c, Excellent visibility. On-site 07.45hrs – 16.00hrs.

Species recorded – Robin, Dunnock, Wren, Woodpigeon, Collared Dove, Herring Gull, Lesser black-backed Gull, Black-headed Gull, **Brent Goose**, Mallard, Goldcrest, Chaffinch, Goldfinch, Linnet, Blue Tit, Coal Tit, Long-tailed Tit, Blackbird, Song Thrush, Mistle Thrush, Starling, Grey Wagtail, Meadow Pipit, Grey Wagtail, Sparrowhawk, Grey Heron, Hooded Crow, Magpie, Rook, Jackdaw, Feral Pigeon.

07.45hrs-12.00hrs – Observing from VP.'s 1&2 from 07.45-11.45hrs, Herring Gull (<30), Black-headed Gull (<20) and Lesser black-backed Gull (<5) noted passing over the site, most going east to west in middle and south of site. Two Mallard noted passing over the south end of the site at 10.15hrs. A Grey Heron passed north over the south side of the site at 11.05hrs. Meadow Pipit (<4), Chaffinch (<5) and Linnet (<8) foraging in field at VP sites. A Sparrowhawk was noted soaring over VP.2 at 11.30hrs. Site traversed from 11.45-13.00hrs, Goldcrest (<3), Mistle Thrush (<1), Song Thrush (<2), Goldfinch (<8), Grey Wagtail (<1) and Blackbird (<10) noted foraging at the east side of the site. No other target species recorded.

16.00hrs-16.00hrs – Monitoring from VP's from 13.30-16.00hrs, Herring Gull (<84) and Black-headed Gull (<46) noted passing east especially in last hour, returning to roost in Dublin Bay in all likelihood. Meadow Pipit (<6) noted foraging in area adjacent VP sites. Sparrowhawk noted hunting at southwest corner of the site at 14.15hrs. Brent Goose (<70) passed east at 15.45hrs south of the site (off-site) following the same flightline as No.4 in Fig.2 below. No other target species recorded.

November 30th, 2021

Sunrise- 08.16hrs/Sunset 16.11hrs. Weather – Wind F4 West, Cloud 8/8, Dry, 11c, Excellent visibility. On-site 08.15hrs – 15.30hrs.

Species recorded – Robin, Dunnock, Wren, Woodpigeon, Collared Dove, Herring Gull, Lesser black-backed Gull, Black-headed Gull, **Brent Goose**, **Redshank**, **Curlew**, Mallard, Goldcrest, Chaffinch, Goldfinch, Greenfinch, Bullfinch, Blue Tit, Coal Tit, Great Tit, Long-tailed Tit, Blackbird, Song Thrush, Redwing, Mistle Thrush, Ring-necked Parakeet, Starling, Grey Wagtail, Peregrine, Hooded Crow, Magpie, Rook, Jackdaw, Raven, Feral Pigeon.

08.15hrs-12.00hrs – Observing from VP.'s 1&2 from 08.15-12.00hrs. At 08.38hrs Curlew (<5) passed west over the site (Height 25m). At 09.56hrs a Peregrine Falcon passed southwest over the site (Height 30m). At 10.08hrs a Redshank was observed passing east over the site (Height 30m), this was the only Redshank recorded passing over the site and likely a bird that was foraging on the Tolka river. Small numbers of Herring Gull (<25), Black-headed Gull (<20) and Lesser black-backed Gull noted passing over the site. Ring-necked Parakeet (<3) were noted at 08.52hrs flying northwest from the hospital buildings. No other target species recorded.

12.00hrs-15.30hrs – Site traversed from 12.00-13.15hrs with typical selection of passerines recorded, Redwing (<4) recorded foraging at east side of site were new to the site. A Herring Gull was noted foraging at the main hospital entrance from 12.10-12.35hrs. VP observations resumed at 13.15hrs until 15.30hrs. Brent Goose (<45) noted passing east at 13.37hrs, off-site and following the Tolka River (Height 30m). Herring Gull (<70) and Black-headed Gull (<30) noted passing east mainly over the site. No other target species recorded.

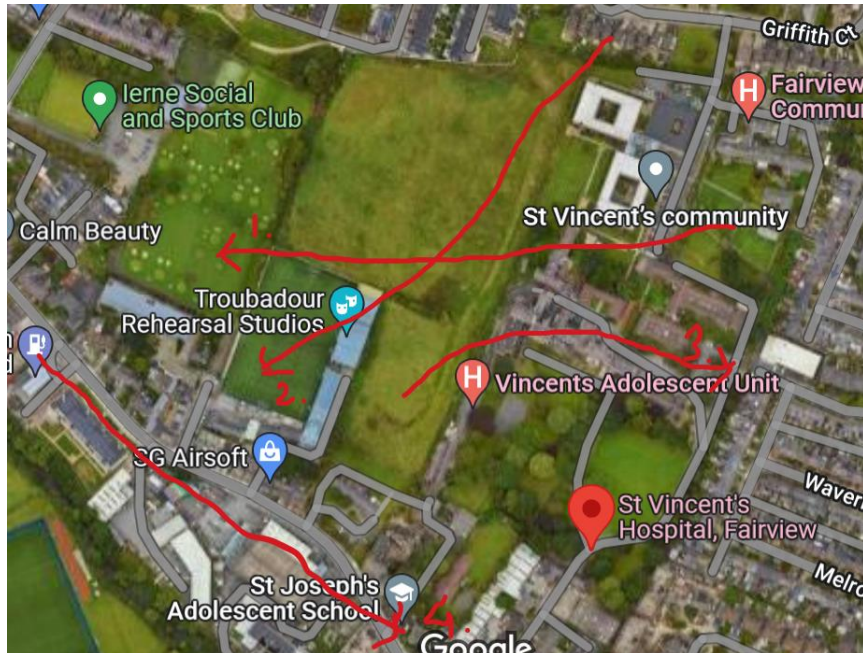


Figure 2. Flightlines for site in November 2021.

30/11/21 08.38hrs No.1 in blue – Curlew (<5), height 25m.
 30/11/21 09.56hrs No.2 in blue – Peregrine Falcon (<1), height 30m.
 30/11/21 10.08hrs No.3 Redshank (<1), height 30m.
 30/11/21 13.37hrs No.4 Brent Goose (<45), Off-site, height 30m.

December 17th, 2021

Sunrise- 08.37hrs/Sunset 16.07hrs. Weather – Wind F3 East, Cloud 8/8, Dry, 9c, Excellent visibility. On-site 09.00hrs – 15.30hrs.

Species recorded – Robin, Dunnock, Wren, Woodpigeon, Collared Dove, Herring Gull, Lesser black-backed Gull, Black-headed Gull, **Brent Goose**, **Curlew**, **Oystercatcher**, Goldcrest, Chaffinch, Goldfinch, Greenfinch, Bullfinch, Blue Tit, Coal Tit, Great Tit, Long-tailed Tit, Blackbird, Song Thrush, Mistle Thrush, Ring-necked Parakeet, Sparrowhawk, Starling, Grey Wagtail, Pied Wagtail, Hooded Crow, Magpie, Rook, Jackdaw, Feral Pigeon.

09.00hrs-12.00hrs – Observing from VP's 1&2 from 09.00hrs-12.00hrs. At 09.20hrs Brent Geese (<140) noted passing west to the south of the site (off-site) following Tolka river, height 40m. At 11.07hrs Brent Geese (<120) noted passing west to the north of the site (off-site), height 30m. At 11.09hrs Ring-necked Parakeet (<3) were noted arriving into the site from the north and observed foraging around hospital buildings. A Sparrowhawk was noted hunting Feral Pigeon at the northwest corner of the site at 11.18hrs. Small number of Herring Gull (<40), Black-headed Gull (<20) and Lesser black-backed Gull noted passing over the site during the morning mainly to the south of the site. No other target species recorded.

12.00hrs-15.30hrs – Site traversed from 12.00-12.45hrs, Sparrowhawk noted hunting at 12.16hrs in playground area, Ring-necked Parakeets (<3) also noted foraging around the playground area at this time. VP observations resumed at 12.45hrs. Curlew (<11) flew northeast over the site at 12.51hrs, height 15m. At 13.54hrs Curlew (<22) flew east over the south side of the site, height 20m. At 13.25hrs a Sparrowhawk was noted hunting over the north side of the site. At 13.34hrs Brent Geese (<160) were noted passing southeast over the boundary of the site, height 25m. At 13.38hrs Curlew (<1) and Oystercatcher (<1) passed east over the north side of the site, height 25m. At 13.40hrs Curlew (<30) passed east to north of site (off-site), height 20m. At 13.42hrs Brent Geese (<180) passed southeast over the site, height 20m, orientating towards the Tolka river. At 13.49hrs an Oystercatcher (<1) passed southeast over the site, height 15m. No other target species recorded.

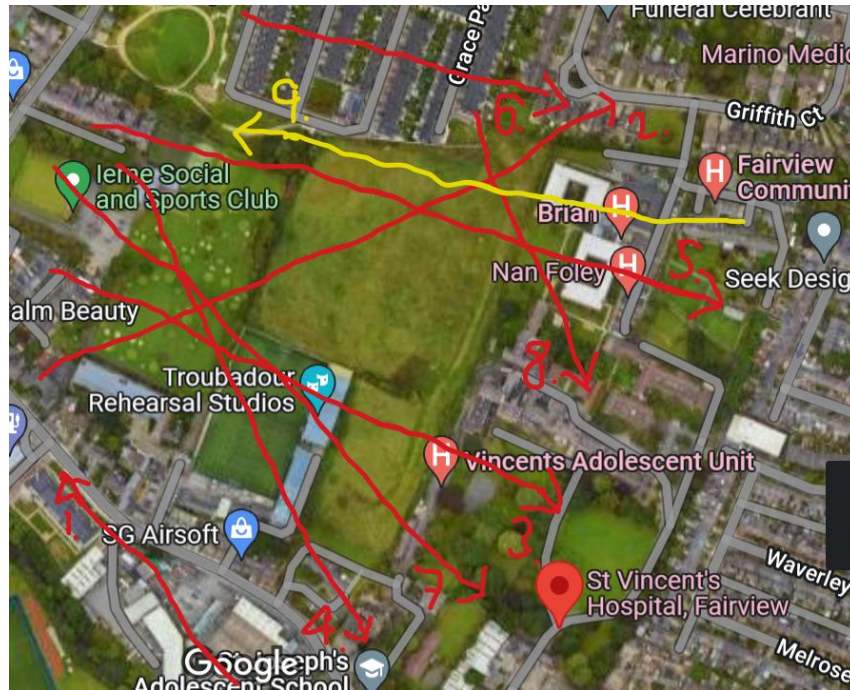


Figure 3. Flightlines for site in December 2021.

17/12/21 09.20hrs No.1 in red – Brent Geese (<140), west, height 30m.
 17/12/21 12.51hrs No.2 in red- Curlew (<11), northeast, height 15m.
 17/12/21 13.54hrs No.3 in red- Curlew (<22), East, height 20m.
 17/12/21 13.34hrs No.4 in red – Brent Geese (<160), height 25m.
 17/12/21 13.38hrs No.5 in red – Curlew (<1) and Oystercatcher (<1), height 25m.
 17/12/21 13.40hrs No.6 in red – Curlew (<30), height 20m.
 17/12/21 13.42hrs No.7 in red – Brent Geese (<180), height 20m.
 17/12/21 13.49hrs No.8 in red – Oystercatcher (<1), height 15m.
 29/12/21 09.05hrs No.1 in red – Brent Geese (<170), height 35m.
 29/12/21 09.20hrs No.1 in red – Brent Geese (<40), height 30m.
 29/12/21 11.15hrs No.9 in yellow – Curlew (<15), height 25m.
 29/12/21 15.10hrs No.6 in red – Brent Geese (<160), height 30m.
 29/12/21 15.30hrs No.5 in red – Curlew (<24), height 25m.

December 29th, 2021

Sunrise- 08.40hrs/Sunset 16.14hrs. Weather – Wind F3 Southwest, Cloud 5/8, Dry, 10c, Excellent visibility. On-site 08.45hrs – 15.45hrs.

Species recorded – Robin, Dunnock, Wren, Woodpigeon, Collared Dove, Herring Gull, Lesser black-backed Gull, Black-headed Gull, Common Gull, **Brent Goose, Curlew, Snipe**, Goldcrest, Chaffinch, Goldfinch, Redpoll, Bullfinch, Linnet, Blue Tit, Coal Tit, Long-tailed Tit, Blackbird, Song Thrush, Redwing, Mistle Thrush, Buzzard, Sparrowhawk, Starling, Grey Wagtail, Pied Wagtail, Hooded Crow, Magpie, Rook, Jackdaw, Feral Pigeon.

08.45hrs-12.00hrs – Observing from VP's 1&2 from 08.45hrs-12.15hrs, at 09.05hrs Brent Geese (<170) passed west south of the site (off-site), following the Tolka River (flightline no.1). At 09.20hrs Brent Geese (<40) passed west following similar line, south of the site. A Buzzard was noted soaring north over the site at 10.10hrs. At 11.15hrs Curlew (<15) were noted passing west at the north side of the site (flightline no.9). Redwing (<5), Redpoll (<7) and Chaffinch noted foraging around VP area. Two Snipe were flushed to the east of VP.2 at 11.50hrs. Herring Gull (<35) and Black-headed Gull (<20) noted passing over the site. No other target species recorded.

12.00hrs-15.45hrs – Site traversed from 12.30-13.30hrs, Goldcrest (<5), Grey Wagtail (<2), Blackbird (<7) and Song Thrush (<2) noted foraging on-site. A Sparrowhawk was noted hunting at the east of the site at 12.55hrs. VP monitoring resumed at 13.45hrs finishing at 15.45hrs. Brent Geese (<160) noted passing east north of the site (off-site) at 15.10hrs (flightline no.6). Curlew (<24) passed east at the north side of the site at 15.30hrs (flightline no.5). Movement east of gulls late in afternoon with Herring (<90), Black-headed Gull (<110), Common Gull (<12) and Lesser black-backed Gull (<5) recorded. No other target species recorded.

January 6th, 2022

Sunrise- 08.38hrs/Sunset 16.23hrs. Weather – Wind F4 South, Cloud 7/8, Light showers, 7c, Good visibility. On-site 09.00hrs – 16.15hrs.

Species recorded – Robin, Dunnock, Wren, Woodpigeon, Herring Gull, Lesser black-backed Gull, Black-headed Gull, Common Gull, **Brent Goose, Curlew, Snipe**, Mallard, Cormorant, Goldcrest, Chaffinch, Greenfinch, Goldfinch, Redpoll, Bullfinch, Linnet, Blue Tit, Coal Tit, Long-tailed Tit, Great Tit, Blackbird, Ring-necked Parakeet, Song Thrush, Redwing, Mistle Thrush, Sparrowhawk, Starling, Meadow Pipit, Grey Wagtail, Pied Wagtail, Hooded Crow, Magpie, Rook, Jackdaw, Feral Pigeon.

09.00hrs-12.00hrs – VP monitoring commencing 09.00hrs until 12.00hrs, Brent Geese (<200) noted passing west at 09.10hrs at south of site, off-site, following Tolka (flightline 1). Curlew (<35) noted passing west at 09.40hrs at the northern boundary of the site (flightline 2). Brent Geese (<75) noted passing southeast at 10.50hrs through the site (flightline 3). Herring Gull (<60), Black-headed Gull (<45) and Common Gull (<14) noted passing over the site. Mallard (<3) noted passing west to south of site at 11.15hrs, off-site and following Tolka. Cormorant noted doing the same at 11.35hrs. One Snipe was flushed west of VP.1 at 11.40hrs. No other Target species recorded.

12.00hrs-16.15hrs – Site traversed from 12.15hrs to 13.30hrs. Herring Gull (<2) noted foraging on green at main entrance to hospital from 12.30-13.10hrs. Ring-necked Parakeet (<3) again recorded on hospital grounds foraging near the cemetery area at 13.00hrs. Redwing (<4) noted foraging at northeast side of the site at 13.05hrs. Monitoring at the VP's resumed at 13.45hrs until 16.15hrs, Brent geese (<150) noted passing east at 15.55hrs to the north of the site (off-site), flightline 4. Herring Gull (<120) and Black-headed Gull (<70) noted passing east over the site. Meadow Pipit (<2) and Greenfinch (<4) noted foraging around VP's. No other target species recorded.

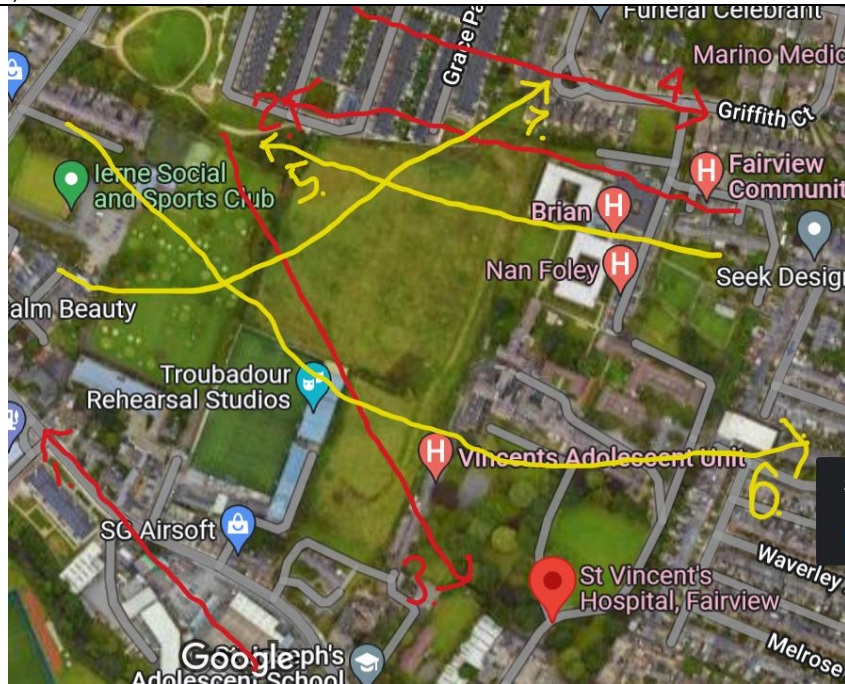


Figure 4. Flightlines for site in January 2022.

06/01/22 09.10hrs No.1 in red - Brent Geese (<200) west, height 35m.
 06/01/22 09.40hrs No.2 in red - Brent Geese (<35) west, height 30m.
 06/01/22 10.50hrs No.3 in red - Brent Geese (<75) Southeast, height 25m.
 06/01/22 15.55hrs No.4 in red - Brent Geese (<150) East, height 40m.
 20/01/22 08.33hrs No.1 in red - Brent Geese (<220) West, height 30m.
 20/01/22 08.38hrs No.1 in red - Brent Geese (<200) West, height 30m.
 20/01/22 09.07hrs No.5 in yellow - Curlew (<3) West, height 30m.
 20/01/22 09.44hrs No.4 in red - Brent Geese (<60) West, height 25m.
 20/01/22 15.18hrs No.6 in yellow - Brent Geese (<160) East, height 25m.
 20/01/22 15.20hrs No.7 in yellow - Brent Geese (<550) Northeast, height 30m.
 20/01/22 16.07hrs No.1 in red - Brent Geese (<80) East, height 25m.
 20/01/22 16.17hrs No.4 in red - Curlew (<35), East, height 30m.

January 20th, 2022

Sunrise- 08.27hrs/Sunset 16.46hrs. Weather – Wind F2 West, Cloud 5/8, Dry, 7c, Excellent visibility. On-site 08.30hrs – 16.45hrs.

Species recorded – Robin, Dunnock, Wren, Woodpigeon, Collared Dove, Herring Gull, Black-headed Gull, Common Gull, **Brent Goose**, **Curlew**, Cormorant, Grey Heron, Little Egret, Chaffinch, Greenfinch, Goldfinch, Redpoll, Bullfinch, Linnet, Blue Tit, Coal Tit, Long-tailed Tit, Great Tit, Blackbird, Ring-necked Parakeet, Song Thrush, Mistle Thrush, Sparrowhawk, Starling, Meadow Pipit, Grey Wagtail, Hooded Crow, Magpie, Jackdaw, Raven, Feral Pigeon.

08.30hrs-12.00hrs – VP 1&2 monitoring commenced from 08.30hrs to 12.00hrs. Brent Geese (<220) noted passing west at 08.33hrs at flightline 1 (off-site). Brent Geese (<200) also noted passing west at flightline 1 at 08.38hrs. At 09.07hrs Curlew (<3) were noted passing west over the north side of the site. At 09.44hrs Brent Geese (<60) were noted passing west north of the site (off-site). Ring-necked Parakeet (<1) noted foraging close to VP 1. Herring Gull (<50), Black-headed Gull (<25) noted passing over the site. Little Egret and Grey Heron noted following course of Tolka river to south of site (off-site) during the morning. No other target species recorded.

12.00hrs-16.45hrs – At 15.18hrs Brent Geese (<160) passed east over the site. At 15.20hrs Brent Geese (<550) passed northeast over the site. At 16.07hrs Brent Geese (<80) passed east south of the site (off-site). At 16.17hrs Curlew (<35) passed east north of the site (off-site). Movement of Gulls east in afternoon with Herring Gull (<minimum 130), Black-headed Gull (<100) and Common Gull (<20) recorded. Cormorant (<1) passed west south of site following Tolka at 16.00hrs (off-site), no other target species recorded.

February 7th, 2022

Sunrise- 07.59hrs/Sunset 17.20hrs. Weather – Wind F4 Southwest, Cloud 7/8, Occasional light showers, 11c, Excellent visibility. On-site 08.30hrs – 17.15hrs.

Species recorded – Robin, Dunnock, Wren, Woodpigeon, Collared Dove, Herring Gull, Black-headed Gull, **Brent Goose**, Grey Heron, Chaffinch, Greenfinch, Redpoll, Goldfinch, Blue Tit, Coal Tit, Great Tit, Blackbird, Ring-necked Parakeet, Song Thrush, Sparrowhawk, Starling, Meadow Pipit, Pied Wagtail, Grey Wagtail, Hooded Crow, Magpie, Jackdaw, Raven, Feral Pigeon.

08.30hrs-12.00hrs – On-site commencing at VP 1. at 08.30hrs, Brent Geese (<110) noted passing west south of the site (off-site) at 08.50hrs and (<55) at 09.15hrs. Sparrowhawk noted hunting at the northwest of the site at 10.30hrs. Herring Gull (<40) and Black-headed Gull (<30) noted passing over the site during the morning. A Grey Heron passed over the south side of the site at 10.25hrs. Meadow Pipit (<10) and Greenfinch (<5) noted foraging in area between the VP's. Two Raven passed north over VP 1. At 11.15hrs. No other target species recorded.

12.00hrs-17.15hrs – Site traversed from 12.00hrs to 13.00hrs, VP's monitored from 13.30hrs to 17.15hrs. Brent Geese (<7) passed southwest over the site at 12.41hrs. A Ring-necked Parakeet was noted foraging in the center of the site at 12.30hrs. Herring Gull (<90) and Black-headed Gull (<75) noted passing east over the site in the late afternoon. At 17.05hrs Brent Geese (<200) were noted passing east north of the site (off-site). No other target species recorded.

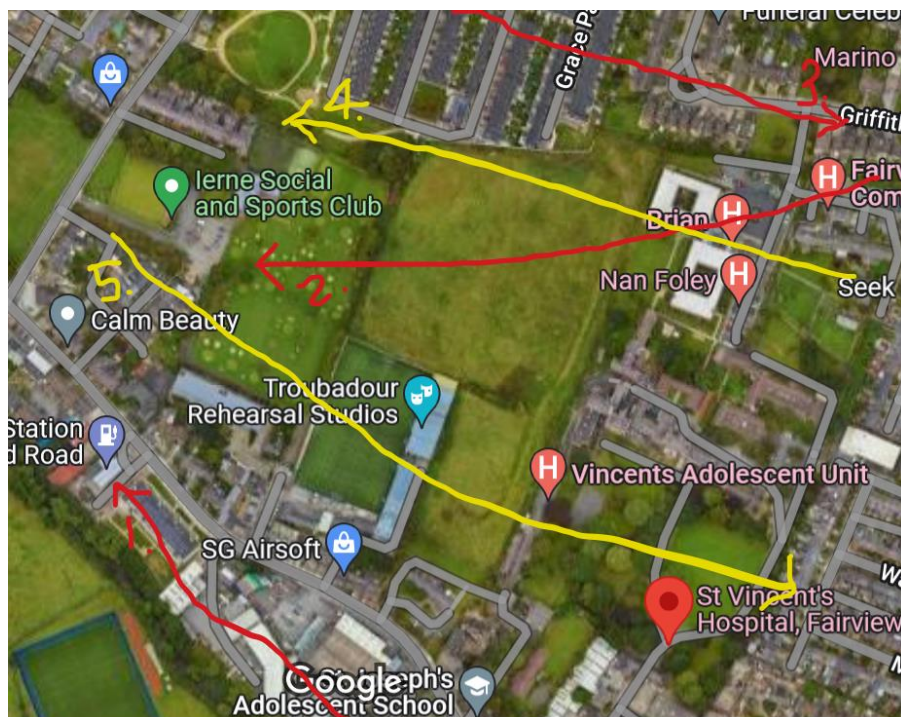


Figure 5. Flightlines for site in February 2022.

07/02/22 08.30hrs No.1 in red - Brent Geese (<110) West, height 30m.
07/02/22 08.50hrs No.1 in red – Brent Geese (<55) West, height 30m.
07/02/22 12.41hrs No.2 in red – Brent Geese (<7) Southwest, height 20m.
07/02/22 17.05hrs No.3 in red – Brent Geese (<200) East, height 25m.
18/02/22 08.25hrs No.1 in red – Brent Geese (<120) West, height 30m.
18/02/22 08.35hrs No.4 in yellow – Brent Geese (<160) & Curlew (<25) West, height 35m.
18/02/22 14.45hrs No.5 in yellow – Brent Geese (<180) East, height 25m.
18/02/22 16.30hrs No.3 in red – Curlew (<20) East, height 30m.

February 18th, 2022

Sunrise- 07.37hrs/Sunset 17.41hrs. Weather – Wind F4 Northwest, Cloud 6/8, Dry, 5c, Excellent visibility. On-site 08.00hrs – 17.15hrs.

Species recorded – Robin, Dunnock, Wren, Woodpigeon, Herring Gull, Common Gull, Black-headed Gull, **Brent Goose**, **Curlew**, Grey Heron, Little Egret, Chaffinch, Redpoll, Linnet, Goldfinch, Blue Tit, Coal Tit, Blackbird, Ring-necked Parakeet, Song Thrush, Sparrowhawk, Starling, Meadow Pipit, Pied Wagtail, Grey Wagtail, Hooded Crow, Magpie, Jackdaw, Feral Pigeon.

08.00hrs-12.00hrs – Observing from VP 1&2 from 08.00hrs to 11.30hrs. At 08.25hrs Brent Geese (<120) passed west south of the site (off-site) following the Tolka. At 08.35hrs Brent Geese (<160) and Curlew (<25) passed through the north side of the site. Herring Gull (<45), Common Gull (<15) and Black-headed Gull (20) recorded passing over the site. At 10.15hrs Ring-necked Parakeet (<2) were noted foraging close to VP.2. Redpoll (<10), Meadow Pipit (<5) and Linnet (<10) were noted foraging in area between VP.1 and VP.2. No other target species recorded.

12.00hrs-17.15hrs – Site traversed from 12.00 to 13.15hrs. Grey Wagtail (<2) and Goldcrest (<4) noted foraging in the east of the site, Sparrowhawk noted hunting in two areas in the east of the site. VP monitoring resumed at 13.45hrs. At 14.45hrs Brent Geese (<180) were noted passing through the south side of the site. At 16.30hrs Curlew (<20) passed east north of the site (off-site). Herring Gull (<130) and Black-headed Gull (<75) noted moving east over the site in late afternoon, no other target species recorded.

March 12th, 2022

Sunrise- 06.47hrs/Sunset 18.24hrs. Weather – Wind F4 South, Cloud 3/8, Dry, 10c, Excellent visibility. On-site 07.15hrs – 17.30hrs.

Species recorded – Robin, Dunnock, Wren, Woodpigeon, Herring Gull, Lesser black-backed Gull, Black-headed Gull, **Brent Goose**, Grey Heron, Goldfinch, Chaffinch, Greenfinch, Redpoll, Linnet, Siskin, House Sparrow, Goldcrest, Blue Tit, Coal Tit, Long-tailed Tit, Great Tit, Blackbird, Song Thrush, Buzzard, Sparrowhawk, Meadow Pipit, Pied Wagtail, Grey Wagtail, Hooded Crow, Magpie, Jackdaw, Feral Pigeon.

07.15hrs-12.00hrs – Observing from VP 1&2 from 07.15hrs to 11.30hrs. The only observation of target species were Brent Geese (<420) passing east over the site at 10.30hrs. Herring Gull (<60), Lesser black-backed Gull (<10) and Black-headed Gull (<15) observed passing over the site during the morning. Sparrowhawk observed soaring over the north side of the site at 10.04hrs. Grey Heron (<1) passed east over the south side of the site at 10.18hrs. Siskin and House Sparrow were species newly recorded on-site being observed foraging at the west boundary of the site. No other target species recorded.

12.00hrs-17.00hrs – Site traversed from 12.00-13.00hrs. Sparrowhawk observed hunting at the northeast corner of the site at 12.40hrs. Buzzard (<2) observed soaring over the east of

the site at 13.00hrs. VP monitoring resumed at 13.30-17.00hrs with no specific target species recorded, Herring Gull (<40) and Black-headed Gull (<15) observed mainly moving east during afternoon. A Sparrowhawk was recorded hunting at the west side of the site at 14.38hrs.

