LANDS AT THE FORMER HOLY CROSS COLLEGE, CLONLIFFE ROAD, DUBLIN 3 & DRUMCONDRA ROAD LOWER, DRUMCONDRA, DUBLIN 9

ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) VOLUME 3: APPENDICES

BSM Brady Shipman Martin
Est. 1968
Built. Environment.

Environmental Assessment **Built Environment**

Client: CWTC Multi Family ICAV acting solely in respect of its sub fund the DBTR DR1 Fund

Date: 04 July 2025

DOCUMENT CONTROL SHEET

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Project Name:	LANDS AT THE FORMER HOLY CROSS COLLEGE, CLONLIFFE ROAD, DUBLIN 3 & DRUMCONDRA ROAD LOWER, DRUMCONDRA, DUBLIN 9
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Appendix 5.1 Asbestos Survey Reports

Phoenix Environmental Safety Ltd.

ASBESTOS SURVEY REPORT

(Refurbishment / Demolition Survey)

Client: CWTC Multi Family ICAV,
C/O Hines Real Estate Ireland Ltd., Clanwilliam Place, Dublin 2

Location: Building 1 (1966 Building),
Holycross College, Clonliffe Road, Dublin 9

Date: 22nd May 2020

Report No. PE 20-198-1

Phoenix
Environmental
Safety Ltd.

Graigueswood, Freshford, Co. Kilkenny
Tel: 056 8832414
Fax: 056 8832950
admin@phoenixenv.ie
www.phoenixenv.ie

Client: CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd., Clanwilliam Place, Dublin 2

Location: Building 1 (1966 Building), Holycross College, Clonliffe Road, Dublin 9

Asbestos Survey Report Type: Refurbishment / Demolition Survey

Survey Company: Phoenix Environmental Safety Ltd.

Surveyors: John Hickey, Jane Hickey & Eoghan Hickey

Testing Laboratory: G & L Consultancy Ltd. & Phoenix Environmental Safety Ltd.

Date of Survey: 12th February 2020 & 19th May 2020

Date of Survey Report: 22nd May 2020

Report issue: Final

Signed: Jane Hickey Date: 22nd May 2020

This report cannot be used for contractual or engineering purposes unless this sheet is signed where indicated by Surveyor. The report must also be designated `final` on the signatory sheet.

Please note that Phoenix Environmental Safety Ltd. cannot be held responsible for the way in which the Client interprets or acts upon the results.

The report must be read in its entirety including any appendices. Phoenix Environmental Safety Ltd. accepts no responsibility for sub-division of this report. All measurements in this report are approximate and therefore should not be used by the asbestos removal contractor for pricing purposes. The asbestos removal contractors should ascertain for themselves, by site measurements and inspection, the exact nature and extent of the work to be done.

The survey information should be used to help in the tendering process for removal of ACMs from the vessel before work starts. The survey report should be supplied by the client to designers and contractors who may be bidding for the work, so that the asbestos risks can be addressed. In this type of survey, where the asbestos is identified so that it can be removed (rather than to manage it), the survey does not normally assess the condition of the asbestos, other than to indicate areas of damage or where additional asbestos debris may be present. However, where the asbestos removal may not take place for some time, the ACMs' condition will need to be assessed and the materials managed

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SUMMARY

Following a request made by Virtus Project Management, we have produced this Refurbishment/Demolition Survey report for Building 1 (1966 Building) at Holycross College, Clonliffe Road, Dublin 9 with the aim of finding asbestos containing materials (ACMs) within the scope of the asbestos survey.

The scope of the asbestos survey was confined to all accessible areas of the existing 1966 Building which is due for complete demolition. The building was live and occupied during the survey with restrictive areas and limited access throughout the building. Destructive and intrusive surveying and sampling was curtailed. A fully destructive sampling survey should be carried out in all areas of Building 1 as soon as the building becomes fully unoccupied.

During the asbestos survey of Building 1 (1966 Building), the following asbestos containing materials were detected in the following locations:

- Asbestos insulation board and associated debris was identified in the attic area (2 m^2 approx.)
- Asbestos cement downpipes were identified in the attic area (3 linear meters approx.)
- Asbestos containing floor tile & bitumen adhesive was identified in the squash gallery on the ground floor (60 m^2 approx.)
- Asbestos containing bitumen adhesive was identified on the floors in the rear kitchen area on the ground floor and on the corridor to the squash court in the basement (180 m^2 approx.)
- CAF gaskets were identified between the older pipework flanges throughout the building and on the calorifier in the basement

See Appendix C & F for more details

INTRODUCTION

Background

Asbestos has been used extensively in the building industry for over one hundred years and has proved to be an excellent product for a variety of uses, having many qualities such as insulation, fire and chemical resistance to name a few. Its suitability across a wide range of uses and its relatively cheap cost made it very popular, with over 3,000 different asbestos products having been recorded.

The use of asbestos containing materials (ACM's) was most prevalent between the 1950's and 1970's when it provided an economic, easy to use and versatile material. Unfortunately, given the constitution and make up of asbestos it can give rise to microscopic airborne fibres being released into the working environment. The fibres have carcinogenic properties caused by inhalation of the fibres which can get lodged in the lining of the lungs causing disease and death.

Scope & Purpose

CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd. have commissioned Phoenix Environmental Safety Ltd. to undertake an asbestos survey at Building 1 (1966 Building) at Holycross College, Clonliffe Road, Dublin 9. The aim of the survey was to locate and identify the presence of asbestos containing materials (ACM's) or suspected ACM's. This report provides a record and assessment of the extent and characteristics of ACM's and is based on information made available on the 12th February 2020 and the 19th May 2020.

This particular survey comprised of a Refurbishment / Demolition Survey, carried out in accordance with S.I. No. 386 of 2006 Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006, the Health and Safety Executive's (UK) guidance document HSG 264 (Asbestos: The Survey Guide) and HSG 227 (A Comprehensive Guide to managing Asbestos in Premises).

This means that:

- As far as reasonably practicable, locate and describe all ACM's in all reasonably accessible areas within the scope of the survey
- A sampling programme is undertaken to identify possible ACM's and estimates of the volumes and the surface areas of ACM made
- A record of the condition of the ACM's or where additional asbestos debris may be expected to be present is produced

Refurbishment / Demolition Surveys (formerly type 3 surveys)

This type of survey is necessary prior to any refurbishment (including "minor") or demolition work being carried out. These "refurbishment / demolition" surveys will be much more intrusive and destructive compared with management surveys as their intention is to locate all the ACMs so that they can be removed before the refurbishment or demolition takes place. Refurbishment/demolition surveys are required as necessary when the needs or use of the building changes and the fabric of the building will be disturbed or complex fixed plant and equipment are to be dismantled.

The purpose of the report is to:

- Enable the client to take appropriate precautions so that people who work at Building 1 (1966 Building) during the forthcoming demolition works are not exposed to asbestos-related health risks
- Provide information to assist the client in developing and implementing an action plan before any refurbishment works or demolition is carried out

Presentation of Findings

Data Sheets

A series of data sheets have been prepared to provide assessments and recommendations for each of the locations where samples were taken. These data sheets are presented in Appendix C.

Figures

The schematic diagrams presented in Appendix F at the rear of this document shows the locations of the asbestos containing materials detected during the asbestos survey.

Caveats

All reasonable steps have been taken to ensure that the contents and findings of this report are true and accurate. Though as stated below, further undetected ACM's may still be present within the premises. The client should therefore be aware of his responsibilities for identifying, locating, removing and/or managing all ACM's within the premises, and for notifying the appropriate authorities where necessary.

Refurbishment / Demolition Surveys

This type of survey employs the use of destructive sampling techniques of an unfamiliar site. Although every effort is made to locate all asbestos containing materials, it is impossible to rule out the possibility that undiscovered asbestos materials may be present. If the building is to undergo major refurbishment or demolition, it is recommended that the persons carrying out the work are made aware of this and take sufficient precautions, as may be appropriate, to ensure the health and safety of their own employees and any other parties who may be affected by the works.

APPENDIX A

ASBESTOS MATERIALS IN BUILDINGS

Sprayed coatings applied in Ireland were typically a mixture of hydrated asbestos cement containing up to 85% asbestos, mainly amosite but crocidolite and mixtures have been used. Primarily used for anti-condensation and acoustic control and fire protection to structural steelwork. It is a friable material but if in a good condition and unlikely to be disturbed presents no immediate danger; however it is likely to release fibres, if disturbed especially during repair and maintenance work. As it ages the binding medium of sprayed asbestos may degrade with the consequent release of more fibres.

Thermal insulation to boilers, vessels, pipe work, valves, pumps etc also known as hand applied lagging. Lagging may have a protective covering of cloth, tape, paper, metal or a surface coating of cement. All types of asbestos may be found in lagging and the content can vary between 15 and 85% asbestos with the protective papers being up to 100% chrysotile. The likelihood of fibre release depends upon its composition, friability and state of repair, but it is particularly susceptible to damage and disturbance through maintenance work or the action of water leaks.

Asbestos insulating boards usually contain between 16 to 40% amosite, although boards may be found to contain other types of asbestos and in other quantities. Insulating boards were developed in the 1950s to provide an economical, lightweight, fire resisting insulating material. As insulation board is semi-compressed it is more likely to release fibres as a result of damage or abrasion. Work on asbestos insulation board can give rise to high levels of asbestos fibre.

Asbestos cement products as in roofing slates, wall cladding, permanent shuttering, flue, rain water and vent pipes generally contain 10 to 15% of asbestos fibre bounded in Portland cement, some flexible boards contain a small proportion of cellulose. All three types of asbestos have been used in the manufacture of asbestos cement. The asbestos fibres in asbestos cement are usually firmly bound in the cement matrix and will be released only if the material is mechanically damaged or as it deteriorates with age.

Ropes and yarns are usually high in asbestos content, approaching 100% and all three types of asbestos have been used in their manufacture. They were used as in the pipe lagging process and in pipe jointing and also for packing materials as in heat/fire resistant boiler, oven and flue sealing or anywhere thermal of fire protection was required. The risk of fibre release depends upon the structure of the material; bonded gasket material is unlikely to release asbestos but an unbonded woven material may give rise to high fibre release especially if when damaged or frayed.

Cloth thermal insulation and lagging, including fire resistant blankets, mattresses and protective curtains, gloves, aprons, overalls etc. All types of asbestos have been used in the manufacture but since the mid 60's the majority has been chrysotile, the content of which can be up to 100 %.

Millboard, paper and CAF gaskets usually have an asbestos content approaching 100% with all three types of asbestos being used in their manufacture. They were used for insulation of electrical equipment and for thermal insulation. Asbestos paper has been used as a laminate for fireproofing to various fibre panels. These materials are on some occasions not well bonded and will release asbestos fibres if subject to abrasion and wear.

Bitumen felts and coatings may contain asbestos either bound in the bitumen matrix or as an asbestos paper liner. These materials are not likely to present a hazard during normal installation or use, but should be removed and disposed of in compliance with any regulation applicable.

Vinyl, thermoplastic floor tiles can contain up to 25% asbestos usually chrysotile, PVC vinyl floor tiles and unbacked PVC flooring normally 7-10% chrysotile and asbestos paper backed PVC flooring the paper backing may contain up to 100% chrysotile. Fibre release is not normally an issue but may occur when the material is cut or subjected to abrasion.

Textured coatings. Decorative coatings on walls and ceilings usually contain 3-5% chrysotile. Fibre release may occur when subjected to abrasion.

Mastics, sealants, putties and floor tile adhesives may contain small amounts of asbestos. The only possible risk is from sanding of hardened material when appropriate precautions should be taken.

Reinforced plastic and resin composites, used for toilet cisterns, seats, banisters, stair nosings, window seals, lab bench tops, brakes and clutches in machines. The plastics usually contain 1-10% chrysotile and were used in for example car batteries to improve the acid resistance. Resins may contain between 20 and 50% amosite, but because of its composition fibre release is likely to be low.

ASBESTOS FIBRE TYPE COMMON NAMES	
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	N/A
Fibrous Anthophyllite	N/A
Fibrous Tremolite	N/A



Chrysotile Amosite Crocidolite



Tremolite Actinolite Anthophyllite

APPENDIX B

RESULTS OF LABORATORY ANALYSIS

ASBESTOS BULK IDENTIFICATION REPORT

Report no: PE20-198-1	Date of Issue: 17th February 2020

Client details:

CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd., Clanwilliam Place, Dublin 2

Identification of asbestos content of suspected asbestos containing material stated to have been sampled from the following location/site:

Building 1 (1966 Building), Holycross College, Clonliffe Road, Dublin 9

No of Samples received: 9	Date of receipt of samples: 12.2.2020	Date of analysis: 17.2.2020

TEST RESULTS

LAB. REF.	SAMPLE NO.	LOCATION	MATERIAL	ASBESTOS TYPE
S 01	BS 176680	1966 Building - attic - ceiling	Insulation board	Amosite & Chrysotile
S 02	BS 176681	1966 Building - attic - debris - slate	Cement slate	No asbestos detected in sample
S 03	BS 176682	1966 Building - attic - pipework insulation	String	No asbestos detected in sample
S 04	BS 176683	1966 Building - ground floor - rear kitchen area	Bitumen	Chrysotile
S 05	BS 176684	1966 Building - basement - boiler house - calorifier	Gasket	Chrysotile
S 06	BS 176685	1966 Building - basement - corridor to squash -	Marmoleum & bitumen	Chrysotile
S 07	BS 176686	1966 Building - ground floor squash gallery	Floor tile and adhesive	Chrysotile
S 08	BS 176687	1966 Building - ground floor canteen	Ceiling tile	No asbestos detected in sample
S 09	BS 176688	1966 Building - ground floor canteen - (perforated)	Ceiling tile	No asbestos detected in sample

LABORATORY ANALYST	G & L Consultancy Ltd.	DATE:	17th February 2020

ASBESTOS BULK IDENTIFICATION REPORT

Report no: PE20-377	Date of Issue: 20th May 2020

Client details:

CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd., Clanwilliam Place, Dublin 2

Identification of asbestos content of suspected asbestos containing material stated to have been sampled from the following location/site:

Building 1 (1966 Building), Holycross College, Clonliffe Road, Dublin 9

No of Samples received: 4	Date of receipt of samples: 19.5.2020	Date of analysis: 20.5.2020

TEST RESULTS

LAB. REF.	SAMPLE NO.	LOCATION	MATERIAL	ASBESTOS TYPE
S 01	PES 28495	1966 Building – Ground floor – Corridor – Riser	String	No asbestos detected in sample
S 02	PES 28496	1966 Building – GF Finance office – Floor	Asphalt	No asbestos detected in sample
S 03	PES 28497	1966 Building – GF Stairwell – Floor	Marmoleum & adhesive	No asbestos detected in sample
S 04	PES 28498	1966 Building – GF Corridor – Underground duct	String	No asbestos detected in sample

LABORATORY ANALYST	John Hickey	DATE:	19th May 2020

APPENDIX C

ASBESTOS DATA SHEETS



Building 1, Holycross College, Clonliffe Road, Dublin 9

PHOENIX ENVIRONMENTAL SAFETY LTD.

ASBESTOS DATA SHEET

Created By	Jane Hickey
Date	22nd May 2020
Site Details	Holycross College, Clonliffe Road, Dublin 9
Client Name	CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd.
Survey Type	R/D Asbestos Survey
Site Ref	PE 20-198
Building Ref.	Building 1 – 1966 Building
Location	Attic
Extent/ Amount	2 m² approx.



Survey Date	12.2.2020	Sample No.	BS 176680
Survey Company	Phoenix Environmental Safety Ltd.		
Testing Laboratory.	G & L Consultancy Ltd.		

MATERIAL ASSESSMENT		PRIORITY ASSESSMENT	
Product type	Insulation board	Normal occupant activity	N/A
Extent of damage	High	Likelihood of disturbance	N/A
Surface treatment	Unsealed	Human exposure potential	N/A
Asbestos type	Amosite & Chrysotile	Maintenance activity	N/A
Material assessment score: N/A	TOTAL SCORE: N/A	Priority assessment score: N/A	

CONCLUSIONS AND RECOMMENDATIONS

The insulation board identified in the attic in the 1966 building contains Chrysotile (white) & Amosite (brown) asbestos fibres. Asbestos insulation boards usually contain between 15 to 40% asbestos fibres

The asbestos insulation board and any associated debris should be removed by a specialist asbestos removal contractor under controlled conditions and disposed of as asbestos waste before the refurbishment/demolition works commence. The insulation board is damaged and access to this area of the attic should be restricted until the insulation board has been removed. Removal of asbestos insulation board requires 14 days notification to the HSA

See Appendix F for more details

All asbestos removal 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

PHOENIX ENVIRONMENTAL SAFETY LTD.

ASBESTOS DATA SHEET

Created By	Jane Hickey
Date	22nd May 2020
Site Details	Holycross College, Clonliffe Road, Dublin 9
Client Name	CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd.
Survey Type	R/D Asbestos Survey
Site Ref	PE 20-198
Building Ref.	Building 1 – 1966 Building
Location	Attic
Extent/ Amount	3 linear meters approx.



Survey Date	12.2.2020	Sample No.	N/A
Survey Company	Phoenix Environmental Safety Ltd.		
Testing Laboratory.	G & L Consultancy Ltd.		

	MATERIAL ASSESSMENT		PRIORITY ASSESSMENT
Product type	Cement pipe	Normal occupant activity	N/A
Extent of damage	Low damage	Likelihood of disturbance	N/A
Surface treatment	Unsealed	Human exposure potential	N/A
Asbestos type	Crocidolite (presumed)	Maintenance activity	N/A
	Material assessment score: N/A	TOTAL SCORE: N/A	Priority assessment score: N/A

CONCLUSIONS AND RECOMMENDATIONS

The cement pipes identified in the attic of the 1966 building are presumed to contain Crocidolite (Blue) asbestos fibres. Asbestos cement products generally contain 10 to 15% asbestos fibres, bound in Portland cement

The cement pipes should be removed by an asbestos removal contractor and disposed of as asbestos waste before the refurbishment/demolition works commence

See Appendix F for more details

All asbestos removal 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

PHOENIX ENVIRONMENTAL SAFETY LTD.

ASBESTOS DATA SHEET

Created By	Jane Hickey
Date	22nd May 2020
Site Details	Holycross College, Clonliffe Road, Dublin 9
Client Name	CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd.
Survey Type	R/D Asbestos Survey
Site Ref	PE 20-198
Building Ref.	Building 1 – 1966 Building
Location	GF Squash court gallery
Extent/ Amount	60 m² approx.



Survey Date	12.2.2020	Sample No.	BS 176686
Survey Company	Phoenix Environmental Safety Ltd.		
Testing Laboratory.	G & L Consultancy Ltd.		

	MATERIAL ASSESSMENT		PRIORITY ASSESSMENT
Product type	Floor tile and bitumen adhesive	Normal occupant activity	N/A
Extent of damage	Low	Likelihood of disturbance	N/A
Surface treatment	Composite material	Human exposure potential	N/A
Asbestos type	Chrysotile	Maintenance activity	N/A
	Material assessment score: N/A	TOTAL SCORE: N/A	Priority assessment score: N/A

CONCLUSIONS AND RECOMMENDATIONS

The floor tiles and bitumen adhesive identified in the squash court gallery on the ground floor of the 1966 Building contains Chrysotile (white) asbestos fibres. Thermoplastic floor tiles can contain up to 25% asbestos fibres, usually Chrysotile. Bitumen adhesives contain a small quantity of asbestos fibres

The asbestos containing floor tiles and bitumen adhesive should be removed by an asbestos asbestos removal contractor and disposed of as asbestos waste before the refurbishment/demolition works commence

See Appendix F for more details

All asbestos removal 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

PHOENIX ENVIRONMENTAL SAFETY LTD.

ASBESTOS DATA SHEET

Created By	Jane Hickey
Date	22nd May 2020
Site Details	Holycross College, Clonliffe Road, Dublin 9
Client Name	CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd.
Survey Type	R/D Asbestos Survey
Site Ref	PE 20-198
Building Ref.	Building 1 – 1966 Building
Location	Kitchen & corridor to SC
Extent/ Amount	180 m² approx.



Survey Date	12.2.2020	Sample No.	BS 176683
Survey Company	Phoenix Environmental Safety Ltd.		
Testing Laboratory.	G & L Consultancy Ltd.		

MATERIAL ASSESSMENT		PRIORITY ASSESSMENT	
Product type	Bitumen adhesive	Normal occupant activity	N/A
Extent of damage	Low	Likelihood of disturbance	N/A
Surface treatment	Well bound material	Human exposure potential	N/A
Asbestos type	Chrysotile	Maintenance activity	N/A
Material assessment score: N/A	TOTAL SCORE: N/A	Priority assessment score: N/A	

CONCLUSIONS AND RECOMMENDATIONS

The bitumen adhesive identified in the floors in the rear kitchen area on the ground floor and on the corridor to the squash courts in the basement contains Chrysotile (white) asbestos fibres. Bitumen adhesives contain a small quantity of asbestos fibres

The asbestos containing bitumen adhesive should be removed by an asbestos asbestos removal contractor and disposed of as asbestos waste before the refurbishment/demolition works commence

See Appendix F for more details

All asbestos removal 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

PHOENIX ENVIRONMENTAL SAFETY LTD.

ASBESTOS DATA SHEET

Created By	Jane Hickey
Date	22nd May 2020
Site Details	Holycross College, Clonliffe Road, Dublin 9
Client Name	CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd.
Survey Type	R/D Asbestos Survey
Site Ref	PE 20-198
Building Ref.	Building 1 – 1966 Building
Location	Boiler house & pipe work
Extent/ Amount	1 per older flange



Survey Date	12.2.2020	Sample No.	BS 176684
Survey Company	Phoenix Environmental Safety Ltd.		
Testing Laboratory.	G & L Consultancy Ltd.		

MATERIAL ASSESSMENT		PRIORITY ASSESSMENT	
Product type	CAF gasket	Normal occupant activity	N/A
Extent of damage	Low	Likelihood of disturbance	N/A
Surface treatment	Exposed edges	Human exposure potential	N/A
Asbestos type	Chrysotile	Maintenance activity	N/A
Material assessment score: N/A	TOTAL SCORE: N/A	Priority assessment score: N/A	

CONCLUSIONS AND RECOMMENDATIONS

The Compressed Asbestos Fibre (CAF) gaskets identified between the flanges of the calorifier in the boiler room in the basement and presumed between the older pipe work flanges throughout the 1966 Building contain Chrysotile (white) asbestos fibres. CAF Gaskets contain almost 100% asbestos fibres, with a small amount of binder

The CAF gaskets should be removed by an asbestos asbestos removal contractor and disposed of as asbestos waste before the refurbishment/demolition works commence

See Appendix F for more details

All asbestos removal 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

APPENDIX D

NON ASBESTOS CONTAINING MATERIALS



Natural slates



Acoustic ceiling tiles sampled (ground floor canteen)

NON ASBESTOS CONTAINING MATERIALS



Strawboard ceilings above the squash courts



Marmoleum over asphalt on floors

NON ASBESTOS CONTAINING MATERIALS



Ceramic tiles in the ground floor kitchen



Carpet and Marmoleum over asphalt leveling compound and concrete

NON ASBESTOS CONTAINING MATERIALS



Insulation & string on pipe work in ground floor underground service duct (limited access)



Rubber nosing on stairs

APPENDIX E

NON ACCESSIBLE LOCATIONS

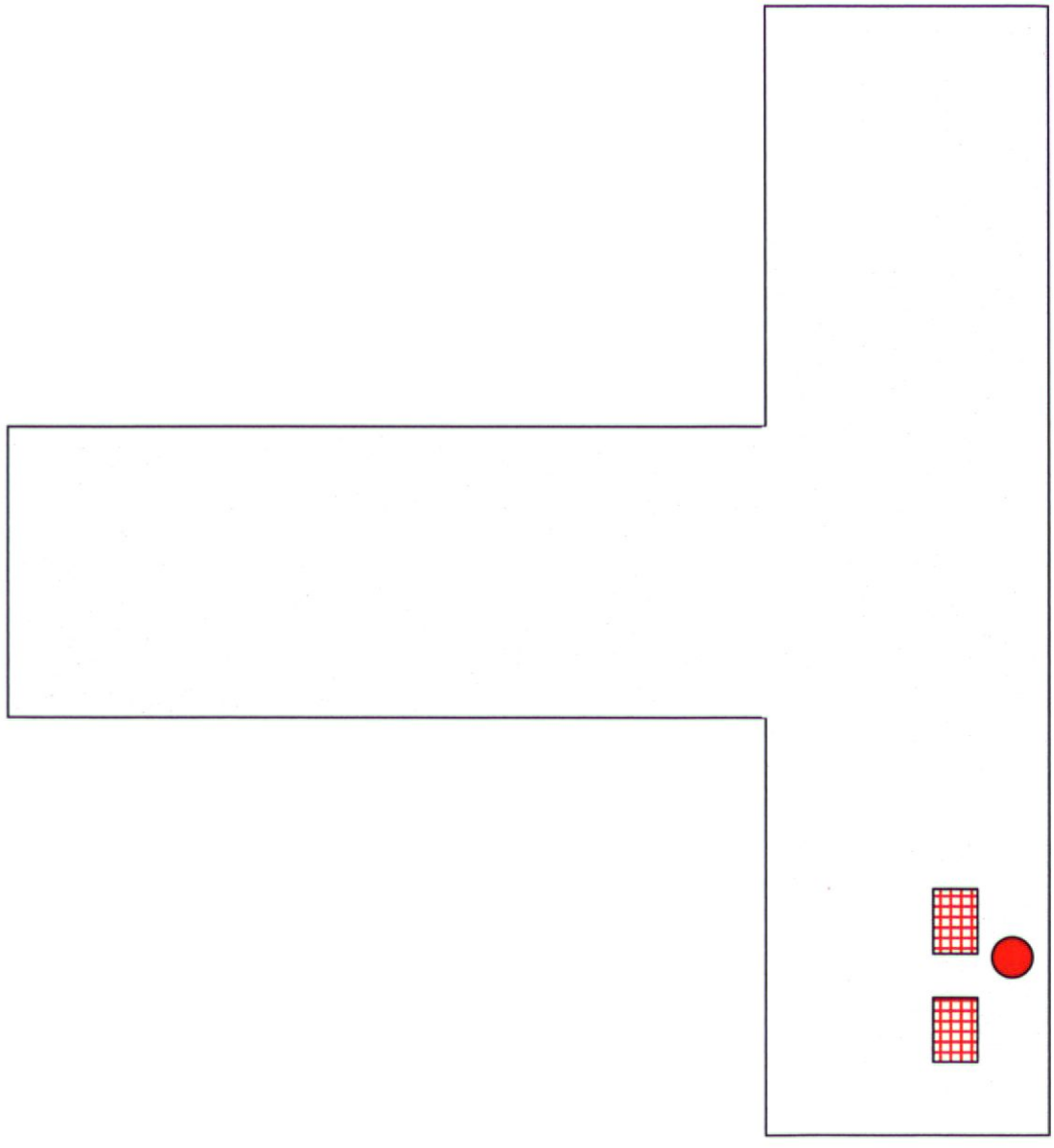
- The property was for live during the course of the survey and intrusive sampling was restricted. Floors which could not be easily lifted and resealed were only visually inspected e.g. floors containing ceramic tiles or hardwood flooring
- The roof areas were inspected where possible, however sampling of flat roof areas was restricted so as not to cause a leak to the areas below
- The 3rd floor was occupied and the rooms were all locked as they are in control of an external company who lease this floor. The inspection on this floor was carried out from the corridor only and no access was gained to any rooms on this floor
- All inaccessible areas are to be re-inspected once the building becomes unoccupied as agreed with the Virtus Project Management representative prior to the commencement of this initial survey
- No inspection was carried on flues, ducts, voids and similar enclosed areas, the access to which would necessitate the use of specialist equipment or tools, or which would have caused damage to decorations, fixtures, equipment, fittings or the structure of the building
- No inspection of live electrical or mechanical plant or similar requiring the attendance of a specialist engineer was carried out. No metal insulation jackets were removed to inspect insulation
- No inspection of any high-level areas requiring specialist access equipment other than telescopic ladder was carried out
- Samples have not been taken where the act of sampling would endanger the surveyors or affect the functional integrity of the item concerned
- All contractors working on the site should always remain vigilant to the possibility that concealed asbestos containing materials may be present on site. If any suspect asbestos containing materials are uncovered during the course of the work, works must stop in that area and the suspect material should be sampled and analysed immediately for the presence of asbestos

APPENDIX F

FLOOR PLANS & LOCATION OF ASBESTOS CONTAINING MATERIALS

Schematic diagram only Not to scale 22nd May 2020	Holycross College, Clonliffe Road, Dublin 9

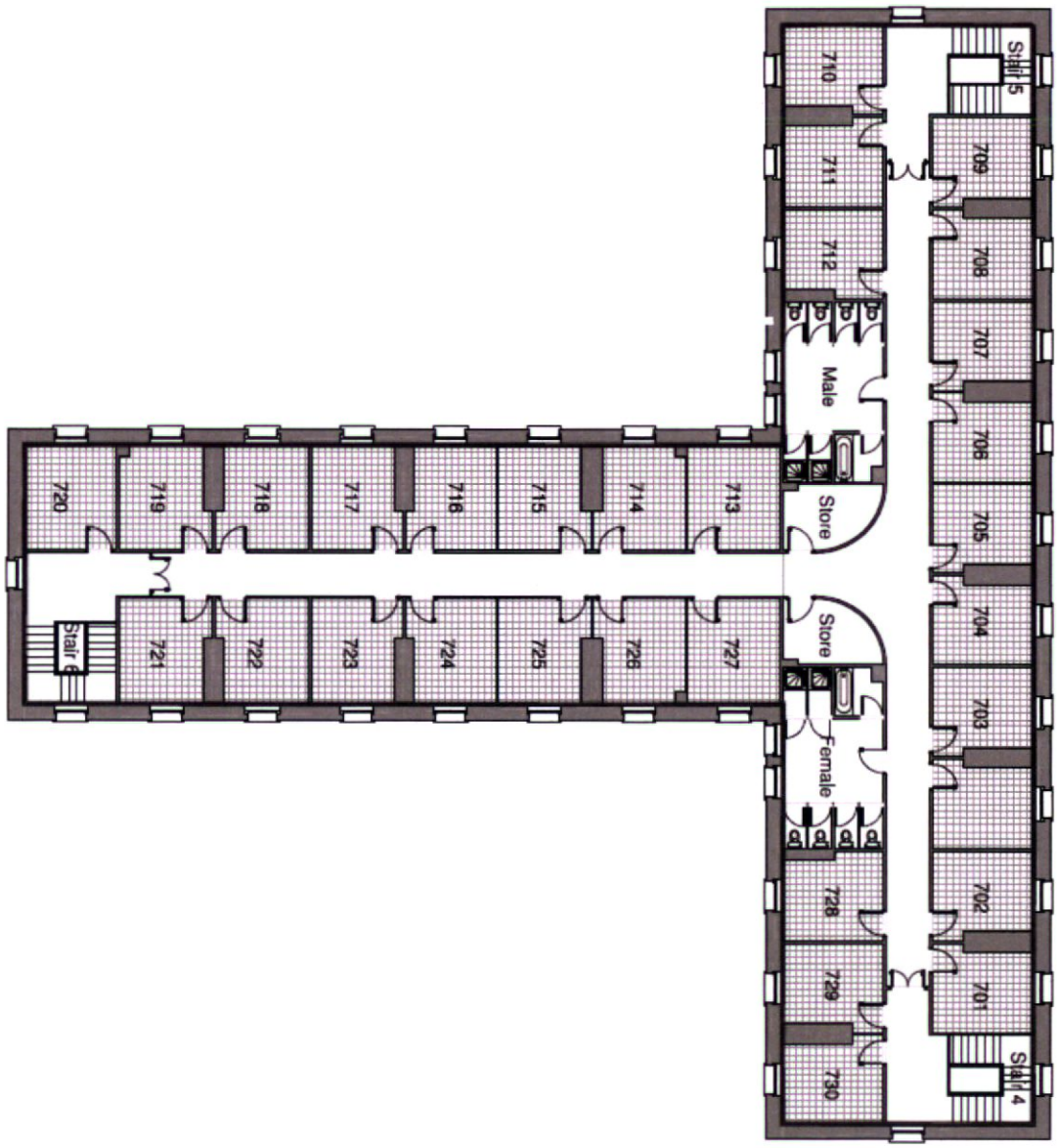
1966 BUILDING – ATTIC



	Areas where an asbestos cement downpipe was identified
	Areas where an asbestos insulation board & associated debris was identified

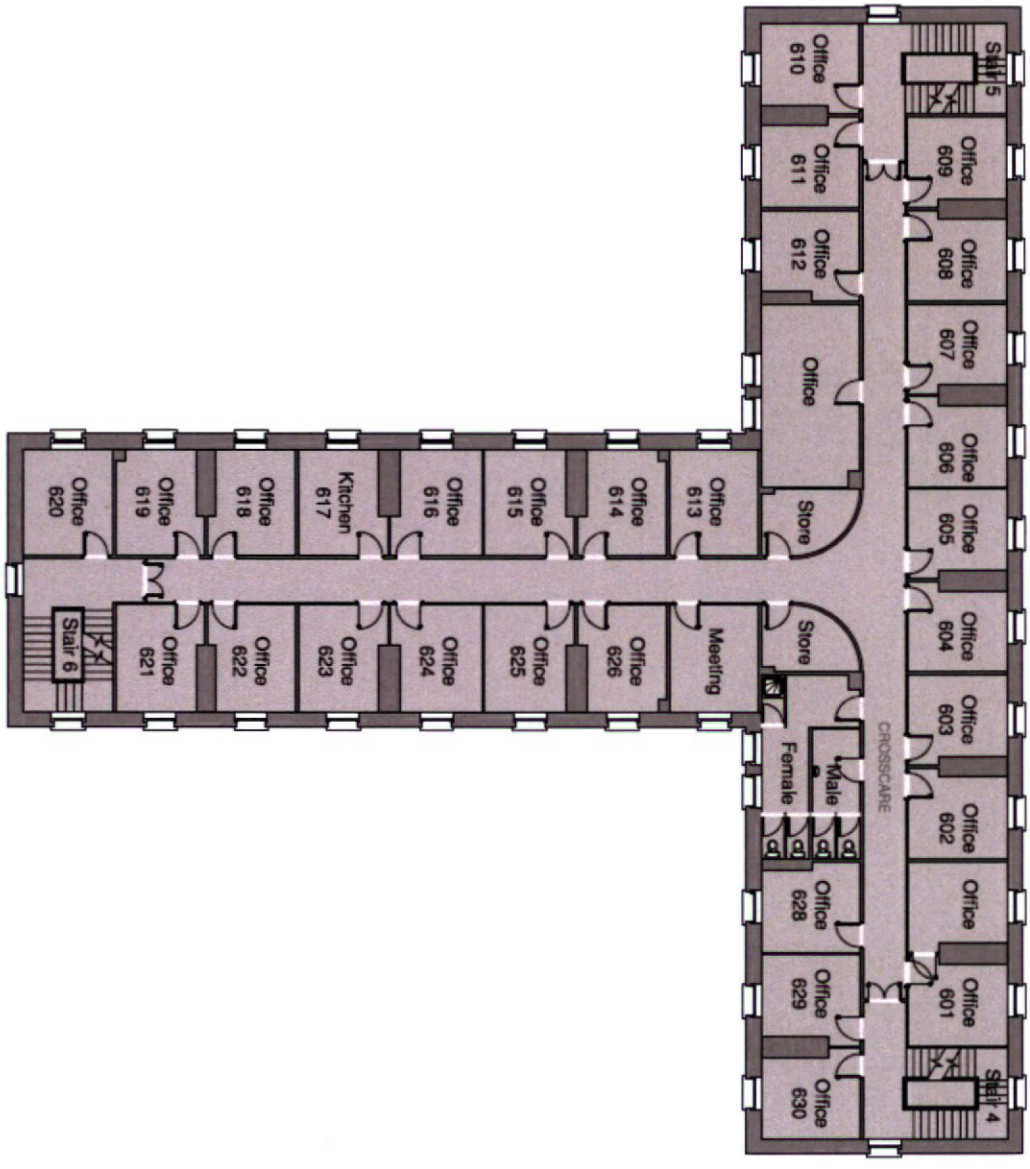
Schematic diagram only Not to scale 22nd May 2020	Holycross College, Clonliffe Road, Dublin 9

1966 BUILDING – 3RD FLOOR PLAN



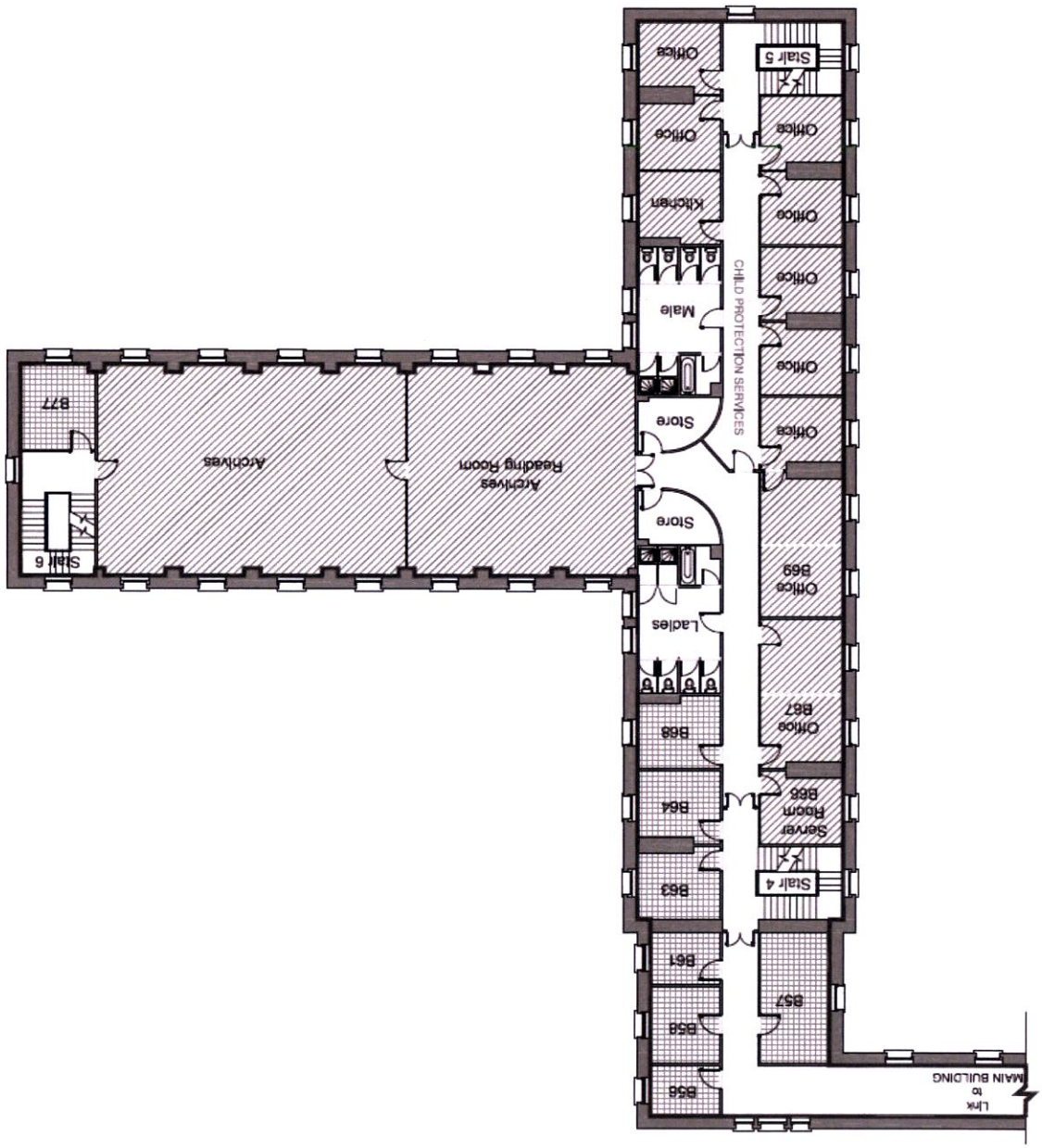
Schematic diagram only Not to scale 22nd May 2020	Holycross College, Clonliffe Road, Dublin 9

1966 BUILDING – 2ND FLOOR PLAN



Schematic diagram only Not to scale 22nd May 2020	Holycross College, Clonliffe Road, Dublin 9

1966 BUILDING – 1ST FLOOR PLAN



Schematic diagram only Not to scale 22nd May 2020	Holycross College, Clonliffe Road, Dublin 9

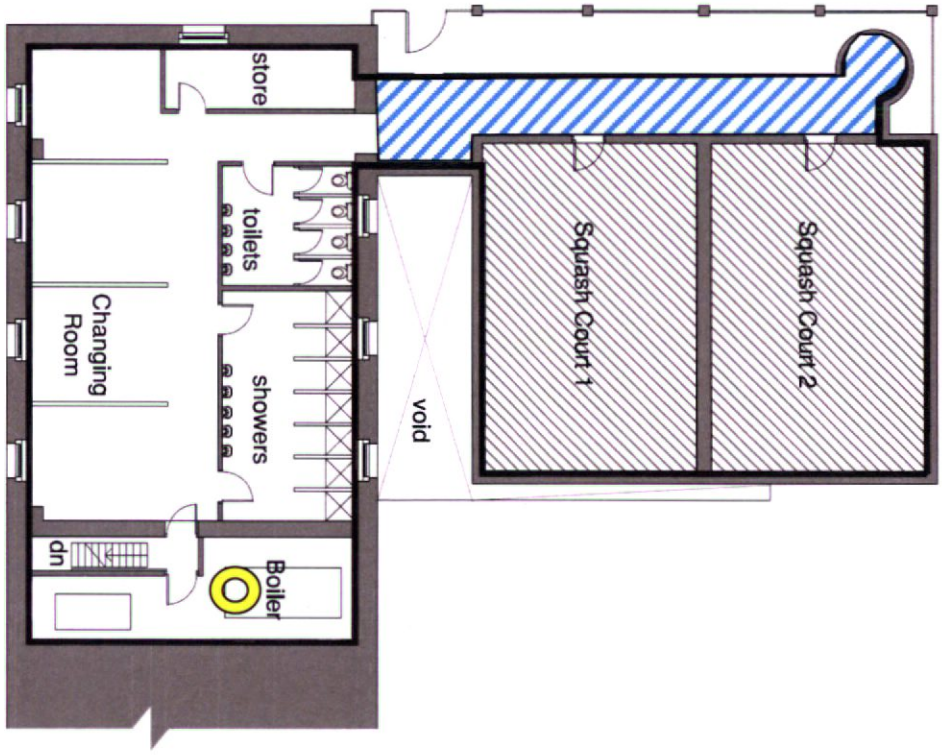
1966 BUILDING – GROUND FLOOR PLAN



	Areas where asbestos containing floor tiles & bitumen adhesive was identified
	Areas where asbestos containing bitumen adhesive was identified

Schematic diagram only Not to scale 22nd May 2020	Holycross College, Clonliffe Road, Dublin 9

1966 BUILDING – BASEMENT FLOOR PLAN



	Area where CAF gaskets were identified
	Areas where asbestos containing bitumen adhesive was identified

Phoenix Environmental Safety Ltd.

ASBESTOS SURVEY REPORT

(Refurbishment / Demolition Survey)

Client: CWTC Multi Family ICAV,
C/O Hines Real Estate Ireland Ltd., Clanwilliam Place, Dublin 2

Location: Building 2 (Main Building & 1951 Building),
Holycross College, Clonliffe Road, Dublin 9

Date: 18th February 2020

Report No. PE 20-198-2 (V2)

Phoenix
Environmental
Safety Ltd.

Graigueswood, Freshford, Co. Kilkenny
Tel: 056 8832414
Fax: 056 8832950
admin@phoenixenv.ie
www.phoenixenv.ie

Client: CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd., Clanwilliam Place, Dublin 2

Location: Building 2 (Main Building & 1951 Building), Holycross College, Clonliffe Road, Dublin 9

Asbestos Survey Report Type: Refurbishment / Demolition Survey

Survey Company: Phoenix Environmental Safety Ltd.

Surveyors: Eoghan Hickey & Andrew Hickey

Testing Laboratory: G & L Consultancy Ltd.

Date of Survey: 12th February 2020

Date of Survey Report: 18th February 2020

Report issue: Final

Signed: *Eoghan Hickey* Date: 18th February 2020

This report cannot be used for contractual or engineering purposes unless this sheet is signed where indicated by Surveyor. The report must also be designated `final` on the signatory sheet.

Please note that Phoenix Environmental Safety Ltd. cannot be held responsible for the way in which the Client interprets or acts upon the results.

The report must be read in its entirety including any appendices. Phoenix Environmental Safety Ltd. accepts no responsibility for sub-division of this report. All measurements in this report are approximate and therefore should not be used by the asbestos removal contractor for pricing purposes. The asbestos removal contractors should ascertain for themselves, by site measurements and inspection, the exact nature and extent of the work to be done.

The survey information should be used to help in the tendering process for removal of ACMs from the vessel before work starts. The survey report should be supplied by the client to designers and contractors who may be bidding for the work, so that the asbestos risks can be addressed. In this type of survey, where the asbestos is identified so that it can be removed (rather than to manage it), the survey does not normally assess the condition of the asbestos, other than to indicate areas of damage or where additional asbestos debris may be present. However, where the asbestos removal may not take place for some time, the ACMs' condition will need to be assessed and the materials managed

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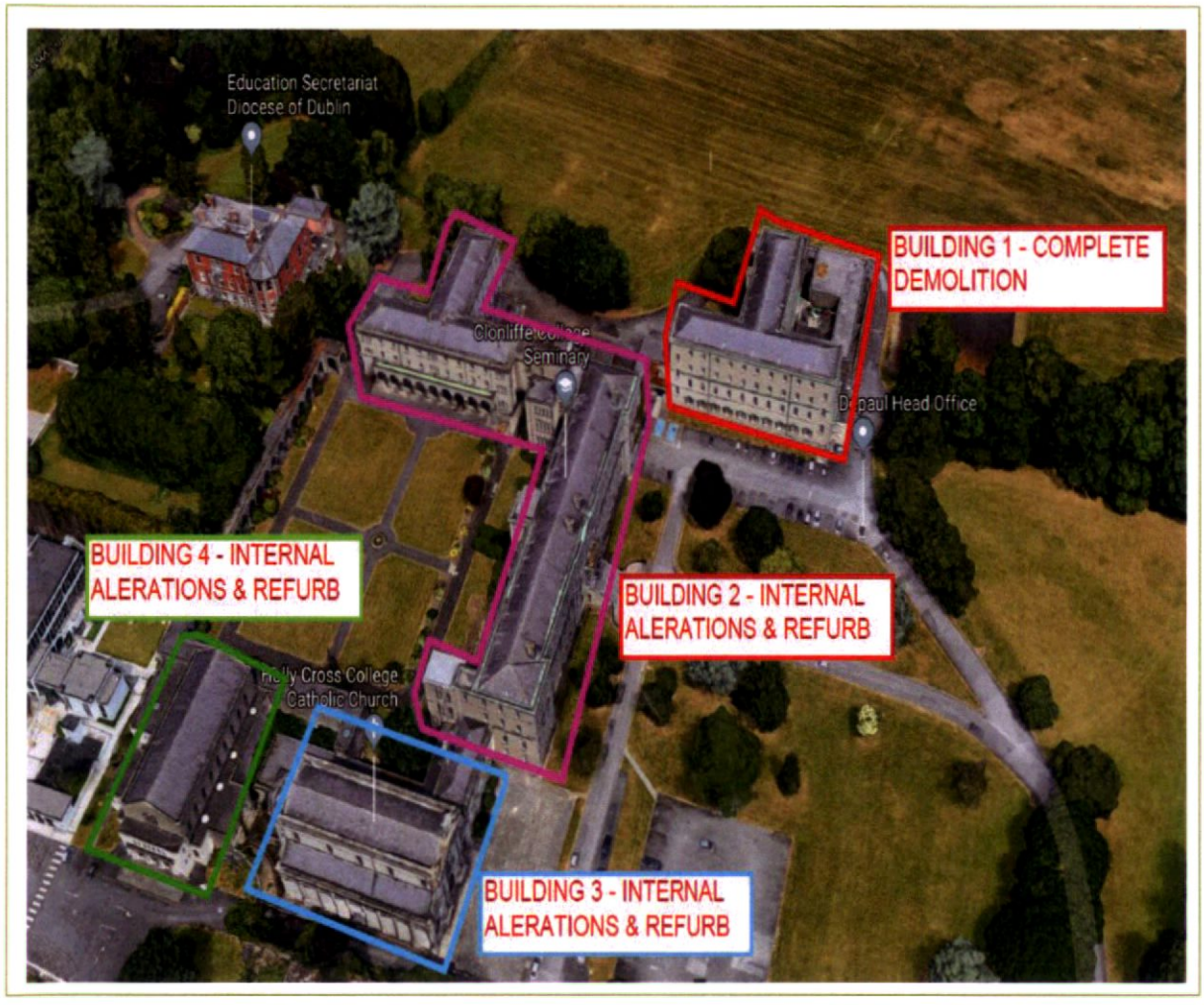
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SUMMARY

Following a request made by Virtus Project Management, we have produced this Refurbishment / Demolition Survey report for Building 2 at Holycross College, Clonliffe Road, Dublin 9 with the aim of finding asbestos containing materials (ACMs) within the scope of the asbestos survey.

The scope of the asbestos survey was confined to all accessible areas of Building 2 which consists of the existing Main Building and 1951 Building at Holycross College which is due to undergo refurbishment works in the near future.

The two buildings were live and in use during the survey and intrusive sampling was restricted in several areas. A more intrusive survey will be required once the building becomes vacant



SUMMARY

During the asbestos survey of Building 2 at Holycross College, the following asbestos containing materials were detected in the following locations:

Main Building:

- Asbestos cement pipes were identified in the attic over the service risers (< 1 linear meter per pipe)
- Asbestos insulation board ceiling tiles were identified in the W/C's and storerooms throughout the building (300 m^2 total approx.)
- Asbestos insulation board radiator panels were identified in the board room and entrance lobby on the 1st floor
- Asbestos containing thermal insulation was identified on the calorifiers (3) and on the pipework in the ground floor plant room (75 linear meters approx.)
- Asbestos containing step nosing's were identified on the main stairs

1951 Building:

- Asbestos cement pipes were identified in the attic and central service risers
- Asbestos cement boards and associated debris was identified in the central service riser (<10 m^2 approx.)
- Asbestos containing thermal insulation was identified on the calorifier between the ground floor and 1st floor central service riser
- Asbestos containing thermal insulation was identified on the pipework outside the lower ground floor boiler room (5 linear meters approx.)
- Corrugated asbestos cement sheeting and associated debris was identified on the roof of the rear outbuildings (150 m^2 approx.)

Throughout Building 2:

- Compressed Asbestos Fibre (CAF) gaskets were identified between the older pipework flanges throughout the building
- Asbestos containing brake shoes were presumed in the lift motor rooms

See Appendix C & F for more details

INTRODUCTION

Background

Asbestos has been used extensively in the building industry for over one hundred years and has proved to be an excellent product for a variety of uses, having many qualities such as insulation, fire and chemical resistance to name a few. Its suitability across a wide range of uses and its relatively cheap cost made it very popular, with over 3,000 different asbestos products having been recorded.

The use of asbestos containing materials (ACM's) was most prevalent between the 1950's and 1970's when it provided an economic, easy to use and versatile material. Unfortunately, given the constitution and make up of asbestos it can give rise to microscopic airborne fibres being released into the working environment. The fibres have carcinogenic properties caused by inhalation of the fibres which can get lodged in the lining of the lungs causing disease and death.

Scope & Purpose

CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd. have commissioned Phoenix Environmental Safety Ltd. to undertake an asbestos survey of Building 2 at Holycross College, Clonliffe Road, Dublin 9. The aim of the survey was to locate and identify the presence of accessible asbestos containing materials (ACM's) or suspected ACM's. This report provides a record and assessment of the extent and characteristics of ACM's and is based on information made available on the 12th February 2020.

This particular survey comprised of a Refurbishment / Demolition Survey, carried out in accordance with S.I. No. 386 of 2006 Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006, the Health and Safety Executive's (UK) guidance document HSG 264 (Asbestos: The Survey Guide) and HSG 227 (A Comprehensive Guide to managing Asbestos in Premises).

This means that:

- As far as reasonably practicable, locate and describe all ACM's in all reasonably accessible areas within the scope of the survey
- A sampling programme is undertaken to identify possible ACM's and estimates of the volumes and the surface areas of ACM made
- A record of the condition of the ACM's or where additional asbestos debris may be expected to be present is produced

Refurbishment / Demolition Surveys (formerly type 3 surveys)

This type of survey is necessary prior to any refurbishment (including "minor") or demolition work being carried out. These "refurbishment / demolition" surveys will be much more intrusive and destructive compared with management surveys as their intention is to locate all the ACMs so that they can be removed before the refurbishment or demolition takes place. Refurbishment/demolition surveys are required as necessary when the needs or use of the building changes and the fabric of the building will be disturbed or complex fixed plant and equipment are to be dismantled.

The purpose of the report is to:

- Enable the client to take appropriate precautions so that people who work in Building 2 during the forthcoming works are not exposed to asbestos-related health risks
- Provide information to assist the client in developing and implementing an action plan before any refurbishment works or demolition is carried out

Presentation of Findings

Data Sheets

A series of data sheets have been prepared to provide assessments and recommendations for each of the locations where samples were taken. These data sheets are presented in Appendix C.

Figures

The schematic diagrams presented in Appendix F at the rear of this document shows the locations of all of the asbestos containing materials detected during the asbestos survey.

Caveats

All reasonable steps have been taken to ensure that the contents and findings of this report are true and accurate. Though as stated below, further undetected ACM's may still be present within the premises. The client should therefore be aware of his responsibilities for identifying, locating, removing and/or managing all ACM's within the premises, and for notifying the appropriate authorities where necessary.

Refurbishment / Demolition Surveys

This type of survey employs the use of destructive sampling techniques of an unfamiliar site. Although every effort is made to locate all asbestos containing materials, it is impossible to rule out the possibility that undiscovered asbestos materials may be present. If the building is to undergo major refurbishment or demolition, it is recommended that the persons carrying out the work are made aware of this and take sufficient precautions, as may be appropriate, to ensure the health and safety of their own employees and any other parties who may be affected by the works.

APPENDIX A

ASBESTOS MATERIALS IN BUILDINGS

Sprayed coatings applied in Ireland were typically a mixture of hydrated asbestos cement containing up to 85% asbestos, mainly amosite but crocidolite and mixtures have been used. Primarily used for anti-condensation and acoustic control and fire protection to structural steelwork. It is a friable material but if in a good condition and unlikely to be disturbed presents no immediate danger; however it is likely to release fibres, if disturbed especially during repair and maintenance work. As it ages the binding medium of sprayed asbestos may degrade with the consequent release of more fibres.

Thermal insulation to boilers, vessels, pipe work, valves, pumps etc also known as hand applied lagging. Lagging may have a protective covering of cloth, tape, paper, metal or a surface coating of cement. All types of asbestos may be found in lagging and the content can vary between 15 and 85% asbestos with the protective papers being up to 100% chrysotile. The likelihood of fibre release depends upon its composition, friability and state of repair, but it is particularly susceptible to damage and disturbance through maintenance work or the action of water leaks.

Asbestos insulating boards usually contain between 16 to 40% amosite, although boards may be found to contain other types of asbestos and in other quantities. Insulating boards were developed in the 1950s to provide an economical, lightweight, fire resisting insulating material. As insulation board is semi-compressed it is more likely to release fibres as a result of damage or abrasion. Work on asbestos insulation board can give rise to high levels of asbestos fibre.

Asbestos cement products as in roofing slates, wall cladding, permanent shuttering, flue, rain water and vent pipes generally contain 10 to 15% of asbestos fibre bounded in Portland cement, some flexible boards contain a small proportion of cellulose. All three types of asbestos have been used in the manufacture of asbestos cement. The asbestos fibres in asbestos cement are usually firmly bound in the cement matrix and will be released only if the material is mechanically damaged or as it deteriorates with age.

Ropes and yarns are usually high in asbestos content, approaching 100% and all three types of asbestos have been used in their manufacture. They were used as in the pipe lagging process and in pipe jointing and also for packing materials as in heat/fire resistant boiler, oven and flue sealing or anywhere thermal of fire protection was required. The risk of fibre release depends upon the structure of the material; bonded gasket material is unlikely to release asbestos but an unbonded woven material may give rise to high fibre release especially if when damaged or frayed.

Cloth thermal insulation and lagging, including fire resistant blankets, mattresses and protective curtains, gloves, aprons, overalls etc. All types of asbestos have been used in the manufacture but since the mid 60's the majority has been chrysotile, the content of which can be up to 100 %.

Millboard, paper and CAF gaskets usually have an asbestos content approaching 100% with all three types of asbestos being used in their manufacture. They were used for insulation of electrical equipment and for thermal insulation. Asbestos paper has been used as a laminate for fireproofing to various fibre panels. These materials are on some occasions not well bonded and will release asbestos fibres if subject to abrasion and wear.

Bitumen felts and coatings may contain asbestos either bound in the bitumen matrix or as an asbestos paper liner. These materials are not likely to present a hazard during normal installation or use, but should be removed and disposed of in compliance with any regulation applicable.

Vinyl, thermoplastic floor tiles can contain up to 25% asbestos usually chrysotile, PVC vinyl floor tiles and unbacked PVC flooring normally 7-10% chrysotile and asbestos paper backed PVC flooring the paper backing may contain up to 100% chrysotile. Fibre release is not normally an issue but may occur when the material is cut or subjected to abrasion.

Textured coatings. Decorative coatings on walls and ceilings usually contain 3-5% chrysotile. Fibre release may occur when subjected to abrasion.

Mastics, sealants, putties and floor tile adhesives may contain small amounts of asbestos. The only possible risk is from sanding of hardened material when appropriate precautions should be taken.

Reinforced plastic and resin composites, used for toilet cisterns, seats, banisters, stair nosings, window seals, lab bench tops, brakes and clutches in machines. The plastics usually contain 1-10% chrysotile and were used in for example car batteries to improve the acid resistance. Resins may contain between 20 and 50% amosite, but because of its composition fibre release is likely to be low.

ASBESTOS FIBRE TYPE COMMON NAMES	
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	N/A
Fibrous Anthophyllite	N/A
Fibrous Tremolite	N/A



Chrysotile Amosite Crocidolite



Tremolite Actinolite Anthophyllite

APPENDIX B

RESULTS OF LABORATORY ANALYSIS

ASBESTOS BULK IDENTIFICATION REPORT

Report no: PE20-198-2	Date of Issue: 17th February 2020

Client details:

CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd., Clanwilliam Place, Dublin 2

Identification of asbestos content of suspected asbestos containing material stated to have been sampled from the following location/site:

Holycross College (Building 2), Clonliffe Road, Dublin 9

No of Samples received: 21	Date of receipt of samples: 12.2.2020	Date of analysis: 17.2.2020

TEST RESULTS

LAB. REF.	SAMPLE NO.	LOCATION	MATERIAL	ASBESTOS TYPE
S 01	BS 176649	Building 2 - Main Building – 3F - redundant apartment	Floor covering (red)	No asbestos detected in sample
S 02	BS 176650	Building 2 - Main Building – 3F - End W/C redundant	Ceiling tile	Amosite & Chrysotile
S 03	BS 176651	Building 2 - Main Building - link corridor to 1951 block	Floor tile	No asbestos detected in sample
S 04	BS 176652	Building 2 - Main Building – 2F - Room 304	Floor covering (green)	No asbestos detected in sample
S 05	BS 176653	Building 2 - Main Building – 2F main stairs	Nosing	Chrysotile
S 06	BS 176654	Building 2 - Main Building – 2F - left lobby ceiling void	Damp proof course	No asbestos detected in sample
S 07	BS 176655	Building 2 - Main Building - 1st floor boardroom	Radiator cover board	Amosite & Chrysotile
S 08	BS 176656	Building 2 - Main Building - 1st floor male W/C	Ceiling tile	Amosite & Chrysotile
S 09	BS 176657	Building 2 - Main Building - ground floor room A12	Floor covering (beige)	No asbestos detected in sample
S 10	BS 176658	Building 2 - Main Building - ground floor room A12	Floor covering (blue)	No asbestos detected in sample
S 11	BS 176659	Building 2 - Main Build - GF elect. room – elect. boxes	Rope	No asbestos detected in sample
S 12	BS 176660	Building 2 - Main Building - GF boiler room - calorifier	Insulation	Amosite
S 13	BS 176661	Building 2 - Main Building - GF boiler room - pipework	Insulation	Amosite
S 14	BS 176662	Building 2 - Main Building - ground floor boiler room	Gasket	No asbestos detected in sample
S 15	BS 176663	Building 2 - 1951 Build. – 1F server Rm - under flooring	Bitumen	No asbestos detected in sample
S 16	BS 176664	Building 2 - 1951 Building – 1F riser by W/C - calorifier	Insulation	Amosite
S 17	BS 176665	Building 2 - 1951 Building - 1st floor riser beside W/C	Cement	Chrysotile
S 18	BS 176666	Building 2 - 1951 Building - ground floor archives	Floor covering	No asbestos detected in sample
S 19	BS 176667	Building 2 - 1951 Building - rear outbuildings - roof	Cement sheeting	Chrysotile
S 20	BS 176668	Building 2 - 1951 Building - lower GF plant rooms	Gasket	Chrysotile
S 21	BS 176669	Building 2 - 1951 Build. - outside LGF plant Rm – P/W	Insulation	Amosite

LABORATORY ANALYST	G & L Consultancy Ltd.	DATE:	17th February 2020

APPENDIX C

ASBESTOS DATA SHEETS



BUILDING 2 (MAIN BUILDING & 1951 BUILDING)



PHOENIX ENVIRONMENTAL SAFETY LTD.

ASBESTOS DATA SHEET

Created By	Eoghan Hickey
Date	18th February 2020
Site Details	Holycross College, Clonliffe Road, Dublin 9
Client Name	CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd.
Survey Type	R/D Asbestos Survey
Site Ref	PE 20-198-2
Building Ref.	Building 2 – Main Building
Location	Attic
Extent/ Amount	< 1 meter per pipe



Survey Date	12.2.2020	Sample No.	N/A
Survey Company	Phoenix Environmental Safety Ltd.		
Testing Laboratory.	G & L Consultancy Ltd.		