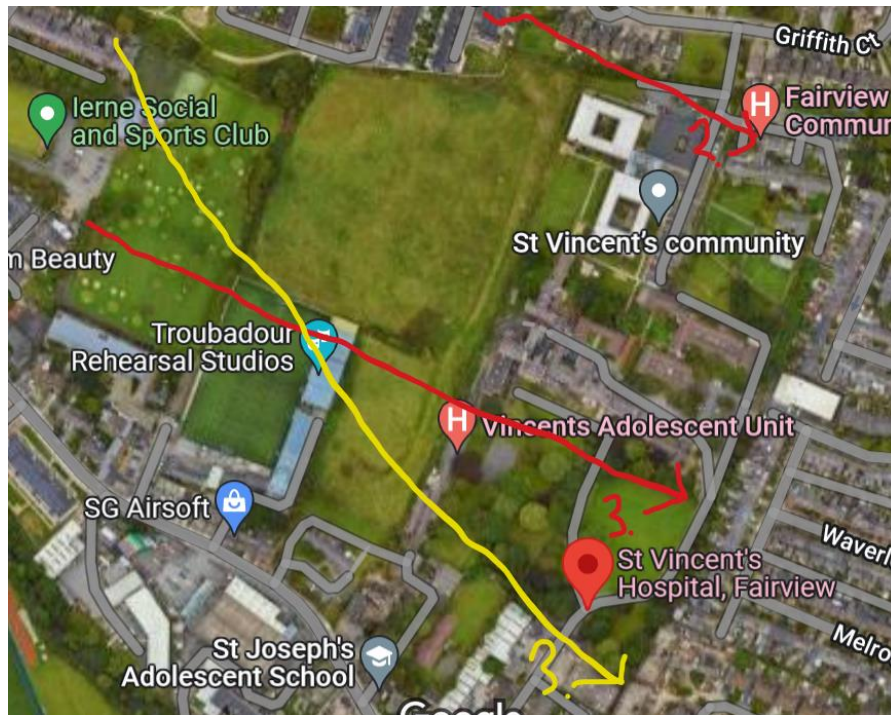


Figure 6. Flightlines for site in March 2022.

12/03/22 10.30hrs No.3 in yellow - Brent Geese (<420) Southeast, height 30m.
 23/03/22 14.45hrs No.3 in yellow – Brent Geese (<30) Southeast, height 35m.
 23/03/22 16.05hrs No.3 in red – Brent Geese (<50) East, height 30m.
 23/03/22 16.15hrs No.2 in red – Brent Geese (<15) East, height 25m.

March 23rd, 2022

Sunrise- 06.20hrs/Sunset 18.43hrs. Weather – Wind F2 Southeast, Cloud 3/8, Dry, 11c, Excellent visibility. On-site 08.15hrs – 16.30hrs.

Species recorded – Robin, Dunnock, Wren, Woodpigeon, Herring Gull, Lesser black-backed Gull, Black-headed Gull, **Brent Goose**, Goldfinch, Chaffinch, Greenfinch, Linnet, Bullfinch, Goldcrest, Blue Tit, Coal Tit, Long-tailed Tit, Great Tit, Blackbird, Song Thrush, Mistle Thrush, Buzzard, Sparrowhawk, Meadow Pipit, Pied Wagtail, Grey Wagtail, Hooded Crow, Magpie, Jackdaw, Raven, Feral Pigeon.

07.00hrs-12.00hrs – Observing from VP's 1&2 from 07.00-11.00hrs. No specific target species recorded. Gull numbers reduced with Herring gull (<40), Lesser black-backed Gull (<5) and Black-headed Gull (<10) noted passing over the site. Sparrowhawk observed soaring over the west side of the site at 09.10hrs and 10.40hrs. Buzzard (<2) observed soaring over the north end of the site at 10.45hrs. Greenfinch (<4) and Linnet (<9) noted foraging around the area between the VP's.

12.00hrs-16.30hrs – Site traversed from 11.00-12.15hrs. Similar profile of passerines observed across site, Mistle Thrush (<2) observed nest building at the east of the site. Two Goldcrest noted in song at the east of the site. VP monitoring resumed from 13.00-16.30hrs. Brent geese (<30) noted passing southeast at 14.45hrs. In late afternoon Brent Geese (<50) passed east over site at 16.05hrs and Brent Geese (<15) passed east north of the site at 16.15hrs (off-site). Herring Gull (<30), Lesser black-backed Gull (<8) and Black-headed Gull (<5) noted passing east in afternoon. No other target species recorded.

Comments and observations on survey results

In total 51 Bird species were recorded overall at the St Vincent's Hospital site in Fairview during 14 surveys over the course of the 2021-2022. Species recorded that are red listed as wintering species of conservation concern (Birdwatch Ireland's birds of conservation concern in Ireland 2020-2026) included Curlew, Redshank, Oystercatcher, Snipe and Redwing, only Snipe and Redwing were recorded foraging on-site, albeit in very small numbers. The remaining species and other amber listed species (such as Brent Geese and Gull species) were all only recorded passing through the site. The most suitable feeding areas (fields at west of site) being sub-optimal for feeding for these species being of long grass sward mixed with other species and rank vegetation. Herring Gull were occasionally noted foraging in very small numbers on the limited maintained grass areas on the rest of the site.

Results suggest that the site is not significant ex-situ foraging or roosting site for species of qualifying interest from nearby Special protection areas (SPA's). It was apparent that the preferred flightline routes for species such as Brent Geese and Curlew were to the south (birds likely following the Tolka River being a natural landmark) and to the north of the Hospital structure complex itself, although occasional flocks were recorded passing close and over the Hospital. Movements recorded were largely early and late in the day reflecting movements of birds from Dublin Bay to feeding site farther west of the site. Other species observed from the site included Grey Heron, Little Egret, Cormorant and Mallard, these species noted almost exclusively recorded following the Tolka River south of the site. Sparrowhawk and Buzzard were quite frequently recorded on-site, breeding nearby or possibly on-site.

APPENDIX 7.2(b)

WINTER BIRD SURVEYS NOVEMBER TO MARCH 2022-2023.

HUGH DELANEY

REPORT ON WINTER BIRD SURVEYS CONDUCTED AT ST. VINCENT'S HOSPITAL FAIRVIEW, CO. DUBLIN

NOVEMBER TO MARCH 2022-2023.

PREPARED BY HUGH DELANEY

Introduction

Between November 2022 and March 2023, 9 winter bird surveys (two per month and one in March) were undertaken at lands at St Vincent's Hospital, in Fairview, North County Dublin, by Hugh Delaney, a freelance Ecologist (Birds primarily) having completed work on numerous sites with ecological consultancies over 10+ years. Hugh is local to the Dun Laoghaire-Rathdown area in Dublin and is especially familiar with the bird life and its ecology in the environs going back over 30 years.

Winter Bird Survey Methodology

Winter bird surveys are conducted from soon after sunrise until late in the afternoon, or alternatively started later in the day until sunset, the site is monitored throughout the survey period and all bird species utilizing the site recorded, including species flying through overhead. Checks are also made on suitable habitat nearby or adjacent the site for comparative purposes and to monitor any interchange of birds between sites. Target species (species of more special interest) utilizing the site will be mapped and estimates of the time these species frequented the site recorded.

Site Location

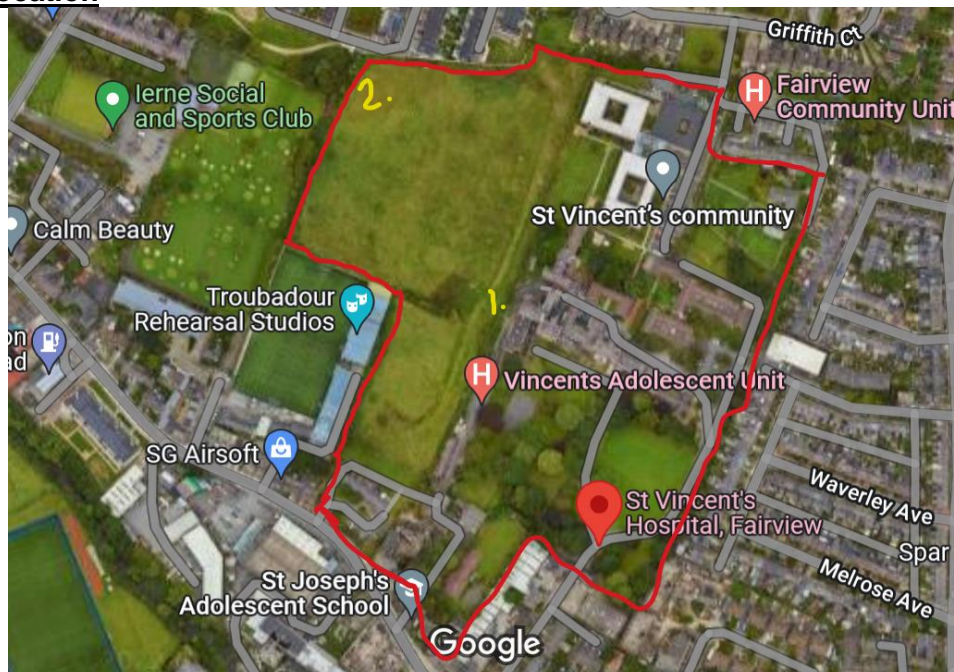


Fig. 1 St Vincent's Hospital Fairview, survey site outlined in red. Green field area at west of site being a primary focus of the surveys with the vantage points marked in yellow (Vantage points 1 & 2).

Site Description

Site located in urban north Dublin city, site comprising of larger buildings in east with some small areas of greens and small patches of mixed mature trees. Two areas area of more substantial rough grassland are situated at the west side of the site.

Specific site survey methodology

Vantage point observations were undertaken at locations at the west side of the site these giving optimal views of species passing over the site and also to note any species foraging in this area. Vantage points 1 and 2 were monitored alternately each hour, recording all species passing through and foraging on-site. Additionally, the entire site was traversed over generally in the middle of the day to collect further data on species utilizing the site. Early survey visits and later survey visits were made alternatively between surveys to ascertain bird movements early in the day and later in the day.

November 15th, 2022

Sunrise- 07.49hrs/Sunset 16.28hrs. Weather – Wind F2 Northwest, Cloud 6/8, Dry, 10c, Excellent visibility. On-site 08.00hrs – 14.30hrs.

Species recorded – Robin, Dunnock, Wren, Woodpigeon, Herring Gull, Lesser black-backed Gull, Black-headed Gull, Mallard, Cormorant, Goldcrest, Chaffinch, Bullfinch, Goldfinch, Linnet, Redpoll, Blue Tit, Coal Tit, Long-tailed Tit, Blackbird, Song Thrush, Mistle Thrush, Starling, Grey Wagtail, Meadow Pipit, Sparrowhawk, Hooded Crow, Magpie, Rook, Jackdaw, Feral Pigeon.

08.00hrs-12.00hrs – Observing from VP.'s 1&2 from 08.00-12.00hrs, Herring Gull (<50), Black-headed Gull (<30) and Lesser black-backed Gull (<3) noted passing over the site, passing mainly east to west. Occasional birds landing on the Hospital buildings. Meadow Pipit (<4), Redpoll (<2), Chaffinch (<5), Bullfinch (<4) and Linnet (<8) foraging in fields at VP sites. Site traversed from 12.00-13.00hrs, Grey Wagtail (<1) Mistle Thrush (<3), Goldfinch (<15), and Blackbird (<5) noted foraging at the east side of the site. No other target species recorded. 12.00hrs-14.30hrs – Monitoring from VP's from 13.00-14.30hrs, Herring Gull (<42), Lesser black-backed Gull (<6) and Black-headed Gull (<35) noted passing mainly east and south over the site. Linnet (<12), Redpoll (<2) and Meadow Pipit (<3) noted foraging in area adjacent VP sites. Sparrowhawk noted hunting between the VP's at 13.15hrs. A Cormorant was observed following Tolka river west at 14.50hrs (offsite). One Mallard passed over the south side of the site at 12.10hrs. No other target species recorded.

November 28th, 2022

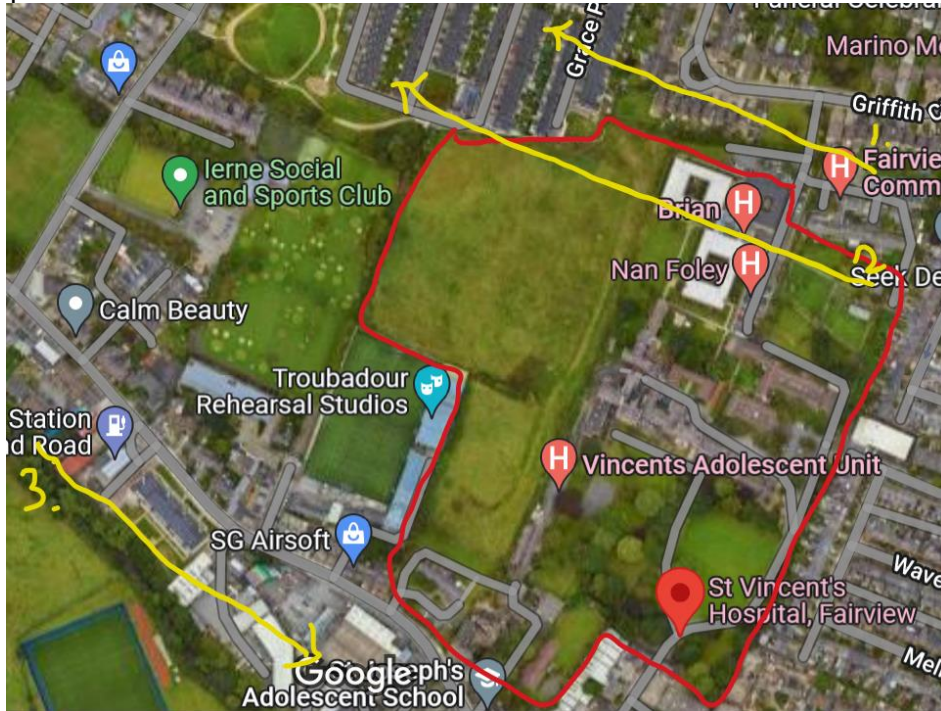
Sunrise- 08.12hrs/Sunset 16.13hrs. Weather – Wind F3 Southwest, Cloud 4/8, Dry, 4c, Excellent visibility. On-site 10.00hrs – 16.30hrs.

Species recorded – Robin, Dunnock, Wren, Woodpigeon, Collared Dove, Herring Gull, Lesser black-backed Gull, Black-headed Gull, Common Gull, **Brent Goose**, Goldcrest, Chaffinch, Goldfinch, Redpoll, Greenfinch, Bullfinch, Blue Tit, Coal Tit, Great Tit, Long-tailed Tit, Blackbird, Song Thrush, Mistle Thrush, Ring-necked Parakeet, Starling, Grey Wagtail, Sparrowhawk, Hooded Crow, Magpie, Rook, Jackdaw, Raven, Feral Pigeon.

10.00hrs-12.00hrs – Observing from VP.'s 1&2 from 10.00-12.00hrs. At 10.45hrs **Brent Geese** (<40) passed west over the north side of the site (Height 25m). Herring Gull (<45), Black-headed Gull (<15), Common Gull (<3) and Lesser black-backed Gull (<5) noted passing over the site mainly west and south. Ring-necked Parakeet (<2) were noted at 11.15hrs flying west from the hospital buildings. No other target species recorded.

12.00hrs-16.30hrs – Site traversed from 12.00-13.30hrs with typical selection of passerines recorded, Goldcrest (<3), Redpoll (5) and Grey Wagtail (<2) more notable. Sparrowhawk noted hunting at east side of site at 12.45hrs. VP observations resumed at 13.30hrs until 16.30hrs. **Brent Goose** noted passing west at 14.35hrs (<25 on-site, height 30m) and (<45) noted passing east at 16.05hrs, off-site and following the Tolka River (height 30m). Herring

Gull (<50) and Black-headed Gull (<50) noted passing east mainly over the site. No other target species recorded.



November flightlines – (all 28/11/22)

No. 1 Brent Goose, 50 west, height 25m. Off-site.

N0.2 Brent Goose, 25 west, height 30m, on-site.

No.3 Brent Goose, 45 east, height 30m, following Tolka, off-site.

December 8th, 2022

Sunrise- 08.27hrs/Sunset 16.07hrs. Weather – Wind F1 Northwest, Cloud 3/8, Dry, 4c, Excellent visibility. On-site 10.00hrs – 16.15hrs.

Species recorded – Robin, Dunnock, Wren, Woodpigeon, Herring Gull, Black-headed Gull, Cormorant, Common Gull, **Brent Goose**, **Curlew**, Goldcrest, Chaffinch, Goldfinch, Redpoll, Greenfinch, Bullfinch, Reed Bunting, Stonechat, Blue Tit, Coal Tit, Great Tit, Long-tailed Tit, Blackbird, Mistle Thrush, Ring-necked Parakeet, Grey Wagtail, Sparrowhawk, Buzzard, Hooded Crow, Magpie, Rook, Jackdaw, Feral Pigeon.

10.00hrs-12.00hrs – Observing from VP.'s 1&2 from 10.00-12.00hrs. At 11.56hrs **Curlew** (<31) passed northeast over the north side of the site (Height 25m). Herring Gull (<35), Black-headed Gull (<45), and Common Gull (<5) noted passing over the site mainly heading west. Ring-necked Parakeet (<2) were noted intermittently during the morning around the hospital buildings. No other target species recorded.

12.00hrs-16.15hrs – Site traversed from 12.00-13.15hrs with typical selection of passerines recorded, Stonechat and Reed Bunting being notable. Buzzard noted in trees at west side of site several times in afternoon. Sparrowhawk noted hunting at east side of site at 12.30hrs. VP observations resumed at 13.15hrs until 16.15hrs. **Brent Goose** noted passing east at 12.30hrs (<110 off-site, height 35m). **Curlew** noted four times over site in afternoon (see details below). Herring Gull (<150) and Black-headed Gull (<400) and Common Gull (<10) noted passing east over the site especially in last hour (heading to roost). No other target species recorded.



No.1.11.56hrs. Curlew 31, heading north, height 25m (appeared to land into site to north on map near Annadale Drive).

No.2 12.30hrs. Brent Goose 110, heading east off-site, height 35m.

No.3 12.35hrs. Curlew 1 heading east, height 35m. Cormorant at 11.28hrs, east height 30m.

No.4 12.43hrs. Curlew 4 heading east, height 30m.

No.5 12.28hrs. Curlew 28 heading east, height 25m.

No.2 15.48hrs. Curlew 7 heading east, height 30m.

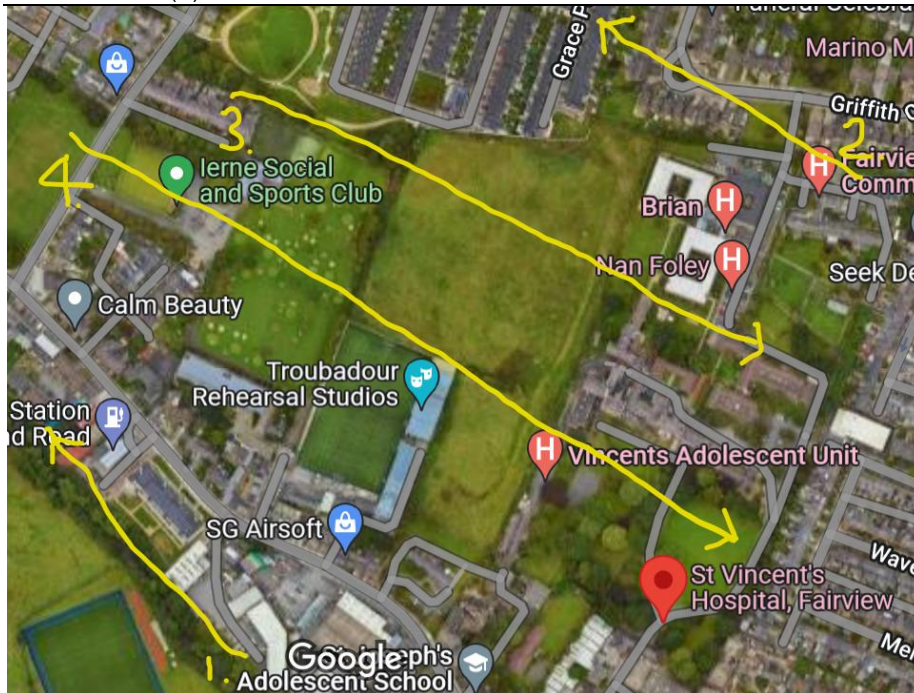
December 20th, 2022

Sunrise- 08.37hrs/Sunset 16.07hrs. Weather – Wind F3 Southwest, Cloud 3/8, Dry, 6c, Excellent visibility. On-site 08.30hrs – 14.30hrs.

Species recorded – Robin, Dunnock, Wren, Woodpigeon, Collared Dove, Little Egret, Herring Gull, Black-headed Gull, Common Gull, **Brent Goose**, **Curlew**, Goldcrest, Chaffinch, Goldfinch, Greenfinch, Bullfinch, Stonechat, Blue Tit, Coal Tit, Great Tit, Long-tailed Tit, Blackbird, Song Thrush, Mistle Thrush, Ring-necked Parakeet, Grey Wagtail, Pied Wagtail, Sparrowhawk, Hooded Crow, Magpie, Rook, Jackdaw, Feral Pigeon.

08.30hrs-12.00hrs – Observing from VP.'s 1&2 from 08.30-12.00hrs. At 08.40hrs **Brent Geese** (<180) passed south of the site (off-site) following the Tolka west (Height 30m). With two more movements in same direction (see below). Brent Geese also observed going west off-site to the north of site (<150 at 09.15hrs). Herring Gull (<30), Black-headed Gull (<25), and Common Gull (<3) noted passing over the site mainly heading west and south. **Curlew** (<40) noted passing east over north side of site at 11.25hrs. No other target species recorded.

12.00hrs-14.30hrs – Site traversed from 12.00-13.00hrs with typical selection of passerines recorded, Stonechat still present on-site. Sparrowhawk noted hunting several times around V.P area. VP observations resumed at 13.00hrs until 14.30hrs. **Brent Geese** (<25) passed east over south side of site at 13.40hrs. Herring Gull (<60) and Black-headed Gull (<40) noted passing over the site. Ring-necked Parakeet (<2) still present on-site. Little Egret (<1) noted following Tolka west (off-site) at 13.30hrs. No other target species recorded.



No.1 08.40hrs Brent Geese 180, west (off-site), height 30m. 08.55hrs Brent Geese 80, west, height 30m. 09.10 Brent Geese 120, west height 25m.

No.2 09.15 Brent Geese 150, west (off-site), height 25m.

No.3 11.25hrs Curlew 40, east, height 30m.

No.4 13.40hrs Brent Geese 25, east, height 25m.

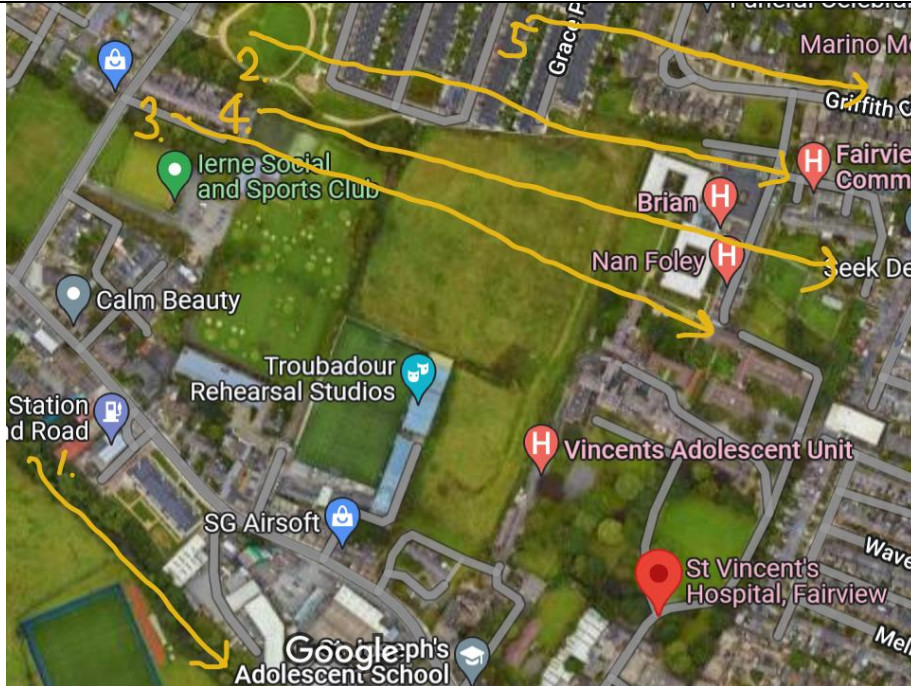
January 7th, 2023

Sunrise- 08.38hrs/Sunset 16.24hrs. Weather – Wind F2 South, Cloud 2/8, Dry, 7c, Excellent visibility. On-site 10.30hrs – 16.30hrs.

Species recorded – Robin, Dunnock, Wren, Woodpigeon, Herring Gull, Black-headed Gull, Common Gull, **Brent Goose**, **Curlew**, **Snipe**, Goldcrest, Chaffinch, Goldfinch, Greenfinch, Bullfinch, Redpoll, Stonechat, Blue Tit, Coal Tit, Great Tit, Long-tailed Tit, Blackbird, Song Thrush, Mistle Thrush, Grey Wagtail, Pied Wagtail, Meadow Pipit, Sparrowhawk, Buzzard, Hooded Crow, Magpie, Rook, Jackdaw, Raven, Feral Pigeon.

10.30hrs-12.00hrs – Observing from VP's 1&2 from 10.30-12.00hrs. At 11.05hrs **Brent Geese** (<65) and **Curlew** (<15) passed south of the site (off-site) following the Tolka east (Height 30m). At 11.45hrs **Brent Geese** (<100) passed east along north edge of site. Herring Gull (<40), Black-headed Gull (<30), noted passing over the site mainly heading west. **Snipe** (<2) were flushed in the rough grass area between the two VP's at 10.45hrs. Meadow Pipit (<8) foraging in rough grass between VP's throughout the day. No other target species recorded.

12.00hrs-16.30hrs – Site traversed from 12.00-13.15hrs with typical selection of passerines recorded. Sparrowhawk and Buzzard observed noted several times around V.P area. VP observations resumed at 13.00hrs until 16.30hrs. **Brent Geese** (<60) passed east over site at 14.10hrs, two other Brent Geese movements later – see below- both off-site. **Curlew** (<45) observed going east over north part of site at 15.40hrs. Herring Gull (<150) and Black-headed Gull (<200) and Common Gull (<25) noted passing over the site going east to roost in Dublin Bay late in afternoon. No other target species recorded.



No. 1 11.05hrs Brent Geese 65 and Curlew 15 east height 25m (Off-site).

No.2 11.45hrs Brent Geese 100 east along border of site, height 30m.

No.3 14.10hrs Brent Geese 60 east, height 30m.

No. 4 15.40hrs Curlew 45 east, height 25m.

No.5 16.05hrs Brent Geese 250 east, height 30m and 16.15hrs Brent Geese 140 east height 35m.

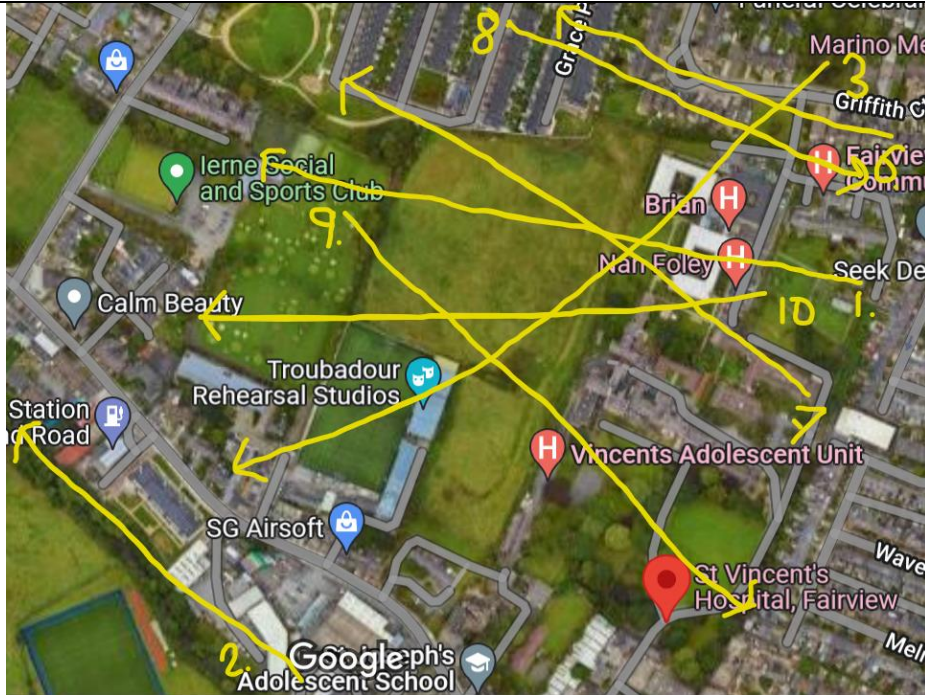
January 21st, 2023

Sunrise- 08.26hrs/Sunset 16.47hrs. Weather – Wind F2 Southeast, Cloud 8/8, Dry, 7c, Excellent visibility. On-site 08.15hrs – 14.30hrs.

Species recorded – Robin, Dunnock, Wren, Woodpigeon, Herring Gull, Black-headed Gull, Cormorant, **Brent Goose**, **Curlew**, **Black-tailed Godwit**, Goldcrest, Chaffinch, Goldfinch, Greenfinch, Linnet, Blue Tit, Coal Tit, Great Tit, Long-tailed Tit, Blackbird, Song Thrush, Redwing, Fieldfare, Starling, Grey Wagtail, Ring-necked Parakeet, Meadow Pipit, Sparrowhawk, Buzzard, Hooded Crow, Magpie, Rook, Jackdaw, Raven, Feral Pigeon.

08.15hrs-12.00hrs – Observing from VP's 1&2 from 08.15-12.00hrs. At 08.46hrs **Brent Geese** (<60) passed west over the north end of the site. At 08.53hrs Brent Geese (<5) passed west following Tolka (Off-site). At 08.58hrs Brent Geese (<80) passed over site from north to south, other Brent and **Curlew** flightlines are detailed below. Herring Gull (<35), Black-headed Gull (<20), noted passing over the site mainly heading west and south. Meadow Pipit (<15) foraging in rough grass between VP's throughout the day and a Fieldfare was notable. No other target species recorded.

12.00hrs-14.30hrs – Site traversed from 12.00-13.00hrs with typical selection of passerines recorded, Redwing (<18) were notable foraging between the VP's. Ring-necked Parakeet (<2) still present on-site. Four sightings of Sparrowhawk including a pair displaying around the west of site. VP observations resumed at 13.00hrs until 14.30hrs. **Brent Geese** (<180) passed west over site at 12.28hrs. **Black-tailed Godwit** (<11) passed east over site at 12.58hrs (first birds observed this winter). Curlew (<4) passed north over site at 13.04hrs. Brent Geese (<3) passed west over site at 13.28hrs. Cormorant observed passing over the south end of the site at 13.50hrs. No other target species recorded.



No.1 08.46hrs Brent Geese 60 west, height 25m.

No.2 08.47hrs Brent Geese 110 west (Off-site), height 25m and 08.58hrs Brent Geese 80 west and 09.10hrs Brent Geese 10 west, height 30m.

No.3 08.53hrs Brent Geese 5 southwest, height 30m.

No.6 09.16hrs Brent Geese 16 west (off-site), height 20m.

No.7 11.22hrs Brent Geese 8 northwest, height 30m.

No.8 12.28hrs Brent Geese 180 east (off-site), height 20m.

No.9 12.58hrs Black-tailed Godwit 11 southeast, height 20m.

No.10 13.28hrs Brent Geese 3 west, height 15m.

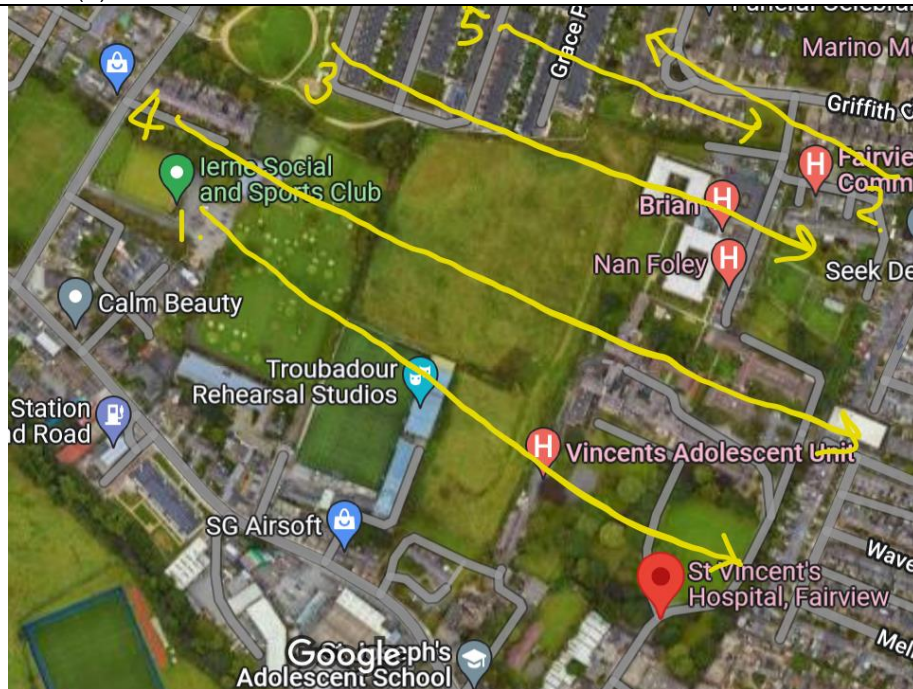
February 9th, 2023

Sunrise- 07.55hrs/Sunset 17.23hrs. Weather – Wind F3 Southwest, Cloud 6/8, Dry, 6c, Excellent visibility. On-site 10.30hrs – 17.30hrs.

Species recorded – Robin, Dunnock, Wren, Woodpigeon, Collared Dove, Herring Gull, Black-headed Gull, Common Gull, **Brent Goose**, **Curlew**, Goldcrest, Chaffinch, Goldfinch, Greenfinch, Bullfinch, Linnet, Blue Tit, Coal Tit, Great Tit, Long-tailed Tit, Blackbird, Song Thrush, Redwing, Starling, Grey Wagtail, Ring-necked Parakeet, Meadow Pipit, Sparrowhawk, Hooded Crow, Magpie, Rook, Jackdaw, Feral Pigeon.

10.30hrs-12.00hrs – Observing from VP.'s 1&2 from 10.30-12.00hrs. At 11.35 **Brent Geese** (<75) passed east over the south end of the site. At 11.52hrs Brent Geese (<90) passed west north of site (off-site). Herring Gull (<50), Black-headed Gull (<20), noted passing over the site mainly heading west. Meadow Pipit (<10) and Redwing (<8) foraging in rough grass between VP's throughout the day. Sparrowhawk again observed displaying over the west side of the site. No other target species recorded.

12.00hrs-17.30hrs – Site traversed from 12.00-13.30hrs with typical selection of passerines recorded. Ring-necked Parakeet (<2) still present on-site. VP observations resumed at 13.30hrs until 17.30hrs. At 13.45hrs **Brent Geese** (35) passed east over north end of the site at 12.28hrs. At 14.30hrs **Curlew** (<25) passed east over middle of site. At 16.45 Brent Geese (<350) passed east north of the site (off-site). No other target species recorded.



- No.1** 11.35hrs Brent Geese 75 east, height 25m.
No.2 11.52hrs Brent Geese 90 west (off-site), height 30m.
No.3 13.45hrs Brent Geese 35 east, height 35m.
No.4 14.30hrs Curlew 25 east, height 25m.
No.5 16.45hrs Brent Geese 350 east (off-site), height 30m.

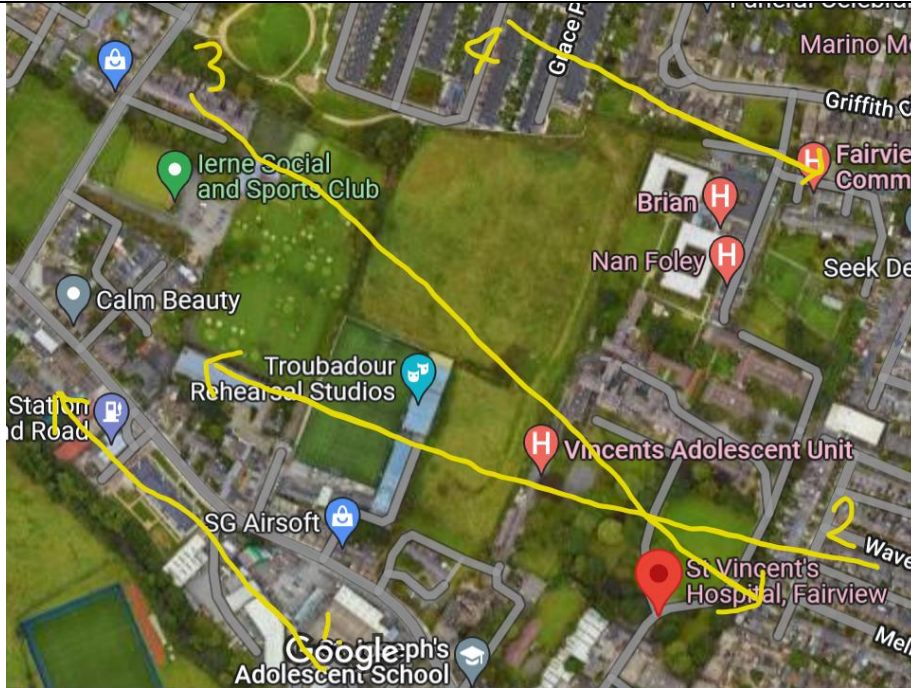
February 24th, 2023

Sunrise- 07.24hrs/Sunset 17.52hrs. Weather – Wind F2 West, Cloud 5/8, Dry, 7c, Excellent visibility. On-site 07.30hrs – 14.30hrs.

Species recorded – Robin, Dunnock, Wren, Woodpigeon, Herring Gull, Black-headed Gull, Common Gull, **Brent Goose**, **Curlew**, Goldcrest, Chaffinch, Goldfinch, Greenfinch, Redpoll, Bullfinch, Blue Tit, Coal Tit, Great Tit, Long-tailed Tit, Blackbird, Song Thrush, Starling, Grey Wagtail, Pied Wagtail, Meadow Pipit, Sparrowhawk, Buzzard, Hooded Crow, Magpie, Rook, Jackdaw, Raven, Feral Pigeon.

07.30hrs-12.00hrs – Observing from VP.'s 1&2 from 07.30-12.00hrs. At 07.45 **Brent Geese** (<125) passed west following the Tolka south of the site, with another two movements shortly after. **Curlew** (<15) passed west over the south end of the site at 10.10hrs. Sparrowhawk and Buzzard intermittently recorded at the west side of the site. Herring Gull (<35), Black-headed Gull (<15), noted passing over the site mainly heading south. No other target species recorded.

12.00hrs-14.30hrs – Site traversed from 12.00-13.00hrs with typical selection of passerines recorded, two Raven noted over the east side of the site at 12.30hrs. VP observations resumed at 13.30hrs until 14.30hrs. At 12.15hrs **Brent Geese** (<20) and **Curlew** (<18) passed southeast over the site. At 13.55hrs Brent Geese (<140) passed east north of the site (off-site). Meadow Pipit (<5), Greenfinch (<6) and Redpoll (<8) noted foraging around the VP area. No other target species recorded.



No 1. 07.45hrs Brent Geese 125 west, height 30m (off-site), 07.50 Brent Geese 150 west, 08.05 Brent Geese 40 west.

No.2 10.10hrs Curlew 15 west, height 20m.

No.3 12.15hrs Brent Geese 20 and Curlew 18 southeast, height 30m.

No.4 13.55hrs Brent Geese 140 east (off-site), height 30m.

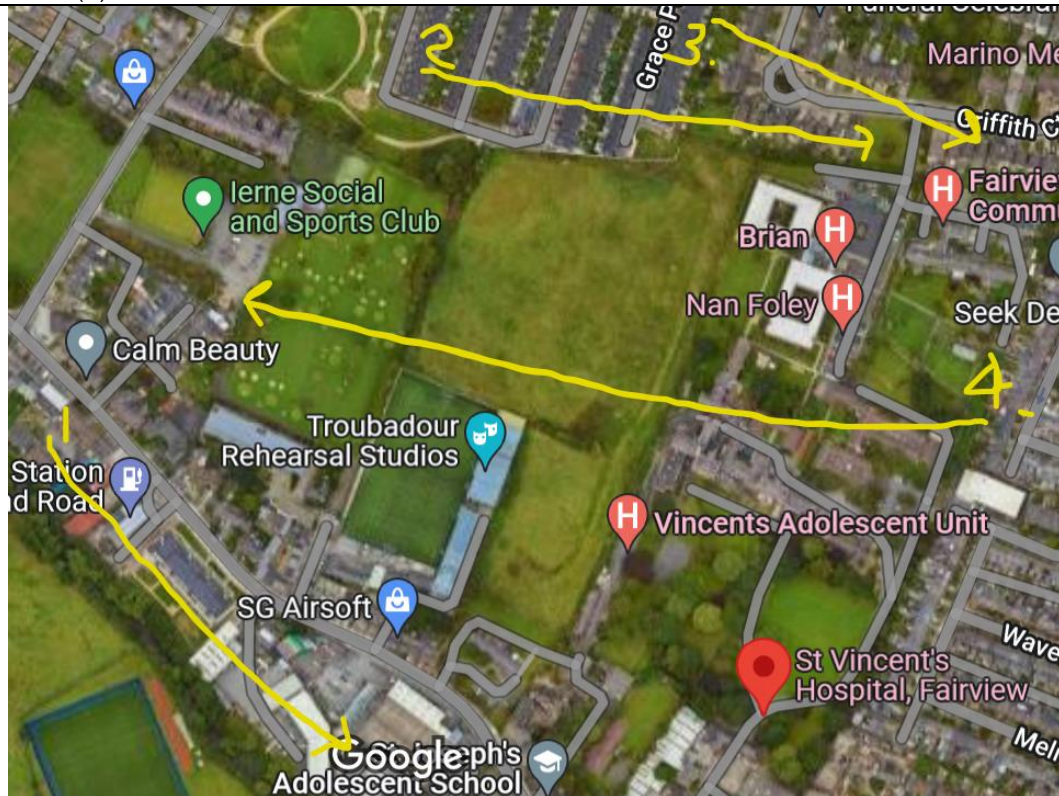
March 8th, 2023

Sunrise- 06.57hrs/Sunset 18.15hrs. Weather – Wind F2 East, Cloud 4/8, Dry, 3c, Excellent visibility. On-site 11.00hrs – 18.15hrs.

Species recorded – Robin, Dunnock, Wren, Woodpigeon, Collared Dove, Herring Gull, Lesser black-backed Gull, Black-headed Gull, **Brent Goose**, **Curlew**, Goldcrest, Chaffinch, Goldfinch, Greenfinch, Bullfinch, Blue Tit, Coal Tit, Great Tit, Long-tailed Tit, Blackbird, Song Thrush, Starling, Grey Wagtail, Pied Wagtail, Meadow Pipit, Sparrowhawk, Buzzard, Hooded Crow, Magpie, Rook, Jackdaw, Feral Pigeon.

11.00hrs-12.00hrs – Observing from VP.'s 1&2 from 11.00-12.00hrs. No target species movements up to midday. Buzzard and Sparrowhawk (displaying) again at the west side of the site. Meadow Pipit (<12) foraging in rough grass area. Herring Gull (<30), Black-headed Gull (<10) and Lesser black-backed Gull (<5) noted passing over the site mainly heading south and west. No other target species recorded.

12.00hrs-18.15hrs – Site traversed from 12.00-13.30hrs with typical selection of passerines recorded. At 14.25hrs **Brent Geese** (<120) noted passing east south of the site (off-site). At 14.40hrs Brent Geese (<50) were noted moving along east along the north boundary of the site. At 15.15hrs Brent Geese (<170) and Curlew (<30) were noted flying east north of the site (off-site). At 15.25hrs Brent Geese (<40) passed over middle of site going west. At 17.40hrs Brent Geese (<200) were noted moving east north of the site (off-site). At 18.00hrs Brent Geese (<80) were noted following Tolka south of the site going east (off-site). Herring Gull (<100) and Black-headed Gull (<80) noted moving east late in day. No other target species recorded.



No 1. 14.25hrs Brent Geese 120, east (off-site), height 25m.

No. 2 14.40 Brent Geese 50, east, height 25m.

No.3 15.15hrs Brent Geese 170 & Curlew 30, east, height 25m.

No.4 15.25hrs Brent Geese 15, west, 30m.

No.3 17.40hrs Brent Geese 200, east, 30m.

No.1 18.00 Brent Geese 80, east, 25m.

Comments and observations on survey results

In total 49 Bird species were recorded overall at the St Vincent's Hospital site in Fairview during 9 surveys over the course of the winter bird survey period 2022-2023. Species recorded that are red listed as wintering species of conservation concern (Birdwatch Ireland's birds of conservation concern in Ireland 2020-2026) include Curlew, Snipe and Redwing, only Snipe and Redwing were recorded foraging on-site, Snipe once (likely roosting only) and Redwing in very small numbers. The remaining species and other amber listed species (such as Brent Geese and Gull species) were all only recorded passing over the site. The most suitable feeding areas (fields at west of site) continue to be sub-optimal for feeding for these species being of long grass sward mixed with other species and rank vegetation. Herring Gull were occasionally noted foraging in very small numbers on the limited maintained grass areas on the rest (east side) of the site.

Results suggest that the site is not significant ex-situ foraging or roosting site for species of qualifying interest from nearby Special protection areas (SPA's). Brent Geese and Curlew were recorded passing over and especially adjacent the site, in common with observations from previous surveys it was apparent that the preferred flightline routes for species these species were to the south (birds following the Tolka River it acting as a navigational landmark or highway so to speak to sites farther west) and to the north of the Hospital structure complex itself, although occasional flocks were recorded passing closer and over the Hospital, however the biggest movements were consistently outside the confines of the hospital area. Movements recorded were largely early and late in the day reflecting movements of birds from Dublin Bay to and from feeding sites farther west of the site. Other species observed from the site included Little Egret, Grey Heron, Cormorant and Mallard, these species noted almost exclusively recorded following the Tolka River south of the site. Sparrowhawk and Buzzard

were quite frequently recorded on-site, with Sparrowhawk especially evidently breeding nearby or on-site (displaying regularly observed).

APPENDIX 7.2(c)

FAIRVIEW WINTER BIRD SURVEYS JANUARY TO MARCH 2021

NIALL KEOGH

**REPORT ON WINTER BIRD SURVEYS CONDUCTED AT ST. VINCENT'S HOSPITAL
FAIRVIEW, CO. DUBLIN**

January to March 2021

Niall Keogh subcontracted by Altemar Ltd.



Overview

Winter bird surveys were carried out at the St Vincent's Hospital Fairview (SVHF) site in north Co. Dublin between January and March 2021. In total, 53 bird species were found, including three species of raptor, three species of wildfowl and two species of wader. Of note was the presence of a small flock of feral Ring-necked Parakeets found using the site as a roosting and possible nesting location. Results from the survey suggested the site is not an ex-situ foraging or roosting site for species of qualifying interest from nearby Special Protection Areas (SPAs) such as the North Bull Island SPA and the South Dublin Bay and River Tolka Estuary SPA.

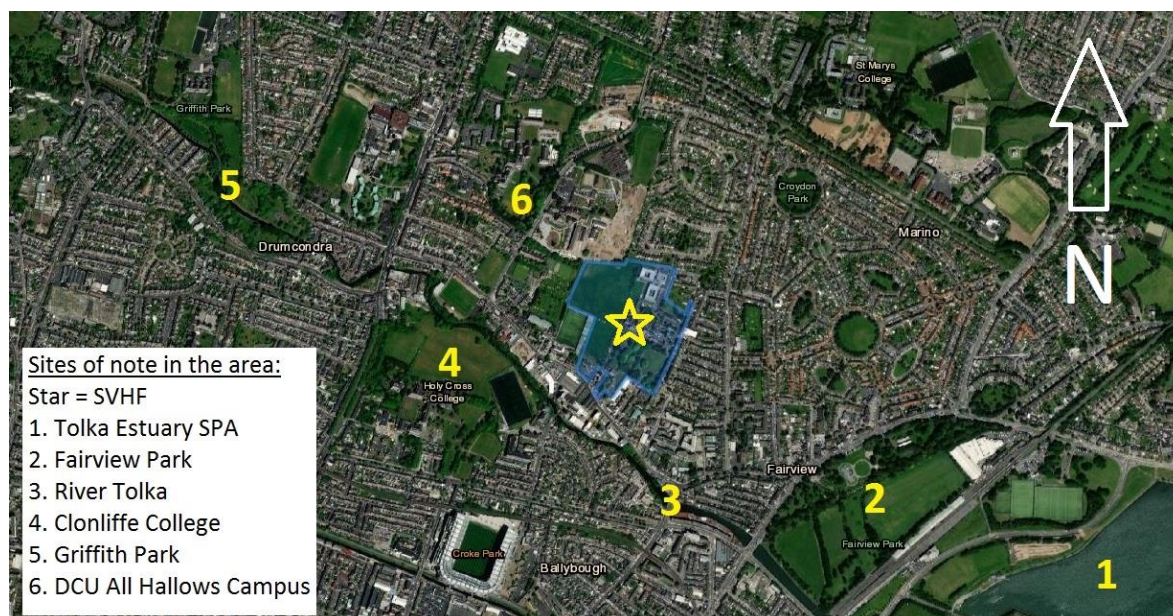


Figure 1. Map showing the survey site at SVHF (marked with a yellow star) and sites of note in the general area around it that are mentioned in the report.

Methods

A total of six survey visits were made to the site in 2021 during the months of January, February and March (the winter bird survey period). These six surveys were allocated to two visits per month, with at least a week in between surveys. Each visit lasted six hours, starting either 30 minutes before sunrise or ending 30 minutes after sunset. The timing of these visits around sunrise and sunset were chosen to try capture morning and evening movements of birds across and into the site and also allowed for the potential to record nocturnal species (Eurasian Woodcock, owls) that might be active at that time. One sunrise visit and one sunset visit was carried out each month.

All visits were conducted during favourable weather conditions, with no precipitation and winds of Beaufort Force 4 or less. The tidal state at nearby coastal SPAs was noted and surveys were timed to occur during both low and high tides in order to assess whether this had a bearing on the use of the site by waterbirds from nearby estuaries and wetlands.

Three survey methods were undertaken during each visit:

- (1) General winter bird surveys: A series of routes or transects through the site were repeatedly walked which covered or allowed views across the entire area. Up to three hours per visit was spent using this method to try and capture an overall sense of presence, status and numbers for each species recorded on site. Numbers for common species were generally estimated but special care was taken to ensure double counting was avoided where possible. Although these surveys were carried out during the winter period, breeding behaviour was noted and

recorded for resident species which were seen to be holding territory, nest building etc. General winter bird survey routes are depicted in Figure 2.



Figure 2. Map of the survey site (marked with boundary line and shaded in blue) with general winter bird survey routes marked in yellow.

- (1) Flush counts for snipe: A series of zig-zig transects were walked in the rough grass and ditch areas of the 'brownfield' on the west side of the site in order to try record the presence of Common Snipe (potentially Jack Snipe and Eurasian Woodcock also). These were carried once per visit and were incorporated into the time spent conducting the general winter bird surveys (see above). Just one flush count per visit was carried out in order to record birds but not to overly disturb any that were present. Flush count survey routes are depicted in Figure 3.



Figure 3. Map of the survey site (marked with boundary line and shaded in blue) with snipe flush count survey routes marked in yellow.

- (2) Vantage Point surveys: Two vantage point locations in the 'brownfield' area with good views across the entire site were used to scan for species of note (e.g. raptors and waterbirds) that

might be using or commuting over the area. Each vantage point watch lasted 3 hours, with one carried out per site visit, alternating between VP1 (located at 53.366851, -6.244835 with a viewshed to the south, west and north) and VP2 (located at 53.368366, -6.245764 with a viewshed to the south and east). Target species seen during these vantage point surveys were recorded with notes taken on time of sighting, duration of sighting, number of birds, direction of travel, flight height and any behavioural observations of interest. Vantage point count survey locations are depicted in Figure 4.



Figure 4. Map of the survey site (marked with boundary line and shaded in blue) with vantage point survey locations and arrows indicating directions of view marked in yellow.

Results

A total of 53 species of bird were recorded during six survey visits to the site between 22nd January and 23rd March 2021. The full list of species recorded is given in Appendix 1. Species richness per site visit ranged between 35 and 45 species and the cumulative total of individual birds per site visit ranged between 480 and 2676. Species richness was noted as highest during morning visits (when passerine activity was greatest) and the largest totals of birds per visit were noted during those carried out later in the day when overhead passage flights of birds (primarily gulls and Light-bellied Brent Geese) heading into Dublin Bay to roost occurred. A species lists with counts for each visit is presented below in Table 1.

The flush count surveys for snipe and woodcock recorded a total of three Common Snipe on two dates. A total of 18 hours of vantage points surveys was conducted across the six survey visits resulting in 118 flight lines of 14 target species recorded. The most frequently observed species during vantage point surveys included Eurasian Sparrowhawk (28 observations), Common Buzzard (24 observations) and Light-bellied Brent Goose (14 observations).

Breeding behaviour was noted for 20 species on the SVHF site, generally involving singing or territory holding by resident passerines but also display flight and apparent territory holding by a pair of Eurasian Sparrowhawk and nest building by some species of corvid.

Table 1. Totals for bird species recorded on each of six visits to SVHF between Jan and Mar 2021. Species recorded as flying over the site only (not on site/ground level) are marked in bold and italics.

APPENDIX 7.1(C)

Species	Visit 1 22 nd Jan	Visit 2 29 th Jan	Visit 3 3 rd Feb	Visit 4 22 nd Feb	Visit 5 1 st Mar	Visit 6 23 rd Mar
Light-bellied Brent Goose	52	250	670	625	524	270
Black Brant					1	
Mute Swan				4		
Mallard	2				6	7
Domestic Mallard					1	
Grey Heron	2	2	1	2	1	3
Little Egret						3
Great Cormorant		3	1	2	2	1
Eurasian Sparrowhawk	2	2	1	3	2	2
Common Buzzard	1	1	4	4	2	5
Eurasian Curlew				9	10	3
Common Snipe				1		2
Black-headed Gull	100	750	1500	40	300	4
Mediterranean Gull					1	
Common Gull		4	6	1	1	
Great Black-backed Gull	3			1	2	1
European Herring Gull	30	200	150	40	60	85
Lesser Black-backed Gull				1	2	8
Rock Dove (Feral Pigeon)	50	40	40	25	25	15
Stock Dove			2	1		
Common Wood Pigeon	25	30	30	40	30	30
Eurasian Collared Dove	4	8	8	7	9	2
Peregrine Falcon	1	1				
Rose-ringed Parakeet		5	5	4	4	2
Eurasian Magpie	20	35	30	35	50	45
Western Jackdaw	20	30	40	15	20	45
Rook	10	5	5	3	3	4
Hooded Crow	4	6	8	8	10	6
Northern Raven				1		
Coal Tit	2	3	1	3	2	
Eurasian Blue Tit	10	10	17	19	17	12
Great Tit	5	6	12	12	12	4
Long-tailed Tit	2	6	2		2	2
Common Chiffchaff						1
Eurasian Blackcap				1		
Goldcrest	2	3	4	3	2	2
Eurasian Wren	5	3	3	13	11	6
Common Starling	20	60	30	14	20	20
Common Blackbird	10	7	14	18	28	14
Redwing	2					
Song Thrush	10	6	6	4	3	2
Mistle Thrush	2	2	4	1	2	
European Robin	10	6	15	13	16	5
House Sparrow				3		
Duncock	6	3	5	14	8	2
Grey Wagtail	2	4	2	1	2	2
Pied Wagtail	1		2		1	
Meadow Pipit				7	4	
Common Chaffinch	10	8	8	7	14	6
European Greenfinch	8	5	10	17	10	10
Common Linnet	24	43	30	18	43	18
Lesser Redpoll	2	1	1	1		
European Goldfinch	15	2	7	20	15	6
Eurasian Siskin	5		2	2	5	
Common Reed Bunting	1			1	1	
	480	1550	2676	1064	1284	654

Discussion

Results from the survey suggested the site is not an ex-situ foraging or roosting site for species of qualifying interest from nearby Special Protection Areas (SPAs) such as the North Bull Island SPA (<https://www.npws.ie/protected-sites/spa/004006>) and the South Dublin Bay and River Tolka Estuary SPA (<https://www.npws.ie/protected-sites/spa/004024>).

Of the 53 bird species recorded on or over the site, three relate to species of qualifying interest at nearby coastal SPAs: Light-bellied Brent Goose, Eurasian Curlew and Black-headed Gull. For each of these species, sightings of birds at SVHF referred to those commuting over the location, likely utilising sports pitches and other amenity grasslands in the area for foraging and travelling to or from roosting and additional foraging sites on the coast in the nearby SPA network. Foraging conditions at SVHF would be considered suboptimal for Light-bellied Brent Goose in the context of urban Dublin habitats where away from coastal estuaries and wetlands, geese primarily forage on maintained amenity grasslands with a short sward (e.g. sports pitches and greens). The largest area of open ground, referred to here as the 'brownfield' site, is comprised of rough grassland with the sward height and species composition such that grazing conditions are not favourable for Light-bellied Brent Goose. Eurasian Curlew could in theory forage in such rough grassland habitats, but none were observed using the site during these surveys and any sightings during vantage points surveys (n=3) referred to birds commuting over the area. The habitat at the 'brownfield' site is depicted in Figure 5.



Figure 5. *An overview of the habitat conditions at the 'brownfield' site, looking northeast.*

An area of amenity grassland at the SVHF site near the Convent Avenue entrance appears similar to some urban foraging sites for geese and Eurasian Curlew but the small size of the area of grass and the close proximity of tall trees and buildings around its perimeter would generally discourage such large waterbirds from utilising the area. This location is suitable for foraging Black-headed Gull, however just a single bird was recorded here during one of six visits to the site, indicating low level use of the site by this species. The amenity grassland discussed here is shown in Figure 6.



Figure 6. *Amenity grassland near the Convent Avenue entrance.*

The 'brownfield' site provides habitat for bird species more typically associated with rural areas such as Common Linnet, Common Reed Bunting, Common Buzzard and Common Snipe. The presence of each of these at this location is of local interest, especially in the context of wider urban biodiversity.

The presence of a small flock of Rose-ringed Parakeet using the site is of interest. Sightings in the Drumcondra and Fairview area of this non-native species have been noted since 2018 with an increase in sightings during 2020 when breeding in the wild was noted for the first time in Ireland. It is likely that these birds relate to escapes from nearby collections but have found the climate and foraging conditions (provided by bird feeders in local gardens and buds/fruit from parkland trees) to their liking.

Two pairs of adults and a juvenile female (born in the wild nearby in 2020) used the SVHF site as a roosting location and attempted breeding was noted by a pair seen excavating and occupying a nest hole. Rose-ringed Parakeet is listed as an invasive species of high impact by the National Biodiversity Data Centre on account of their potential impact native cavity nesting bird species and their potential to damage crops (<https://maps.biodiversityireland.ie/Species/11749>). Efforts are underway by the National Parks & Wildlife Service to try and control this small population in Dublin before it becomes fully established (A.Walsh 2021, pers. comm.).

Of note would be European Herring Gull and Eurasian Sparrowhawk, both of which were present regularly on the site during winter bird surveys and displayed behaviour that suggested breeding may occur there or locally. Up to ten European Herring Gulls were often present on the roof of the old/main hospital building which provides potential suitable urban nesting habitat. A pair of Eurasian Sparrowhawk noted in the area on each visit included a hunting adult male and a displaying adult female which was even seen to drive off other female birds. The trees at the south end of the DCU All Hallows campus were identified as the potential territory site here but the large trees around the playground area at SVHF could potentially host a breeding pair.