MATERIAL ASSESSMENT		PRIORITY ASSESSMENT	
Product type	Cement pipe (presumed)	Normal occupant activity	N/A
Extent of damage	Low	Likelihood of disturbance	N/A
Surface treatment	Sealed	Human exposure potential	N/A
Asbestos type	Crocidolite (presumed)	Maintenance activity	N/A
Material assessment score: N/A		TOTAL SCORE: N/A	Priority assessment score: N/A

CONCLUSIONS AND RECOMMENDATIONS

The cement pipes identified over the service risers in the attic of the main building were presumed to contain Crocidolite (blue) asbestos as no sample could be taken without damaging the integrity of the pipe which was in use. Asbestos cement products generally contain 10 to 15% asbestos fibres, bound in Portland cement

The asbestos cement pipes may be left in situ and managed in place. However, if the forthcoming works are likely to disturb the cement pipes, then they should be removed by an asbestos asbestos removal contractor and disposed of as asbestos waste before the refurbishment/demolition works commence

See Appendix F for more details

All asbestos removal 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

PHOENIX ENVIRONMENTAL SAFETY LTD.

ASBESTOS DATA SHEET

Created By	Eoghan Hickey
Date	18th February 2020
Site Details	Holycross College, Clonliffe Road, Dublin 9
Client Name	CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd.
Survey Type	R/D Asbestos Survey
Site Ref	PE 20-198-2
Building Ref.	Building 2 – Main Building
Location	W/C's & storerooms
Extent/ Amount	300 m² total approx.



Survey Date	12.2.2020	Sample No.	BS 176650
Survey Company	Phoenix Environmental Safety Ltd.		
Testing Laboratory.	G & L Consultancy Ltd.		

	MATERIAL ASSESSMENT		PRIORITY ASSESSMENT
Product type	Insulation board	Normal occupant activity	N/A
Extent of damage	Medium	Likelihood of disturbance	N/A
Surface treatment	Unsealed	Human exposure potential	N/A
Asbestos type	Amosite & Chrysotile	Maintenance activity	N/A
	Material assessment score: N/A	TOTAL SCORE: N/A	Priority assessment score: N/A

CONCLUSIONS AND RECOMMENDATIONS

The insulation board identified on the ceilings in the W/C and storerooms throughout the main building contains Chrysotile (white) & Amosite (brown) asbestos. Asbestos insulation boards usually contain between 15 to 40% asbestos fibres

The asbestos insulation board should be removed by a specialist asbestos removal contractor under controlled conditions and disposed of as asbestos waste before the refurbishment/demolition works commence

Removal of asbestos insulation board requires 14 days notification to the HSA

See Appendix F for more details

All asbestos removal 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

DETAIL OF THE ASBESTOS INSULATION BOARD



Asbestos insulation board ceiling tiles in the 2nd floor storeroom

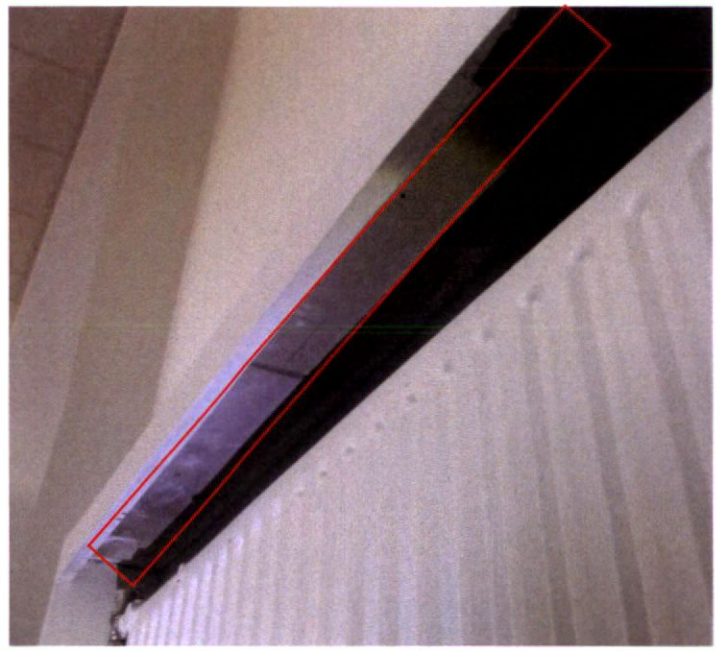


Asbestos insulation board ceiling tiles in the 1st floor toilets

PHOENIX ENVIRONMENTAL SAFETY LTD.

ASBESTOS DATA SHEET

Created By	Eoghan Hickey
Date	18th February 2020
Site Details	Holycross College, Clonliffe Road, Dublin 9
Client Name	CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd.
Survey Type	R/D Asbestos Survey
Site Ref	PE 20-198-2
Building Ref.	Building 2 – Main Building
Location	Board room & entrance lobby
Extent/ Amount	Over radiator



Survey Date	12.2.2020	Sample No.	BS 176655
Survey Company	Phoenix Environmental Safety Ltd.		
Testing Laboratory.	G & L Consultancy Ltd.		

MATERIAL ASSESSMENT		PRIORITY ASSESSMENT	
Product type	Insulation board	Normal occupant activity	N/A
Extent of damage	Low	Likelihood of disturbance	N/A
Surface treatment	Unsealed	Human exposure potential	N/A
Asbestos type	Amosite & Chrysotile	Maintenance activity	N/A
Material assessment score: N/A	TOTAL SCORE: N/A	Priority assessment score: N/A	

CONCLUSIONS AND RECOMMENDATIONS

The insulation board identified above radiators in the board room & entrance lobby in the main building contains Chrysotile (white) & Amosite (brown) asbestos. Asbestos insulation boards usually contain between 15 to 40% asbestos fibres

The asbestos insulation board should be removed by a specialist asbestos removal contractor under controlled conditions and disposed of as asbestos waste before the refurbishment/demolition works commence

Removal of asbestos insulation board requires 14 days notification to the HSA

See Appendix F for more details

All asbestos removal 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

PHOENIX ENVIRONMENTAL SAFETY LTD.

ASBESTOS DATA SHEET

Created By	Eoghan Hickey
Date	18th February 2020
Site Details	Holycross College, Clonliffe Road, Dublin 9
Client Name	CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd.
Survey Type	R/D Asbestos Survey
Site Ref	PE 20-198-2
Building Ref.	Building 2 – Main Building
Location	Plant room
Extent/ Amount	75 linear meters total approx.



Survey Date	12.2.2020	Sample No.	BS 176660
Survey Company	Phoenix Environmental Safety Ltd.		
Testing Laboratory.	G & L Consultancy Ltd.		

MATERIAL ASSESSMENT		PRIORITY ASSESSMENT	
Product type	Thermal insulation	Normal occupant activity	N/A
Extent of damage	Medium	Likelihood of disturbance	N/A
Surface treatment	Sealed	Human exposure potential	N/A
Asbestos type	Amosite	Maintenance activity	N/A
Material assessment score: N/A	TOTAL SCORE: N/A	Priority assessment score: N/A	

CONCLUSIONS AND RECOMMENDATIONS

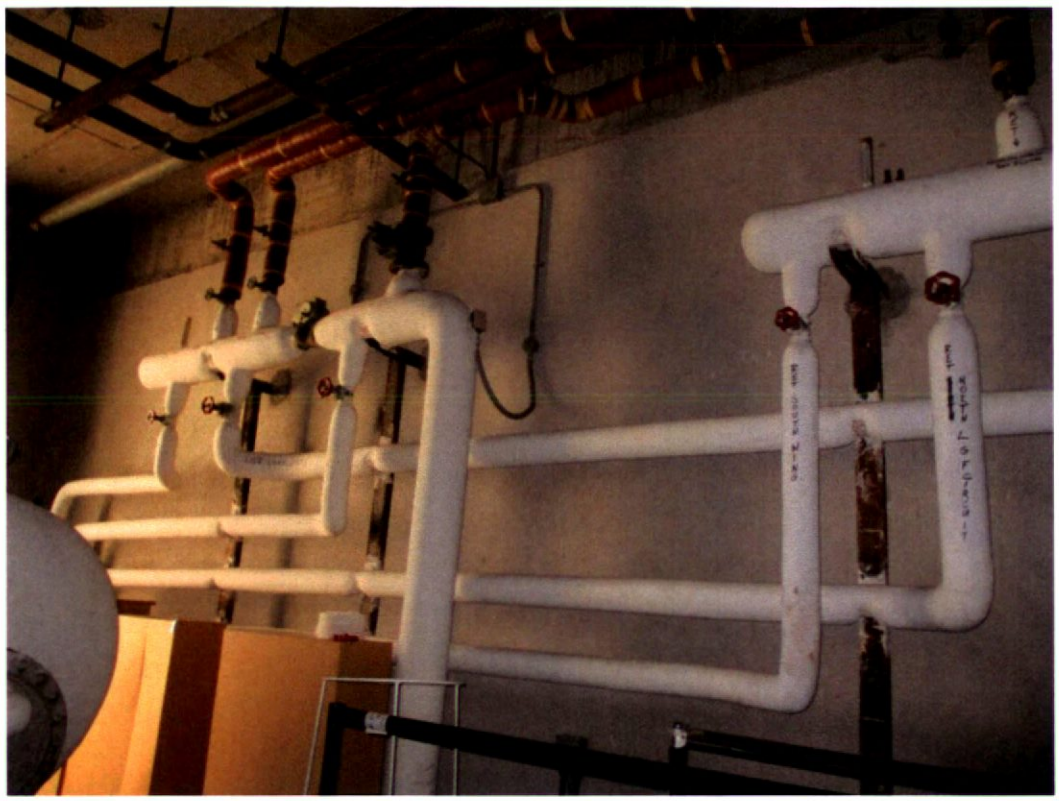
The thermal insulation on the pipework and on the 3 calorifiers in the ground floor plant room in the main building contains Amosite (brown) asbestos fibres. Asbestos thermal insulation can contain between 15-85% asbestos fibres

The asbestos containing thermal insulation should be removed by a specialist asbestos removal contractor and disposed of as asbestos waste before the refurbishment/demolition works commence. Access should be restricted to the Plant room. Removal works with the asbestos containing thermal insulation will require 14 days notification to the HSA

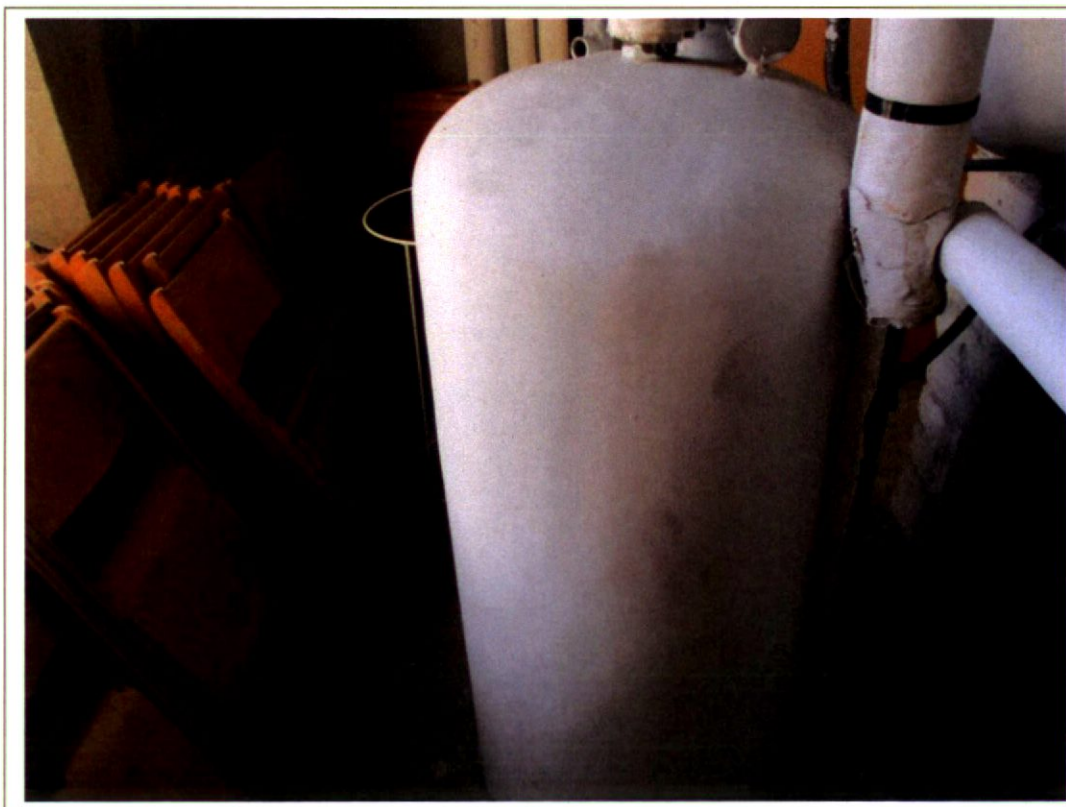
See Appendix F for more details

All asbestos removal 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

DETAIL OF THE ASBESTOS CONTAINING THERMAL INSULATION



Thermal insulation on the pipework in the ground floor plant room



Thermal insulation on the small calorifier in the ground floor plant room

PHOENIX ENVIRONMENTAL SAFETY LTD.

ASBESTOS DATA SHEET

Created By	Eoghan Hickey
Date	18th February 2020
Site Details	Holycross College, Clonliffe Road, Dublin 9
Client Name	CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd.
Survey Type	R/D Asbestos Survey
Site Ref	PE 20-198-2
Building Ref.	Building 2 – Main Building
Location	Main stairs – nosing
Extent/ Amount	1 per step



Survey Date	12.2.2020	Sample No.	BS 176653
Survey Company	Phoenix Environmental Safety Ltd.		
Testing Laboratory.	G & L Consultancy Ltd.		

MATERIAL ASSESSMENT		PRIORITY ASSESSMENT	
Product type	Stair nosing	Normal occupant activity	N/A
Extent of damage	Low	Likelihood of disturbance	N/A
Surface treatment	Composite material	Human exposure potential	N/A
Asbestos type	Chrysotile	Maintenance activity	N/A
Material assessment score: N/A	TOTAL SCORE: N/A	Priority assessment score: N/A	

CONCLUSIONS AND RECOMMENDATIONS

The step nosing's identified on the main stairs in the main building contains Chrysotile (white) asbestos fibres. Resins may contain between 20 and 50% asbestos fibres

The asbestos containing step nosing's may be left in situ and managed in place. However, if the forthcoming works are likely to disturb the step nosing's, then they should be removed by an asbestos asbestos removal contractor and disposed of as asbestos waste before the refurbishment/demolition works commence

See Appendix F for more details

All asbestos removal 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

PHOENIX ENVIRONMENTAL SAFETY LTD.

ASBESTOS DATA SHEET

Created By	Eoghan Hickey
Date	18th February 2020
Site Details	Holycross College, Clonliffe Road, Dublin 9
Client Name	CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd.
Survey Type	R/D Asbestos Survey
Site Ref	PE 20-198-2
Building Ref.	Building 2 – 1951 Building
Location	Central risers
Extent/ Amount	< 10 m² total approx.



Survey Date	12.2.2020	Sample No.	BS 176665
Survey Company	Phoenix Environmental Safety Ltd.		
Testing Laboratory.	G & L Consultancy Ltd.		

MATERIAL ASSESSMENT		PRIORITY ASSESSMENT	
Product type	Cement board	Normal occupant activity	N/A
Extent of damage	Medium	Likelihood of disturbance	N/A
Surface treatment	Sealed	Human exposure potential	N/A
Asbestos type	Chrysotile	Maintenance activity	N/A
Material assessment score: N/A	TOTAL SCORE: N/A	Priority assessment score: N/A	

CONCLUSIONS AND RECOMMENDATIONS

The cement boards and associated debris identified in the 1st floor and ground floor central risers in the 1951 building contain Chrysotile (white) asbestos. Asbestos cement products generally contain 10 to 15% asbestos fibres, bound in Portland cement

The cement boards should be removed by an asbestos removal contractor and disposed of as asbestos waste if they are likely to be disturbed as part of the forthcoming refurbishment/demolition works

See Appendix F for more details

All asbestos removal 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

DETAIL OF THE ASBESTOS CEMENT BOARDS



Asbestos cement board debris in the ground floor riser in the 1951 Building



Asbestos cement boards in the central risers in the 1951 Building

PHOENIX ENVIRONMENTAL SAFETY LTD.

ASBESTOS DATA SHEET

Created By	Eoghan Hickey
Date	18th February 2020
Site Details	Holycross College, Clonliffe Road, Dublin 9
Client Name	CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd.
Survey Type	R/D Asbestos Survey
Site Ref	PE 20-198-2
Building Ref.	Building 2 – 1951 Building
Location	Attic and service risers
Extent/ Amount	Not quantified



Survey Date	12.2.2020	Sample No.	
Survey Company	Phoenix Environmental Safety Ltd.		
Testing Laboratory.	G & L Consultancy Ltd.		

MATERIAL ASSESSMENT		PRIORITY ASSESSMENT	
Product type	Cement pipe (presumed)	Normal occupant activity	N/A
Extent of damage	Low	Likelihood of disturbance	N/A
Surface treatment	Sealed	Human exposure potential	N/A
Asbestos type	Crocidolite (presumed)	Maintenance activity	N/A
Material assessment score: N/A	TOTAL SCORE: N/A	Priority assessment score: N/A	

CONCLUSIONS AND RECOMMENDATIONS

The cement pipes identified in the central service risers and in the in the attic of the 1951 building were presumed to contain Crocidolite (blue) asbestos. Asbestos cement products generally contain 10 to 15% asbestos fibres, bound in Portland cement

The asbestos cement pipes may be left in situ and managed in place. However, if the forthcoming works are likely to disturb the cement pipes, then they should be removed by an asbestos asbestos removal contractor and disposed of as asbestos waste before the refurbishment/demolition works commence

See Appendix F for more details

All asbestos removal 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

DETAIL OF THE ASBESTOS CEMENT FLUE PIPE



An asbestos cement flue pipe identified in the service riser in the 1951 Building



Asbestos cement flue pipe identified in the service riser in the 1951 Building

PHOENIX ENVIRONMENTAL SAFETY LTD.

ASBESTOS DATA SHEET

Created By	Eoghan Hickey
Date	18th February 2020
Site Details	Holycross College, Clonliffe Road, Dublin 9
Client Name	CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd.
Survey Type	R/D Asbestos Survey
Site Ref	PE 20-198-2
Building Ref.	Building 2 – 1951 Building
Location	1st floor & ground floor riser
Extent/ Amount	1 calorifier



Survey Date	12.2.2020	Sample No.	BS 176664
Survey Company	Phoenix Environmental Safety Ltd.		
Testing Laboratory.	G & L Consultancy Ltd.		

MATERIAL ASSESSMENT		PRIORITY ASSESSMENT	
Product type	Thermal insulation	Normal occupant activity	N/A
Extent of damage	High	Likelihood of disturbance	N/A
Surface treatment	Sealed	Human exposure potential	N/A
Asbestos type	Amosite	Maintenance activity	N/A
Material assessment score: N/A	TOTAL SCORE: N/A	Priority assessment score: N/A	

CONCLUSIONS AND RECOMMENDATIONS

The thermal insulation on the calorifier in the 1st floor and ground floor riser in the 1951 building contains Amosite (brown) asbestos fibres. Asbestos thermal insulation can contain between 15-85% asbestos fibres

The asbestos containing thermal insulation should be removed by a specialist asbestos removal contractor and disposed of as asbestos waste before the refurbishment/demolition works commence

This area is in very poor condition and access should be restricted to this area. Removal works with the asbestos containing thermal insulation will require 14 days notification to the HSA

See Appendix F for more details

All asbestos removal 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

PHOENIX ENVIRONMENTAL SAFETY LTD.

ASBESTOS DATA SHEET

Created By	Eoghan Hickey
Date	18th February 2020
Site Details	Holycross College, Clonliffe Road, Dublin 9
Client Name	CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd.
Survey Type	R/D Asbestos Survey
Site Ref	PE 20-198-2
Building Ref.	Building 2 – 1951 Building
Location	Lower ground floor pipework
Extent/ Amount	5 linear meters approx.



Survey Date	12.2.2020	Sample No.	BS 176669
Survey Company	Phoenix Environmental Safety Ltd.		
Testing Laboratory.	G & L Consultancy Ltd.		

MATERIAL ASSESSMENT		PRIORITY ASSESSMENT	
Product type	Thermal insulation	Normal occupant activity	N/A
Extent of damage	High	Likelihood of disturbance	N/A
Surface treatment	Sealed	Human exposure potential	N/A
Asbestos type	Amosite	Maintenance activity	N/A
Material assessment score: N/A	TOTAL SCORE: N/A	Priority assessment score: N/A	

CONCLUSIONS AND RECOMMENDATIONS

The thermal insulation on the pipework outside the lower ground floor boiler rooms in the 1951 building contains Amosite (brown) asbestos fibres. Asbestos thermal insulation can contain between 15-85% asbestos fibres

The asbestos containing thermal insulation should be removed by a specialist asbestos removal contractor and disposed of as asbestos waste before the refurbishment/demolition works commence

The pipework is in poor condition and access should be restricted to this area. Removal works with the asbestos containing thermal insulation will require 14 days notification to the HSA

See Appendix F for more details

All asbestos removal 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

PHOENIX ENVIRONMENTAL SAFETY LTD.

ASBESTOS DATA SHEET

Created By	Eoghan Hickey
Date	18th February 2020
Site Details	Holycross College, Clonliffe Road, Dublin 9
Client Name	CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd.
Survey Type	R/D Asbestos Survey
Site Ref	PE 20-198-2
Building Ref.	Building 2 – 1951 Building
Location	Rear outbuildings – roof
Extent/ Amount	150 m² approx.



Survey Date	12.2.2020	Sample No.	BS 176667
Survey Company	Phoenix Environmental Safety Ltd.		
Testing Laboratory.	G & L Consultancy Ltd.		

	MATERIAL ASSESSMENT		PRIORITY ASSESSMENT
Product type	Cement sheeting	Normal occupant activity	N/A
Extent of damage	High	Likelihood of disturbance	N/A
Surface treatment	Sealed	Human exposure potential	N/A
Asbestos type	Chrysotile	Maintenance activity	N/A
	Material assessment score: N/A	TOTAL SCORE: N/A	Priority assessment score: N/A

CONCLUSIONS AND RECOMMENDATIONS

The cement sheeting and associated debris identified on the roof of the rear outbuildings contains Chrysotile (white) asbestos. Asbestos cement products generally contain 10 to 15% asbestos fibres, bound in Portland cement

The cement sheeting and associated debris should be removed by an asbestos removal contractor and disposed of as asbestos waste if they are to be disturbed as part of the forthcoming refurbishment works

See Appendix F for more details

All asbestos removal 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

DETAIL OF THE ASBESTOS CEMENT SHEETING



Asbestos cement sheeting identified in the rear outbuildings the 1951 Building



Asbestos cement sheeting debris identified in the rear outbuildings the 1951 Building

PHOENIX ENVIRONMENTAL SAFETY LTD.

ASBESTOS DATA SHEET

Created By	Eoghan Hickey
Date	18th February 2020
Site Details	Holycross College, Clonliffe Road, Dublin 9
Client Name	CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd.
Survey Type	R/D Asbestos Survey
Site Ref	PE 20-198-2
Building Ref.	Building 2
Location	Older pipework throughout
Extent/ Amount	1 per older pipework flange



Survey Date	12.2.2020	Sample No.	BS 176668
Survey Company	Phoenix Environmental Safety Ltd.		
Testing Laboratory.	G & L Consultancy Ltd.		

	MATERIAL ASSESSMENT		PRIORITY ASSESSMENT
Product type	CAF gasket	Normal occupant activity	N/A
Extent of damage	Low	Likelihood of disturbance	N/A
Surface treatment	Sealed	Human exposure potential	N/A
Asbestos type	Chrysotile	Maintenance activity	N/A
	Material assessment score: N/A	TOTAL SCORE: N/A	Priority assessment score: N/A

CONCLUSIONS AND RECOMMENDATIONS

The Compressed Asbestos Fibre (CAF) gaskets identified between the older pipe work flanges throughout Building 2 contains Chrysotile (white) asbestos fibres. CAF Gaskets contain almost 100% asbestos fibres, with a small amount of binder

The CAF gaskets may be left in situ and managed in place. However, if the forthcoming works are likely to disturb the CAF gaskets, then they should be removed by an asbestos asbestos removal contractor and disposed of as asbestos waste before the refurbishment/demolition works commence

See Appendix F for more details

All asbestos removal 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

DETAIL OF THE CAF GASKETS



MANAGEMENT OF COMPRESSED ASBESTOS FIBRE GASKETS

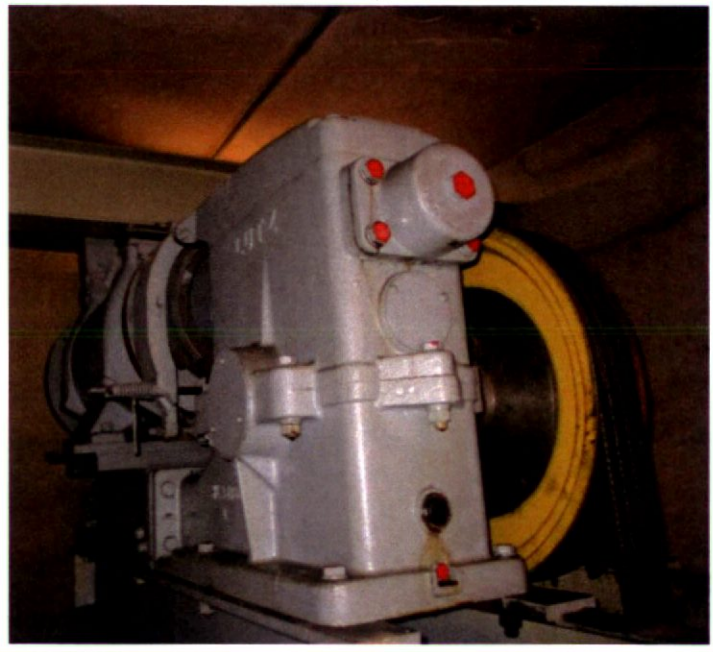
Some high-level pipework was located throughout the building while other gaskets are recessed deep into the flange. These valves should be treated the same as the asbestos containing gaskets as it is always difficult to give an accurate quantification to the asbestos containing gaskets throughout the building as sampling every flange on site is not possible.

If a gasket which is considered to contain asbestos is encountered, it must be dealt with and disposed of in a controlled manner. However, if a gasket is clearly formed of rubber, plastic, graphite or metal normal operating procedures should be used for removal. If a gasket is not readily identifiable (as non-asbestos) it should be presumed asbestos containing and the necessary precautions and controls implemented during removal works.

PHOENIX ENVIRONMENTAL SAFETY LTD.

ASBESTOS DATA SHEET

Created By	Eoghan Hickey
Date	18th February 2020
Site Details	Holycross College, Clonliffe Road, Dublin 9
Client Name	CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd.
Survey Type	R/D Asbestos Survey
Site Ref	PE 20-198-2
Building Ref.	Building 2
Location	Lift motors throughout
Extent/ Amount	1 per older brake pad



Survey Date	12.2.2020	Sample No.	
Survey Company	Phoenix Environmental Safety Ltd.		
Testing Laboratory.	G & L Consultancy Ltd.		

	MATERIAL ASSESSMENT		PRIORITY ASSESSMENT
Product type	Resin brake shoe (presumed)	Normal occupant activity	N/A
Extent of damage	Low	Likelihood of disturbance	N/A
Surface treatment	Sealed	Human exposure potential	N/A
Asbestos type	Crocidolite (presumed)	Maintenance activity	N/A
	Material assessment score: N/A	TOTAL SCORE: N/A	Priority assessment score: N/A

CONCLUSIONS AND RECOMMENDATIONS

The brake shoes visually identified on the lift motors in the lift motor rooms throughout were live and could not be sampled. These brake shoes were presumed to contain Crocidolite (blue) asbestos fibers

The brake shoes may be left in situ and managed in place. If any future works are likely to disturb the lift motors, the brake shoes should be sampled for the presence of asbestos

See Appendix F for more details

All asbestos removal 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

APPENDIX D

NON ASBESTOS CONTAINING MATERIALS

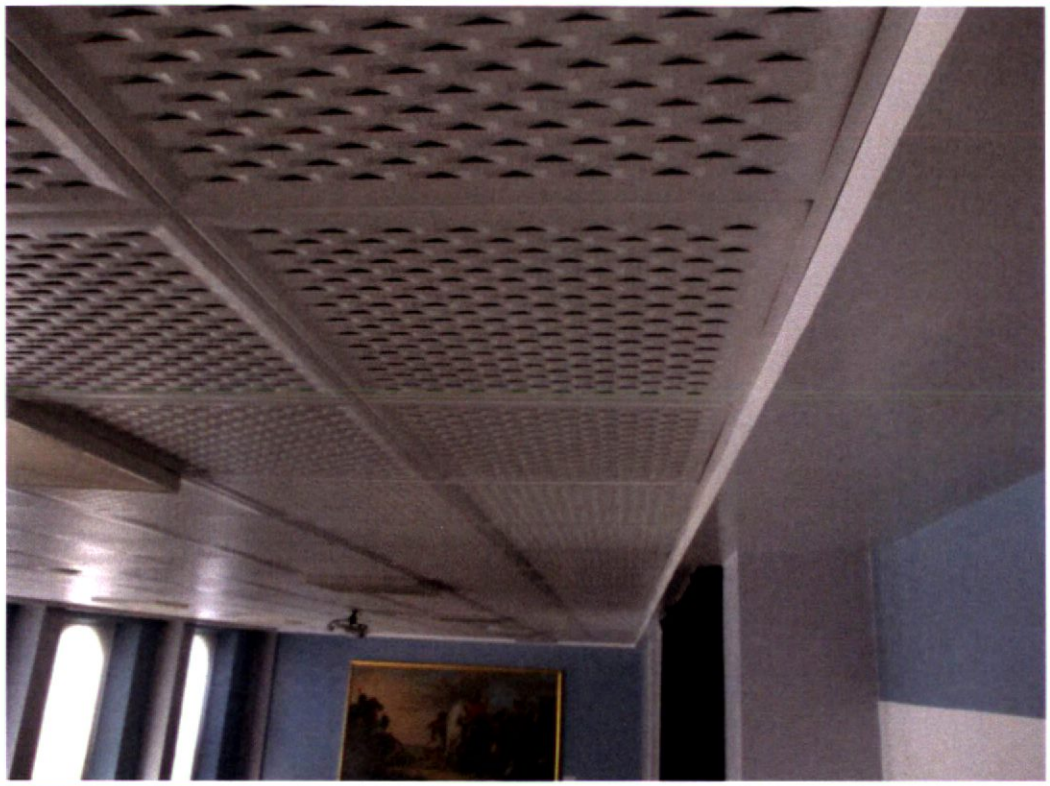


Natural slates on the roof of the main building



Plasterboards on the 2nd floor ceilings

NON ASBESTOS CONTAINING MATERIALS

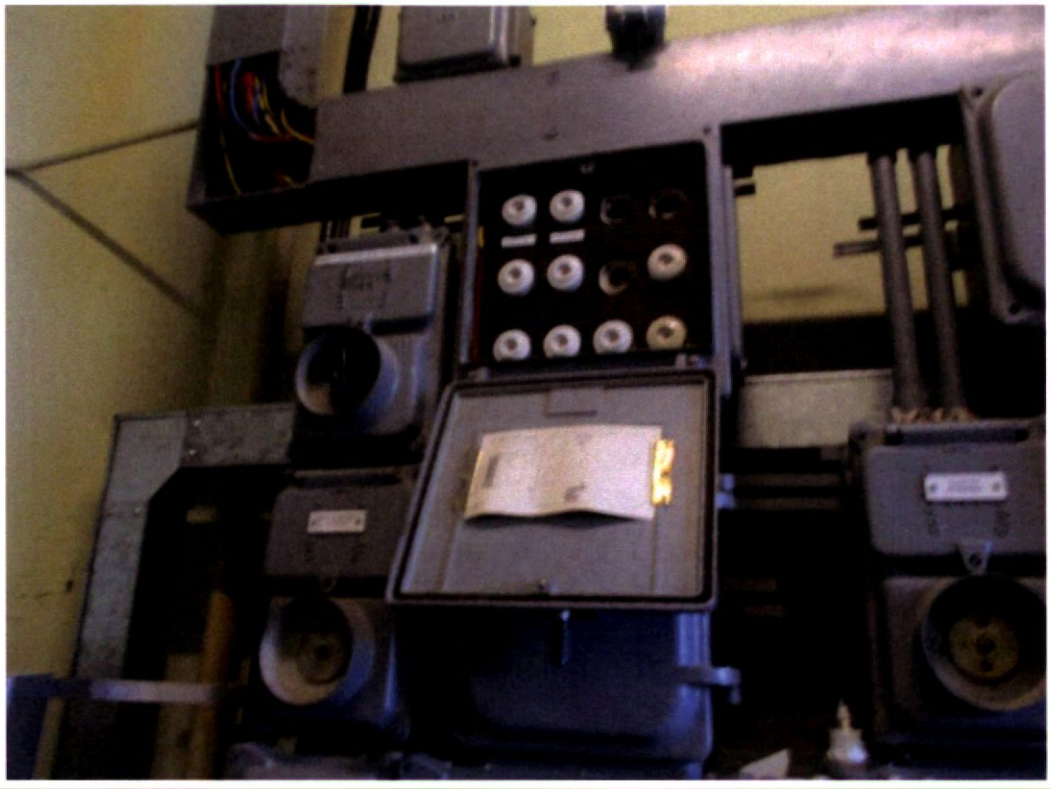


Metal panels on the ceilings in the 1st floor chapter room in the Main Building



Floor covering in the corridors and offices in the Main Building

NON ASBESTOS CONTAINING MATERIALS



Rope on the electrical boxes in the ground floor electrical room in the Main Building



Floor covering in the offices on the ground floor in the Main Building

NON ASBESTOS CONTAINING MATERIALS



Bitumen under hardwood floor in the 1st floor server room in the 1951 Building



Pipework insulation outside the rear outbuildings in the 1951 Building

APPENDIX E

NON ACCESSIBLE LOCATIONS

- The property was live during the survey and intrusive sampling was restricted. Floors which could not be easily lifted and resealed were only visually inspected e.g. floors containing ceramic tiles or hardwood flooring. The areas behind the interlocking ceiling tiles (see below) were not inspected as the building was live and removing the tiles would cause damage to the overall integrity of the ceiling tiles



- The external outbuildings were inaccessible as they are in use by other agencies/companies not associated with the Holycross College. The internal areas were not accessible

- The roof areas were inspected where possible, however sampling of flat roof areas was restricted so as not to cause a leak to the areas below

- Almost all floors throughout Building 2 were in use and several areas were locked and these are highlighted in Appendix F

- All inaccessible areas noted in this section are to be re-inspected once the building becomes unoccupied as agreed with the Virtus Project Management representative prior to the commencement of this initial survey

- No inspection was carried on flues, ducts, voids and similar enclosed areas, the access to which would necessitate the use of specialist equipment or tools, or which would have caused damage to decorations, fixtures, fittings or the structure of the building

Continued….

NON ACCESSIBLE LOCATIONS

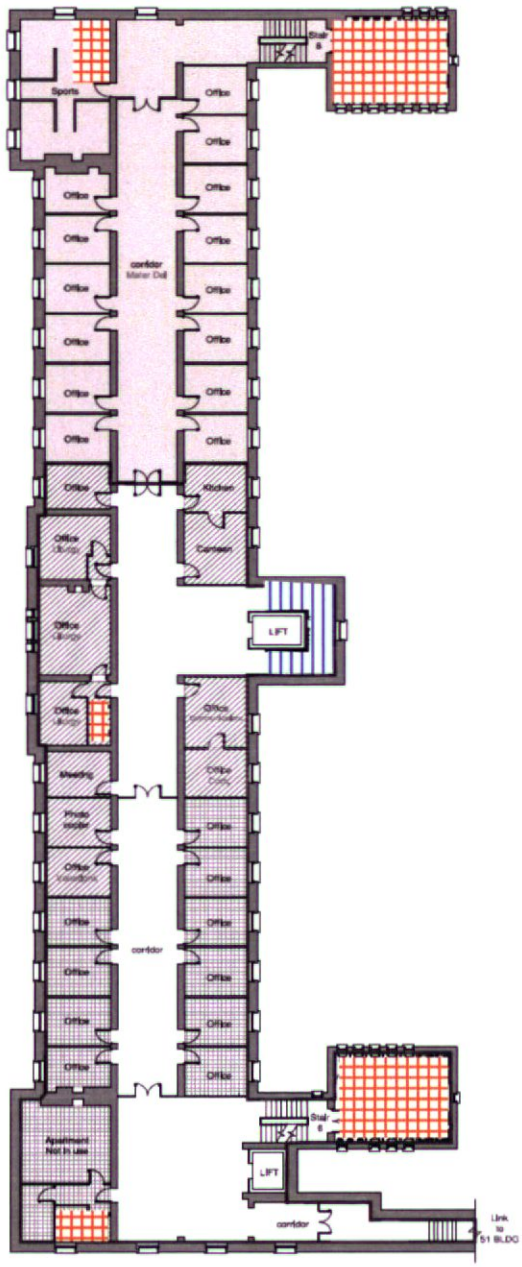
- No inspection of live electrical or mechanical plant or similar requiring the attendance of a specialist engineer was carried out. No metal insulation jackets were removed to inspect insulation
- No inspection of any high-level areas requiring specialist access equipment other than telescopic ladder was carried out
- Samples have not been taken where the act of sampling would endanger the surveyors or affect the functional integrity of the item concerned
- All contractors working on the site should always remain vigilant to the possibility that concealed asbestos containing materials may be present on site. If any suspect asbestos containing materials are uncovered during the course of the work, works must stop in that area and the suspect material should be sampled and analysed immediately for the presence of asbestos

APPENDIX F

FLOOR PLANS & LOCATION OF ASBESTOS CONTAINING MATERIALS

Schematic diagram only Not to scale 18th February 2020	Building 2, Holycross College, Clonliffe Road, Dublin 9

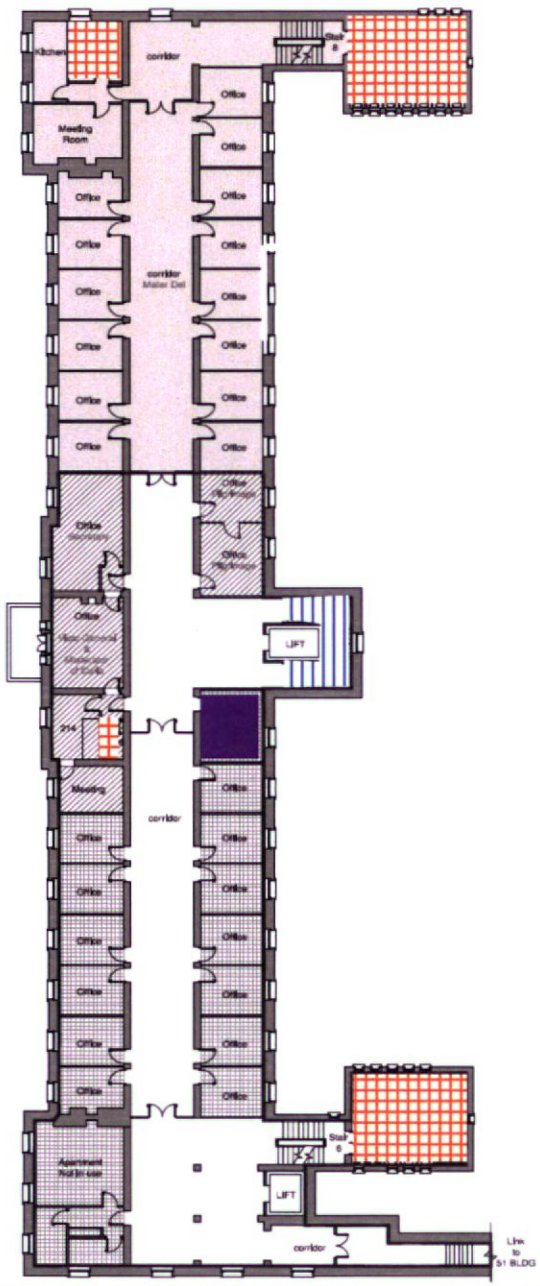
MAIN BUILDING – 3RD FLOOR PLAN



	Areas where asbestos insulation board ceiling panels were identified
	Areas where asbestos containing stair nosing's were identified
	Please Note: asbestos cement pipes were identified over the risers in the attic
	Please Note: asbestos containing brake shoes were presumed in the live lift motor rooms
	Please Note: CAF were identified between the older pipework flanges throughout

Schematic diagram only Not to scale 18th February 2020	Building 2, Holycross College, Clonliffe Road, Dublin 9

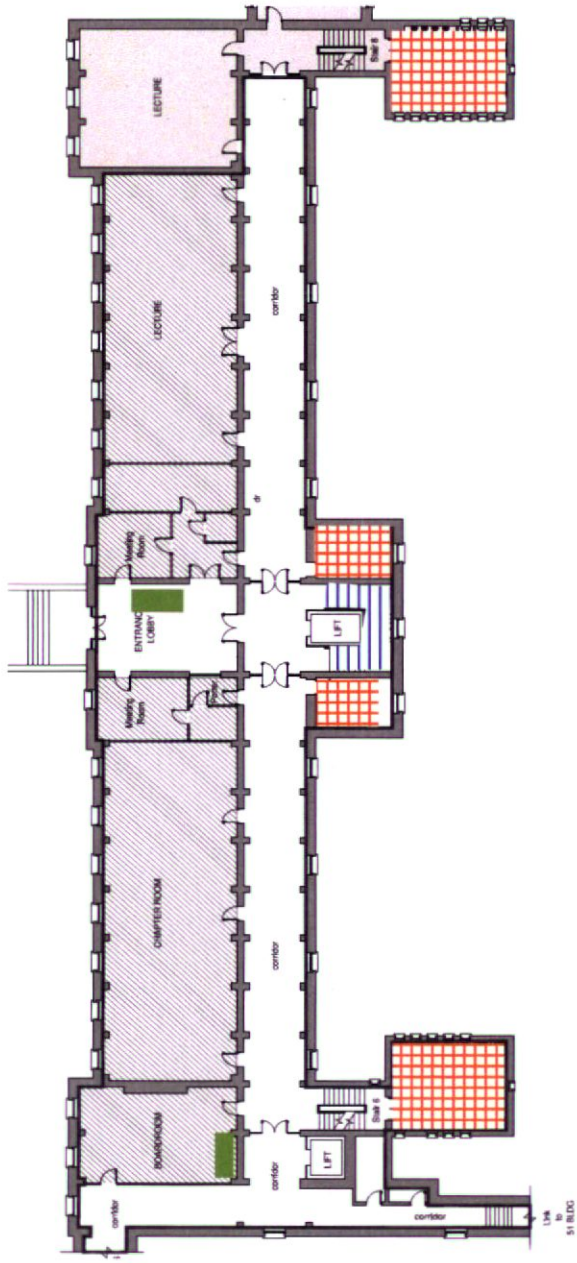
MAIN BUILDING – 2ND FLOOR PLAN



	Areas where asbestos insulation board ceiling panels were identified
	Areas where asbestos containing stair nosing's were identified
	Areas which were inaccessible
	Please Note: CAF were identified between the older pipework flanges throughout

Schematic diagram only Not to scale 18th February 2020	Building 2, Holycross College, Clonliffe Road, Dublin 9

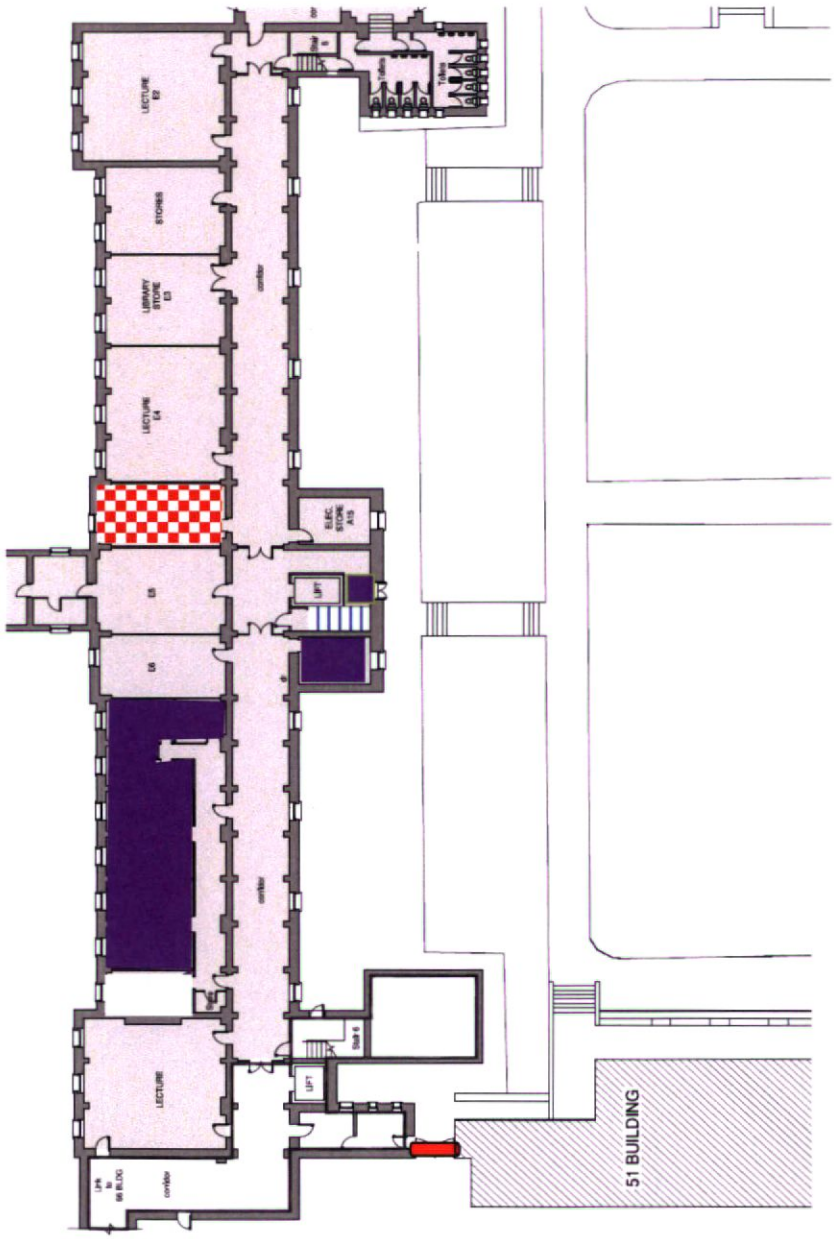
MAIN BUILDING – 1ST FLOOR PLAN



	Areas where asbestos insulation board ceiling panels were identified
	Areas where asbestos containing stair nosing's were identified
	Areas where asbestos insulation board radiator panels were identified
	Please Note: CAF were identified between the older pipework flanges throughout

Schematic diagram only Not to scale 18th February 2020	Building 2, Holycross College, Clonliffe Road, Dublin 9

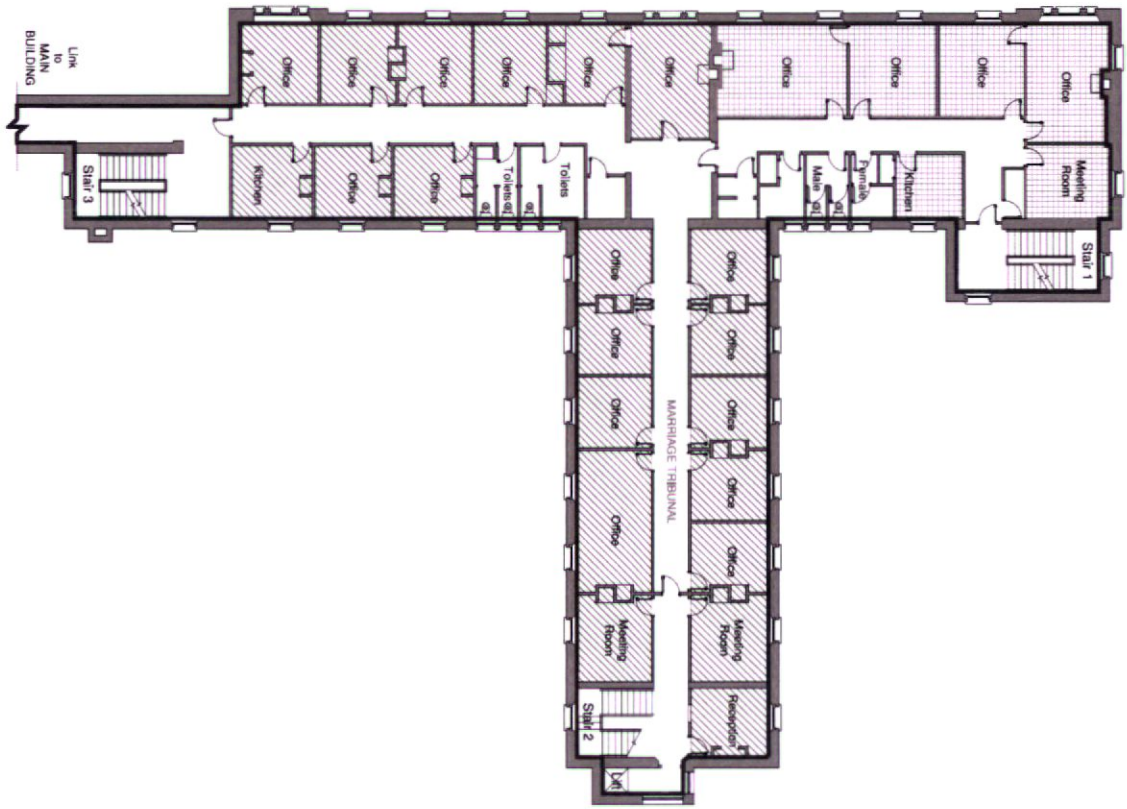
MAIN BUILDING – GROUND FLOOR PLAN



	Areas where asbestos containing thermal insulation was identified on pipework and calorifiers
	Areas where asbestos containing thermal insulation was identified on pipework
	Areas which were inaccessible
	Please Note: CAF were identified between the older pipework flanges throughout

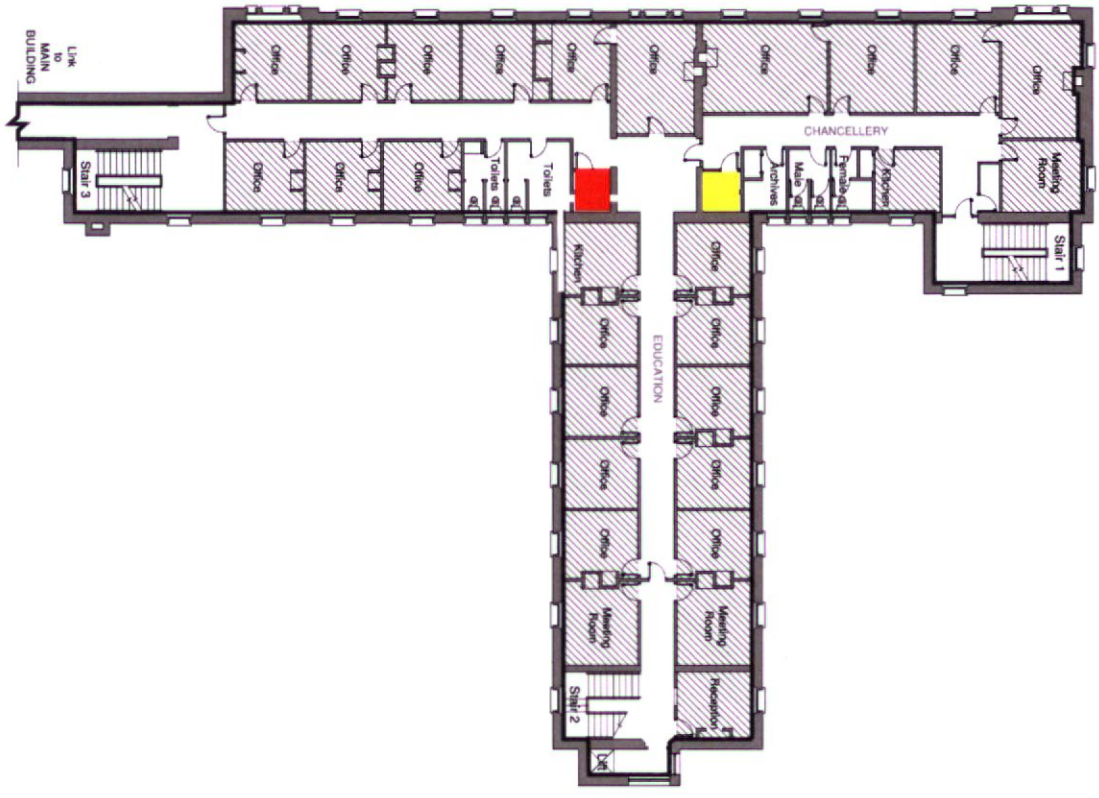
Schematic diagram only Not to scale 18th February 2020	Building 2, Holycross College, Clonliffe Road, Dublin 9

1951 BUILDING – 2ND FLOOR PLAN


Link to MAIN BUILDING
Stair 3
Kitchen
Office
Toilets
Toilets
Office
Office
Office

Schematic diagram only Not to scale 18th February 2020	Building 2, Holycross College, Clonliffe Road, Dublin 9

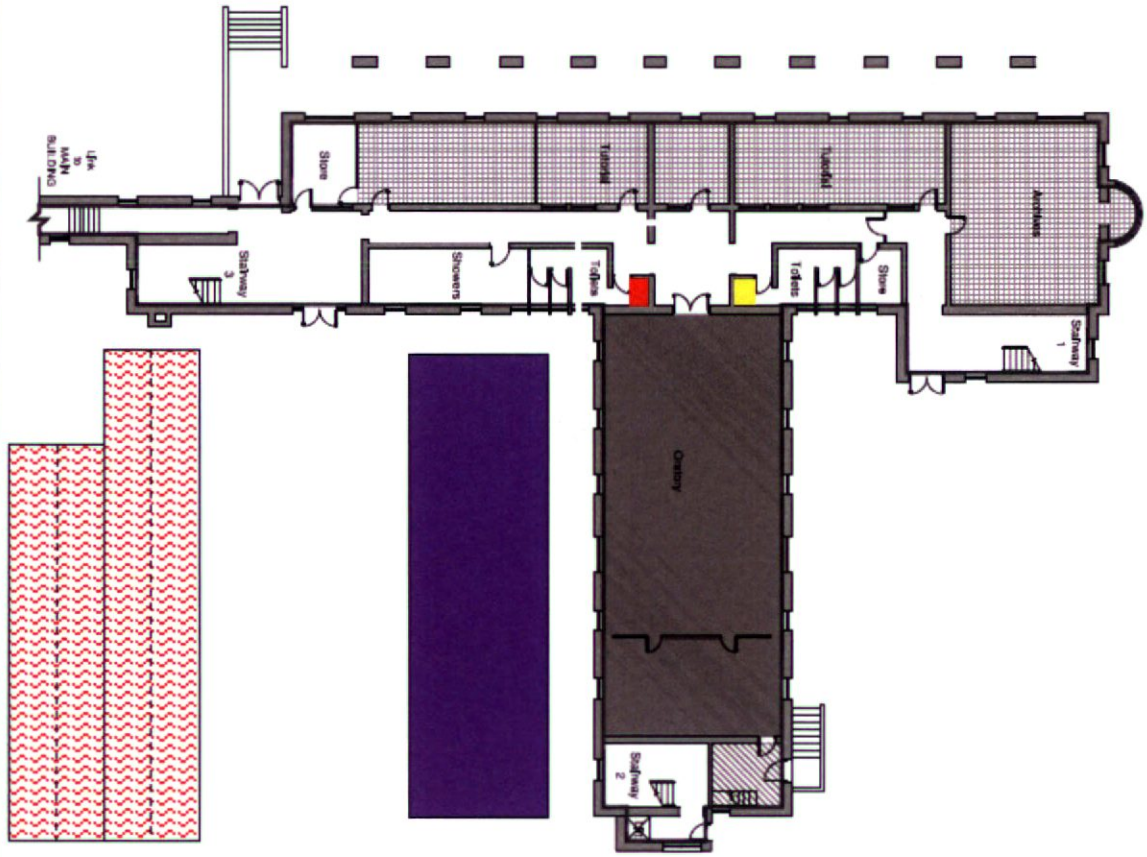
1951 BUILDING – 1ST FLOOR PLAN



	Areas where an asbestos containing thermal insulation, cement downpipe & cement boards were identified
	Areas where an asbestos cement downpipe & cement boards were identified
	Please Note: CAF were presumed between the older pipework flanges throughout

Schematic diagram only Not to scale 18th February 2020	Building 2, Holycross College, Clonliffe Road, Dublin 9

1951 BUILDING – GROUND FLOOR PLAN



	Areas where an asbestos containing thermal insulation was identified
	Areas where an asbestos containing cement downpipe & cement boards were identified
	Areas where an asbestos containing cement sheeting and associated debris was identified
	Areas which were inaccessible
	Please Note: CAF were presumed between the older pipework flanges throughout

Phoenix Environmental Safety Ltd.

ASBESTOS SURVEY REPORT

(Refurbishment / Demolition Survey)

Client: CWTC Multi Family ICAV,
C/O Hines Real Estate Ireland Ltd., Clanwilliam Place, Dublin 2

Location: Building 3 (Church & Link Building),
Holycross College, Clonliffe Road, Dublin 9

Date: 18th February 2020

Report No. PE 20-198-3

Phoenix
Environmental
Safety Ltd.

Graigueswood, Freshford, Co. Kilkenny
Tel: 056 8832414
Fax: 056 8832950
admin@phoenixenv.ie
www.phoenixenv.ie

Client: CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd., Clanwilliam Place, Dublin 2

Location: Building 3 (Church & Link Building), Holycross College, Clonliffe Road, Dublin 9

Asbestos Survey Report Type: Refurbishment / Demolition Survey

Survey Company: Phoenix Environmental Safety Ltd.

Surveyors: John Hickey & Jane Hickey

Testing Laboratory: G & L Consultancy Ltd.

Date of Survey: 12th February 2020

Date of Survey Report: 18th February 2020

Report issue: Final

Signed: *Jane Hickey* Date: 18th February 2020

This report cannot be used for contractual or engineering purposes unless this sheet is signed where indicated by Surveyor. The report must also be designated `final` on the signatory sheet.

Please note that Phoenix Environmental Safety Ltd. cannot be held responsible for the way in which the Client interprets or acts upon the results.

The report must be read in its entirety including any appendices. Phoenix Environmental Safety Ltd. accepts no responsibility for sub-division of this report. All measurements in this report are approximate and therefore should not be used by the asbestos removal contractor for pricing purposes. The asbestos removal contractors should ascertain for themselves, by site measurements and inspection, the exact nature and extent of the work to be done.

The survey information should be used to help in the tendering process for removal of ACMs from the vessel before work starts. The survey report should be supplied by the client to designers and contractors who may be bidding for the work, so that the asbestos risks can be addressed. In this type of survey, where the asbestos is identified so that it can be removed (rather than to manage it), the survey does not normally assess the condition of the asbestos, other than to indicate areas of damage or where additional asbestos debris may be present. However, where the asbestos removal may not take place for some time, the ACMs' condition will need to be assessed and the materials managed

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SUMMARY

Following a request made by Virtus Project Management, we have produced this Refurbishment / Demolition Survey report for Building 3 (Church and Link Building) at Holycross College, Clonliffe Road, Dublin 9 with the aim of finding asbestos containing materials (ACMs) within the scope of the asbestos survey.

The scope of the asbestos survey was confined to all accessible areas of the Church and Link Building which are due to undergo refurbishment works in the near future. The buildings were live and to remain in use following the asbestos survey and destructive surveying and sampling was curtailed.

During the asbestos survey of Building 3 (Church and Link Building), the following asbestos containing materials were detected in the following locations:

- Asbestos textile material was identified in the dome lights clamps on the flat roof area
- Asbestos containing floor tiles and adhesive was identified in the electrical panel area and computer room on the ground floor and in the lecture room on the first floor (150 m^2 total approx.)

See Appendix C & F for more details



INTRODUCTION

Background

Asbestos has been used extensively in the building industry for over one hundred years and has proved to be an excellent product for a variety of uses, having many qualities such as insulation, fire and chemical resistance to name a few. Its suitability across a wide range of uses and its relatively cheap cost made it very popular, with over 3,000 different asbestos products having been recorded.

The use of asbestos containing materials (ACM's) was most prevalent between the 1950's and 1970's when it provided an economic, easy to use and versatile material. Unfortunately, given the constitution and make up of asbestos it can give rise to microscopic airborne fibres being released into the working environment. The fibres have carcinogenic properties caused by inhalation of the fibres which can get lodged in the lining of the lungs causing disease and death.

Scope & Purpose

CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd. have commissioned Phoenix Environmental Safety Ltd. to undertake an asbestos survey of Building 3 (Church and Link Building) at Holycross College, Clonliffe Road, Dublin 9. The aim of the survey was to locate and identify the presence of asbestos containing materials (ACM's) or suspected ACM's. This report provides a record and assessment of the extent and characteristics of ACM's and is based on information made available on the 12th February 2020.

This particular survey comprised of a Refurbishment / Demolition Survey, carried out in accordance with S.I. No. 386 of 2006 Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006, the Health and Safety Executive's (UK) guidance document HSG 264 (Asbestos: The Survey Guide) and HSG 227 (A Comprehensive Guide to managing Asbestos in Premises).

This means that:

- As far as reasonably practicable, locate and describe all ACM's in all reasonably accessible areas within the scope of the survey
- A sampling programme is undertaken to identify possible ACM's and estimates of the volumes and the surface areas of ACM made
- A record of the condition of the ACM's or where additional asbestos debris may be expected to be present is produced

Refurbishment / Demolition Surveys (formerly type 3 surveys)

This type of survey is necessary prior to any refurbishment (including "minor") or demolition work being carried out. These "refurbishment / demolition" surveys will be much more intrusive and destructive compared with management surveys as their intention is to locate all the ACMs so that they can be removed before the refurbishment or demolition takes place. Refurbishment/demolition surveys are required as necessary when the needs or use of the building changes and the fabric of the building will be disturbed or complex fixed plant and equipment are to be dismantled.