Appendix 1. Full list of bird species recorded during six visits (including overhead) to SVHF between Jan and Mar 2021. Taxonomy and nomenclature follows that of the Irish Rare Birds Committee (2019). [http://irbc.ie/topbar/IrishList/IRBC_IrishList\(31122018\).pdf](http://irbc.ie/topbar/IrishList/IRBC_IrishList(31122018).pdf)

	Vernacular Name	Scientific Name
1	Light-bellied Brent Goose	<i>Branta bernicla hrota</i>
	Black Brant	<i>Branta bernicla nigricans</i>
2	Mute Swan	<i>Cygnus olor</i>
3	Mallard	<i>Anas platyrhynchos</i>
4	Grey Heron	<i>Ardea cinerea</i>
5	Little Egret	<i>Egretta garzetta</i>
6	Great Cormorant	<i>Phalacrocorax carbo</i>
7	Eurasian Sparrowhawk	<i>Accipiter nisus</i>
8	Common Buzzard	<i>Buteo buteo</i>
9	Eurasian Curlew	<i>Numenius arquata</i>
10	Common Snipe	<i>Gallinago gallinago</i>
11	Black-headed Gull	<i>Chroicocephalus ridibundus</i>
12	Mediterranean Gull	<i>Ichthyaetus melanocephalus</i>
13	Common Gull	<i>Larus canus</i>
14	Great Black-backed Gull	<i>Larus marinus</i>
15	European Herring Gull	<i>Larus argentatus argenteus</i>
16	Lesser Black-backed Gull	<i>Larus fuscus graellsii</i>
17	Rock Dove (Feral Pigeon)	<i>Columba livia</i>
18	Stock Dove	<i>Columba oenas</i>
19	Common Wood Pigeon	<i>Columba palumbus</i>
20	Eurasian Collared Dove	<i>Streptopelia decaocto</i>
21	Peregrine Falcon	<i>Falco rusticolus</i>
22	Ring-necked Parakeet	<i>Psittacula krameri</i>
23	Eurasian Magpie	<i>Pica pica</i>
24	Western Jackdaw	<i>Coloeus monedula</i>
25	Rook	<i>Corvus frugilegus</i>
26	Hooded Crow	<i>Corvus cornix</i>
27	Northern Raven	<i>Corvus corax</i>
28	Coal Tit	<i>Parus ater</i>
29	Eurasian Blue Tit	<i>Cyanistes caeruleus</i>
30	Great Tit	<i>Parus major</i>
31	Long-tailed Tit	<i>Aegithalos caudatus</i>
32	Common Chiffchaff	<i>Phylloscopus collybita</i>
33	Eurasian Blackcap	<i>Sylvia atricapilla</i>
34	Goldcrest	<i>Regulus regulus</i>
35	Eurasian Wren	<i>Troglodytes troglodytes</i>
36	Common Starling	<i>Sturnus vulgaris</i>
37	Common Blackbird	<i>Turdus merula</i>
38	Redwing	<i>Turdus iliacus</i>
39	Song Thrush	<i>Turdus philomelos</i>
40	Mistle Thrush	<i>Turdus viscivorus</i>
41	European Robin	<i>Erithacus rubecula</i>
42	House Sparrow	<i>Passer domesticus</i>
43	Dunnock	<i>Prunella modularis</i>
44	Grey Wagtail	<i>Motacilla cinerea</i>
45	Pied Wagtail	<i>Motacilla alba yarrellii</i>
46	Meadow Pipit	<i>Anthus pratensis</i>
47	Common Chaffinch	<i>Fringilla coelebs</i>
48	European Greenfinch	<i>Chloris chloris</i>
49	Common Linnet	<i>Linaria cannabina</i>
50	Lesser Redpoll	<i>Acanthis cabaret</i>

APPENDIX 7.1(C)

	Vernacular Name	Scientific Name
51	European Goldfinch	<i>Carduelis carduelis</i>
52	Eurasian Siskin	<i>Spinus spinus</i>
53	Common Reed Bunting	<i>Emberiza schoeniclus</i>

APPENDIX 12.1

SMR/RMP SITES WITHIN THE STUDY AREA

PREPARED BY IAC

SMR NO.	DU018-017
RMP STATUS	Yes
TOWNLAND	Dublin North City
PARISH	Clonturk
BARONY	Coolock
I.T.M.	716804, 736469
CLASSIFICATION	Castle - unclassified
DIST. FROM DEVELOPMENT	Within the site
DESCRIPTION	Duncans map (1821) has 'castle' marked here. Taylors map of the Environs of Dublin (1816) has 'castle of Richmond' marked on the site. Today there is a two-storey, 5 bay house on the site. There are no surface remains of the castle.
REFERENCE	www.archaeology.ie/ SMR file

SMR NO.	DU018-015001
RMP STATUS	Yes
TOWNLAND	Richmond
PARISH	Clonturk
BARONY	Coolock
I.T.M.	716631, 736923
CLASSIFICATION	Castle - unclassified
DIST. FROM DEVELOPMENT	c. 118m northwest
DESCRIPTION	<p>Drumcondra Castle was built in the 16th-century on the present site of St. Joseph's Asylum for the Blind by John Bathe, a Meath family, who later became Chancellor of the Exchequer (Bowen 1963, 68). This is recorded in a tablet preserved in St. Joseph's Asylum and dated to 1561. It is located on an internal wall on the N side of the present building (Ball 1920, 159-165; 167-168). Part of the walls of the 16th century castle are at ground floor level. The original building was orientated north-south and was rectangular in plan, although it may have had a turret on the SW corner. It is intact at semi-basement /ground level, where it currently forms part of the kitchen and can be identified by the thickness of the wall, which are almost 1.20m in width. The original vaulting survives, as does the rectangular fireplace in the S wall. After John Bathe's death in 1586 the castle became the residence of Sir William Warren, after he married Elenor preston, John Bathe's widow. The castle is marked on the Down Survey map as a large castle/house with two smaller gabled houses standing beside it. Drumcondra Castle is also mentioned in the Civil survey (1654-6) the proprietor being James Bath (Simington 1945, 180). In 1703, Drumcondra Castle was purchased by Captain Chichester Phillips, and at the time the estate was listed as a castle with a brick dwelling house, stables, a coach house, malt house, one brick house and five cabins. Test excavations NW of the castle in 2009 revealed a series of pits and ditches that were thought to be related to the castle (09E437).</p>
REFERENCE	www.archaeology.ie/ SMR file

SMR NO.	DU018-015002
RMP STATUS	No
TOWNLAND	Richmond
PARISH	Clonturk
BARONY	Coolock
I.T.M.	716646, 736934
CLASSIFICATION	House - 16th/17th century
DIST. FROM DEVELOPMENT	c. 165m northwest (exact location unknown)

DESCRIPTION	The Civil survey (1654-6) mentions a stone House at Drumconragh (Simington 1945, 180). This was probably on the site of where St. Joseph's Asylum for the Blind stands. The exact location of this monument is unknown.
REFERENCE	www.archaeology.ie/ SMR file

SMR NO.	DU018-015003
RMP STATUS	No
TOWNLAND	Richmond
PARISH	Clonturk
BARONY	Coolock
I.T.M.	716646, 736934
CLASSIFICATION	Barn
DIST. FROM DEVELOPMENT	c. 155m northwest (exact location unknown)
DESCRIPTION	The Civil survey (1654-6) mentions the presence of a barn at Drumconragh (Simington, 1945, 180). The exact location of this monument is unknown. It may be in the vicinity of St Joseph's Asylum for the Blind.
REFERENCE	www.archaeology.ie/ SMR file

SMR NO.	DU018-015004
RMP STATUS	No
TOWNLAND	Clonturk
PARISH	Clonturk
BARONY	Coolock
I.T.M.	716646, 736934
CLASSIFICATION	Gatehouse
DIST. FROM DEVELOPMENT	c. 110m northwest (exact location unknown)
DESCRIPTION	The Civil survey (1654-6) mentions a gatehouse associated with a castle at Drum Conragh (DU018-015001-) in 1654 (Simington 1945, 180). The exact location of this monument is unknown.
REFERENCE	www.archaeology.ie/ SMR file

SMR NO.	DU018-030
RMP STATUS	Yes
TOWNLAND	Dublin North City
PARISH	Clonturk
BARONY	Coolock
I.T.M.	716594, 736320
CLASSIFICATION	Water mill - unclassified
DIST. FROM DEVELOPMENT	c. 165m southwest
DESCRIPTION	The Civil Survey 1654-6 mentions a watermill at St. Mary Abbey lands and the Grange of Clonliffe. It is marked on the Down Survey (1655-6) maps as 'Grange mill' and a corn mill on the 1837 OS 6-inch map. A printing works occupies the site. No visible trace.
REFERENCE	www.archaeology.ie/ SMR file

SMR NO.	DU018-040
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RMP STATUS	Yes
TOWNLAND	Dublin North City
PARISH	Clonturk
BARONY	Coolock
I.T.M.	717045 736180
CLASSIFICATION	Burial ground
DIST. FROM DEVELOPMENT	c. 234m southeast
DESCRIPTION	This is a Jewish cemetery founded in 1718. There was a house built at the entrance in 1857 to protect it from graverobbers.
REFERENCE	www.archaeology.ie/ SMR file

SMR NO.	DU018-019001
RMP STATUS	Yes
TOWNLAND	Clonliffe West
PARISH	Clonturk
BARONY	Coolock
I.T.M.	716451, 736339
CLASSIFICATION	House - 17th/18th century
DIST. FROM DEVELOPMENT	c. 250m southeast
DESCRIPTION	Located on the grounds of Clonliffe College in a prominent position above the River Tolka. It is brick built and rises to two storeys over basement. The entrance is W facing. Indicated as the Red House on the latest OS edition, but as Clonliff House on the first OS map. Dillon, Cosgrave (1909, 80) mentions the Red House. The date of construction is uncertain but the form of the staircase with barley-sugar balusters, low risers, broad handrail, paired with staircase panelling would appear to be 17th century.
REFERENCE	www.archaeology.ie/ SMR file

APPENDIX 12.2

LEGISLATION PROTECTING THE ARCHAEOLOGICAL RESOURCE

PREPARED BY IAC

Protection of Cultural Heritage

The cultural heritage in Ireland is safeguarded through national and international policy designed to secure the protection of the cultural heritage resource to the fullest possible extent (Department of Arts, Heritage, Gaeltacht and the Islands 1999, 35). This is undertaken in accordance with the provisions of the European Convention on the Protection of the Archaeological Heritage (Valletta Convention), ratified by Ireland in 1997.

The Archaeological Resource

The National Monuments Act 1930 to 2014 and relevant provisions of the National Cultural Institutions Act 1997 are the primary means of ensuring the satisfactory protection of archaeological remains, which includes all man-made structures of whatever form or date except buildings habitually used for ecclesiastical purposes. A National Monument is described as 'a monument or the remains of a monument the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic or archaeological interest attaching thereto' (National Monuments Act 1930 Section 2). A number of mechanisms under the National Monuments Act are applied to secure the protection of archaeological monuments. These include the Register of Historic Monuments, the Record of Monuments and Places, and the placing of Preservation Orders and Temporary Preservation Orders on endangered sites.

Ownership And Guardianship of National Monuments

The Minister may acquire national monuments by agreement or by compulsory order. The state or local authority may assume guardianship of any national monument (other than dwellings). The owners of national monuments (other than dwellings) may also appoint the Minister or the local authority as guardian of that monument if the state or local authority agrees. Once the site is in ownership or guardianship of the state, it may not be interfered with without the written consent of the Minister.

Register of Historic Monuments

Section 5 of the 1987 Act requires the Minister to establish and maintain a Register of Historic Monuments. Historic monuments and archaeological areas present on the register are afforded statutory protection under the 1987 Act. Any interference with sites recorded on the register is illegal without the permission of the Minister. Two months' notice in writing is required prior to any work being undertaken on or in the vicinity of a registered monument. The register also includes sites under Preservation Orders and Temporary Preservation Orders. All registered monuments are included in the Record of Monuments and Places.

Preservation Orders and Temporary Preservation Orders

Sites deemed to be in danger of injury or destruction can be allocated Preservation Orders under the 1930 Act. Preservation Orders make any interference with the site illegal. Temporary Preservation Orders can be attached under the 1954 Act. These perform the same function as a Preservation Order but have a time limit of six months, after which the situation must be reviewed. Work may only be undertaken on or in the vicinity of sites under Preservation Orders with the written consent, and at the discretion, of the Minister.

Record of Monuments and Places

Section 12(1) of the 1994 Act requires the Minister for Arts, Heritage, Gaeltacht and the Islands (now the Minister for the Department of Housing, Local Government and Heritage) to establish and maintain a record of monuments and places where the Minister believes that such monuments exist. The record comprises a list of monuments and relevant places and a map/s showing each monument and relevant place in respect of each county in the state. All sites recorded on the Record of Monuments and Places receive statutory protection under the National Monuments Act 1994. All recorded monuments on the proposed development site are represented on the accompanying maps.

Section 12(3) of the 1994 Act provides that 'where the owner or occupier (other than the Minister for Arts, Heritage, Gaeltacht and the Islands) of a monument or place included in the Record, or any other person, proposes to carry out, or to cause or permit the carrying out of, any work at or in relation to such a monument or place, he or she shall give notice in writing to the Minister of Arts, Heritage, Gaeltacht and the Islands to carry out work and shall not, except in case of urgent necessity and with the consent of the Minister, commence the work until two months after giving of notice'.

Under the National Monuments (Amendment) Act 2004, anyone who demolishes or in any way interferes with a recorded site is liable to a fine not exceeding €3,000 or imprisonment for up to 6 months. On summary conviction and on conviction of indictment, a fine not exceeding €10,000 or imprisonment for up to 5 years is the penalty. In addition, they are liable for costs for the repair of the damage caused.

In addition to this, under the European Communities (Environmental Impact Assessment) Regulations 1989, Environmental Impact Statements (EIS) are required for various classes and sizes of development project to assess the impact the proposed development will have on the existing environment, which includes the cultural, archaeological and built heritage resources. These document's recommendations are typically incorporated into the conditions under which the proposed development must proceed, and thus offer an additional layer of protection for monuments which have not been listed on the RMP.

The Planning and Development Act 2000

Under planning legislation, each local authority is obliged to draw up a Development Plan setting out their aims and policies with regard to the growth of the area over a five-year period. They cover a range of issues including archaeology and built heritage, setting out their policies and objectives with regard to the protection and enhancement of both. These policies can vary from county to county. The Planning and Development Act 2000 recognises that proper planning and sustainable development includes the protection of the archaeological heritage. Conditions relating to archaeology may be attached to individual planning permissions.

Dublin City Council Development Plan 2022-2028

It is the policy of Dublin City Council:

BHA26:

Archaeological Heritage

-
1. To protect and preserve Sites and Zones of Archaeological interest which have been identified in the Record of Monuments and Places and the Historic Environment Viewer (www.archaeology.ie).
 2. To protect archaeological material in situ by ensuring that only minimal impact on archaeological layers is allowed, by way of re-use of standing buildings, the construction of light buildings, low impact foundation design, or the omission of basements (except in exceptional circumstances) in the Zones of Archaeological Interest.
 3. To seek the preservation in situ (or where this is not possible or appropriate, as a minimum, preservation by record) of all archaeological monuments included in the Record of Monuments and Places, and of previously unknown sites, features and objects of archaeological interest that become revealed through development activity. In respect of decision making on development proposals affecting sites listed in the Record of Monuments and Places, the Council will have regard to the advice and/or recommendations of the Department of Housing, Heritage and Local Government.
 4. Development proposals within Sites and Zones of Archaeological Interest, of sites over 0.5 hectares size and of sites listed in the Dublin City Industrial Heritage Record, will be subject to consultation with the City Archaeologist and archaeological assessment prior to a planning application being lodged.
 5. To preserve known burial grounds and disused historic graveyards. Where disturbance of ancient or historic human remains is unavoidable, they will be excavated according to best archaeological practice and reburied or permanently curated.
 6. Preserve the character, setting and amenity of upstanding and below ground town wall defences.
 7. Development proposals in marine, lacustrine and riverine environments and areas of reclaimed land shall have regard to the Shipwreck Inventory maintained by the Department of Culture, Heritage and the Gaeltacht and be subject to an appropriate level of archaeological assessment.

To have regard to national policy documents and guidelines relating to archaeology and to best practice guidance published by the Heritage Council, the Institute of Archaeologists of Ireland and Transport Infrastructure Ireland.

APPENDIX 12.3

IMPACT ASSESSMENT AND THE CULTURAL HERITAGE RESOURCE

PREPARED BY IAC

Potential Impacts on Archaeological and Historical Remains

Impacts are defined as ‘the degree of change in an environment resulting from a development’ (Environmental Protection Agency 2022). They are described as profound, significant or slight impacts on archaeological remains. They may be negative, positive or neutral, direct, indirect or cumulative, temporary or permanent.

Impacts can be identified from detailed information about a project, the nature of the area affected and the range of archaeological and historical resources potentially affected. Development can affect the archaeological and historical resource of a given landscape in a number of ways.

- Permanent and temporary land-take, associated structures, landscape mounding, and their construction may result in damage to or loss of archaeological remains and deposits, or physical loss to the setting of historic monuments and to the physical coherence of the landscape.
- Archaeological sites can be affected adversely in a number of ways: disturbance by excavation, topsoil stripping and the passage of heavy machinery; disturbance by vehicles working in unsuitable conditions; or burial of sites, limiting accessibility for future archaeological investigation.
- Hydrological changes in groundwater or surface water levels can result from construction activities such as de-watering and spoil disposal, or longer-term changes in drainage patterns. These may desiccate archaeological remains and associated deposits.
- Visual impacts on the historic landscape sometimes arise from construction traffic and facilities, built earthworks and structures, landscape mounding and planting, noise, fences and associated works. These features can impinge directly on historic monuments and historic landscape elements as well as their visual amenity value.
- Landscape measures such as tree planting can damage sub-surface archaeological features, due to topsoil stripping and through the root action of trees and shrubs as they grow.
- Ground consolidation by construction activities or the weight of permanent embankments can cause damage to buried archaeological remains, especially in colluviums or peat deposits.
- Disruption due to construction also offers in general the potential for adversely affecting archaeological remains. This can include machinery, site offices, and service trenches.

Although not widely appreciated, positive impacts can accrue from developments. These can include positive resource management policies, improved maintenance and access to archaeological monuments, and the increased level of knowledge of a site or historic landscape as a result of archaeological assessment and fieldwork.

Predicted Impacts

The severity of a given level of land-take or visual intrusion varies with the type of monument, site or landscape features and its existing environment. Severity of impact can be judged taking the following into account:

-
- The proportion of the feature affected and how far physical characteristics fundamental to the understanding of the feature would be lost;
 - Consideration of the type, date, survival/condition, fragility/vulnerability, rarity, potential and amenity value of the feature affected;
 - Assessment of the levels of noise, visual and hydrological impacts, either in general or site-specific terms, as may be provided by other specialists.
-

APPENDIX 12.4

MITIGATION MEASURES AND THE CULTURAL HERITAGE RESOURCE

PREPARED BY IAC

Potential Mitigation Strategies for Cultural Heritage Remains

Mitigation is defined as features of the design or other measures of the proposed development that can be adopted to avoid, prevent, reduce or offset negative effects.

The best opportunities for avoiding damage to archaeological remains or intrusion on their setting and amenity arise when the site options for the development are being considered. Damage to the archaeological resource immediately adjacent to developments may be prevented by the selection of appropriate construction methods. Reducing adverse effects can be achieved by good design, for example by screening historic buildings or upstanding archaeological monuments or by burying archaeological sites undisturbed rather than destroying them. Offsetting adverse effects is probably best illustrated by the full investigation and recording of archaeological sites that cannot be preserved *in situ*.

Definition of Mitigation Strategies

Archaeological Resource

The ideal mitigation for all archaeological sites is preservation in situ. This is not always a practical solution, however. Therefore, a series of recommendations are offered to provide ameliorative measures where avoidance and preservation in situ are not possible.

Archaeological Test Trenching can be defined as ‘a limited programme of intrusive fieldwork which determines the presence or absence of archaeological features, structures, deposits, artefacts or ecofacts within a specified area or site on land, inter-tidal zone or underwater. If such archaeological remains are present field evaluation defines their character, extent, quality and preservation, and enables an assessment of their worth in a local, regional, national or international context as appropriate’ (ClfA 2020a).

Full Archaeological Excavation can be defined as ‘a programme of controlled, intrusive fieldwork with defined research objectives which examines, records and interprets archaeological deposits, features and structures and, as appropriate, retrieves artefacts, ecofacts and other remains within a specified area or site on land, inter-tidal zone or underwater. The records made and objects gathered during fieldwork are studied and the results of that study published in detail appropriate to the project design’ (ClfA 2020b).

Archaeological Monitoring can be defined as ‘a formal programme of observation and investigation conducted during any operation carried out for non-archaeological reasons. This will be within a specified area or site on land, inter-tidal zone or underwater, where there is a possibility that archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report and ordered archive (ClfA 2020c).

Underwater Archaeological Assessment consists of a programme of works carried out by a specialist underwater archaeologist, which can involve wade surveys, metal detection surveys and the excavation of test pits within the sea or riverbed. These assessments are able to access and assess the potential of an underwater environment to a much higher degree than terrestrial based assessments.

APPENDIX 12.5

GEOPHYSICAL SURVEY REPORT

J. M. LEIGH SURVEYS LTD.

GEOPHYSICAL SURVEY

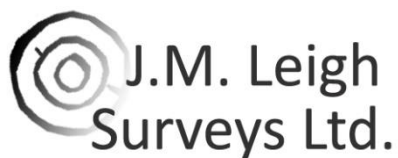
REPORT

St. Vincent's Hospital, Fairview,
Dublin City North / Richmond,
Dublin 3

Date:
31/05/2021

Licence: 21R0101

J. M. Leigh Surveys Ltd.
124 Oaklawn West
Leixlip
County Kildare
www.jmlsurveys.com
01 615 4647



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GEOPHYSICAL SURVEY SUMMARY SHEET
ST. VINCENT'S HOSPITAL, FAIRVIEW, DUBLIN 3

Site Name	St. Vincent's, Fairview	Ref No.	21030
Townland	Dublin City North / Richmond	Licence No.	21R0101
County	Dublin 3	Licence Holder	Joanna Leigh
ITM (centre)	E716785, N736706	Purpose	Pre-planning
Client	IAC Ltd.	Reference No.	N/A

Ground Conditions Survey was conducted throughout accessible areas within the grounds of St. Vincent's Hospital. Ground conditions were varied, comprising of landscaped lawns to overgrown vegetation.

Survey Type Detailed gradiometer survey totalling c. 4.5 hectares.

Summary of Results

The data is dominated by modern magnetic disturbance. Modern pipes and areas of ground disturbance are recorded. Existing landscaping features, including pathways are evident in Area B. No responses of potential archaeological interest were recorded. It is possible that more subtle responses are masked by the modern magnetic disturbance and remain undetected.

Field Staff Joanna Leigh & Susan Curran

Report Date 31/05/2021 **Report Author** Joanna Leigh

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3. Survey Methodology	2
4. Data Display	2
5. Survey Results and Conclusion	3
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Geophysical Survey Report

St. Vincent's Hospital, Fairview, Dublin 3

1 Introduction

- 1.1 A geophysical survey has been conducted by J. M. Leigh Surveys Ltd. within the grounds of St. Vincent's Hospital, Fairview in the townlands of Dublin City North and Richmond. The survey was requested by IAC Ltd. as part of a wider pre-planning investigation for a proposed development within the grounds of the hospital.
- 1.2 Within the grounds of St Vincent Hospital, four areas (Area A, B, C and D) were identified as suitable for geophysical survey. The location of Areas A, B, C and D are presented in Figure 1 at a scale of 1:2,500.
- 1.3 There is one recorded monument within the grounds of St Vincent's Hospital. The recorded castle (DU018-017) is within the southern half of the hospital grounds.
- 1.4 Several further monuments lie within close proximity to the site. These include another castle (DU018-015001) which is situated c. 120m to the north-west and a church (DU018-013001) and graveyard (DU018-013002), which lie c. 400m to the north-west. Five recorded monuments are located within 300m to the south of the application area. These include a house – 17th/18th century (DU018-019001), a bridge (DU018-022002) and weir (DU018-022002), a water mill (DU018-030) and a burial ground (DU018-040).
- 1.5 The main aim of the survey was to identify any responses which may represent previously unknown archaeological remains within the grounds of St Vincent's Hospital.
- 1.6 The detailed gradiometer survey was conducted under licence 21R0101 issued by the Department of Housing, Local Government and Heritage.

2 Survey ground conditions and further information

- 2.1 Survey Area A is within a large open field to the west of the hospital. The ground cover comprised overgrown vegetation but was suitable for survey. No topographical features were noted during the survey fieldwork.
- 2.2 Survey Area B, to the south of Area A also comprised of overgrown vegetation and patches of brambles. This area sits on a steep south facing slope with a broken wall separating Areas A and B.

- 2.3 Area C is located to the south of hospital buildings. This is within a landscaped area with trees and paths.
- 2.4 Area D is located within the south of the hospital grounds and comprised short grass at the time of survey. No topographical features were noted.

3 Survey Methodology

- 3.1 A detailed gradiometer survey detects subtle variations in the local magnetic field and measurements are recorded in nano-Tesla (nT). Some archaeological features such as ditches, large pits and fired features have an enhanced magnetic signal and can be detected through recorded survey.
- 3.2 Data was collected with a Bartington Grad 601-2 instrument. This is a specifically designed gradiometer for use in archaeological prospection. The gradiometer operates with a dual sensor capacity making survey fast and effective.
- 3.3 The instrument is calibrated in the field to ensure a constant high quality of data. Extremely sensitive, these instruments can detect variations in soil magnetism to 0.01nT, affording diverse application throughout a variety of archaeological, soil morphological and geological conditions.
- 3.4 Data was collected with a sample interval of 0.25m and a traverse interval of 1m, providing 6400 readings per 40m x 40m grid. The survey grid was set out using a GPS VRS unit. Survey tie-in information is available upon request.
- 3.5 The survey methodology, data presentation and report content adhere to the European Archaeological Council (EAC) (2016) 'Guidelines for the use of Geophysics in Archaeology'.

4 Data display

- 4.1 An overall summary greyscale image and accompanying interpretation diagram are presented in Figures 2 and 3 at a scale of 1:1,250.
- 4.2 Numbers in parenthesis in the text refer to specific responses highlighted in the interpretation diagram (Figure 3).
- 4.3 Isolated ferrous responses highlighted in the summary interpretation diagram most likely represent modern ferrous litter and debris and are not of archaeological interest. These are not discussed in the text unless considered relevant.

- 4.4 The raw gradiometer data is presented in archive format in Appendix A1.01. The raw data is displayed as a greyscale image and xy-trace plot, both at a scale of 1:500. The archive plots are used to aid interpretation of the results and are used for reference only. The archive plots are available as PDF images upon request.
- 4.5 The display formats referred to above and the interpretation categories are discussed in the summary technical information section at the end of this report.

5 Survey Results and Conclusion (Figure 3)

- 5.1 The data is largely dominated by modern magnetic disturbance resulting from modern pipes, landscaping, and spreads of modern material.
- 5.2 Detailed survey in Area A comprises of a magnetically 'noisy' background response. This is the result of modern litter and ground disturbance. No responses of archaeological interest are identifiable within the data set.
- 5.3 A modern pipe (1) in Area A is visible and runs through the data set from north-east to south-west.
- 5.4 Area B is completely magnetically disturbed, from modern material and ground disturbance. No responses of interest were recorded.
- 5.5 Area C is contained within a landscaped area to the south of hospital buildings. Again, modern disturbance dominates the data. Responses (2) in the south of the area are indicative of service pipes.
- 5.6 In the northern half of Area C there are two linear responses (3). These correspond with the location of two paths running across the area. Further linear trends (4) in the south have no clear pattern and most likely represent ground disturbance or former landscaping features. These are not considered to be of archaeological interest.
- 5.7 A metal fence runs around the extent of Area D and has resulted in magnetic disturbance. In the north east of Area D, a distinct spread of magnetic disturbance (5) is evident. The origin of this is unknown. It most likely represents a spread of buried modern material or ground disturbance. The disturbance is considered to be modern in origin and no clear archaeological interpretation can be provided.
- 5.8 A faint negative trend (6) is evident in the south-east of Area D. This may represent below ground services or perhaps a former boundary feature. This is not considered to be archaeological in origin.

- 5.9 The magnetic disturbance in Areas A, B, C and D results from service pipes, landscaping features and modern ground disturbance. No responses of potential interest were recorded. It is noted that the modern magnetic disturbance may mask more subtle responses, and archaeological features may remain undetected.
- 5.10 Consultation with a licensed archaeologist and with the Department of Housing, Local Government and Heritage is recommended to establish if any additional archaeological works are required.

6 Technical Information Section

Instrumentation & Methodology

Detailed Gradiometer Survey

Detailed gradiometer survey can either be targeted across a specific area of interest or conducted as a blanket survey across an entire application area, often as a standalone methodology.

Sampling methodologies can vary but a typical survey is conducted with a sample interval of 0.25m and a traverse interval of 1m. This allows detection of potential archaeological responses. Data is often collected in grids measuring 40m x 40m, with the data displayed accordingly. A more detailed survey methodology may be applied where archaeological remains are thought likely. This can sometimes produce results with a more detailed resolution. A survey with a grid size of 20m x 20m and a traverse interval of 0.5m will provide a data set with high resolution.



Bartington GRAD 601-2

The Bartington Grad 601-2 instrument is a specifically designed gradiometer for use in archaeological prospection. The gradiometer operates with a dual sensor capacity making survey very fast and effective. The sensors have a separation of 1m allowing greater sensitivity.

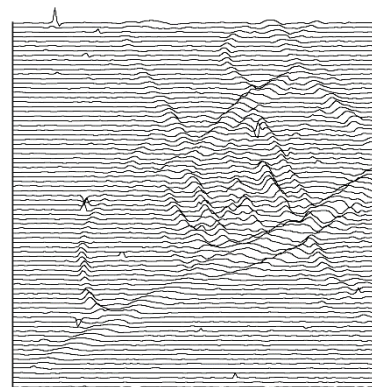


Frequent realignment of the instruments and zero drift correction ensure a constant high quality of data. Extremely sensitive, these instruments can detect variations in soil magnetism to 0.1nT, affording diverse application throughout a variety of archaeological, soil morphological and geological conditions.

Gradiometer Data Display & Presentation

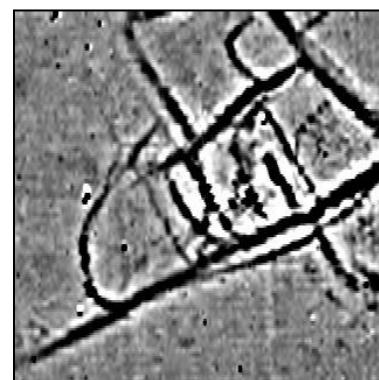
XY Trace

The data are presented as a series of linear traces, enabling a semi-profile display of the respective anomalies along the X and Y-axes. This display option is essential for distinguishing between modern ferrous materials (buried metal debris) and potential archaeological responses. The XY trace plot provides a linear display of the magnitude of the response within a given data set.



Greyscale*

As with dot density plots, the greyscale format assigns a cell to each datum according to its location on the grid. The display of each data point is conducted at very fine increments, allowing the full range of values to be displayed within the given data set. This display method also enables the identification of discrete responses that may be at the limits of instrument detection. In the summary diagrams processed, interpolated data is presented. Raw un-interpolated data is presented in the archive drawings along with the xy-trace plots.



Interpretation

An interpretation of the data is made using many of the plots presented in the final report, in addition to examination of the raw and processed data. The project managers' knowledge and experience allow a detailed interpretation of the survey results with respect to archaeological potential.



**XY Trace and raw greyscale plots are presented in archive form for display of the raw survey data. Summary greyscale images of the interpolated data are included for presentation purposes and to assist interpretation. The archive plots are provided as PDF images upon request.*

Glossary of Interpretation Terms

Categories of responses may vary for different data sets. The list below are the most used categories for describing geophysical responses, as presented in the summary interpretation diagrams.

Archaeology

This category refers to responses which are interpreted as of clear archaeological potential and are supported by further archaeological evidence such as aerial photography or excavation. The term is generally associated with significant concentrations of former settlement, such as ditched enclosures, pits, and associated features.

?Archaeology

This term corresponds to anomalies that display typical archaeological patterns where no record of comparative archaeological evidence is available. In some cases, it may prove difficult to distinguish between these and evidence of more recent activity also visible in the data.

Area of Increased Magnetic Response

These responses often lack any distinctive archaeological form, and it is therefore difficult to assign any specific interpretation. The resulting responses are site specific, possibly associated with concentrations of archaeological debris or more recent disturbance to underlying archaeological features.

Trend

This category refers to low-level magnetic responses barely visible above the magnetic background of the soil. Interpretation is tentative, as these anomalies are often at the limits of instrument detection.

Ploughing/Ridge & Furrow

Visible as a series of linear responses, these anomalies equate with recent or archaeological cultivation activity.

?Natural

A broad response resulting from localised natural variations in the magnetic background of the subsoil; presenting as broad amorphous responses most likely resulting from geological features.

Ferrous Response

These anomalies exhibit a typically strong magnetic response, often referred to as 'iron spikes,' and are the result of modern metal debris located within the topsoil.

Area of Magnetic Disturbance

This term refers to large-scale magnetic interference from existing services or structures. The extent of this interference may in some cases obscure anomalies of potential archaeological interest.

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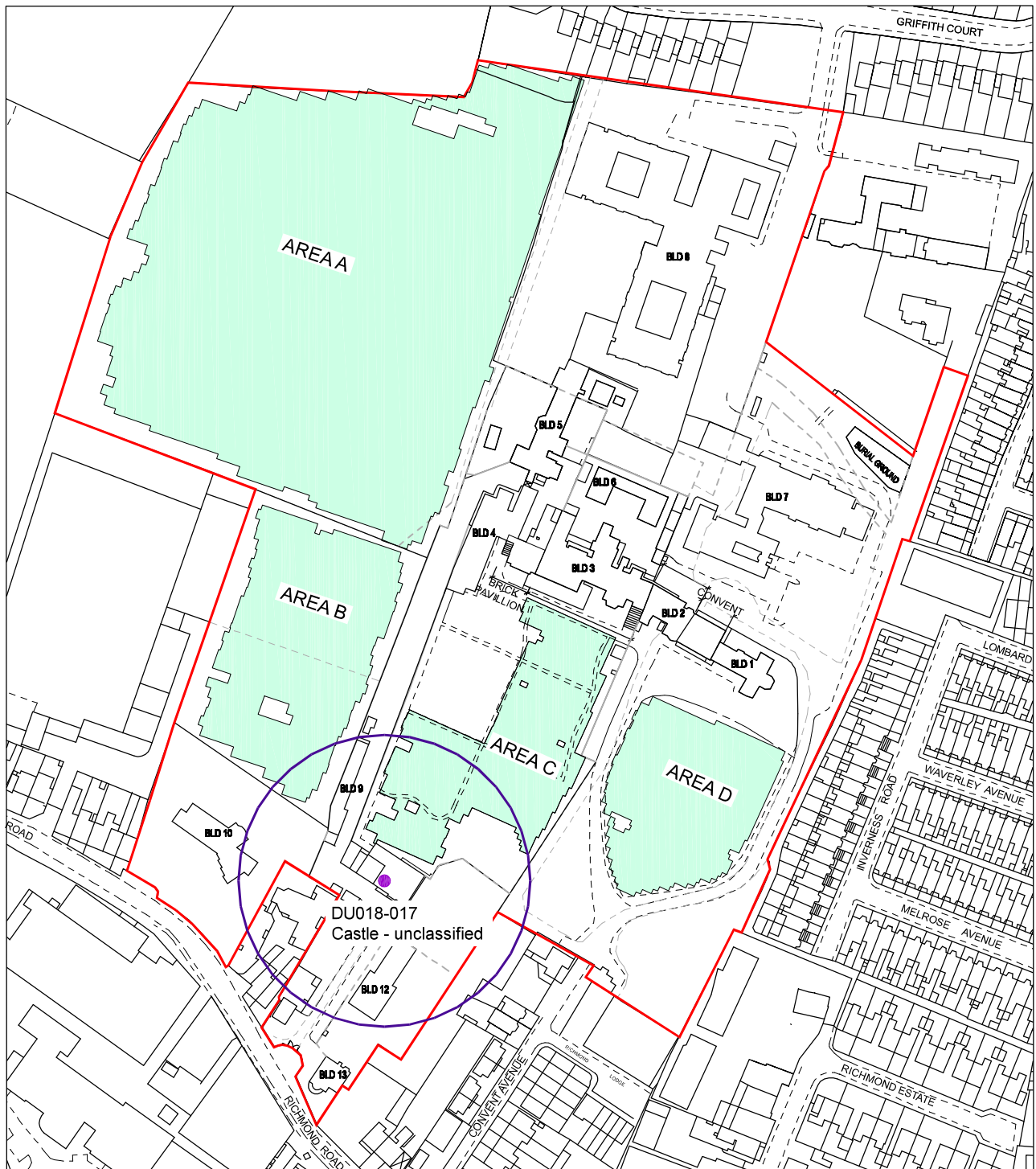
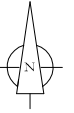
National Soil Survey of Ireland (1980) *General soil map second edition (1:575,000)*. An Foras Taluntais.

List of Figures

Figure	Description	Paper Size	Scale
Figure 1	Site & survey location diagram	A4	1:2,500
Figure 2	Summary greyscale image	A3	1:1,250
Figure 3	Summary interpretation diagram	A3	1:1,250

Archive Data Supplied as a PDF Upon Request

A1.01	Raw data XY-Trace plot	A0	1:500
A1.02	Raw data greyscale image	A0	1:500



Site Application Area



Detailed
Gradiometer Survey

0 metres 100

Client:

IAC Ltd.

Project:

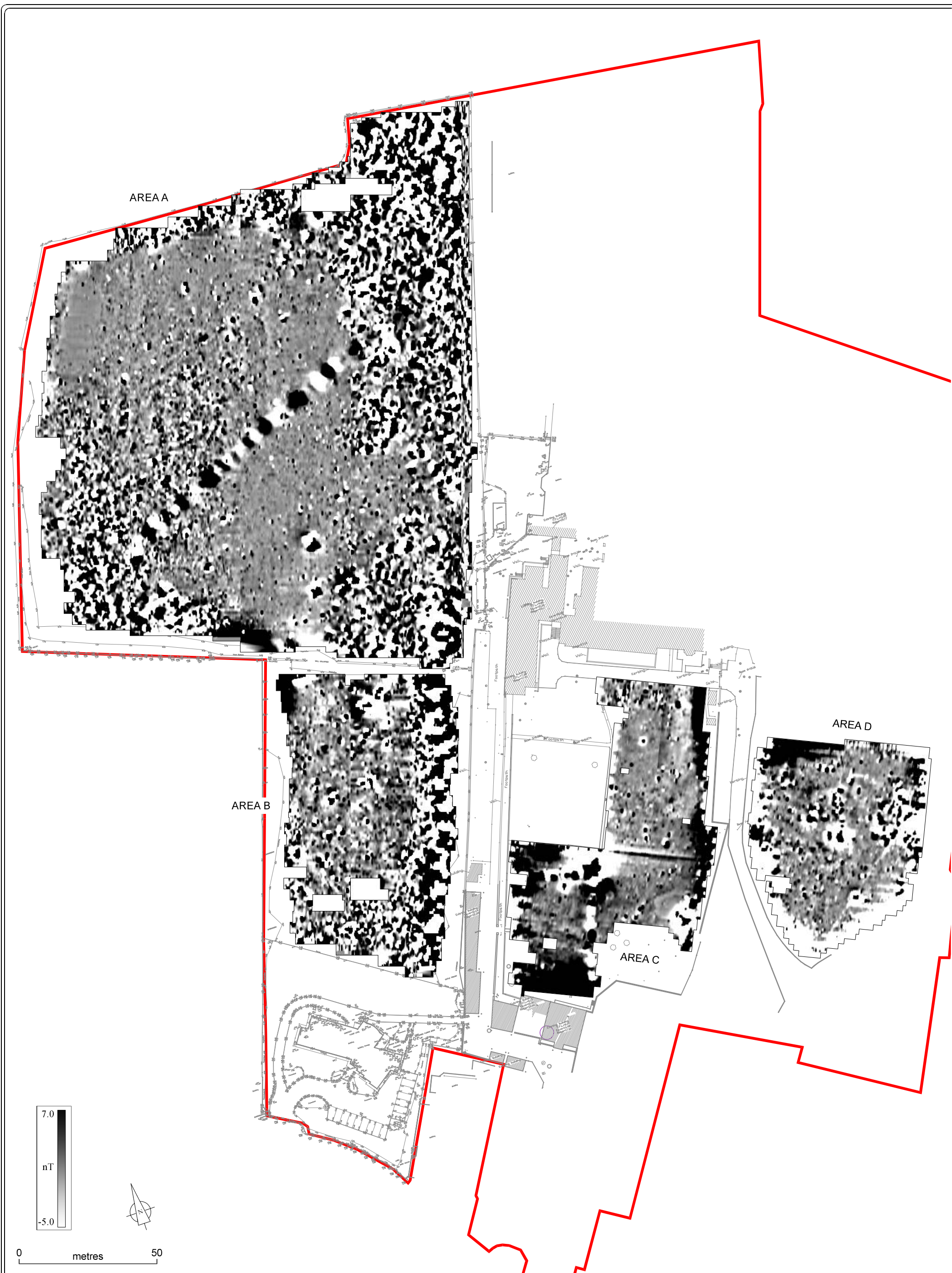
Geophysical Survey
St. Vincent's, Fairview,
Dublin 3

Title:

Site & Survey Location

 **J.M. Leigh
Surveys Ltd.**
www.jmlsurveys.com

Scale @ A4: 1:2,500
Figure: 1
Licence No.: 21R0101
Issue Date: 31.05.2021





APPENDIX 15.1

RESOURCE WASTE MANAGEMENT PLAN

PREPARED BY AWN CONSULTING LTD

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RESOURCE & WASTE MANAGEMENT PLAN FOR A PROPOSED MIXED-USE DEVELOPMENT

AT

**ST. VINCENT'S HOSPITAL
REDEVELOPMENT,
RICHMOND ROAD AND
CONVENT AVENUE,
FAIRVIEW, DUBLIN 3**

Report Prepared For

St Vincent's Hospital

Report Prepared By

Chonail Bradley
Principal Environmental Consultant

Our Reference

CB/217501.0888WMR01



Date of Issue

27 March 2023

Document History

Document Reference		Original Issue Date	
CB/217501.0.888WMR01		27 March 2023	
Revision Level	Revision Date	Description	Sections Affected

Record of Approval

Details	Written by	Approved by
Signature		
Name	Chonail Bradley	Fergal Callaghan
Title	Principal Environmental Consultant	Director
Date	25 March 2023	25 March 2023

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1.0 INTRODUCTION

AWN Consulting Ltd. (AWN) has prepared this Resource and Waste Management Plan (RWMP) on behalf of St Vincent's Hospital, for a proposed development consisting of the demolition of some of the existing buildings onsite, and the renovation and construction of multiple buildings to provide for a mixed-use development consisting of residential units, mental health hospital, childcare facility, co-working units, gym and residential amenities. The development will also include for car and bicycle parking, hard and soft landscaping and installation of all services at St. Vincent's Hospital, Richmond Road and Convent Avenue, Fairview, Dublin 3.

This plan will provide information necessary to ensure that the management of Construction & Demolition (C&D) waste at the site is undertaken in accordance with the current legal and industry standards including the *Waste Management Acts 1996 - 2011* and associated Regulations ¹, *Protection of the Environment Act 2003* as amended ², *Litter Pollution Act 1997* as amended ³ and the *Eastern-Midlands Region Waste Management Plan 2015 – 2021* ⁴. In particular, this Plan aims to ensure maximum recycling, reuse and recovery of waste with diversion from landfill, wherever possible. It also seeks to provide guidance on the appropriate collection and transport of waste from the site to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil and/or water).

This RWMP includes information on the legal and policy framework for C&D waste management in Ireland, estimates of the type and quantity of waste to be generated by the proposed development and makes recommendations for management of different waste streams.

2.0 C&D RESOURCE & WASTE MANAGEMENT IN IRELAND

2.1 National Level

The Irish Government issued a policy statement in September 1998 known as '*Changing Our Ways*' ⁵, which identified objectives for the prevention, minimisation, reuse, recycling, recovery and disposal of waste in Ireland. The target for C&D waste in this report was to recycle at least 50% of C&D waste within a five year period (by 2003), with a progressive increase to at least 85% over fifteen years (i.e. 2013).

In response to the *Changing Our Ways* report, a task force (Task Force B4) representing the waste sector of the already established Forum for the Construction Industry, released a report entitled '*Recycling of Construction and Demolition Waste*' ⁶ concerning the development and implementation of a voluntary construction industry programme to meet the Government's objectives for the recovery of C&D waste.

In September 2020, the Irish Government published a policy document outlining a new action plan for Ireland to cover the period of 2020-2025. This plan, '*A Waste Action Plan for a Circular Economy*' ⁷ (WAPCE), replaces the previous national waste management plan, "*A Resource Opportunity*" (2012), and was prepared in response to the 'European Green Deal' which sets a roadmap for a transition to an altered economical model, where climate and environmental challenges are turned into opportunities.

The WAPCE sets the direction for waste planning and management in Ireland up to 2025. This reorientates policy from a focus on managing waste to a much greater focus on creating circular patterns of production and consumption. Other policy statements of a number of public bodies already acknowledge the circular economy as a national policy priority.

The policy document contains over 200 measures across various waste areas including circular economy, municipal waste, consumer protection and citizen engagement, plastics and packaging, construction and demolition, textiles, green public procurement and waste enforcement.

One of the first actions to be taken was the development of the Whole of Government Circular Economy Strategy 2022-2023 'Living More, Using Less' (2021) ⁸ to set a course for Ireland to transition across all sectors and at all levels of Government toward circularity and was issued in December 2021. It is anticipated that the Strategy will be updated in full every 18 months to 2 years.

The Circular Economy and Miscellaneous Provisions Act 2022 ⁹ was signed into law in July 2022. The Act underpins Ireland's shift from a "take-make-waste" linear model to a more sustainable pattern of production and consumption, that retains the value of resources in our economy for as long as possible and that will to significantly reduce our greenhouse gas emissions. The Act defines Circular Economy for the first time in Irish law, incentivises the use of recycled and reusable alternatives to wasteful, single-use disposable packaging, introduces a mandatory segregation and incentivised charging regime for commercial waste, streamlines the national processes for End-of-Waste and By-Products decisions, tackling the delays which can be encountered by industry, and supporting the availability of recycled secondary raw materials in the Irish market, and tackles illegal fly-tipping and littering.

The Environmental Protection Agency (EPA) of Ireland issued '*Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects*' in November 2021 ¹⁰. These guidelines replace the previous 2006 guidelines issued by The National Construction and Demolition Waste Council (NCDWC) and the Department of the Environment, Heritage and Local Government (DoEHLG) in 2006 ¹⁰. The guidelines provide a practical approach which is informed by best practice in the prevention and management of C&D wastes and resources from design to construction of a project, including consideration of the deconstruction of a project. These guidelines have been followed in the preparation of this document and include the following elements:

- Predicted C&D wastes and procedures to prevent, minimise, recycle and reuse wastes;
- Design teams roles and approach;
- Relevant EU, national and local waste policy, legislation and guidelines;
- Waste disposal/recycling of C&D wastes at the site;
- Provision of training for Resource Manager (RM) and site crew;
- Details of proposed record keeping system;
- Details of waste audit procedures and plan; and
- Details of consultation with relevant bodies i.e. waste recycling companies, Local Authority, etc.

Section 3 of the Guidelines identifies thresholds above which there is a requirement for the preparation of a RWMP for developments. The new guidance classifies developments on a two-tiered system. Developments which do not exceed any of the following thresholds may be classed as Tier 1 development:

- New residential development of less than 10 dwellings.
- Retrofit of 20 dwellings or less.
- New commercial, industrial, infrastructural, institutional, educational, health and other developments with an aggregate floor area less than 1,250m².
- Retrofit of commercial, industrial, infrastructural, institutional, educational, health and other developments with an aggregate floor area less than 2,000m²; and
- Demolition projects generating in total less than 100m³ in volume of C&D waste.

A development which exceeds one or more of these thresholds is classed as Tier-2 projects.

This development requires a RWMP as a Tier 2 development as it is above following criterion:

- New residential development of less than 10 dwellings.
- Retrofit of 20 dwellings or less.
- New commercial, industrial, infrastructural, institutional, educational, health and other developments with an aggregate floor area less than 1,250m²; and
- Demolition projects generating in total less than 100m³ in volume of C&D waste.

Other guidelines followed in the preparation of this report include ‘*Construction and Demolition Waste Management – a handbook for Contractors and Site Managers*’¹¹, published by FÁS and the Construction Industry Federation in 2002 and the previous guidelines, ‘*Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects*’ (2006).

These guidance documents are considered to define best practice for C&D projects in Ireland and describe how C&D projects are to be undertaken such that environmental impacts and risks are

2.2 Regional Level

The proposed development is located in the Local Authority area of Dublin City Council (DCC). The *Eastern-Midlands Region Waste Management Plan 2015 – 2021* is the regional waste management plan for the DCC area published in May 2015. The plan is set to be replaced in 2023 with a new national waste management plan.

The Regional Plan sets out the strategic targets for waste management in the region and sets a specific target for C&D waste of “70% preparing for reuse, recycling and other recovery of construction and demolition waste” (excluding natural soils and stones and hazardous wastes) to be achieved by 2020.

Municipal landfill charges in Ireland are based on the weight of waste disposed. In the Leinster Region, charges are approximately €130 - €150 per tonne of waste which includes a €75 per tonne landfill levy introduced under the *Waste Management (Landfill Levy) (Amendment) Regulations 2012*.

The *Dublin City Development Plan 2022 – 2028*¹² sets out a number of policies and objectives for Dublin City in line with the objectives of the National climate action policy and emphasises the need to take action to address climate action across all sectors of society and the economy. In the waste sector, policy on climate action is focused on a shift towards a 'circular economy' encompassing three core principles: designing out waste and pollution; keeping products and material in use; and regenerating natural systems. Further policies and objectives can be found within the draft development plan.

Policies:

- *CA7 F: minimising the generation of site and construction waste and maximising reuse or recycling.*
- *CA22: The Circular economy: To support the shift towards the circular economy approach as set out in 'a Waste Action Plan for a Circular Economy 2020 to 2025, Ireland's National Waste Policy, or as updated.*
- *CA23: To have regard to existing Best Practice Guidance on Waste Management Plans for Construction and Demolition Projects as well as any future updates to these guidelines in order to ensure the consistent application of planning requirements.*
- *SI27: Sustainable Waste Management: To support the principles of the circular economy, good waste management and the implementation of best practice in relation to waste management in order for Dublin City and the Region to become self-sufficient in terms of resource and waste management and to provide a waste management infrastructure that supports this objective.*
- *SI29: Segregated Storage and Collection of Waste Streams: To require new commercial and residential developments, to include adequate and easily accessible storage space that supports the separate collection of as many waste and recycling streams as possible, but at a minimum general domestic waste, dry recyclables and food waste as appropriate.*
- *SI30: To require that the storage and collection of mixed dry recyclables, organic and residual waste materials within proposed apartment schemes have regard to the Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities 2018 (or and any future updated versions of these guidelines produced during the lifetime of this plan).*

Objectives:

- *SIO14 Local Recycling Infrastructure: To provide for a citywide network of municipal civic amenity facilities/ multi-material public recycling and reuse facilities in accessible locations throughout the city in line with the objectives of the circular economy and 15 minute city.*
- *SIO16 Eastern-Midlands Region Waste Management Plan: To support the implementation of the Eastern-Midlands Regional Waste Management Plan 2015–2021 and any subsequent plans in order to facilitate the transition from a waste management economy towards a circular economy.*

2.3 Legislative Requirements

The primary legislative instruments that govern waste management in Ireland and applicable to the project are:

- Waste Management Act 1996 as amended.

- Environmental Protection Act 1992 as amended.
- Litter Pollution Act 1997 as amended.
- Planning and Development Act 2000 as amended ¹³
- Circular Economy and Miscellaneous Provisions Act 2022.

One of the guiding principles of European waste legislation, which has in turn been incorporated into the *Waste Management Act 1996 - 2001* and subsequent Irish legislation, is the principle of “*Duty of Care*”. This implies that the waste producer is responsible for waste from the time it is generated through until its legal recycling, recovery or disposal (including its method of disposal). As it is not practical in most cases for the waste producer to physically transfer all waste from where it is produced to the final destination, waste contractors will be employed to physically transport waste to the final destination. Following on from this is the concept of “*Polluter Pays*” whereby the waste producer is liable to be prosecuted for pollution incidents, which may arise from the incorrect management of waste produced, including the actions of any contractors engaged (e.g. for transportation and disposal/recovery/recycling of waste).

It is therefore imperative that the developer ensures that the waste contractors engaged by demolition and construction contractors are legally compliant with respect to waste transportation, recycling, recovery and disposal. This includes the requirement that a contractor handle, transport and recycle/recover/dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

A collection permit to transport waste must be held by each waste contractor which is issued by the National Waste Collection Permit Office (NWCPO). Waste receiving facilities must also be appropriately permitted or licensed. Operators of such facilities cannot receive any waste, unless in possession of a Certificate of Registration (COR) or waste permit granted by the relevant Local Authority under the *Waste Management (Facility Permit & Registration) Regulations 2007 and Amendments* or a waste or IE licence granted by the EPA. The COR/permit/licence held will specify the type and quantity of waste able to be received, stored, sorted, recycled, recovered and/or disposed of at the specified site.

3.0 Design Approach

The client and the design team have integrated the ‘*Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects*’ guidelines into the design workshops, to help review processes, identify and evaluate resource reduction measures and investigate the impact on cost, time, quality, buildability, second life and management post demolition and construction. Further details on these design principals can be found within the aforementioned guidance document.

The design team have undertaken the design process in line with the international best practice principles to firstly prevent wastes, reuse where possible and thereafter sustainably reduce and recover materials. The below sections have been the focal point of the design process and material selections and will continued to be analysed and investigated throughout the design process and when selecting material.

The approaches presented are based on international principles of optimising resources and reducing waste on construction projects through:

- Prevention;
- Reuse;
- Recycling;
- Green Procurement Principles;
- Off-Site Construction;
- Materials Optimisation; and
- Flexibility and Deconstruction.

3.1 Designing For Prevention, Reuse and Recycling

Undertaken at the outset and during project feasibility and evaluation the Client and Design Team considered:

- Establishing the potential for any reusable site assets (buildings, structures, equipment, materials, soils, etc.);
- The potential for refurbishment and refit of existing structures or buildings rather than demolition and new build;
- Assessing any existing buildings on the site that can be refurbished either in part or wholly to meet the Client requirements; and
- Enabling the optimum recovery of assets on site.

3.2 Designing for Green Procurement

Waste prevention and minimisation pre-procurement have been discussed and will be further discussed in this section. The Design Team will discuss proposed design solutions, encourage innovation in tenders and incentivise competitions to recognise sustainable approaches. They should also discuss options for packaging reduction with the main Contractor and subcontractors/suppliers using measures such as 'Just-in-Time' delivery and use ordering procedures that avoid excessive waste. The Green procurement extends from the planning stage into the detailed design and tender stage and will be an ongoing part of the long-term design and selection process for this development.

3.3 Designing for Off-Site Construction

Use of off-site manufacturing has been shown to reduce residual wastes by up to 90% (volumetric building versus traditional). The decision to use offsite construction is typically cost led but there are significant benefits for resource management. Some further considerations for procurement will be investigated as part of the detailed design process are listed as follows:

- Modular buildings as these can displace the use of concrete and the resource losses associated with concrete blocks such as broken blocks, mortars, etc.;
 - Modular buildings are typically pre-fitted with fixed plasterboard and installed insulation, eliminating these residual streams from site.
- Use of pre-cast structural concrete panels which can reduce the residual volumes of concrete blocks, mortars, plasters, etc.;
- The use of prefabricated composite panels for walls and roofing to reduce residual volumes of insulation and plasterboards;
- Using pre-cast hollow-core flooring instead of in-situ ready mix flooring or timber flooring to reduce the residual volumes of concrete/formwork and wood/packaging, respectively; and
- Designing for the preferential use of offsite modular units.

3.4 Designing for Materials Optimisation During Construction

To ensure manufacturers and construction companies adopt lean production models, including maximising the reuse of materials onsite. This helps to reduce the environmental impacts associated with transportation of materials and from waste management activities. This includes investigating the use of standardised sizes for certain materials to help reduce the amount of offcuts produced on site, focusing on promotion and development of off-site manufacture.

3.5 Designing for Flexibility and Deconstruction

Design flexibility has and will be investigated throughout the design process to ensure that where possible products (including buildings) only contain materials that can be recycled and are designed to be easily disassembled. Material efficiency is being considered for the duration and end of life of a building project to produce; flexible, adaptable spaces that enable a resource-efficient, low-waste future change of use; durability of materials and how they can be recovered effectively when maintenance and refurbishment are undertaken and during disassembly/deconstruction.

4.0 DESCRIPTION OF THE PROJECT

4.1 Location, Size and Scale of the Development

St. Vincent's Hospital Fairview, intend to apply for a **ten year planning permission** for a Large-scale Residential Development (LRD) at St. Vincent's Hospital, Richmond Road and Convent Avenue, Fairview, Dublin 3. The site contains protected structures under RPS Ref.: 2032 (St. Vincent's Hospital old house/convent, including plastered extension to the west, including entrance porch to convent. Two-storey over garden level brick building (with granite steps and entrance door surround) on south front. Four-storey pedimented brick pavilion, with stone trimmings, to the west (including granite balustrading at parapet level). Railings in front of convent building on north side), RPS Ref.: 8788 (Richmond House, including former chapel and courtyard with outbuildings) and RPS Ref.: 8789 (Brooklawn, a 'House', including red brick wall and two gate piers). The application site includes an area of the public road / footpaths (extending for approximately 0.8km) to facilitate service connections via Griffith Court, Philipsburgh Avenue and Griffith Avenue, part of the open space within Grace Park Wood to facilitate a pedestrian / cycle connection, and part of Richmond Road to facilitate service connections and associated upgrades. The site is bound by the Grace Park Wood residential development to the northwest; Griffith Court, the 'Fairview Community Unit' nursing home, Fairview Day Centre, Gheel Autism Services and a graveyard to the north; the An Post Fairview Delivery Service Unit on Lomond Avenue and properties on Inverness Road, Foyle Road and Richmond Avenue to the east; existing residential and commercial properties on Richmond Road and Convent Avenue to the south and Charthouse Business Centre, Dublin Port Stadium / Stella Maris FC, and Ierne Sports and Social Club to the west of the site.

In summary, the proposed development will consist of the redevelopment of the site to provide for a new hospital building, providing mental health services, provision of 9 no. residential buildings (Blocks A, B, C, D-E, F, G, H, J, and L), community facilities, and public open space. The proposed building heights range from 2 to 13 storeys. The residential development includes a total of 811 no. residential units, including 494 no. standard designed apartments (SDA) and 317 no. Build to Rent (BTR) apartments, with a mix of 18 no. studio units, 387 no. 1 bed units, 349 no. 2 bed units and 57 no. 3 bed units.

The development includes the partial demolition and change of use, including associated alterations, of the existing hospital building (part protected structure under RPS Ref.: 2032), to provide residential amenity areas, a gym, a café, co-working space, a community library, a childcare facility, and a community hall (referred to as Block K). The development also includes additional residential amenities and facilities, a retail unit and a café. The proposed development includes for the demolition of existing structures on site, including extensions of and buildings within the curtilage of the existing hospital buildings under RPS Ref.: 2032, and other existing buildings and ancillary structures on the site; and the change of use, refurbishment and alterations of a number of buildings and protected structures on the site including Brooklawn (RPS Ref.: 8789), Richmond House (RPS Ref.: 8788), the Laundry building and Rose Cottage.