The purpose of the report is to:

- Enable the client to take appropriate precautions so that people who work in the Church and Link building (Building 3) during the forthcoming works are not exposed to asbestos-related health risks
- Provide information to assist the client in developing and implementing an action plan before any refurbishment works or demolition is carried out

Presentation of Findings

Data Sheets

A series of data sheets have been prepared to provide assessments and recommendations for each of the locations where samples were taken. These data sheets are presented in Appendix C.

Figures

The schematic diagrams presented in Appendix F at the rear of this document shows the locations of all of the asbestos containing materials detected during the asbestos survey.

Caveats

All reasonable steps have been taken to ensure that the contents and findings of this report are true and accurate. Though as stated below, further undetected ACM's may still be present within the premises. The client should therefore be aware of his responsibilities for identifying, locating, removing and/or managing all ACM's within the premises, and for notifying the appropriate authorities where necessary.

Refurbishment / Demolition Surveys

This type of survey employs the use of destructive sampling techniques of an unfamiliar site. Although every effort is made to locate all asbestos containing materials, it is impossible to rule out the possibility that undiscovered asbestos materials may be present. If the building is to undergo major refurbishment or demolition, it is recommended that the persons carrying out the work are made aware of this and take sufficient precautions, as may be appropriate, to ensure the health and safety of their own employees and any other parties who may be affected by the works.

APPENDIX A

ASBESTOS MATERIALS IN BUILDINGS

Sprayed coatings applied in Ireland were typically a mixture of hydrated asbestos cement containing up to 85% asbestos, mainly amosite but crocidolite and mixtures have been used. Primarily used for anti-condensation and acoustic control and fire protection to structural steelwork. It is a friable material but if in a good condition and unlikely to be disturbed presents no immediate danger; however it is likely to release fibres, if disturbed especially during repair and maintenance work. As it ages the binding medium of sprayed asbestos may degrade with the consequent release of more fibres.

Thermal insulation to boilers, vessels, pipe work, valves, pumps etc also known as hand applied lagging. Lagging may have a protective covering of cloth, tape, paper, metal or a surface coating of cement. All types of asbestos may be found in lagging and the content can vary between 15 and 85% asbestos with the protective papers being up to 100% chrysotile. The likelihood of fibre release depends upon its composition, friability and state of repair, but it is particularly susceptible to damage and disturbance through maintenance work or the action of water leaks.

Asbestos insulating boards usually contain between 16 to 40% amosite, although boards may be found to contain other types of asbestos and in other quantities. Insulating boards were developed in the 1950s to provide an economical, lightweight, fire resisting insulating material. As insulation board is semi-compressed it is more likely to release fibres as a result of damage or abrasion. Work on asbestos insulation board can give rise to high levels of asbestos fibre.

Asbestos cement products as in roofing slates, wall cladding, permanent shuttering, flue, rain water and vent pipes generally contain 10 to 15% of asbestos fibre bounded in Portland cement, some flexible boards contain a small proportion of cellulose. All three types of asbestos have been used in the manufacture of asbestos cement. The asbestos fibres in asbestos cement are usually firmly bound in the cement matrix and will be released only if the material is mechanically damaged or as it deteriorates with age.

Ropes and yarns are usually high in asbestos content, approaching 100% and all three types of asbestos have been used in their manufacture. They were used as in the pipe lagging process and in pipe jointing and also for packing materials as in heat/fire resistant boiler, oven and flue sealing or anywhere thermal of fire protection was required. The risk of fibre release depends upon the structure of the material; bonded gasket material is unlikely to release asbestos but an unbonded woven material may give rise to high fibre release especially if when damaged or frayed.

Cloth thermal insulation and lagging, including fire resistant blankets, mattresses and protective curtains, gloves, aprons, overalls etc. All types of asbestos have been used in the manufacture but since the mid 60's the majority has been chrysotile, the content of which can be up to 100 %.

Millboard, paper and CAF gaskets usually have an asbestos content approaching 100% with all three types of asbestos being used in their manufacture. They were used for insulation of electrical equipment and for thermal insulation. Asbestos paper has been used as a laminate for fireproofing to various fibre panels. These materials are on some occasions not well bonded and will release asbestos fibres if subject to abrasion and wear.

Bitumen felts and coatings may contain asbestos either bound in the bitumen matrix or as an asbestos paper liner. These materials are not likely to present a hazard during normal installation or use, but should be removed and disposed of in compliance with any regulation applicable.

Vinyl, thermoplastic floor tiles can contain up to 25% asbestos usually chrysotile, PVC vinyl floor tiles and unbacked PVC flooring normally 7-10% chrysotile and asbestos paper backed PVC flooring the paper backing may contain up to 100% chrysotile. Fibre release is not normally an issue but may occur when the material is cut or subjected to abrasion.

Textured coatings. Decorative coatings on walls and ceilings usually contain 3-5% chrysotile. Fibre release may occur when subjected to abrasion.

Mastics, sealants, putties and floor tile adhesives may contain small amounts of asbestos. The only possible risk is from sanding of hardened material when appropriate precautions should be taken.

Reinforced plastic and resin composites, used for toilet cisterns, seats, banisters, stair nosings, window seals, lab bench tops, brakes and clutches in machines. The plastics usually contain 1-10% chrysotile and were used in for example car batteries to improve the acid resistance. Resins may contain between 20 and 50% amosite, but because of its composition fibre release is likely to be low.

ASBESTOS FIBRE TYPE COMMON NAMES	
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	N/A
Fibrous Anthophyllite	N/A
Fibrous Tremolite	N/A



Chrysotile Amosite Crocidolite



Tremolite Actinolite Anthophyllite

APPENDIX B

RESULTS OF LABORATORY ANALYSIS

ASBESTOS BULK IDENTIFICATION REPORT

Report no: PE20-198-3	Date of Issue: 17th February 2020

Client details:

CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd., Clanwilliam Place, Dublin 2

Identification of asbestos content of suspected asbestos containing material stated to have been sampled from the following location/site:

Building 3 (Church and Link Building), Holycross College, Clonliffe Road, Dublin 9

No of Samples received: 8	Date of receipt of samples: 12.2.2020	Date of analysis: 17.2.2020

TEST RESULTS

LAB. REF.	SAMPLE NO.	LOCATION	MATERIAL	ASBESTOS TYPE
S 01	BS 176675	Church - electrical panel area	Floor tile & Adhesive	Chrysotile
S 02	BS 176676	Church - room to organ area – marmoleum	Floor tile	No asbestos detected in sample
S 03	BS 176677	Link - ground floor computer room	Floor tile and adhesive	Chrysotile
S 04	BS 176678	Link - 1st floor - lecture room	Floor tile and adhesive	Chrysotile
S 05	BS 176679	Link - flat roof - dome light	Textile	Chrysotile

LABORATORY ANALYST	G & L Consultancy Ltd.	DATE:	17th February 2020

APPENDIX C

ASBESTOS DATA SHEETS



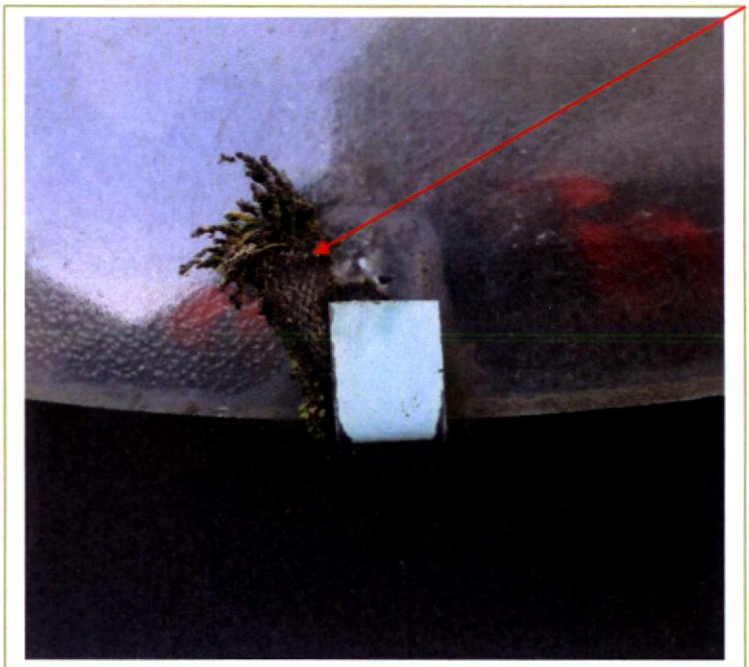
Building 3 (Church and Link Building), Holycross College, Clonliffe Road, Dublin 9



PHOENIX ENVIRONMENTAL SAFETY LTD.

ASBESTOS DATA SHEET

Created By	Jane Hickey
Date	18th February 2020
Site Details	Holycross College, Clonliffe Road, Dublin 9
Client Name	CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd.
Survey Type	R/D Asbestos Survey
Site Ref	PE 20-198-3
Building Ref.	Building 3
Location	Flat roof areas
Extent/ Amount	7 Dome lights approx.



Survey Date	12.2.2020	Sample No.	BS 176679
Survey Company	Phoenix Environmental Safety Ltd.		
Testing Laboratory.	G & L Consultancy Ltd.		

MATERIAL ASSESSMENT		PRIORITY ASSESSMENT	
Product type	Textile material	Normal occupant activity	N/A
Extent of damage	Frayed	Likelihood of disturbance	N/A
Surface treatment	Unsealed	Human exposure potential	N/A
Asbestos type	Chrysotile	Maintenance activity	N/A
Material assessment score: N/A		TOTAL SCORE: N/A	Priority assessment score: N/A

CONCLUSIONS AND RECOMMENDATIONS

The textile material identified in the metal clamps of the dome lights on the flat roof area of Building 3 contains Chrysotile (white) asbestos fibres. Textile material can contain up to 100% asbestos fibres

The textile material in the clamps is frayed and should be removed by an asbestos asbestos removal contractor and disposed of as asbestos waste before the refurbishment/demolition works commence

See Appendix F for more details

All asbestos removal 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

PHOENIX ENVIRONMENTAL SAFETY LTD.

ASBESTOS DATA SHEET

Created By	Jane Hickey
Date	18th February 2020
Site Details	Holycross College, Clonliffe Road, Dublin 9
Client Name	CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd.
Survey Type	R/D Asbestos Survey
Site Ref	PE 20-198-3
Building Ref.	Building 3 – Link Building
Location	Ground & First floor
Extent/ Amount	150 m² approx.



Survey Date	12.2.2020	Sample No.	BS 176675
Survey Company	Phoenix Environmental Safety Ltd.		
Testing Laboratory.	G & L Consultancy Ltd.		

	MATERIAL ASSESSMENT		PRIORITY ASSESSMENT
Product type	Floor tile and bitumen adhesive	Normal occupant activity	N/A
Extent of damage	Low	Likelihood of disturbance	N/A
Surface treatment	Composite material	Human exposure potential	N/A
Asbestos type	Chrysotile	Maintenance activity	N/A
	Material assessment score: N/A	TOTAL SCORE: N/A	Priority assessment score: N/A

CONCLUSIONS AND RECOMMENDATIONS

The floor tiles and bitumen adhesive identified in the electrical panel area and computer room on the ground floor and lecture room on the first floor in the Link building contains Chrysotile (white) asbestos fibres. Thermoplastic floor tiles can contain up to 25% asbestos fibres. Bitumen adhesives contain a small quantity of asbestos fibres

As the floors are likely to be disturbed during the forthcoming refurbishment works, the asbestos floor tiles and bitumen adhesive should be removed by an asbestos asbestos removal contractor and disposed of as asbestos waste before the refurbishment/demolition works commence

See Appendix F for more details

All asbestos removal 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

APPENDIX D

NON ASBESTOS CONTAINING MATERIALS



Lath and mortar ceilings in the Link area

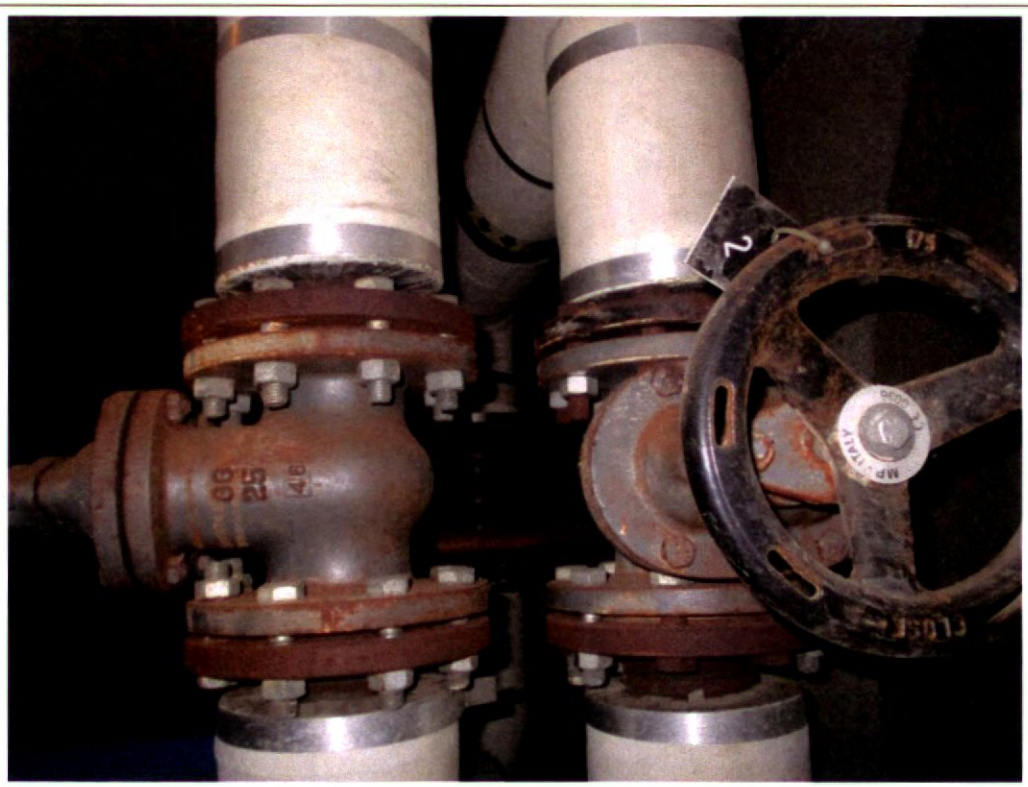


Floor tiles and adhesive in the entrance room to the organ

NON ASBESTOS CONTAINING MATERIALS



Modern fibre glass insulation on pipe work in the church boiler house



Graphite gaskets between flanges in the church boiler house

APPENDIX E

NON ACCESSIBLE LOCATIONS

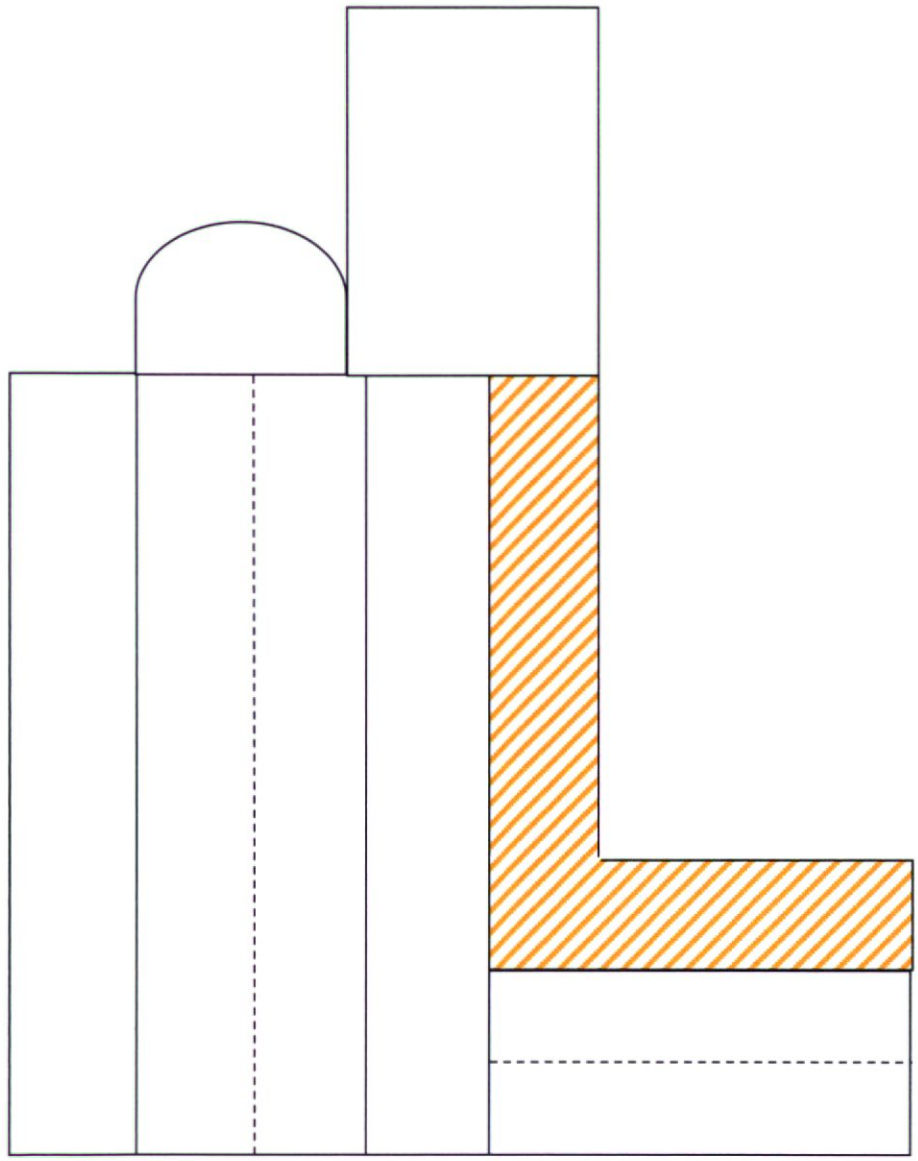
- The service ducts carrying the heating pipework underneath the Church were not accessible as the Church is in use. Further inspection required
- The property was live during the survey and to remain in use after the survey therefore intrusive and destructive surveying and sampling was restricted. A further more intrusive and destructive survey should be carried out as soon as the building becomes unoccupied
- The pitched roof areas were inspected from the attic areas only and the external areas will need to be inspected from an MEWP in advance of roof replacement works. The pitched and flat roof areas were not accessible and not sampled
- Floors which could not be easily lifted and resealed were only visually inspected e.g. floors containing ceramic tiles or hardwood flooring
- No inspection was carried on flues, ducts, voids and similar enclosed areas, the access to which would necessitate the use of specialist equipment or tools, or which would have caused damage to decorations, fixtures, fittings or the structure of the building. The duct under the church was not accessible
- No inspection of live electrical or mechanical plant or similar requiring the attendance of a specialist engineer was carried out. No metal insulation jackets were removed to inspect insulation
- No inspection of any high-level areas requiring specialist access equipment other than telescopic ladder was carried out
- Samples have not been taken where the act of sampling would endanger the surveyors or affect the functional integrity of the item concerned
- All contractors working on the site should always remain vigilant to the possibility that concealed asbestos containing materials may be present on site. If any suspect asbestos containing materials are uncovered during the course of the work, works must stop in that area and the suspect material should be sampled and analysed immediately for the presence of asbestos

APPENDIX F

FLOOR PLANS & LOCATION OF ASBESTOS CONTAINING MATERIALS

Schematic diagram only Not to scale 18th February 2020	Building 3 (Church and Link Building), Holycross College, Clonliffe Road, Dublin 9

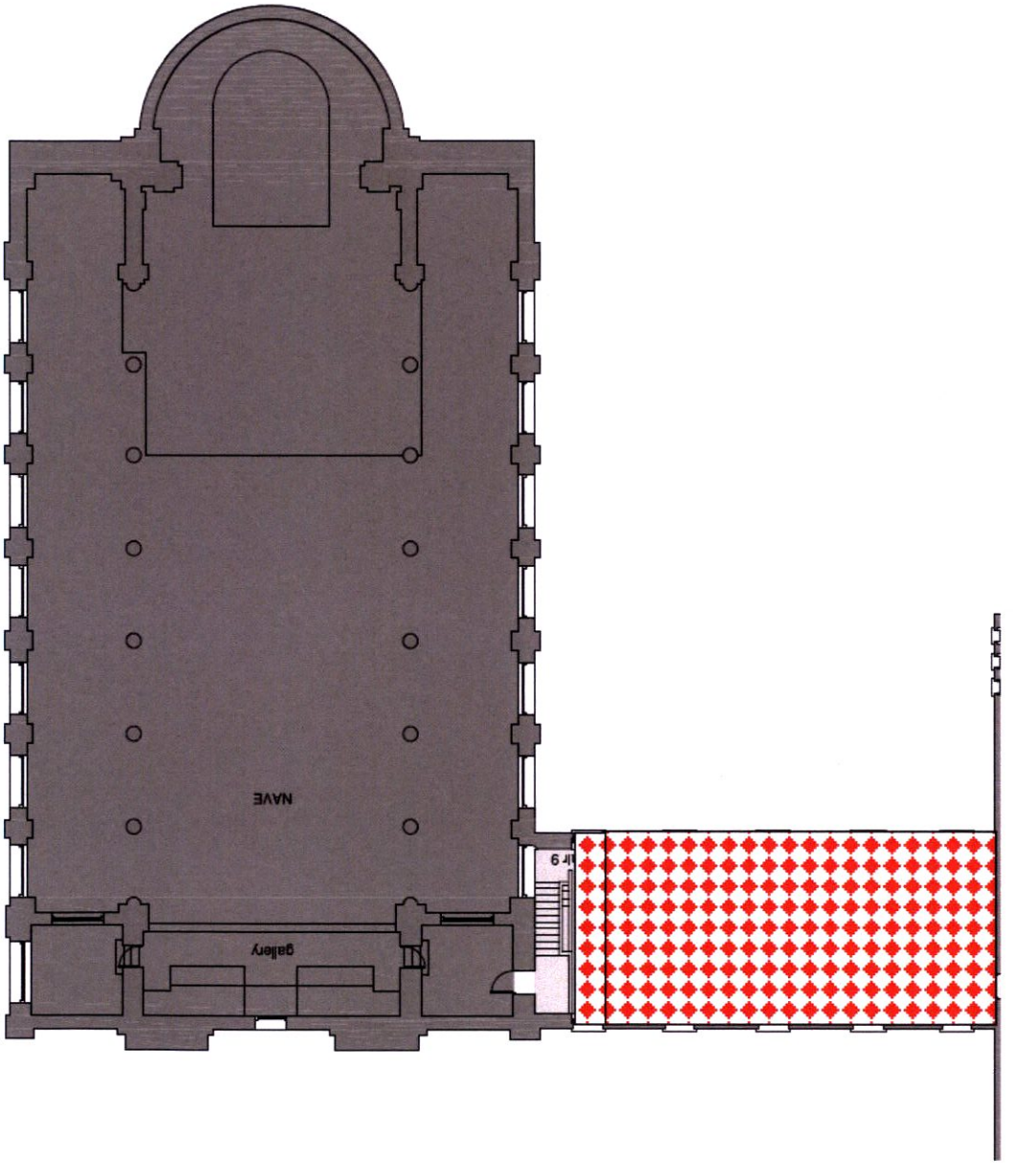
BUILDING 3 – CHURCH & LINK – ROOF PLAN



	Areas where asbestos textile material was identified (on roof light clamps)

Schematic diagram only Not to scale 18th February 2020	Building 3 (Church and Link Building), Holycross College, Clonliffe Road, Dublin 9

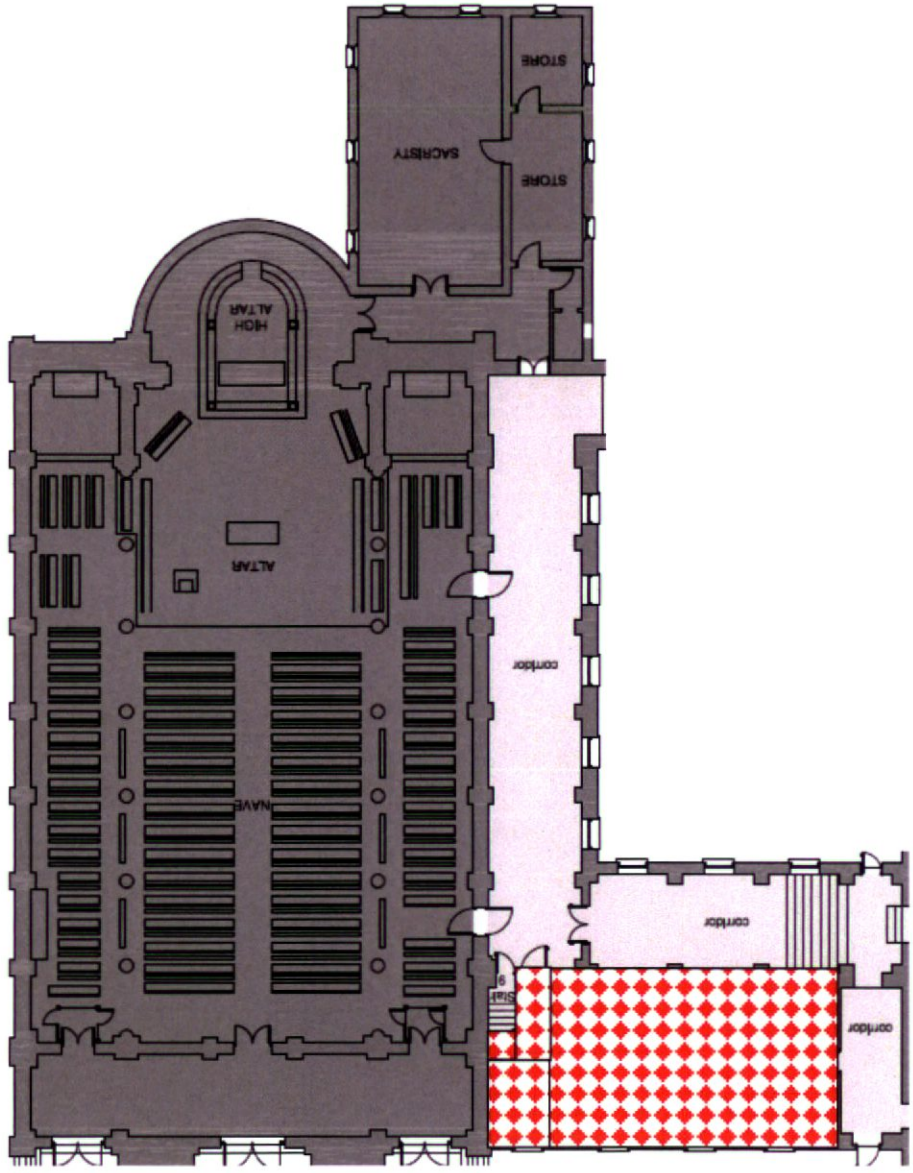
BUILDING 3 – CHURCH & LINK – 1ST FLOOR PLAN



	Areas where asbestos floor tiles and bitumen adhesive was identified

Schematic diagram only Not to scale 18th February 2020	Building 3 (Church and Link Building), Holycross College, Clonliffe Road, Dublin 9

BUILDING 3 – CHURCH & LINK – GROUND FLOOR PLAN



	Areas where asbestos floor tiles and bitumen adhesive was identified

Phoenix Environmental Safety Ltd.

ASBESTOS SURVEY REPORT

(Refurbishment / Demolition Survey)

Client: CWTC Multi Family ICAV,
C/O Hines Real Estate Ireland Ltd., Clanwilliam Place, Dublin 2

Location: Building 4 (Mater Dei Library),
Holycross College, Clonliffe Road, Dublin 9

Date: 18th February 2020

Report No. PE 20-198-4

Phoenix
Environmental
Safety Ltd.

Graigueswood, Freshford, Co. Kilkenny
Tel: 056 8832414
Fax: 056 8832950
admin@phoenixenv.ie
www.phoenixenv.ie

Client: CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd., Clanwilliam Place, Dublin 2

Location: Building 4 (Mater Dei Library), Holycross College, Clonliffe Road, Dublin 9

Asbestos Survey Report Type: Refurbishment / Demolition Survey

Survey Company: Phoenix Environmental Safety Ltd.

Surveyors: John Hickey & Jane Hickey

Testing Laboratory: G & L Consultancy Ltd.

Date of Survey: 12th February 2020

Date of Survey Report: 18th February 2020

Report issue: Final

Signed: *Jane Hickey* Date: 18th February 2020

This report cannot be used for contractual or engineering purposes unless this sheet is signed where indicated by Surveyor. The report must also be designated `final` on the signatory sheet.

Please note that Phoenix Environmental Safety Ltd. cannot be held responsible for the way in which the Client interprets or acts upon the results.

The report must be read in its entirety including any appendices. Phoenix Environmental Safety Ltd. accepts no responsibility for sub-division of this report. All measurements in this report are approximate and therefore should not be used by the asbestos removal contractor for pricing purposes. The asbestos removal contractors should ascertain for themselves, by site measurements and inspection, the exact nature and extent of the work to be done.

The survey information should be used to help in the tendering process for removal of ACMs from the vessel before work starts. The survey report should be supplied by the client to designers and contractors who may be bidding for the work, so that the asbestos risks can be addressed. In this type of survey, where the asbestos is identified so that it can be removed (rather than to manage it), the survey does not normally assess the condition of the asbestos, other than to indicate areas of damage or where additional asbestos debris may be present. However, where the asbestos removal may not take place for some time, the ACMs' condition will need to be assessed and the materials managed

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Signatory Sheet 2

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Appendix F (Floor plans & location of asbestos containing materials).....17-18

SUMMARY

Following a request made by Virtus Project Management, we have produced this Refurbishment / Demolition Survey report for Building 4 (Mater Dei Library), Holycross College, Clonliffe Road, Dublin 9 with the aim of finding asbestos containing materials (ACMs) within the scope of the asbestos survey.

The scope of the asbestos survey was confined to all accessible areas of the former Mater Dei Library building (Building 4) which is due to undergo refurbishment works in the near future.

During the asbestos survey of Building 4 (Mater Dei Library), no asbestos containing materials were identified.



INTRODUCTION

Background

Asbestos has been used extensively in the building industry for over one hundred years and has proved to be an excellent product for a variety of uses, having many qualities such as insulation, fire and chemical resistance to name a few. Its suitability across a wide range of uses and its relatively cheap cost made it very popular, with over 3,000 different asbestos products having been recorded.

The use of asbestos containing materials (ACM's) was most prevalent between the 1950's and 1970's when it provided an economic, easy to use and versatile material. Unfortunately, given the constitution and make up of asbestos it can give rise to microscopic airborne fibres being released into the working environment. The fibres have carcinogenic properties caused by inhalation of the fibres which can get lodged in the lining of the lungs causing disease and death.

Scope & Purpose

CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd. have commissioned Phoenix Environmental Safety Ltd. to undertake an asbestos survey of Building 4 (Mater Dei Library), Holycross College, Clonliffe Road, Dublin 9. The aim of the survey was to locate and identify the presence of asbestos containing materials (ACM's) or suspected ACM's. This report provides a record and assessment of the extent and characteristics of ACM's and is based on information made available on the 12th February 2020.

This particular survey comprised of a Refurbishment / Demolition Survey, carried out in accordance with S.I. No. 386 of 2006 Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006, the Health and Safety Executive's (UK) guidance document HSG 264 (Asbestos: The Survey Guide) and HSG 227 (A Comprehensive Guide to managing Asbestos in Premises).

This means that:

- As far as reasonably practicable, locate and describe all ACM's in all reasonably accessible areas within the scope of the survey
- A sampling programme is undertaken to identify possible ACM's and estimates of the volumes and the surface areas of ACM made
- A record of the condition of the ACM's or where additional asbestos debris may be expected to be present is produced

Refurbishment / Demolition Surveys (formerly type 3 surveys)

This type of survey is necessary prior to any refurbishment (including "minor") or demolition work being carried out. These "refurbishment / demolition" surveys will be much more intrusive and destructive compared with management surveys as their intention is to locate all the ACMs so that they can be removed before the refurbishment or demolition takes place. Refurbishment/demolition surveys are required as necessary when the needs or use of the building changes and the fabric of the building will be disturbed or complex fixed plant and equipment are to be dismantled.

The purpose of the report is to:

- Enable the client to take appropriate precautions so that people who work in Building 4 (Mater Dei Library) during the forthcoming works are not exposed to asbestos-related health risks
- Provide information to assist the client in developing and implementing an action plan before any refurbishment works or demolition is carried out

Presentation of Findings

Data Sheets

A series of data sheets have been prepared to provide assessments and recommendations for each of the locations where samples were taken. These data sheets are presented in Appendix C.

Figures

The schematic diagrams presented in Appendix F at the rear of this document shows the locations of all of the asbestos containing materials detected during the asbestos survey.

Caveats

All reasonable steps have been taken to ensure that the contents and findings of this report are true and accurate. Though as stated below, further undetected ACM's may still be present within the premises. The client should therefore be aware of his responsibilities for identifying, locating, removing and/or managing all ACM's within the premises, and for notifying the appropriate authorities where necessary.

Refurbishment / Demolition Surveys

This type of survey employs the use of destructive sampling techniques of an unfamiliar site. Although every effort is made to locate all asbestos containing materials, it is impossible to rule out the possibility that undiscovered asbestos materials may be present. If the building is to undergo major refurbishment or demolition, it is recommended that the persons carrying out the work are made aware of this and take sufficient precautions, as may be appropriate, to ensure the health and safety of their own employees and any other parties who may be affected by the works.

APPENDIX A

ASBESTOS MATERIALS IN BUILDINGS

Sprayed coatings applied in Ireland were typically a mixture of hydrated asbestos cement containing up to 85% asbestos, mainly amosite but crocidolite and mixtures have been used. Primarily used for anti-condensation and acoustic control and fire protection to structural steelwork. It is a friable material but if in a good condition and unlikely to be disturbed presents no immediate danger; however it is likely to release fibres, if disturbed especially during repair and maintenance work. As it ages the binding medium of sprayed asbestos may degrade with the consequent release of more fibres.

Thermal insulation to boilers, vessels, pipe work, valves, pumps etc also known as hand applied lagging. Lagging may have a protective covering of cloth, tape, paper, metal or a surface coating of cement. All types of asbestos may be found in lagging and the content can vary between 15 and 85% asbestos with the protective papers being up to 100% chrysotile. The likelihood of fibre release depends upon its composition, friability and state of repair, but it is particularly susceptible to damage and disturbance through maintenance work or the action of water leaks.

Asbestos insulating boards usually contain between 16 to 40% amosite, although boards may be found to contain other types of asbestos and in other quantities. Insulating boards were developed in the 1950s to provide an economical, lightweight, fire resisting insulating material. As insulation board is semi-compressed it is more likely to release fibres as a result of damage or abrasion. Work on asbestos insulation board can give rise to high levels of asbestos fibre.

Asbestos cement products as in roofing slates, wall cladding, permanent shuttering, flue, rain water and vent pipes generally contain 10 to 15% of asbestos fibre bounded in Portland cement, some flexible boards contain a small proportion of cellulose. All three types of asbestos have been used in the manufacture of asbestos cement. The asbestos fibres in asbestos cement are usually firmly bound in the cement matrix and will be released only if the material is mechanically damaged or as it deteriorates with age.

Ropes and yarns are usually high in asbestos content, approaching 100% and all three types of asbestos have been used in their manufacture. They were used as in the pipe lagging process and in pipe jointing and also for packing materials as in heat/fire resistant boiler, oven and flue sealing or anywhere thermal of fire protection was required. The risk of fibre release depends upon the structure of the material; bonded gasket material is unlikely to release asbestos but an unbonded woven material may give rise to high fibre release especially if when damaged or frayed.

Cloth thermal insulation and lagging, including fire resistant blankets, mattresses and protective curtains, gloves, aprons, overalls etc. All types of asbestos have been used in the manufacture but since the mid 60's the majority has been chrysotile, the content of which can be up to 100 %.

Millboard, paper and CAF gaskets usually have an asbestos content approaching 100% with all three types of asbestos being used in their manufacture. They were used for insulation of electrical equipment and for thermal insulation. Asbestos paper has been used as a laminate for fireproofing to various fibre panels. These materials are on some occasions not well bonded and will release asbestos fibres if subject to abrasion and wear.

Bitumen felts and coatings may contain asbestos either bound in the bitumen matrix or as an asbestos paper liner. These materials are not likely to present a hazard during normal installation or use, but should be removed and disposed of in compliance with any regulation applicable.

Vinyl, thermoplastic floor tiles can contain up to 25% asbestos usually chrysotile, PVC vinyl floor tiles and unbacked PVC flooring normally 7-10% chrysotile and asbestos paper backed PVC flooring the paper backing may contain up to 100% chrysotile. Fibre release is not normally an issue but may occur when the material is cut or subjected to abrasion.

Textured coatings. Decorative coatings on walls and ceilings usually contain 3-5% chrysotile. Fibre release may occur when subjected to abrasion.

Mastics, sealants, putties and floor tile adhesives may contain small amounts of asbestos. The only possible risk is from sanding of hardened material when appropriate precautions should be taken.

Reinforced plastic and resin composites, used for toilet cisterns, seats, banisters, stair nosings, window seals, lab bench tops, brakes and clutches in machines. The plastics usually contain 1-10% chrysotile and were used in for example car batteries to improve the acid resistance. Resins may contain between 20 and 50% amosite, but because of its composition fibre release is likely to be low.

ASBESTOS FIBRE TYPE COMMON NAMES	
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	N/A
Fibrous Anthophyllite	N/A
Fibrous Tremolite	N/A



Chrysotile Amosite Crocidolite



Tremolite Actinolite Anthophyllite

APPENDIX B

RESULTS OF LABORATORY ANALYSIS

ASBESTOS BULK IDENTIFICATION REPORT

Report no: PE20-198-4	Date of Issue: 17th February 2020

Client details:

CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd., Clanwilliam Place, Dublin 2

Identification of asbestos content of suspected asbestos containing material stated to have been sampled from the following location/site:

Building 4 (Mater Dei Library), Holycross College, Clonliffe Road, Dublin 9

No of Samples received: 5	Date of receipt of samples: 12.2.2020	Date of analysis: 17.2.2020

TEST RESULTS

LAB. REF.	SAMPLE NO.	LOCATION	MATERIAL	ASBESTOS TYPE
S 01	BS 176670	MD Library - above radiators	Insulation board	No asbestos detected in sample
S 02	BS 176671	MD Library - main floor area parquet floor	Tar	No asbestos detected in sample
S 03	BS 176672	MD Library - office area – marmoleum	Floor tile	No asbestos detected in sample
S 04	BS 176673	MD Library - basement - pipework	String	No asbestos detected in sample
S 05	BS 176674	MD Library - basement - pipe line	Board	No asbestos detected in sample

LABORATORY ANALYST	G & L Consultancy Ltd.	DATE:	17th February 2020

APPENDIX C

ASBESTOS DATA SHEETS



Building 4 (Mater Dei Library), Holycross College, Clonliffe Road, Dublin 9

PHOENIX ENVIRONMENTAL SAFETY LTD.

ASBESTOS DATA SHEET

Created By	Jane Hickey
Date	18th February 2020
Site Details	Building 4, Holycross College, Clonliffe Road, Dublin 9
Client Name	CWTC Multi Family ICAV, C/O Hines Real Estate Ireland Ltd.
Survey Type	R/D Asbestos Survey
Site Ref	PE 20-198-4
Building Ref.	Building 4 – Mater Dei Lib.
Location	N/A
Extent/ Amount	N/A



Survey Date	12.2.2020	Sample No.	N/A
Survey Company	Phoenix Environmental Safety Ltd.		
Testing Laboratory.	G & L Consultancy Ltd.		

MATERIAL ASSESSMENT		PRIORITY ASSESSMENT	
Product type	Floor tile and bitumen adhesive	Normal occupant activity	N/A
Extent of damage	Low	Likelihood of disturbance	N/A
Surface treatment	Composite material	Human exposure potential	N/A
Asbestos type	Chrysotile	Maintenance activity	N/A
Material assessment score: N/A	TOTAL SCORE: N/A	Priority assessment score: N/A	

CONCLUSIONS AND RECOMMENDATIONS

NO ASBESTOS CONTAINING MATERIALS IDENTIFIED

APPENDIX D

NON ASBESTOS CONTAINING MATERIALS



Natural slates on the roof



Plasterboard on the walls in the file store area

NON ASBESTOS CONTAINING MATERIALS



Insulation boards above radiators

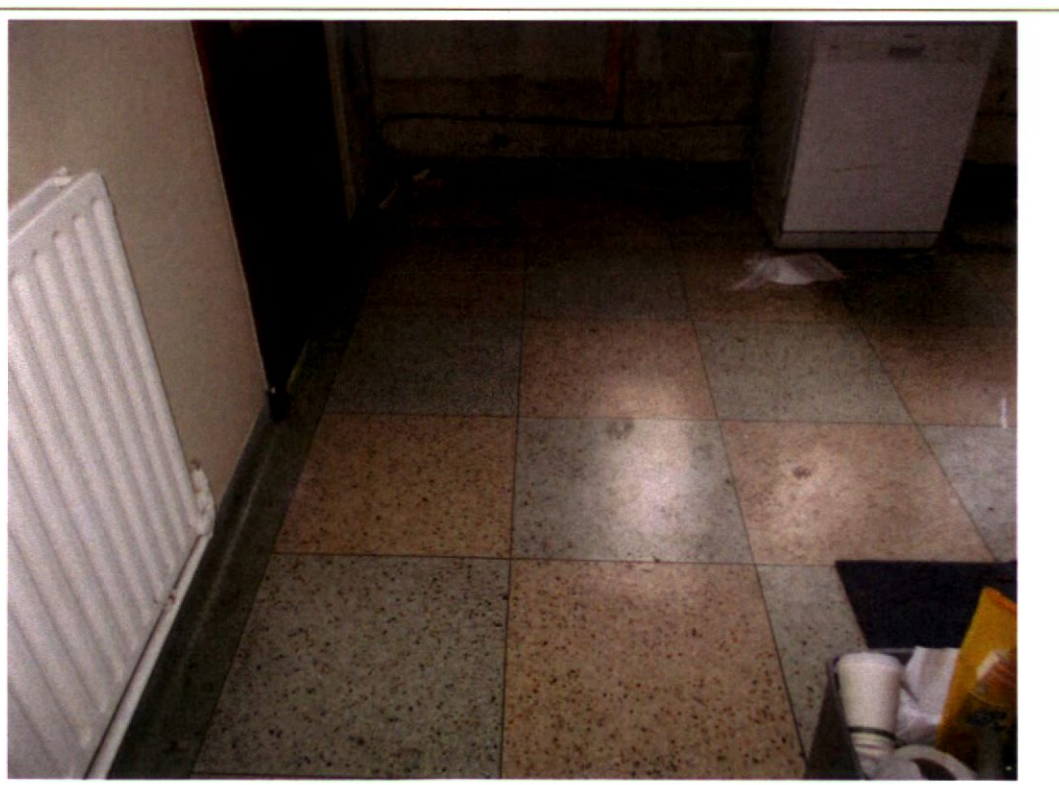


Fibre glass insulation and string sampled on pipe work in the basement area

NON ASBESTOS CONTAINING MATERIALS



Parquet flooring and tar under carpets



Terrazzo flooring in the toilet areas

APPENDIX E

NON ACCESSIBLE LOCATIONS

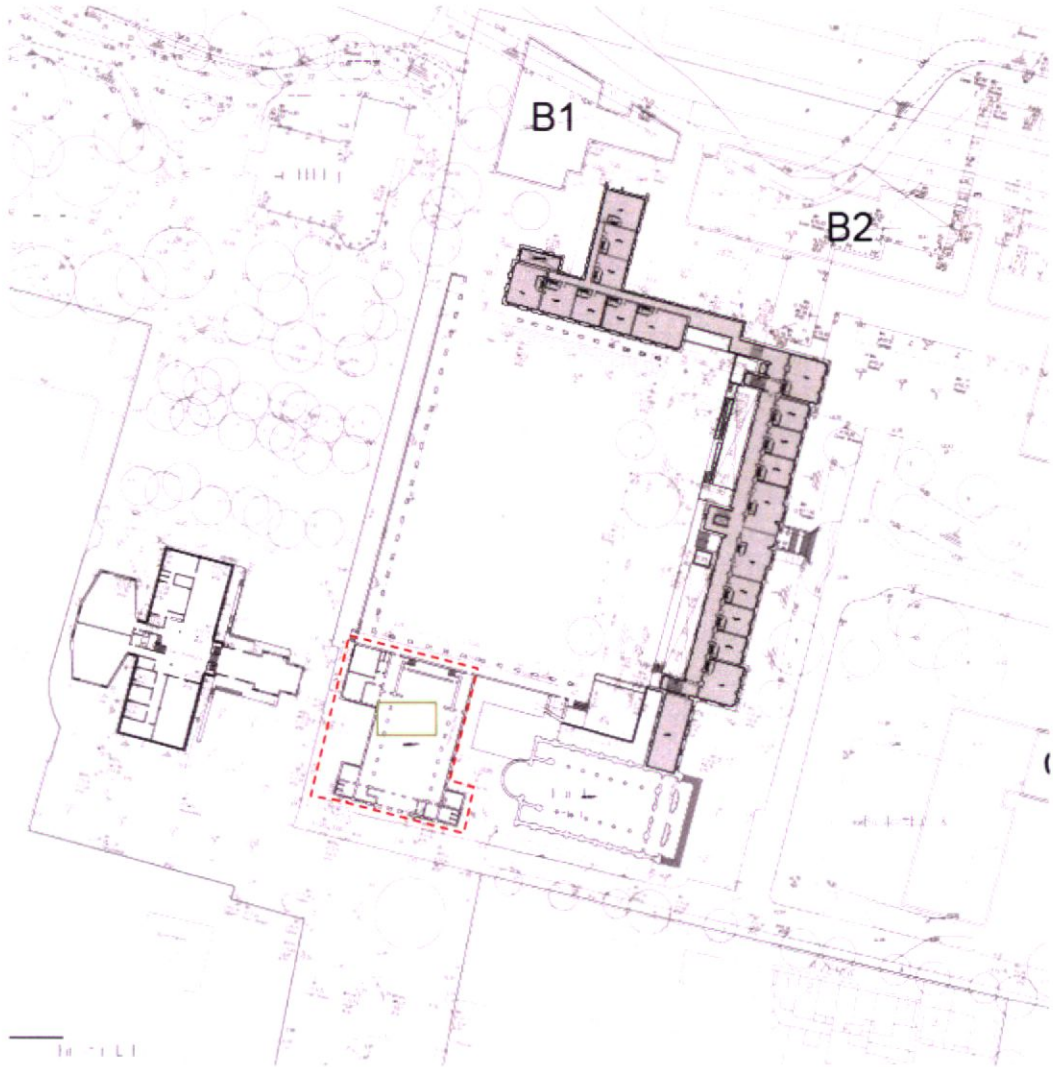
- The duct running under the building was not accessible – confined space. Further inspection required
- The pitched roof areas were inspected from limited attic areas only and the external roof areas will need to be inspected from an MEWP during the second phase of the survey
- No inspection was carried on flues, ducts, voids and similar enclosed areas, the access to which would necessitate the use of specialist equipment or tools, or which would have caused damage to decorations, fixtures, fittings or the structure of the building
- No inspection of live electrical or mechanical plant or similar requiring the attendance of a specialist engineer was carried out
- No inspection of any high-level areas requiring specialist access equipment other than telescopic ladder was carried out
- Samples have not been taken where the act of sampling would endanger the surveyors or affect the functional integrity of the item concerned
- All contractors working on the site should always remain vigilant to the possibility that concealed asbestos containing materials may be present on site. If any suspect asbestos containing materials are uncovered during the course of the work, works must stop in that area and the suspect material should be sampled and analysed immediately for the presence of asbestos
- Further inspection required as soon as the building is completely unoccupied

APPENDIX F

FLOOR PLANS & LOCATION OF ASBESTOS CONTAINING MATERIALS

Schematic diagram only Not to scale 18th February 2020	Building 4 (Mater Dei Library), Holycross College, Clonliffe Road, Dublin 9

SITE PLAN



	Building within the scope of the asbestos survey

Appendix 8.1 Bat Survey Report



Wildlife Surveys Ireland

A bat assessment of of Holy Cross College, Clonliffe and Evaluation of Potential Impacts of Development

By Brian Keeley BSc (Hons) in Zool.
Wildlife Surveys Ireland
Golashane Nature Reserve
Tierworker, Kells, Co. Meath
A82 VE86

13/06/2025

www.wildlifesurveys.net

Wildlife Surveys Ireland

Summary

A bat assessment was carried out by three surveyors from Wildlife Surveys Ireland at Clonliffe College including visual inspection and a dusk and dawn (emergence and return surveys) bat activity survey on June 4th to 5th 2025. Data from previous evaluations of the site by WSI were also included.

Bat species found roosting None

Bat species found feeding and commuting on the site

Common pipistrelle	*Pipistrellus pipistrellus*
Soprano pipistrelle	*Pipistrellus pygmaeus*
Leisler's bat	*Nyctalus leisleri*

Predicted Impacts

There is the potential for roost loss through building demolition and tree removal albeit that no roosts were identified except in a building adjoining the site.

There will be feeding loss through vegetation removal and a consequent reduction in insect abundance and substrate. There will be increased lighting which will restrict bat roosting and movement through the site.

Mitigation and Recommendations

Avoidance of the bird nesting period for tree removal and hedgerow clearance
Checking of all trees and other structures for bats prior to felling
Checking of all buildings and other structures for bats prior to demolition or roof-level works
Planting for bats
Lighting Control
Bat boxes (8 Schwegler bat boxes)

Impacts after mitigation

There is potential for some feeding loss for bats through loss of vegetation and increased lighting with the implementation of all mitigation.

Preliminary survey details

Desktop survey of the existing environment

Thanks to Bat Conservation Ireland for their data. All data from this report will be placed on their database. The only record of a bat roost is from the building adjacent to the site reported in 2023 as a bat roost by Wildlife Surveys Ireland Ltd. All other observations are of foraging and commuting bats and include data from WSI and BCI and indicate that there are four bat species recorded from within 1km of the site.

Bat data from within 1km of the site:

Bat Conservation Ireland data: search results 13 June 2025			
Search parameters: Roosts Transects Ad-hoc observation sites with observations of all species within 1000m of O1630636391			
Roosts			
Name	Grid ref	Species observed	
Clonliffe College	O1636	Pipistrellus pipistrellus (45kHz)	
Transects			
Name	Grid ref	Species observed	
Griffth Park to Drumcondra Park Transect	O1636	Pipistrellus spp. (45kHz/55kHz),Myotis daubentonii, Unidentified bat	
Ad-hoc observations			
Survey	Grid ref	Date	Species observed
NBDC Bat Records	O1736	26/04/2021	Pipistrellus spp. (45kHz/55kHz)
NBDC Bat Records	O1536	04/09/2021	Pipistrellus spp. (45kHz/55kHz)
Wildlife Surveys Ireland Surveys	O1635	21/05/2025	Pipistrellus pipistrellus,Nyctalus leisleri
Wildlife Surveys Ireland Surveys	O1636	04/06/2025	Pipistrellus pipistrellus,Pipistrellus pygmaeus,Nyctalus leisleri

See Appendix for bat data from within 10km of the site.

Habitat within the site of value to bats

Buildings and artificial surfaces

This habitat is present onsite (the large number of building elements within the site).

Amenity grassland (improved) GA2

This habitat is present onsite. The grassland is currently unmanaged.

WD5 Scattered trees and parkland

This habitat is present onsite and is often a valuable feeding area for bats and occasionally good roosting opportunities are provide by the trees.

WS1 Scrub

There is a small amount of scrub towards the northwest boundary of the site.

Connectivity – Map of site showing the wider area with ecological features



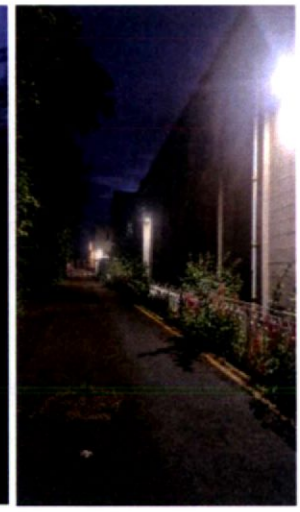
The site is surrounded by housing and a small number of green areas (of which the areas northeast is now under construction). The River Tolka forms an ecological corridor while areas such as Griffith Park, the Botanic Gardens and Glasnevin Cemetery provide greenery.

Date: Wednesday, 04/05/2025

Sunrise time: 05.00 **Sunset time:** 21.46.

Lux Levels Areas around the building have intense lighting and most areas away from the buildings are unlit.





Temperature and weather conditions

Temperature during the evening survey was 13°C, with a temperature of 12°C during the morning survey. Conditions were appropriate for bat activity with very low wind speeds and dry conditions. There was 80% cloud cover.

Complexity of lands and ability to cover ground during surveys

All areas accessible.

Survey constraints

(1) Mobility of bats: Bat species are mobile and can move from roost to roost, depending on roost availability, feeding availability and weather conditions. They may move to roosts which have not been identified in this report in order to hibernate or create mating or feeding perches. A bat survey is a snapshot of bat activity over the survey time.

(2) Identification of bats: It can be difficult to differentiate *Myotis* species. For this reason, sound files are included within the report. Brown long eared bats are very quiet, and their presence can be overlooked in bat surveys as they may not register on bat detectors.

(3) Timing of survey: Bat surveys generally take place when the bats are active – May – September. The time of survey of this assessment was perfectly suited to an evaluation of the site for roost importance and feeding activity.

Surveyors Brian Keeley, Hugh and Saoirse Keeley of Wildlife Surveys Ireland carried out this survey.

Wildlife Surveys Ireland

Equipment

- Exide Lamps (one per surveyor)
- Petzl Tikka Head torches (one per surveyor)
- Elekon Batlogger M2 x 3 broad spectrum bat detectors with recording capacity and GPS (one per surveyor) (2) and Kaleidoscope Pro sound analysis software
- 2 Songmeter Mini Bat + detectors placed overnight around the main building both to the front (2 sites – high on building for first 1.5 hours and at main door area for sunrise) and rear (at the cloisters for the entire night).
- Mobile phones for communication during the survey (one per surveyor)
- Pulsar Helion 2 XP50 thermal imager.

Survey procedure

Surveyors arrived on site shortly before sunset. All lands, trees, buildings and treelines were assessed for suitability for bats, including their suitability as feeding habitat and/or suitability as bat roosts. Areas and features with high potential were identified throughout the site and used as points of interest during the active survey. Survey routes were planned so that a surveyor could efficiently cover as much land as possible while maintaining a focus on these key points of interest. A static bat monitoring device ("Mini") was placed near areas and features of especially high interest, particularly features that bats may be using as roosts, in order to provide a timeline of bat activity throughout the night.

Over the next 90 minutes, surveyors covered the walkable area of the site along their planned routes, with adjustments being made to account for especially high or low bat activity in an area – for example, a surveyor may examine a tree associated with a high level of bat activity, as it may be a bat roost. After the 90 minutes had elapsed, most bats would already have emerged from their roosts in order to feed for the night, making the period shortly after sunset one of the best times to identify roosts and feeding habitats.

Surveyors returned to the site approximately 90 minutes before sunrise the next morning. At this time, any changes in temperature and weather conditions were noted, as well as any other factors (e.g. street lighting) that may have impacted bat activity during the night. Surveyors covered the site area again, this time with particular attention paid to possible roosts, as bats can be seen returning to their roosts during this time period. Any static monitors left out the previous night were collected for analysis.

A thermal imager was used to examine the trees within the site for the heat associated with roosting, emerging and swarming bats and also to examine buildings for emerging bats.

Survey

Tree Category

All trees were examined with a Pulsar thermal imager and found not to have any bat roosts. A nest site within a tree near to the Red House was the only cavity that was noted to be occupied (by a bird) at the time of survey.

Emergence/re-entry survey

Results

Bat species found roosting	None within buildings or trees directly impacted by the proposal. Common pipistrelles in Red House beside the site *Pipistrellus pipistrellus*

There is a roost within the attic of the neighbouring Red House. These bats were also present in autumn 2023 and they are probably a breeding population of common pipistrelles. The bats were seen to swarm around the eaves of the Red House from 04.01 hours onwards. There was repeat soprano pipistrelle activity around the Red House, and this may also be a soprano pipistrelle roost.

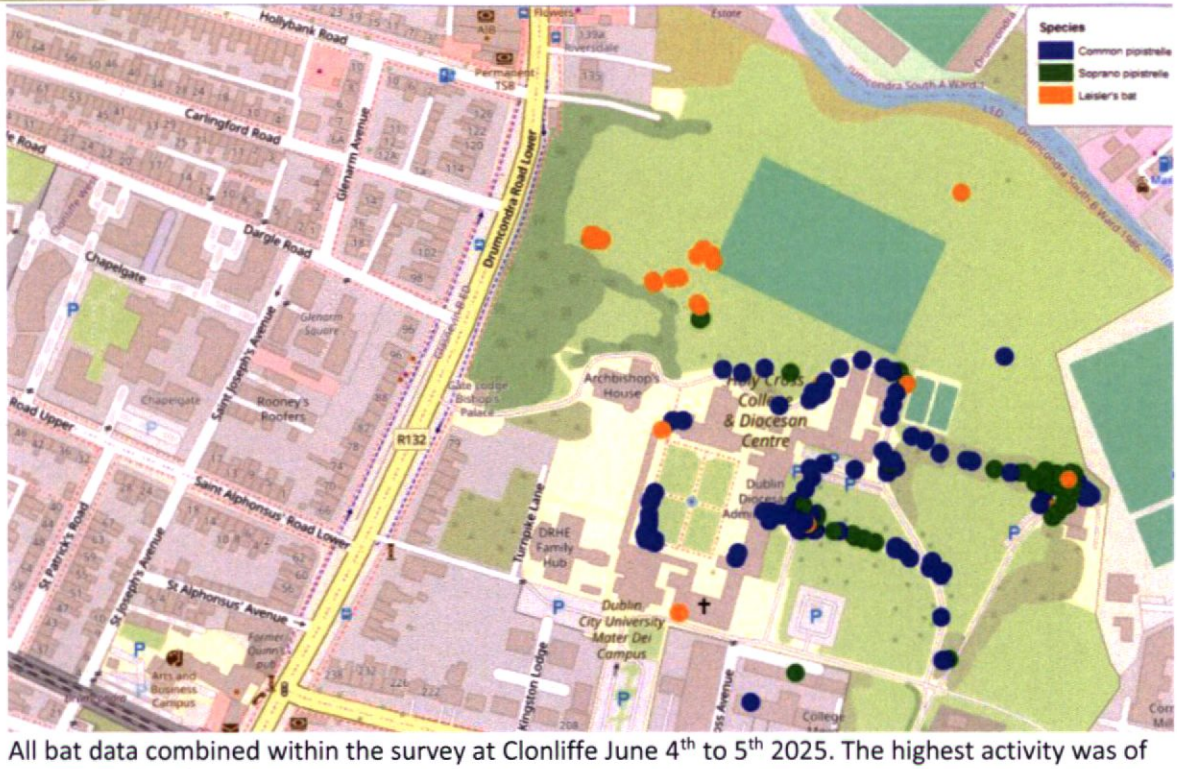
A common pipistrelle was noted to circle to the rear of the college at 04.41 hours but there was no roost feature at the point of circling and the bat was not seen to enter the building.

Bat species found feeding and commuting on the site

Common pipistrelle	*Pipistrellus pipistrellus*
Soprano pipistrelle	*Pipistrellus pygmaeus*
Leisler's bat	*Nyctalus leisleri*

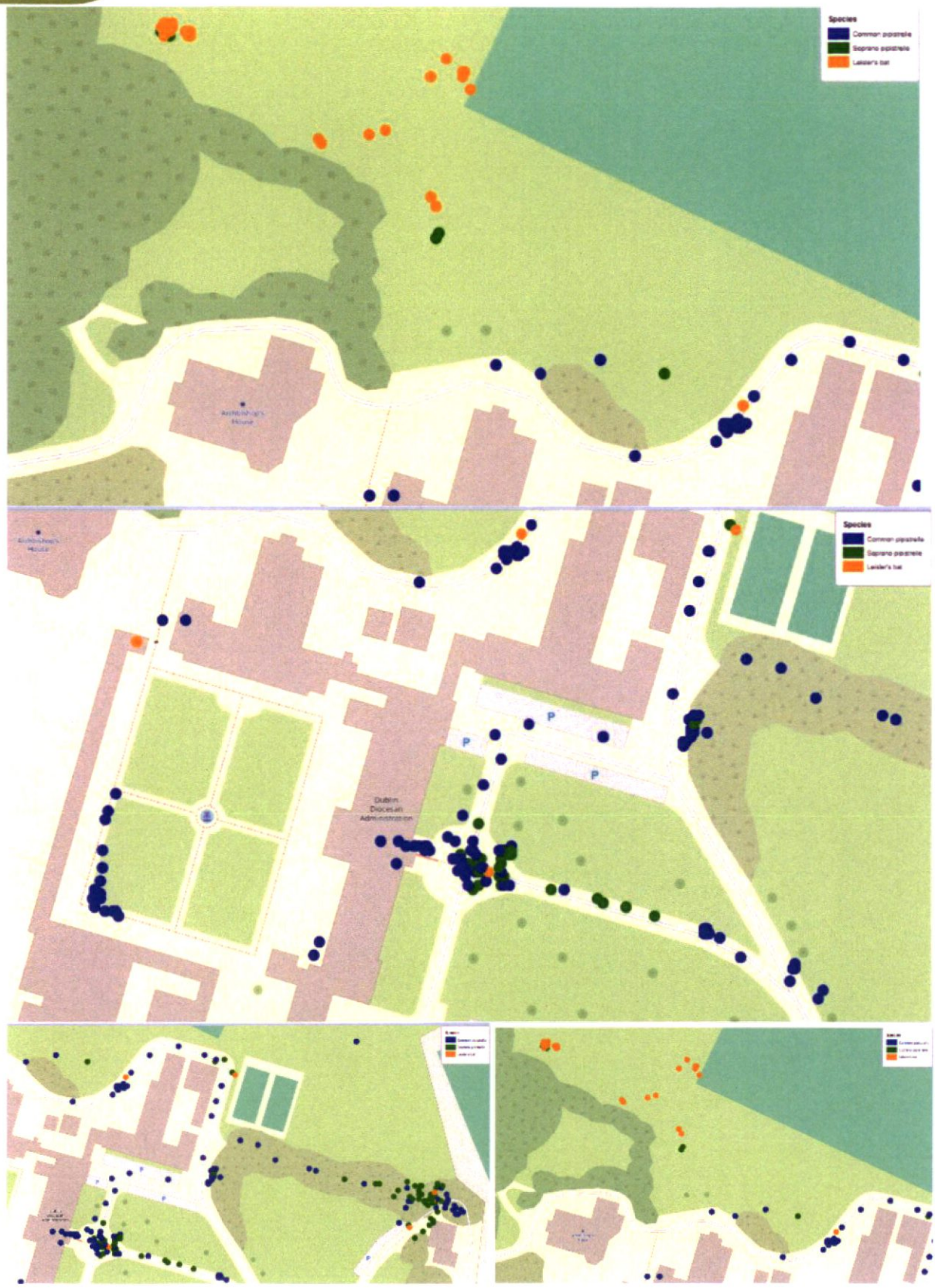
Pipistrelle activity was noted around the Red House, around the College buildings perimeter, along the treeline leading to the Red House, around the Cloisters and past the trees in the lawns in front of the College. Soprano pipistrelles were noted both in front of the College and along the trees leading to Red House and was much more restricted than common pipistrelles. Leisler's bat activity was highest towards the grassy area close to the Tolka and overall was very limited within the site. At one point, three Leisler's bats were visible at the same time over the long grass.