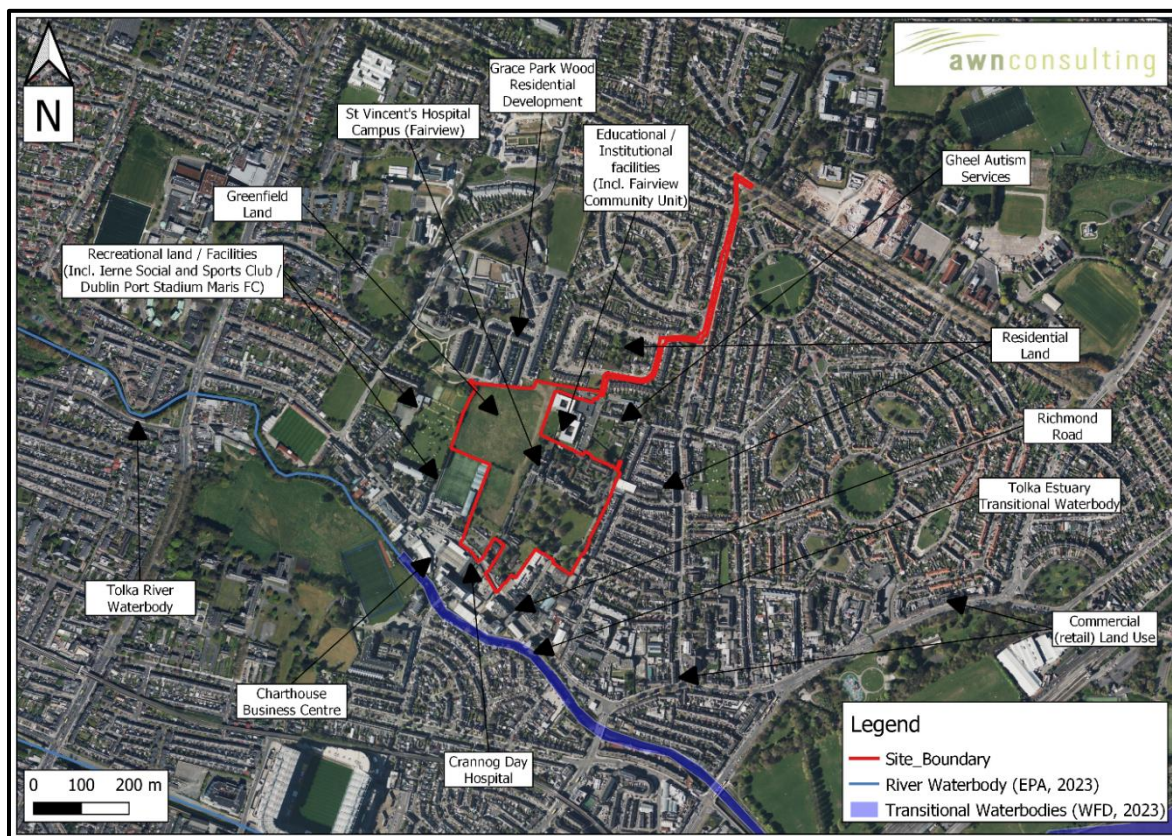


Figure 4.1 Proposed Site Location



Figure 4.2 Proposed Site Layout (Source STW)

A **ten year planning permission** is sought for the proposed development comprising of the following (see public notices for the detailed description):

- Provision of a new part two and part three storey hospital building, providing mental health services, accommodating 73 no. beds, associated facilities, a single storey facilities management building, plant rooms and service areas, associated car and cycle parking, access roads, and open space, all on a proposed hospital site of c. 2.67 ha.
- Refurbishment and repurposing of existing buildings on site including Brooklawn (RPS Ref.: 8789), Richmond House, including chapel and outbuildings (RPS Ref.: 8788), the Laundry building and Rose Cottage for ancillary uses associated with the new hospital. The existing gate lodge building will remain in residential use and used by visiting members of staff to the new hospital.
- Change of use, refurbishment, alterations and extensions, to the existing hospital building (part protected structure under RPS Ref.: 2032), to provide residential amenity areas, a gym, a café, co-working space, a library, a childcare facility, and a community hall (referred to as Block K).
- The proposal includes the demolition of existing structures on site with a GFA of 5,872 sq.m, including the (1) westernmost range of the hospital building, which includes St. Teresa's and the Freeman Wing, (2) extensions to the south and north of the main hospital building, including the conservatory extension, toilet block extension, an external corridor, toilet core, lift core, and stair core (which are all part of / within the curtilage of RPS Ref.: 2032), (4) hospital buildings and outbuildings located to the north of the existing main hospital building (5) St.

Joseph's Adolescent School located in the southeast of the site, (6) Crannog Day Hospital located in the southwest of the site, and (7) extensions to the Old Laundry Building and Rose Cottage.

- Provision of 9 no. residential buildings (Blocks A, B, C, D-E, F, G, H, J, and L) providing a total of 811 no. residential units, including 494 no. standard designed apartments (in Blocks A, B, C, G, H, J, and L) and 317 no. Build to Rent apartments (in Blocks D-E and F). Residential amenities and facilities are proposed in Block C, D-E, J and K. A retail unit is proposed in Block A and a café in Block F. Block J is proposed as an extension of the existing hospital buildings (protected structure RPS Ref.: 2032- referred to as Block K).
- The building heights of the proposed residential blocks range from part 2 to part 13 storeys. A proposed basement / lower ground level, containing car and cycle parking and plant areas, is located below and accessed via Blocks C, D-E and F.
- Access to the new hospital and associated grounds is provided from Richmond Road and Convent Avenue, with separate internal access points. A separate vehicular access to the residential development is provided from Richmond Road. The development includes a proposed pedestrian / cycle connection to Griffith Court, requiring alterations to the service yard of the Fairview Community Unit, pedestrian / cycle connections to the Fairview Community Unit campus to the north (providing an onward connection to Griffith Court), a pedestrian / cycle connection to Grace Park Wood, and makes provision internally within the site for a potential future connection to Lomond Avenue / Inverness Road.
- The proposal includes public open space, including allotments, children's play areas, a central park, a linear park and an entrance plaza, with a set down area at Richmond Road, and communal open space at surface level. The proposal includes communal roof terraces on Block C and Blocks D-E and private balconies / terraces for the apartments.
- The proposal also includes provision of internal access roads, car and cycle parking, pedestrian and cycle infrastructure, associated set down areas, alterations to existing landscape features, landscaping, boundary treatments, lighting, telecommunications infrastructure at roof level of Block B, green roofs, lift overruns and plant at roof level, site services, including a watermain connection / upgrade via Griffith Court, Philipsburgh Avenue and Griffith Avenue, site clearance, and all associated site works.

4.2 Details of the Non-Hazardous Wastes to be produced

There will be waste materials generated from the demolition and refurbishment of the existing buildings onsite, to accommodate the proposed development. The Architectural report and Design Conservation report submitted with this application goes into further detail regarding which buildings are to be demolished and which are to be renovated and retained.

The volume of waste generated from demolition and renovations will be more difficult to segregate than waste generated from the construction phase, as many of the materials will be bonded together or integrated i.e. plasterboard on timber ceiling joists, steel embedded in concrete etc.

There will be soil, stones, clay and made ground excavated to facilitate construction of new foundations, underground services, and the installation of the proposed basement. The project Engineers (OCSC) have estimated c. 110,000m³ of material will need to be

excavated. The majority (but not all) of the topsoil stripped from the site will be reused on site for backfill (levels in some areas need to be raised) and landscaping with some export required. Any surplus topsoil material will be transported off site for appropriate reuse, recovery, recycling and / or disposal. It is envisaged that all of the subsoil and stones will be removed from the site and transported off site for appropriate reuse, recovery, recycling and / or disposal.

During the construction phase there may be a surplus of building materials, such as timber off-cuts, broken concrete blocks, cladding, plastics, metals and tiles generated. There may also be excess concrete during construction which will need to be disposed of. Plastic and cardboard waste from packaging and supply of materials will also be generated. The contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

Waste will also be generated from construction workers e.g. organic/food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided on site during the construction phase. Waste printer/toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices.

4.3 Potential Hazardous Wastes Arising

4.3.1 Contaminated Soil

Site investigations and environmental soil testing were undertaken in April 2002 by Ground Investigations Ireland. Prior to any material being removed offsite it is envisaged that further environmental soil testing using waste classification testing parameters will be undertaken.

If any potentially contaminated material is encountered, it will need to be segregated from clean/inert material, tested and classified as either non-hazardous or hazardous in accordance with the EPA publication entitled '*Waste Classification: List of Waste & Determining if Waste is Hazardous or Non-Hazardous*'¹² using the *HazWasteOnline* application (or similar approved classification method). The material will then need to be classified as clean, inert, non-hazardous or hazardous in accordance with the *EC Council Decision 2003/33/EC*¹³, which establishes the criteria for the acceptance of waste at landfills.

In the event that Asbestos containing materials (ACMs) are found, the removal will only be carried out by a suitably permitted waste contractor, in accordance with *S.I. No. 386 of 2006 Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010*. All asbestos will be taken to a suitably licensed or permitted facility.

In the event that hazardous soil, or historically deposited waste is encountered during the construction phase, the contractor will notify DCC and provide a Hazardous/Contaminated Soil Management Plan, to include estimated tonnages, description of location, any relevant mitigation, destination for disposal/treatment, in addition to information on the authorised waste collector(s).

4.3.2 Fuel/Oils

Fuels and oils are classed as hazardous materials; any on-site storage of fuel/oil, and all storage tanks and all draw-off points will be bunded and located in a dedicated, secure

area of the site. Provided that these requirements are adhered to and the site crew are trained in the appropriate refuelling techniques, it is not expected that there will be any fuel/oil waste generated at the site.

4.3.3 Invasive Plant Species

Multiple site surveys were undertaken including surveys for invasive species by Altamar Ltd (project ecologist) This included a site walkover survey of the entire site, around the courtyards, carparks and boundary walls to search for any schedule 3 invasive species.

No invasive plant species that could hinder removal of soil from the site during groundworks, such as Japanese knotweed, giant rhubarb or Himalayan balsam were noted on site.

4.3.4 Asbestos

Multiple Asbestos Survey were undertaken by Phoenix Environmental Safety Ltd. Across the 30th of June to the 2nd of July 2021 for the purpose of identifying and managing any asbestos containing materials (ACMs). Asbestos and asbestos related material was found in multiple locations across the site including but not limited to in cement debris, boiler room gaskets, Cement Slates, textured coatings, adhesives, woven ropes, piping, ceiling boards and textiles.

When removal is required, the removal of asbestos or ACMs will be carried out by a suitably qualified contractor. The ACM's will only be removed from site by a suitably permitted waste contractor. in accordance with *S.I. No. 386 of 2006 Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010*. All asbestos/ACMs will be taken to a suitably licensed or permitted facility.

4.3.5 Other known Hazardous Substances

Paints, glues, adhesives and other known hazardous substances will be stored in designated areas. They will generally be present in small volumes only and associated waste volumes generated will be kept to a minimum. Wastes will be stored in appropriate receptacles pending collection by an authorised waste contractor.

In addition, WEEE (containing hazardous components), printer toner/cartridges, batteries (Lead, Ni-Cd or Mercury) and/or fluorescent tubes and other mercury containing waste may be generated from during C&D activities or temporary site offices. These wastes, if generated, will be stored in appropriate receptacles in designated areas of the site pending collection by an authorised waste contractor.

4.4 Main Construction and Demolition Waste Categories

The main non-hazardous and hazardous waste streams that could be generated by the construction activities at a typical site are shown in Table 6.1. The List of Waste (LoW) code (as effected from 1 June 2015) (also referred to as the European Waste Code or EWC) for each waste stream is also shown.

5.0 Roles and Responsibilities

The *Best Practice Guidelines on the Preparation of Resource Waste Management Plans for Construction and Demolition Projects* promotes that a RM should be appointed. The RM may be performed by number of different individuals over the life-cycle of the Project, however it is intended to be a reliable person chosen from within the Planning/Design/Contracting Team, who is technically competent and appropriately trained, who takes the responsibility to ensure that the objectives and measures within the Project RWMP are complied with. The RM is assigned the requisite authority to meet the objective and obligations of the RWMP. The role will include the important activities of conducting waste checks/audits and adopting construction and demolition methodology that is designed to facilitate maximum reuse and/or recycling of waste.

5.1 Role of the Client

The Client are the body establishing the aims and the performance targets for the project.

- The Client has commissioned the preparation and submission of a preliminary RWMP as part of the design and planning submission;
- The Client is to commission the preparation and submission of an updated RWMP as part of the construction tendering process;
- The Client will ensure that the RWMP is agreed on and submitted to the local authority prior to commencement of works on site;
- The Client is to request the end-of-project RWMP from the Contractor.

5.2 Role of the Client Advisory Team

The Client Advisory Team or Design Team is formed of architects, consultants, quantity surveyors and engineers and is responsible for:

- Drafting and maintaining the RWMP through the design, planning and procurement phases of the project;
- Appointing a RM to track and document the design process, inform the Design Team and prepare the RWMP.
- Including details and estimated quantities of all projected waste streams with the support of environmental consultants/scientists. This should also include data on waste types (e.g. waste characterisation data, contaminated land assessments, site investigation information) and prevention mechanisms (such as by-products) to illustrate the positive circular economy principles applied by the Design Team;
- Managing and valuing the demolition work with the support of quantity surveyors;
- Handing over of the RWMP to the selected Contractor upon commencement of construction of the development, in a similar fashion to how the safety file is handed over to the Contractor;
- Working with the Contractor as required to meet the performance targets for the project.

5.3 Future Role of the Contractor

The future demolition and construction Contractors have not yet been decided upon for this RWMP. However, once select they will have major roles to fulfil. They will be responsible for:

- Preparing, implementing and reviewing the (including the Pre-Demolition) RWMP throughout the demolition and construction phases (including the management of all suppliers and sub-contractors) as per the requirements of these guidelines;
- Identifying a designated and suitably qualified RM who will be responsible for implementing the RWMP;
- Identifying all hauliers to be engaged to transport each of the resources / wastes off-site;
- Implementing waste management policies whereby waste materials generated on site are to be segregated as far as practicable;
- Renting and operating a mobile-crusher to crush concrete for temporary reuse onsite during construction and reduce the amount of HGV loads required to remove material from site;
- Applying for the appropriate waste permit to crush concrete onsite;
- Identifying all destinations for resources taken off-site. As above, any resource that is legally classified as a 'waste' must only be transported to an authorised waste facility;
- End-of-waste and by-product notifications addressed with the EPA where required;
- Clarification of any other statutory waste management obligations, which could include on-site processing;
- Full records of all resources (both wastes and other resources) should be maintained for the duration of the project; and
- Preparing a RWMP Implementation Review Report at project handover.

6.0 Key Materials & Quantities

6.1 Project Resource Targets

Project specific resource and waste management targets for the site have not yet been set and this information should be updated for these targets once these targets have been confirmed by the client. However, it is expected for projects of this nature that a minimum of 70% of waste is fully re-used, recycled or recovered. Target setting will inform the setting of project-specific benchmarks to track target progress. Typical Key Performance Indicators (KPIs) that may be used to set targets include (as per guidelines):

- Weight (tonnes) or Volume (m^3) of waste generated per construction value;
- Weight (tonnes) or Volume (m^3) of waste generated per construction floor area (m^2);
- Fraction of resource reused on site;
- Fraction of resource notified as by-product;
- Fraction of waste segregated at source before being sent off-site for recycling/recovery; and
- Fraction of waste recovered, fraction of waste recycled, or fraction of waste disposed.

6.2 Main Construction and Demolition Waste Categories

The main non-hazardous and hazardous waste streams that could be generated by the construction activities at a typical site are shown in Table 6.1. The List of Waste (LoW) code (applicable as of 1 June 2015) (also referred to as the European Waste Code (EWC)) for each waste stream is also shown.

Table 6.1 Typical waste types generated and LoW codes (individual waste types may contain hazardous substances)

Waste Material	LoW/EWC Code
Concrete, bricks, tiles, ceramics	17 01 01-03 & 07
Wood, glass and plastic	17 02 01-03
Treated wood, glass, plastic, containing hazardous substances	17-02-04*
Bituminous mixtures, coal tar and tarred products	17 03 01*, 02 & 03*
Metals (including their alloys) and cable	17 04 01-11
Soil and stones	17 05 03* & 04
Gypsum-based construction material	17 08 01* & 02
Paper and cardboard	20 01 01
Mixed C&D waste	17 09 04
Green waste	20 02 01
Electrical and electronic components	20 01 35 & 36
Batteries and accumulators	20 01 33 & 34
Liquid fuels	13 07 01-10
Chemicals (solvents, pesticides, paints, adhesives, detergents etc.)	20 01 13, 19, 27-30
Insulation materials	17 06 04
Organic (food) waste	20 01 08
Mixed Municipal Waste	20 03 01

* individual waste type may contain hazardous substances

7.0 WASTE MANAGEMENT

7.1 Demolition Waste Generation

Demolition works at the site will involve the demolition and renovation of the buildings onsite. Demolition figures published by the EPA in the 'National Waste Reports' ¹⁴ and data from previous projects have been used to estimate the approximate break-down for indicative reuse (offsite), recycling and disposal targets of demolition waste. The quantities of waste material have been supplied by the project architects (Scott Tallon Walker) This breakdown is shown in Table 7.1.

Table 7.1: Predicted on and off-site reuse, recycle and disposal rates for demolition waste

Waste Types	Total Waste	Reuse		Recycle/Recovery		Disposal	
	Tonnes	%	Tonnes	%	Tonnes	%	Tonnes
Glass	50.0	0	0.0	85	42.5	15	7.5
Concrete, Bricks, Tiles, Ceramics	10088.6	30	3026.6	65	6557.6	5	504.4
Plasterboard	96.0	30	28.8	60	57.6	10	9.6
Metals	1.0	5	0.1	80	0.8	15	0.2
Slate	199.0	0	0.0	85	169.2	15	29.9
Timber	215.0	10	21.5	60	129.0	30	64.5
Asbestos	1.0	0	0.0	0	0.0	100	1.0
Total	10650.6		3076.9		6956.6		617.0

7.2 Construction Waste Generation

The below Table 7.2 shows the breakdown of C&D waste types produced on a typical site based on data from the EPA *National Waste Reports* ¹⁴ and the joint EPA & GMIT study ¹⁵, along with other research reports.

Table 7.2: Waste materials generated on a typical Irish construction site

Waste Types	%
Mixed C&D	33
Timber	28
Plasterboard	10
Metals	8
Concrete	6
Other	15
Total	100

The Table 7.3 below shows the estimated construction waste generation for the development based on the gross floor area of construction and other information available to date, along with indicative targets for management of the waste streams. The estimated waste amounts for the main waste types (with the exception of soils and stones) are based on an average large-scale development waste generation rate per m², using the waste breakdown rates shown in Table 7.2. These have been calculated from the schedule of development areas provided by the architect.

Table 7.3: Predicted on and off-site reuse, recycle and disposal rates for construction waste

Waste Type	Total Waste	Reuse		Recycle/Recovery		Disposal	
	Tonnes	%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	1432.7	10	143.3	80	1146.2	10	143.3
Timber	1215.6	40	486.3	55	668.6	5	60.8
Plasterboard	434.2	30	130.2	60	260.5	10	43.4
Metals	347.3	5	17.4	90	312.6	5	17.4
Concrete	260.5	30	78.1	65	169.3	5	13.0
Other	651.2	20	130.2	60	390.7	20	130.2
Total	4341.6		985.5		2947.9		408.1

In addition to the information in Table 7.3, there will be a 110,000m³ of soil, stones, clay and made ground excavated to facilitate construction of new foundations, underground services, and the installation of the proposed basement. The majority (but not all) of the topsoil stripped from the site will be reused on site for backfill (levels in some areas need to be raised) and landscaping with some export required. Any surplus topsoil material will be transported off site for appropriate reuse, recovery, recycling and / or disposal. It is envisaged that all of the subsoil and stones will be removed from the site and transported off site for appropriate reuse, recovery, recycling and / or disposal.

It should be noted that until final materials and detailed construction methodologies have been confirmed, it is difficult to predict with a high level of accuracy the construction waste that will be generated from the proposed works as the exact materials and quantities may be subject to some degree of change and variation during the construction process.

7.3 Proposed Resource and Waste Management Options

Waste materials generated will be segregated on site, where it is practical. Where the on-site segregation of certain wastes types is not practical, off-site segregation will be carried out. There will be skips and receptacles provided to facilitate segregation at source where feasible. All waste receptacles leaving site will be covered or enclosed. The appointed waste contractor will collect and transfer the wastes as receptacles are filled. There are numerous waste contractors in the Dublin Region that provide this service.

All waste arising's will be handled by an approved waste contractor holding a current waste collection permit. All waste arising's requiring disposal off-site will be reused, recycled, recovered or disposed of at a facility holding the appropriate registration, permit or licence, as required.

During construction some of the sub-contractors on site will generate waste in relatively low quantities. The transportation of non-hazardous waste by persons who are not directly involved with the waste business, at weights less than or equal to 2 tonnes, and in vehicles not designed for the carriage of waste, are exempt from the requirement to have a waste collection permit (Ref. Article 30 (1) (b) of the Waste Collection Permit Regulations 2007 as amended). Any sub-contractors engaged that do not generate more than 2 tonnes of waste at any one time can transport this waste offsite in their work vehicles (which are not design for the carriage of waste). However, they are required to ensure that the receiving facility has the appropriate COR / permit / licence.

Written records will be maintained by the contractor(s) detailing the waste arising throughout the C&D phases, the classification of each waste type, waste collection permits for all waste contactors who collect waste from the site and COR/permit or licence for the receiving waste facility for all waste removed off site for appropriate reuse, recycling, recovery and/or disposal

Dedicated bunded storage containers will be provided for hazardous wastes which may arise such as batteries, paints, oils, chemicals etc, if required.

The anticipated management of the main waste streams is outlined as follows:

Soil, Stone, Gravel and Clay

The waste hierarchy states that the preferred option for waste management is prevention and minimisation of waste, followed by preparing for reuse and recycling / recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal. The excavations are required to facilitate construction works so the preferred option (prevention and minimisation) cannot be accommodated for the excavation phase.

When material is removed off-site it could be reused as a by-product (and not as a waste). If this is done, it will be done in accordance with Regulation 27 (By-products), as amended, of S.I. No. 323/2020 - European Union (Waste Directive) Regulations 2011-2020, (Previously Article 27 of the European Communities (Waste Directive)), which requires that certain conditions are met and that by-product notifications are made to the EPA via their online notification form. Excavated material should not be removed from site until approval from the EPA has been received. The potential to reuse material as a by-product will be confirmed during the course of the excavation works, with the objective of eliminating any unnecessary disposal of material.

The next option (beneficial reuse) may be appropriate for the excavated material, pending environmental testing to classify the material as hazardous or non-hazardous in accordance with the EPA *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* publication. Clean inert material may be used as fill material in other construction projects or engineering fill for waste licensed sites. Beneficial reuse of surplus excavation material as engineering fill may be subject to further testing to determine if materials meet the specific engineering standards for their proposed end use.

Any nearby sites requiring clean fill/capping material will be contacted to investigate reuse opportunities for clean and inert material. If any of the material is to be reused on another site as a by-product (and not as a waste), this will be done in accordance with Regulation 27. Similarly, if any soils/stones are imported onto the site from another construction site as a by-product, this will also be done in accordance with Regulation 27. Regulation 27 will be investigated to see if the material can be imported onto this site for beneficial reuse instead of using virgin materials.

If the material is deemed to be a waste, then removal and reuse / recovery / disposal of the material will be carried out in accordance with the *Waste Management Act 1996* as amended, the *Waste Management (Collection Permit) Regulations 2007* as amended and the *Waste Management (Facility Permit & Registration) Regulations 2007* as amended. Once all available beneficial reuse options have been exhausted, the options of recycling and recovery at waste permitted and licensed sites will be considered.

In the event that contaminated material is encountered and subsequently classified as hazardous, this material will be stored separately to any non-hazardous material. It will require off-site treatment at a suitable facility or disposal abroad via Transfrontier Shipment of Wastes (TFS).

Bedrock

While it is not envisaged that bedrock will be encountered, if bedrock is encountered, it is anticipated that it will not be crushed on site. Any excavated rock is expected to be removed offsite for appropriate reuse, recovery and/or disposal. If bedrock is to be crushed onsite the appropriate mobile waste facility permit will be obtained from DCC.

Silt & Sludge

During the construction phase, silt and petrochemical interception should be carried out on runoff and pumped water from site works, where required. Sludge and silt will then be collected by a suitably licensed contractor and removed offsite.

Concrete Blocks, Bricks, Tiles & Ceramics

The majority of concrete blocks, bricks, tiles and ceramics generated as part of the construction works are expected to be clean, inert material and should be recycled, where possible. If concrete is to be crushed onsite the appropriate mobile waste facility permit will be obtained from DCC.

Hard Plastic

As hard plastic is a highly recyclable material, much of the plastic generated will be primarily from material off-cuts. All recyclable plastic will be segregated and recycled, where possible.

Timber

Timber that is uncontaminated, i.e. free from paints, preservatives, glues etc., will be disposed of in a separate skip and recycled off-site.

Metal

Metals will be segregated where practical and stored in skips. Metal is highly recyclable and there are numerous companies that will accept these materials.

Plasterboard

There are currently a number of recycling services for plasterboard in Ireland. Plasterboard from the construction phases will be stored in a separate skip, pending collection for recycling. The site manager will ensure that oversupply of new plasterboard is carefully monitored to minimise waste.

Glass

Glass materials will be segregated for recycling, where possible.

Waste Electrical and Electronic Equipment (WEEE)

Any WEEE will be stored in dedicated covered cages/receptacles/pallets pending collection for recycling.

Other Recyclables

Where any other recyclable wastes such as cardboard and soft plastic are generated, these will be segregated at source into dedicated skips and removed off-site.

Non-Recyclable Waste

C&D waste which is not suitable for reuse or recovery, such as polystyrene, some plastics and some cardboards, will be placed in separate skips or other receptacles. Prior to removal from site, the non-recyclable waste skip/receptacle will be examined by a member of the waste team (see Section 10.0) to determine if recyclable materials have been placed

in there by mistake. If this is the case, efforts will be made to determine the cause of the waste not being segregated correctly and recyclable waste will be removed and placed into the appropriate receptacle.

Asbestos Containing Materials

Any asbestos or ACM found onsite will be removed by a suitably competent contractor and disposed of as asbestos waste before the demolition works begin. All asbestos removal work or encapsulation work must be carried out in accordance with *S.I. No. 386 of 2006 Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010*.

Other Hazardous Wastes

On-site storage of any hazardous wastes produced (i.e. contaminated soil if encountered and/or waste fuels) will be kept to a minimum, with removal off-site organised on a regular basis. Storage of all hazardous wastes on-site will be undertaken so as to minimise exposure to on-site personnel and the public and to also minimise potential for environmental impacts. Hazardous wastes will be recovered, wherever possible, and failing this, disposed of appropriately.

Onsite Crushing

It is currently not envisaged that the crushing of waste materials will occur onsite, however if the crushing of material is to be undertaken a mobile waste facility permit will first be obtained from DCC and the destination of the excepting waste facility will be supplied to the DCC waste unit.

7.4 Tracking and Documentation Procedures for Off-Site Waste

All waste will be documented prior to leaving the site. Waste will be weighed by the contractor, either by weighing mechanism on the truck or at the receiving facility. These waste records will be maintained on site by the nominated project RM (see Section 10.0).

All movement of waste and the use of waste contractors will be undertaken in accordance with the *Waste Management Acts 1996 - 2011*, *Waste Management (Collection Permit) Regulations 2007* as amended and *Waste Management (Facility Permit & Registration) Regulations 2007* and amended. This includes the requirement for all waste contractors to have a waste collection permit issued by the NWCPO. The nominated project RM (see Section 10.0) will maintain a copy of all waste collection permits on-site.

If the waste is being transported to another site, a copy of the Local Authority waste COR/permit or EPA Waste/IE Licence for that site will be provided to the nominated project RM (see Section 10.0). If the waste is being shipped abroad, a copy of the Transfrontier Shipping (TFS) notification document will be obtained from DCC (as the relevant authority on behalf of all local authorities in Ireland) and kept on-site along with details of the final destination (COR, permits, licences etc.). A receipt from the final destination of the material will be kept as part of the on-site waste management records.

All information will be entered in a waste management recording system to be maintained on site.

8.0 ESTIMATED COST OF WASTE MANAGEMENT

An outline of the costs associated with different aspects of waste management is outlined below. The total cost of C&D waste management will be measured and will take into account handling costs, storage costs, transportation costs, revenue from rebates and disposal costs.

8.1 Reuse

By reusing materials on site, there will be a reduction in the transport and recycle/recovery/disposal costs associated with the requirement for a waste contractor to take the material off-site.

Clean and inert soils, gravel, stones etc. which cannot be reused on site may be used as access roads or capping material for landfill sites etc. This material is often taken free of charge or a reduced fee for such purposes, reducing final waste disposal costs.

8.2 Recycling

Salvageable metals will earn a rebate which can be offset against the costs of collection and transportation of the skips.

Clean uncontaminated cardboard and certain hard plastics can also be recycled. Waste contractors will charge considerably less to take segregated wastes, such as recyclable waste, from a site than mixed waste.

Timber can be recycled as chipboard. Again, waste contractors will charge considerably less to take segregated wastes such as timber from a site than mixed waste.

8.3 Disposal

Landfill charges are currently at around €130 - €150 per tonne which includes a €75 per tonne landfill levy specified in the *Waste Management (Landfill Levy) Regulations 2015*. In addition to disposal costs, waste contractors will also charge a collection fee for skips.

Collection of segregated C&D waste usually costs less than municipal waste. Specific C&D waste contractors take the waste off-site to a licensed or permitted facility and, where possible, remove salvageable items from the waste stream before disposing of the remainder to landfill. Clean soil, rubble, etc. is also used as fill/capping material, wherever possible.

9.0 DEMOLITION PROCEDURES

The demolition stage will involve the removal of the demolition and renovation of the existing development. The demolition areas are identified in the planning drawings submitted as part of this application and in the drawing in Appendix A of this report. The following sequence of works will be followed during the demolition stage.

Check for Hazards

Prior to commencing works, buildings and structures to be demolished will be checked for any likely hazards including asbestos, ACMs, electrical power lines or cables, gas

reticulation systems, telecommunications, unsafe structures and fire / explosion hazards, e.g. combustible dust, chemical hazards, oil, fuels and contamination.

Removal of Components

All hazardous materials will be removed first. All components from within the buildings that can be salvaged will be removed next. This will primarily be comprised of metal; however, may also include timbers, doors, windows, wiring and metal ducting, etc.

Removal of Roofing

Steel roof supports, beams, etc., will be dismantled and taken away for recycling / salvage.

Excavation of Services, Demolition of Walls and Concrete

Services will be removed from the ground and the breakdown of walls will be carried out once all salvageable or reusable materials have been taken from the buildings. Finally, any existing foundations and hard standing areas will be excavated.

10.0 TRAINING PROVISIONS

A member of the construction team will be appointed as the project RM to ensure commitment, operational efficiency and accountability during the C&D phases of the project.

10.1 Resource Manager Training and Responsibilities

The nominated RM will be given responsibility and authority to select a waste team if required, i.e. members of the site crew that will aid them in the organisation, operation and recording of the waste management system implemented on site. The RM will have overall responsibility to oversee, record and provide feedback to the client on everyday waste management at the site. Authority will be given to the RM to delegate responsibility to sub-contractors, where necessary, and to coordinate with suppliers, service providers and sub-contractors to prioritise waste prevention and material salvage.

The RM will be trained in how to set up and maintain a record keeping system, how to perform an audit and how to establish targets for waste management on site. The RM will also be trained in the best methods for segregation and storage of recyclable materials, have information on the materials that can be reused on site and be knowledgeable in how to implement this RWMP.

10.2 Site Crew Training

Training of site crew is the responsibility of the RM and, as such, a waste training program should be organised. A basic awareness course will be held for all site crew to outline the RWMP and to detail the segregation of waste materials at source. This may be incorporated with other site training needs such as general site induction, health and safety awareness and manual handling.

This basic course will describe the materials to be segregated, the storage methods and the location of the Waste Storage Areas (WSAs). A sub-section on hazardous wastes will

be incorporated into the training program and the particular dangers of each hazardous waste will be explained.

11.0 TRACKING AND TRACING / RECORD KEEPING

Records should be kept for all waste material which leaves the site, either for reuse on another site, recycling or disposal. A recording system will be put in place to record the waste arising's on site.