Wildlife Surveys Ireland



All bat data combined within the survey at Clonliffe June 4th to 5th 2025. The highest activity was of feeding bats in front of the College main entrance and also around the Red House. The latter is a bat roost.

Wildlife Surveys Ireland



Wildlife Surveys Ireland

Bat data from surveyor hand held monitor at Clonliffe College June 4th 2025

	Passes Per Hour				
Bat Species	**10**	**11**	**03**	**04**	**Grand Total**
Leisler's Bat	3	1		2	6
Pipistrelle Species	3				3
Common Pipistrelle	12	11	2	100	125
Common Pipistrelle Soprano Pipistrelle				4	4
Soprano Pipistrelle	8	7	3	92	110
Swarming Common Pipistrelles				1	1
Grand Total	**26**	**19**	**5**	**199**	**249**

The high soprano pipistrelle activity was noted near to Red House and may suggest that the roost in this house includes soprano and common pipistrelles.

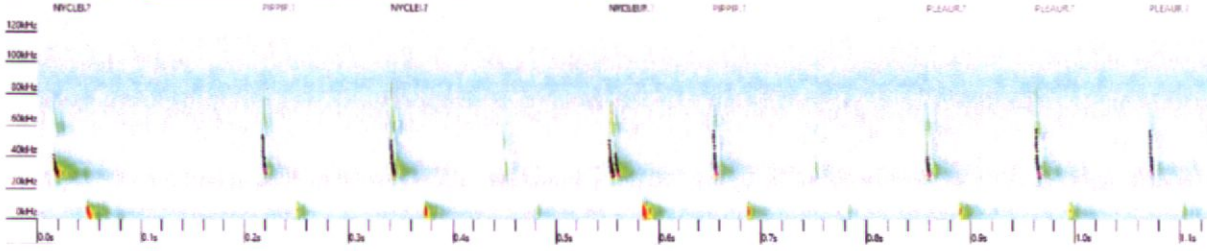
Bat data from surveyor hand held monitor including observations closer to the River Tolka and grassland at Clonliffe College June 4th 2025

	Passes Per Hour				
Bat Species	**9**	**10**	**03**	**04**	**Grand Total**
Leisler's Bat		47			47
Pipistrelle Species		1	1		2
Common Pipistrelle		22	4	75	101
Common Pipistrelle Leisler's Bat		2			2
Soprano Pipistrelle	1	14	1	1	17
Soprano Pipistrelle Leisler's Bat		1			1
Grand Total	**1**	**87**	**6**	**76**	**170**

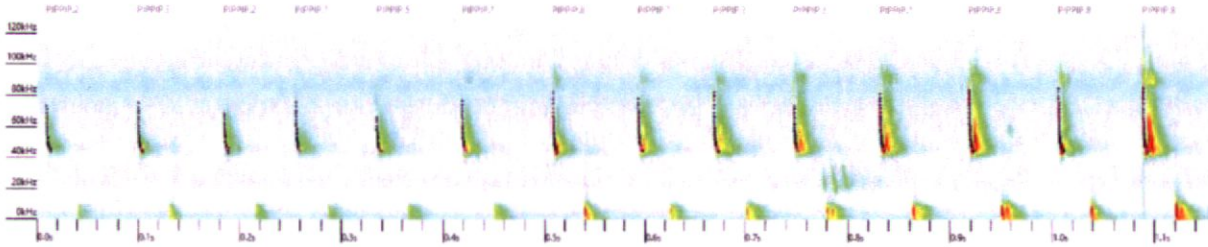
The high Leisler's bat activity was noted close to the Tolka and (unmanaged) amenity grassland.

Wildlife Surveys Ireland

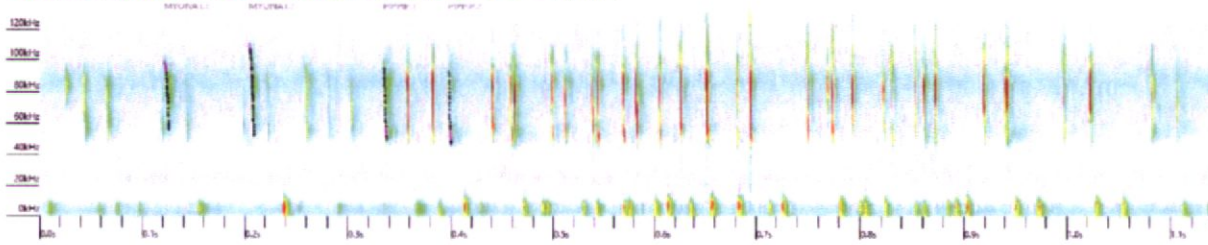
Bat spectrograms June 4th to 5th 2025 Clonliffe College



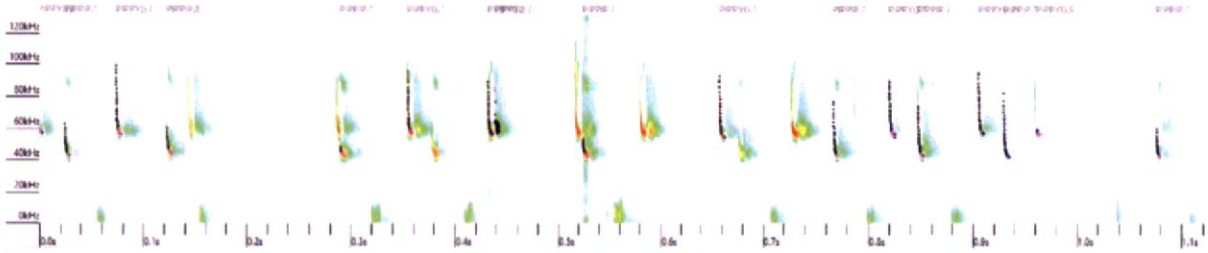
Leisler's bat signals at 22.37 hours



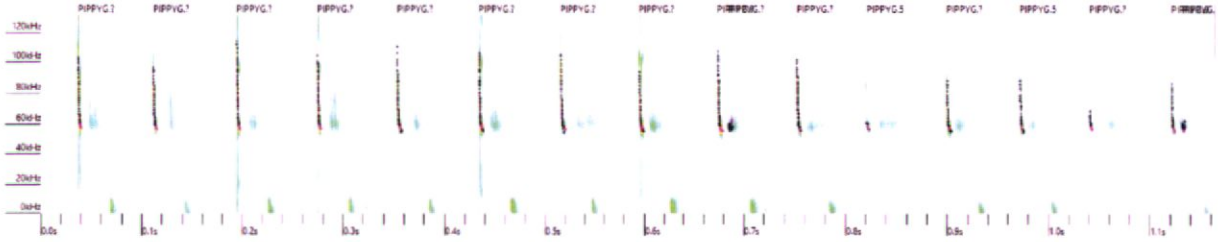
Common pipistrelle echolocation calls at 04.19 hours



Swarming common pipistrelles at the Red House at 04.05 hours



Common and soprano pipistrelles at 04.18 hours in front of the College main doors



Soprano pipistrelle calls at 04.45 hours feeding around the trees leading to the Red House

Wildlife Surveys Ireland

Proposed Construction

The development will consist of the construction of a residential development set out in blocks ranging in height up to 13 storeys, to accommodate 1131 no. apartments including retail and crèche units, residential tenant amenity spaces, community/cultural spaces, mobility hubs and public open space. Refer to the statutory notices for a full description.

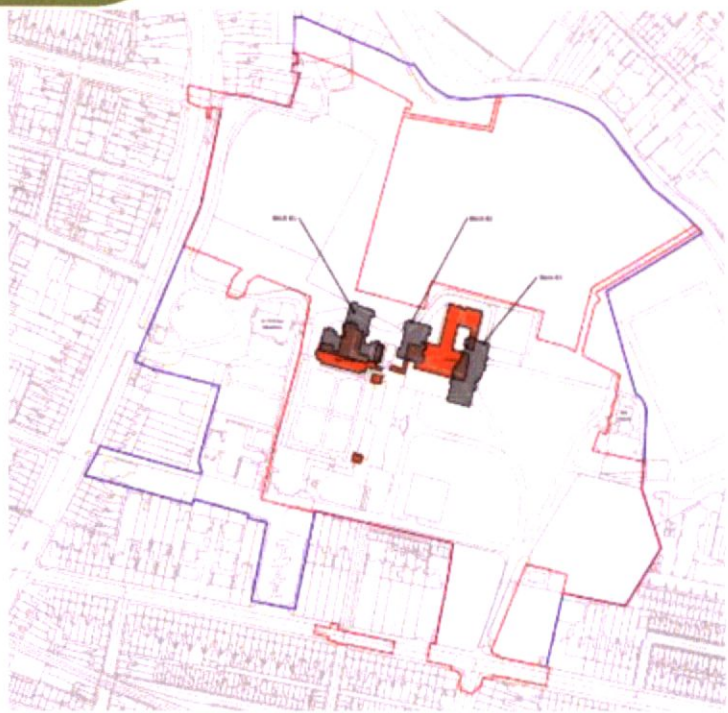
The proposed development sits as part of a Site Masterplan for a wider landbank which includes an under-construction hotel development and future proposed GAA facilities. To facilitate the proposed development the scheme will involve the demolition of a number of existing structures on the site.

The application site contains a number of Protected Structures including The Seminary Building, Holy Cross Chapel, South Link Building, The Assembly Hall and The Ambulatory while the wider lands also include The Red House and the Archbishop's House (both Protected Structures). The application proposes the renovation and reuse of the Seminary Building and the South Link Building to accommodate residential units and the use of the existing Holy Cross Chapel, Assembly Hall and Cloister Garden for use as community/cultural uses.

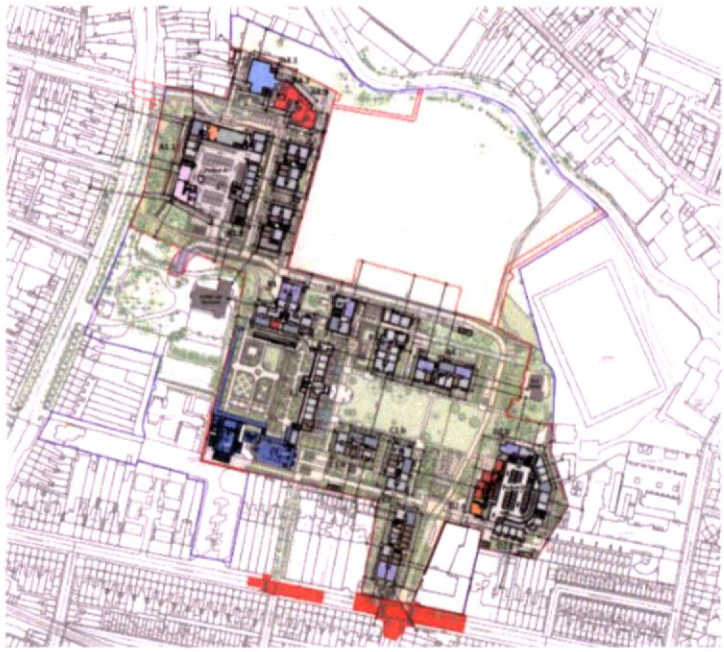
The residential buildings are arranged around a number of proposed public open spaces and routes throughout the site with extensive landscaping and tree planting proposed. Communal amenity spaces will be located adjacent to residential buildings and at roof level throughout the scheme. To facilitate the proposed development the scheme will involve the removal of some existing trees on the site.

The site is proposed to be accessed by vehicles, cyclists and pedestrians from a widened entrance on Clonliffe Road, at the junction with Jones's Road and through the opening up of an unused access point on Drumcondra Road Lower at the junction with Hollybank Road. An additional cyclist and pedestrian access is proposed through an existing access point on Holy Cross Avenue. The development will include both basement and podium parking under a number of blocks to accommodate car parking spaces, bicycle parking, storage, services and plant areas.

The proposed development includes all site landscaping works, green roofs, boundary treatments, lighting, servicing and utilities, signage, and associated and ancillary works, including site development works above and below ground.



Proposed for demolition



Proposed construction

Impact assessment procedure:

Potential impacts

Roost loss

There are several buildings that will be demolished. To date, following 3 surveys over 3 separate years, there have been no bats roosting within these buildings. Nonetheless, buildings offer a wide variety of roost options and there is potential for roosting bats that may be occasional or infrequent and may be of individual bats.

There are numerous trees within the site that will be removed as part of the proposal. No bats were recorded to emerge from or return from any trees within the site. Similarly, as for buildings, trees may be used by small numbers of bats for short periods but repeatedly.

Feeding loss

There will be a loss of tree cover and unmanaged vegetation, and this will lead to a reduction in insect abundance and substrate. This will reduce foraging opportunities for bats.

Lighting

There will be increased lighting associated with housing and traffic and public access. Lighting can have a negative effect on bat movement and roosting and may restrict access to some bat species to a site and deter the use of previous roost sites. As bats are sensitive to lighting, increased lighting will reduce bat activity in an area.

Mitigation and recommendations

Avoidance of the bird nesting period for tree removal and hedgerow clearance

All clearance operations shall avoid the bird nesting period; March 1st to August 31st. This will ensure that no birds are directly lost from these procedures. In a situation where trees must be removed prior to the end of the nesting season *and there is no alternative to felling at this time*, an assessment for nesting birds shall be carried out by an ecologist.

Checking of all trees and other structures for bats prior to felling

All mature trees shall be checked for bats by a bat specialist to identify trees with the highest potential prior to felling or major surgery. From this, trees with the highest roost potential as determined by the bat specialist shall be subjected to a higher level of examination that shall include thorough checking of all suitable crevices, cavities, ivy

cover or loose bark. This will require access via a hoist to reach all suitable cavities and cracks. Trees 169, 194 and 193 have very high bat roost potential and must be checked prior to felling, Should bats be noted during this evaluation, a derogation shall be required from NPWS. This would also require further mitigation measures including roost replacement such as additional bat boxes or other alternatives.

Checking of all buildings and other structures for bats prior to demolition or roof-level works

For all buildings proposed for demolition or where there is a need to undertake repairs / building work at roof level for the remaining buildings, a bat specialist shall examine each area for the presence of bats prior to commencement. Sufficient time must be allowed to seek a derogation if bats are present.

Mitigation by remedy

Planting for bats

Planting must provide suitable cover to encourage insect diversity that would sustain bats (and nesting birds). This can be achieved both by availing of native species and non-native non-invasive plant species. Planting should be examined by an ecologist and where supplementary planting is considered necessary; this should be incorporated.

Lighting control

A dark sky area must be designated within the development to provide commuting and feeding corridors, and light spillage and pollution must be kept to a minimum with the use of cowls, caps, and low-level bollard lighting where possible.

Lighting design will be in accordance with:

Bats and Lighting – Guidance Notes for Planners, Engineers, Architects and Developers (Bat Conservation Ireland, 2010) https://www.batconservationireland.org/wp-content/uploads/2013/09/BCIrelandGuidelines_Lighting.pdf

Bats and Artificial Lighting at Night, Institute of Lighting Professionals, 2023 https://theilp.org.uk/publication/guidance-note-8-bats-and-artificial-lighting/

Guidance Notes for the Reduction of Obtrusive Light GN01-21 (Institute of Lighting Professionals, 2021) https://theilp.org.uk/publication/guidance-note-1-for-the-reduction-of-obtrusive-light-2021/

Dark Sky Ireland's Environmentally Friendly Lighting Guide https://www.darksky.ie/lighting-documents/#guidelines

Mitigation Options and Recommendations (Eurobats)

	Measure	Recommendations
Avoidance	*Conserve dark areas*	High priority areas that should remain dark: • protected areas, including roosting and underground hibernation sites • feeding areas (natural areas, vegetation patches) • commuting routes (forest edges, hedgerows, rivers, tree lines)
Only if lighting is necessary, and after an assessment of bat occupancy and patterns of activity within the landscape framework of functional habitats:		
Mitigation	*Part-night lighting*	Turn off public outdoor lighting within **2 hours after sunset** (civil twilight): • Especially during bat reproduction and migration periods • Particular attention within home ranges of maternity colonies
	Dimming	• Adapt dimming strategy to human activities • Keep illuminance levels as low as possible according to EU standards (not going over minimum illuminance required)
	Avoid light trespass	Avoid light trespass over 0.1 lx on surrounding surfaces: • Use fully shielded luminaires • No illumination at or above horizontal • Control street light height, especially along pedestrian pathways and tree lines • Use fewer light sources at points low to the ground • Consider the interaction between light from luminaires and reflecting structures, such as roads and walls
General lighting and not sports lighting	*Adapt lamp spectra*	Avoid lamps emitting wavelengths below **540 nm** (blue and UV ranges) and with a correlated colour temperature > 2700 K
Compensation	*Restore dark areas*	No net loss of darkness: • Restore darkness to the same extent as the proportion of dark areas lost • Enhance alternative dark corridors that connect roosts and feeding areas

The Eurobats guidelines (Voigt et al. 2018) for lighting at night and bat conservation considerations include:

- **Limiting the duration of night-time lighting**
- **Dimming illuminance and limiting light trespass**
- **Limiting the short wavelength (UV and blue) content of the light spectrum** (wavelengths in the UV range can be filtered without any decrease in *illuminance* level)

There are several ways of lessening the impact of lighting upon bats. A number of these are given here:

1. **Lighting must be cowled if required to prevent light overspill on to surrounding trees**
   Light modelling would provide appropriate information on how light will be restricted from the trees while providing illumination for pedestrians and cyclists.

Internal louvres are the most efficient means of controlling light overspill / pollution.

2. **Lighting operation should be based on levels of activity**
   This should mirror the levels of use of the infield area. Lighting is unnecessary except at times of darkness and when games or training is under way.

3. **Lighting should be sufficiently controlled to provide for low levels at ground level.** The design should strive to achieve 3 lux at ground level in the case where bats are found to be present, through landscaping or similar, to control spill as required. It is easier to control light overspill from shorter columns, but this is not possible for sports lighting. The measures below may assist in creating darker areas for bats that would in some areas be less than 3 lux.

4. **LED lights should be considered as the option for the lighting**
   LED lights are an energy efficient and highly controllable light source, are highly adaptable in terms of direction and strength and can be timed to switch on and off as they light quickly to the level required. These should ensure energy efficiency and money-saving as well as ecological advantages.

5. **Planting should be used to reduce / prevent light overspill and create commuting corridors**
   Planting of treelines and hedgerow can prevent lighting from creating a barrier to movement and provide feeding for birds and mammals lost by the removal of vegetation. This should include species that will grow to tree height rather than low shrubs.

Bat boxes

8 Schwegler bat boxes are proposed for incorporation into the site to provide roost sites for bats. The type of bat boxes required are the following: 2 x Eco Bat Boxes, 6 x 2F with double front panel. These shall be provided in unlit areas at a height of no less than 2 metres and in uncluttered areas away from busy roads or other high activity. Mature trees are typically very suitable for boxes. Bat boxes should primarily face southwards but with three of the boxes facing away from direct solar radiation towards midday (e.g., westerly).

Impacts after mitigation

There is potential for some feeding loss for bats through loss of vegetation and increased lighting.

APPENDICES

Wildlife Surveys Ireland

Bat Biology

Female bats gather in groups known as maternity roosts in summer to have their young. They generally have one baby each year, so are slow to reproduce, and disturbance of a maternity roost can be catastrophic.

In winter bats move to old stonework, trees and caves to hibernate. They are especially vulnerable here as they are slow to awaken, and if tree felling is carried out, they can easily be killed.

Species descriptions from Bat Conservation Ireland (2025), Biodiversity Ireland (2025) and further as listed below:

Common Pipistrelle and Soprano Pipistrelle

Pipistrellus pipistrellus and *Pipistrellus pygmaeus*

Ireland's two smallest bat species, and also the commonest, the common and soprano pipistrelles are the bats most likely to be seen flying around soon after dusk in both urban and rural areas. Both have a rapid, twisting flight as they pursue tiny prey of midges, mosquitoes and small moths. A single pipistrelle (weighing no more than 5-6g, the weight of a 1-euro piece) may consume as many as 3,000 of these insects in one night. Pipistrelles are frequently found roosting in houses, although they also roost in other locations such as tree holes. In houses they prefer to occupy confined spaces such as behind hanging tiles and soffit boards or between roofing felt and roof tiles, rather than the main attic space.

The two are called common and soprano because the latter echolocates at a higher frequency peaking at 55kHz, compared with the former which echolocates at a peak frequency of 46kHz. The soprano pipistrelle tends to form nursery (or maternity) roosts with larger numbers of individuals (up to 1,500) compared with the common pipistrelle which would typically have a much smaller nursery roost size.

Trends in these species are monitored annually using the Car-based Bat Monitoring Scheme. Results from this scheme indicate that since 2003 the soprano pipistrelle has increased significantly while the common pipistrelle has also increased, albeit more slowly. The reasons for these increases are poorly understood but both species may be recovering from past declines or responding to increased woodland cover and/or climate change.

Wildlife Surveys Ireland

Conservation status

HABITATS DIRECTIVE ARTICLE 17 REPORTING
Range: Favourable
Population: Favourable
Habitat: Favourable
Future Prospects: Favourable
Overall Assessment of Conservation Status: Favourable
Overall Trend in Conservation Status: N/A
Source: NPWS 2013.

IUCN Conservation Status
Ireland: Least Concern
Europe: Least Concern
Global: Least Concern
Sources: (1) Marnell, F. et al 2009; (2) Hutson T., et al 2007 (3) Hutson, A.M. et al 2008

Legal status
Protected by the following legal instruments:
- Habitats Directive (92/43/EEC), Annex IV
- Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) Appendix II
- Agreement on the Conservation of Populations of European Bats (EUROBATS)
- Wildlife Act (1976)
- Wildlife (Amendment) Act (2000)
- Wildlife (N.I.) Order of 1985

Wildlife Surveys Ireland

Leisler's bat

Nyctalus leisleri

This is the biggest Irish bat, and it is often found roosting in buildings although 13% of its roosts recorded in Ireland have been in trees. The Leisler's bat has distinctive level flight at greater heights than the other Irish species, from which it dives down after dung flies and beetles. It can be seen soon after sunset flying over open spaces such as parks and fields. Because it is one of the first bats to emerge in the evening and is quite large, the Leisler's may be confused with swifts that may also be flying around. They are best told apart by the wing shape; the swift's wings are smoothly curved and scimitar-like. Swifts also shriek, while the Leisler's bat is inaudible without a bat detector. The Leisler's bat is rare in Britain and the rest of Europe, but it is relatively common here. For this reason, the Irish population of Leisler's bats is considered of International Importance.

Leisler's bat is monitored by the Car-based Bat Monitoring Scheme and its annual trend has shown significant increases since 2003. The reason for the increase is poorly understood but it may be recovering from past declines or responding to increased woodland cover and/or climate change.

Conservation status

HABITATS DIRECTIVE ARTICLE 17 REPORTING
Range: Favourable
Population: Favourable
Habitat: Favourable
Future Prospects: Favourable
Overall Assessment of Conservation Status: Favourable
Overall Trend in Conservation Status: N/A
Source: NPWS 2013.

IUCN Conservation Status
Ireland: Near Threatened
Europe: Least Concern
Global: Least Concern
Sources: (1) Marnell, F. et al 2009; (2) Hutson T., et al 2007 (3) Hutson, A.M. et al 2008

Legal status
Protected by the following legal instruments:

- Habitats Directive (92/43/EEC), Annex IV
- Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) Appendix II
- Agreement on the Conservation of Populations of European Bats (EUROBATS)
- Wildlife Act (1976)
- Wildlife (Amendment) Act (2000)
- Wildlife (N.I.) Order of 1985

Daubenton's bat

Myotis daubentonii

Often called the 'water bat', this species is easily recognised in flight by its low, level flight a few centimetres above the surface of lakes, slow-moving rivers and canals. It skims like a hovercraft above the water in search of caddisflies, mayflies and midges, and may even scoop prey from the water surface using its big feet. Many other bats feed over lakes and rivers, but none has such a close association with water as the Daubenton's. The Daubenton's bat can even swim if it makes a mistake and ends up in the water.

Daubenton's bats roost under stone bridges, in ruins, canal tunnels, trees and damp caves.

The Daubenton's bat annual trend is monitored using a volunteer-based programme – the All Ireland Daubenton's Bat Waterways Survey. This scheme has been ongoing since 2006 and the Daubenton's bat trend has been reasonably stable since this time.

Conservation status

HABITATS DIRECTIVE ARTICLE 17 REPORTING
Range: Favourable
Population: Favourable
Habitat: Favourable
Future Prospects: Favourable
Overall Assessment of Conservation Status: Favourable
Overall Trend in Conservation Status: N/A
Source: NPWS 2013.

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IUCN Conservation Status
Ireland: Least Concern
Europe: Least Concern
Global: Least Concern
Sources: (1) Marnell, F. et al 2009; (2) Hutson T., et al 2007 (3) Hutson, A.M. et al 2008

Legal status
Protected by the following legal instruments:
- Habitats Directive (92/43/EEC), Annex IV
- Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) Appendix II
- Agreement on the Conservation of Populations of European Bats (EUROBATS)
- Wildlife Act (1976)
- Wildlife (Amendment) Act (2000)
- Wildlife (N.I.) Order of 1985

Legislation

Bats are protected under the 1996 Wildlife Act, the 2000 Wildlife (Amendment) Act, S.I. No 477 of 2011, The Habitats Directive, The Bonn and Bern Convention, and the Eurobats agreement.

The European Community (Natural Habitats) Regulations S.I. No 477 of 2011 states:

51. (1) The Minister shall take the requisite measures to establish a system of strict protection for the fauna consisting of the species referred to in Part 1 of the First Schedule. (2) Notwithstanding any consent, statutory or otherwise, given to a person by a public authority or held by a person, except in accordance with a licence granted by the Minister under Regulation 54, a person who in respect of the species referred to in Part 1 of the First Schedule— (a) deliberately captures or kills any specimen of these species in the wild, (b) deliberately disturbs these species particularly during the period of breeding, rearing, hibernation and migration, (c) deliberately takes or destroys eggs of those species from the wild, (d) damages or destroys a breeding site or resting place of such an animal, or (e) keeps, transports, sells, exchanges, offers for sale or offers for exchange any specimen of these species taken in the wild, other than those taken legally as referred to in Article 12(2) of the Habitats Directive, shall be guilty of an offence. (3) The prohibitions referred to in paragraph (2) shall apply to all stages of life

of the biological cycle of fauna to which this Regulation applies. (4) The Minister shall establish a system to monitor the incidental capture and killing of fauna consisting of the animal species referred to in Part 1 of the First Schedule and, having regard to the information gathered, he or she shall conduct further research or take such conservation measures as required to ensure that incidental capture and killing does not have a significant negative impact on the species concerned.

The EU Habitats Directive (92/43/EEC) lists all Irish bat species in Annex IV and one Irish species, the lesser horseshoe bat (Rhinolophus hipposideros), in Annex II. Annex II includes animal and plant species of community interest whose conservation requires the designation of Special Areas of Conservation (SACs) because they are endangered, rare, vulnerable or endemic. Annex IV includes various species that require strict protection. Article 11 of the Habitats Directive requires member states to monitor all species listed in the Habitats Directive and Article 17 requires States to report to the EU on the findings of monitoring schemes.

The Bern and Bonn Conventions:

Ireland is also a signatory to a number of conservation agreements pertaining to bats such as the Bern and Bonn Conventions. The European Bats Agreement (EUROBATS) is an agreement under the Bonn Convention. Ireland and the UK are two of the 31 signatories. The Agreement has an Action Plan with priorities for implementation. Devising strategies for monitoring of populations of selected bat species in Europe is among the resolutions of EUROBATS.

1.3.1 The Bern Convention:

Article 6 of the "Convention on the Conservation of European Wildlife and Natural Habitats' (Berne Convention) reads:

"Each Contracting Party shall take appropriate and necessary legislative and administrative measures to ensure the special protection of the wild fauna species specified in Appendix II. The following will in particular be prohibited for these species:

a) all forms of deliberate capture and keeping and deliberate killing;

b) the deliberate damage to or destruction of breeding or resting sites;

c) the deliberate disturbance of wild fauna, particularly during the period of breeding, rearing and hibernation, insofar as disturbance would be significant in relation to the objectives of this Convention; ...

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Appendix II lists strictly protected fauna species and this list includes "Microchiroptera, all species except Pipistrellus pipistrelles".

The EUROBATS Agreement:

The 'Agreement on the Conservation of Populations of European Bats' (EUROBATS) was negotiated under the 'Convention for the Conservation of Migratory Wild Species' (Bonn Convention) and came into force in January 1994. The legal protection of bats and their habitats are given in Article III as fundamental obligations:

"1. Each Party shall prohibit the deliberate capture, keeping or killing of bats except under permit from its competent authority

2. Each Party shall identify those sites within its own area of jurisdiction which are important for the conservation status, including for the shelter and protection, of bats. It shall, taking into account as necessary economic and social considerations, protect such sites from damage or disturbance. In addition, each Party shall endeavour to identify and protect important feeding areas for bats from damage or disturbance."

The Agreement covers all European bat species.

Contact Details:
Contact Brian Keeley at 087 675 3201.

Access the Wildlife Surveys Irelands website at wildlifesurveys.net

Wildlife Surveys Ireland

Bat Conservation Ireland data: search results 13 Jun 2025

Search parameters: Roosts Transects Ad-hoc observation sites with observations of all species within 10000m of O1630636391

Roosts

Name	Grid reference	Species observed
11 Pembroke Cottages	O1929	Nyctalus leisleri
139 Stillorgan Rd	O1830	Unidentified bat
153 Ard na Mara	O2145	Unidentified bat
2 Louvain	O1829	Unidentified bat,Nyctalus leisleri
23 Woodbrook Park	O1228	Nyctalus leisleri
33 Inchicore Rd	O1234	Unidentified bat
52 River Valley Grove	O1745	Pipistrellus spp. (45kHz/55kHz)
60 Cremore	O1227	Unidentified bat
7 Stirling Park	O1530	Unidentified bat
Abbotstown House	O0939	Nyctalus leisleri
Bailiff\\\'s/Superintendent\\\'s Lodge	O1035	Pipistrellus pygmaeus
Blanchardstown Hospital	O0839	Pipistrellus spp. (45kHz/55kHz),Pipistrellus pygmaeus
Boland\\\'s Mill	O1733	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
Castleknock College	O0836	Plecotus auritus,Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Nyctalus leisleri,Myotis spp.
Castleknock D	O0935	Pipistrellus pygmaeus
Cheeverstown house	O1228	Pipistrellus pygmaeus
Church at St. Mary\\\'s Hospital	O1034	Plecotus auritus
Clonliffe College	O1636	Pipistrellus pipistrellus (45kHz)
Deerfield House, Phoenix Park	O1135	Plecotus auritus
Dublin Electricity Generating Station building	O2033	Pipistrellus pipistrellus (45kHz)
Farmleigh House	O0936	Pipistrellus pygmaeus,Nyctalus leisleri,Myotis daubentonii
Former Pathology Building	O1533	Pipistrellus pygmaeus
Garage house roost	O2241	Pipistrellus pygmaeus
Industrial buildings, Former Paper Mills	O1730	Pipistrellus pipistrellus (45kHz)
Kingsfurze	O0835	Unidentified bat
Kinsaley House	O2142	Plecotus auritus,Pipistrellus spp. (45kHz/55kHz)
Knockmary Hill Lodge	O1034	Pipistrellus spp. (45kHz/55kHz)
Large Clock Tower	O0936	Pipistrellus pipistrellus (45kHz)
Laundry Gate Lodge	O1235	Pipistrellus pygmaeus
Mc Kee Barracks	O1335	Myotis mystacinus
Mock church tower	O1136	Nyctalus leisleri
Mountjoy House	O1036	Plecotus auritus
Mountjoy House building	O1036	Plecotus auritus
National Concert Hall	O1532	Pipistrellus pygmaeus
Old Industrial Site	O1434	Pipistrellus pipistrellus (45kHz)

Old shower block	O1234	Pipistrellus spp. (45kHz/55kHz)
Open fronted industrial unit	O1730	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
OPW Storage Areas	O1235	Plecotus auritus
Roe family	O0636	Nyctalus leisleri
Santry, Tree Roost	O1640	Unidentified bat
Seamount House	O2345	Pipistrellus pipistrellus (45kHz)
Seamount Lodge	O2345	Plecotus auritus
Shed at Deerkeeper\'s Lodge	O1134	Plecotus auritus
Small clock tower	O0936	Nyctalus leisleri
Sport Ireland Bat Box Scheme - BB1	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB10	O0938	Unidentified bat
Sport Ireland Bat box Scheme - BB11	O0938	Unidentified bat
Sport Ireland Bat Box Scheme - BB12	O0938	Unidentified bat
Sport Ireland Bat Box Scheme - BB13	O0938	Unidentified bat
Sport Ireland Bat Box Scheme - BB14	O0938	Unidentified bat
Sport Ireland Bat Box Scheme - BB15	O0938	Unidentified bat
Sport Ireland Bat Box Scheme - BB16	O0938	Unidentified bat
Sport Ireland Bat Box Scheme - BB17	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB18	O0939	Pipistrellus spp. (45kHz/55kHz)
Sport Ireland Bat Box Scheme - BB19	O0939	Pipistrellus spp. (45kHz/55kHz)
Sport Ireland Bat Box Scheme - BB2	O0939	Pipistrellus spp. (45kHz/55kHz)
Sport Ireland Bat Box Scheme - BB20	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB21	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB22	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB23	O0939	Pipistrellus spp. (45kHz/55kHz)
Sport Ireland Bat Box Scheme - BB25	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB26	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB27	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB28	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB29	O0939	Pipistrellus spp. (45kHz/55kHz)
Sport Ireland Bat Box Scheme - BB3	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB30	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB31	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB32	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB33	O0939	Unidentified bat

Sport Ireland Bat Box Scheme - BB34	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB35	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB36	O0939	Pipistrellus spp. (45kHz/55kHz)
Sport Ireland Bat Box Scheme - BB37	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB38	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB39	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB4	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB40	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB41	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB42	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB43	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB44	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB45	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB46	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB47	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB48	O0939	Pipistrellus pygmaeus
Sport Ireland Bat Box Scheme - BB49	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB5	O0939	Pipistrellus spp. (45kHz/55kHz)
Sport Ireland Bat Box Scheme - BB50	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB6	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB7	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB8	O0939	Unidentified bat
Sport Ireland Bat Box Scheme - BB9	O0939	Unidentified bat
Sports Ireland Bat Box Scheme - BB24	O0939	Unidentified bat
St Brigids Castleknock	O0837	Plecotus auritus
St Marys	O1533	Nyctalus leisleri
St Marys	O1335	Nyctalus leisleri
St Peters Yellow walls	O0743	Pipistrellus spp. (45kHz/55kHz)
St Pius	O1533	Unidentified bat
US Ambassador\\\'s residence and outbuildings	O1035	Plecotus auritus
Viking Components Europe	O1533	Unidentified bat
Warrenstown House, Blanchardstown Road North, Blanchardstown, Dublin 15	O0740	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri,Pipistrellus spp. (45kHz/55kHz)
Transects		

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Name	Grid reference start	Species observed
Abbotstown Bridge Transect	O0938	Myotis daubentonii,Unidentified bat
Ashtown Station Transect	O1137	Myotis daubentonii,Unidentified bat
Ballydoden Road Transect, Dublin	O1228	Myotis daubentonii,Unidentified bat
Bridge on Spring Avenue	O1328	Myotis daubentonii,Unidentified bat,Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz)
Cardiff Bridge Transect	O1237	Myotis daubentonii,Unidentified bat
Castleknock Transect, Spot 10	O0838	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Pipistrellus spp. (45kHz/55kHz),Myotis spp.
Castleknock Transect, Spot 2	O0737	
Castleknock Transect, Spot 3	O0737	Unidentified bat,Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Pipistrellus spp. (45kHz/55kHz),Myotis spp.
Castleknock Transect, Spot 4	O0737	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Myotis spp.
Castleknock Transect, Spot 5	O0737	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Pipistrellus nathusii,Pipistrellus spp. (45kHz/55kHz),Myotis spp.,Nyctalus leisleri
Castleknock Transect, Spot 6	O0737	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Pipistrellus spp. (45kHz/55kHz)
Castleknock Transect, Spot 7	O0737	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Pipistrellus spp. (45kHz/55kHz)
Castleknock Transect, Spot 8	O0837	Unidentified bat,Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Pipistrellus spp. (45kHz/55kHz)
Castleknock Transect, Spot 9	O0837	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Pipistrellus spp. (45kHz/55kHz)
Clonskeagh Bridge Transect	O1630	Unidentified bat,Myotis daubentonii,Pipistrellus spp. (45kHz/55kHz),Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Clonskeagh Bridge Transect, Spot 1	O1630	Myotis daubentonii,Unidentified bat,Pipistrellus pygmaeus,Pipistrellus spp. (45kHz/55kHz),Nyctalus leisleri
Clonskeagh Bridge Transect, Spot 10	O1730	Myotis daubentonii,Pipistrellus pygmaeus,Pipistrellus spp. (45kHz/55kHz),Myotis spp.,Unidentified bat
Clonskeagh Bridge Transect, Spot 2	O1630	Myotis daubentonii,Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Pipistrellus spp. (45kHz/55kHz),Nyctalus leisleri,Unidentified bat
Clonskeagh Bridge Transect, Spot 3	O1630	Unidentified bat,Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Nyctalus leisleri,Myotis spp.,Myotis daubentonii
Clonskeagh Bridge Transect, Spot 4	O1630	Unidentified bat,Nyctalus leisleri,Pipistrellus pipistrellus (45kHz),Myotis daubentonii
Clonskeagh Bridge Transect, Spot 5	O1730	Unidentified bat,Pipistrellus spp. (45kHz/55kHz),Pipistrellus pipistrellus (45kHz),Nyctalus leisleri,Myotis daubentonii
Clonskeagh Bridge Transect, Spot 6	O1730	Unidentified bat,Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Nyctalus leisleri,Myotis spp.,Myotis daubentonii
Clonskeagh Bridge Transect, Spot 7	O1730	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Myotis daubentonii,Unidentified bat
Clonskeagh Bridge Transect, Spot 8	O1730	Myotis daubentonii,Pipistrellus pygmaeus,Nyctalus leisleri,Pipistrellus spp. (45kHz/55kHz),Myotis spp.,Unidentified bat
Clonskeagh Bridge Transect, Spot 9	O1730	Unidentified bat,Pipistrellus pygmaeus,Nyctalus leisleri,Pipistrellus spp. (45kHz/55kHz),Myotis daubentonii
Dolphins Barn, Dublin Transect	O1332	Unidentified bat,Myotis daubentonii
Grand Canal at Inchicore	O1032	
Grandard Bridge Transect	O0938	Myotis daubentonii,Unidentified bat
Griffth Park to Drumcondra Park Transect	O1636	Pipistrellus spp. (45kHz/55kHz),Myotis daubentonii,Unidentified bat
Herbert Park (Ballsbridge) Transect	O1732	Myotis daubentonii,Unidentified bat
Kilmainham Section (Inchicore) Transect	O1233	Myotis daubentonii,Unidentified bat
Milltown Brid	O1630	Myotis daubentonii,Unidentified bat,Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz)
Newbridge Firhouse Transect, Spot 1	O1127	Pipistrellus pygmaeus
Newbridge Firhouse Transect, Spot 10	O1027	Unidentified bat,Myotis daubentonii

Newbridge Firhouse Transect, Spot 2	O1127	Pipistrellus pygmaeus,Pipistrellus spp. (45kHz/55kHz),Myotis daubentonii
Newbridge Firhouse Transect, Spot 3	O1127	Pipistrellus pygmaeus,Pipistrellus spp. (45kHz/55kHz),Nyctalus leisleri,Myotis spp.,Pipistrellus pipistrellus (45kHz),Myotis daubentonii
Newbridge Firhouse Transect, Spot 4	O1127	Pipistrellus pygmaeus,Myotis daubentonii
Newbridge Firhouse Transect, Spot 5	O1027	Pipistrellus spp. (45kHz/55kHz)
Newbridge Firhouse Transect, Spot 6	O1027	Unidentified bat,Pipistrellus spp. (45kHz/55kHz),Pipistrellus pygmaeus
Newbridge Firhouse Transect, Spot 7	O1027	Myotis daubentonii,Unidentified bat,Pipistrellus pygmaeus,Pipistrellus spp. (45kHz/55kHz),Pipistrellus pipistrellus (45kHz),Myotis spp.
Newbridge Firhouse Transect, Spot 8	O1027	Myotis spp.
Newbridge Firhouse Transect, Spot 9	O1027	Myotis daubentonii,Unidentified bat,Myotis spp.
O04 (16) 2004-2008	O0646	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz),Pipistrellus spp. (45kHz/55kHz)
Phibsboro	O1536	Unidentified bat
Portobello Grove Rd Transect	O1532	Unidentified bat,Myotis daubentonii
ransect	O1127	Myotis daubentonii,Unidentified bat
Rathfarnham Rd R114 Bridge Transect	O1429	Unidentified bat,Myotis daubentonii
St. Lukes Hospital	O1529	Myotis daubentonii,Unidentified bat
Templeogue Bridge (Sth R137)	O1228	Myotis daubentonii,Unidentified bat
Violet Hill Drive Transect	O1337	Nyctalus leisleri,Pipistrellus spp. (45kHz/55kHz),Unidentified bat,Myotis daubentonii
Violet Hill Drive Transect, Spot 1	O1437	
Violet Hill Drive Transect, Spot 10	O1337	Unidentified bat
Violet Hill Drive Transect, Spot 2	O1435	
Violet Hill Drive Transect, Spot 3	O1437	
Violet Hill Drive Transect, Spot 4	O1437	Pipistrellus pipistrellus (45kHz)
Violet Hill Drive Transect, Spot 5	O1437	Myotis daubentonii
Violet Hill Drive Transect, Spot 6	O1437	Myotis daubentonii
Violet Hill Drive Transect, Spot 7	O1437	Pipistrellus pipistrellus (45kHz),Unidentified bat,Myotis daubentonii
Violet Hill Drive Transect, Spot 8	O1437	Unidentified bat
Violet Hill Drive Transect, Spot 9	O1337	Pipistrellus pipistrellus (45kHz)
War Memorial Garden Transect	O1134	Myotis daubentonii,Unidentified bat
Waterstown Park	O0835	Unidentified bat,Myotis daubentonii

Ad-hoc observations

Survey	Grid reference	Date	Species observed
Ad Hoc Records collected during Monitoring	O0942	30/09/2021	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
Bat Eco Services	O1931	04/06/2020	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1933	04/06/2020	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1833	04/06/2020	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri,Myotis spp.

Bat Eco Services	O1933	04/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1833	04/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1833	04/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1833	04/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1833	04/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1833	04/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1833	04/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1833	04/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1833	04/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1833	04/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1833	04/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1833	04/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1833	04/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1833	04/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1833	04/06/202 0	Pipistrellus pipistrellus (45kHz)
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Bat Eco Services	O1833	04/06/202 0	Pipistrellus pipistrellus (45kHz)
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Bat Eco Services	O1833	04/06/202 0	Pipistrellus pipistrellus (45kHz)
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Bat Eco Services	O1833	04/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1833	04/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1833	04/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1833	04/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1833	05/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1933	05/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1833	05/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1933	05/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2033	05/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1933	05/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1933	30/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2030	30/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2029	30/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2029	30/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2129	30/06/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2129	01/07/202 0	Pipistrellus pipistrellus (45kHz)

Bat Eco Services	O2129	01/07/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O2129	01/07/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O2129	01/07/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O2129	01/07/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O2129	01/07/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O2129	01/07/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O2030	01/07/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O2030	01/07/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O2030	01/07/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O2030	01/07/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O2030	01/07/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O2030	01/07/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O2030	01/07/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O2030	01/07/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O2030	01/07/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O1833	05/08/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O1833	05/08/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O1833	05/08/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O1933	05/08/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O1933	05/08/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O1933	05/08/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O1933	05/08/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O1933	05/08/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O1933	05/08/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O2033	05/08/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O2033	05/08/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O2033	05/08/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O1933	05/08/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O1933	05/08/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O2030	06/08/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O2129	07/08/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O2129	07/08/202 0	Pipistrellus pipistrellus (45kHz)	
Bat Eco Services	O2129	07/08/202 0	Pipistrellus pipistrellus (45kHz)	

Bat Eco Services	O2129	07/08/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2129	07/08/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1932	20/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1933	20/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1933	20/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1933	20/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1933	20/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1933	20/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1933	20/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1933	20/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2133	20/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2033	20/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2133	20/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2133	20/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2133	20/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2133	20/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2133	20/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2133	20/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2133	20/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2033	20/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2033	20/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2033	20/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1933	20/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1933	20/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2033	20/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1931	27/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2030	27/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2030	27/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2030	27/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2228	27/09/202 0	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1933	04/06/202 0	Nyctalus leisleri
Bat Eco Services	O1933	04/06/202 0	Nyctalus leisleri

Bat Eco Services	O1833	04/06/202 0	Nyctalus leisleri
Bat Eco Services	O1833	04/06/202 0	Nyctalus leisleri
Bat Eco Services	O1933	04/06/202 0	Nyctalus leisleri
Bat Eco Services	O1833	04/06/202 0	Nyctalus leisleri
Bat Eco Services	O1833	04/06/202 0	Nyctalus leisleri
Bat Eco Services	O1833	04/06/202 0	Nyctalus leisleri
Bat Eco Services	O1833	04/06/202 0	Nyctalus leisleri
Bat Eco Services	O1833	05/06/202 0	Nyctalus leisleri
Bat Eco Services	O1833	05/06/202 0	Nyctalus leisleri
Bat Eco Services	O1833	04/06/202 0	Nyctalus leisleri
Bat Eco Services	O1933	05/06/202 0	Nyctalus leisleri
Bat Eco Services	O1933	05/06/202 0	Nyctalus leisleri
Bat Eco Services	O1933	05/06/202 0	Nyctalus leisleri
Bat Eco Services	O1933	05/06/202 0	Nyctalus leisleri
Bat Eco Services	O1933	05/06/202 0	Nyctalus leisleri
Bat Eco Services	O1933	05/06/202 0	Nyctalus leisleri
Bat Eco Services	O1933	05/06/202 0	Nyctalus leisleri
Bat Eco Services	O1933	05/06/202 0	Nyctalus leisleri
Bat Eco Services	O1933	05/06/202 0	Nyctalus leisleri
Bat Eco Services	O1933	05/06/202 0	Nyctalus leisleri
Bat Eco Services	O1833	05/06/202 0	Nyctalus leisleri
Bat Eco Services	O1933	05/06/202 0	Nyctalus leisleri
Bat Eco Services	O1933	05/06/202 0	Nyctalus leisleri
Bat Eco Services	O1931	30/06/202 0	Nyctalus leisleri
Bat Eco Services	O2129	30/06/202 0	Nyctalus leisleri
Bat Eco Services	O2129	30/06/202 0	Nyctalus leisleri
Bat Eco Services	O2129	30/06/202 0	Nyctalus leisleri
Bat Eco Services	O2328	30/06/202 0	Nyctalus leisleri
Bat Eco Services	O2328	30/06/202 0	Nyctalus leisleri
Bat Eco Services	O2328	30/06/202 0	Nyctalus leisleri
Bat Eco Services	O2328	30/06/202 0	Nyctalus leisleri
Bat Eco Services	O2328	30/06/202 0	Nyctalus leisleri
Bat Eco Services	O2328	30/06/202 0	Nyctalus leisleri
Bat Eco Services	O2328	30/06/202 0	Nyctalus leisleri

Bat Eco Services	O2328	30/06/202 0	Nyctalus leisleri
Bat Eco Services	O2328	30/06/202 0	Nyctalus leisleri
Bat Eco Services	O2428	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2328	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2129	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2229	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2129	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2328	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2129	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2129	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2029	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2029	01/07/202 0	
Bat Eco Services	O2029	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2029	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2029	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2029	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2029	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2029	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2029	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2029	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2029	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2029	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2030	01/07/202 1	Nyctalus leisleri
Bat Eco Services	O2030	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2030	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2030	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2030	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2030	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2030	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2030	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2030	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2030	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2030	01/07/202 0	Nyctalus leisleri

Bat Eco Services	O2030	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2030	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2030	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2030	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2030	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2030	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2030	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2030	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2030	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2030	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2030	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2030	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2030	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2030	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O2030	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O1930	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O1930	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O1930	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O1930	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O1930	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O1930	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O1930	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O1930	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O1930	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O1930	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O1930	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O1930	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O1931	01/07/202 0	Nyctalus leisleri
Bat Eco Services	O1931	05/08/202 0	Nyctalus leisleri
Bat Eco Services	O1931	05/08/202 0	Nyctalus leisleri
Bat Eco Services	O1931	05/08/202 0	Nyctalus leisleri
Bat Eco Services	O1931	05/08/202 0	Nyctalus leisleri
Bat Eco Services	O1931	05/08/202 0	Nyctalus leisleri

Bat Eco Services	O1931	05/08/202 0	Nyctalus leisleri
Bat Eco Services	O1932	05/08/202 0	Nyctalus leisleri
Bat Eco Services	O1932	05/08/202 0	Nyctalus leisleri
Bat Eco Services	O1932	05/08/202 0	Nyctalus leisleri
Bat Eco Services	O1932	05/08/202 0	Nyctalus leisleri
Bat Eco Services	O1932	05/08/202 0	Nyctalus leisleri
Bat Eco Services	O1932	05/08/202 0	Nyctalus leisleri
Bat Eco Services	O1932	05/08/202 0	Nyctalus leisleri
Bat Eco Services	O1932	05/08/202 0	Nyctalus leisleri
Bat Eco Services	O1932	05/08/202 0	Nyctalus leisleri
Bat Eco Services	O1932	05/08/202 0	Nyctalus leisleri
Bat Eco Services	O1932	05/08/202 0	Nyctalus leisleri
Bat Eco Services	O1932	05/08/202 0	Nyctalus leisleri
Bat Eco Services	O1833	05/08/202 0	Nyctalus leisleri
Bat Eco Services	O2033	05/08/202 0	Nyctalus leisleri
Bat Eco Services	O1930	06/08/202 0	Nyctalus leisleri
Bat Eco Services	O1930	06/08/202 0	Nyctalus leisleri
Bat Eco Services	O1930	06/08/202 0	Nyctalus leisleri
Bat Eco Services	O2030	06/08/202 0	Nyctalus leisleri
Bat Eco Services	O2030	06/08/202 0	Nyctalus leisleri
Bat Eco Services	O2129	07/08/202 0	Nyctalus leisleri
Bat Eco Services	O2129	07/08/202 0	
Bat Eco Services	O2129	07/08/202 0	Nyctalus leisleri
Bat Eco Services	O2129	07/08/202 0	Nyctalus leisleri
Bat Eco Services	O2129	07/08/202 0	Nyctalus leisleri
Bat Eco Services	O2129	07/08/202 0	Nyctalus leisleri
Bat Eco Services	O2129	07/08/202 0	Nyctalus leisleri
Bat Eco Services	O2129	07/08/202 0	Nyctalus leisleri
Bat Eco Services	O2129	07/08/202 0	Nyctalus leisleri
Bat Eco Services	O2129	07/08/202 0	Nyctalus leisleri
Bat Eco Services	O2229	07/08/202 0	Nyctalus leisleri
Bat Eco Services	O2229	07/08/202 0	Nyctalus leisleri
Bat Eco Services	O2328	07/08/202 0	Nyctalus leisleri
Bat Eco Services	O1932	20/09/202 0	Nyctalus leisleri

Bat Eco Services	O1932	20/09/202 0	Nyctalus leisleri
Bat Eco Services	O1932	20/09/202 0	Nyctalus leisleri
Bat Eco Services	O1933	05/06/202 0	Myotis spp.
Bat Eco Services	O1931	05/08/202 0	Pipistrellus pygmaeus
Bat Eco Services	O2033	04/06/202 0	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
Bat Eco Services	O1933	04/06/202 0	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
Bat Eco Services	O1931	04/06/202 0	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
Bat Eco Services	O1930	26/06/202 0	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
Bat Eco Services	O2030	26/06/202 0	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
Bat Eco Services	O2030	26/06/202 0	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
Bat Eco Services	O2129	26/06/202 0	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
Bat Eco Services	O1931	05/08/202 0	Pipistrellus nathusii
Bat Eco Services	O2030	05/08/202 0	Pipistrellus nathusii
Bat Eco Services	O2129	05/08/202 0	Myotis spp.
Bat Eco Services	O1933	15/09/202 0	Pipistrellus nathusii
Bat Eco Services	O1833	15/09/202 0	Pipistrellus nathusii,Myotis spp.
Bat Eco Services	O1931	15/09/202 0	Pipistrellus nathusii
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pipistrellus (45kHz)

Bat Eco Services	O2342	28/05/202	1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	03/06/202	1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	03/06/202	1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	03/06/202	1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	03/06/202	1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	03/06/202	1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	03/06/202	1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	03/06/202	1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	03/06/202	1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	03/06/202	1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	03/06/202	1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	03/06/202	1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O2342	03/06/202	1	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Bat Eco Services	O2342	28/05/202	1	Nyctalus leisleri
Bat Eco Services	O2342	28/05/202	1	Nyctalus leisleri
Bat Eco Services	O2342	28/05/202	1	Nyctalus leisleri
Bat Eco Services	O2342	28/05/202	1	Nyctalus leisleri
Bat Eco Services	O2342	28/05/202	1	Nyctalus leisleri
Bat Eco Services	O2342	28/05/202	1	Nyctalus leisleri
Bat Eco Services	O2342	28/05/202	1	Nyctalus leisleri
Bat Eco Services	O2342	28/05/202	1	Nyctalus leisleri
Bat Eco Services	O2342	28/05/202	1	Nyctalus leisleri
Bat Eco Services	O2342	28/05/202	1	Nyctalus leisleri
Bat Eco Services	O2342	28/05/202	1	Nyctalus leisleri
Bat Eco Services	O2342	28/05/202	1	Nyctalus leisleri
Bat Eco Services	O2342	28/05/202	1	Nyctalus leisleri
Bat Eco Services	O2342	28/05/202	1	Nyctalus leisleri
Bat Eco Services	O2342	28/05/202	1	Nyctalus leisleri
Bat Eco Services	O2342	28/05/202	1	Nyctalus leisleri
Bat Eco Services	O2342	28/05/202	1	Nyctalus leisleri
Bat Eco Services	O2342	28/05/202	1	Nyctalus leisleri
Bat Eco Services	O2342	28/05/202	1	Nyctalus leisleri
Bat Eco Services	O2343	28/05/202	1	Nyctalus leisleri
Bat Eco Services	O2343	28/05/202	1	Nyctalus leisleri

Bat Eco Services	O2343	28/05/202	1	Nyctalus leisleri

Bat Eco Services	O2342	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2343	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2343	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2343	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2343	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2343	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2343	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2343	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2343	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2343	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2343	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2343	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2343	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2343	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pygmaeus
Bat Eco Services	O2342	28/05/202 1	Pipistrellus pygmaeus

Bat Eco Services	O2342	28/05/202	1	Pipistrellus pygmaeus

Bat Eco Services	O2342	03/06/202 1	Pipistrellus pygmaeus

		29/07/202	
Bat Eco Services	O1037	1	Myotis daubentonii
		02/05/202	
Bat Eco Services	O0938	2	Myotis daubentonii,Pipistrellus pygmaeus
		02/05/202	
Bat Eco Services	O0938	2	Myotis daubentonii
		02/05/202	
Bat Eco Services	O0938	2	Myotis daubentonii
		02/05/202	
Bat Eco Services	O0938	2	Myotis daubentonii
		02/05/202	
Bat Eco Services	O0938	2	Myotis daubentonii
		02/05/202	
Bat Eco Services	O0938	2	Pipistrellus pygmaeus
		02/05/202	
Bat Eco Services	O0938	2	Myotis daubentonii
		02/05/202	
Bat Eco Services	O0637	2	Pipistrellus pygmaeus
		02/09/202	
Bat Eco Services	O1037	1	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)
		02/09/202	
Bat Eco Services	O0938	1	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)
		02/09/202	
Bat Eco Services	O1037	1	Nyctalus leisleri
		28/07/202	
Bat Eco Services	O0937	1	Nyctalus leisleri
		28/07/202	
Bat Eco Services	O0938	1	Nyctalus leisleri
		28/07/202	
Bat Eco Services	O0937	1	Nyctalus leisleri
		02/05/202	
Bat Eco Services	O0737	2	Nyctalus leisleri
		02/05/202	
Bat Eco Services	O0938	2	Pipistrellus pygmaeus
		02/05/202	
Bat Eco Services	O0838	2	Pipistrellus pygmaeus
		02/09/202	
Bat Eco Services	O1037	1	Pipistrellus pipistrellus (45kHz)
		02/09/202	
Bat Eco Services	O0938	1	Pipistrellus pipistrellus (45kHz)
		02/09/202	
Bat Eco Services	O0938	1	Pipistrellus pipistrellus (45kHz)
		02/09/202	
Bat Eco Services	O0938	1	Pipistrellus pipistrellus (45kHz)
		02/09/202	
Bat Eco Services	O1037	1	Pipistrellus pipistrellus (45kHz)
		02/09/202	
Bat Eco Services	O1037	1	Pipistrellus pipistrellus (45kHz)
		02/09/202	
Bat Eco Services	O1037	1	Pipistrellus pipistrellus (45kHz)
		02/09/202	
Bat Eco Services	O1037	1	Pipistrellus pipistrellus (45kHz)
		02/05/202	
Bat Eco Services	O0938	2	Pipistrellus pygmaeus
		02/09/202	
Bat Eco Services	O1037	1	Pipistrellus pipistrellus (45kHz)
		02/09/202	
Bat Eco Services	O1037	1	Pipistrellus pipistrellus (45kHz)
		02/09/202	
Bat Eco Services	O1037	1	Pipistrellus pipistrellus (45kHz)
		02/09/202	
Bat Eco Services	O0937	1	Pipistrellus pipistrellus (45kHz)
		02/09/202	
Bat Eco Services	O0938	1	Pipistrellus pipistrellus (45kHz)
		02/09/202	
Bat Eco Services	O0938	1	Pipistrellus pipistrellus (45kHz)

Bat Eco Services	O0938	02/09/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0938	02/09/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0937	02/09/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0937	02/09/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1037	02/09/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1037	02/09/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1037	02/09/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1037	02/09/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1037	02/09/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1037	02/09/202 1	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1037	02/09/202 1	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Bat Eco Services	O0937	02/09/202 1	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Bat Eco Services	O1037	29/07/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0938	28/07/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0937	28/07/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0937	28/07/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0937	28/07/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O1037	28/07/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0937	28/07/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0938	02/05/202 2	Pipistrellus pygmaeus
Bat Eco Services	O0937	28/07/202 1	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0938	02/05/202 2	Myotis daubentonii,Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Bat Eco Services	O0938	02/05/202 2	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0938	02/05/202 2	Pipistrellus pygmaeus
Bat Eco Services	O0938	02/05/202 2	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0938	02/05/202 2	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0938	02/05/202 2	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Bat Eco Services	O0938	02/05/202 2	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0938	02/05/202 2	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0938	02/05/202 2	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0838	02/05/202 2	Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0637	02/05/202 2	Pipistrellus pipistrellus (45kHz)

Bat Eco Services	O0637	02/05/202 2		Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0938	02/05/202 2		Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0938	02/05/202 2		Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0938	02/05/202 2		Myotis daubentonii,Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0938	02/05/202 2		Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0938	02/05/202 2		Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0838	02/05/202 2		Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0737	02/05/202 2		Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0737	02/05/202 2		Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0737	02/05/202 2		Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0637	02/05/202 1		Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0938	02/05/202 2		Pipistrellus pygmaeus
Bat Eco Services	O0938	02/05/202 2		Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Bat Eco Services	O0938	02/05/202 2		Pipistrellus pipistrellus (45kHz)
Bat Eco Services	O0938	02/05/202 2		Pipistrellus pygmaeus
Bat Eco Services	O0938	02/05/202 2		Pipistrellus pygmaeus
Bat Eco Services	O1037	02/09/202 1		Pipistrellus pygmaeus
Bat Eco Services	O0937	02/09/202 1		Pipistrellus pygmaeus
Bat Eco Services	O0937	02/09/202 1		Pipistrellus pygmaeus
Bat Eco Services	O0938	02/09/202 1		Pipistrellus pygmaeus
Bat Eco Services	O0938	02/09/202 1		Pipistrellus pygmaeus
Bat Eco Services	O0937	02/09/202 1		Pipistrellus pygmaeus
Bat Eco Services	O0937	02/09/202 1		Pipistrellus pygmaeus
Bat Eco Services	O0937	02/09/202 1		Pipistrellus pygmaeus
Bat Eco Services	O1037	02/09/202 1		Pipistrellus pygmaeus
Bat Eco Services	O1037	02/09/202 1		Pipistrellus pygmaeus
Bat Eco Services	O1037	02/09/202 1		Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Bat Eco Services	O1037	02/09/202 1		Pipistrellus pygmaeus
Bat Eco Services	O1037	02/09/202 1		Pipistrellus pygmaeus
Bat Eco Services	O1037	02/09/202 1		Pipistrellus pygmaeus
Bat Eco Services	O0937	02/09/202 1		Pipistrellus pygmaeus
Bat Eco Services	O0937	02/09/202 1		Pipistrellus pygmaeus
Bat Eco Services	O0938	02/09/202 1		Pipistrellus pygmaeus

Bat Eco Services	O0938	02/09/202 1	Pipistrellus pygmaeus
Bat Eco Services	O0938	02/09/202 1	Pipistrellus pygmaeus
Bat Eco Services	O0938	02/09/202 1	
Bat Eco Services	O0938	02/09/202 1	Pipistrellus pygmaeus
Bat Eco Services	O0937	02/09/202 1	Pipistrellus pygmaeus
Bat Eco Services	O0937	02/09/202 1	Pipistrellus pygmaeus
Bat Eco Services	O0937	02/09/202 1	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Bat Eco Services	O0937	02/09/202 1	Pipistrellus pygmaeus
Bat Eco Services	O0937	02/09/202 1	Pipistrellus pygmaeus
Bat Eco Services	O0937	02/09/202 1	Pipistrellus pygmaeus
Bat Eco Services	O1037	02/09/202 1	Pipistrellus pygmaeus
Bat Eco Services	O1037	02/09/202 1	Pipistrellus pygmaeus
Bat Eco Services	O1037	02/09/202 1	Pipistrellus pygmaeus
Bat Eco Services	O1037	02/09/202 1	Pipistrellus pygmaeus
Bat Eco Services	O1037	02/09/202 1	Pipistrellus pygmaeus
Bat Eco Services	O1037	02/09/202 1	Pipistrellus pygmaeus
Bat Eco Services	O1037	02/09/202 1	Pipistrellus pygmaeus
Bat Eco Services	O1037	02/09/202 1	Pipistrellus pygmaeus
Bat Eco Services	O1037	02/09/202 1	Pipistrellus pygmaeus
Bat Eco Services	O1037	02/09/202 1	Pipistrellus pygmaeus
Bat Eco Services	O1037	02/09/202 1	Pipistrellus pygmaeus
Bat Eco Services	O1037	02/09/202 1	Pipistrellus pygmaeus
Bat Eco Services	O1037	02/09/202 1	Pipistrellus pygmaeus
Bat Eco Services	O1037	28/07/202 1	Pipistrellus pygmaeus
Bat Eco Services	O1037	29/07/202 1	Pipistrellus pygmaeus
Bat Eco Services	O1037	29/07/202 1	
Bat Eco Services	O0937	28/07/202 1	Pipistrellus pygmaeus
Bat Eco Services	O0938	28/07/202 1	Pipistrellus pygmaeus
Bat Eco Services	O0938	28/07/202 1	Pipistrellus pygmaeus
Bat Eco Services	O0938	28/07/202 1	Pipistrellus pygmaeus
Bat Eco Services	O0938	28/07/202 1	Pipistrellus pygmaeus
Bat Eco Services	O0938	28/07/202 1	Pipistrellus pygmaeus
Bat Eco Services	O0937	28/07/202 1	Pipistrellus pygmaeus
Bat Eco Services	O0937	28/07/202 1	Pipistrellus pygmaeus

Bat Eco Services	O0937	28/07/2021	Pipistrellus pygmaeus
Bat Eco Services	O0937	28/07/2021	Pipistrellus pygmaeus
Bat Eco Services	O1037	28/07/2021	Pipistrellus pygmaeus
Bat Eco Services	O1037	28/07/2021	Pipistrellus pygmaeus
Bat Eco Services	O0838	02/05/2021	Pipistrellus pygmaeus
Bat Eco Services	O0938	02/05/2021	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Bat Eco Services	O0737	02/05/2021	Pipistrellus pygmaeus
Bat Eco Services	O0838	02/05/2021	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri,Myotis daubentonii
Bat Eco Services	O0737	02/05/2021	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri,Pipistrellus nathusii
Bat Eco Services	O0737	02/05/2021	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri,Plecotus auritus,Myotis daubentonii,Pipistrellus nathusii
Bat Survey - Scott Cawley	O1733	07/06/2006	Pipistrellus pygmaeus,Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)
Bat Survey - Scott Cawley	O1135	2007-06-00	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Pipistrellus nathusii,Plecotus auritus,Nyctalus leisleri,Myotis natterreri,Myotis daubentonii,Myotis mystacinus,Myotis mystacinus/brandtii
Bat Survey - Scott Cawley	O1135	2008-00-00	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Pipistrellus nathusii,Plecotus auritus,Nyctalus leisleri,Myotis natterreri,Myotis daubentonii,Myotis spp.,Myotis mystacinus/brandtii
Bat Survey - Scott Cawley	O0933	27/05/2011	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)
Bat Survey - Scott Cawley	O1332	09/10/2003	Pipistrellus spp. (45kHz/55kHz)
Bat Survey - Scott Cawley	O1726	15/06/2004	Pipistrellus pipistrellus (45kHz)
Bat Survey - Scott Cawley	O1828	01/04/2001	Nyctalus leisleri
Bat Survey - Scott Cawley	O1733	12/05/2005	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
Bat Survey - Scott Cawley	O1534	25/07/2005	Nyctalus leisleri
Bat Survey - Scott Cawley	O1039	02/08/2005	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Bat Survey - Scott Cawley	O1433	2006-07-00	Pipistrellus pipistrellus (45kHz)
Bat Survey - Scott Cawley	O1734	18/05/2006	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Bat Survey - Scott Cawley	O1339	05/09/2006	Pipistrellus pygmaeus
Bat Survey - Scott Cawley	O1327	24/05/2007	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)
Bat Survey - Scott Cawley	O0939	31/07/2008	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Bat Survey - Scott Cawley	O1732	19/06/2008	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Myotis daubentonii
Bat Survey - Scott Cawley	O1533	2009-05-00	Nyctalus leisleri,Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz)
Bat Survey - Scott Cawley	O1237	11/06/2009	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)
Bat Survey - Scott Cawley	O2327	07/07/2009	Nyctalus leisleri
Bat Survey - Scott Cawley	O1727	01/10/2009	Pipistrellus pipistrellus (45kHz)
Bat Survey - Scott Cawley	O1630	25/06/2009	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Bat Survey - Scott Cawley	O2428	29/06/2009	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)

Bat Survey - Scott Cawley	O1235	13/08/2007	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Nyctalus leisleri,Myotis mystacinus,Myotis daubentonii,Plecotus auritus,Myotis spp.,Pipistrellus nathusii
Bat Survey - Scott Cawley	O1136	21/05/2007	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)
Bat Survey - Scott Cawley	O1136	21/05/2007	Nyctalus leisleri
Bat Survey - Scott Cawley	O1134	08/05/2007	Nyctalus leisleri,Pipistrellus spp. (45kHz/55kHz)
Bat Survey - Scott Cawley	O0935	18/07/2007	Pipistrellus pygmaeus
Bat Survey - Scott Cawley	O0836	20/07/2007	Pipistrellus pygmaeus
Bat Survey - Scott Cawley	O0936	05/08/2007	Nyctalus leisleri,Pipistrellus spp. (45kHz/55kHz),Myotis spp.
Bat Survey - Scott Cawley	O1036	10/08/2007	Pipistrellus pygmaeus
Bat Survey - Scott Cawley	O1135	2008-06-00	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Pipistrellus nathusii,Plecotus auritus,Nyctalus leisleri,Myotis natterreri,Myotis daubentonii,Myotis mystacinus/brandtii,Myotis spp.
Bat Survey - Scott Cawley	O1842	2010-10-00	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
Bat Survey - Scott Cawley	O1731	11/05/2010	Pipistrellus spp. (45kHz/55kHz)
Bat Survey - Scott Cawley	O1830	24/05/2010	Pipistrellus spp. (45kHz/55kHz)
Bat Survey - Scott Cawley	O1531	27/08/2010	Nyctalus leisleri,Pipistrellus spp. (45kHz/55kHz)
Bat Survey - Scott Cawley	O1440	07/09/2010	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri,Pipistrellus spp. (45kHz/55kHz)
Bat Survey - Scott Cawley	O1427	09/09/2010	Nyctalus leisleri
Bat Survey - Scott Cawley	O1634	15/09/2010	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz),Pipistrellus nathusii
Bat Survey - Scott Cawley	O1327	21/10/2010	Pipistrellus pipistrellus (45kHz)
Bat Survey - Scott Cawley	O1741	31/05/2011	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Pipistrellus spp. (45kHz/55kHz),Nyctalus leisleri,Unidentified bat
Bat Survey - Scott Cawley	O0731	09/06/2011	Pipistrellus pygmaeus,Nyctalus leisleri
Bat Survey - Scott Cawley	O1729	15/04/2011	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Myotis spp.,Unidentified bat
Bat Survey - Scott Cawley	O1440	30/08/2011	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri,Unidentified bat,Pipistrellus spp. (45kHz/55kHz)
Bat Survey - Scott Cawley	O1237	16/07/2012	Myotis daubentonii,Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Pipistrellus spp. (45kHz/55kHz),Nyctalus leisleri
Bat Survey - Scott Cawley	O1026	24/08/2012	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Myotis daubentonii,Nyctalus leisleri
Bat Survey - Scott Cawley	O2627	15/05/2012	Nyctalus leisleri,Pipistrellus spp. (45kHz/55kHz),Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz)
Bat Survey - Scott Cawley	O2427	09/08/2012	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)
Bat Survey - Scott Cawley	O1730	27/06/2013	Nyctalus leisleri,Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz)
Bat Survey - Scott Cawley	O1733	25/07/2013	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri,Pipistrellus spp. (45kHz/55kHz),Plecotus auritus
Bat Survey - Scott Cawley	O2326	2012-09-00	Pipistrellus spp. (45kHz/55kHz)
Bat Survey - Scott Cawley	o1932	29/06/2017	Nyctalus leisleri
Bat Survey - Scott Cawley	o1540	30/08/2016	Nyctalus leisleri
Bat Survey - Scott Cawley	o1540	31/08/2016	Nyctalus leisleri
Bat Survey - Scott Cawley	o1540	06/09/2016	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)

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Bat Survey - Scott Cawley	o1539	30/08/201	6	Nyctalus leisleri
Bat Survey - Scott Cawley	o1540	06/09/201	6	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)
Bat Survey - Scott Cawley	o1539	06/09/201	6	Unidentified bat,Pipistrellus pipistrellus (45kHz)
Bat Survey - Scott Cawley	o1440	31/08/201	6	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri,Pipistrellus pygmaeus
Bat Survey - Scott Cawley	o2129	17/05/201	6	
Bat Survey - Scott Cawley	O1435	10/10/201	6	Pipistrellus pipistrellus (45kHz)
Bat Survey - Scott Cawley	O1327	06/09/201	6	Pipistrellus spp. (45kHz/55kHz),Nyctalus leisleri
Bat Survey - Scott Cawley	O1327	09/09/201	6	Pipistrellus spp. (45kHz/55kHz)
Bat Survey - Scott Cawley	O1532	29/09/201	6	Nyctalus leisleri,Pipistrellus pygmaeus
Bat Survey - Scott Cawley	O1532	05/10/201	6	Nyctalus leisleri,Pipistrellus pygmaeus
Bat Survey - Scott Cawley	O2428	13/04/201	7	Nyctalus leisleri
Bat Survey - Scott Cawley	O1526	15/06/201	6	Pipistrellus spp. (45kHz/55kHz),Nyctalus leisleri
Bat Survey - Scott Cawley	O1526	05/07/201	6	Pipistrellus pygmaeus,Plecotus auritus
Bat Survey - Scott Cawley	O1526	28/07/201	6	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri,Myotis daubentonii,Myotis natterreri,Plecotus auritus
Bat Survey - Scott Cawley	O1526	01/09/201	6	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
Bat Survey - Scott Cawley	O1526	01/09/201	6	Pipistrellus pygmaeus,Nyctalus leisleri,Myotis daubentonii,Myotis mystacinus
Bat Survey - Scott Cawley	O1931	11/05/201	7	Nyctalus leisleri,Pipistrellus pygmaeus
Bat Survey - Scott Cawley	O1931	15/05/201	7	Nyctalus leisleri
Bat Survey - Scott Cawley	O0739	25/08/201	5	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Bat Survey - Scott Cawley	O1539	30/08/201	6	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
Bat Survey - Scott Cawley	O1334	16/09/201	5	Nyctalus leisleri
Bat Surveys - Tina Aughney	O1546	31/08/200	6	Myotis natterreri,Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)
Bat Surveys - Tina Aughney	O1632	07/09/200	7	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
Bat Surveys - Tina Aughney	O1429	19/07/200	7	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Pipistrellus spp. (45kHz/55kHz),Nyctalus leisleri,Myotis spp.,Myotis daubentonii
Bat Surveys - Tina Aughney	O1529	19/07/200	7	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Pipistrellus spp. (45kHz/55kHz),Nyctalus leisleri,Myotis spp.,Myotis daubentonii
Bat Surveys - Tina Aughney	O1630	19/07/200	7	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Pipistrellus spp. (45kHz/55kHz),Nyctalus leisleri,Myotis spp.,Myotis daubentonii
Bat Surveys - Tina Aughney	O1730	19/07/200	7	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Pipistrellus spp. (45kHz/55kHz),Nyctalus leisleri,Myotis spp.,Myotis daubentonii
Bat Surveys - Tina Aughney	O1731	19/07/200	7	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Pipistrellus spp. (45kHz/55kHz),Nyctalus leisleri,Myotis spp.,Myotis daubentonii
Bat Surveys - Tina Aughney	O1733	30/06/200	6	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
Bat Surveys - Tina Aughney	O1329	20/07/200	7	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Myotis daubentonii,Plecotus auritus
Bat Surveys - Tina Aughney	O1329	22/07/200	7	Myotis daubentonii,Pipistrellus pipistrellus (45kHz),Myotis mystacinus/brandtii,Pipistrellus pygmaeus,Nyctalus leisleri
Bat Surveys - Tina Aughney	O1329	27/07/200	7	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Myotis daubentonii
Bat Surveys - Tina Aughney	O1731	26/10/200	7	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri

Bat Surveys - Tina Aughney	O1546	30/08/200 6	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri,Myotis natterreri
Bat Surveys - Tina Aughney	O0832	28/06/200 5	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri,Myotis daubentonii
Bat Surveys - Tina Aughney	O1727	09/04/200 1	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
Bat Surveys - Tina Aughney	O0631	22/04/201 1	Pipistrellus pygmaeus,Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)
Bat Surveys - Tina Aughney	O2528	19/06/201 2	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)
Bat Surveys - Tina Aughney	O2242	06/05/201 7	Plecotus auritus,Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
Bat Surveys - Tina Aughney	O2029	11/08/201 7	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri,Plecotus auritus
Bat Surveys - Tina Aughney	O1737	11/08/201 7	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri,Plecotus auritus
Bat Surveys - Tina Aughney	O1831	23/04/201 7	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
Bat Surveys - Tina Aughney	O1435	23/06/201 8	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)
BATLAS 2010	O0832	27/09/200 8	Pipistrellus pipistrellus (45kHz)
BATLAS 2010	O1540	01/08/200 8	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
BATLAS 2010	O1640	01/08/200 8	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
BATLAS 2010	O1538	01/08/200 8	Pipistrellus pipistrellus (45kHz)
BATLAS 2010	O1744	30/07/200 8	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
BATLAS 2010	O1542	31/07/200 8	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
BATLAS 2010	O1442	16/07/200 8	Nyctalus leisleri
BATLAS 2010	O1542	16/07/200 8	Nyctalus leisleri
BATLAS 2010	O1543	16/07/200 8	Nyctalus leisleri
BATLAS 2010	O1642	16/07/200 8	Nyctalus leisleri
BATLAS 2010	O1643	16/07/200 8	Nyctalus leisleri
BATLAS 2010	O0731	27/06/200 8	Pipistrellus pygmaeus
BATLAS 2010	O1533	16/06/200 8	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
BATLAS 2010	O1633	16/06/200 8	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
BATLAS 2010	O1834	01/06/200 8	Unidentified bat
BATLAS 2010	O0631	28/08/200 8	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Myotis daubentonii
BATLAS 2010	O0635	30/06/200 8	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri,Myotis spp.,Myotis daubentonii
BATLAS 2010	O0638	17/09/200 8	Pipistrellus pygmaeus
BATLAS 2010	O0637	15/08/200 8	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri,Myotis daubentonii
BATLAS 2010	O0729	17/09/200 8	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
BATLAS 2010	O1136	30/09/200 8	Pipistrellus pipistrellus (45kHz),Pipistrellus nathusii,Myotis natterreri,Myotis mystacinus/brandtii,Myotis daubentonii
BATLAS 2010	O1136	30/09/200 8	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
BATLAS 2010	O0936	30/09/200 8	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Pipistrellus spp. (45kHz/55kHz),Nyctalus leisleri,Myotis daubentonii

BATLAS 2010	O1136	30/09/200 8	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
BATLAS 2010	O1136	30/09/200 8	Pipistrellus nathusii,Plecotus auritus,Myotis natterreri,Myotis mystacinus/brandtii,Myotis daubentonii
BATLAS 2010	O1134	30/09/200 8	Pipistrellus spp. (45kHz/55kHz)
BATLAS 2010	O1036	30/09/200 8	Pipistrellus spp. (45kHz/55kHz)
BATLAS 2010	O1235	30/09/200 8	Pipistrellus spp. (45kHz/55kHz),Myotis daubentonii
BATLAS 2010	O1036	30/09/200 8	Pipistrellus spp. (45kHz/55kHz),Nyctalus leisleri
BATLAS 2010	O1134	30/09/200 8	Pipistrellus spp. (45kHz/55kHz),Plecotus auritus,Nyctalus leisleri
BATLAS 2010	O1034	30/09/200 8	Plecotus auritus
BATLAS 2010	O1135	30/09/200 8	Plecotus auritus
BATLAS 2010	O1136	30/09/200 8	Nyctalus leisleri
BATLAS 2010	O0935	30/09/200 8	Myotis natterreri
BATLAS 2010	O1035	30/09/200 8	Myotis natterreri
BATLAS 2010	O1233	28/08/200 8	Pipistrellus pipistrellus (45kHz),Pipistrellus spp. (45kHz/55kHz),Nyctalus leisleri
BATLAS 2010	O1328	13/08/200 8	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Pipistrellus spp. (45kHz/55kHz),Myotis spp.
BATLAS 2020	O0729	06/07/201 7	
BATLAS 2020	O0730	02/09/201 6	
BATLAS 2020	O0632	02/09/201 6	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
BATLAS 2020	O1132	20/10/201 5	Pipistrellus pipistrellus (45kHz),Pipistrellus nathusii
BATLAS 2020	O1034	08/10/201 5	Pipistrellus nathusii
BATLAS 2020	O1036	08/10/201 5	Pipistrellus nathusii
BATLAS 2020	O1036	08/10/201 5	Pipistrellus pipistrellus (45kHz)
BATLAS 2020	O1036	08/10/201 5	Pipistrellus pipistrellus (45kHz)
BATLAS 2020	O0640	22/08/201 8	
BATLAS 2020	O1142	14/09/201 7	Pipistrellus spp. (45kHz/55kHz)
Bats in Dublin's City Centre Parks and Waterways	O1633	05/07/200 0	Myotis mystacinus/brandtii
Bats in Dublin's City Centre Parks and Waterways	O1535	22/05/200 0	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)
Bats in Dublin's City Centre Parks and Waterways	O1632	13/05/200 0	Pipistrellus pipistrellus (45kHz)
Bats in Dublin's City Centre Parks and Waterways	O1633	10/05/200 0	Pipistrellus pygmaeus
Daubentons bat rabies sampling	O1427	03/07/202 1	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)
Dublin Bat Group surveys	O1137	08/09/199 9	Myotis daubentonii,Pipistrellus pygmaeus
Dublin Bat Group surveys	O1526	18/08/199 9	Nyctalus leisleri
Dublin Bat Group surveys	O1633	10/05/200 0	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)
Dublin Bat Group surveys	O1137	08/09/199 9	Nyctalus leisleri

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Dublin Bat Group surveys	O1633	05/07/2000	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Dublin Bat Group surveys	O1529	18/08/1999	Pipistrellus pygmaeus
Dublin Bat Group Telephone and Follow-up Surveys	O0937	07/04/2002	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
East Coast Project	O2639	18/08/2024	Pipistrellus nathusii,Nyctalus leisleri,Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Plecotus auritus,Myotis daubentonii,Myotis natterreri,Myotis mystacinus
East Coast Project	O2639	09/09/2024	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Plecotus auritus,Myotis daubentonii,Myotis natterreri,Myotis spp.
EIS and Road Surveys - Conor Kelleher	O1037	07/04/2002	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
EIS and Road Surveys - Conor Kelleher	O1334	12/07/2006	Pipistrellus pipistrellus (45kHz)
EIS and Road Surveys - Conor Kelleher	O0932	08/07/2007	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Myotis daubentonii,Nyctalus leisleri
EIS and Road Surveys - Conor Kelleher	O0732	08/07/2007	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Myotis daubentonii,Nyctalus leisleri
EIS and Road Surveys - Conor Kelleher	O0832	08/07/2007	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Myotis daubentonii,Nyctalus leisleri
EIS and Road Surveys - Conor Kelleher	O1032	08/07/2007	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Myotis daubentonii,Nyctalus leisleri
EIS and Road Surveys - Conor Kelleher	O0735	22/06/2005	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
EIS and Road Surveys - Conor Kelleher	O0938	22/06/2005	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
EIS and Road Surveys - Conor Kelleher	O0732	22/06/2005	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Nyctalus leisleri,Myotis daubentonii
EIS and Road Surveys - Conor Kelleher	O0735	22/06/2005	Myotis daubentonii
EIS and Road Surveys - Conor Kelleher	O1127	22/06/2005	Pipistrellus pygmaeus,Myotis daubentonii
EIS and Road Surveys - Conor Kelleher	O1931	22/06/2005	Nyctalus leisleri
EIS and Road Surveys - Conor Kelleher	O1640	22/06/2005	Pipistrellus pygmaeus,Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)
EIS and Road Surveys - Conor Kelleher	O1344	14/09/2002	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Plecotus auritus,Nyctalus leisleri
EIS and Road Surveys - Conor Kelleher	O1444	14/09/2002	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Plecotus auritus,Nyctalus leisleri
EIS and Road Surveys - Conor Kelleher	O1544	14/09/2002	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Plecotus auritus,Nyctalus leisleri
EIS surveys - Brian Keeley	O1727	01/09/2004	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
EIS surveys - Brian Keeley	O2129	01/07/2004	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
EIS surveys - Brian Keeley	O2329	01/06/2004	Pipistrellus spp. (45kHz/55kHz),Nyctalus leisleri
EIS surveys - Brian Keeley	O1728	04/09/2003	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
EIS surveys - Brian Keeley	O2043	09/07/2004	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri,Myotis mystacinus/brandtii,Plecotus auritus
EIS surveys - Brian Keeley	O2041	20/09/2005	Pipistrellus pygmaeus
EIS surveys - Brian Keeley	O0935	02/09/2005	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri,Plecotus auritus,Myotis mystacinus
EIS surveys - Brian Keeley	O0735	01/09/2005	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri,Plecotus auritus,Myotis daubentonii
EIS surveys - Brian Keeley	O1237	06/06/2006	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
EIS surveys - Brian Keeley	O2145	05/07/2006	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri,Plecotus auritus
EIS surveys - Brian Keeley	O1641	02/06/2006	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri

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EIS surveys - Brian Keeley	O2126	07/10/2006	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
EIS surveys - Brian Keeley	O0735	10/08/2006	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
EIS surveys - Brian Keeley	O1342	30/08/2007	Nyctalus leisleri
EIS surveys - Brian Keeley	O2343	10/07/2007	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
EIS surveys - Brian Keeley	O1833	24/05/2011	Pipistrellus pygmaeus,Nyctalus leisleri,Pipistrellus pipistrellus (45kHz),Myotis daubentonii
EIS surveys - Brian Keeley	O0729	14/09/2010	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Plecotus auritus
EIS surveys - Brian Keeley	O1833	12/07/2010	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
EIS surveys - Brian Keeley	O1831	04/06/2010	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
EIS surveys - Brian Keeley	O2345	19/05/2009	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)
EIS surveys - Brian Keeley	O1237	13/09/2010	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
EIS surveys - Brian Keeley	O1733	08/10/2009	Pipistrellus nathusii,Pipistrellus pygmaeus,Nyctalus leisleri
EIS surveys - Brian Keeley	O1842	09/08/2012	Nyctalus leisleri,Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz)
EIS surveys - Brian Keeley	O1037	04/05/2013	Myotis daubentonii,Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
EIS Surveys - Caroline Shiel	O1135	04/06/2007	Nyctalus leisleri
EIS Surveys - Niamh Roche	O1744	20/09/2003	Nyctalus leisleri
EIS Surveys - Niamh Roche	O1930	2001-05-00	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)
EIS Surveys - Niamh Roche	O1833	2004-09-00	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
EIS Surveys - Niamh Roche	O1833	2004-09-00	Nyctalus leisleri
Faith Wilson	O1728	04/09/2003	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Faith Wilson	O0836	11/06/2008	Myotis spp.,Pipistrellus spp. (45kHz/55kHz),Nyctalus leisleri
Faith Wilson	O1632	08/10/2009	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Pipistrellus nathusii
Faith Wilson	O1433	01/08/2007	Nyctalus leisleri
Faith Wilson	O0640	07/10/2007	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Faith Wilson	O0640	07/10/2007	Myotis daubentonii,Pipistrellus pygmaeus
Faith Wilson	O0739	07/10/2007	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
Faith Wilson	O0838	11/08/2008	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Myotis daubentonii
Faith Wilson	O0838	09/10/2007	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri,Myotis daubentonii,Plecotus auritus
Faith Wilson	O0938	09/10/2007	Pipistrellus pipistrellus (45kHz)
Faith Wilson	O1426	31/10/2014	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri,Pipistrellus pygmaeus
Faith Wilson	O0631	10/10/2018	Nyctalus leisleri,Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz)
Faith Wilson	O2227	13/07/2021	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
John Curtin	O0635	18/09/2017	Myotis daubentonii
National Biodiversity Data Centre Bat Records	O1830	30/09/2016	Myotis natterreri,Pipistrellus pygmaeus

National Biodiversity Data Centre Bat Records	O1538	01/05/201 4	Pipistrellus pygmaeus
National Biodiversity Data Centre Bat Records	O2137	07/06/201 3	Nyctalus leisleri
National Biodiversity Data Centre Bat Records	O2137	07/06/201 3	Pipistrellus pipistrellus (45kHz)
National Biodiversity Data Centre Bat Records	O2136	07/06/201 3	Pipistrellus pygmaeus
National Biodiversity Data Centre Bat Records	O1127	20/04/201 9	Myotis daubentonii
National Biodiversity Data Centre Bat Records	O1127	21/04/201 9	Myotis daubentonii
National Biodiversity Data Centre Bat Records	O1027	24/02/201 9	Myotis daubentonii
National Biodiversity Data Centre Bat Records	O2245	17/06/201 7	Pipistrellus spp. (45kHz/55kHz)
National Biodiversity Data Centre Bat Records	O1134	04/09/201 8	Unidentified bat
National Biodiversity Data Centre Bat Records	O1233	20/04/201 9	Myotis daubentonii
National Biodiversity Data Centre Bat Records	O1328	21/09/201 8	Nyctalus leisleri
National Biodiversity Data Centre Bat Records	O1929	01/08/201 8	Nyctalus leisleri,Pipistrellus pygmaeus
National Biodiversity Data Centre Bat Records	O1630	23/08/201 8	Myotis daubentonii
National Biodiversity Data Centre Bat Records	O1532	28/05/201 6	Nyctalus leisleri
National Biodiversity Data Centre Bat Records	O1137	15/10/202 0	Pipistrellus spp. (45kHz/55kHz)
National Biodiversity Data Centre Bat Records	O1438	06/06/202 1	Myotis natterreri,Pipistrellus pygmaeus,Nyctalus leisleri
National Biodiversity Data Centre Bat Records	O1438	07/06/202 1	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
National Biodiversity Data Centre Bat Records	O1438	04/06/202 1	Nyctalus leisleri
National Biodiversity Data Centre Bat Records	O1438	05/06/202 1	Nyctalus leisleri
National Biodiversity Data Centre Bat Records	O0838	18/07/202 1	Pipistrellus spp. (45kHz/55kHz)
National Biodiversity Data Centre Bat Records	O1537	21/11/202 2	Pipistrellus spp. (45kHz/55kHz)
National Biodiversity Data Centre Bat Records	O2539	07/04/202 0	Pipistrellus pygmaeus
National Biodiversity Data Centre Bat Records	O1226	30/06/202 1	Pipistrellus spp. (45kHz/55kHz)
National Biodiversity Data Centre Bat Records	O2428	12/04/202 2	Pipistrellus spp. (45kHz/55kHz)
National Biodiversity Data Centre Bat Records	O1630	15/03/202 1	Myotis daubentonii
National Biodiversity Data Centre Bat Records	O1527	05/06/202 1	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
National Biodiversity Data Centre Bat Records	O1527	05/06/202 1	Nyctalus leisleri
National Biodiversity Data Centre Bat Records	O1226	23/04/202 1	Pipistrellus spp. (45kHz/55kHz)
National Biodiversity Data Centre Bat Records	O1127	09/04/202 0	Myotis daubentonii
National Biodiversity Data Centre Bat Records	O1127	11/04/202 2	Unidentified bat
National Biodiversity Data Centre Bat Records	O1127	27/04/202 2	Unidentified bat
National Biodiversity Data Centre Bat Records	O1732	25/07/201 9	Unidentified bat
National Biodiversity Data Centre Bat Records	O1335	21/10/202 0	Pipistrellus spp. (45kHz/55kHz),Pipistrellus pygmaeus

National Biodiversity Data Centre Bat Records	O1736	26/04/202 1	Pipistrellus spp. (45kHz/55kHz)
National Biodiversity Data Centre Bat Records	O1536	04/09/202 1	Pipistrellus spp. (45kHz/55kHz)
National Biodiversity Data Centre Bat Records	O1541	24/06/202 2	Pipistrellus spp. (45kHz/55kHz),Nyctalus leisleri
National Biodiversity Data Centre Bat Records	O1540	24/06/202 2	Pipistrellus pygmaeus
National Biodiversity Data Centre Bat Records	O1540	24/06/202 2	Nyctalus leisleri
National Biodiversity Data Centre Bat Records	O1426	21/08/202 1	Pipistrellus spp. (45kHz/55kHz)
National Biodiversity Data Centre Bat Records	O0933	13/10/202 1	Pipistrellus spp. (45kHz/55kHz)
National Biodiversity Data Centre Bat Records	O1328	07/04/202 1	Pipistrellus spp. (45kHz/55kHz)
National Biodiversity Data Centre Bat Records	O1628	04/07/202 2	Unidentified bat
National Biodiversity Data Centre Bat Records	O2028	20/06/202 0	Pipistrellus spp. (45kHz/55kHz)
National Biodiversity Data Centre Bat Records	O2028	20/06/202 0	Unidentified bat
National Biodiversity Data Centre Bat Records	O0938	08/11/202 3	Unidentified bat
National Biodiversity Data Centre Bat Records	O0938	03/04/202 4	Unidentified bat
National Biodiversity Data Centre Bat Records	O1127	08/04/202 3	Myotis daubentonii
National Biodiversity Data Centre Bat Records	O1234	19/09/202 4	Pipistrellus spp. (45kHz/55kHz)
National Biodiversity Data Centre Bat Records	O1233	26/03/202 3	Pipistrellus spp. (45kHz/55kHz)
National Biodiversity Data Centre Bat Records	O1233	07/04/202 3	Pipistrellus spp. (45kHz/55kHz)
National Biodiversity Data Centre Bat Records	O1233	15/06/202 3	Pipistrellus spp. (45kHz/55kHz)
National Biodiversity Data Centre Bat Records	O1233	17/06/202 3	Pipistrellus pygmaeus
National Biodiversity Data Centre Bat Records	O1233	17/07/202 3	Pipistrellus spp. (45kHz/55kHz)
National Biodiversity Data Centre Bat Records	O1233	02/05/202 3	Pipistrellus spp. (45kHz/55kHz)
National Biodiversity Data Centre Bat Records	O1233	03/06/202 3	
National Biodiversity Data Centre Bat Records	O1333	28/05/202 3	Pipistrellus spp. (45kHz/55kHz)
National Biodiversity Data Centre Bat Records	O1332	13/06/202 3	
National Biodiversity Data Centre Bat Records	O1333	07/06/202 4	Myotis daubentonii
National Biodiversity Data Centre Bat Records	O1333	17/09/202 4	Nyctalus leisleri
National Biodiversity Data Centre Bat Records	O1327	02/10/202 4	Unidentified bat
National Biodiversity Data Centre Bat Records	O1433	21/05/202 3	Pipistrellus spp. (45kHz/55kHz)
National Biodiversity Data Centre Bat Records	O1431	17/09/202 4	Unidentified bat
National Biodiversity Data Centre Bat Records	O1536	24/11/202 3	Pipistrellus spp. (45kHz/55kHz)
National Biodiversity Data Centre Bat Records	O1632	09/08/202 4	Unidentified bat
National Biodiversity Data Centre Bat Records	O1632	03/04/202 3	Unidentified bat
National Biodiversity Data Centre Bat Records	O1732	31/07/202 4	Pipistrellus spp. (45kHz/55kHz)

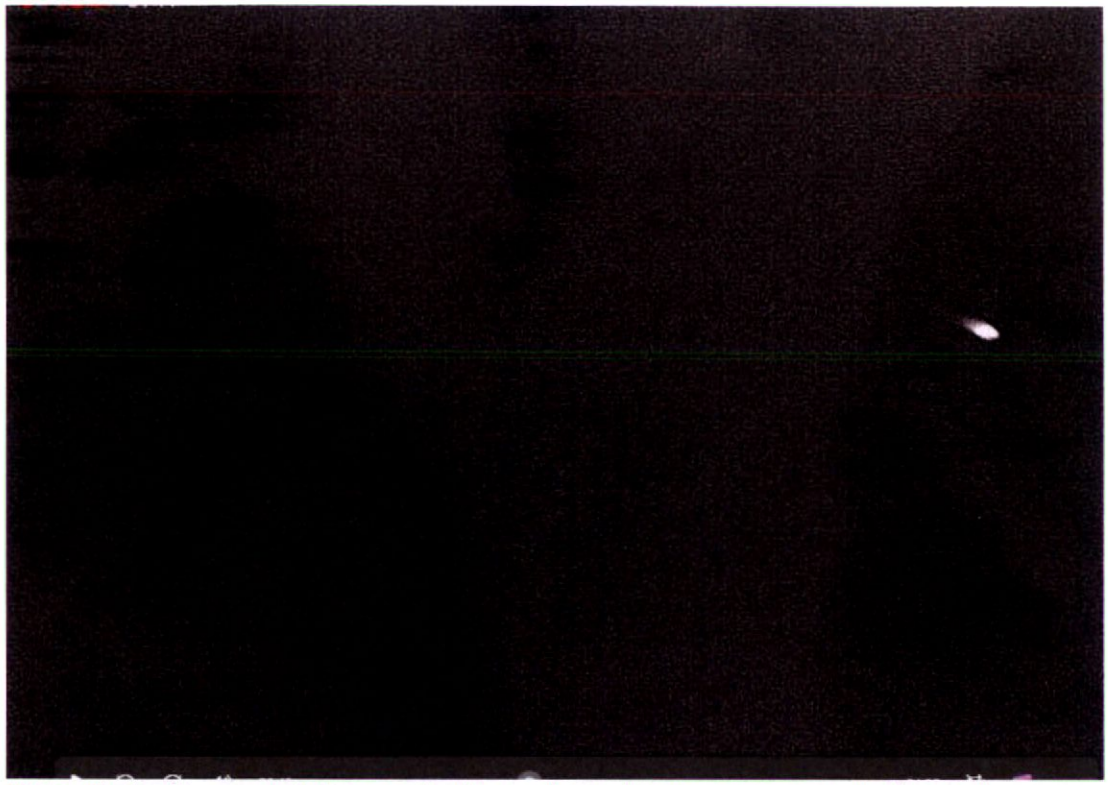
National Biodiversity Data Centre Bat Records	O1728	25/07/202 3	Unidentified bat
National Biodiversity Data Centre Bat Records	O1732	27/09/202 4	Myotis daubentonii
National Biodiversity Data Centre Bat Records	O2128	08/07/202 4	Pipistrellus spp. (45kHz/55kHz),Nyctalus leisleri
National Biodiversity Data Centre Bat Records	O2429	15/07/202 2	Pipistrellus spp. (45kHz/55kHz)
Neighbourhood Bats 2021	O1427	30/06/202 1	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)
Neighbourhood Bats 2021	O1427	01/07/202 1	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)
Neighbourhood Bats 2021	O1427	02/07/202 1	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
Neighbourhood Bats 2021	O1427	03/07/202 1	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)
Neighbourhood Bats 2021	O1427	04/07/202 1	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
Neighbourhood Bats 2021	O1427	05/07/202 1	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
Neighbourhood Bats 2021	O1427	06/07/202 1	Nyctalus leisleri
Neighbourhood Bats 2021	O1427	07/07/202 1	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
Neighbourhood Bats 2021	O1427	08/07/202 1	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
Neighbourhood Bats 2021	O1427	09/07/202 1	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
Neighbourhood Bats 2021	O1427	10/07/202 1	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)
Neighbourhood Bats 2021	O1427	11/07/202 1	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
Neighbourhood Bats 2021	O1427	12/07/202 1	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
Neighbourhood Bats 2021	O1427	13/07/202 1	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
Neighbourhood Bats 2021	O1427	14/07/202 1	Pipistrellus pipistrellus (45kHz)
Neighbourhood Bats 2021	O1427	15/07/202 1	Myotis spp.,Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
Neighbourhood Bats 2021	O1427	16/07/202 1	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
Neighbourhood Bats 2021	O1427	17/07/202 1	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
Neighbourhood Bats 2021	O1427	18/07/202 1	Pipistrellus pipistrellus (45kHz),Pipistrellus nathusii,Pipistrellus pygmaeus,Nyctalus leisleri
Neighbourhood Bats 2021	O1427	19/07/202 1	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
Neighbourhood Bats 2021	O1427	20/07/202 1	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
Neighbourhood Bats 2021	O1427	21/07/202 1	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
Neighbourhood Bats 2021	O1427	22/07/202 1	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
Neighbourhood Bats 2021	O1427	23/07/202 1	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri,Pipistrellus pygmaeus
Neighbourhood Bats 2021	O1427	24/07/202 1	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
Neighbourhood Bats 2021	O1427	25/07/202 1	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri,Pipistrellus pygmaeus,Pipistrellus nathusii
Neighbourhood Bats 2021	O1427	26/07/202 1	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)
Neighbourhood Bats 2021	O1427	27/07/202 1	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
Neighbourhood Bats 2021	O1427	28/07/202 1	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus

Neighbourhood Bats 2021	O1427	29/07/202 1	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Neighbourhood Bats 2021	O1427	30/07/202 1	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Neighbourhood Bats 2021	O1427	31/07/202 1	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Neighbourhood Bats 2021	O1427	01/08/202 1	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
Neighbourhood Bats 2021	O1427	02/08/202 1	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
Neighbourhood Bats 2021	O1427	03/08/202 1	Nyctalus leisleri,Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz)
Neighbourhood Bats 2021	O1427	06/08/202 1	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
Neighbourhood Bats 2021	O1427	05/08/202 1	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)
Neighbourhood Bats 2021	O1427	04/08/202 1	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
Neighbourhood Bats 2021	O1427	07/08/202 1	Nyctalus leisleri,Pipistrellus pygmaeus
Neighbourhood Bats 2021	O1427	08/08/202 1	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
Neighbourhood Bats 2021	O1427	09/08/202 1	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz),Plecotus auritus,Pipistrellus pygmaeus
Neighbourhood Bats 2021	O1427	10/08/202 1	Nyctalus leisleri,Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz)
Neighbourhood Bats 2021	O1427	11/08/202 1	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Neighbourhood Bats 2021	O1427	12/08/202 1	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Neighbourhood Bats 2021	O1427	13/08/202 1	Nyctalus leisleri
Neighbourhood Bats 2021	O1427	14/08/202 1	Nyctalus leisleri
Neighbourhood Bats 2021	O1427	15/08/202 1	Nyctalus leisleri
Neighbourhood Bats 2021	O1427	17/08/202 1	Nyctalus leisleri
Niamh Roche	O1526	28/07/199 9	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Niamh Roche	O0834	20/04/200 6	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz)
Niamh Roche	O1830	10/06/201 5	Nyctalus leisleri
Niamh Roche	O1830	10/06/201 5	Nyctalus leisleri
Niamh Roche	O1830	10/06/201 5	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Niamh Roche	O1830	10/06/201 5	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz)
Niamh Roche	O1830	10/06/201 5	Pipistrellus pipistrellus (45kHz)
Niamh Roche	O1830	11/06/201 5	Nyctalus leisleri
Niamh Roche	O1830	11/06/201 5	Nyctalus leisleri
Niamh Roche	O1830	11/06/201 5	Pipistrellus pipistrellus (45kHz)
Niamh Roche	O1830	11/06/201 5	Pipistrellus pipistrellus (45kHz)
Niamh Roche	O1830	11/06/201 5	Pipistrellus pipistrellus (45kHz)
Niamh Roche	O1830	11/06/201 5	Pipistrellus pipistrellus (45kHz)
Niamh Roche	O1830	28/06/201 5	Pipistrellus pygmaeus

Niamh Roche	O1830	12/06/2015	Pipistrellus spp. (45kHz/55kHz),Pipistrellus pygmaeus
Niamh Roche	O1830	24/06/2015	Pipistrellus pygmaeus
Niamh Roche	O1929	22/07/2015	Nyctalus leisleri,Pipistrellus spp. (45kHz/55kHz),Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Niamh Roche	O1929	29/07/2015	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
Niamh Roche	O1929	02/08/2015	Pipistrellus pygmaeus,Nyctalus leisleri
Niamh Roche	O1929	05/08/2015	Nyctalus leisleri,Pipistrellus pygmaeus
Niamh Roche	O1929	07/08/2015	Pipistrellus pygmaeus
Niamh Roche	O1829	22/07/2015	Nyctalus leisleri
Niamh Roche	O1929	22/07/2015	Pipistrellus pygmaeus
Niamh Roche	O1929	22/07/2015	Pipistrellus pygmaeus
Visiting Bat Specialists	O1630	11/05/2005	Pipistrellus pipistrellus (45kHz)
Wildlife Surveys Ireland Surveys	O1930	08/08/2023	Myotis daubentonii,Nyctalus leisleri,Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Wildlife Surveys Ireland Surveys	O0631	15/08/2023	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus
Wildlife Surveys Ireland Surveys	O1137	20/05/2024	Myotis daubentonii,Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
Wildlife Surveys Ireland Surveys	O0836	25/07/2024	Nyctalus leisleri,Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz)
Wildlife Surveys Ireland Surveys	O1732	29/07/2024	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
Wildlife Surveys Ireland Surveys	O1740	29/05/2024	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri
Wildlife Surveys Ireland Surveys	O1635	21/05/2024	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri
Wildlife Surveys Ireland Surveys	O1636	04/06/2024	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri

Wildlife Surveys Ireland

Photos of the site



Pipistrelle feeding around the trees leading to the Red House over a sustained period.



Bird in tree cavity near Red House(close to the foraging bat above



Construction at Clonliffe College



Attic area of main building



Area of the static monitor at sunset

Appendix 8.2 Bird Survey Reports

scott cawley

Wintering Bird Survey Report

For a Proposed Strategic Housing Development

Lands at Clonliffe College, Clonliffe Road, Drumcondra, Dublin 3

Prepared for Hines

Scott Cawley, College House, 71 – 73 Rock Road, Blackrock, Co. Dublin, A94 F9X9, Ireland

Tel+353(1)676-9815 Fax +353(1) 676-9816

Document Control

Project Title	Wintering Bird Survey Report, Lands at Clonliffe College, Clonliffe Road, Drumcondra, Dublin 3			
Document Title	Wintering Bird Survey Report		Project No.	190250
Revision	Issue Date	Author	Reviewed By	Approved By
I1	16/06/2020	CC	MMW	ACr

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This report has been prepared by Scott Cawley Ltd. in accordance with the particular instructions and requirements of our agreement with the Client, the project's budgetary and time constraints and in line with best industry standards. The methodology adopted and the sources of information used by Scott Cawley Ltd. in providing its services are outlined in this report. The scope of this report and the services are defined by these circumstances.

Where the conclusions and recommendations contained within this document are based upon information provided by others than Scott Cawley Ltd., no liability is accepted on the validity or accuracy of that information. It is assumed that all relevant information has been provided by those parties from whom it has been requested and that the information is true and accurate. No independent verification of any documentation or information supplied by others has been made.

The conclusions presented in this report represent Scott Cawley Ltd.'s best professional judgement based on review of site conditions observed during the site visit (if applicable) and the relevant information available at the time of writing. Scott Cawley Ltd. has used reasonable skill, care and diligence in compiling this report and no warranty is provided as to the report's accuracy.

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Appendix I – Desk Study Results

Appendix II – Results of Survey Observations

Appendix III – Results of Survey Transects

1 Introduction

1 This Wintering Bird Survey Report was authored by Colm Clarke of Scott Cawley Ltd.

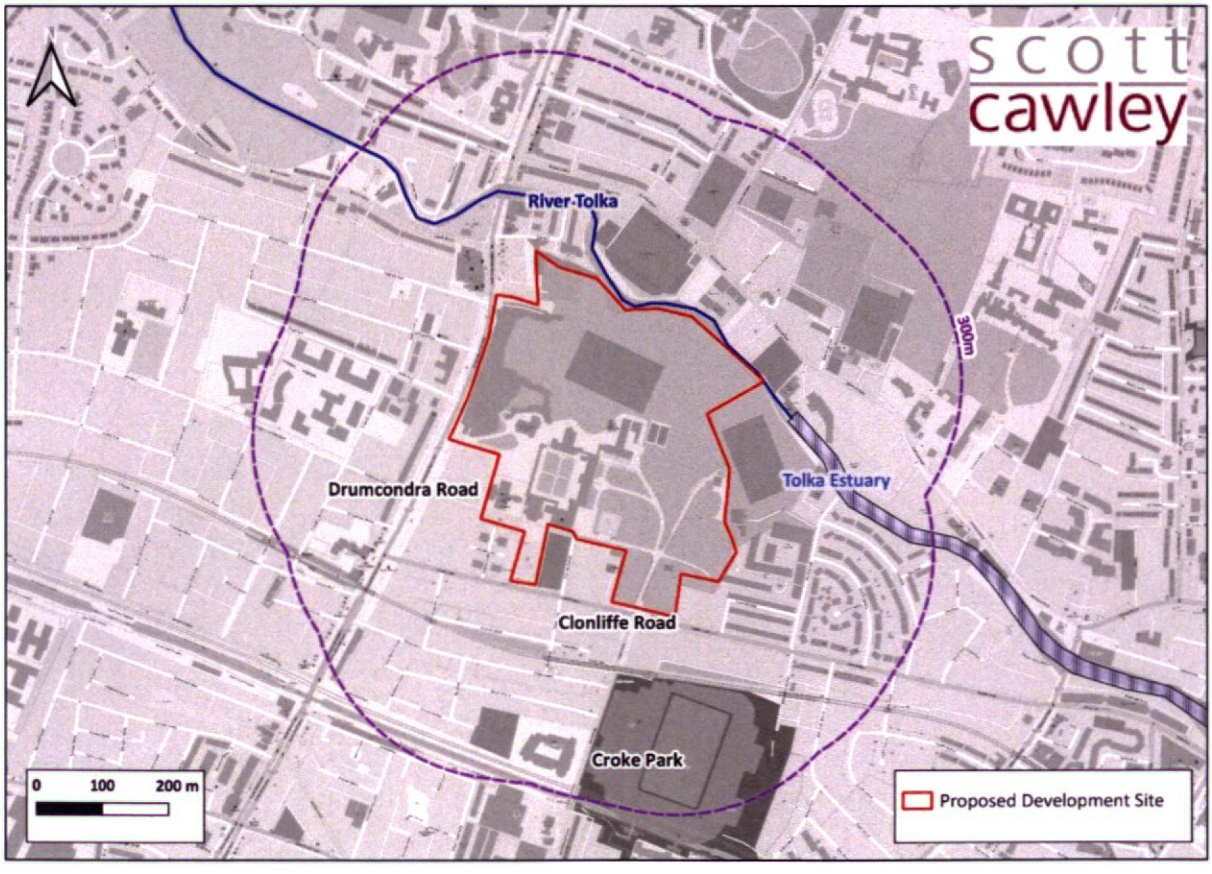
2 It provides an overview of the wintering bird baseline for lands at Clonliffe College, Clonliffe Road, Drumcondra, Dublin 3 (refer to Figure 1 for location) for the season 2019/20. The proposed development consists of a residential scheme to be constructed within the red line boundary illustrated in Figure 1, below.

3 The proposed development site consists of the Clonliffe College Campus, containing large amenity grassland areas, areas of parkland, woodland, and ornamental borders. A large area of open grassland habitat is located in the northern part of the lands, south of the River Tolka. There are scattered trees throughout the proposed development site, but particularly along the northern and western parts. The proposed development site is surrounded largely by residential development. There are also several sports complexes in the vicinity - the Belvedere Rugby grounds to the east, and Shelbourne Football Club across the River Tolka, to the north and Croke Park Stadium to the south.

4 The purpose of the report is to:

- Establish the presence/absence and use of the proposed development site and surrounding area by wintering birds; and
- To understand the importance of the proposed development site and surrounding area for wintering birds, including those Special Conservation Interest (SCI) species for which European sites have been designated.

Figure 1: The proposed development site in relation to the surrounding environment.



2 Planning, Policy and Legislation

The collation of ecological baseline data and the preparation of this assessment has had regard to the following legislation and policy documents. This is not an exhaustive list but the most relevant legislative and policy basis for the purposes of preparing this Wintering Bird Survey Report.

The following international legislation is relevant to the proposed development:

- Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora; hereafter, referred to as the 'Habitats Directive'. The Habitats Directive is the legislation under which the Natura 2000 network[1] was established and special areas of conservation (SACs) are designated for the protection of natural habitat types listed in Annex I, and habitats of the species listed in Annex II, of that directive.
- Directive 2009/147/EEC; hereafter, referred to as the 'Birds Directive'. The Birds Directive is the legislation under which special protection areas are designated for the protection of endangered species of wild birds listed in Annex I of that directive.

The following national legislation is relevant to the proposed development in the context of wintering wetland bird SCIs of European sites:

- *European Communities (EC) (Birds and Natural Habitats) Regulations 2011 to 2015*; hereafter the 'Birds and Habitats Regulations'. This legislation transposes the Habitats and Birds Directives into Irish law. It also contains regulations (49 and 50) that deal with invasive species (those included within the Third Schedule of the regulations).

The following plans and policies are relevant to the proposed development:

- National Biodiversity Action Plan 2017-2021 (Department of Culture Heritage and the Gaeltacht, 2017)
- Dublin City Development Plan 2016-2022 (Dublin City Council, 2016)
- Dublin City Biodiversity Action Plan 2015-2020 (Dublin City Council, 2015)

3 Methodology

3.1 Author Statement

This report was authored by Colm Clarke, and reviewed by Maeve Maher-McWilliams and Ashling Cronin of Scott Cawley Ltd. Survey methodologies were designed and supervised by Scott Cawley and surveys were completed by Colm Clarke, Niall McHugh, Shane Brien, and Cathal O'Brien of Scott Cawley and by independent ornithologist Hugh Delaney, under Colm Clarke's supervision.

Colm Clarke is a Senior Ecologist with Scott Cawley and has over five years' experience in ecological consultancy. He obtained an honours degree in Natural Sciences, with a specialisation in Botany, from Trinity College Dublin, and a Masters in Biodiversity and Conservation from the same institution. Colm is

[1] The Natura 2000 network is a European network of important ecological sites, as defined under Article 3 of the Habitats Directive 92/43/EEC, which comprises both special areas of conservation and special protection areas. Special conservation areas are sites hosting the natural habitat types listed in Annex I, and habitats of the species listed in Annex II, of the Habitats Directive, and are established under the Habitats Directive itself. Special protection areas are established under Article 4 of the Birds Directive 2009/147/EC for the protection of endangered species of wild birds. The aim of the network is to aid the long-term survival of Europe's most valuable and threatened species and habitats.

In Ireland these sites are designed as *European sites* - defined under the Planning Acts and/or the Birds and Habitats Regulations as (a) a candidate site of Community importance, (b) a site of Community importance, (c) a candidate special area of conservation, (d) a special area of conservation, (e) a candidate special protection area, or (f) a special protection area. They are commonly referred to in Ireland as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

an Associate Member of the Chartered Institute of Ecology and Environmental Management (CIEEM). Colm has been project manager and lead author on a large number of Ecological Assessments for Scott Cawley, and regularly undertakes both field work and report writing as part of his role. Colm was the project manager for Wintering Bird Surveys at Clonliffe College.

11 Maeve Maher-McWilliams is a Principal Ecologist with Scott Cawley. She holds a BSc (Honours) in Biological Sciences from Queen's University Belfast and obtained a distinction in her MSc in Evolutionary and Behavioural Ecology from the University of Exeter. Maeve has worked in environmental consultancy for over eight years across Ireland, Northern Ireland and Scotland specialising in ornithology. Maeve is Scott Cawley's lead ornithologist and has acted as project manager on a variety of developments including large to small scale residential schemes, flood defence schemes, tourism/recreational projects, wind farm developments, solar developments, hydro-schemes, port developments, and linear infrastructure projects. Maeve regularly prepares and reviews Ecological reports (Appropriate Assessment Screening, Natura Impact Statement and Ecological Impact Assessment).

12 Ashling Cronin is Technical Director at Scott Cawley. She holds a Masters in Ecological Assessment, an honours degree in Applied Ecology from University College Cork and an Advanced Diploma in Planning and Environmental Law from The Honourable Society of King's Inns. She has over ten years' experience in environmental management and environmental / ecological assessment across both the private and public sector. As Technical Director, Ashling provides technical review and quality assurance of surveys and documentation.

13 Shane Brien is a Consultant Ecologist with Scott Cawley. He obtained an honours degree in Environmental Science from the National University of Ireland Galway, and a Masters in Ecological Assessment from University College Cork. Shane is a Qualifying Member of the CIEEM. Shane has over two year's professional experience in ecological consultancy in Ireland and is conversant with a wide range of field survey methodologies. He regularly participates in Irish Wetland Bird Surveys (I-WeBS) for Birdwatch Ireland in a voluntary capacity. Shane completed wintering bird surveys in the proposed development site under the supervision of Colm Clarke.

14 Cathal O'Brien is a Consultant Ecologist with Scott Cawley Ltd and is a Qualifying Member of the CIEEM. Cathal an honours degree in Environmental Biology from University College Dublin, and a Masters in Ecology from the University of Bremen. Cathal has three years' experience in a range of environmental fields, including habitat assessment in terms of mammal, flora, wintering bird surveys and breeding bird surveys. Prior to joining Scott Cawley, Cathal operated as an independent ecologist, specialising in bird surveys. He completed wintering bird surveys for the proposed development under the supervision of Colm Clarke.

15 Niall McHugh is a Field Ecologist with Scott Cawley. He obtained an honours degree in Freshwater and Marine Biology from the Galway-Mayo Institute of Technology. He has been actively involved in numerous ecological surveys with Scott Cawley and completed wintering bird surveys for the proposed development under the supervision of Colm Clarke. He is also a member of BirdWatch Ireland and has regularly undertaken volunteer bird surveys over the past three years including IWeBS, Garden Bird surveys and Hen Harrier surveys.

16 Hugh Delaney is an Independent Ornithologist with over 12 years' experience in bird surveying, he has worked on a broad range of sites across Ireland primarily associated with wind farm projects and has very extensive knowledge of bird distribution, ecology and Identification and has contributed to bird surveys and record gathering for over 20 years. He has worked with Scott-Cawley on a range of projects including the Dun Laoghaire Harbour Deep Port proposal, Brent Geese surveys in North Dublin in 2015/16 and 2016/17, and the Sutton to Sandycove Promenade and Cycleway (S2S) project.

3.2 Desk Study

17 A desk study was undertaken in August 2019, prior to the commencement of field work. It was updated in May and June 2020, following the completion of field work. The purpose of the desk study was to collate available information on the local ecological environment. The following resources were used to inform the assessment presented in this report:

- Records of wetland bird species which are Special Conservation Interests (SCIs) for European sites, for the 10km grid square O13, as held by the National Biodiversity Data Centre www.biodiversityireland.ie – refer to Appendix I for all desk study records
- Irish Wetland Bird Survey (I-WeBS) summary data for the following sites: 0U404 Dublin Bay; 0U403 Baldoyle Bay; 0U408 Broadmeadow (Malahide) Estuary; 0U407 Rogerstown Estuary; 0U951 Ireland's Eye; and 0U903 Lambay Island. Summary data was downloaded from the BirdWatch Ireland website at https://birdwatchireland.ie/our-work/surveys-research/research-surveys/irish-wetland-bird-survey/
- Ordnance Survey Ireland mapping and aerial photography from http://map.geohive.ie/
- Information on the conservation status of birds in Ireland from *Birds of Conservation Concern in Ireland* (Colhoun & Cummins, 2013)
- Publicly available information on inland feeding sites for Light-bellied Brent Geese *Branta bernicla hrota* (herein referred to as Brent Geese) in the Dublin area contained within (Benson, 2009), Scott Cawley (2017) and Enviroguide (2020).

18 It is Scott Cawley's understanding that a three-year project studying the movements and behaviour of wintering bird species in Dublin Bay, and funded in part by the four Dublin local authorities (Dublin City Council, South Dublin County Council, Dún Laoghaire-Rathdown County Council, and Fingal County Council), was underway in in its second year in 2019/20. The data was not publicly available at the time of writing of this report.

3.3 Field Survey

19 Surveys of wintering wetland birds utilising the proposed development site and the adjacent lands at Clonliffe College were undertaken between sunrise and sunset, four times per month, for the months of September 2019 through February 2020, inclusive. A survey could not be completed over the Christmas-New Year period due to the closure of the lands, and therefore three visits were undertaken in December 2019. Two survey dates were completed in March 2020. A third and fourth survey date could not be accomplished in March 2020 in light of restrictions on work imposed by the Irish Government during the 2020 COVID-19 pandemic. The inability to complete the final survey visits has not imposed any limitations on the ability to assess the importance of the site for SCI wetland bird species as it was at the very end of the season when numbers of birds in the Dublin Bay population tapers off. Survey dates are listed in Table 1, overleaf.

20 Each survey visit was conducted by two surveyors, who recorded observations of wintering birds entering and exiting the lands, and the behaviour and movements of birds within the lands. Observations were aided by the use of Binoculars (8x42) and a spotting scope. Where present and readable, ring codes of birds were collected. The surveyors kept to the margins of fields in the site so as to ensure that their presence did not prevent birds landing on site.

21 The survey effort in this instance is intended to provide a representative sample of use of the lands by wintering birds. The observations of bird movements in the lands were complemented by a search for evidence of wintering birds in the lands. Droppings and feathers of Brent Geese accumulate on well-used sites (author, personal observation), and on survey dates where birds were not observed landing in the survey area, a search for evidence of wintering birds was undertaken. Data was collected at sampling points (c. 1m2 in total area, i.e. 1m x 1m) located equidistant from each other along a fixed transect line through the proposed development site (see Figure 2, overleaf). Data on the following variables was collected at each sampling point along the transect:

- The presence and abundance of signs of wintering birds (e.g. droppings and feathers)
- The height of the grass sward
- The proportion cover of bare ground
- The proportion cover of grass species

- The proportion cover of forb[2] species present

22 The results of field surveys have been contextualised against the 1% threshold of the international population of each species, as contained within Nagy & Langendoen (2018), and against the populations of each species at nearby European sites. European sites in the vicinity of the proposed development are illustrated in Figure 3, overleaf.

Table 1 Winter bird survey dates

Survey Date(s)	Surveyor(s)
5th September 2019 12th September 2019 19th September 2019 27th September 2019	Colm Clarke, Niall McHugh, Shane Brien and Cathal O'Brien of Scott Cawley Ltd. and independent ornithologist Hugh Delaney
3rd October 2019 9th October 2019 17th October 2019 24th October 2019	
8th November 2019 13th November 2019 21st November 2019 29th November 2019	
6th December 2019 11th December 2019 20th December 2019	
8th January 2020 15th January 2020 24th January 2020 31st January 2020	
5th February 2020 14th February 2020 22nd February 2020 27th February 2020	
6th March 2020 14th March 2020	

[2] A forb is an herbaceous plant species that is not a grass, sedge or rush, e.g. the plant species daisy *Bellis perennis*.

Figure 2: Transect lines in relation to the survey area.