A waste tracking log should be used to track each waste movement from the site. On exit from the site the waste collection vehicle driver should stop at the site office and sign out as a visitor and provide the security personnel or RM with a waste docket (or WTF for hazardous waste) for the waste load collected. At this time, the security personnel should complete and sign the Waste Tracking Register with the following information:

- Date
- Time
- Waste Contractor
- Company waste contractor appointed by e.g. Contractor or subcontractor name
- Collection Permit No.
- Vehicle Reg.
- Driver Name
- Docket No.
- Waste Type
- EWC/LoW

The waste vehicle will be checked by security personal or the RM to ensure it has the waste collection permit no. displayed and a copy of the waste collection permit in the vehicle before they are allowed to remove the waste from the site.

The waste transfer dockets will be transferred to the RM on a weekly basis and can be placed in the Waste Tracking Log file. This information will be forwarded onto the DCC Waste Regulation Unit when requested.

Each subcontractor that has engaged their own waste contractor will be required to maintain a similar waste tracking log with the waste dockets / WTF maintained on file and available for inspection on site by the main contractor as required. These subcontractor logs will be merged with the main waste log.

Waste receipts from the receiving waste facility will also be obtained by the site contractor(s) and retained. A copy of the Waste Collection Permits, CORs, Waste Facility Permits and Waste Licences will be maintained on site at all times and will be periodically reviewed by the RM. Subcontractors who have engaged their own waste contractors, should provide the main contractor with a copy of the waste collection permits and COR / permit / licence for the receiving waste facilities and maintain a copy on file, available for inspection on site as required.

12.0 OUTLINE WASTE AUDIT PROCEDURE

12.1 Responsibility for Waste Audit

The appointed RM will be responsible for conducting a waste audit at the site during the C&D phase of the development. Contact details for the nominated RM will be provided to the DCC Waste Regulation Unit after the main contractor is appointed and prior to any material being removed from site.

12.2 Review of Records and Identification of Corrective Actions

A review of all waste management costs and the records for the waste generated and transported off-site should be undertaken mid-way through the project.

If waste movements are not accounted for, the reasons for this should be established in order to see if and why the record keeping system has not been maintained. The waste records will be compared with the established recovery/reuse/recycling targets for the site. Each material type will be examined, in order to see where the largest percentage waste generation is occurring. The waste management methods for each material type will be reviewed in order to highlight how the targets can be achieved.

Upon completion of the C&D phase, a final report will be prepared, summarising the outcomes of waste management processes adopted and the total recycling/reuse/recovery figures for the development.

12.3 Pest Management

A pest control operator will be appointed as required to manage pest onsite during the construction phase of the project. Organic and food wastes generated by staff will not be stored in open skips, but in closed waste receptacles. Any waste receptacles will be carefully managed to prevent leaks, odours and pest problems.

13.0 C&D ENVIRONMENTAL MITIGATION MEASURES

During the Demolition and Construction phase the project Construction Environmental Management Plan (CEMP) will be followed in regard to implementing and managing all environmental management requirements.

This CEMP explains the construction techniques and methodologies which will be implemented during demolition and construction of the proposed development.

The CEMP mitigation measures will be implemented to ensure that pollution and nuisances arising from site clearance and construction activities is prevented where possible and managed in accordance with best practice environmental protection.

The CEMP will be implemented and adhered to by the demolition and construction contractors and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager, RM and Ecological Clerk of Works where relevant. All personnel working on the site will be trained in the implementation of the procedures.

14.0 CONSULTATION WITH RELEVANT BODIES

14.1 Local Authority

Once construction contractors have been appointed, have appointed waste contractors and prior to removal of any C&D waste materials offsite, details of the proposed destination of each waste stream will be provided to the DCC Waste Regulation Unit.

DCC will also be consulted, as required, throughout the demolition, excavation and construction phases in order to ensure that all available waste reduction, reuse and recycling opportunities are identified and utilised and that compliant waste management practices are carried out.

14.2 Recycling/Salvage Companies

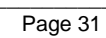
The appointed waste contractor for the main waste streams managed by the demolition and construction contractors will be audited in order to ensure that relevant and up-to-date waste collection permits and facility registrations/permits/licences are held. In addition, information will be obtained regarding the feasibility of recycling each material, the costs of recycling/reclamation, the means by which the wastes will be collected and transported off-site, and the recycling/reclamation process each material will undergo off site.

15.0 REFERENCES

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APPENDIX A

Building Demolition Guide



APPENDIX 15.2

OPERATIONAL WASTE MANAGEMENT PLAN

PREPARED BY AWN CONSULTING LTD

OPERATIONAL WASTE MANAGEMENT PLAN FOR A PROPOSED MIXED-USE DEVELOPMENT

AT

**ST. VINCENT'S HOSPITAL
REDEVELOPMENT,
RICHMOND ROAD AND
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Report Prepared For

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Our Reference

CB/217501.0888WMR02

Date of Issue



27 March 2023



Document History

Document Reference		Original Issue Date	
CB/217501.0888WMR01		27 March 2023	
Revision Level	Revision Date	Description	Sections Affected

Record of Approval

Details	Written by	Approved by
Signature		
Name	Chonaiil Bradley	Fergal Callaghan
Title	Principal Environmental Consultant	Director
Date	27 March 2023	27 March 2023

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1.0 INTRODUCTION

AWN Consulting Ltd. (AWN) has prepared this Operational Waste Management Plan (OWMP) on behalf of St Vincent's Hospital, for a proposed development consisting of the demolition of some of the existing buildings onsite, and the renovation and construction of multiple buildings to provide for a mixed-use development consisting of residential units, mental health hospital, childcare facility, co-working units, gym and residential amenities. The development will also include for car and bicycle parking, hard and soft landscaping and installation of all services at St. Vincent's Hospital, Richmond Road and Convent Avenue, Fairview, Dublin 3.

This OWMP has been prepared to ensure that the management of waste during the operational phase of the commercial development is undertaken in accordance with current legal and industry standards including, the *Waste Management Act 1996* as amended and associated Regulations ¹, *Environmental Protection Agency Act 1992* as amended ², *Litter Pollution Act 1997* as amended ³, the '*Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021*' ⁴, *Dublin City Development Plan 2022 – 2028* ⁵, and DCC '*Dublin City Council (Storage, Presentation and Segregation of Household and Commercial Waste) Bye-Laws*' (2018) ⁶. In particular, this OWMP aims to provide a robust strategy for storing, handling, collection and transport of the wastes generated at site.

In addition, the following guidelines were consulted for healthcare specific waste management practice in relation to the proposed nursing home use and supporting medical care:

- Health Service Executive (HSE), *Waste Management Awareness Handbook* (2011) ⁷; and
- HSE and Department of Health and Children (DOHC), *Healthcare Risk Waste Management: Segregation, Packaging and Storage Guidelines for Healthcare Risk Waste, 4th Edition* (2010) ⁸.

This OWMP aims to ensure maximum recycling, reuse and recovery of waste with diversion from landfill, wherever possible. The OWMP also seeks to provide guidance on the appropriate collection and transport of waste to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil or water resources). The plan estimates the type and quantity of waste to be generated from the proposed development during the operational phase and provides a strategy for managing the different waste streams.

At present, there are no specific guidelines in Ireland for the preparation of OWMPs. Therefore, in preparing this document, consideration has been given to the requirements of national and regional waste policy, legislation and other guidelines.

2.0 OVERVIEW OF WASTE MANAGEMENT IN IRELAND

2.1 National Level

The Irish Government issued a policy statement in September 1998 titled as '*Changing Our Ways*' ⁹ which identified objectives for the prevention, minimisation, reuse, recycling, recovery and disposal of waste in Ireland. A heavy emphasis was placed on reducing reliance on landfill and finding alternative methods for managing waste. Amongst other things, Changing Our Ways stated a target of at least 35% recycling of municipal (i.e. household, commercial and non-process industrial) waste.

A further policy document '*Preventing and Recycling Waste – Delivering Change*' was published in 2002 ¹⁰. This document proposed a number of programmes to increase

recycling of waste and allow diversion from landfill. The need for waste minimisation at source was considered a priority.

This view was also supported by a review of sustainable development policy in Ireland and achievements to date, which was conducted in 2002, entitled '*Making Ireland's Development Sustainable – Review, Assessment and Future Action*'¹¹. This document also stressed the need to break the link between economic growth and waste generation, again through waste minimisation and reuse of discarded material.

In order to establish the progress of the Government policy document *Changing Our Ways*, a review document was published in April 2004 entitled '*Taking Stock and Moving Forward*'¹². Covering the period 1998 – 2003, the aim of this document was to assess progress to date with regard to waste management in Ireland, to consider developments since the policy framework and the local authority waste management plans were put in place, and to identify measures that could be undertaken to further support progress towards the objectives outlined in *Changing Our Ways*.

In particular, *Taking Stock and Moving Forward* noted a significant increase in the amount of waste being brought to local authority landfills. The report noted that one of the significant challenges in the coming years was the extension of the dry recyclable collection services.

In September 2020, the Irish Government published a new policy document outlining a new action plan for Ireland to cover the period of 2020-2025. This plan 'A Waste Action Plan for a Circular Economy'¹³ (WAPCE), was prepared in response to the 'European Green Deal' which sets a roadmap for a transition to a new economy, where climate and environmental challenges are turned into opportunities, replacing the previous national waste management plan "A Resource Opportunity" (2012).

The WAPCE sets the direction for waste planning and management in Ireland up to 2025. This reorientates policy from a focus on managing waste to a much greater focus on creating circular patterns of production and consumption. Other policy statements of a number of public bodies already acknowledge the circular economy as a national policy priority.

The policy document contains over 200 measures across various waste areas including circular economy, municipal waste, consumer protection and citizen engagement, plastics and packaging, construction and demolition, textiles, green public procurement and waste enforcement.

One of the first actions to be taken was the development of the Whole of Government Circular Economy Strategy 2022-2023 'Living More, Using Less' (2021)¹⁴ to set a course for Ireland to transition across all sectors and at all levels of Government toward circularity and was issued in December 2021. It is anticipated that the Strategy will be updated in full every 18 months to 2 years.

The Circular Economy and Miscellaneous Provisions Act 2022¹⁵ was signed into law in July 2022. The Act underpins Ireland's shift from a "take-make-waste" linear model to a more sustainable pattern of production and consumption, that retains the value of resources in our economy for as long as possible and that will to significantly reduce our greenhouse gas emissions. The Act defines Circular Economy for the first time in Irish law, incentivises the use of recycled and reusable alternatives to wasteful, single-use disposable packaging, introduces a mandatory segregation and incentivised charging regime for commercial waste, streamlines the national processes for End-of-Waste and By-Products decisions, tackling the delays which can be encountered by industry, and supporting the availability of recycled secondary raw materials in the Irish market, and tackles illegal fly-tipping and littering.

Since 1998, the Environmental Protection Agency (EPA) has produced periodic '*National Waste (Database) Reports*'¹⁶ detailing, among other things, estimates for household and commercial (municipal) waste generation in Ireland and the level of recycling, recovery and disposal of these materials. The *2020 National Waste Statistics web resource*, which is the most recent study published, along with the national waste statistics web resource (December 2022) reported the following key statistics for 2020:

- **Generated** – Ireland produced 3,210,220 t of municipal waste in 2020. This is a 4% increase since 2019. This means that the average person living in Ireland generated 645 kg of municipal waste in 2020.
- **Managed** – Waste collected and treated by the waste industry. In 2020, a total of 3,180,620 t of municipal waste was managed and treated.
- **Unmanaged** – Waste that is not collected or brought to a waste facility and is, therefore, likely to cause pollution in the environment because it is burned, buried or dumped. The EPA estimates that 29,600 t was unmanaged in 2020.
- **Recovered** – The amount of waste recycled, used as a fuel in incinerators, or used to cover landfilled waste. In 2020, around 84% of municipal waste was recovered – an increase from 83% in 2019.
- **Recycled** – The waste broken down and used to make new items. Recycling also includes the breakdown of food and garden waste to make compost. The recycling rate in 2020 was 41%, which is up from 37% in 2019.
- **Disposed** – 16% of municipal waste was landfilled in 2020. This is an increase from 15% in 2019.

2.2 Regional Level

The proposed development is located in the Local Authority area of Dublin City Council (DCC).

The *EMR Waste Management Plan 2015 – 2021* is the regional waste management plan for the DCC area published in May 2015. A new *National Waste Management Plan* is expected to be published in 2023 and will supersede the three current regional waste management plans in Ireland.

The current regional plan sets out the following strategic targets for waste management in the region:

- A 1% reduction per annum in the quantity of household waste generated per capita over the period of the plan;
- Achieve a recycling rate of 50% of managed municipal waste by 2020; and
- Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices.

Municipal landfill charges in Ireland are based on the weight of waste disposed. In the Leinster Region, charges are approximately €130 - €150 per tonne of waste which includes a €75 per tonne landfill levy specified in the *Waste Management (Landfill Levy) Regulations 2012*.

The *Dublin City Development Plan 2022 – 2028* sets out a number of policies and objectives for Dublin City in line with the objectives of the National climate action policy and emphasises the need to take action to address climate action across all sectors of society and the economy. In the waste sector, policy on climate action is focused on a shift towards a 'circular economy' encompassing three core principles: designing out waste and pollution; keeping products and material in use; and regenerating natural

systems. Further policies and objectives can be found within the draft development plan.

Policies:

- CA7 F: *minimising the generation of site and construction waste and maximising reuse or recycling.*
- CA22: *The Circular economy: To support the shift towards the circular economy approach as set out in 'a Waste Action Plan for a Circular Economy 2020 to 2025, Ireland's National Waste Policy, or as updated.*
- CA23: *To have regard to existing Best Practice Guidance on Waste Management Plans for Construction and Demolition Projects as well as any future updates to these guidelines in order to ensure the consistent application of planning requirements.*
- SI27: *Sustainable Waste Management: To support the principles of the circular economy, good waste management and the implementation of best practice in relation to waste management in order for Dublin City and the Region to become self-sufficient in terms of resource and waste management and to provide a waste management infrastructure that supports this objective.*
- SI30: *To require that the storage and collection of mixed dry recyclables, organic and residual waste materials within proposed apartment schemes have regard to the Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities 2018 (or and any future updated versions of these guidelines produced during the lifetime of this plan).*

Objectives:

- SIO14 *Local Recycling Infrastructure: To provide for a citywide network of municipal civic amenity facilities/ multi-material public recycling and reuse facilities in accessible locations throughout the city in line with the objectives of the circular economy and 15 minute city.*
- SIO16 *Eastern-Midlands Region Waste Management Plan: To support the implementation of the Eastern-Midlands Regional Waste Management Plan 2015–2021 and any subsequent plans in order to facilitate the transition from a waste management economy towards a circular economy.*

2.3 Legislative Requirements

The primary legislative instruments that govern waste management in Ireland and applicable to the project are:

- Waste Management Act 1996 as amended.
- Environmental Protection Agency Act 1992 as amended;
- Litter Pollution Act 1997 as amended and
- Planning and Development Act 2000 as amended ¹⁷
- Circular Economy and Miscellaneous Provisions Act 2022.

These Acts and subordinate Regulations enable the transposition of relevant European Union Policy and Directives into Irish law.

One of the guiding principles of European waste legislation, which has in turn been incorporated into the *Waste Management Act 1996* as amended and subsequent Irish legislation, is the principle of “*Duty of Care*”. This implies that the waste producer is responsible for waste from the time it is generated through until its legal disposal (including its method of disposal.) As it is not practical in most cases for the waste producer to physically transfer all waste from where it is produced to the final disposal area, waste contractors will be employed to physically transport waste to the final waste disposal site.

It is therefore imperative that the residents, tenants, staff and the proposed facilities management company (s) undertake on-site management of waste in accordance with all legal requirements and employ suitably permitted/licenced contractors to undertake off-site management of their waste in accordance with all legal requirements. This includes the requirement that a waste contractor handle, transport and reuse/recover/recycle/dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

A collection permit to transport waste must be held by each waste contractor which is issued by the National Waste Collection Permit Office (NWCPO). Waste receiving facilities must also be appropriately permitted or licensed. Operators of such facilities cannot receive any waste, unless in possession of a Certificate of Registration (COR) or waste permit granted by the relevant Local Authority under the *Waste Management (Facility Permit & Registration) Regulations 2007* as amended or a waste or IED (Industrial Emissions Directive) licence granted by the EPA. The COR/permit/licence held will specify the type and quantity of waste able to be received, stored, sorted, recycled, recovered and/or disposed of at the specified site.

2.3.1 Dublin City Council Waste Management Bye-Laws

The DCC “Dublin City Council (Storage, Presentation and Segregation of Household and Commercial Waste) Bye-Laws (2018)” were brought into force in May 2019. These bye-laws repeal the previous Bye-Laws for the Storage, Presentation and Collection of Household and Commercial Waste. The bye-laws set a number of enforceable requirements on waste holders with regard to storage, separation and presentation of waste within the DCC administrative area. Key requirements under these bye-laws of relevance to the operational phase of the Development include the following:

- Kerbside waste presented for collection shall not be presented for collection earlier than 5.00 pm on the day immediately preceding the designated waste collection day;
- All containers used for the presentation of kerbside waste and any uncollected waste shall be removed from any roadway, footway, footpath or any other public place no later than 10:00 am on the day following the designated waste collection day, unless an alternative arrangement has been approved in accordance with bye-law 2.3;
- Documentation, including receipts, is obtained and retained for a period of no less than one year to provide proof that any waste removed from the premises has been managed in a manner that conforms to these bye-laws, to the Waste Management Act and, where such legislation is applicable to that person, to the European Union (Household Food Waste and Bio-Waste) Regulations 2015; and
- Adequate access and egress onto and from the premises by waste collection vehicles is maintained.

The full text of the bye-laws is available from the DCC website.

2.4 **Regional Waste Management Service Providers and Facilities**

Various contractors offer waste collection services for the commercial sectors in the DCC region. Details of waste collection permits (granted, pending and withdrawn) for the region are available from the NWCPO.

As outlined in the regional waste management plan, there is a decreasing number of landfills available in the region. Only three municipal solid waste landfills remain operational and are all operated by the private sector. There are a number of other licensed and permitted facilities in operation in the region including waste transfer stations, hazardous waste facilities and integrated waste management facilities. There

are two existing thermal treatment facilities, one in Duleek, Co. Meath and a second facility in Poolbeg in Dublin.

There is a DCC Recycling Centre at Shamrock Terrace, North Strand, located c.1.22 km to the south-east of the Development Site, which can be utilised by the residents of the proposed Development for other household waste streams while a bottle bank can be found c. 780 m to the north west at the Drumcondra Road Upper Tesco.

A copy of all CORs and waste permits issued by the Local Authorities are available from the NWCPO website and all waste/IE licenses issued are available from the EPA.

3.0 DESCRIPTION OF THE PROJECT

3.1 Location, Size and Scale of the Development

3.2 The proposed development will consist of the redevelopment of the site to provide for a new hospital building, providing mental health services, provision of 9 no. residential buildings (Blocks A, B, C, D-E, F, G, H, J, and L), community facilities, and public open space. The proposed building heights range from 2 to 13 storeys. The residential development includes a total of 811 no. residential units, including 494 no. standard designed apartments (SDA) and 317 no. Build to Rent (BTR) apartments, with a mix of 18 no. studio units, 387 no. 1 bed units, 349 no. 2 bed units and 57 no. 3 bed units. The development includes the partial demolition and change of use, including associated alterations, of the existing hospital building (part protected structure under RPS Ref.: 2032), to provide residential amenity areas, a gym, a café, co-working space, a community library, a childcare facility, and a community hall (referred to as Block K). The development also includes additional residential amenities and facilities, a retail unit and a café. The proposed development includes for the demolition of existing structures on site, including extensions of and buildings within the curtilage of the existing hospital buildings under RPS Ref.: 2032, and other existing buildings and ancillary structures on the site; and the change of use, refurbishment and alterations of a number of buildings and protected structures on the site including Brooklawn (RPS Ref.: 8789), Richmond House (RPS Ref.: 8788), the Laundry building and Rose Cottage. See public notices for the detailed description.

Typical Waste Categories

The typical non-hazardous and hazardous wastes that will be generated at the proposed development will include the following:

- Dry Mixed Recyclables (DMR) - includes waste paper (including newspapers, magazines, brochures, catalogues, leaflets), cardboard and plastic packaging, metal cans, plastic bottles, aluminium cans, tins and Tetra Pak cartons;
- Organic waste – food waste and green waste generated from internal plants/flowers;
- Glass; and
- Mixed Non-Recyclable (MNR)/General Waste.

In addition to the typical waste materials that will be generated at the development on a daily basis, there will be some additional waste types generated in small quantities which will need to be managed separately including:

- Green/garden waste may be generated from internal plants or external landscaping;
- Batteries (both hazardous and non-hazardous);

- Waste electrical and electronic equipment (WEEE) (both hazardous and non-hazardous);
- Printer cartridges/toners;
- Chemicals (paints, adhesives, resins, detergents, etc.) ;
- Light bulbs (Fluorescent Tubes, Long Life, LED and Lilament bulbs);
- Textiles (rags);
- Waste cooking oil (if any generated by the residential and commercial tenants);
- Furniture (and from time to time other bulky wastes);
- Abandoned bicycles; and
- Medical Waste.

3.2.1 Healthcare Waste from the Mental Health Facility

Healthcare waste is defined in the HSE and DOHC *Healthcare Risk Waste Management* publication as “solid or liquid waste arising from healthcare”. Waste materials generated will fall into two main categories, namely healthcare non-risk waste (i.e. non-clinical healthcare waste) and healthcare risk waste (hazardous) as illustrated in Figure 3.1. Hazardous waste has been further subdivided in this plan into non-clinical hazardous waste and clinical/risk waste.

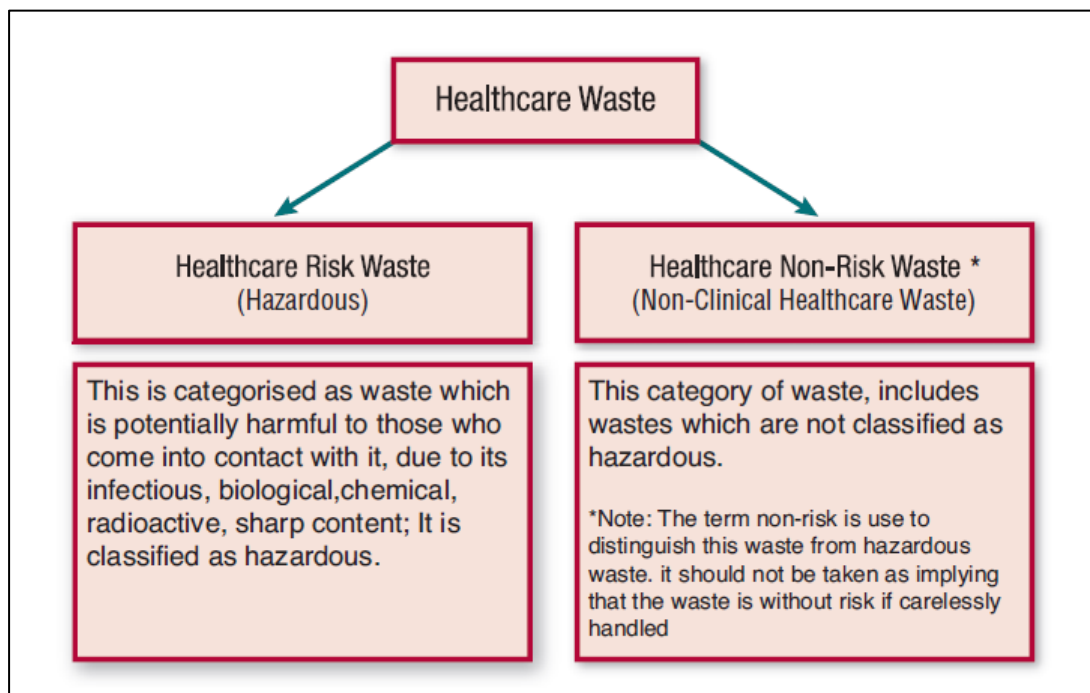


Figure 3.1 Healthcare Waste Categories (Source: HSE, *Waste Management Awareness Handbook* (2001))

Non-Risk/Non-Clinical Non-Hazardous Waste

The typical non-risk/non-clinical non-hazardous waste streams that will be generated will include the following typical waste categories:

- Dry Mixed Recyclables (DMR) – includes cardboard, non-confidential paper, newspaper, leaflets plastic packaging and bottles, aluminium cans, tins and Tetra Pak cartons;
- Confidential paper;
- Mixed Non-Recyclable /General Waste (MNR);
- Organic (food/catering) waste; and
- Glass.

In addition to the typical non-risk/non-clinical non-hazardous waste materials that will be generated on a daily basis, there will be some additional wastes generated on a regular basis that will need to be managed separately including:

- Green/garden waste from landscaping activities;
- Textiles;
- Batteries (non-hazardous) *note: hazardous batteries may also be generated which are referred to in Section 3.2.2;*
- WEEE including computers, printers and other ICT equipment (non-hazardous) *note: WEEE containing hazardous components may also be generated which are referred to in Section 3.2.2;* and
- Furniture (and from time to time other bulky wastes).

Non-Clinical Hazardous Waste

The typical non-clinical hazardous waste streams that will be generated will include the following:

- Printer/toner cartridges;
- Batteries (hazardous) *note: non-hazardous batteries may also be generated which are referred to in Section 3.2.1;*
- WEEE including computers, printers and other ICT equipment (containing hazardous components) *note: WEEE not containing hazardous components may also be generated which are referred to in Section 3.2.1;*
- Cleaning chemicals (solvents, pesticides, paints, adhesives, resins, detergents, etc.); and
- Light bulbs (Long Life, LED and Lilament bulbs).

Healthcare Risk Waste (Hazardous)

Healthcare risk waste will be generated from the treatment of residents. Figure 3.2 shows the classification and colour coding of healthcare risk waste as presented in the HSE guidance document.

Not all of the waste types listed in Figure 3.2 will be generated at the Mental Health Facility as the centre will provide care services only and will not carry out significant surgical procedures or cancer care services.

The healthcare risk waste generated at the care centre will comprise waste disposed of in yellow bags (such as dressings, swabs, bandages, gloves, nappies etc.) and yellow sharps buckets (for waste such as needles, syringes, razors, stitch cutters etc.).

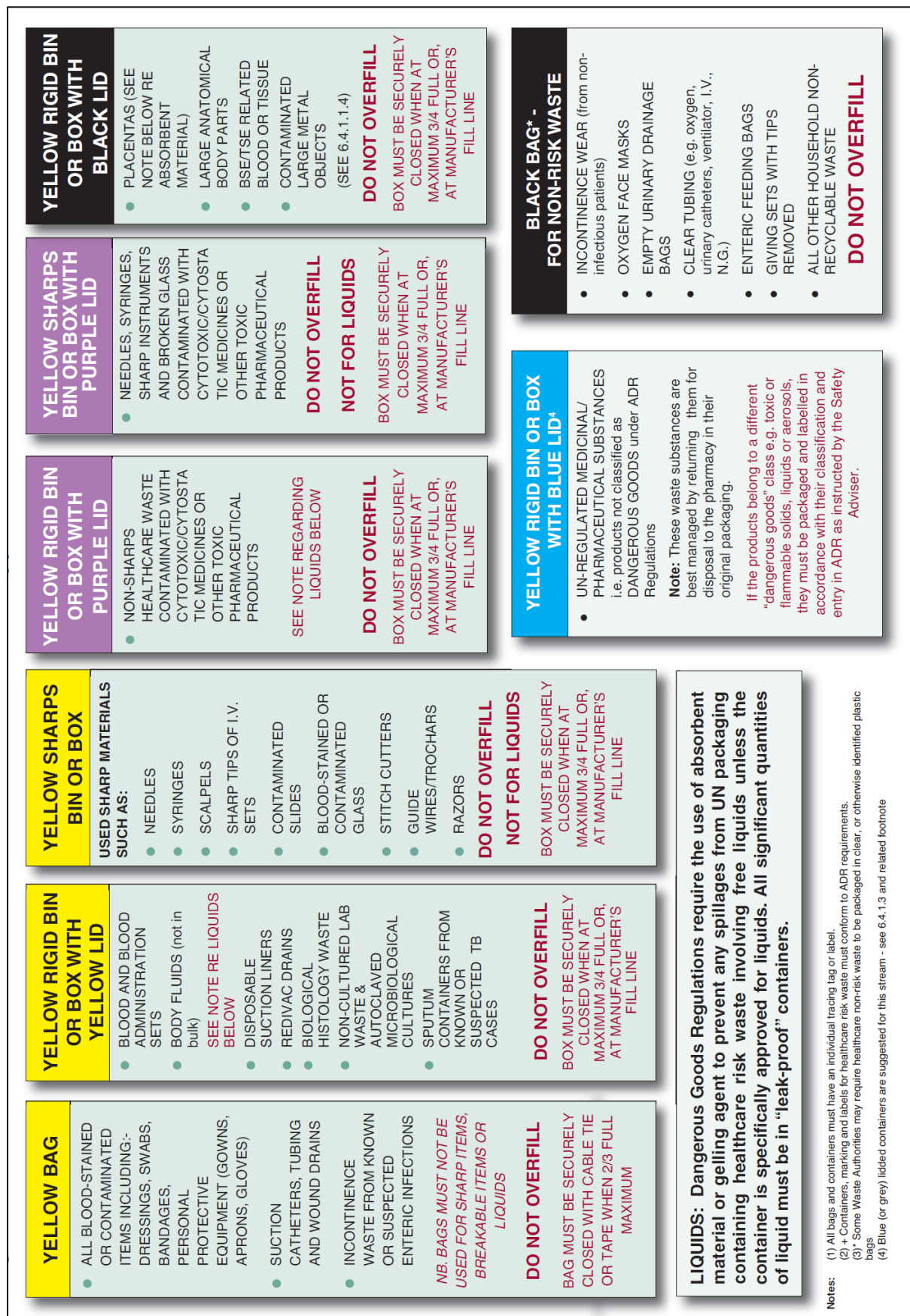


Figure 3.2 Segregation of Healthcare Risk Waste (Source: HSE and DOHC, *Healthcare Risk Waste Management* (2010) and HSE, *Waste Management Awareness Handbook* (2011))

Wastes should be segregated into the above waste types to ensure compliance with waste legislation and guidance while maximising the re-use, recycling and recovery of waste with diversion from landfill wherever possible.

3.3 European Waste Codes

In 1994, the *European Waste Catalogue*¹⁸ and *Hazardous Waste List*¹⁹ were published by the European Commission. In 2002, the EPA published a document titled the *European Waste Catalogue and Hazardous Waste List*²⁰, which was a condensed version of the original two documents and their subsequent amendments. This document has recently been replaced by the EPA 'Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous'²¹ which became valid from the 1st June 2015. This waste classification system applies across the EU and is the basis for all national and international waste reporting, such as those associated with waste collection permits, COR's, permits and licences and EPA National Waste Database.

Under the classification system, different types of wastes are fully defined by a code. The List of Waste (LoW) code (also referred to as European Waste Code or EWC) for typical waste materials expected to be generated during the operation of the proposed development are provided in Table 3.1 below.

Waste Material	LoW/EWC Code
Paper and Cardboard	20 01 01
Plastics	20 01 39
Metals	20 01 40
Mixed Non-Recyclable Waste	20 03 01
Glass	20 01 02
Biodegradable Kitchen Waste	20 01 08
Oils and Fats	20 01 25
Textiles	20 01 11
Batteries and Accumulators *	20 01 33* - 34
Printer Toner/Cartridges*	20 01 27* - 28
Green Waste	20 02 01
WEEE *	20 01 35*-36
Chemicals (solvents, pesticides, paints & adhesives, detergents, etc.) *	20 01 13*/19*/27*/28/29*30
Fluorescent tubes and other mercury containing waste *	20 01 21*
Bulky Wastes	20 03 07

* Individual waste type may contain hazardous materials

Table 3.1 Typical Waste Types Generated and LoW Codes

4.0 ESTIMATED WASTE ARISING

A waste generation model (WGM) developed by AWN, has been used to predict waste types, weights and volumes arising from operations within the proposed development. The WGM incorporates building area and use and combines these with other data including Irish and US EPA waste generation rates.

The estimated quantum/volume of waste that will be generated from the residential units and the mental care facility has been determined based on the predicted occupancy of the units and floor area of the shared spaces, while waste generation estimates for the mental care facility, co-working office, retail, café and gym units is based on the floor area.

The estimated waste generation for the development for the main waste types is presented in Table 4.1, 4.2 & 4.3.

Waste Type	Waste Volume (m ³ / week)			
	Block A (combined)	Block B (combined)	Block C (combined)	Block DE (combined)
Organic Waste	0.85	1.20	1.19	3.02
DMR	6.06	8.52	8.43	21.42
Glass	0.17	0.23	0.23	0.58
MNR	3.19	4.48	4.43	11.26
Total	10.27	14.43	14.29	36.29

Table 4.1 Estimated waste generation for the Residential units.

Waste Type	Waste Volume (m ³ / week)			
	Block F (combined)	Block G (combined)	Block H (combined)	Block J (combined)
Organic Waste	1.79	2.04	0.45	0.19
DMR	12.70	14.44	3.18	1.34
Glass	0.35	0.39	0.09	0.04
MNR	6.68	7.59	1.67	0.70
Total	21.52	24.46	5.39	2.26

Table 4.2 Estimated waste generation for the Residential units.

Waste Type	Waste Volume (m ³ / week)			
	Block L (combined)	Mental Health Facility & Associated Buildings	Block K Commercial Combined (Café/Creche/C o-working/Gym)	Brooklawn Building
Organic Waste	1.28	0.26	0.47	0.03
DMR	9.07	1.62	5.58	0.56
Glass	0.25	0.07	0.22	<0.01
MNR	4.77	0.71	4.68	0.24
Confidential Paper	-	-	0.36	0.10
Medical/Biological Waste	-	0.77	-	-
Medical Waste (Sharps)	-	0.04	-	-
Total	15.37	7.21	11.31	0.94

Table 4.3 Estimated Waste Generation for the proposed residential and commercial units.

Waste Type	Waste Volume (m ³ / week)		
	Richmond House	Rose Cottage	Laundry Building
Organic Waste	0.03	0.01	0.05
DMR	0.89	0.30	0.89
Glass	0.01	<0.01	0.02
MNR	0.38	0.13	0.37
Confidential Paper	0.16	0.06	-
Total	1.49	0.50	1.34

Table 4.4 Estimated Waste Generation for the proposed commercial units.

The BS5906:2005 Waste Management in Buildings – Code of Practice ¹⁸ was considered in the estimations of the waste arising. It has been assumed that hotel, retail and café units will generate similar waste volumes over a seven-day period, while the office will operate over a five-day period.

5.0 WASTE STORAGE AND COLLECTION

This section provides information on how waste generated within the development will be stored and how the waste will be collected from the development. This has been prepared with due consideration of the proposed site layout as well as best practice standards, local and national waste management requirements including those of DCC. In particular, consideration has been given to the following documents:

- *BS 5906:2005 Waste Management in Buildings – Code of Practice;*
- *EMR Waste Management Plan 2015 – 2021;*
- *Dublin City Council Development Plan 2022 – 2028;*
- *DCC Dublin City Council (Storage, Presentation and Segregation of Household and Commercial Waste) Bye-Laws (2018);*
- The Department of Housing, Local Government and Heritage. (DoHLGH), *Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities (2020)* ²².
- DoHLGH, *Design Manual for Urban Roads and Streets (2022)* ²³

Waste Storage Areas

Locations of all Waste Storage Areas (WSAs) can be viewed on the drawings submitted with the planning application under Section 4.12 of the Site Servicing in the Scott Tallon Walker Design Statement and in Appendix A of this report.

The waste receptacles from the residential WSAs and commercial WSAs will be collected by facilities management or the waste contractor (agreement dependant), at the time of collection and brought through the development, to the staging areas, within the development redline boundary.

The staging/collection areas are such that it will not obstruct traffic or pedestrians (allowing a footway path of at least 1.8m, the space needed for two wheelchairs to pass each other) as is recommended in the Design Manual for Urban Roads and Streets (2022).

Using the estimated waste generation volumes in Tables 4.1, above, the waste receptacle requirements for MNR, DMR, organic waste, glass and medical waste have been established for the WSA.

Waste Storage Requirements

It is envisaged that DMR, MNR, organic waste, glass and all medical waste will be collected on a weekly basis

Using the predicted waste generation volumes presented in Table 4.1 and 4.2 waste receptacle requirements have been established for the WSAs. This is presented below in Table 5.1.

Area/Use	Bins Required				
	MNR ¹	DMR ²	Organic	Glass	Medical
Residential Block A (combined)	3 x 1100L	6 x 1100L	4 x 240L	1 x 240L	-
Residential Block B (combined)	4 x 1100L	8 x 1100L	5 x 240L	1 x 240L	-
Residential Block C (combined)	4 x 1100L	8 x 1100L	5 x 240L	1 x 240L	-

Area/Use	Bins Required				
	MNR ¹	DMR ²	Organic	Glass	Medical
Residential Block DE (combined)	11 x 1100L	20 x 1100L	13 x 240L	3 x 240L	-
Residential Block F (combined)	7 x 1100L	12 x 1100L	8 x 240L	2 x 240L	-
Residential Block G (combined)	7 x 1100L	14 x 1100L	9 x 240L	2 x 240L	-
Residential Block H (combined)	2 x 1100L	3 x 1100L	2 x 240L	1 x 240L	-
Residential Block J (combined)	1 x 1100L	2 x 1100L	1 x 240L	1 x 240L	-
Residential Block L (combined)	5 x 1100L	9 x 1100L	6 x 240L	1 x 240L	-
Mental Health Facility & Laundry Building	3 x 1100L	5 x 1100L	2 x 240L	1 x 120L	Roll Cage 770L
Block K Commercial Combined (Café/Creche/Co-working/Gym)	5 x 1100L	5 x 1100L	2 x 240L	1 x 240L	-
Brooklawn Building	1 x 240L	1 x 1100L	1 x 120L	1 x 120L	-
Richmond House	2 x 240L	1 x 1100L	1 x 120L	1 x 120L	-
Rose Cottage	1 x 240L	2 x 240L	1 x 120L	1 x 120L	-

Note: ¹ = Mixed Non-Recyclables

² = Dry Mixed Recyclables

Table 5.1 Waste storage requirements for the proposed development

The waste receptacle requirements have been established from distribution of the total weekly waste generation estimate into the holding capacity of each receptacle type.

Waste storage receptacles as per Table 5.1 above (or similar appropriate approved containers) will be provided by the Hospital, facilities management company, or the tenants in the WSAs depending on the agreement.

As outlined in the current Dublin City Development Plan, it is preferable to use 1,100 litre wheelie bins for waste storage, where practical. However, in the case of organic and glass waste, it is considered more suitable to use smaller waste receptacles due to the weight of bins when filled with organic and glass waste. The use of 240 & 120 litre bins as recommended in Table 5.1 will reduce the manual handling impacts on the facilities management personnel and waste contractor employees.

The types of bins used will vary in size, design and colour dependent on the appointed waste contractor. However, examples of typical receptacles to be provided in the WSA are shown in Figure 5.1. All waste receptacles used will comply with the SIST EN 840-1:2020 and SIST EN 840-2:2020 as the standards for performance requirements of mobile waste containers, where appropriate.



Figure 5.1 Typical waste receptacles of varying size (240L and 1100L)

Facilities management may use a commercially available mini compactor for the DMR and MNR waste streams in the residential WSA (s), referred to as an Epac compactor in this OWMP.

This option will significantly reduce the volume of waste and as such the number of bins stored on site and the number of bins that will need to be transported for collection. It compresses/compacts the waste into 2m³ and 3m³ bags.

Alternative options can be considered in future by the facilities management company, as technologies are developed. Solely for the purpose of ensuring the residential WSA is sufficiently sized to accommodate bins which take up more space.

The Epac compactor referred to is a compactor that compresses/compacts the waste into 2m³ and 3m³ skip bags (also called Flexible Intermediate Bulk Containers or FIBCs). A photo of the Epac mini compactor is provided as Figure 5.2.

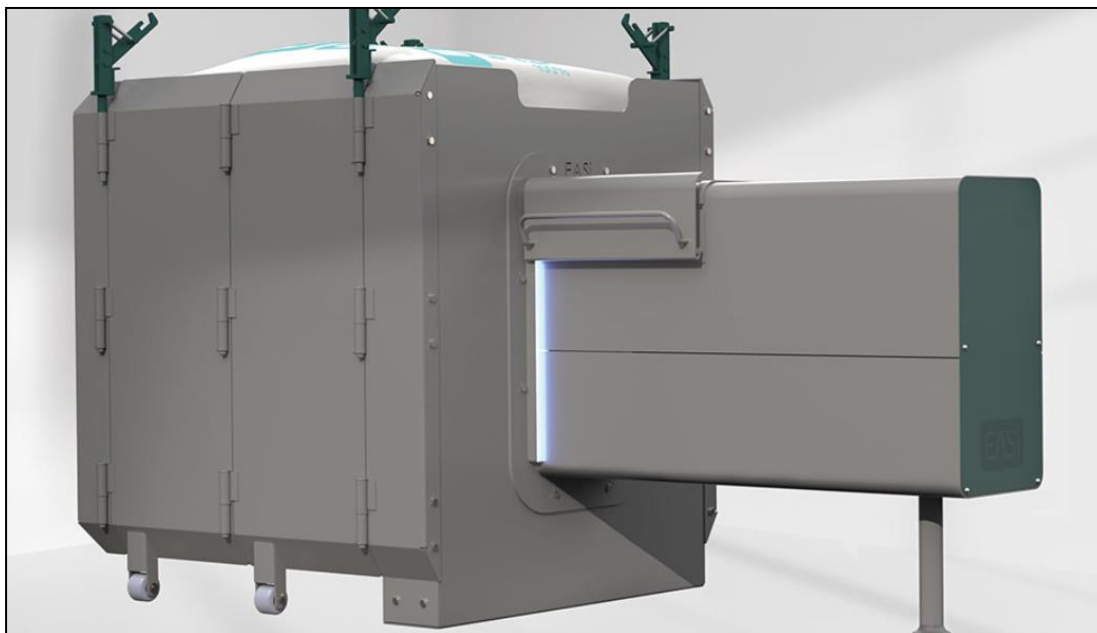


Figure 5.2 Photo of an Epac Mini Compactor (Source: bnmrecycling Website)

Receptacles for organic, mixed dry recyclable, glass and mixed non-recyclable waste will be provided in the WSA's prior to first occupation of the development i.e. prior to the first residential or commercial unit being occupied.

This Plan or a revised operational manual will be provided to each tenant from first occupation of the development i.e. once the first unit is occupied. This Plan will be

supplemented, as required, by the property management company with any new information on waste segregation, storage, reuse and recycling initiatives that are subsequently introduced.

5.1 Waste Storage – Residential Units

Residents will be required to segregate waste into the following main waste streams:

- DMR;
- MNR;
- Glass; and
- Organic waste.

Residents will be required to take their segregated waste materials to their designated WSA and deposit their segregated waste into the appropriate bins. The location of the WSAs are illustrated in the drawings submitted with the planning application under separate cover.

Provision will be made in all residential units to accommodate 3 no. bin types to facilitate waste segregation at source. An example of a potential 3 bin storage system is provided in figure 5.3 below.



Figure 5.3 Example three bin storage system to be provided within the unit design

Each bin / container in the WSAs will be clearly labelled and colour coded to avoid cross contamination of the different waste streams. Signage will be posted above or on the bins to show exactly which waste types can be placed in each bin.

Access to the residential WSAs will be restricted to authorised residents, facilities management and waste contractors by means of a key or electronic fob access.

Other waste materials such as textiles, cooking oil, bulky objects, batteries, printer toner / cartridges, light bulbs and WEEE may be generated infrequently by the residents. Residents will be required to identify suitable temporary storage areas for these waste items within their own units and dispose of them appropriately. Further details on additional waste types can be found in Section 5.6.

5.2 Waste Storage – Co-Working Office, Brooklawn, Richmond House & Rose Cottage

The office tenant(s) will be required to segregate waste within the development into the following main waste types:

- DMR;
- MNR;
- Cardboard;
- Paper (confidential);
- Organic waste; and
- Glass.

Personnel nominated by the office tenant(s) will empty the bins in the Area Waste Station (AWS), as required, and bring the segregated waste using trolleys/carts/bins to the shared commercial WSAs located on ground level (co-working office) or own designated WSAs (Brooklawn, Richmond House & Rose Cottage).

The offices will be occupied by multiple tenants. It is recommended that the office tenants implement the 'binless office' concept where employees do not have bins located under desks and instead bring their waste to AWSs located strategically on the office floors, at print stations/rooms and at any micro kitchens or tea stations which may be provided within the tenants office space. Experience has shown that the maximum travel distance should be no more than 15m from the employee's desk to the AWS. This 'best in class' concept achieves maximum segregation of waste in an office setting.

Typically, an AWS would include a bin for DMR and a bin for MNR. It is recommended that a confidential paper bin with a locked lid/door should also be provided for at each AWS and/or adjacent to photocopy/printing stations, as required. In addition, it is recommended that organic and glass bins should be provided at any micro kitchens or tea stations, where appropriate.

A printer cartridge/toner bin should be provided at the print/copy stations, where appropriate.

It is recommended that all bins/containers should be clearly labelled, and colour coded to avoid cross contamination of the different waste streams. Signage should be posted on or above the bins to show which wastes can be put in each bin.

The binless office concept, in addition to assisting in maximising recycling rates and minimising associated landfill disposal costs, also has the advantage of substantially reducing cleaning costs, as cleaners visit only the AWSs on each floor, as opposed to each desk.

Suppliers for the tenants should be requested by the tenants to make deliveries in reusable containers, minimize packaging and/or to remove any packaging after delivery where possible, to reduce waste generated by the development.

It is proposed that confidential paper waste will be managed separately to non-confidential paper waste. Tenants will be required to engage with an appropriately permitted/licenced confidential waste management contractor for collection and shredding of confidential paper. It is anticipated that tenants will place locked confidential waste paper bins as required throughout their office areas. The confidential waste company will typically collect bins directly from the office areas, under agreement with the tenant, and bring the locked bin or bags of confidential waste via the lifts to their collection truck. It is envisaged that confidential paper waste will be shredded on-site in the dedicated collection truck.

Access to the WSAs will be restricted to authorised tenants, facilities management and waste contractors by means of a key or electronic fob access.

Other waste materials such as textiles, batteries, printer toner/cartridges and WEEE will be generated less frequently. Tenants will be required to find space within their own units for the temporary storage of these items pending collection by a suitable waste contractor. Facilities management may arrange collection depending on the agreement. Further details on additional waste types can be found in Section 5.6.

5.3 Waste Storage – Retail/Café/Gym/Creche (Commercial)

The tenants will be required to segregate waste within their unit, into the following main waste types:

- DMR;
- MNR;
- Organic waste; and
- Glass.

The tenants will take their waste to their allocated commercial waste store, at ground level at Block K.

Suppliers for the tenants should be requested by the tenants to make deliveries in reusable containers, minimize packaging or to remove any packaging after delivery where possible, to reduce waste generated by the development.

If any kitchens/food preparation areas are allocated in unit areas, this will contribute a significant portion of the volume of waste generated on a daily basis, and as such it is important that adequate provision is made for the storage and transfer of waste from these areas to the WSAs.

If kitchens are required it is anticipated that waste will be generated in kitchens throughout the day, primarily at the following locations:

- Food Storage Areas (i.e. cold stores, dry store, freezer stores and stores for decanting of deliveries);
- Meat Preparation Area;
- Vegetable Preparation Area;
- Cooking Area;

Small bins will be placed adjacent to each of these areas for temporary storage of waste generated during the day. Waste will then be transferred from each of these areas to the appropriate retail/commercial WSA.

All bins/containers in the tenant's areas as well as in the WSAs will be clearly labelled and colour coded to avoid cross contamination of the different waste streams. Signage will be posted above or on the bins to show exactly which wastes can be put in each.

Other waste materials such as batteries, printer cartridges, bulky waste and WEEE will be generated less frequently. Space will have to be allowed for in the tenants unit for storage of these waste types as required. Other waste types will be collected on an as required basis. Collection may be arranged by facilities management or the tenant depending on the agreement. Further details on additional waste types can be found in Section 5.6.

5.4 Waste Storage – Mental Health Facility & Laundry Building

The operator will be required to segregate their waste within the development into the following main waste types:

- DMR;
- MNR;
- Organic waste;
- Glass; and
- Medical.

The nominated personnel will bring the segregated waste materials to the appropriate WSA located at ground floor level. Space will be provided in residents rooms to accommodate bins where practical to facilitate waste segregation (including a sanitary waste bin).

Suppliers for the development should be requested by the operator(s) to make deliveries in reusable containers, minimize packaging or to remove any packaging after delivery where possible, to reduce waste generated by the development.

Signage should be erected above internal bins and in the main WSAs to identify what waste types should be placed into each bin as appropriate. Bins/containers should be labelled and colour coded to avoid cross contamination of the different waste streams.

The majority of waste materials collected in bins in the rooms, common areas etc. will not be segregated and will be managed as MNR waste. House-keeping and Facility cleaning staff will segregate waste, where possible, during cleaning by using segregated containers on their cleaning trolleys. Waste will be transferred from the cleaning carts to the appropriate bins in the WSA via the lifts and internal passageways.

The kitchen in the Mental Health Facility will contribute a significant portion of the volume of waste generated on a daily basis, and as such it is important that adequate provision is made for the storage and transfer of waste from these areas to the WSA.

It is anticipated that waste will be generated in the kitchens throughout the day, primarily at the following locations:

- Food Storage Areas (i.e. cold stores, dry store, freezer stores and stores for decanting of deliveries);
- Meat Preparation Area;
- Vegetable Preparation Area;
- Cooking Area; and
- Dish-wash and Glass-wash Area;

Small bins will be placed adjacent to each of these areas as required for temporary storage of waste generated during the day. Waste will then be transferred from each of these areas to the WSAs and placed into the segregated bins as detailed in Table 5.1.

All bins/containers in the kitchen areas as well as in the WSAs will be clearly labelled and colour coded to avoid cross contamination of the different waste streams. Signage will be posted above or on the bins to show exactly which wastes can be put in each.

Appropriate colour coded, labelled and secured receptacles will be required for healthcare risk waste generated in the building as set out in the HSE, *Waste Management Awareness Handbook* (and illustrated in Figure 3.2). The required healthcare risk waste receptacles will be:

- Yellow bags (stored in rigid bins e.g. 1100L bin)
- Yellow rigid buckets with yellow lid

These waste receptacles will be stored in designated treatment rooms or storage rooms. This room should have at least sharps boxes and the 1 no. 770 litre yellow clinical waste bin stored in the main waste store.

In addition, clinical waste bags and sharps buckets may be temporarily transferred to utility stores located across the unit during the day prior to transfer to the medical waste room. Where required, these temporary storage locations should have 60/80 litre pedal bins for yellow risk waste bags and shelf storage for sharps buckets.

Other waste materials such as textiles, batteries, printer toner / cartridges, light bulbs, cooking oil, green waste, chemicals, bulky items and WEEE will be generated less frequently by residents and management. Alternative storage areas will be allocated within the Facility operator's own unit to store these items until a licensed waste collector is arranged to collect it. Facilities management may arrange collection, depending on the agreement. Further details on additional waste types can be found in Section 5.6.

5.5 Waste Collection

There are numerous private contractors that provide waste collection in the Dublin City Council area.

All waste contractors servicing the proposed development must hold a valid waste collection permit for the specific waste types collected. All waste collected must be transported to registered/permitted/licensed facilities only.

Waste will be taken to the nearest waste staging point by facilities management, to await the waste contractor. Facilities management may avail to a mechanical aid in the form of a manual or electronic tug machine to assist with the movement of bins. Travel paths for bins to staging areas can be found under Section 4.12 of the Site Servicing in our Design Statement and in Appendix A of this report.

The waste receptacles from the WSAs will be collected by facilities management, immediately prior to collection and brought to where the bins will be staged temporarily awaiting collection. The staging areas are such that they will not obstruct traffic or pedestrians (allowing a footway path of at least 1.8m, the space needed for two wheelchairs to pass each other) as is recommended in the *Design Manual for Urban Roads and Streets* (2022) ²⁴.

All residents and tenants should be made aware of the waste collection arrangements and all waste receptacles must be clearly identified and maintained in good condition as required by waste legislation and the requirements of the DCC Waste Bye-Laws.

5.6 Additional Waste Materials

In addition to the typical waste materials that are generated on a daily basis, there will be some additional waste types generated from time to time that will need to be managed separately. A non-exhaustive list is presented below.

Green Waste

Green waste may be generated from gardens, external landscaping and internal plants / flowers. Green waste generated from landscaping of external areas will be removed by external landscape contractors. Green waste generated from gardens internal plants / flowers can be placed in the organic waste bins.

Batteries

A take-back service for waste batteries and accumulators (e.g. rechargeable batteries) is in place in order to comply with the S.I. No. 283/2014 - European Union (Batteries and Accumulators) Regulations 2014, as amended. In accordance with these regulations, consumers are able to bring their waste batteries to their local civic amenity centre or can return them free of charge to retailers which supply the equivalent type of battery, regardless of whether or not the batteries were purchased at the retail outlet and regardless of whether or not the person depositing the waste battery purchases any product or products from the retail outlet.

The commercial tenants cannot use the civic amenity centre. They must segregate their waste batteries and either avail of the take-back service provided by retailers or arrange for recycling / recovery of their waste batteries by a suitably permitted / licenced contractor. Facilities management may arrange collection, depending on the agreement.

Waste Electrical and Electronic Equipment (WEEE)

The WEEE Directive (Directive 2002/96/EC) and associated Waste Management (WEEE) Regulations have been enacted to ensure a high level of recycling of electronic and electrical equipment. In accordance with the regulations, consumers can bring their waste electrical and electronic equipment to their local recycling centre. In addition, consumers can bring back WEEE within 15 days to retailers when they purchase new equipment on a like for like basis. Retailers are also obliged to collect WEEE within 15 days of delivery of a new item, provided the item is disconnected from all mains, does not pose a health and safety risk and is readily available for collection.

As noted above, the commercial tenants cannot use the civic amenity centre. They must segregate their WEEE and either avail of the take-back / collection service provided by retailers or arrange for recycling / recovery of their WEEE by a suitably permitted / licenced contractor. Facilities management may arrange collection, depending on the agreement.

Printer Cartridge / Toners

It is recommended that a printer cartridge / toner bin is provided in the commercial unit, where appropriate. The commercial tenant will be required to store this waste within their unit and arrange for return to retailers or collection by an authorised waste contractor, as required.

Waste printer cartridge / toners generated by residents can usually be returned to the supplier free of charge or can be brought to a civic amenity centre.

Chemicals

Chemicals (such as solvents, paints, adhesives, resins, detergents, etc) are largely generated from building maintenance works. Such works are usually completed by external contractors who are responsible for the off-site removal and appropriate recovery / recycling / disposal of any waste materials generated.

Any waste cleaning products or waste packaging from cleaning products generated in the commercial units that is classed as hazardous (if they arise) will be appropriately stored within the tenants' own space. Facilities management may arrange collection, depending on the agreement.

Any waste cleaning products or waste packaging from cleaning products that are classed as hazardous (if they arise) generated by the residents should be brought to a civic amenity centre.

Light Bulbs

Waste light bulbs (fluorescent, incandescent and LED) may be generated by lighting at the commercial units. It is anticipated that commercial tenants will be responsible for the off-site removal and appropriate recovery / disposal of these wastes. Facilities management may arrange collection, depending on the agreement.

Light bulbs generated by residents should be taken to the nearest civic amenity centre for appropriate storage and recovery / disposal.

Textiles

Where possible, waste textiles should be recycled or donated to a charity organisation for reuse. Commercial and residential tenants will be responsible for disposing of waste textiles appropriately.

Waste Cooking Oil

If the commercial tenants use cooking oil, waste cooking oil will need to be stored within the unit on a bunded area or spill pallet and regular collections by a dedicated waste contractor will need to be organised as required. Under sink grease traps will be installed in any cooking space.

If the residents generate waste cooking oil, this can be brought to a civic amenity centre.

Furniture & Other Bulky Waste Items

Furniture and other bulky waste items (such as carpet, etc.) may occasionally be generated by the commercial tenant. The collection of bulky waste will be arranged, as required by the tenant. If residents wish to dispose of furniture, this can be brought to a civic amenity centre.

Abandoned Bicycles

Bicycle parking areas are planned for the development. As happens in other developments, residents sometimes abandon faulty or unused bicycles, and it can be difficult to determine their ownership. Abandoned bicycles should be donated to charity if they arise or Facilities management will arrange collection by a licensed waste contractor.

Covid-19 Waste

Any waste generated by residential and commercial tenants that have tested positive for Covid-19 should be managed in accordance with the current Covid-19 HSE Guidelines at the time that that waste arises. At the time this report was prepared, the HSE Guidelines require the following procedure for any waste from a person that tests positive for Covid-19:

- Put all waste (gloves, tissues, wipes, masks) from that person in a bin bag and tie when almost full;
- Put this bin bag into a second bin bag and tie a knot;
- Store this bag safely for 3 days, then put the bag into the non-recyclable waste / general waste wheelie bin for collection / emptying.

Please note that this guidance is likely to be updated by the time the proposed Development is open and occupied and the relevant guidance at the time will need to be reviewed.

5.7 Waste Storage Area Design

The WSAs should be designed and fitted-out to meet the requirements of relevant design standards, including:

- Be fitted with a non-slip floor surface;
- Provide ventilation to reduce the potential for generation of odours with a recommended 6-10 air changes per hour for a mechanical system for internal WSAs;
- Provide suitable lighting – a minimum Lux rating of 400 is recommended;
- Be easily accessible for people with limited mobility;
- Be restricted to access by nominated personnel only;
- Be supplied with hot or cold water for disinfection and washing of bins;
- Be fitted with suitable power supply for power washers;
- Have a sloped floor to a central foul drain for bins washing run-off;
- Have appropriate signage placed above and on bins indicating correct use;
- Have access for potential control of vermin, if required; and
- Be fitted with CCTV for monitoring.

The facilities company and commercial tenants will be required to maintain the waste storage areas in good condition as required by the DCC Waste Bye-Laws.

Access to the WSA will be restricted to authorised staff, be sufficient to allow a 1100 litre bin to pass easily into and out of the room for transfer via the walkways to the waste staging/collection zone.

In accordance with the HSE publication *National Hospital Office – National Cleaning Manual Appendices*, the following specifications are also required:

- The waste receptacle including all component parts should be clean and well-maintained with no blood or body substances, rust, dust, dirt, debris and spillages.
- Bins should be emptied as appropriate, with fresh liners fitted in accordance with local and national policy. Bags should be removed and labelled/tagged when no more than $\frac{3}{4}$ full and stored appropriately in a secure location.
- There should be an agreed schedule in operation for replacement of sani-bins in place.
- The sani-bin/nappy bin, including all component parts should be clean and well-maintained with no blood or body substances, rust, dust, dirt, debris and spillages.

The facilities management company will be required to maintain the waste storage areas in good condition as required by the DCC Waste Bye-Laws.

5.8 Facility Management Responsibilities

It shall be the responsibility of the Facilities Management Company to ensure that all domestic waste generated by apartment residents is managed to ensure correct storage prior to collection by an appropriately permitted waste management company.

Facilities Management should provide the following items to residents

- Provision of a Waste Management Plan document, prepared by the Facilities Management Company to all residential apartment units, which shall clearly state the methods of source waste segregation, storage, reuse and recycling initiatives that shall apply to the management of the development;
- Provision and maintenance of appropriate graphical signage to inform residents of their obligation to reduce waste, segregate waste and in the correct bin;
- Preparation of an annual waste management report for all residential apartment units;

- Designation of access routes to common waste storage areas to ensure safe access from the apartment units by mobility impaired persons.
- Provision of an appropriately qualified and experienced staff member, who will be responsible for all aspects of waste management at the development;
- Daily inspection of apartment waste storage areas and signing of a daily check list, which shall be displayed within the area; and
- Maintenance of a weekly register, detailing the quantities and breakdown of wastes collected from the apartment blocks and provision of supporting documentation by the waste collector to allow tracking of waste recycling rates.

Commercial units with the exclusion of the mental health facility will also receive the same documents for the commercial waste activities.

6.0 CONCLUSIONS

In summary, this OWMP presents a waste strategy that addresses all legal requirements, waste policies and best practice guidelines and demonstrates that the required storage areas have been incorporated into the design of the development.

Implementation of this OWMP will ensure a high level of recycling, reuse and recovery at the development. All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in the *EMR Waste Management Plan 2015 – 2021*.

Adherence to this plan will also ensure that waste management at the development is carried out in accordance with the requirements of the *DCC Waste Bye-Laws*.

The waste strategy presented in this document will provide sufficient storage capacity for the estimated quantity of segregated waste. The designated area for waste storage will provide sufficient room for the required receptacles in accordance with the details of this strategy.

7.0 REFERENCES

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Appendix A Waste Storage and Collection Locations Diagram