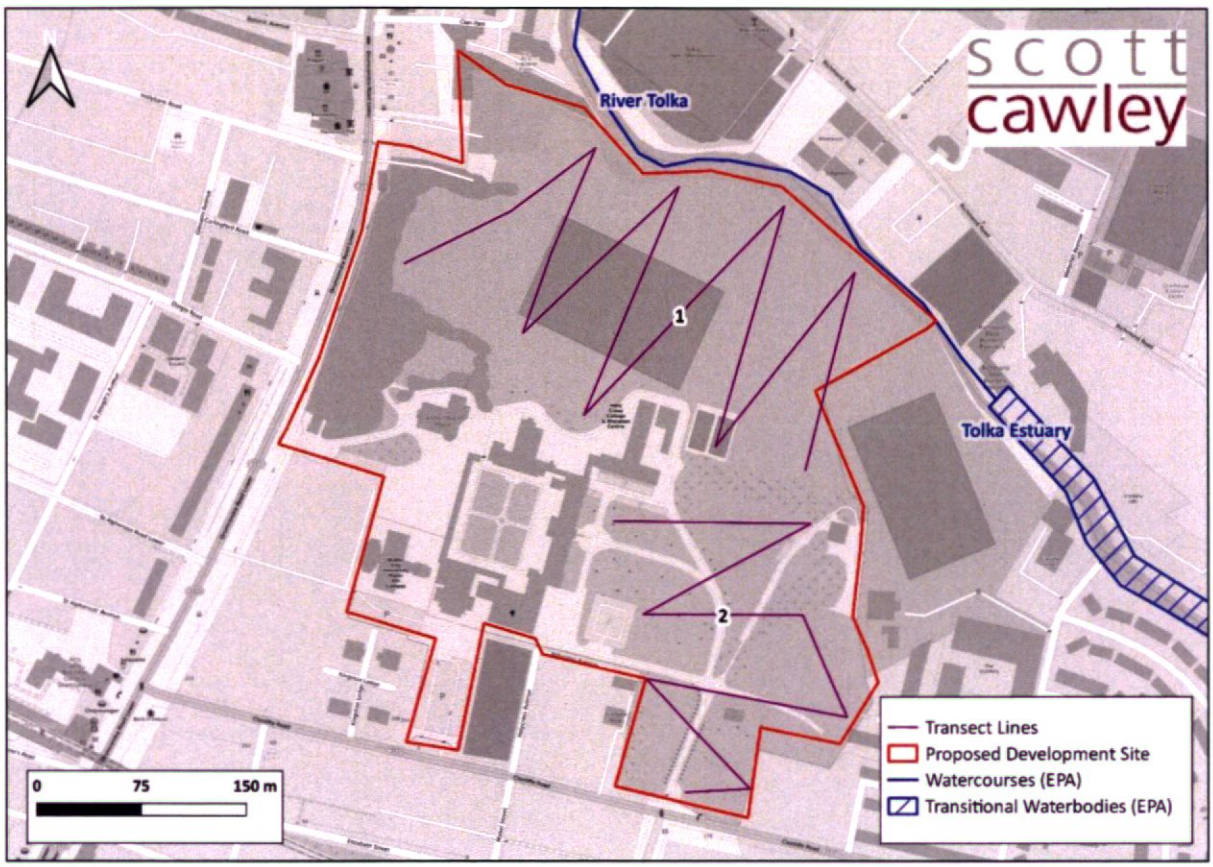
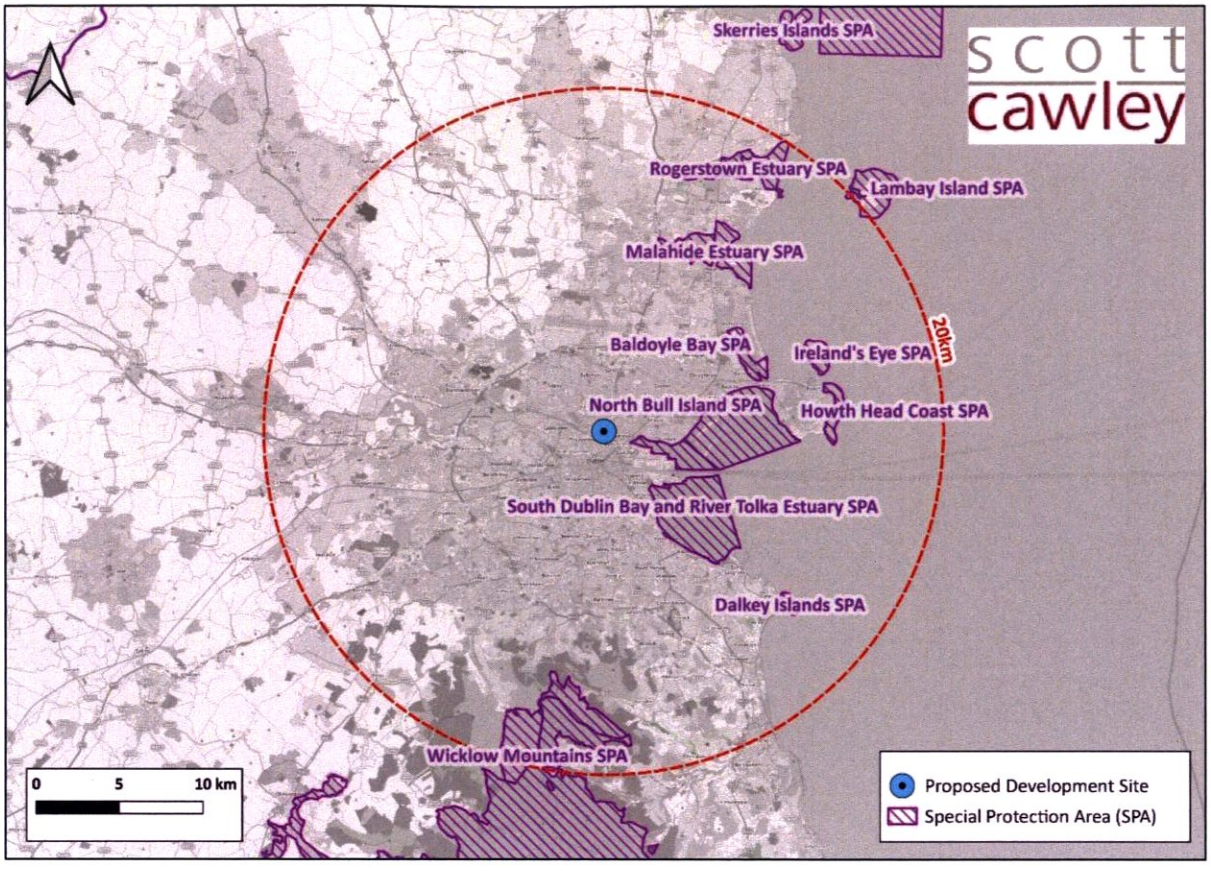


Figure 3: Proposed development site in the context of European sites within 20km.



3.3.1 Survey Limitations

23 It must be acknowledged that the surveys of the lands were undertaken across a single wintering bird survey season. It is possible that the number and frequency of use of inland feeding sites varies from season to season, based on forage resource, disturbance levels, changes to site suitability and other environmental factors. Desktop sources of information have been referenced to overcome this limitation. Most recent data on inland foraging sites for Brent Geese relates to the 2015/16 and 2016/17 wintering bird season, contained within Scott Cawley (2017).

4 Wintering Bird Baseline

24 The results of desk study searches are presented in full in Appendix I of this report, while the full set of survey observations are included as Appendix II of this report. The results of desk and field surveys are summarised in this section of the report, and account of observations by species is included in the sections below.

25 Records of 49 species of wetland birds, for which European sites have been designated, were returned from the search of the NBDC database for the 10km grid square O13. The records have been reproduced in Appendix I of this report.

26 The following SCI species of European sites in the vicinity of the proposed development site were observed either flying over or foraging within the proposed development site in the 2019/2020 wintering bird season:

- Black-headed Gull *Larus ridibundus*
- Herring Gull *Larus argentatus*

- Light-bellied Brent Goose *Branta bernicla hrota*
- Cormorant *Phalacrocorax carbo*
- Curlew *Numenius arquata*
- Grey heron *Ardea cinerea*
- Kingfisher *Alcedo atthis*

Herring Gull were the most frequent visitors to the proposed development site, with observations of the species on all 25 survey dates. Black-headed Gull were observed foraging in the lands on 13 of the 25 survey dates, and flying over the site on 10 of the survey dates. Light-bellied Brent Geese (hereafter referred to as Brent Geese) did not land to forage within the proposed development site on any date over the survey period, but were observed flying over the site on 11 dates between December 2019 and March 2020. Like Brent Geese, Curlew were not observed landing or foraging within the proposed development site on any occasion, but were observed flying over the site on 10 dates between October 2019 and March 2020. Cormorant were observed foraging in the River Tolka on five dates between September and December 2019, and were observed flying over or within the proposed development site on 16 dates. Kingfisher were observed foraging in and along the River Tolka on the northern boundary of the site on 18 of the 25 survey dates. Grey Heron were observed flying over the site on nine dates.

The proposed development site was heavily utilised by dog walkers over the 2019-2020 season, with dogs generally observed off-lead. This may have discouraged birds such as Brent geese and Curlew from landing in the site.

Wetland bird species are mobile and can regularly travel up to 20km between roosting and feeding sites (Scottish Natural Heritage, 2010). For this reason, it is possible that birds observed at Clonliffe College could belong to populations of SCI species associated with European sites up to 20km from the survey area. Each of the eight SCI species observed foraging within or flying over the survey are discussed in more details in the subsections set out below.

4.1 Black-headed Gull *Larus ridibundus* [A179]

4.1.1 Results of Desk Study for Brent Goose

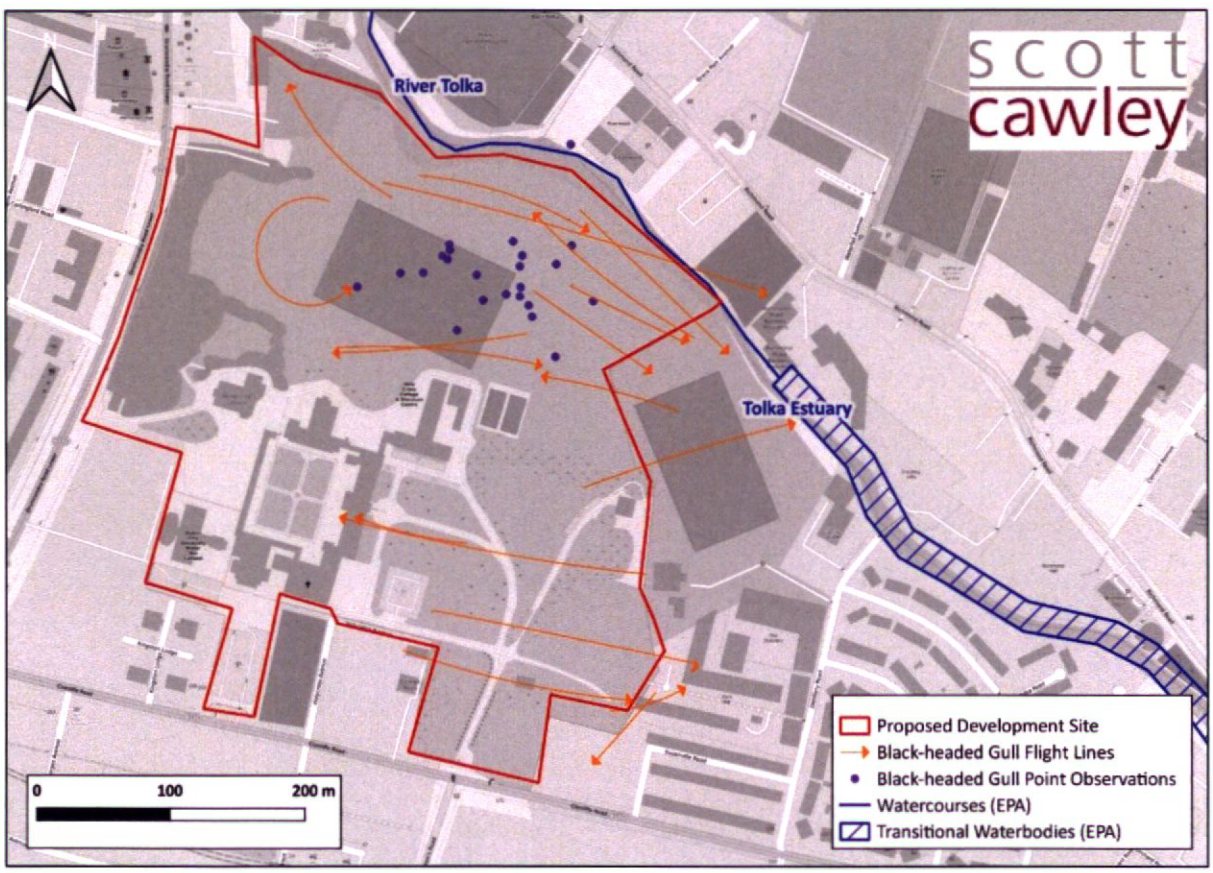
Black-headed Gull *Larus ridibundus* [A179] is a SCI species for which the following European sites within 20km of the proposed development have been designated:

- South Dublin Bay and River Tolka Estuary SPA (004024), *c.* 1.5km southeast. This European site encompasses the coastal and intertidal zones of Dublin Bay extending between the Bull Wall in the north and Dún Laoghaire West Pier in the south. The baseline population of Black-headed Gull in the European site, based on the five-year mean peak counts for the period 1995/96-1999/2000, is listed as 3,040 birds in the Conservation Objectives Supporting Document (NPWS, 2014). South Dublin Bay and River Tolka Estuary SPA (004024) is listed as the fourth most important site in the country for this species. The flock in South Dublin Bay and the River Tolka Estuary SPA has decreased substantially since the population baseline was established in the late 1990s based on review of I-WeBS data for 0U404 Dublin Bay.
- North Bull Island SPA (004006), *c.* 4.5km east. This European site encompasses the coastal fringes of Bull Island, and surrounding intertidal and coastal zones extending between the North Bull wall in the south and Howth Head in the north. The baseline population of Black-headed Gull in the European site, based on the five-year mean peak counts for the period 1995/96-1999/2000, is listed as 2,196 birds in the Conservation Objectives Supporting Document (NPWS, 2014). North Bull Island SPA (004006) is the eighth most important site in Ireland for wintering Black-headed Gull and is of all-Ireland importance for the species (NPWS, 2014). The flock in North Bull Island has decreased substantially since the population baseline was established in the late 1990s based on review of I-WeBS data for 0U404 Dublin Bay.

It is likely that there is some movement of birds between the aforementioned flocks over the winter period, based on changes in foraging resources and other variables. The flock in Dublin Bay (encompassing both the South Dublin Bay and River Tolka Estuary SPA, and North Bull Island SPA populations) forms a single unit, with roosting spread out across several subsites in the Bay (NPWS, 2014). The species forages both intertidally and subtidally in Dublin Bay.

4.1.2 Field Survey Results for Black-headed Gulls

Figure 4: Black-headed Gull activity in the survey area between September 2019 and March 2020.



Black-headed Gull were observed foraging in the lands on 13 of the 25 survey dates. A peak count of 16 birds was observed foraging on grassy fields in the northern part of the site (see Figure 4) on 12th September 2019. Smaller numbers of birds were observed roosting or foraging in this area on other survey dates. This species was not observed utilising grasslands in the south of the proposed development site.

Birds were observed flying over the proposed development site on ten survey days. Flocks of birds flying over the site were substantially larger than the flocks utilising the site for foraging and roosting activity. A peak count of 170 birds was observed flying over the site on 22nd February 2020.

4.1.3 Black-headed Gull at Clonliffe College in the context of European sites within 20km

In order to evaluate the importance of the survey area for foraging Black-headed Gull, it is important to relate the number of birds observed foraging in the lands against the baseline populations of European sites in the vicinity, and against the international flocks. The peak count of foraging birds in the survey area (16 birds) potentially represents:

- 0.005% of the baseline population of the South Dublin Bay and River Tolka Estuary SPA (004024) of 3,040 birds, should the flock utilising the survey area belong to this population. It represents 0.0079% of the more recent population estimate of the SPA flock (2006/07-2010/11) of 2,023 birds as documented within NPWS (2014).

- 0.007% of the baseline population of the North Bull Island SPA (004006) of 2,196 birds, should the flock utilising the survey area belong to this population. It represent 0.01% of the more recent population estimate of the SPA flock (2006/07-2010/11) of 1,527 birds as documented within NPWS (2014).

According to Nagy & Langendoen (2018), 1% of the international population of Black-headed Gull is 20,000 birds. The peak count of birds utilising the survey area did not reach or exceed this number in the 2019/20 survey season. The peak count of 16 birds observed in the survey area represents 0.0008% of the international population of the species.

4.2 Herring Gull *Larus argentatus* [A184]

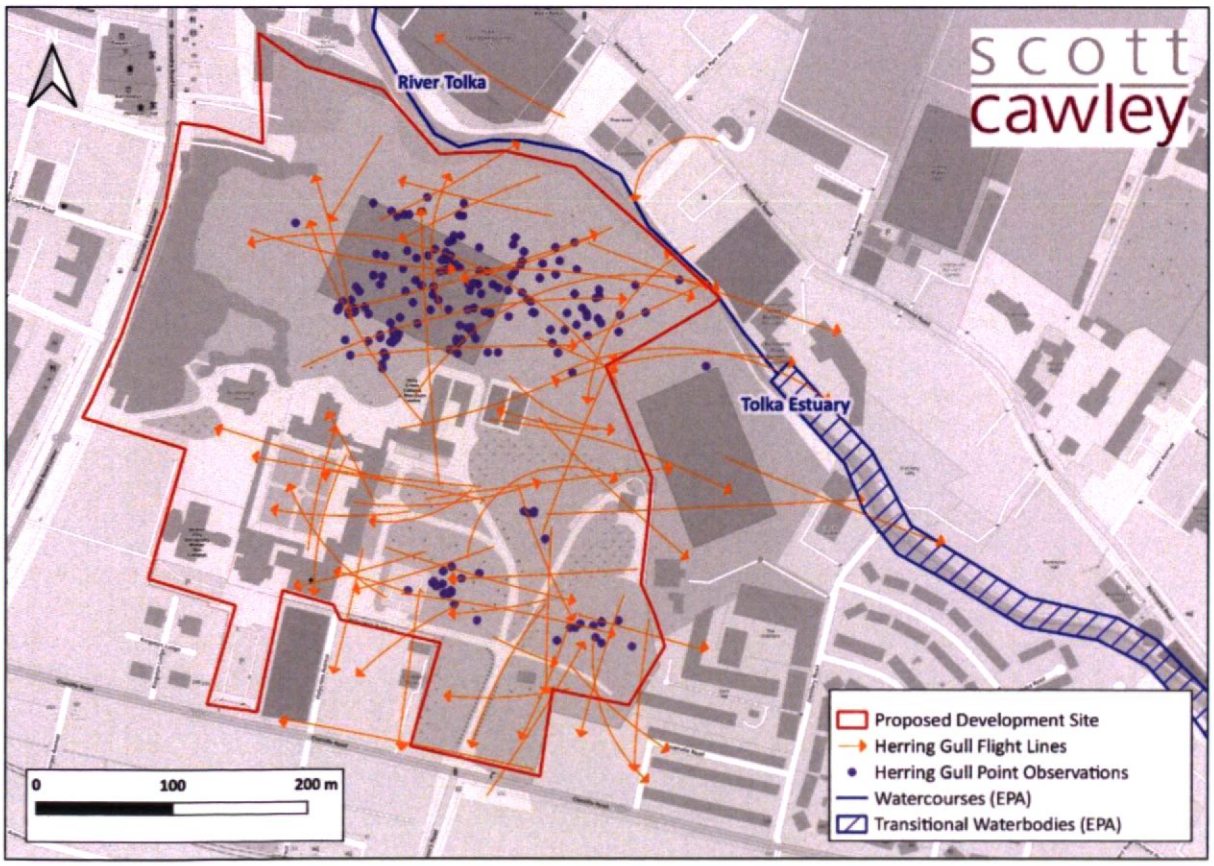
4.2.1 Results of Desk Study for Herring Gull

Herring Gull *Larus argentatus* [A148] is a SCI species for which the following European sites within 20km of the proposed development have been designated:

- Ireland's Eye SPA (004117), *c.* 12.5km north-east of the proposed development site. The European site encompasses the island of Ireland's Eye and the surrounding coastal waters. Ireland's Eye is an important breeding site for Herring Gull, and has a population of 250 birds (NPWS, 2018A).
- Lambay Island SPA (004069), *c.* 19.6km north-east of the proposed development site. The European site encompasses Lambay Island and its surrounding coastal waters. Lambay Island is an important breeding site for Herring Gull, and has a population of 1,806 birds (NPWS, 2018B).

There is potential that some members of the Ireland's Eye or Lambay Island breeding population utilise the proposed development site for forage during the winter months. This species is a commonly encountered urban bird species, with large populations residing in the urban area around Dublin.

Figure 5: Herring Gull activity in the survey area between September 2019 and March 2020



4.2.2 *Field Survey Results for Herring Gull*

38 Herring Gull were observed in the proposed development site on all 25 survey dates. On the vast majority of survey visits, a small number of birds (<20 birds) were observed foraging for earthworms on grassland areas of the site. Larger flocks of the species (>20 birds) were observed on five dates in September 2019, November 2019, December 2019, and March 2020 (full list of observations included in Appendix II of this report). The peak count for Herring Gull foraging in the proposed development site was 144 birds observed on 6th December 2019.

4.2.3 *Herring Gull at Clonliffe College in the context of European sites within 20km*

39 It is worth bearing in mind that nearby European sites have been designated for their breeding populations of Herring Gull as opposed to their wintering populations. The surveys undertaken to inform this report related to the winter season, when the resident population is likely to be boosted by winter migrants. A direct comparison against nearby European site populations, is therefore not possible.

40 In relation to wintering populations of the species in the vicinity, the peak count of birds in the proposed development site potentially represents:

- 37% of the wintering population in Dublin Bay, referencing the I-WeBS mean peak count of 389 birds for the period 2010/11 – 2014/15 (See Appendix I).
- 48% of the wintering population at Ireland's Eye, referencing the I-WeBS mean peak count of 300 birds over the period 2010/11 - 2014/15 (See Appendix I).

41 According to Nagy & Langendoen (2018), 1% of the international population of Herring Gull is 10,200 birds. The peak count of birds utilising the survey area did not reach or exceed this number in the 2019/20 survey season. The peak count of 144 birds observed in the survey area represents 0.014% of the international population of the species

4.3 Light-bellied Brent Goose *Branta bernicla hrota* [A046]

4.3.1 *Results of Desk Study for Brent Goose*

42 Light-bellied Brent Goose *Branta bernicla hrota* [A046] is a SCI species for which the following European sites within 20km of the proposed development have been designated:

- South Dublin Bay and River Tolka Estuary SPA (004024), *c.* 1.5km southeast. This European site encompasses the coastal and intertidal zones of Dublin Bay extending between the Bull Wall in the north and Dún Laoghaire West Pier in the south. The baseline population of Brent Geese in the European site, based on the five-year mean peak counts for the period 1995/96-1999/2000, is listed as 525 birds in the Conservation Objectives Supporting Document (NPWS, 2014). South Dublin Bay and River Tolka Estuary SPA (004024) is listed as the twelfth most important site in the country for this species. It should be noted that the number of Brent Geese in Dublin Bay has increased significantly since the original baseline population was estimated based on review of I-WeBS data for 0U404 Dublin Bay.
- North Bull Island SPA (004006), *c.* 4.5km east. This European site encompasses the coastal fringes of Bull Island, and surrounding intertidal and coastal zones extending between the North Bull wall in the south and Howth Head in the north. The baseline population of Brent Geese in the European site, based on the five-year mean peak counts for the period 1995/96-1999/2000, is listed as 1,548 birds in the Conservation Objectives Supporting Document (NPWS, 2014). North Bull Island SPA (004006) is the most important site in Ireland for wintering Brent Geese (NPWS, 2014). The site hosts a population of international importance for the species. It should be noted that the number of Brent Geese in Dublin Bay has increased significantly since the original baseline population was estimated based on review of I-WeBS data for 0U404 Dublin Bay
- Baldoyle Bay SPA (004016), *c.* 8.9km north-east. This European site encompasses the intertidal lagoon and tidal mouth of an estuary between Baldoyle Village and Portmarnock Village in North

County Dublin. The baseline population for Brent Geese at this European site is 726 birds, based on the five-year mean peak counts for the period 1995/96-1999/2000 (NPWS, 2011). Baldoyle Estuary SPA is listed as the seventh most important site for Brent Geese in Ireland. The Baldoyle flock has decreased in size relative to the baseline population for the SPA based on review of recent I-WeBS data for the site.

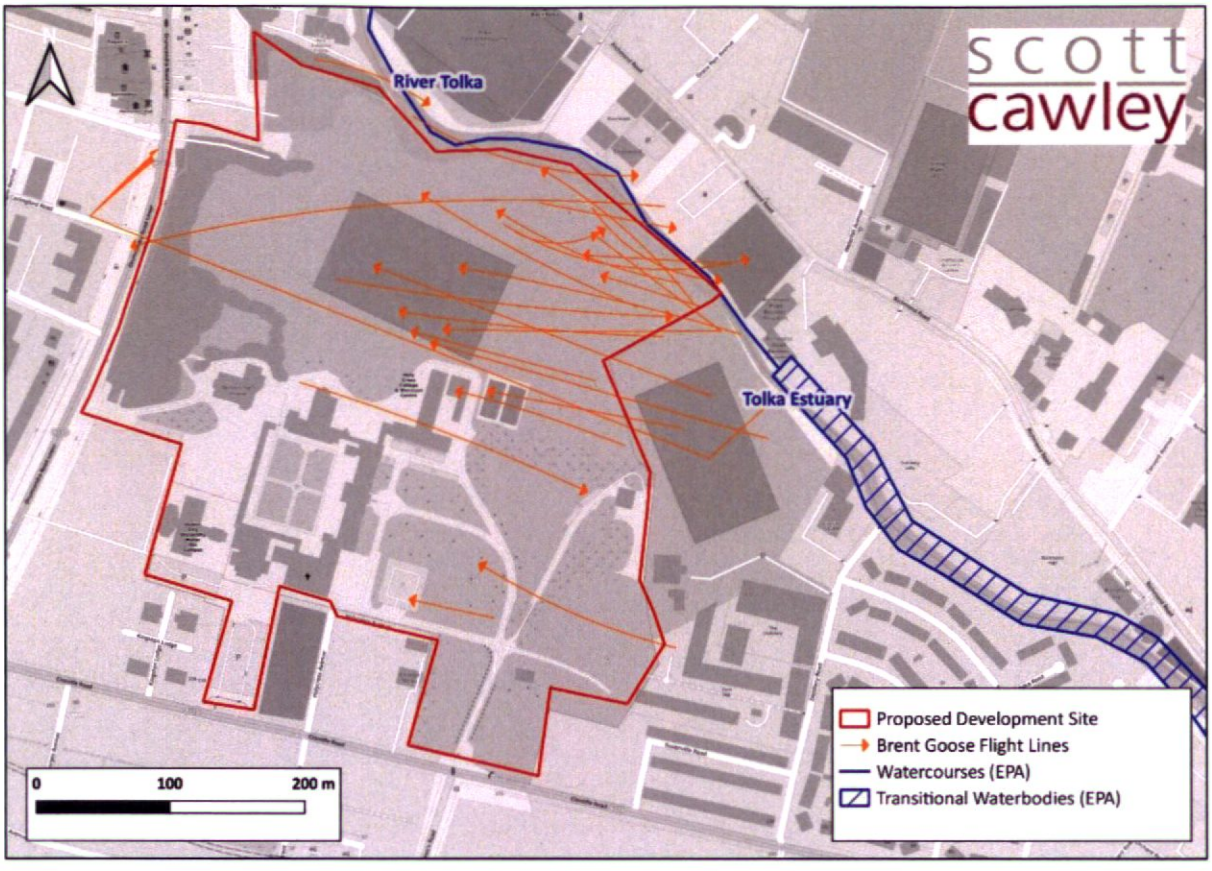
- Malahide Estuary SPA (004025), *c.* 10.8km north. This European site encompasses the Malahide Estuary and Broadmeadow Water and surrounding coastal habitats. The baseline population for Brent Geese at this European site is 1,104 birds, based on the five-year mean peak counts for the period 1995/96-1999/2000 (NPWS, 2013A). Malahide Estuary SPA is listed as the fourth most important site for Brent Geese in Ireland. Recent I-WeBS data for Rogerstown Estuary does not include regular counts of Brent Geese, however older data from the period 2005/06-2009/10 indicates that the flock has increased in size relative to the baseline (NPWS, 2013B)
- Rogerstown Estuary SPA (004015), *c.* 15.4km north. The baseline population for Brent Geese at this European site is 1,069 birds, based on the five-year mean peak counts for the period 1995/96-1999/2000 (NPWS, 2013B). Rogerstown Estuary SPA is listed as the fifth most important site for Brent Geese in Ireland. The Rogerstown Estuary flock has decreased in size relative to the baseline population for the SPA based on review of recent I-WeBS data for the site

It is likely that there is some movement of birds between the aforementioned flocks over the winter period, based on changes in foraging resources and other variables. The flock in Dublin Bay (encompassing both the South Dublin Bay and River Tolka Estuary SPA, and North Bull Island SPA populations) forms a single unit, with roosting concentrated in the Lagoon east of Bull Island (NPWS, 2014). The Dublin Bay population forages on *Zostera* beds and algal mats in the bay. It also uses a range of terrestrial sites inland of Dublin Bay for foraging (NPWS 2014; Benson, 2009; Scott Cawley, 2017; Enviroguide, 2019). It is thought that the switch to inland terrestrial sites is linked to recent increases in population and/or depletion of coastal foraging resources through the winter season (NPWS, 2014; Benson, 2009).

The first published records of Brent Geese using inland feeding sites dates to 1991 (O'Briain & Healy, 1991). A study of the use of inland foraging sites by Brent Geese was undertaken and published in Benson (2009). Benson (2009) identified 60 sites across the Dublin area in her study. These sites were spread between Portmarnock in the North, Sandymount in the south and Ashtown and Greenhills in the west. The proposed development site at Clonliffe College does not appear in the list of 60 sites compiled by Benson (2009). More recent work on the range of Brent Geese in Dublin was undertaken to inform Natura Impact Statements for a residential development in St. Anne's Park (Scott Cawley, 2017; Enviroguide, 2019). Scott Cawley undertook surveys of a large number of sites across the Dublin area in the 2015/16 and 2016/17 winter bird seasons, identifying 119 inland foraging sites for Brent Geese across the Dublin Area. The lands at Clonliffe College were identified as a known inland feeding site in Scott Cawley (2017), where they are referred to as "Drumcondra/Holy Cross College". Data on the site relates to the season 2015/2016 when a peak count of 200 birds was recorded at the site on 13th January 2016.

4.3.2 Field Survey Results for Brent Geese

Figure 6: Light-bellied Brent goose activity in the survey area between September 2019 and March 2020



45 Brent Geese were not observed foraging within the lands on any survey dates across the seven-month survey period (See Appendix II), and no evidence of usage by Brent Geese was collected from completion of survey transects in the proposed development site. The most likely explanation for this is that the length of the grass in the proposed development site is suboptimal for the Geese, which favour a short, open sward. The grass across the northern part of the site remained relatively tall throughout the survey period. The full dataset for transect surveys, containing data on sward height across the survey season, is provided as Appendix III of this report.

46 Birds were observed flying over the proposed development site on 11 dates between December 2019 and March 2020 (see Figure 6). The peak count of birds flying over the lands was 550 birds, recorded on 5th February 2020. Birds tended to fly between 30m and 50m above ground level. Birds tended to fly east-west in the mornings and west-east in the evenings, suggesting the birds were travelling from sites closer to Dublin Bay in the morning and returning to roost in Dublin Bay in the evenings. Several known inland feeding sites exist within the immediate vicinity of the lands, including St. Patrick's College in Drumcondra, and several sites off of Griffith Avenue.

4.4 Cormorant *Phalacrocorax carbo* [A017]

4.4.1 Results of Desk Study for Cormorant

47 Cormorant *Phalacrocorax carbo* [A017] is a SCI species for which the following European sites within 20km of the proposed development have been designated:

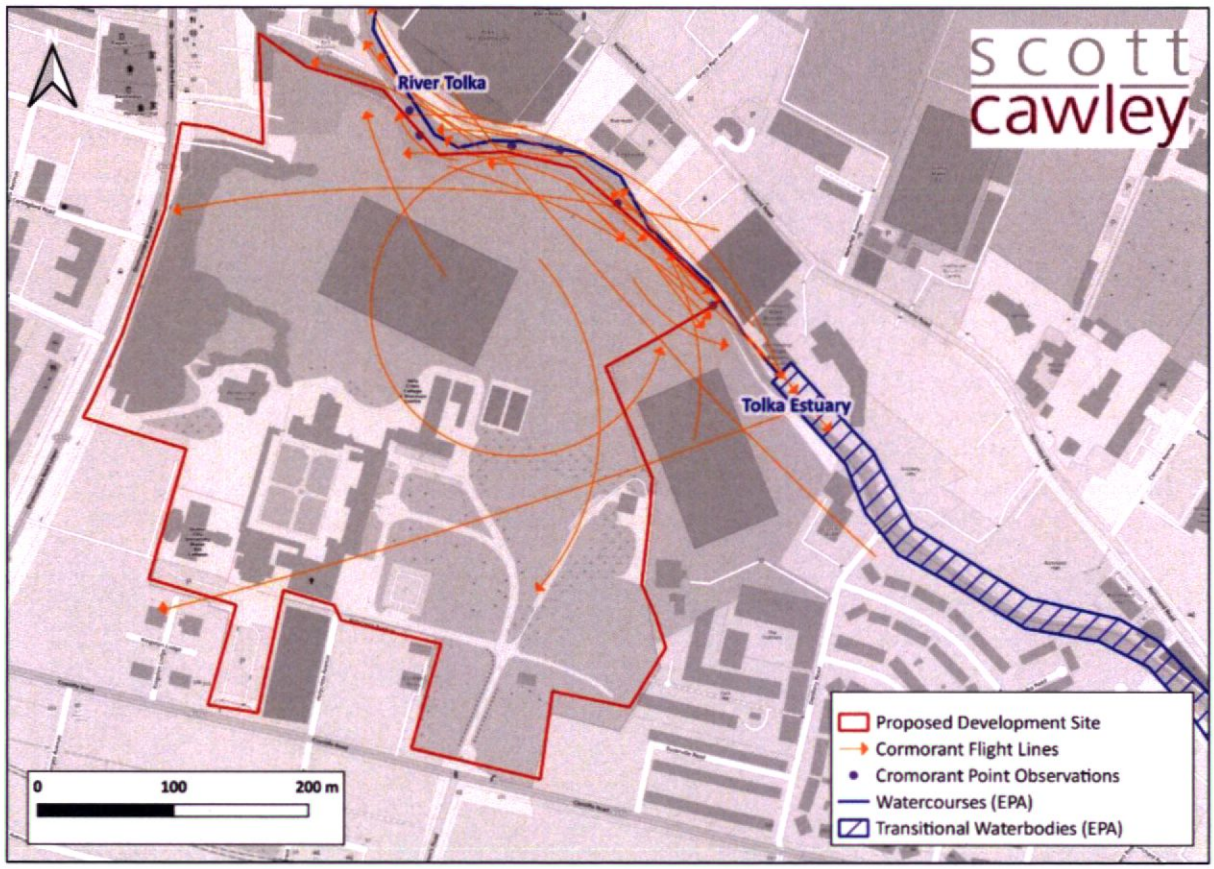
- Ireland's Eye SPA (004117), *c.* 12.5km north-east of the proposed development site. The European site encompasses the island of Ireland's Eye and the surrounding coastal waters. Cormorant breed on the island in nationally important numbers (306 pairs) (NPWS, 2018A).
- Lambay Island SPA (004069), *c.* 19.6km north-east of the proposed development site. The European site encompasses Lambay Island and its surrounding coastal waters. Cormorant breed

on the island in internationally important numbers (675 pairs), with smaller number of birds (29) overwintering at the site (NPWS, 2018B).

48 There is potential that some members of the Ireland's Eye or Lambay Island breeding population utilise the section of the River Tolka that runs along the northern boundary of the proposed development site.

4.4.2 *Field Survey Results for Cormorant*

Figure 7: Cormorant activity in the survey area between September 2019 and March 2020



49 Cormorant activity was chiefly concentrated along the River Tolka, which forms the northern boundary of the proposed development site. Members of the species were observed foraging in the River Tolka on five dates between September and December 2019. Observations were generally of a single individual foraging in the river. What is thought to be a single bird was observed foraging on nine occasions in the Tolka on 12th September 2019. Cormorant were observed flying over the proposed development site on 16 dates, again generally individual birds, although two birds were noted flying over the site on 12th September 2019. Birds were generally observed flying upriver along the Tolka, as opposed to across the proposed development site (See Figure 7).

4.4.3 *Cormorant at Clonliffe College in the context of European sites within 20km*

50 It is worth bearing in mind that nearby European sites, Ireland's Eye SPA (004117) and Lambay Island SPA (004069) have been designated for their breeding populations of Cormorant as opposed to their wintering populations. The surveys undertaken to inform this report related to the winter season, when the resident population, and it is not clear how the wintering population relates to the breeding populations at Ireland's Eye and Lambay Island in this instance.

51 In relation to wintering populations of the species in the vicinity, the peak count of birds in the proposed development site potentially represents:

- 0.006% of the wintering population at Ireland's Eye, referencing the I-WeBS mean peak count of 175 birds over the period 2010/11 - 2014/15 (See Appendix I).
- 0.005% of the wintering population at Lambay Island, referencing the I-WeBS mean peak count of 200 birds over the period 2010/11 – 2014/15 (See Appendix I).

52 According to Nagy & Langendoen (2018), 1% of the international population of Cormorant is 1,200 birds. The peak count of birds utilising the survey area did not reach or exceed this number in the 2019/20 survey season. The peak count of one bird observed in the survey area represents 0.0008% of the international population of the species.

4.5 Curlew *Numenius arquata* [A160]

4.5.1 Results of Desk Study for Curlew

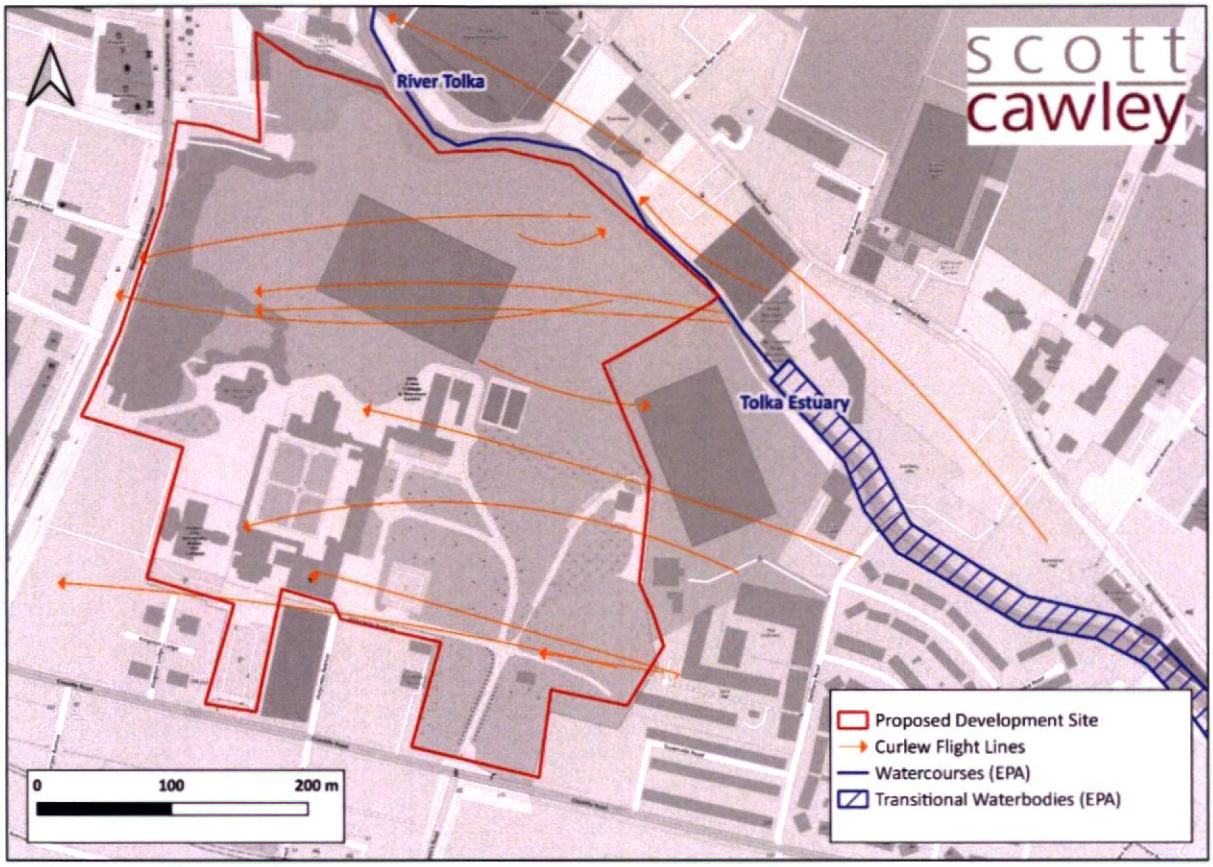
53 Curlew is a SCI species for which the following European site within 20km of the proposed development have been designated:

- North Bull Island SPA (004006), *c.* 4.5km east. The baseline population of Curlew in the European site, based on the five-year mean peak counts for the period 1995/96-1999/2000, is listed as 937 birds in the Conservation Objectives Supporting Document (NPWS, 2014). North Bull Island SPA (004006) is the 11th most important site in Ireland for wintering Curlew (NPWS, 2014). The site hosts a population of all-Ireland importance for the species. Data on the flock size at North Bull Island SPA contained within the *Conservation Objectives Supporting Document* (NPWS, 2014) and for Dublin Bay contained within I-WeBS data (See Appendix I) indicates that the SPA population has increased slightly relative to the baseline population.

54 Curlew are known to forage for earthworms on damp grassland on terrestrial sites (NPWS, 2014). The range of terrestrial sites in the Dublin area does not appear to be as well-documented as Brent Geese. Curlew are known to use inland feeding sites but the network of inland feeding sites is not as well-documented as for Brent Geese. The long-term trend (since the first I-WeBS population estimated, and the most recent population estimate in 2018) in the Irish overwintering population of Curlew has been a precipitous decline in numbers (Burke *et al.*, 2018).

4.5.2 *Field Survey Results for Curlew*

Figure 8: Curlew activity in the survey area between September 2019 and March 2020.



Curlew were observed flying over the site on 10 dates between October 2019 and March 2020. Flock sizes were smaller than Brent Goose flocks observed flying over the site, with a peak count of 32 birds flying across the site on 6th December 2019. Virtually all observations of Curlew flight lines were of movements east-west, e.g. from Dublin Bay inland. West-east movements were observed only on two occasions (see Figure 8). Curlew were not observed foraging within the proposed development site on any occasion.

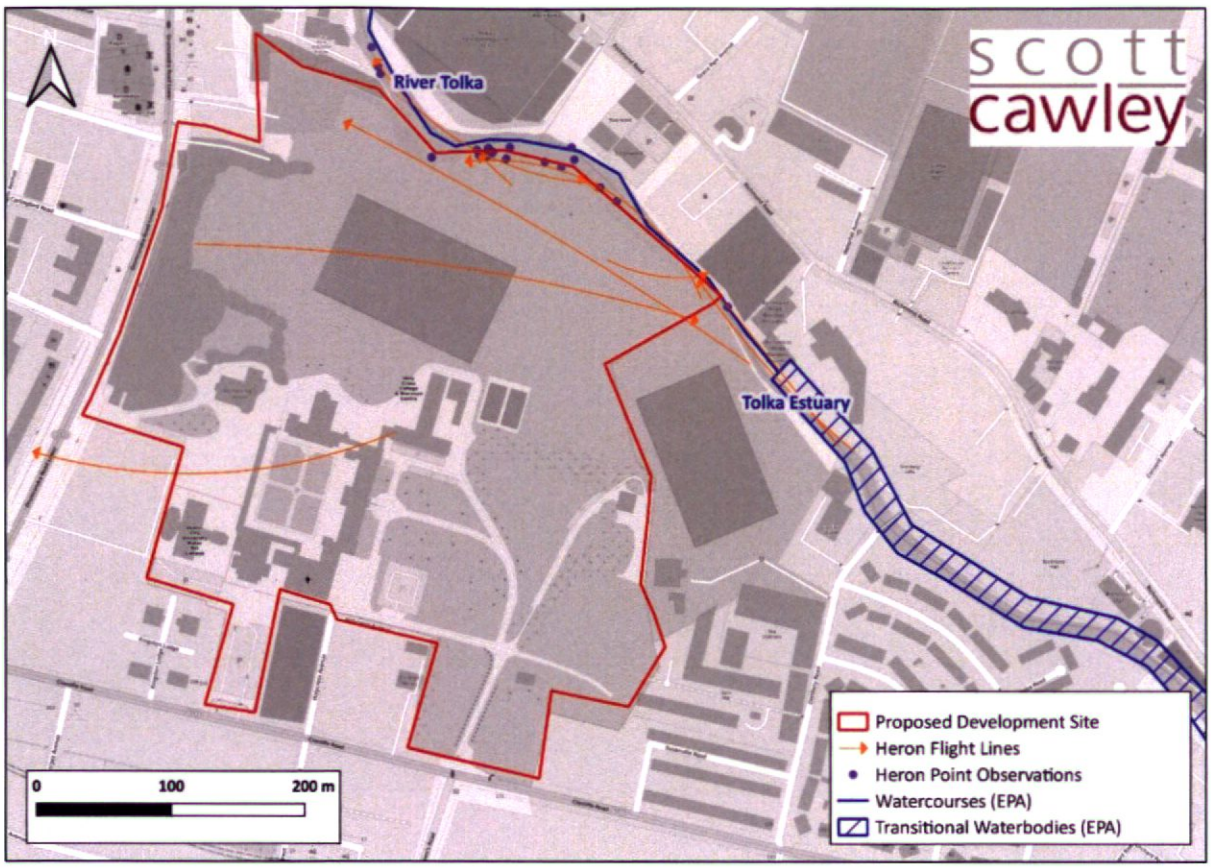
4.6 Grey Heron *Ardea cinerea* [A028]

4.6.1 *Results of Desk Study for Grey Heron*

There are no European sites for which Grey Heron is an SCI species within the vicinity of the proposed development site. The closest European sites which includes Grey Heron as a designating feature is Wexford Harbour and Slobs SPA (004076), *c.* 99km south of the proposed development site. Grey Herons are generally sedentary in Ireland, meaning they do not travel long distances between their breeding and wintering grounds[3], and for this reason, the population of birds in the proposed development site is not part of any European site population.

[3] From information on Grey Heron *Ardea cinerea* published on the BirdWatch Ireland website https://birdwatchireland.ie/birds/grey-Heron/. Accessed 9th June 2020

Figure 9: Grey Heron activity in the survey area between September 2019 and March 2020.



4.6.2 Field Survey Results for Grey Heron

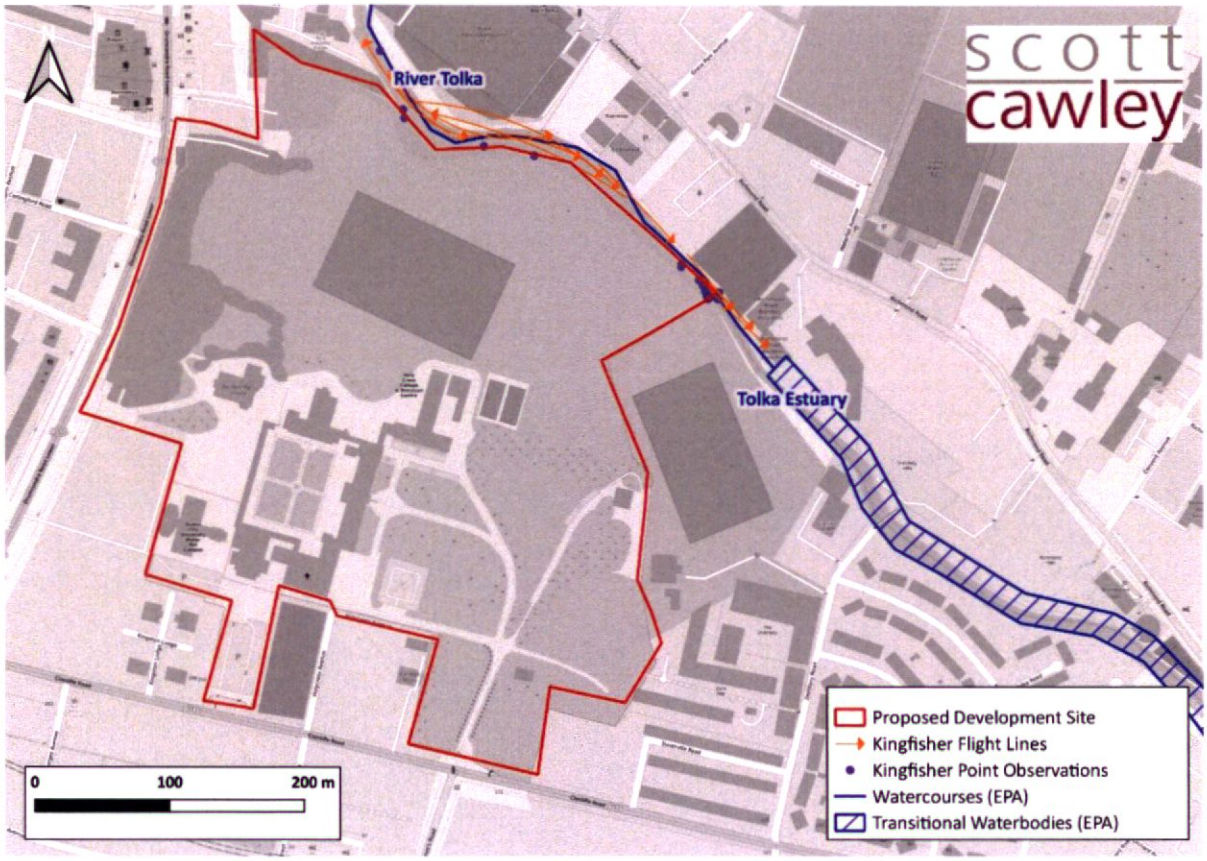
57 Similar to observations of Cormorant, single Grey Herons were observed foraging in and along the River Tolka on nine dates. The birds were also noted flying up and down river. The species was strongly associated with the River Tolka and was not observed foraging or flying across the remainder of the proposed development site.

4.7 Kingfisher *Alcedo atthis* [A229]

4.7.1 Results of Desk Study for Kingfisher

58 There are no European sites for which Kingfisher is an SCI species within the vicinity of the proposed development site. The closest European sites which includes Kingfisher as a designating feature is the River Boyne and River Blackwater SPA (004232), *c.* 37km northeast of the proposed development site. The River Boyne and River Blackwater SPA is in a separate water catchment to the River Tolka and is therefore not directly connected to the proposed development site. The population on the River Tolka is not part of the River Boyne and River Blackwater SPA population on the basis of distance of separation between the two.

Figure 10: Kingfisher activity in the survey area between September 2019 and March 2020



4.7.2 Field Survey Results for Kingfisher

Kingfisher were observed foraging and/or commuting along the River Tolka on 18 of the 25 completed survey visits. The species was note perching on vegetation overhanging the River Tolka from within the proposed development site. In most instances, a single bird was observed, however two birds were observed on 12th September 2019. The section of the River Tolka running along the northern boundary of the proposed development site is likely to form part of a breeding territory for a pair of Kingfisher.

5 Conclusions

Observations of wintering birds in the proposed development site have been contextualised against the populations of these species in nearby European sites. In the case of Black-headed Gull, Herring Gull, Brent Geese, Curlew, Cormorant, Grey Heron and Kingfisher, it has been demonstrated that the peak count of birds in the survey area in 2019/20 is less than 1% of the international population of these species.

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Appendix I – Desk Study Results

Wetland Bird Survey Records for O13 10km Grid Square, returned from the National Biodiversity Data Centre Database

A search for all species records contained within the O13 10km grid square was returned on 10th June 2020. The records have been reviewed by Colm Clarke of Scott Cawley and only records relating to wetland birds are presented in the table, below. A large proportion of records are of rare / vagrant species.

Appendix I - Table 1: Wetland bird records from the 10km grid square O13, as returned from the NBDC

Species name	Record count	Date of last record	Title of dataset
Arctic Tern *Sterna paradisaea*	2	31/12/2011	Bird Atlas 2007 - 2011
Barnacle Goose *Branta leucopsis*	1	15/02/2015	Birds of Ireland
Bar-tailed Godwit *Limosa lapponica*	5	31/12/2011	Bird Atlas 2007 - 2011
Black Brant *Branta bernicla subsp. Nigricans*	3	10/03/1995	Rare birds of Ireland
Black Guillemot *Cepphus grille*	23	05/06/2016	Birds of Ireland
Black-headed Gull *Larus ridibundus*	100	08/12/2017	Birds of Ireland
Black-legged Kittiwake *Rissa tridactyla*	4	10/03/2012	Birds of Ireland
Black-tailed Godwit *Limosa limosa*	5	10/03/2012	Birds of Ireland
Branta bernicla subsp. hrota	14	31/12/2011	Bird Atlas 2007 - 2011
Brent Goose *Branta bernicla*	39	17/02/2017	Birds of Ireland
Common Coot *Fulica atra*	31	27/10/2017	Birds of Ireland
Common Greenshank *Tringa nebularia*	2	31/12/2011	Bird Atlas 2007 - 2011
Common Guillemot *Uria aalge*	2	09/03/2009	Birds of Ireland
Common Kingfisher *Alcedo atthis*	28	15/08/2017	Birds of Ireland
Common Pochard *Aythya ferina*	3	31/12/2011	Bird Atlas 2007 - 2011
Common Redshank *Tringa totanus*	13	17/09/2017	Birds of Ireland
Common Sandpiper *Actitis hypoleucos*	1	31/07/1991	The Second Atlas of Breeding Birds in Britain and Ireland: 1988-1991
Common Shelduck *Tadorna tadorna*	9	31/12/2011	Bird Atlas 2007 - 2011
Common Snipe *Gallinago gallinago*	6	28/01/2017	Birds of Ireland
Common Tern *Sterna hirundo*	6	18/06/2017	Birds of Ireland
Dunlin *Calidris alpina*	6	31/12/2011	Bird Atlas 2007 - 2011
Eurasian Curlew *Numenius arquata*	16	04/12/2017	Birds of Ireland
Eurasian Oystercatcher *Haematopus ostralegus*)	22	17/09/2017	Birds of Ireland
Eurasian Teal *Anas crecca*	12	26/02/2017	Birds of Ireland
Eurasian Wigeon *Anas penelope*	4	31/12/2011	Bird Atlas 2007 - 2011
European Golden Plover *Pluvialis apricaria*	1	31/12/2011	Bird Atlas 2007 - 2011

Species name	Record count	Date of last record	Title of dataset
European Shag *Phalacrocorax aristotelis*	1	24/07/1994	European Seabirds at Sea (ESAS) bird sightings 1980-2003
Gadwall *Anas strepera*	2	31/12/2011	Bird Atlas 2007 - 2011
Great Cormorant *Phalacrocorax carbo*	35	03/12/2017	Birds of Ireland
Great Crested Grebe *Podiceps cristatus*	4	31/12/2011	Bird Atlas 2007 - 2011
Great Egret *Ardea alba*)	1	24/06/2013	Rare birds of Ireland
Great Northern Diver *Gavia immer*	1	31/12/2011	Bird Atlas 2007 - 2011
Greater Scaup *Aythya marila*	4	27/10/2017	Birds of Ireland
Grey Heron *Ardea cinerea*	87	15/12/2017	Birds of Ireland
Grey Plover *Pluvialis squatarola*	3	31/12/2011	Bird Atlas 2007 - 2011
Herring Gull *Larus argentatus*	113	26/11/2017	Birds of Ireland
Lesser Black-backed Gull *Larus fuscus*	33	24/07/2017	Birds of Ireland
Little Grebe *Tachybaptus ruficollis*	35	27/10/2017	Birds of Ireland
Little Tern *Sternula albifrons*	1	31/07/1972	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.
Mallard *Anas platyrhynchos*	110	02/12/2017	Birds of Ireland
Manx Shearwater *Puffinus puffinus*	4	18/08/1994	European Seabirds at Sea (ESAS) bird sightings 1980-2003
Northern Lapwing *Vanellus vanellus*	6	31/12/2011	Bird Atlas 2007 - 2011
Northern Shoveler *Anas clypeata*	3	31/12/2011	Bird Atlas 2007 - 2011
Red Knot *Calidris canutus*	6	31/12/2011	Bird Atlas 2007 - 2011
Red-breasted Merganser *Mergus serrator*	3	31/12/2011	Bird Atlas 2007 - 2011
Red-throated Diver *Gavia stellata*	2	31/12/2011	Bird Atlas 2007 - 2011
Ringed Plover *Charadrius hiaticula*	7	31/12/2011	Bird Atlas 2007 - 2011
Ruddy Turnstone *Arenaria interpres*	6	31/12/2011	Bird Atlas 2007 - 2011
Tufted Duck *Aythya fuligula*	54	06/12/2017	Birds of Ireland

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U404 Dublin Bay

The mean is based only on the most recent 5-season period, *i.e.* for the period 2010/11 - 2014/15. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 2: I-WeBS summary data for OU404 Dublin Bay

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Arctic Tern			2					3					3
Bar-tailed Godwit	150.00	1200.00	2231	2138	1260	1540	1745	1917	2141	1710	1658	2173	1920
Black-headed Gull		20000.00	3766	4358	3738	2234	2356	2269	1907	2649	1259	2768	2170
Black-necked Grebe								4					4
Black-tailed Godwit	190.00	610.00	664	936	698	1449	1375	927	1362	1768	873	2185	1423
Common Gull		16400.00	549	298	685	579	573	410	309	985	272	890	573
Common Scoter	140.00	5500.00		2	30		80	20	10	42		40	28
Common Tern			173	15	23		14	38	3	39		1	20
Common/ Arctic Tern				400*				163					163
Coot	220.00	17500.00	1										
Cormorant	120.00	1200.00	309	182	82	211	98	151	53	198	41	71	103
Curlew	350.00	8400.00	1374	1017	742	1240	688	1169	874	932	1424	567	993
Curlew Sandpiper		10000.00						1	1				1
Dunlin	570.00	13300.00	7453	6124	6443	4270	6490	3559	4163	5907	3603	3376	4122
Feral/hybrid Mallard type								2	1				2
Gadwall	20.00	600.00			4	19				2	2		2
Glaucous Gull		2200.00			1								
Golden Plover	1200.00	9300.00	1020	162	2500	1360	430	390	404	1080	742	1155	754
Goldeneye	60.00	11500.00	23	23	6	6	5	11	6		2	1*	6

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Great Black-backed Gull		4200.00	637	180	141	84	124	358	116	190	52	263	196
Great Crested Grebe	40.00	3500.00	97	198	105	255	421	930	254	755	143	307	478
Great Northern Diver	20.00	50.00	3	2		8		2		3		5	3
Greenshank	20.00	2300.00	33	47	68	28	43	40	46	34	47	78	49
Green-winged Teal						1							
Grey Heron	25.00	2700.00	44	33	31	54	30	28	15	68	40	44	39
Grey Plover	30.00	2500.00	751	202	265	394	293	200	307	310	452	240	302
Herring Gull		10200.00	497	262	314	422	341	519	135	490	261	538	389
Kingfisher			1			1	1			1		1	1
Knot	280.00	4500.00	4519	5802	5832	4105	2799	3435	3022	4547	4950	2495	3690
Lapwing	1100.00	20000.00	56	26	64	191	44	120	67	52	54	143	87
Lesser Black-backed Gull		5500.00	475	14	4	19	195	28	25	5	20	16	19
Light-bellied Brent Goose	360.00	400.00	2017	3819	4445	5536	3292	4102	6134	3717	4862	4195	4602
Little Egret	20.00	1300.00	29	69	100	87	73	48	19	59	69	59	51
Little Grebe	20.00	4000.00					5	1	9	1	5		4
Little Gull		1100.00					1	1					1
Little Tern			1										
Long-tailed Duck		17250.00		1					2	1			2
Mallard	290.00	20000.00	91	67	58	97	138	151	52	97	106	120	105
Mediterranean Gull		770.00	16	33	70	27	8	113	23	39	27	64	53
Moorhen		20000.00	4	9	4	6	7	7	5	5		5	6
Mute Swan	90.00		5		3	7	6	2	2	5	6	9	5

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Oystercatcher	690.00	8200.00	3327	2933	3946	4324	2804	3408	3025	3074	3315	3588	3282
Pintail	20.00	600.00	150	179	117	162	173	212	160	200	150	124	169
Purple Sandpiper	20.00	710.00		1	2		16	4	3	2	1	2	2
Red-breasted Merganser	20.00	1700.00	43	56	109	58	63	114	50	60	57	69	70
Red-necked Grebe										1			1
Redshank	300.00	3900.00	1758	2856	3621	2639	2790	2509	2077	2460	1889	1648	2117
Red-throated Diver	20.00	3000.00	12	7	9	5	16	8	8	7	2	7	6
Ring-billed Gull		20000.00			1		1	2	1				2
Ringed Plover	100.00	730.00	849	355	146	267	205	314	217	139	121	109	180
Roseate Tern								3					3
Sanderling	60.00	1200.00	692	609	434	674	300	411	405	510	266	841	487
Sandwich Tern			342	122	38	2	43	6	23	52		8	22
Scaup	65.00	3100.00				2							
Shag		2000.00	7	7	35	2	25	19	23	36	3	71	30
Shelduck	120.00	3000.00	761	1036	866	1142	821	603	731	961	2927	744	1193
Shoveler	30.00	400.00	104	111	76	249	73	101	79	126	97	115	104
Slavonian Grebe		55.00					1						
Snipe		20000.00	1		2	16	18	12	62	20		31	31
Spotted Redshank		900.00	1					1		1		3	2
Teal	340.00	5000.00	925	823	785	980	1358	909	981	1378	1233	1291	1158
Tufted Duck	310.00	12000.00			1								
Turnstone	95.00	1400.00	356	292	380	329	392	349	227	466	250	584	375
Unidentified Gull								10	85				48

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Unidentified Tern			244										
Water Rail			1	1				1					1
Whimbrel		6700.00			1		1		1	2	4		2
Wigeon	630.00	15000.00	518	1302	663	1911	806	610	445	691	2201	1106	1011
Yellow-legged Gull									1	1		2	1

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U403 Baldoyle Bay

The mean is based only on the most recent 5-season period, *i.e.* for the period 2010/11 - 2014/15. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 3: I-WeBS summary data for OU403 Baldoyle Bay

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Mute Swan	90.00		1				0	0	0			2	2
Light-bellied Brent Goose	360.00	400.00	678	710	1120	956	0	0	0	580	588	342	503
Egyptian Goose							0	0	0			1	1
Shelduck	120.00	3000.00	175	365	357	238	0	0	0	52	97	88	79
Wigeon	630.00	15000.00	208	57	125	178	0	0	0	54	54	32	47
Teal	340.00	5000.00	320	125	163	218	0	0	0	145	160	108	138
Mallard	290.00	20000.00	178	278	193	249	0	0	0	67	102	106	92
Pintail	20.00	600.00	12	32	23	12	0	0	0	4	4		4
Shoveler	30.00	400.00					0	0	0				
Long-tailed Duck		17250.00				2	0	0	0				
Common Scoter	140.00	5500.00		62	27	130	0	0	0	16	7		12

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Goldeneye	60.00	11500.00				15	0	0	0				
Red-breasted Merganser	20.00	1700.00	17	17	14	23	0	0	0	6	5	2	4
Red-throated Diver	20.00	3000.00	2	5	5	2	0	0	0	14	64		39
Great Northern Diver	20.00	50.00		1	2	5	0	0	0	1	2		2
Little Grebe	20.00	4000.00	1			5	0	0	0	1			1
Great Crested Grebe	40.00	3500.00	16	16	22	63	0	0	0	124	189		156
Cormorant	120.00	1200.00	8	17	14	20	0	0	0	10	4	3	6
Shag		2000.00					0	0	0	7			7
Little Egret	20.00	1300.00	8	27	40	56	0	0	0	18	3	7	9
Grey Heron	25.00	2700.00	8	17	14	32	0	0	0	5	7	7	6
Moorhen		20000.00	2				0	0	0				
Oystercatcher	690.00	8200.00	556	985	1014	880	0	0	0	277	1113	219	536
Ringed Plover	100.00	730.00	45	128	150	168	0	0	0	34	59	123	72
Golden Plover	1200.00	9300.00	1800	1100	750	672	0	0	0	2500	450	2000	1650
Grey Plover	30.00	2500.00	113	45	112	166	0	0	0	55	28	8	30
Lapwing	1100.00	20000.00	460	320	287	550	0	0	0	372	300	137	270
Knot	280.00	4500.00	210	85	47	112	0	0	0	553		19	286
Sanderling	60.00	1200.00	10	35	31	29	0	0	0	6			6
Curlew Sandpiper		10000.00		2	4	12	0	0	0				
Dunlin	570.00	13300.00	205	226	300	110	0	0	0	750	233	300	428
Snipe		20000.00		4	17		0	0	0				
Black-tailed Godwit	190.00	610.00	210	175	175	270	0	0	0	389	139	296	275
Bar-tailed Godwit	150.00	1200.00	150	131	131	105	0	0	0	162	150	48	120

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Whimbrel		6700.00		4	1	7	0	0	0				
Curlew	350.00	8400.00	140	100	138	148	0	0	0	90	61	106	86
Common Sandpiper						2	0	0	0				
Green Sandpiper		15500.00			2	1	0	0	0				
Greenshank	20.00	2300.00	5	27	32	25	0	0	0	6	11	3	7
Redshank	300.00	3900.00	369	375	330	284	0	0	0	144	152	125	140
Turnstone	95.00	1400.00	20	73	126	139	0	0	0	17	12	13	14
Black-headed Gull		20000.00	166				0	0	0	242	281	52	192
Common Gull		16400.00	22				0	0	0	64	11	4	26
Lesser Black-backed Gull		5500.00					0	0	0	4	18	1	8
Herring Gull		10200.00	230				0	0	0	47	91	58	65
Great Black-backed Gull		4200.00	175				0	0	0	7	15	10	11
Sandwich Tern			168	21	37	31	0	0	0				
Roseate Tern						12	0	0	0				
Common Tern			32	8	12	52	0	0	0				
Arctic Tern				2	8	24	0	0	0				
Kingfisher			1		2	3	0	0	0				

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U408 Broadmeadow (Malahide) Estuary

The mean is based only on the most recent 5-season period, *i.e.* for the period 2010/11 - 2014/15. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 4: I-WeBS summary data for OU408 Broadmeadow (Malahide) Estuary

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Mute Swan	90.00		97	112	110	114	108	90	47	50	89	58	67
Whooper Swan	150.00	270.00			9			2		1			2
Black Swan											1		1
Greenland White-fronted Goose	110.00	240.00					1						
Bar-headed Goose						1	1						
Barnacle Goose	150.00	710.00					1						
Light-bellied Brent Goose	360.00	400.00	1927	2000	1856	898	1411	943	1980	710	464	824	984
Shelduck	120.00	3000.00	247	273	246	341	479	8	262	120	222	303	183
Wigeon	630.00	15000.00	95	187	150	42	168		157		2	67	75
Gadwall	20.00	600.00					2		120	4			62
Teal	340.00	5000.00	65	176	142	99	670	41	112	119	87	141	100
Mallard	290.00	20000.00	146	340	178	176	379	95	220	112	92	92	122
Pintail	20.00	600.00	74	40	72	66	72		29	6		15	17
Shoveler	30.00	400.00			14	6	50					9	9
Pochard	160.00	3000.00	16	40	18	35	8		2				2
Tufted Duck	310.00	12000.00			2	15	8				1		1
Scaup	65.00	3100.00	2		1		4				3		3
Long-tailed Duck		17250.00					1		3				3

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Common Scoter	140.00	5500.00	240	520	300	278			30				30
Goldeneye	60.00	11500.00	104	184	105	126	93	51	66	36	92	31	55
Red-breasted Merganser	20.00	1700.00	65	51	39	161	78	87	57	80	35	26	57
Ruddy Duck							1						
Red-throated Diver	20.00	3000.00		4	8				4				4
Great Northern Diver	20.00	50.00				3				3		2	2
Little Grebe	20.00	4000.00	4	7	8	13	28	23	21	8	33	26	22
Great Crested Grebe	40.00	3500.00	89	61	96	54	44	34	120	60	72	84	74
Slavonian Grebe		55.00	2										
Cormorant	120.00	1200.00	155	133	58	42	28	6	101	101	42	86	67
Shag		2000.00	2		130	66	30		32	8	9	5	14
Little Egret	20.00	1300.00	26	23	26	17	3	2	17	13	16	35	17
Grey Heron	25.00	2700.00	25	39	28	77	20	12	19	19	27	26	21
Moorhen		20000.00	1	5	3	7	12	4	4	6	9	4	5
Coot	220.00	17500.00	1		2		12						
Oystercatcher	690.00	8200.00	1102	1519	1529	1285	1471	78	1300	1833	1355	1291	1171
Ringed Plover	100.00	730.00	94	15	16	14	25		71			13	42
Golden Plover	1200.00	9300.00	500	2300	1310	72	1000	260	1000	200	5		366
Grey Plover	30.00	2500.00	139	163	155	150	169	3	140	9	6	100	52
Lapwing	1100.00	20000.00	1196	570	434	315	642	1180	900	590	681	63	683
Knot	280.00	4500.00	250	200	331	354	870	4	440	110	49	9	122
Sanderling	60.00	1200.00		8	4		1		2	80	46		43
Curlew Sandpiper		10000.00							2				2

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Dunlin	570.00	13300.00	490	310	1173	416	1365	23	480	94	121	300	204
Ruff		12200.00	8	1	4	1	1	4	1	2	5		3
Jack Snipe		20000.00							1				1
Snipe		20000.00	20	15	44	5	46	20	25	56	25	36	32
Black-tailed Godwit	190.00	610.00	428	397	366	478	258	296	355	206	167	121	229
Bar-tailed Godwit	150.00	1200.00	262	101	200	358	286	62	213	133	14	60	96
Curlew	350.00	8400.00	301	390	240	545	330	1	500	244	83	246	215
Common Sandpiper					6	3	4	1	17		1		6
Green Sandpiper		15500.00								27			27
Spotted Redshank		900.00	1	1	1						1		1
Greenshank	20.00	2300.00	52	78	59	29	26	26	43	64	30	34	39
Redshank	300.00	3900.00	442	927	589	459	364	87	374	171	130	363	225
Turnstone	95.00	1400.00	140	220	139	175	175	23	221	94	85	75	100
Mediterranean Gull		770.00		1									
Little Gull		1100.00			1								
Black-headed Gull		20000.00	510	902	1072	930	565	479	368	659	571	496	515
Common Gull		16400.00	71	180	221	187	228	149	70	71	16	184	98
Lesser Black-backed Gull		5500.00	2	3	28	5	5	4	3	15	8	196	45
Herring Gull		10200.00	20	217	77	66	68	55	139	110	95	118	103
Iceland Gull		1600.00						2					2
Great Black-backed Gull		4200.00	10	10	18	20	20	15	44	93	9	42	41
Sandwich Tern			237	152	26	84	3	2	50	12		2	16

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Common Tern				20		1							

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U407 Rogerstown Estuary

The mean is based only on the most recent 5-season period, *i.e.* for the period 2010/11 - 2014/15. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 5: I-WeBS summary data for OU407 Rogerstown Estuary

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Mute Swan	90.00				6	3			4	2	2	2	2
Whooper Swan	150.00	270.00					2					12	12
Pink-footed Goose		3500.00	2									8	8
Greenland White-fronted Goose	110.00	240.00						3					3
Greylag Goose	50.00	980.00	90	63	87	134	19	33	89	5	33	95	51
Barnacle Goose	150.00	710.00	1		1								
Brent Goose					1								
Dark-Bellied Brent Goose										1			1
Light-bellied Brent Goose	360.00	400.00	1196	2794	2652	2749	1051	2661	1395	2217	1047	2662	1996
Hybrid Shelduck				1									
Ruddy Shelduck						1							
Shelduck	120.00	3000.00	761	706	809	886	730	752	793	877	652	624	740
Wigeon	630.00	15000.00	1022	724	580	690	490	813	585	686	1342	1532	992
Gadwall	20.00	600.00			1				2		3	2	2

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Teal	340.00	5000.00	1265	1021	1054	1003	1448	1211	1469	685	2008	967	1268
Mallard	290.00	20000.00	138	213	248	319	109	182	198	172	260	220	206
Pintail	20.00	600.00	2		16	6	2		1		4	5	3
Shoveler	30.00	400.00	46	43	79	36	21	26	34	42	15	25	28
Pochard	160.00	3000.00			2								
Scaup	65.00	3100.00				27							
Common Scoter	140.00	5500.00											
Goldeneye	60.00	11500.00	2	1	1	1	1		6				6
Red-breasted Merganser	20.00	1700.00	10	16	26	30	16	30	22	20	39	23	27
Red-throated Diver	20.00	3000.00	1	1	2	1		4	1	2	4	1	2
Great Northern Diver	20.00	50.00	3		1					2			2
Little Grebe	20.00	4000.00	9	19	12	18	10	24	15	15	22	25	20
Great Crested Grebe	40.00	3500.00	2	3	3	46	1	4	14	5	22	3	10
Slavonian Grebe		55.00	1										
Cormorant	120.00	1200.00	21	58	55	77	23	17	33	32	21	27	26
Shag		2000.00	12	302	28	28	44	40	47	36	21	10	31
Little Egret	20.00	1300.00	28	33	41	42	1	43	48	57	46	55	50
Grey Heron	25.00	2700.00	19	36	34	24	6	24	24	17	21	16	20
Great White Egret												1	1
Glossy Ibis													
Spoonbill													
Water Rail					1	1						1	1
Moorhen		20000.00	1	3		3		1	1	8	5	2	3

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Coot	220.00	17500.00							2	3		2	2
Oystercatcher	690.00	8200.00	2666	2779	1199	2024	1781	2116	2491	1531	1519	1697	1871
Ringed Plover	100.00	730.00	196	251	190	153	113	105	284	167	161	125	168
American Golden Plover						1							
Golden Plover	1200.00	9300.00	2150	910	6590	664	40	530	3300	130	2000	2050	1602
Grey Plover	30.00	2500.00	651	231	283	223	210	371	242	151	120	64	190
Lapwing	1100.00	20000.00	3259	3655	5820	1268	710	2855	5805	897	2099	5185	3368
Knot	280.00	4500.00	500	86	500	501	88	190	256	30	130	89	139
Sanderling	60.00	1200.00	53	50	14	30	6	20	300	31	1	130	96
Little Stint		3000.00			1			1		3		1	2
Curlew Sandpiper		10000.00	2	2		6		1	4			1	2
Purple Sandpiper	20.00	710.00	23	10	7	76	5	6	3	72	32	4	23
Dunlin	570.00	13300.00	2065	1680	2546	3151	1061	1904	1860	581	2264	3469	2016
Ruff		12200.00	3	3		1			1			2	2
Jack Snipe		20000.00											
Snipe		20000.00	10	9	35	37	10	4	20	9	5	24	12
Woodcock										1			1
Black-tailed Godwit	190.00	610.00	795	722	1138	568	148	450	883	597	237	191	472
Bar-tailed Godwit	150.00	1200.00	23	63	31	126	1	76	44	120	149	99	98
Whimbrel		6700.00			1	2		2	28	1	1	1	7
Curlew	350.00	8400.00	1376	1246	1055	803	33	922	518	684	600	625	670
Common Sandpiper			1	2	2								
Green Sandpiper		15500.00	5	1								1	1

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Spotted Redshank		900.00		2	1	1			1				1
Greenshank	20.00	2300.00	49	68	40	50	14	83	32	36	35	59	49
Lesser Yellowlegs				1							1		1
Redshank	300.00	3900.00	1241	1025	907	987	378	1104	689	844	945	1007	918
Turnstone	95.00	1400.00	339	227	77	81	95	176	224	207	110	223	188
Mediterranean Gull		770.00				1			1	1			1
Black-headed Gull		20000.00	230	748	764	1314	136	457	310	602	448	458	455
Common Gull		16400.00	17	22	80	419	73	142	175	256	343	159	215
Lesser Black-backed Gull		5500.00		1	3	29	35	76	3	1	38	9	25
Herring Gull		10200.00	23	755	906	596	45	739	189	237	300	332	359
Great Black-backed Gull		4200.00	22	150	170	119	16	107	84	106	37	53	77
Sandwich Tern			2	81	70	100			104	58	245	82	122
Roseate Tern									1				1
Common Tern				20	2					1	4	41	15
Arctic Tern				12									
Kingfisher			1	1	1	1		1	12	2	1		4

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U951 Ireland's Eye

The mean is based only on the most recent 5-season period, *i.e.* for the period 2010/11 - 2014/15. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 6: I-WeBS summary data for OU951 Ireland's Eye

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Light-bellied Brent Goose	360.00	400.00	0	80	50	0	0	0	0	100		200	150
Shelduck	120.00	3000.00	0			0	0	0	0			20	20
Mallard	290.00	20000.00	0	6		0	0	0	0	5			5
Red-throated Diver	20.00	3000.00	0			0	0	0	0	2			2
Cormorant	120.00	1200.00	0	100	20	0	0	0	0	200		150	175
Shag		2000.00	0			0	0	0	0	150		60	105
Little Egret	20.00	1300.00	0		2	0	0	0	0			1	1
Grey Heron	25.00	2700.00	0		2	0	0	0	0	1		1	1
Oystercatcher	690.00	8200.00	0	35	100	0	0	0	0	200	150*	100	150
Ringed Plover	100.00	730.00	0			0	0	0	0	10	5*	4	7
Sanderling	60.00	1200.00	0			0	0	0	0	60			60
Purple Sandpiper	20.00	710.00	0	20	5	0	0	0	0	10		15	12
Dunlin	570.00	13300.00	0			0	0	0	0	10			10
Whimbrel		6700.00	0		2	0	0	0	0			1	1
Curlew	350.00	8400.00	0	50	25	0	0	0	0	30	6*	5	18
Greenshank	20.00	2300.00	0		1	0	0	0	0	1		2	2
Redshank	300.00	3900.00	0		10	0	0	0	0	25	10*	25	25
Turnstone	95.00	1400.00	0	60	60	0	0	0	0	80	20*	150	115
Mediterranean Gull		770.00	0			0	0	0	0		1*		

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Black-headed Gull		20000.00	0			0	0	0	0	50		6	28
Common Gull		16400.00	0		10	0	0	0	0	60			60
Herring Gull		10200.00	0		200	0	0	0	0	300	200*	300	300
Great Black-backed Gull		4200.00	0		200	0	0	0	0	250	200*	200	225
Sandwich Tern			0		2	0	0	0	0		15*		

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U903 Lambay Island

The mean is based only on the most recent 5-season period, *i.e.* for the period 2010/11 - 2014/15. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 7: I-WeBS summary data for OU903 Lambay Island

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Greylag Goose	50.00	980.00	0	60				0	0		0		
Light-bellied Brent Goose	360.00	400.00	0	315		400	350	0	0		0	400*	
Shelduck	120.00	3000.00	0	7	6*			0	0		0	4*	
Mallard	290.00	20000.00	0					0	0	10	0		10
Red-throated Diver	20.00	3000.00	0	2				0	0	2	0	2*	2
Great Northern Diver	20.00	50.00	0			2		0	0		0		
Great Crested Grebe	40.00	3500.00	0	2				0	0		0		
Cormorant	120.00	1200.00	0	100		50		0	0	200	0	20*	200
Shag		2000.00	0					0	0	200	0	150*	200
Grey Heron	25.00	2700.00	0	1				0	0	2	0	1*	2
Oystercatcher	690.00	8200.00	0	110	10*	100	100	0	0	100	0	250*	100
Ringed Plover	100.00	730.00	0	2		2		0	0		0	2*	
Golden Plover	1200.00	9300.00	0				100	0	0		0		
Lapwing	1100.00	20000.00	0			100	10	0	0		0		
Purple Sandpiper	20.00	710.00	0	3				0	0	2	0	10*	2
Snipe		20000.00	0	1				0	0		0		
Bar-tailed Godwit	150.00	1200.00	0			2		0	0		0		
Whimbrel		6700.00	0	5		2	1	0	0	10	0	8*	10
Curlew	350.00	8400.00	0	71	6*	200	100	0	0	350	0	200*	350

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Redshank	300.00	3900.00	0	15		25	15	0	0	30	0	10*	30
Turnstone	95.00	1400.00	0	25	5*	25	50	0	0	60	0	50*	60
Mediterranean Gull		770.00	0		1*	1		0	0	1	0		1
Sabine's Gull			0	1				0	0		0		
Black-headed Gull		20000.00	0		200*	10		0	0	50	0	5*	50
Common Gull		16400.00	0			20		0	0		0		
Lesser Black-backed Gull		5500.00	0	17				0	0		0		
Herring Gull		10200.00	0	750				0	0	300	0	500*	300
Great Black-backed Gull		4200.00	0	235				0	0	300	0	400*	300
Sandwich Tern			0		4*			0	0		0		
Common Tern			0	1				0	0		0		

Appendix II – Results of Survey Observations

Activity codes: HU – Hunting/Feeding; WA – Walking; FL – Flying; OG – On ground; GL – Gliding; PE – Perching; SO – Soaring; PR – Preening; WP – With prey; SW – Swimming; RO – Roosting

Habitat codes: GA1 – Improved Grassland; WD – Highly modified woodland; GS – Rough Grassland; WS1 – Scrub; GS4 – Wet Grassland; WS5 – Recently felled woodland; GM1 – Marsh; WL1 – Hedgerow; FL – Lake; WL2 – Treeline; FW – Watercourse; PB – Bog; FS1 – Reed/sedge swamp; PF – Fen/flush; FS2 – Tall-herb swamp; HH – Heath; WN – Semi natural woodland; HD – Bracken.

Appendix II - Table 1: Record of survey observations – consisting of both flight lines and point observations. Survey start time and survey end time relate to the start and end of the survey on the date of survey. Observation start relates to the time the species was observed on site.

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
HD	05/09/2019	06:35	20:00	F2 west	4/8	15	0	excellent	1	06:50	HG	3	HU	GA1
HD	05/09/2019	06:35	20:00	F2 west	4/8	15	0	excellent	2	07:15	HG	5	HU	GA1
HD	05/09/2019	06:35	20:00	F2 west	4/8	15	0	excellent	3	08:20	HG	1	HU	GA1
HD	05/09/2019	06:35	20:00	F2 west	4/8	15	0	excellent	6	09:50	BH	2	OG	GA1
HD	05/09/2019	06:35	20:00	F2 west	4/8	15	0	excellent	7	10:40	HG	4	OG	GA1
HD	05/09/2019	06:35	20:00	F2 west	4/8	15	0	excellent	9	13:20	HG	4	OG	GA1
HD	05/09/2019	06:35	20:00	F2 west	4/8	15	0	excellent	10	15:05	HG	5	OG	GA1
HD	05/09/2019	06:35	20:00	F2 west	4/8	15	0	excellent	11	16:15	HG	3	OG	GA1
HD	05/09/2019	06:35	20:00	F2 west	4/8	15	0	excellent	13	17:45	HG	2	OG	GA1
HD	05/09/2019	06:35	20:00	F2 west	4/8	15	0	excellent	14	18:10	HG	2	OG	GA1
NMH	12/09/2019	06:54	19:47	1/4	4/8	Dec-18	Early intermittent rain then dry	Good	1		HG	35	FL	GA2
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			HG	33	FL	GA2
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			HG	25	FL	GA2
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			HG	14	FL	GA2

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			HG	41	FL	GA2/WD5
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			HG	39	FL	GA2
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			HG	42	FL	BL3/GA2
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			HG	20	FL	BL3/GA2
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			HG	34	FL	BL3/GA2
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			HG	13	FL	BL3
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			HG	8	FL	BL3/GA2
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			HG	32	FL	GA2/WD
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			HG	31	FL	GA2
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			HG	6	FL	GA2/WL2
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			BH	32	FL	GA2/WD5
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Excellent			CA	9	SW	FW
HD	12/09/2019	06:50	19:50	F2 SW	8/8	15	light drizzle to dry after 09:00	excellent	1	07:05	HG	17	HU/OG	GA1
HD	12/09/2019	06:50	19:50	F2 SW	8/8	15	light drizzle to dry after 09:00	excellent	1	07:05	BH	1	HU	GA1
HD	12/09/2019	06:50	19:50	F2 SW	8/8	15	light drizzle to dry after 09:00	excellent	2	07:10	BH	16	HU	GA1
HD	12/09/2019	06:50	19:50	F2 SW	8/8	15	light drizzle to dry after 09:00	excellent	2	07:10	HG	13	HU	GA1
HD	12/09/2019	06:50	19:50	F2 SW	8/8	15	light drizzle to dry after 09:00	excellent	3	07:20	CA	1	HU	FW
HD	12/09/2019	06:50	19:50	F2 SW	8/8	15	light drizzle to dry after 09:00	excellent	4	07:20	H.	1	HU	FW
HD	12/09/2019	06:50	19:50	F2 SW	8/8	15	light drizzle to dry after 09:00	excellent	6	10:10	HG	5	HU	GA1
HD	12/09/2019	06:50	19:50	F2 SW	8/8	15	light drizzle to dry after 09:00	excellent	7	11:35	HG	2	HU	GA1
HD	12/09/2019	06:50	19:50	F2 SW	8/8	15	light drizzle to dry after 09:00	excellent	7	11:35	BH	1	HU	GA1
HD	12/09/2019	06:50	19:50	F2 SW	8/8	15	light drizzle to dry after 09:00	excellent	8	14:00	KF	2	HU	FW

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
HD	12/09/2019	06:50	19:50	F2 SW	8/8	15	light drizzle to dry after 09:00	excellent	9	14:08	KF	1	HU	FW
HD	12/09/2019	06:50	19:50	F2 SW	8/8	15	light drizzle to dry after 09:00	excellent	10	15:15	HG	4	HU	GA1
HD	12/09/2019	06:50	19:50	F2 SW	8/8	15	light drizzle to dry after 09:00	excellent	15	18:04	HG	2	HU	GA1
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	12	FL	GA2/WD
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			BH	11	FL	BL3/GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	19	FL	BL3/GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	65	FL	GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	82	FL	GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	20	FL	GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	38	FL	GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	48	FL	GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	81	FL	GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	38	FL	BL3/GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	40	FL	BL3
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	80	FL	GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			BH	62	FL	GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	43	FL	GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	75	FL	GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			KF	3	FL	FW
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	75	FL	BL3/FW
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	31	FL	BL3
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			BH	61	FL	GA2

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	22	FL	GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			BH	44	FL	GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	54	FL	GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	64	FL	GA2/WD
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	69	FL	GA2/WD
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	55	FL	GA2/WD5
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	6	FL	BL3/GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	70	FL	GA2/WD5
HD	19/09/2019	07:10	19:30	F2 east	2/8	17	0	excellent	1	07:25	HG	4	OG	GA1
HD	19/09/2019	07:10	19:30	F2 east	2/8	17	0	excellent	2	07:50	HG	2	OG	GA
HD	19/09/2019	07:10	19:30	F2 east	2/8	17	0	excellent	2	07:50	BH	1	OG	GA1
HD	19/09/2019	07:10	19:30	F2 east	2/8	17	0	excellent	6	08:58	KF	1	FL	FW
HD	19/09/2019	07:10	19:30	F2 east	2/8	17	0	excellent	8	09:15	H.	1	HU	WN
HD	19/09/2019	07:10	19:30	F2 east	2/8	17	0	excellent	6	10:51	KF	1	HU	WN
HD	19/09/2019	07:10	19:30	F2 east	2/8	17	0	excellent	7	10:56	KF	2	HU	WN
HD	19/09/2019	07:10	19:30	F2 east	2/8	17	0	excellent	16	14:40	HG	1	HU	GA1
HD	19/09/2019	07:10	19:30	F2 east	2/8	17	0	excellent	6	16:14	KF	1	HU	WN
HD	19/09/2019	07:10	19:30	F2 east	2/8	17	0	excellent	6	17:24	KF	1	HU	WN
HD	19/09/2019	07:10	19:30	F2 east	2/8	17	0	excellent	18	18:04	HG	4	OG	GA1
NMH	27/09/2019	07:20	19:11	2/4	6/8	13					HG	44	FL	GA2
NMH	27/09/2019	07:20	19:11	2/4	6/8	13					HG	10	FL	GA2/WD5
NMH	27/09/2019	07:20	19:11	2/4	6/8	13					BH	7	FL	GA2/WD5

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
NMH	27/09/2019	07:20	19:11	2/4	6/8	13					HG	33	FL	BL3/GA2
NMH	27/09/2019	07:20	19:11	2/4	6/8	13					HG	42	FL	BL3/GA2
NMH	27/09/2019	07:20	19:11	2/4	6/8	13					HG	28	FL	GA2
NMH	27/09/2019	07:20	19:11	2/4	6/8	13					HG	55	FL	GA2
NMH	27/09/2019	07:20	19:11	2/4	6/8	13					HG	63	FL	GA2
NMH	27/09/2019	07:20	19:11	2/4	6/8	13					BH	52	FL	GA2
NMH	27/09/2019	07:20	19:11	2/4	6/8	13					HG	33	FL	BL3/GA2
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	1	07:45	HG	17	HU/OG	GA1
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	2	08:24	HG	24	OG	GA1
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	3	08:38	HG	2	OG	GA1
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	6	09:02	KF	1	HU	FW
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	7	09:08	H.	1	HU	FW
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	8	09:30	HG	1	OG	GA1
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	9	09:38	HG	5	OG	GA1
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	10	10:20	HG	3	OG	GA1
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	11	11:53	KF	1	HU	FW
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	12	12:45	HG	7	OG	GA1
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	11	15:49	KF	1	HU	FW
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	14	15:55	KF	1	HU	FW
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	15	16:22	KF	1	HU	FW
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	16	17:35	HG	2	OG	GA1
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	17	18:40	HG	4	OG	GA1

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
NMH	03/10/2019	07:29	18:58	3/4	6/8	12	Intermittent heavy showers	good			BH	32	FL	BL3
NMH	03/10/2019	07:29	18:58	3/4	6/8	12	Intermittent heavy showers	good			HG	10	FL	GA2
NMH	03/10/2019	07:29	18:58	3/4	6/8	12	Intermittent heavy showers	good			HG	12	FL	BL3/GA2
NMH	03/10/2019	07:29	18:58	3/4	6/8	12	Intermittent heavy showers	good			HG	36	FL	GA2
NMH	03/10/2019	07:29	18:58	3/4	6/8	12	Intermittent heavy showers	good			BH	9	FL	GA2
NMH	03/10/2019	07:29	18:58	3/4	6/8	12	Intermittent heavy showers	good			HG	57	FL	GA2
NMH	03/10/2019	07:29	18:58	3/4	6/8	12	Intermittent heavy showers	good			HG	59	FL	GA2
NMH	03/10/2019	07:29	18:58	3/4	6/8	12	Intermittent heavy showers	good			HG	63	FL	BL3/FW
HD	03/10/2019	07:30	19:00	F2 south	8/8	13	0	excellent	2	08:21	CA	1	FL	FW
NMH	03/10/2019	07:29	18:58								BH	14	HU/RO	WD/WN5
HD	03/10/2019	07:30	19:00	F2 south	8/8	13	0	excellent	1	07:55	HG	7	OG	GA1
HD	03/10/2019	07:30	19:00	F2 south	8/8	13	0	excellent	4	09:10	HG	8	OG	GA1
HD	03/10/2019	07:30	19:00	F2 south	8/8	13	0	excellent	5	11:10	H.	1	HU	FW
HD	03/10/2019	07:30	19:00	F2 south	8/8	13	0	excellent	7	12:50	HG	5	OG	GA1
HD	03/10/2019	07:30	19:00	F2 south	8/8	13	0	excellent	8	13:45	HG	4	OG	GA1
HD	03/10/2019	07:30	19:00	F2 south	8/8	13	0	excellent	9	15:05	HG	11	OG	GA1
HD	03/10/2019	07:30	19:00	F2 south	8/8	13	0	excellent	11	16:30	HG	2	OG	GA1
HD	03/10/2019	07:30	19:00	F2 south	8/8	13	0	excellent	13	17:15	HG	2	OG	GA1
HD	03/10/2019	07:30	19:00	F2 south	8/8	13	0	excellent	14	18:12	HG	2	OG	GA1
COB	09/10/2019	07:40	18:43	2/4	1/8	11	Afternoon shower	excellent	1		KF	1	FL	FW
COB	09/10/2019	07:40	18:43	2/4	1/8	11	Afternoon shower	excellent	2	08:03	HG	1	FL	GA2
COB	09/10/2019	07:40	18:43	2/4	1/8	11	Afternoon shower	excellent	3	08:12	HG	1	FL	GA2

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
COB	09/10/2019	07:40	18:43	2/4	1/8	11	Afternoon shower	excellent	4	09:12	HG	1	FL	GA2
COB	09/10/2019	07:40	18:43	2/4	1/8	11	Afternoon shower	excellent			CA	1	FL	FW
COB	09/10/2019	07:40	18:43	2/4	1/8	11	Afternoon shower	excellent			CA	1	FL	GA2/FW
NMH	09/10/2019	07:40	18:43	2/4	1/8	11	Showers	excellent			BH	116	FL	GA2
NMH	09/10/2019	07:40	18:43	2/4	1/8	11	Showers	excellent			H.	108	FL	FW
NMH	09/10/2019	07:40	18:43	2/4	1/8	11	Showers	excellent			HG	115	FL	GA2
NMH	09/10/2019	07:40	18:43	2/4	1/8	11	Showers	excellent			HG	106	FL	GA2
NMH	09/10/2019	07:40	18:43	2/4	1/8	11	Showers	excellent			HG	95	FL	BL3/GA2
COB	09/10/2019	07:40	18:43	2/4	1/8	11	Afternoon shower	Excellent	6	11:12	HG	2	RO	GA2
COB	09/10/2019	07:40	18:43	2/4	1/8	11	Afternoon shower	Excellent	7	11:18	HG	1	HU	GA2
COB	09/10/2019	07:40	18:43	2/4	1/8	11	Afternoon shower	Excellent	8	11:38	HG	7	HU	GA2
COB	09/10/2019	07:40	18:43	2/4	1/8	11	Afternoon shower	Excellent			H.	1	RO	FW/WN5
COB	17/10/2019	07:54	18:25	1/4	3/8	10	Dry	excellent	2	09:03	HG	1	FL	GA2
COB	17/10/2019	07:54	18:25	1/4	3/8	10	Dry	excellent	3	09:03	HG	1	FL	GA2
COB	17/10/2019	07:54	18:25	1/4	3/8	10	Dry	excellent			H.	1	FL	FW
NMH	17/10/2019	07:54	18:25	1/4	3/8	10	Dry	excellent			HG	88	FL	GA2
NMH	17/10/2019	07:54	18:25	1/4	3/8	10	Dry	excellent			HG	86	FL	BL3/GA2
NMH	17/10/2019	07:54	18:25	1/4	3/8	10	Dry	excellent			HG	59	FL	GA2
NMH	17/10/2019	07:54	18:25	1/4	3/8	10	Dry	excellent			HG	61	FL	BL3/GA2
NMH	17/10/2019	07:54	18:25	1/4	3/8	10	Dry	excellent			BH	45	FL	BL3/GA2
NMH	17/10/2019	07:54	18:25	1/4	3/8	10	Dry	excellent			BH	93	FL	GA2
COB	17/10/2019	07:54	18:25	1/4	3/8	10	Dry	Excellent	4	11:25	HG	1	HU	GA2

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
COB	24/10/2019	08:07	18:09	1/4	1/8	7-12	Showers	excellent	1	08:10	CU	8	FL	GA2
COB	24/10/2019	08:07	18:09	1/4	1/8	7-12	Showers	excellent	4	08:43	CU	5	FL	GA2
COB	24/10/2019	08:07	18:09	1/4	1/8	7-12	Showers	excellent			H.	2	FL	GA2
COB	24/10/2019	08:07	18:09	1/4	1/8	7-12	Showers	excellent			H.	1	FL	FW
COB	24/10/2019	08:07	18:09	1/4	1/8	7-12	Showers	excellent			CA	2	FL	FW
NMH	24/10/2019	08:07	18:09	1/4	2/8	7-12	Dry	excellent			BH	73	FL	GA2/FW
NMH	24/10/2019	08:07	18:09	1/4	2/8	7-12	Dry	excellent			CU	12	FL	GA2
NMH	24/10/2019	08:07	18:09	1/4	2/8	7-12	Dry	excellent			HG	89	FL	BL3/GA2
NMH	24/10/2019	08:07	18:09	1/4	2/8	7-12	Dry	excellent			HG	97	FL	BL3/GA2/WD5
NMH	24/10/2019	08:07	18:09	1/4	2/8	7-12	Dry	excellent			KF		FL	FW
NMH	24/10/2019	08:07	18:09	1/4	2/8	7-12	Dry	excellent			KF		FL	FW
NMH	24/10/2019	08:07	18:09	1/4	2/8	7-12	Dry	excellent			BH	94	FL	GA2/WL2
COB	24/10/2019	08:07	18:09	1/4	1/8	7-12	Showers	Excellent			H.	1	HU	FW
NMH	24/10/2019	08:07	18:09	1/4	2/8	7-12	Showers	Excellent			H.		HU	FW
SB	08/11/2019	07:40	16:50	1/4	5/8	5	Dry	excellent	12	09:01	CU		FL	GA2
COB	08/11/2019	07:36	16:41	1/4	1/8	5	Dry	excellent	1	07:55	BH	2	FL	GA2
COB	08/11/2019	07:36	16:41	1/4	1/8	5	Dry	excellent	2	09:05	HG	2	FL	GA2
COB	08/11/2019	07:36	16:41	1/4	1/8	5	Dry	excellent			CA	1	FL	GA2/FW
COB	08/11/2019	07:36	16:41	1/4	1/8	5	Dry	excellent			CA	1	FL	FW
HD	08/11/2019	07:30	16:30	F2 NW	6/8	6	0	excellent	10	13:30	H.	2	FL	WN
COB	08/11/2019	07:36	16:41	1/4	1/8	5	Dry	Excellent	4	14:23	HG	2	HU	GA2
COB	08/11/2019	07:36	16:41	1/4	1/8	5	Dry	Excellent			CA	1	HU	FW

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
COB	08/11/2019	07:36	16:41	1/4	1/8	5	Dry	Excellent			H.	1	HU	FW
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	1	07:40	HG	5	OG	GA1
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	2	08:10	HG	4	OG	GA1
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	3	08:18	CA	1	HU	FW
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	4	08:50	BH	1	OG	GA1
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	4	08:50	HG	3	OG	GA1
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	6	10:10	HG	2	HU/OG	GA1
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	8	11:40	HG	5	OG	GA1
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	9	12:20	BH	1	OG	GA1
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	9	12:20	HG	2	OG	GA1
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	11	14:05	HG	3	OG	GA1
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	13	15:10	HG	4	OG	GA1
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	14	15:24	HG	7	OG	GA1
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	15	15:35	HG	1	OG	GA1
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	15	15:35	BH	1	OG	GA1
COB	13/11/2019	07:45	16:32	1/4	8/8	6	Heavy rain in afternoon			07:46	CU	10	FL	BL3/GA2
NMH	13/11/2019	07:45	16:35	1/4	8/8	6	Heavy rain in afternoon	excellent			HG		FL	GA2/WD
NMH	13/11/2019	07:45	16:35	1/4	8/8	6	Heavy rain in afternoon	excellent			HG	56	FL	GA2
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	13	15:05	CA	1	FL	FW
COB	13/11/2019	07:45	16:32	1/4	8/8	6	Heavy rain in afternoon.				H.	4	HU	FW
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	1	07:55	HG	12	OG/HU	GA1
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	1	07:55	BH	1	OG/HU	GA1

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	2	08:15	KF	1	HU	FW
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	3	08:45	HG	4	OG/HU	GA1
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	5	10:05	HG	2	OG	GA1
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	6	10:40	CA	1	HU	FW
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	7	11:22	HG	4	OG	GA1
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	8	11:49	HG	14	OG	GA1
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	9	13:32	KF	1	HU	FW
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	11	14:10	HG	3	OG	GA1
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	11	14:10	BH	1	OG	GA1
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	12	14:52	HG	4	OG	GA1
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	14	15:20	HG	2	OG	GA1
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	14	15:20	BH	6	OG	GA1
COB	21/11/2019	08:00	16:40	2/4	8/8	8	Rain in morning/dry afternoon		4	11:25	KF	1	FL	FW
COB	21/11/2019	08:00	16:40	2/4	8/8	8	Rain in morning/dry afternoon		5	16:14	BH	150	FL	BL3/GA2
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	14	16:08	BH	140	FL	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	9	13:22	H.	1	FL	FW
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	1	08:20	HG	11	OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	2	08:43	HG	47	HU/OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	4	09:06	HG	5	OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	5	09:29	HG	10	OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	6	09:42	BH	3	OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	6	09:42	HG	3	OG	GA1

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	8	12:50	BH	6	OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	8	12:50	HG	4	OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	9	10:43	HG	5	HU/OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	10	14:02	HG	13	OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	10	10:59	HG	43	RO	Astroturf
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	11	14:27	BH	2	OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	11	11:04	HG	7	OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	12	11:10	HG	9	OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	13	15:20	HG	3	OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	13	11:18	HG	18	OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	14	11:35	HG	25	OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	7	11:46	KF	1	HU	FW
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	7	09:53	KF	1	HU	FW
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	8	10:38	HG	3	OG	GA1
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	1	08:24	HG	4	HU/OG	GA1
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	2	08:35	HG	6	OG	GA1
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	5	09:40	HG	1	HU	GA1
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	6	12:35	HG	23	HU/OG	GA1
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	6	12:35	BH	1	HU/OG	GA1
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	8	13:54	KF	1	HU	FW
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	9	14:35	HG	2	HU/OG	GA1
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	10	14:45	BH	1	HU/OG	GA1

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	11	15:02	HG	3	HU/OG	GA1
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	12	15:14	HG	2	HU/OG	GA1
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	13	15:32	HG	2	HU/OG	GA1
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	4	09:18	KF	1	HU	FW
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	4	13:51	CA	1	FL	FW
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	4	14:03	CA	1	HU	FW
COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent			CA	1	FL	FW
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	11	14:22	BG	17	FL	GA1
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	11	14:22	CU	32	FL	GA1
COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light Showers	Excellent			H.	1	HU	FW
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	1	08:24	HG	45	HU/OG	GA1
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	3	08:53	CA	1	HU	FW
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	4	09:40	KF	1	HU	FW
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	4	09:46	KF	1	HU	FW
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	5	10:05	HG	2	HU/OG	GA1
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	6	10:19	HG	3	HU/OG	GA1
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	6	10:19	BH	1	HU/OG	GA1
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	7	11:29	HG	17	HU/OG	GA1
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	8	11:20	HG	32	HU/OG	GA1
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	9	11:35	HG	144	HU/OG	GA1
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	10	12:58	H.	1	HU	FW
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	4	14:55	KF	1	HU	WN

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
COB	11/12/2019	08:29	16:06	2/4	3/8	5	Dry	excellent	1	08:24	CU	4	FL	BL3/GA2
COB	11/12/2019	08:29	16:06	2/4	3/8	5	Dry	excellent			CA	1	FL	BL3/FW
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	2	09:15	BG	12	FL	GA1
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	7	11:47	BG	48	FL	GA1
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	11	12:18	CA	1	FL	WN/FW
COB	11/12/2019	08:29	16:06	2/4	3/8	5	Dry	Excellent	4	12:53	KF	1	PE/RO	FW/WN5
COB	11/12/2019	08:29	16:06	2/4	3/8	5	Dry	Excellent			H.	1	HU	FW
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	1	08:40	HG	6	HU/OG	GA1
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	3	09:42	HG	7	HU/OG	GA1
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	3	09:42	BH	2	HU/OG	GA1
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	4	10:50	H.	1	HU	FW
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	5	11:20	HG	2	HU/OG	GA1
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	6	11:45	HG	2	HU/OG	GA1
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	10	12:15	HG	5	HU/OG	GA1
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	13	12:49	KF	1	HU	FW
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	14	13:25	HG	4	HU/OG	GA1
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	16	14:41	HG	3	HU/OG	GA1
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	18	15:42	HG	4	HU/OG	GA1
COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent	3	11:24	BG	9	FL	GA2/FW
COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent	4	11:24	CU	4	FL	GA2
COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent			CA	1	FL	GA2/WD
HD	20/12/2019	08:30	15:55	F2 SW	4/8	4	0	excellent	1	08:55	HG		HU/OG	GA1

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
HD	20/12/2019	08:30	15:55	F2 SW	4/8	4	0	excellent	5	09:33	HG	2	HU/OG	GA1
HD	20/12/2019	08:30	15:55	F2 SW	4/8	4	0	excellent	7	09:44	HG	4	HU/OG	GA1
HD	20/12/2019	08:30	15:55	F2 SW	4/8	4	0	excellent	10	11:33	KF	1	HU	FW
HD	20/12/2019	08:30	15:55	F2 SW	4/8	4	0	excellent	11	11:48	KF	1	FL	FW
HD	20/12/2019	08:30	15:55	F2 SW	4/8	4	0	excellent	16	13:40	HG	2	HU/OG	GA1
HD	20/12/2019	08:30	15:55	F2 SW	4/8	4	0	excellent	17	14:24	HG	5	HU/OG	GA1
HD	20/12/2019	08:30	15:55	F2 SW	4/8	4	0	excellent	19	15:10	HG	1	HU/OG	GA1
COB	08/01/2020	08:38	16:26	2/4	7/8	9	Dry	excellent	1	11:52	KF	1	FL	FW
HD	08/01/2020	08:30	16:15	F2 SW	6/8	8	0	excellent	2	09:20	BG	60	FL	GA1
HD	08/01/2020	08:30	16:15	F2 SW	6/8	8	0	excellent	6	11:15	CA	1	FL	FW
HD	08/01/2020	08:30	16:15	F2 SW	6/8	8	0	excellent	13	15:08	BG	380	FL	FW
COB	08/01/2020	08:38	16:26	2/4	7/8	9	Dry	Excellent			H.	1	HU	FW
HD	08/01/2020	08:30	16:15	F2 SW	6/8	8	0	excellent	1	08:50	HG	3	HU/OG	GA1
HD	08/01/2020	08:30	16:15	F2 SW	6/8	8	0	excellent	3	09:25	HG	6	HU/OG	GA1
HD	08/01/2020	08:30	16:15	F2 SW	6/8	8	0	excellent	5	10:25	HG	2	HU/OG	GA1
HD	08/01/2020	08:30	16:15	F2 SW	6/8	8	0	excellent	11	14:32	HG	6	HU/OG	GA1
HD	08/01/2020	08:30	16:15	F2 SW	6/8	8	0	excellent	12	14:55	HG	2	HU/OG	GA1
HD	08/01/2020	08:30	16:15	F2 SW	6/8	8	0	excellent	14	15:48	HG	7	HU/OG	GA1
COB	15/01/2020	08:33	16:36	3/4	1/8	7	Dry	excellent	1	09:06	KF	1	FL	FW
COB	15/01/2020	08:33	16:36	3/4	1/8	7	Dry	excellent			H.	2	FL	GA2
COB	15/01/2020	08:33	16:36	3/4	1/8	7	Dry	excellent			CA	1	FL	BL3/GA2
HD	15/01/2020		F3 SW	2/8	7	0	excellent			09:55	BG	60	FL	GA1

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
HD	15/01/2020		F3 SW	2/8	7	0	excellent			09:44	BG	4	FL	GA1
HD	15/01/2020		F3 SW	2/8	7	0	excellent			09:25	BG	7	FL	GA
HD	15/01/2020		F3 SW	2/8	7	0	excellent			08:55	HG	4	HU/OG	GA1
HD	15/01/2020		F3 SW	2/8	7	0	excellent			09:10	HG	7	HU/OG	
HD	15/01/2020		F3 SW	2/8	7	0	excellent			10:17	HG	5	HU/OG	GA1
HD	15/01/2020		F3 SW	2/8	7	0	excellent			11:02	HG	3	HU/OG	GA1
HD	15/01/2020		F3 SW	2/8	7	0	excellent			11:25	HG	5	HU/OG	GA1
HD	15/01/2020		F3 SW	2/8	7	0	excellent			12:40	HG	12	HU/OG	GA1
HD	15/01/2020		F3 SW	2/8	7	0	excellent			14:05	HG	4	HU/OG	GA1
COB	24/01/2020	08:22	16:52	1/4	8/8	8	Drizzle		8	09:07	BG	220	FL	BL3/GA2
COB	24/01/2020	08:22	16:52	1/4	8/8	8	Drizzle				CA	1	FL	FW
HD	24/01/2020	08:15	16:40	F2 east	8/8	6	0	excellent	6	09:17	BG	25	FL	FW
HD	24/01/2020	08:15	16:40	F2 east	8/8	6	0	excellent	5	09:13	BG	170	FL	GA1
HD	24/01/2020	08:15	16:40	F2 east	8/8	6	0	excellent	4	09:12	BG	120	FL	GA1
HD	24/01/2020	08:15	16:40	F2 east	8/8	6	0	excellent	3	09:05	BG	160	FL	GA1
HD	24/01/2020	08:15	16:40	F2 east	8/8	6	0	excellent	3	09:03	BG	280	FL	GA1
HD	24/01/2020	08:15	16:40	F2 east	8/8	6	0	excellent	2	09:00	BG	420	FL	GA1
HD	24/01/2020	08:15	16:40	F2 east	8/8	6	0	excellent	1	08:50	HG	4	HU/OG	GA1
HD	24/01/2020	08:15	16:40	F2 east	8/8	6	0	excellent	7	09:50	H.	1	HU	FW
HD	24/01/2020	08:15	16:40	F2 east	8/8	6	0	excellent	8	10:35	HG	10	HU/OG	GA1
HD	24/01/2020	08:15	16:40	F2 east	8/8	6	0	excellent	8	10:35	BH	4	HU/OG	GA1
HD	24/01/2020	08:15	16:40	F2 east	8/8	6	0	excellent	11	12:42	HG	3	HU/OG	GA1

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
HD	24/01/2020	08:15	16:40	F2 east	8/8	6	0	excellent	12	13:30	HG	6	HU/OG	GA1
HD	24/01/2020	08:15	16:40	F2 east	8/8	6	0	excellent	16	15:42	HG	1	HU	GA1
COB	31/01/2020	08:12	17:05	2/4	7/8	13	Early morning drizzle, dry	excellent	3	09:28	CU	1	FL	BL3/GA2
COB	31/01/2020	08:12	17:05	2/4	7/8	13	Early morning drizzle, dry	excellent	5	15:08	KF	1	FL	FW
COB	31/01/2020	08:12	17:05	2/4	7/8	13	Early morning drizzle, dry	excellent			CA	1	FL	BL3/FW
COB	31/01/2020	08:12	17:05	2/4	7/8	13	Early morning drizzle, dry	excellent			H.	1	FL	GA2/WD
HD	31/01/2020	08:05	17:00	F2 SW	4/8	10	0	excellent	17	16:25	HG	20	FL	GA1
HD	31/01/2020	08:05	17:00	F2 SW	4/8	10	0	excellent	1	08:15	HG	11	HU/OG	GA1
HD	31/01/2020	08:05	17:00	F2 SW	4/8	10	0	excellent	2	08:50	KF	1	FL	FW
HD	31/01/2020	08:05	17:00	F2 SW	4/8	10	0	excellent	3	09:02	HG	7	HU/OG	GA1
HD	31/01/2020	08:05	17:00	F2 SW	4/8	10	0	excellent	3	09:02	BH	2	HU/OG	GA1
HD	31/01/2020	08:05	17:00	F2 SW	4/8	10	0	excellent	7	11:05	HG	2	HU/OG	GA1
HD	31/01/2020	08:05	17:00	F2 SW	4/8	10	0	excellent	8	11:45	H.	1	HU	FW
HD	31/01/2020	08:05	17:00	F2 SW	4/8	10	0	excellent	9	12:15	HG	9	HU/OG	GA1
HD	31/01/2020	08:05	17:00	F2 SW	4/8	10	0	excellent	12	14:14	HG	4	HU/OG	GA1
HD	31/01/2020	08:05	17:00	F2 SW	4/8	10	0	excellent	14	15:25	HG	1	HU/OG	GA1
HD	31/01/2020	08:05	17:00	F2 SW	4/8	10	0	excellent	15	16:00	HG	8	HU/OG	GA1
HD	31/01/2020	08:05	17:00	F2 SW	4/8	10	0	excellent	16	16:10	BH	1	HU/OG	GA1
COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent	2	12:26	CU	23	FL	BL3/GA2
COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent	3	16:23	KF	1	FL	FW
COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent			H.	1	FL	GA2/WD
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	11	12:45	BG	380	FL	FW

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	12	13:17	BG	550	FL	FW
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	14	13:42	BG	55	FL	FW
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	21	16:03	CA	1	FL	GA1
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	1	08:25	HG	2	HU/OG	GA1
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	2	08:27	HG	4	HU/OG	GA1
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	4	09:54	H.	1	HU	FW
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	6	10:30	HG	8	HU/OG	GA1
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	7	11:02	HG	3	HU/OG	GA1
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	9	11:50	HG	4	HU/OG	GA1
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	10	12:16	HG	2	HU/OG	GA1
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	13	13:30	HG	6	HU/OG	GA1
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	15	14:28	HG	4	HU/OG	GA1
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	16	14:50	HG	2	HU/OG	GA1
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	19	15:25	HG	4	HU/OG	GA1
COB	14/02/2020	07:47	17:32	3/4	5/8	8	Showers				KF	1	FL	FW
COB	14/02/2020	07:47	17:32	3/4	5/8	8	Showers				CA	1	FL	FW
HD	14/02/2020	07:50	17:30	F3 south	5/8	8	0	excellent	18	16:34	BG	9	FL	GA1
HD	14/02/2020	07:50	17:30	F3 south	5/8	8	0	excellent	9	12:04	CU	4	FL	GA1
HD	14/02/2020	07:50	17:30	F3 south	5/8	8	0	excellent	2	08:42	BG	18	FL	GA1
HD	14/02/2020	07:50	17:30	F3 south	0	8	0	excellent	1	08:05	HG	5	HU/OG	GA1
HD	14/02/2020	07:50	17:30	F3 south	0	8	0	excellent	3	09:20	H.	1	HU	FW
HD	14/02/2020	07:50	17:30	F3 south	0	8	0	excellent	6	10:12	HG	4	HU/OG	GA1

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
HD	14/02/2020	07:50	17:30	F3 south	0	8	0	excellent	8	11:22	HG	3	HU/OG	GA1
HD	14/02/2020	07:50	17:30	F3 south	0	8	0	excellent	10	12:44	HG	5	HU/OG	GA1
HD	14/02/2020	07:50	17:30	F3 south	0	8	0	excellent	12	14:10	HG	2	HU/OG	GA1
HD	14/02/2020	07:50	17:30	F3 south	0	8	0	excellent	14	15:30	HG	2	HU	GA1
HD	14/02/2020	07:50	17:30	F3 south	0	8	0	excellent	16	16:04	HG	3	HU/OG	GA1
HD	14/02/2020	07:50	17:30	F3 south	0	8	0	excellent	17	16:22	HG	5	HU/OG	
HD	22/02/2020	07:40	17:04	F3 west	5/8	6	dry in morning, showers in afternoon	excellent	16	17:05	BH	170	FL	GA1
HD	22/02/2020	07:40	17:04	F3 west	5/8	6	dry in morning, showers in afternoon	excellent	12	15:17	CA	1	FL	FW
HD	22/02/2020	07:40	17:04	F3 west	5/8	6	dry in morning, showers in afternoon	excellent	9	13:39	BG	30	FL	GA1
HD	22/02/2020	07:40	17:40	F3 west	5/8	6	dry in morning, showers in afternoon	excellent	1	08:32	HG	6	HU/OG	GA1
HD	22/02/2020	07:40	17:40	F3 west	5/8	6	dry in morning, showers in afternoon	excellent	2	09:12	H.	1	HU	FW
HD	22/02/2020	07:40	17:40	F3 west	5/8	6	dry in morning, showers in afternoon	excellent	3	09:40	HG	8	HU/OG	GA1
HD	22/02/2020	07:40	17:40	F3 west	5/8	6	dry in morning, showers in afternoon	excellent	4	10:24	KF	1	FL	FW
HD	22/02/2020	07:40	17:40	F3 west	5/8	6	dry in morning, showers in afternoon	excellent	5	11:12	BH	4	HU/OG	GA1
HD	22/02/2020	07:40	17:40	F3 west	5/8	6	dry in morning, showers in afternoon	excellent	5	11:12	HG	12	HU/OG	GA1
HD	22/02/2020	07:40	17:40	F3 west	5/8	6	dry in morning, showers in afternoon	excellent	10	14:20	HG	4	HU/OG	GA1
HD	22/02/2020	07:40	17:40	F3 west	5/8	6	dry in morning, showers in afternoon	excellent	11	14:55	HG	5	HU/OG	GA1
HD	22/02/2020	07:40	17:40	F3 west	5/8	6	dry in morning, showers in afternoon	excellent	13	15:49	HG	4	HU/OG	GA1
HD	22/02/2020	07:40	17:40	F3 west	5/8	6	dry in morning, showers in afternoon	excellent	15	16:32	HG	2	HU/OG	GA1
COB	27/02/2020	07:20	18:04	2/4	6/8	8	Showers				CA	1	FL	GA2/FW
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	4	08:19	BG	8	FL	GA1
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	3	08:10	BG	180	FL	GA1

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	6	08:31	BG	40	FL	GA1
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	2	08:00	BG	140	FL	GA
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	7	08:48	CA	1	FL	GA1
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	1	07:38	HG	2	HU/OG	GA1
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	19	16:32	HG	8	HU/OG	GA1
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	9	09:28	HG	4	HU/OG	GA1
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	13	13:12	HG	4	HU/OG	GA1
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	16	15:50	HG	4	HU/OG	GA1
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	15	15:09	HG	6	HU/OG	GA1
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	20	16:50	HG	2	HU/OG	GA1
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	11	11:05	H.	1	HU	FW
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	10	09:52	HG	2	HU/OG	GA1
COB	06/03/2020	07:00	18:13	1/4	6/8	0-8	Dry	excellent	2	07:35	CU	24	FL	FW/N of site
COB	06/03/2020	07:00	18:13	1/4	6/8	0-8	Dry	excellent	4	09:08	KF	4	FL	FW
COB	06/03/2020	07:00	18:13	1/4	6/8	0-8	Dry	excellent			CA	1	FL	GA2/FW
COB	06/03/2020	07:00	18:13	1/4	6/8	0-8	Dry	excellent			CA	1	FL	GA2
COB	06/03/2020	07:00	18:13	1/4	6/8	0-8	Dry	excellent			CA	1	FL	GA2/FW
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	2	07:35	CU	25	FL	FW
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	3	07:39	CA	1	FL	FW
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	4	08:38	CA	1	FL	FW
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	15	12:09	BG	320	FL	GA1
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	1	07:10	HG	15	HU/OG	GA1

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	5	09:10	HG	3	HU/OG	GA1
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	7	10:24	KF	1	FL	FW
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	8	11:02	HG	8	HU/OG	GA1
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	10	11:32	HG	2	HU/OG	GA1
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	12	11:45	HG	3	HU/OG	GA1
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	18	14:42	HG	11	HU/OG	GA1
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	19	15:04	HG	3	HU/OG	GA1
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	20	15:25	HG	4	HU/OG	GA1
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	21	16:02	HG	2	HU/OG	GA1
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	19	17:20	CA	1	FL	GA1
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	13	14:07	H.	1	FL	FW
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	9	11:22	CA	1	FL	FW
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	1	07:04	HG	22	HU/OG	GA1
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	2	07:04	HG	4	HU/OG	GA1
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	4	08:10	KF	1	FL	FW
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	5	08:42	HG	6	HU/OG	GA1
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	8	10:52	HG	4	HU/OG	GA1
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	10	11:41	HG	2	HU/OG	GA1
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	11	13:00	HG	2	HU/OG	
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	14	14:52	HG	8	HU/OG	GA1
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	15	15:04	HG	4	HU/OG	GA1
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	16	15:48	HG	2	HU/OG	GA1

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	20	17:31	HG	2	HU/OG	GA1

Appendix III – Results of Survey Transects

Appendix III - Table 1: Results of survey transects sorted by date.

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
1	HD	05/09/2019	10:20	10:55	F2 west	5/8	14	0	excellent		0	4.5	5	100	0	Yes
2	HD	05/09/2019	10:20	10:55	F2 west	5/8	14	0	excellent		0	4	0	95	5	Yes
3	HD	05/09/2019	10:20	10:55	F2 west	5/8	14	0	excellent		0	5	0	95	5	Yes
4	HD	05/09/2019	10:20	10:55	F2 west	5/8	14	0	excellent		0	5.5	0	100	0	Yes
5	HD	05/09/2019	10:20	10:55	F2 west	5/8	14	0	excellent		0	5	0	100	0	Yes
6	HD	05/09/2019	10:20	10:55	F2 west	5/8	14	0	excellent		0	6	0	95	5	Yes
7	HD	05/09/2019	10:20	10:55	F2 west	5/8	14	0	excellent		0	5	0	100	0	Yes
8	HD	05/09/2019	10:20	10:55	F2 west	5/8	14	0	excellent		0	6	0	90	10	Yes
9	HD	05/09/2019	10:20	10:55	F2 west	5/8	14	0	excellent		0	6	5	95	5	Yes
10	HD	05/09/2019	10:20	10:55	F2 west	5/8	14	0	excellent		0	5	0	10	0	Yes
1	NMH	05/09/2019	09:15	10:05	1/4	2/8	10	0	excellent		0	10	0	90	12	Yes
2	NMH	05/09/2019	09:15	10:05	1/4	2/8	10	0	excellent		0	13	0.5	80	20	Yes
3	NMH	05/09/2019	09:15	10:05	1/4	2/8	10	0	excellent		0	9	11	60	30	Yes
4	NMH	05/09/2019	09:15	10:05	1/4	2/8	10	0	excellent		0	10	1	88	12	Yes
5	NMH	05/09/2019	09:15	10:05	1/4	2/8	10	0	excellent		0	13	0	90	10	Yes
6	NMH	05/09/2019	09:15	10:05	1/4	2/8	10	0	excellent		0	8	0.1	70	30	Yes
7	NMH	05/09/2019	09:15	10:05	1/4	2/8	10	0	excellent		0	9	0	85	20	Yes
8	NMH	05/09/2019	09:15	10:05	1/4	2/8	10	0	excellent		0	7	0.5	80	25	Yes
9	NMH	05/09/2019	09:15	10:05	1/4	2/8	10	0	excellent		0	10	0	50	50	Yes
10	NMH	05/09/2019	09:15	10:05	1/4	2/8	10	0	excellent		0	5.5	0.2	70	30	Yes
1	HD	12/09/2019	11:15	11:40	F2 SE	7/8	14	0	excellent		0	4	0	100	0	Yes
2	HD	12/09/2019	11:15	11:40	F2 SE	7/8	14	0	excellent		0	4	0	95	5	Yes
3	HD	12/09/2019	11:15	11:40	F2 SE	7/8	14	0	excellent		0	5	0	95	5	Yes
4	HD	12/09/2019	11:15	11:40	F2 SE	7/8	14	0	excellent		0	5.5	0	100	0	Yes
5	HD	12/09/2019	11:15	11:40	F2 SE	7/8	14	0	excellent		0	5.5	0	100	0	Yes
6	HD	12/09/2019	11:15	11:40	F2 SE	7/8	14	0	excellent		0	6	0	95	5	Yes
7	HD	12/09/2019	11:15	11:40	F2 SE	7/8	14	0	excellent		0	5.5	0	100	0	Yes
8	HD	12/09/2019	11:15	11:40	F2 SE	7/8	14	0	excellent		0	6	0	90	10	Yes
9	HD	12/09/2019	11:15	11:40	F2 SE	7/8	14	0	excellent		0	6	5	90	10	Yes
10	HD	12/09/2019	11:15	11:40	F2 SE	7/8	14	0	excellent		0	5.5	0	95	5	Yes
1	NMH	12/09/2019	12:30	13:10	3/4	4/8	17	0	good	High dog activity and large amount of dog droppings	0	11	0	90	10	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
2	NMH	12/09/2019	12:30	13:10	3/4	4/8	17	0	good	High dog activity and large amount of dog droppings	0	12	1	85	15	Yes
3	NMH	12/09/2019	12:30	13:10	3/4	4/8	17	0	good	High dog activity and large amount of dog droppings	0	16	3	75	25	Yes
4	NMH	12/09/2019	12:30	13:10	3/4	4/8	17	0	good	High dog activity and large amount of dog droppings	0	8.5	0.8	92	8	Yes
5	NMH	12/09/2019	12:30	13:10	3/4	4/8	17	0	good	High dog activity and large amount of dog droppings	0	14	0.1	95	5	Yes
6	NMH	12/09/2019	12:30	13:10	3/4	4/8	17	0	good	High dog activity and large amount of dog droppings	0	8	0	85	15	Yes
7	NMH	12/09/2019	12:30	13:10	3/4	4/8	17	0	good	High dog activity and large amount of dog droppings	0	6	0.5	85	15	Yes
8	NMH	12/09/2019	12:30	13:10	3/4	4/8	17	0	good	High dog activity and large amount of dog droppings	0	9	0.5	95	5	Yes
9	NMH	12/09/2019	12:30	13:10	3/4	4/8	17	0	good	High dog activity and large amount of dog droppings	0	11	0	85	15	Yes
10	NMH	12/09/2019	12:30	13:10	3/4	4/8	17	0	good	High dog activity and large amount of dog droppings	0	7.5	0	80	20	Yes
1	HD	19/09/2019	14:30	15:00	F2 west	4/8	18	0	excellent		0	5	0	90	10	Yes
2	HD	19/09/2019	14:30	15:00	F2 west	4/8	18	0	excellent		0	4	0	95	5	Yes
3	HD	19/09/2019	14:30	15:00	F2 west	4/8	18	0	excellent		0	5	0	100	0	Yes
4	HD	19/09/2019	14:30	15:00	F2 west	4/8	18	0	excellent		0	6	0	100	0	Yes
5	HD	19/09/2019	14:30	15:00	F2 west	4/8	18	0	excellent		0	5	0	95	5	Yes
6	HD	19/09/2019	14:30	15:00	F2 west	4/8	18	0	excellent		0	6	0	100	0	Yes
7	HD	19/09/2019	14:30	15:00	F2 west	4/8	18	0	excellent		0	5	0	90	10	Yes
8	HD	19/09/2019	14:30	15:00	F2 west	4/8	18	0	excellent		0	5.5	0	100	0	Yes
9	HD	19/09/2019	14:30	15:00	F2 west	4/8	18	0	excellent		0	6	0	90	10	Yes
10	HD	19/09/2019	14:30	15:00	F2 west	4/8	18	0	excellent		0	6	0	90	10	Yes
1	NMH	19/09/2019	12:45	13:25	0	0	18	0	excellent	Day started cold and misty, grass dew. Temp rose and grass dried	0	13	0	95	5	Yes
2	NMH	19/09/2019	12:45	13:25	0	0	18	0	excellent	Day started cold and misty, grass dew. Temp rose and grass dried	0	10.5	0	97	3	Yes
3	NMH	19/09/2019	12:45	13:25	0	0	18	0	excellent	Day started cold and misty, grass dew. Temp rose and grass dried	0	17.5	0.2	92	8	Yes
4	NMH	19/09/2019	12:45	13:25	0	0	18	0	excellent	Day started cold and misty, grass dew. Temp rose and grass dried	0	7.5	1	95	5	Yes
5	NMH	19/09/2019	12:45	13:25	0	0	18	0	excellent	Day started cold and misty, grass dew. Temp rose and grass dried	0	12	0	80	20	Yes
6	NMH	19/09/2019	12:45	13:25	0	0	18	0	excellent	Day started cold and misty, grass dew. Temp rose and grass dried	0	12	0	90	10	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
7	NMH	19/09/2019	12:45	13:25	0	0	18	0	excellent	Day started cold and misty, grass dew. Temp rose and grass dried	0	10	0.5	83	17	Yes
8	NMH	19/09/2019	12:45	13:25	0	0	18	0	excellent	Day started cold and misty, grass dew. Temp rose and grass dried	0	8.5	1	90	10	Yes
9	NMH	19/09/2019	12:45	13:25	0	0	18	0	excellent	Day started cold and misty, grass dew. Temp rose and grass dried	0	9.5	0	89	11	Yes
10	NMH	19/09/2019	12:45	13:25	0	0	18	0	excellent	Day started cold and misty, grass dew. Temp rose and grass dried	0	6	0	78	22	Yes
1	HD	27/09/2019	16:05	16:35	F3 SW	6/8	17	0	excellent		0	5	0	90	10	Yes
2	HD	27/09/2019	16:05	16:35	F3 SW	6/8	17	0	excellent		0	5	0	100	0	Yes
3	HD	27/09/2019	16:05	16:35	F3 SW	6/8	17	0	excellent		0	6	0	100	0	Yes
4	HD	27/09/2019	16:05	16:35	F3 SW	6/8	17	0	excellent		0	6	5	90	10	Yes
5	HD	27/09/2019	16:05	16:35	F3 SW	6/8	17	0	excellent		0	5.5	0	90	10	Yes
6	HD	27/09/2019	16:05	16:35	F3 SW	6/8	17	0	excellent		0	6	0	100	0	Yes
7	HD	27/09/2019	16:05	16:35	F3 SW	6/8	17	0	excellent		0	5	0	100	0	Yes
8	HD	27/09/2019	16:05	16:35	F3 SW	6/8	17	0	excellent		0	7	0	90	10	Yes
9	HD	27/09/2019	16:05	16:35	F3 SW	6/8	17	0	excellent		0	6	0	90	10	Yes
10	HD	27/09/2019	16:05	16:35	F3 SW	6/8	17	0	excellent		0	6	0	90	10	Yes
1	NMH	27/09/2019	12:45	13:30	3/4	4/8	13	scattered showers	good	Day started wet and overcast until 11. After that weather cleared up, sun out on occasion	0	16	0	90	10	Yes
2	NMH	27/09/2019	12:45	13:30	3/4	4/8	13	scattered showers	good	Day started wet and overcast until 11. After that weather cleared up, sun out on occasion	0	12	0.3	87	13	Yes
3	NMH	27/09/2019	12:45	13:30	3/4	4/8	13	scattered showers	good	Day started wet and overcast until 11. After that weather cleared up, sun out on occasion	0	22.5	0	98	2	Yes
4	NMH	27/09/2019	12:45	13:30	3/4	4/8	13	scattered showers	good	Day started wet and overcast until 11. After that weather cleared up, sun out on occasion	0	1	0.5	97	3	Yes
5	NMH	27/09/2019	12:45	13:30	3/4	4/8	13	scattered showers	good	Day started wet and overcast until 11. After that weather cleared up, sun out on occasion	0	15.5	0	96	4	Yes
6	NMH	27/09/2019	12:45	13:30	3/4	4/8	13	scattered showers	good	Day started wet and overcast until 11. After that weather cleared up, sun out on occasion	0	8	0.2	89	11	Yes
7	NMH	27/09/2019	12:45	13:30	3/4	4/8	13	scattered showers	good	Day started wet and overcast until 11. After that weather cleared up, sun out on occasion	0	10	0.5	95	5	Yes
8	NMH	27/09/2019	12:45	13:30	3/4	4/8	13	scattered showers	good	Day started wet and overcast until 11. After that weather cleared up, sun out on occasion	0	12	3	92	8	Yes
9	NMH	27/09/2019	12:45	13:30	3/4	4/8	13	scattered showers	good	Day started wet and overcast until 11. After that weather cleared up, sun out on occasion	0	9.5	0.3	95	10	Yes
10	NMH	27/09/2019	12:45	13:30	3/4	4/8	13	scattered showers	good	Day started wet and overcast until 11. After that weather cleared up, sun out on occasion	0	6.5	0.5	93	10	Yes
1	HD	03/10/2019	14:15	14:45	F2 SE	3/8	15	0	excellent		0	5	0	90	10	Yes
2	HD	03/10/2019	14:15	14:45	F2 SE	3/8	15	0	excellent		0	6	0	90	10	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
3	HD	03/10/2019	14:15	14:45	F2 SE	3/8	15	0	excellent		0	6	5	100	0	Yes
4	HD	03/10/2019	14:15	14:45	F2 SE	3/8	15	0	excellent		0	6	0	85	15	Yes
5	HD	03/10/2019	14:15	14:45	F2 SE	3/8	15	0	excellent		0	6	0	100	0	Yes
6	HD	03/10/2019	14:15	14:45	F2 SE	3/8	15	0	excellent		0	7	0	100	0	Yes
7	HD	03/10/2019	14:15	14:45	F2 SE	3/8	15	0	excellent		0	6	0	100	0	Yes
8	HD	03/10/2019	14:15	14:45	F2 SE	3/8	15	0	excellent		0	7	0	90	10	Yes
9	HD	03/10/2019	14:15	14:45	F2 SE	3/8	15	0	excellent		0	7	0	100	0	Yes
10	HD	03/10/2019	14:15	14:45	F2 SE	3/8	15	0	excellent		0	6	0	90	0	Yes
1	NMH	03/10/2019	14:02	14:41	3/4	6/8	12	intermittent light and heavy showers	good	day started off half overcast and gradually becoming stormy	0	12	0	88	12	Yes
2	NMH	03/10/2019	14:02	14:41	3/4	6/8	12	intermittent light and heavy showers	good	day started off half overcast and gradually becoming stormy	0	9.5	1	93	7	Yes
3	NMH	03/10/2019	14:02	14:41	3/4	6/8	12	intermittent light and heavy showers	good	day started off half overcast and gradually becoming stormy	0	19	0.3	98	2	Yes
4	NMH	03/10/2019	14:02	14:41	3/4	6/8	12	intermittent light and heavy showers	good	day started off half overcast and gradually becoming stormy	0	15	3	95	5	Yes
5	NMH	03/10/2019	14:02	14:41	3/4	6/8	12	intermittent light and heavy showers	good	day started off half overcast and gradually becoming stormy	0	16	0	99	0	Yes
6	NMH	03/10/2019	14:02	14:41	3/4	6/8	12	intermittent light and heavy showers	good	day started off half overcast and gradually becoming stormy	0	11	0.2	90	10	Yes
7	NMH	03/10/2019	14:02	14:41	3/4	6/8	12	intermittent light and heavy showers	good	day started off half overcast and gradually becoming stormy	0	11.5	1	85	15	Yes
8	NMH	03/10/2019	14:02	14:41	3/4	6/8	12	intermittent light and heavy showers	good	day started off half overcast and gradually becoming stormy	0	13	0	91	9	Yes
9	NMH	03/10/2019	14:02	14:41	3/4	6/8	12	intermittent light and heavy showers	good	day started off half overcast and gradually becoming stormy	0	10	0.5	94	6	Yes
10	NMH	03/10/2019	14:02	14:41	3/4	6/8	12	intermittent light and heavy showers	good	day started off half overcast and gradually becoming stormy	0	7	0	85	15	Yes
1	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	17	0	75	25	Yes
2	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	13	0	80	20	Yes
3	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	10	0	70	30	Yes
4	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	10	0	65	35	Yes
5	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	12	0	60	40	Yes
6	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	14	0	75	25	Yes
7	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	14	0	60	40	Yes
8	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	14.5	0	85	15	Yes
9	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	13	0	55	45	Yes
10	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	12	0	50	50	Yes
11	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	10	0	65	35	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
12	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	10.5	0	70	30	Yes
13	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	13	0	60	40	Yes
14	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	11.5	0	65	35	Yes
15	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	11	0	55	45	Yes
16	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	9	0	75	25	Yes
17	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	8.5	0	60	40	Yes
18	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	9	0	75	25	Yes
19	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	13	0	80	20	Yes
20	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	15	0	60	40	Yes
1	NMH	09/10/2019	14:30	15:05	3/4	3/8	12	0	good	breezy, blustery - grass not mown in 2 weeks	0	14	0	98	2	Yes
2	NMH	09/10/2019	14:30	15:05	3/4	3/8	12	0	good	breezy, blustery - grass not mown in 2 weeks	0	11	0.5	96	4	Yes
3	NMH	09/10/2019	14:30	15:05	3/4	3/8	12	0	good	breezy, blustery - grass not mown in 2 weeks	0	16	0	99	1	Yes
4	NMH	09/10/2019	14:30	15:05	3/4	3/8	12	0	good	breezy, blustery - grass not mown in 2 weeks	0	9.5	0.2	92	8	Yes
5	NMH	09/10/2019	14:30	15:05	3/4	3/8	12	0	good	breezy, blustery - grass not mown in 2 weeks	0	15	0.5	96	4	Yes
6	NMH	09/10/2019	14:30	15:05	3/4	3/8	12	0	good	breezy, blustery - grass not mown in 2 weeks	0	10	0.2	98	2	Yes
7	NMH	09/10/2019	14:30	15:05	3/4	3/8	12	0	good	breezy, blustery - grass not mown in 2 weeks	0	10	0	99	1	Yes
8	NMH	09/10/2019	14:30	15:05	3/4	3/8	12	0	good	breezy, blustery - grass not mown in 2 weeks	0	10	5	87	13	Yes
9	NMH	09/10/2019	14:30	15:05	3/4	3/8	12	0	good	breezy, blustery - grass not mown in 2 weeks	0	8	1.5	90	10	Yes
10	NMH	09/10/2019	14:30	15:05	3/4	3/8	12	0	good	breezy, blustery - grass not mown in 2 weeks	0	6	0	96	4	Yes
1	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	13.5	0	75	25	Yes
2	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	13	0	80	20	Yes
3	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	12.5	0	75	25	Yes
4	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	10.5	0	70	30	Yes
5	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	10	0	75	25	Yes
6	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	12	0	70	30	Yes
7	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	8.5	0	55	45	Yes
8	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	8	0	65	35	Yes
9	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	9.5	0	60	40	Yes
10	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	13	0	60	40	Yes
11	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	11	0	65	35	Yes
12	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	7.5	0	60	35	Yes
13	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	9	0	60	40	Yes
14	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	9.5	0	65	35	Yes
15	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	8	0	80	20	Yes
16	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	11.5	0	60	40	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
17	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	11.5	0	60	40	Yes
18	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	10.5	0	65	35	Yes
19	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	13.5	0	70	30	Yes
20	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	11	0	65	35	Yes
21	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	11.5	0	70	30	Yes
1	NMH	17/10/2019	17:36	18:00	0	2/8	8	scattered showers	excellent	Day started bright and warm. Afternoon scattered showers. Lots of HG foraging and resting	0	16	0.2	95	5	Yes
2	NMH	17/10/2019	17:36	18:00	0	2/8	8	scattered showers	excellent	Day started bright and warm. Afternoon scattered showers. Lots of HG foraging and resting	0	13	0.3	96	4	Yes
3	NMH	17/10/2019	17:36	18:00	0	2/8	8	scattered showers	excellent	Day started bright and warm. Afternoon scattered showers. Lots of HG foraging and resting	0	20	0.3	99	2	Yes
4	NMH	17/10/2019	17:36	18:00	0	2/8	8	scattered showers	excellent	Day started bright and warm. Afternoon scattered showers. Lots of HG foraging and resting	0	10.5	0.5	91	9	Yes
5	NMH	17/10/2019	17:36	18:00	0	2/8	8	scattered showers	excellent	Day started bright and warm. Afternoon scattered showers. Lots of HG foraging and resting	0	16	0.5	90	12	Yes
6	NMH	17/10/2019	17:36	18:00	0	2/8	8	scattered showers	excellent	Day started bright and warm. Afternoon scattered showers. Lots of HG foraging and resting	0	8	2	92	8	Yes
7	NMH	17/10/2019	17:36	18:00	0	2/8	8	scattered showers	excellent	Day started bright and warm. Afternoon scattered showers. Lots of HG foraging and resting	0	9.5	0.2	93	7	Yes
8	NMH	17/10/2019	17:36	18:00	0	2/8	8	scattered showers	excellent	Day started bright and warm. Afternoon scattered showers. Lots of HG foraging and resting	0	13.5	0	95	8	Yes
9	NMH	17/10/2019	17:36	18:00	0	2/8	8	scattered showers	excellent	Day started bright and warm. Afternoon scattered showers. Lots of HG foraging and resting	0	11.5	0.1	93	10	Yes
10	NMH	17/10/2019	17:36	18:00	0	2/8	8	scattered showers	excellent	Day started bright and warm. Afternoon scattered showers. Lots of HG foraging and resting	0	9	0	90	11	Yes
1	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	18	0	80	20	Yes
2	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	19	0	90	10	Yes
3	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	17	0	95	5	Yes
4	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	14	0	65	35	Yes
5	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	15	0	70	30	Yes
6	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	18	0	95	5	Yes
7	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	16	0	55	45	Yes
8	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	14	0	60	40	Yes
9	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	16	0	55	45	Yes
10	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	14	0	60	40	Yes
11	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	22	0	80	20	Yes
12	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	13	0	85	15	Yes
13	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	13	0	85	15	Yes
14	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	14	0	45	55	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
15	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	15	0	50	50	Yes
16	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	12	0	70	30	Yes
17	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	14	0	85	15	Yes
18	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	16	0	75	25	Yes
19	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	13	0	70	30	Yes
20	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	15	0	80	20	Yes
1	NMH	24/10/2019	13:30	14:10	0	2/8	12	scattered heavy showers mid afternoon	excellent	Bright clear start. Overcast and rainy afternoon. Grass freshly cut (3-4 days), various grass mosaic	0	6	0.2	98	2	Yes
2	NMH	24/10/2019	13:30	14:10	0	2/8	12	scattered heavy showers mid afternoon	excellent	Bright clear start. Overcast and rainy afternoon. Grass freshly cut (3-4 days), various grass mosaic	0	6.5	0.5	97	4	Yes
3	NMH	24/10/2019	13:30	14:10	0	2/8	12	scattered heavy showers mid afternoon	excellent	Bright clear start. Overcast and rainy afternoon. Grass freshly cut (3-4 days), various grass mosaic	0	7.5	0.4	97	5	Yes
4	NMH	24/10/2019	13:30	14:10	0	2/8	12	scattered heavy showers mid afternoon	excellent	Bright clear start. Overcast and rainy afternoon. Grass freshly cut (3-4 days), various grass mosaic	0	9	0.2	99	1	Yes
5	NMH	24/10/2019	13:30	14:10	0	2/8	12	scattered heavy showers mid afternoon	excellent	Bright clear start. Overcast and rainy afternoon. Grass freshly cut (3-4 days), various grass mosaic	0	13.5	0	98	2	Yes
6	NMH	24/10/2019	13:30	14:10	0	2/8	12	scattered heavy showers mid afternoon	excellent	Bright clear start. Overcast and rainy afternoon. Grass freshly cut (3-4 days), various grass mosaic	0	5.5	1.2	98	3	Yes
7	NMH	24/10/2019	13:30	14:10	0	2/8	12	scattered heavy showers mid afternoon	excellent	Bright clear start. Overcast and rainy afternoon. Grass freshly cut (3-4 days), various grass mosaic	0	6	0.3	97	5	Yes
8	NMH	24/10/2019	13:30	14:10	0	2/8	12	scattered heavy showers mid afternoon	excellent	Bright clear start. Overcast and rainy afternoon. Grass freshly cut (3-4 days), various grass mosaic	0	5.5	0.1	98	3	Yes
9	NMH	24/10/2019	13:30	14:10	0	2/8	12	scattered heavy showers mid afternoon	excellent	Bright clear start. Overcast and rainy afternoon. Grass freshly cut (3-4 days), various grass mosaic	0	5.5	0.1	97	3	Yes
10	NMH	24/10/2019	13:30	14:10	0	2/8	12	scattered heavy showers mid afternoon	excellent	Bright clear start. Overcast and rainy afternoon. Grass freshly cut (3-4 days), various grass mosaic	0	5	0	96	8	Yes
1	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent		0	18	0	75	25	Yes
2	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent		0	14	0	95	5	Yes
3	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent		0	15	0	85	15	Yes
4	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent		0	15.5	0	55	45	Yes
5	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent		0	12.5	0	70	30	Yes
6	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent		0	14	0	85	15	Yes
7	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent		0	13.5	0	80	20	Yes
8	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent		0	14.5	0	65	35	Yes
9	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent		0	14	0	40	60	Yes
10	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent		0	15.5	0	40	60	Yes
11	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent	Transect in big field	0	16	0	80	20	Yes
12	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent	Transect in big field	0	15.5	0	60	40	Yes
13	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent	Transect in big field	0	16	0	60	40	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
14	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent	Transect in big field	0	15.5	0	55	45	Yes
15	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent	Transect in big field	0	15	0	60	40	Yes
16	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent	Transect in big field	0	13.5	0	70	30	Yes
17	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent	Transect in big field	0	11.5	0	70	30	Yes
18	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent	Transect in big field	0	16.5	0	95	5	Yes
19	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent	Transect in big field	0	14	0	75	25	Yes
20	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent	Transect in big field	0	14.5	0	85	15	Yes
1	HD	08/11/2019	11:10	11:40	F3 NW	5/8	6	0	excellent	Grass was cut at the front entrance. Moss cover was ranged from 5-30	0	6	0	90	10	Yes
2	HD	08/11/2019	11:10	11:40	F3 NW	5/8	6	0	excellent	Grass was cut at the front entrance. Moss cover was ranged from 5-30	0	8	0	90	10	Yes
3	HD	08/11/2019	11:10	11:40	F3 NW	5/8	6	0	excellent	Grass was cut at the front entrance. Moss cover was ranged from 5-30	0	7	5	95	5	Yes
4	HD	08/11/2019	11:10	11:40	F3 NW	5/8	6	0	excellent	Grass was cut at the front entrance. Moss cover was ranged from 5-30	0	6	0	90	10	Yes
5	HD	08/11/2019	11:10	11:40	F3 NW	5/8	6	0	excellent	Grass was cut at the front entrance. Moss cover was ranged from 5-30	0	5	0	100	0	Yes
6	HD	08/11/2019	11:10	11:40	F3 NW	5/8	6	0	excellent	Grass was cut at the front entrance. Moss cover was ranged from 5-30	0	6	0	100	0	Yes
7	HD	08/11/2019	11:10	11:40	F3 NW	5/8	6	0	excellent	Grass was cut at the front entrance. Moss cover was ranged from 5-30	0	7.5	5	90	10	Yes
8	HD	08/11/2019	11:10	11:40	F3 NW	5/8	6	0	excellent	Grass was cut at the front entrance. Moss cover was ranged from 5-30	0	8	0	90	10	Yes
9	HD	08/11/2019	11:10	11:40	F3 NW	5/8	6	0	excellent	Grass was cut at the front entrance. Moss cover was ranged from 5-30	0	8	0	100	0	Yes
10	HD	08/11/2019	11:10	11:40	F3 NW	5/8	6	0	excellent	Grass was cut at the front entrance. Moss cover was ranged from 5-30	0	7	0	100	0	Yes
1	SB	08/11/2019	07:40	08:30	1/4	5/8	5	0	excellent		0	5	35	60	5	Yes
2	SB	08/11/2019	07:40	08:30	1/4	5/8	5	0	excellent		0	6	0	90	5	Yes
3	SB	08/11/2019	07:40	08:30	1/4	5/8	5	0	excellent		0	5	20	70	5	Yes
4	SB	08/11/2019	07:40	08:30	1/4	5/8	5	0	excellent		0	4	10	70	10	Yes
5	SB	08/11/2019	07:40	08:30	1/4	5/8	5	0	excellent		0	5	20	70	5	Yes
6	SB	08/11/2019	07:40	08:30	1/4	5/8	5	0	excellent		0	7	5	80	5	Yes
7	SB	08/11/2019	07:40	08:30	1/4	5/8	5	0	excellent		0	3	5	60	30	Yes
8	SB	08/11/2019	07:40	08:30	1/4	5/8	5	0	excellent		0	6	5	60	30	Yes
9	SB	08/11/2019	07:40	08:30	1/4	5/8	5	0	excellent		0	3	5	70	30	Yes
10	SB	08/11/2019	07:40	08:30	1/4	5/8	5	0	excellent		0	3	2	60	30	Yes
10	HD	13/11/2019	15:05	15:35	F2 south	7/8	6	0	excellent	Cold, dark overcast day. Large area covered by leaf litter. Large patches of bare ground	0	8	0	100	0	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
9	HD	13/11/2019	15:05	15:35	F2 south	7/8	6	0	excellent	Cold, dark overcast day. Large area covered by leaf litter. Large patches of bare ground	0	8	0	90	10	Yes
8	HD	13/11/2019	15:05	15:35	F2 south	7/8	6	0	excellent	Cold, dark overcast day. Large area covered by leaf litter. Large patches of bare ground	0	9	0	85	15	Yes
7	HD	13/11/2019	15:05	15:35	F2 south	7/8	6	0	excellent	Cold, dark overcast day. Large area covered by leaf litter. Large patches of bare ground	0	8	0	90	10	Yes
6	HD	13/11/2019	15:05	15:35	F2 south	7/8	6	0	excellent	Cold, dark overcast day. Large area covered by leaf litter. Large patches of bare ground	0	8	5	90	10	Yes
5	HD	13/11/2019	15:05	15:35	F2 south	7/8	6	0	excellent	Cold, dark overcast day. Large area covered by leaf litter. Large patches of bare ground	0	7	0	100	0	Yes
4	HD	13/11/2019	15:05	15:35	F2 south	7/8	6	0	excellent	Cold, dark overcast day. Large area covered by leaf litter. Large patches of bare ground	0	6	0	100	0	Yes
3	HD	13/11/2019	15:05	15:35	F2 south	7/8	6	0	excellent	Cold, dark overcast day. Large area covered by leaf litter. Large patches of bare ground	0	8	0	90	10	Yes
2	HD	13/11/2019	15:05	15:35	F2 south	7/8	6	0	excellent	Cold, dark overcast day. Large area covered by leaf litter. Large patches of bare ground	0	8	0	90	10	Yes
1	HD	13/11/2019	15:05	15:35	F2 south	7/8	6	0	excellent	Cold, dark overcast day. Large area covered by leaf litter. Large patches of bare ground	0	8	0	100	0	Yes
1	NMH	13/11/2019	14:36	15:11	1/4	6/8	8	None/light drizzle. Afternoon heavy rain from 15:00	good	Transect in front of Clonliffe College	0	7	0.5	93	5	Yes
2	NMH	13/11/2019	14:36	15:11	1/4	6/8	8	None/light drizzle. Afternoon heavy rain from 15:00	good	Transect in front of Clonliffe College	0	8	2	97	3	Yes
3	NMH	13/11/2019	14:36	15:11	1/4	6/8	8	None/light drizzle. Afternoon heavy rain from 15:00	good	Transect in front of Clonliffe College	0	14	0	98	1	Yes
4	NMH	13/11/2019	14:36	15:11	1/4	6/8	8	None/light drizzle. Afternoon heavy rain from 15:00	good	Transect in front of Clonliffe College	0	9	2.5	91	7	Yes
5	NMH	13/11/2019	14:36	15:11	1/4	6/8	8	None/light drizzle. Afternoon heavy rain from 15:00	good	Transect in front of Clonliffe College	0	12	0.2	95	8	Yes
6	NMH	13/11/2019	14:36	15:11	1/4	6/8	8	None/light drizzle. Afternoon heavy rain from 15:00	good	Transect in front of Clonliffe College	0	6	3	90	9	Yes
7	NMH	13/11/2019	14:36	15:11	1/4	6/8	8	None/light drizzle. Afternoon heavy rain from 15:00	good	Transect in front of Clonliffe College	0	8	1	99	2	Yes
8	NMH	13/11/2019	14:36	15:11	1/4	6/8	8	None/light drizzle. Afternoon heavy rain from 15:00	good	Transect in front of Clonliffe College	0	8	1	87	11	Yes
9	NMH	13/11/2019	14:36	15:11	1/4	6/8	8	None/light drizzle. Afternoon heavy rain from 15:00	good	Transect in front of Clonliffe College	0	6.5	1.5	96	4	Yes
10	NMH	13/11/2019	14:36	15:11	1/4	6/8	8	None/light drizzle. Afternoon heavy rain from 15:00	good	Transect in front of Clonliffe College	0	5	0	90	10	Yes
1	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent	Transect in front of Clonliffe College	0	7	0	100	0	Yes
2	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent	Transect in front of Clonliffe College	0	7	0	90	10	Yes
3	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent	Transect in front of Clonliffe College	0	8	0	95	5	Yes
4	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent	Transect in front of Clonliffe College	0	8	0	100	0	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
5	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent	Transect in front of Clonliffe College	0	8	0	100	0	Yes
6	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent	Transect in front of Clonliffe College	0	8	0	65	35	Yes
7	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent	Transect in front of Clonliffe College	0	6	0	85	15	Yes
8	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent	Transect in front of Clonliffe College	0	8	0	100	0	Yes
9	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent	Transect in front of Clonliffe College	0	4	5	95	5	Yes
10	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent		0	6	0	80	20	Yes
11	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent		0	6	0	80	20	Yes
12	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent		0	5	0	95	5	Yes
13	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent		0	6	0	95	5	Yes
14	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent		0	7	0	85	15	Yes
15	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent		0	7	0	85	15	Yes
16	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent		0	6	0	85	15	Yes
17	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent		0	6	0	80	20	Yes
18	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent		0	2	60	100	0	Yes
19	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent		0	6	0	95	5	Yes
10	HD	29/11/2019	13:40	14:10	F2 north	8/8	5	showers (light)	excellent	No evidence of Geese. Grass has grown in southern transect. Moss/leaf litter cover ranges from 5-60	0	10	0	100	0	Yes
9	HD	29/11/2019	13:40	14:10	F2 north	8/8	5	showers (light)	excellent	No evidence of Geese. Grass has grown in southern transect. Moss/leaf litter cover ranges from 5-60	0	9	0	95	5	Yes
8	HD	29/11/2019	13:40	14:10	F2 north	8/8	5	showers (light)	excellent	No evidence of Geese. Grass has grown in southern transect. Moss/leaf litter cover ranges from 5-60	0	9	0	90	10	Yes
7	HD	29/11/2019	13:40	14:10	F2 north	8/8	5	showers (light)	excellent	No evidence of Geese. Grass has grown in southern transect. Moss/leaf litter cover ranges from 5-60	0	8.5	0	100	0	Yes
6	HD	29/11/2019	13:40	14:10	F2 north	8/8	5	showers (light)	excellent	No evidence of Geese. Grass has grown in southern transect. Moss/leaf litter cover ranges from 5-60	0	9	5	90	10	Yes
5	HD	29/11/2019	13:40	14:10	F2 north	8/8	5	showers (light)	excellent	No evidence of Geese. Grass has grown in southern transect. Moss/leaf litter cover ranges from 5-60	0	7	0	95	5	Yes
4	HD	29/11/2019	13:40	14:10	F2 north	8/8	5	showers (light)	excellent	No evidence of Geese. Grass has grown in southern transect. Moss/leaf litter cover ranges from 5-60	0	8	0	100	0	Yes
3	HD	29/11/2019	13:40	14:10	F2 north	8/8	5	showers (light)	excellent	No evidence of Geese. Grass has grown in southern transect. Moss/leaf litter cover ranges from 5-60	0	9.5	0	90	10	Yes
2	HD	29/11/2019	13:40	14:10	F2 north	8/8	5	showers (light)	excellent	No evidence of Geese. Grass has grown in southern transect. Moss/leaf litter cover ranges from 5-60	0	9	0	90	10	Yes
1	HD	29/11/2019	13:40	14:10	F2 north	8/8	5	showers (light)	excellent	No evidence of Geese. Grass has grown in southern transect. Moss/leaf litter cover ranges from 5-60	0	8.5	0	95	5	Yes
1	SB	29/11/2019	08:20	09:10	1/4	4/8	6	showers most of the day	excellent	Transect in front of Clonliffe College	0	6	30	40	40	Yes
2	SB	29/11/2019	08:20	09:10	1/4	4/8	6	showers most of the day	excellent	Transect in front of Clonliffe College	0	8	40	30	30	Yes
3	SB	29/11/2019	08:20	09:10	1/4	4/8	6	showers most of the day	excellent	Transect in front of Clonliffe College	0	8	10	70	10	Yes
4	SB	29/11/2019	08:20	09:10	1/4	4/8	6	showers most of the day	excellent	Transect in front of Clonliffe College	0	8	20	80	10	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
5	SB	29/11/2019	08:20	09:10	1/4	4/8	6	showers most of the day	excellent	Transect in front of Clonliffe College	0	8	10	60	40	Yes
6	SB	29/11/2019	08:20	09:10	1/4	4/8	6	showers most of the day	excellent	Transect in front of Clonliffe College	0	6	50	40	20	Yes
7	SB	29/11/2019	08:20	09:10	1/4	4/8	6	showers most of the day	excellent	Transect in front of Clonliffe College	0	7	10	80	20	Yes
8	SB	29/11/2019	08:20	09:10	1/4	4/8	6	showers most of the day	excellent	Transect in front of Clonliffe College	0	6	10	60	40	Yes
9	SB	29/11/2019	08:20	09:10	1/4	4/8	6	showers most of the day	excellent	Transect in front of Clonliffe College	0	7	5	50	50	Yes
10	SB	29/11/2019	08:20	09:10	1/4	4/8	6	showers most of the day	excellent	Transect in front of Clonliffe College	0	5	0	60	40	Yes
1	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent	Transect in front of Clonliffe College	0	10	15	100	0	Yes
2	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent	Transect in front of Clonliffe College	0	9	5	100	0	Yes
3	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent	Transect in front of Clonliffe College	0	11	0	100	0	Yes
4	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent	Transect in front of Clonliffe College	0	9	5	100	0	Yes
5	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent	Transect in front of Clonliffe College	0	9	15	90	10	Yes
6	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent	Transect in front of Clonliffe College	0	10	10	100	0	Yes
7	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent	Transect in front of Clonliffe College	0	7	5	90	10	Yes
8	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent	Transect in front of Clonliffe College	0	7	15	65	35	Yes
9	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent	Transect in front of Clonliffe College	0	9	0	70	30	Yes
10	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent		0	9	0	45	55	Yes
11	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent		0	7	0	90	10	Yes
12	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent		0	10	0	100	0	Yes
13	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent		0	9	0	85	15	Yes
14	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent		0	8	0	5	80	Yes
15	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent		0	6	5	85	15	Yes
16	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent		0	11	0	100	0	Yes
17	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent		0	6	5	100	0	Yes
18	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent		0	9	5	85	15	Yes
19	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent		0	10	5	85	15	Yes
1	HD	06/12/2019	11:15	11:45	F3 west	5/8	7	0	excellent	Transect in front of Clonliffe College	0	9	0	90	10	Yes
2	HD	06/12/2019	11:15	11:45	F3 west	5/8	7	0	excellent	Transect in front of Clonliffe College	0	9.5	0	90	10	Yes
3	HD	06/12/2019	11:15	11:45	F3 west	5/8	7	0	excellent	Transect in front of Clonliffe College	0	10	5	100	0	Yes
4	HD	06/12/2019	11:15	11:45	F3 west	5/8	7	0	excellent	Transect in front of Clonliffe College	0	8	0	100	0	Yes
5	HD	06/12/2019	11:15	11:45	F3 west	5/8	7	0	excellent	Transect in front of Clonliffe College	0	7	0	90	10	Yes
6	HD	06/12/2019	11:15	11:45	F3 west	5/8	7	0	excellent	Transect in front of Clonliffe College	0	9	0	90	10	Yes
7	HD	06/12/2019	11:15	11:45	F3 west	5/8	7	0	excellent	Transect in front of Clonliffe College	0	9	0	100	0	Yes
8	HD	06/12/2019	11:15	11:45	F3 west	5/8	7	0	excellent	Transect in front of Clonliffe College	0	10	0	90	10	Yes
9	HD	06/12/2019	11:15	11:45	F3 west	5/8	7	0	excellent	Transect in front of Clonliffe College	0	9	0	90	10	Yes
10	HD	06/12/2019	11:15	11:45	F3 west	5/8	7	0	excellent	Transect in front of Clonliffe College	0	10	0	100	0	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent	Transect in front of Clonliffe College	0	6	0	90	10	Yes
	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent	Transect in front of Clonliffe College	0	9	0	85	15	Yes
	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent	Transect in front of Clonliffe College	0	6	0	85	15	Yes
	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent	Transect in front of Clonliffe College	0	7	0	65	35	Yes
	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent	Transect in front of Clonliffe College	0	8	5	85	15	Yes
	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent	Transect in front of Clonliffe College	0	9	0	85	15	Yes
1	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent	Transect in front of Clonliffe College	0	7	0	100	0	Yes
2	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent	Transect in front of Clonliffe College	0	7	0	100	0	Yes
3	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent		0	6	0	100	0	Yes
4	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent		0	9	0	90	10	Yes
5	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent		0	8	0	0	100	Yes
6	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent		0	8	10	5	95	Yes
7	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent		0	6	40	0	100	Yes
8	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent		0	9	0	10	90	Yes
9	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent		0	7	0	20	80	Yes
10	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent		0	7	0	15	85	Yes
11	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent		0	8	0	30	70	Yes
12	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent		0	4	25	25	75	Yes
10	HD	11/12/2019	12:00	12:30	F2 west	5/8	6	0	excellent	Transect in front of Clonliffe College	0	10.5	0	95	5	Yes
9	HD	11/12/2019	12:00	12:30	F2 west	5/8	6	0	excellent	Transect in front of Clonliffe College	0	9	0	100	0	Yes
8	HD	11/12/2019	12:00	12:30	F2 west	5/8	6	0	excellent	Transect in front of Clonliffe College	0	10	0	90	10	Yes
7	HD	11/12/2019	12:00	12:30	F2 west	5/8	6	0	excellent	Transect in front of Clonliffe College	0	10	0	95	5	Yes
6	HD	11/12/2019	12:00	12:30	F2 west	5/8	6	0	excellent	Transect in front of Clonliffe College	0	9	0	90	10	Yes
5	HD	11/12/2019	12:00	12:30	F2 west	5/8	6	0	excellent	Transect in front of Clonliffe College	0	7	0	100	0	Yes
4	HD	11/12/2019	12:00	12:30	F2 west	5/8	6	0	excellent	Transect in front of Clonliffe College	0	8	0	95	5	Yes
3	HD	11/12/2019	12:00	12:30	F2 west	5/8	6	0	excellent	Transect in front of Clonliffe College	0	10.5	0	95	5	Yes
2	HD	11/12/2019	12:00	12:30	F2 west	5/8	6	0	excellent	Transect in front of Clonliffe College	0	10	0	90	10	Yes
1	HD	11/12/2019	12:00	12:30	F2 west	5/8	6	0	excellent	Transect in front of Clonliffe College	0	9	0	95	5	Yes
1	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent	Transect in front of Clonliffe College	0	7	5	100	0	Yes
2	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent	Transect in front of Clonliffe College	0	8	5	95	5	Yes
3	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent	Transect in front of Clonliffe College	0	9	5	95	5	Yes
4	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent	Transect in front of Clonliffe College	0	10	5	100	0	Yes
5	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent	Transect in front of Clonliffe College	0	8	5	100	0	Yes
6	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent	Transect in front of Clonliffe College	0	8	10	90	10	Yes
7	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent	Transect in front of Clonliffe College	0	7	5	95	5	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
8	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent	Transect in front of Clonliffe College	0	8	0	100	0	Yes
9	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent		0	11	0	95	5	Yes
10	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent		0	8	5	95	5	Yes
11	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent		0	10	5	100	0	Yes
12	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent		0	9	10	95	5	Yes
13	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent		0	10	0	80	20	Yes
14	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent		0	7	0	75	25	Yes
15	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent		0	7	5	85	15	Yes
16	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent		0	8	5	90	10	Yes
17	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent		0	6	10	90	10	Yes
18	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent		0	7	10	95	5	Yes
10	HD	20/12/2019	14:15	14:45	F2 SW	7/8	5	0	good	Transect in front of Clonliffe College	0	11	0	90	10	Yes
9	HD	20/12/2019	14:15	14:45	F2 SW	7/8	5	0	good	Transect in front of Clonliffe College	0	10.5	0	95	5	Yes
8	HD	20/12/2019	14:15	14:45	F2 SW	7/8	5	0	good	Transect in front of Clonliffe College	0	11	0	90	10	Yes
7	HD	20/12/2019	14:15	14:45	F2 SW	7/8	5	0	good	Transect in front of Clonliffe College	0	10	0	90	10	Yes
6	HD	20/12/2019	14:15	14:45	F2 SW	7/8	5	0	good	Transect in front of Clonliffe College	0	9	0	95	5	Yes
5	HD	20/12/2019	14:15	14:45	F2 SW	7/8	5	0	good	Transect in front of Clonliffe College	0	8	5	90	10	Yes
4	HD	20/12/2019	14:15	14:45	F2 SW	7/8	5	0	good	Transect in front of Clonliffe College	0	8	0	100	0	Yes
3	HD	20/12/2019	14:15	14:45	F2 SW	7/8	5	0	good	Transect in front of Clonliffe College	0	10.5	0	90	10	Yes
2	HD	20/12/2019	14:15	14:45	F2 SW	7/8	5	0	good	Transect in front of Clonliffe College	0	11	0	95	5	Yes
1	HD	20/12/2019	14:15	14:45	F2 SW	7/8	5	0	good	Transect in front of Clonliffe College	0	9	0	90	10	Yes
1	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Transect in front of Clonliffe College	0	7	10	85	15	Yes
2	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Transect in front of Clonliffe College	0	6	20	95	5	Yes
3	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	10	90	10	Yes
4	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Transect in front of Clonliffe College	0	7	15	100	0	Yes
5	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Transect in front of Clonliffe College	0	7	5	100	0	Yes
6	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	5	100	0	Yes
7	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	0	100	0	Yes
8	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Transect in front of Clonliffe College	0	10	10	100	0	Yes
9	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Landscape gardeners confirmed main area of grass is being cut this winter	0	9	5	90	10	Yes
10	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Landscape gardeners confirmed main area of grass is being cut this winter	0	7	10	100	0	Yes
11	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Landscape gardeners confirmed main area of grass is being cut this winter	0	8	10	100	0	Yes
12	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Landscape gardeners confirmed main area of grass is being cut this winter	0	8	5	90	10	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
13	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Landscape gardeners confirmed main area of grass is being cut this winter	0	8	5	90	10	Yes
14	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Landscape gardeners confirmed main area of grass is being cut this winter	0	8	10	95	5	Yes
15	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Landscape gardeners confirmed main area of grass is being cut this winter	0	7	5	100	0	Yes
16	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Landscape gardeners confirmed main area of grass is being cut this winter	0	7	5	95	5	Yes
17	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Landscape gardeners confirmed main area of grass is being cut this winter	0	8	10	75	25	Yes
18	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Landscape gardeners confirmed main area of grass is being cut this winter	0	7	5	75	25	Yes
10	HD	08/01/2020	14:20	14:50	F2 SW	5/8	8	0	excellent	Transect in front of Clonliffe College	0	12	0	95	5	Yes
9	HD	08/01/2020	14:20	14:50	F2 SW	5/8	8	0	excellent	Transect in front of Clonliffe College	0	11	0	95	5	Yes
8	HD	08/01/2020	14:20	14:50	F2 SW	5/8	8	0	excellent	Transect in front of Clonliffe College	0	9.5	0	95	5	Yes
7	HD	08/01/2020	14:20	14:50	F2 SW	5/8	8	0	excellent	Transect in front of Clonliffe College	0	10	0	100	0	Yes
6	HD	08/01/2020	14:20	14:50	F2 SW	5/8	8	0	excellent	Transect in front of Clonliffe College	0	10	0	90	10	Yes
5	HD	08/01/2020	14:20	14:50	F2 SW	5/8	8	0	excellent	Transect in front of Clonliffe College	0	8.5	0	90	10	Yes
4	HD	08/01/2020	14:20	14:50	F2 SW	5/8	8	0	excellent	Transect in front of Clonliffe College	0	9	0	100	0	Yes
3	HD	08/01/2020	14:20	14:50	F2 SW	5/8	8	0	excellent	Transect in front of Clonliffe College	0	11	0	95	5	Yes
2	HD	08/01/2020	14:20	14:50	F2 SW	5/8	8	0	excellent	Transect in front of Clonliffe College	0	11	0	90	10	Yes
1	HD	08/01/2020	14:20	14:50	F2 SW	5/8	8	0	excellent	Transect in front of Clonliffe College	0	9	0	85	15	Yes
1	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	7	5	100	0	Yes
2	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	6	60	100	0	Yes
3	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	5	95	5	Yes
4	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	7	70	100	0	Yes
5	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	9	0	100	0	Yes
6	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	9	10	100	0	Yes
7	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	10	0	100	0	Yes
8	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	9	5	100	0	Yes
9	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	7	5	100	0	Yes
10	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	5	100	0	Yes
11	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	9	5	100	0	Yes
12	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	10	95	5	Yes
13	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	7	5	100	0	Yes
14	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	10	100	0	Yes
15	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	9	5	90	10	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
16	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	5	85	15	Yes
10	HD	15/01/2020	11:10	11:40	F3 SW	3/8	7	0	excellent	Transect in front of Clonliffe College	0	12	0	95	5	Yes
9	HD	15/01/2020	11:10	11:40	F3 SW	3/8	7	0	excellent	Transect in front of Clonliffe College	0	11	0	100	0	Yes
8	HD	15/01/2020	11:10	11:40	F3 SW	3/8	7	0	excellent	Transect in front of Clonliffe College	0	9.5	0	90	5	Yes
7	HD	15/01/2020	11:10	11:40	F3 SW	3/8	7	0	excellent	Transect in front of Clonliffe College	0	11	0	100	0	Yes
6	HD	15/01/2020	11:10	11:40	F3 SW	3/8	7	0	excellent	Transect in front of Clonliffe College	0	9	0	90	10	Yes
5	HD	15/01/2020	11:10	11:40	F3 SW	3/8	7	0	excellent	Transect in front of Clonliffe College	0	9	0	90	10	Yes
4	HD	15/01/2020	11:10	11:40	F3 SW	3/8	7	0	excellent	Transect in front of Clonliffe College	0	11	0	100	0	Yes
3	HD	15/01/2020	11:10	11:40	F3 SW	3/8	7	0	excellent		0	11	0	95	5	Yes
2	HD	15/01/2020	11:10	11:40	F3 SW	3/8	7	0	excellent		0	10.5	0	90	10	Yes
1	HD	15/01/2020	11:10	11:40	F3 SW	3/8	7	0	excellent		0	10	0	85	15	Yes
1	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent		0	7	15	80	20	Yes
2	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent		0	8	25	100	0	Yes
3	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent		0	7	10	85	15	Yes
4	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent		0	7	35	100	0	Yes
5	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent		0	8	5	100	0	Yes
6	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent		0	9	10	100	0	Yes
7	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent		0	9	10	100	0	Yes
8	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	15	100	0	Yes
9	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent	Transect in front of Clonliffe College	0	6	15	80	20	Yes
10	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	15	90	10	Yes
11	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	10	100	0	Yes
12	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent	Transect in front of Clonliffe College	0	9	15	100	0	Yes
13	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	5	100	0	Yes
14	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	15	100	0	Yes
15	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent	Transect in front of Clonliffe College	0	9	15	90	10	Yes
16	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent	Transect in front of Clonliffe College	0	9	0	75	25	Yes
17	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	30	70	30	Yes
10	HD	24/01/2020	15:20	15:45	F2 east	7/8	5	0	excellent	Transect in front of Clonliffe College	0	11	0	100	0	Yes
9	HD	24/01/2020	15:20	15:45	F2 east	7/8	5	0	excellent	Transect in front of Clonliffe College	0	11	0	95	5	Yes
8	HD	24/01/2020	15:20	15:45	F2 east	7/8	5	0	excellent	Transect in front of Clonliffe College	0	9	0	90	10	Yes
7	HD	24/01/2020	15:20	15:45	F2 east	7/8	5	0	excellent	Transect in front of Clonliffe College	0	9	0	100	0	Yes
6	HD	24/01/2020	15:20	15:45	F2 east	7/8	5	0	excellent	Transect in front of Clonliffe College	0	11	0	90	10	Yes
5	HD	24/01/2020	15:20	15:45	F2 east	7/8	5	0	excellent	Transect in front of Clonliffe College	0	10	5	95	5	Yes
4	HD	24/01/2020	15:20	15:45	F2 east	7/8	5	0	excellent		0	10	0	95	5	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
3	HD	24/01/2020	15:20	15:45	F2 east	7/8	5	0	excellent		0	11	0	95	5	Yes
2	HD	24/01/2020	15:20	15:45	F2 east	7/8	5	0	excellent		0	11	0	90	0	Yes
1	HD	24/01/2020	15:20	15:45	F2 east	7/8	5	0	excellent		0	10	0	90	10	Yes
1	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent		0	9	5	95	5	Yes
2	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent		0	8	10	90	10	Yes
3	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent		0	9	10	100	0	Yes
4	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent		0	6	15	100	0	Yes
5	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent		0	6	10	80	20	Yes
6	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent		0	9	10	100	0	Yes
7	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent	Transect in front of Clonliffe College	0	8	5	100	0	Yes
8	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent	Transect in front of Clonliffe College	0	6	10	95	5	Yes
9	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent	Transect in front of Clonliffe College	0	9	0	100	0	Yes
10	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent	Transect in front of Clonliffe College	0	8	5	100	0	Yes
11	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent	Transect in front of Clonliffe College	0	8	25	100	0	Yes
12	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent	Transect in front of Clonliffe College	0	7	15	85	15	Yes
13	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent	Transect in front of Clonliffe College	0	7	10	90	10	Yes
14	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent	Transect in front of Clonliffe College	0	9	5	90	10	Yes
15	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent	Transect in front of Clonliffe College	0	8	15	85	15	Yes
16	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent	Transect in front of Clonliffe College	0	7	5	90	10	Yes
1	HD	31/01/2020	14:00	14:30	F2 SW	6/8	9	0	excellent	Transect in front of Clonliffe College	0	10	0	95	5	Yes
2	HD	31/01/2020	14:00	14:30	F2 SW	6/8	9	0	excellent	Transect in front of Clonliffe College	0	10	0	100	0	Yes
3	HD	31/01/2020	14:00	14:30	F2 SW	6/8	9	0	excellent	Transect in front of Clonliffe College	0	10	0	95	5	Yes
4	HD	31/01/2020	14:00	14:30	F2 SW	6/8	9	0	excellent	Transect in front of Clonliffe College	0	10	0	95	5	Yes
5	HD	31/01/2020	14:00	14:30	F2 SW	6/8	9	0	excellent	Transect in front of Clonliffe College	0	11	5	90	10	Yes
6	HD	31/01/2020	14:00	14:30	F2 SW	6/8	9	0	excellent	Transect in front of Clonliffe College	0	11	0	100	0	Yes
7	HD	31/01/2020	14:00	14:30	F2 SW	6/8	9	0	excellent	Transect in front of Clonliffe College	0	9	0	100	0	Yes
8	HD	31/01/2020	14:00	14:30	F2 SW	6/8	9	0	excellent	Transect in front of Clonliffe College	0	10	0	90	10	Yes
9	HD	31/01/2020	14:00	14:30	F2 SW	6/8	9	0	excellent	Transect in front of Clonliffe College	0	10	0	90	10	Yes
10	HD	31/01/2020	14:00	14:30	F2 SW	6/8	9	0	excellent		0	11	0	95	5	Yes
1	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent		0	8	5	100	0	Yes
2	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent		0	7	15	90	10	Yes
3	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent		0	7	15	100	0	Yes
4	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent		0	7	10	100	0	Yes
5	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent		0	8	10	95	5	Yes
6	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent		0	6	10	85	15	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
7	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent		0	6	10	85	15	Yes
8	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent		0	7	10	90	10	Yes
9	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent		0	7	5	80	20	Yes
10	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent	Transect in front of Clonliffe College	0	9	15	90	10	Yes
11	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent	Transect in front of Clonliffe College	0	5	40	90	10	Yes
12	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent	Transect in front of Clonliffe College	0	6	25	100	0	Yes
13	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent	Transect in front of Clonliffe College	0	7	15	90	10	Yes
14	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent	Transect in front of Clonliffe College	0	7	15	100	0	Yes
15	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent	Transect in front of Clonliffe College	0	7	10	100	0	Yes
16	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent	Transect in front of Clonliffe College	0	8	10	95	5	Yes
17	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent	Transect in front of Clonliffe College	0	6	10	85	15	Yes
18	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent	Transect in front of Clonliffe College	0	7	10	90	10	Yes
19	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent	Transect in front of Clonliffe College	0	7	5	80	20	Yes
10	HD	05/02/2020	10:00	10:30	F2 west	6/8	6	0	excellent	Transect in front of Clonliffe College	0	11	0	95	5	Yes
9	HD	05/02/2020	10:00	10:30	F2 west	6/8	6	0	excellent	Transect in front of Clonliffe College	0	10	0	10	0	Yes
8	HD	05/02/2020	10:00	10:30	F2 west	6/8	6	0	excellent	Transect in front of Clonliffe College	0	11	0	95	5	Yes
7	HD	05/02/2020	10:00	10:30	F2 west	6/8	6	0	excellent	Transect in front of Clonliffe College	0	10.5	5	90	10	Yes
6	HD	05/02/2020	10:00	10:30	F2 west	6/8	6	0	excellent	Transect in front of Clonliffe College	0	10.5	0	95	10	Yes
5	HD	05/02/2020	10:00	10:30	F2 west	6/8	6	0	excellent	Transect in front of Clonliffe College	0	10	0	100	0	Yes
4	HD	05/02/2020	10:00	10:30	F2 west	6/8	6	0	excellent		0	11	0	90	10	Yes
3	HD	05/02/2020	10:00	10:30	F2 west	6/8	6	0	excellent		0	11	0	95	5	Yes
2	HD	05/02/2020	10:00	10:30	F2 west	6/8	6	0	excellent		0	11	0	90	10	Yes
1	HD	05/02/2020	10:00	10:30	F2 west	6/8	6	0	excellent		0	10	0	90	10	Yes
1	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	7	10	90	10	Yes
2	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	5	10	75	25	Yes
3	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	5	5	95	5	Yes
4	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	4	30	100	0	Yes
5	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	6	0	100	0	Yes
6	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	7	10	100	0	Yes
7	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	7	5	100	0	Yes
8	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	5	20	100	0	Yes
9	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	15	90	10	0	Yes
10	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	7	10	90	10	Yes
11	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	7	0	85	15	Yes
12	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	6	15	85	15	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
13	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	7	5	90	10	Yes
14	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	6	5	100	0	Yes
15	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	6	15	90	10	Yes
16	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	6	5	90	10	Yes
1	HD	14/02/2020	11:00	11:30	F3 south	5/8	7	0	excellent	Transect in front of Clonliffe College	0	11	0	95	5	Yes
2	HD	14/02/2020	11:00	11:30	F3 south	5/8	7	0	excellent	Transect in front of Clonliffe College	0	10	0	90	10	Yes
3	HD	14/02/2020	11:00	11:30	F3 south	5/8	7	0	excellent	Transect in front of Clonliffe College	0	11	0	90	10	Yes
4	HD	14/02/2020	11:00	11:30	F3 south	5/8	7	0	excellent	Transect in front of Clonliffe College	0	12	0	95	5	Yes
5	HD	14/02/2020	11:00	11:30	F3 south	5/8	7	0	excellent	Transect in front of Clonliffe College	0	11	0	95	5	Yes
6	HD	14/02/2020	11:00	11:30	F3 south	5/8	7	0	excellent	Transect in front of Clonliffe College	0	11	0	100	0	Yes
7	HD	14/02/2020	11:00	11:30	F3 south	5/8	7	0	excellent	Transect in front of Clonliffe College	0	10.5	0	90	10	Yes
8	HD	14/02/2020	11:00	11:30	F3 south	5/8	7	0	excellent	Transect in front of Clonliffe College	0	10.5	0	80	20	Yes
9	HD	14/02/2020	11:00	11:30	F3 south	5/8	7	0	excellent	Transect in front of Clonliffe College	0	11	0	90	10	Yes
10	HD	14/02/2020	11:00	11:30	F3 south	5/8	7	0	excellent	Transect in front of Clonliffe College	0	12	0	95	5	Yes
1	HD	22/02/2020	14:05	14:35	F4 west	8/8	7	showers	excellent	Transect in front of Clonliffe College	0	11	0	90	10	Yes
2	HD	22/02/2020	14:05	14:35	F4 west	8/8	7	showers	excellent	Transect in front of Clonliffe College	0	10	5	85	15	Yes
3	HD	22/02/2020	14:05	14:35	F4 west	8/8	7	showers	excellent	Transect in front of Clonliffe College	0	12	0	85	15	Yes
4	HD	22/02/2020	14:05	14:35	F4 west	8/8	7	showers	excellent	Transect in front of Clonliffe College	0	11	0	90	10	Yes
5	HD	22/02/2020	14:05	14:35	F4 west	8/8	7	showers	excellent	Transect in front of Clonliffe College	0	10.5	0	100	0	Yes
6	HD	22/02/2020	14:05	14:35	F4 west	8/8	7	showers	excellent	Transect in front of Clonliffe College	0	11	0	95	5	Yes
7	HD	22/02/2020	14:05	14:35	F4 west	8/8	7	showers	excellent	Transect in front of Clonliffe College	0	0	90	10	0	Yes
8	HD	22/02/2020	14:05	14:35	F4 west	8/8	7	showers	excellent		0	12	0	85	15	Yes
9	HD	22/02/2020	14:05	14:35	F4 west	8/8	7	showers	excellent		0	11	0	90	10	Yes
10	HD	22/02/2020	14:05	14:35	F4 west	8/8	7	showers	excellent		0	12	0	95	5	Yes
15	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	7	5	100	0	Yes
16	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	6	15	100	0	Yes
17	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	7	15	90	10	Yes
1	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	5	25	95	5	Yes
2	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	6	35	100	0	Yes
3	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	9	15	100	0	Yes
4	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	9	5	100	0	Yes
5	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	7	15	100	0	Yes
6	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	9	10	100	0	Yes
7	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	10	5	100	0	Yes
8	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	8	5	100	0	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
9	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	7	65	60	40	Yes
10	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	8	5	100	0	Yes
11	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	7	10	100	0	Yes
12	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	10	0	100	0	Yes
13	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	Excellent		0	8	15	80	20	Yes
14	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	Excellent		0	8	10	90	10	Yes
10	HD	06/03/2020	14:45	15:15	F1 west	3/8	6	0	excellent		0	12	0	95	5	Yes
9	HD	06/03/2020	14:45	15:15	F1 west	3/8	6	0	excellent		0	12	0	90	10	Yes
8	HD	06/03/2020	14:45	15:15	F1 west	3/8	6	0	excellent		0	11	5	90	10	Yes
7	HD	06/03/2020	14:45	15:15	F1 west	3/8	6	0	excellent		0	12	0	85	15	Yes
6	HD	06/03/2020	14:45	15:15	F1 west	3/8	6	0	excellent		0	10	0	90	10	Yes
5	HD	06/03/2020	14:45	15:15	F1 west	3/8	6	0	excellent		0	11	0	90	10	Yes
4	HD	06/03/2020	14:45	15:15	F1 west	3/8	6	0	excellent		0	11.5	0	95	5	Yes
3	HD	06/03/2020	14:45	15:15	F1 west	3/8	6	0	excellent		0	11	0	90	10	Yes
2	HD	06/03/2020	14:45	15:15	F1 west	3/8	6	0	excellent		0	11	0	85	15	Yes
1	HD	06/03/2020	14:45	15:15	F1 west	3/8	6	0	excellent		0	12	0	95	5	Yes
10	HD	14/03/2020	11:20	11:55	F2 SW	5/8	7	showers	excellent		0	13	0	90	10	Yes
9	HD	14/03/2020	11:20	11:55	F2 SW	5/8	7	showers	excellent		0	13	0	85	15	Yes
8	HD	14/03/2020	11:20	11:55	F2 SW	5/8	7	showers	excellent		0	11.5	0	90	10	Yes
7	HD	14/03/2020	11:20	11:55	F2 SW	5/8	7	showers	excellent		0	11.5	0	85	15	Yes
6	HD	14/03/2020	11:20	11:55	F2 SW	5/8	7	showers	excellent		0	11	0	90	10	Yes
5	HD	14/03/2020	11:20	11:55	F2 SW	5/8	7	showers	excellent		0	12	0	85	15	Yes
4	HD	14/03/2020	11:20	11:55	F2 SW	5/8	7	showers	excellent		0	11	0	95	5	Yes
3	HD	14/03/2020	11:20	11:55	F2 SW	5/8	7	showers	excellent		0	12	0	90	10	Yes
2	HD	14/03/2020	11:20	11:55	F2 SW	5/8	7	showers	excellent		0	12	0	85	15	Yes
1	HD	14/03/2020	11:20	11:55	F2 SW	5/8	7	showers	excellent		0	13	0	90	10	Yes

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Wintering Bird Survey Report

For a Proposed Strategic Housing Development

Lands at Clonliffe College, Clonliffe Road, Drumcondra, Dublin 3

Prepared for CWTC Multi Family ICAV

Scott Cawley, College House, 71 – 73 Rock Road, Blackrock, Co. Dublin, A94 F9X9, Ireland

Tel+353(1)676-9815 Fax +353(1) 676-9816

Document Control

Project Title	Wintering Bird Survey Report, Lands at Clonliffe College, Clonliffe Road, Drumcondra, Dublin 3			
Document Title	Wintering Bird Survey Report		Project No.	200228
Revision	Issue Date	Author	Reviewed By	Approved By
I2	19/04/2021	CMcC	ACr	ACr

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This report has been prepared by Scott Cawley Ltd. in accordance with the particular instructions and requirements of our agreement with the Client, the project's budgetary and time constraints and in line with best industry standards. The methodology adopted and the sources of information used by Scott Cawley Ltd. in providing its services are outlined in this report. The scope of this report and the services are defined by these circumstances.

Where the conclusions and recommendations contained within this document are based upon information provided by others than Scott Cawley Ltd., no liability is accepted on the validity or accuracy of that information. It is assumed that all relevant information has been provided by those parties from whom it has been requested and that the information is true and accurate. No independent verification of any documentation or information supplied by others has been made.

The conclusions presented in this report represent Scott Cawley Ltd.'s best professional judgement based on review of site conditions observed during the site visit (if applicable) and the relevant information available at the time of writing. Scott Cawley Ltd. has used reasonable skill, care and diligence in compiling this report and no warranty is provided as to the report's accuracy.

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Appendix I – Desk Study Results

Appendix II – Results of Survey Observations

Appendix III – Results of Survey Transects

1 Introduction

This Wintering Bird Survey Report was authored by Criostoir Mac Cuirc of Scott Cawley Ltd.

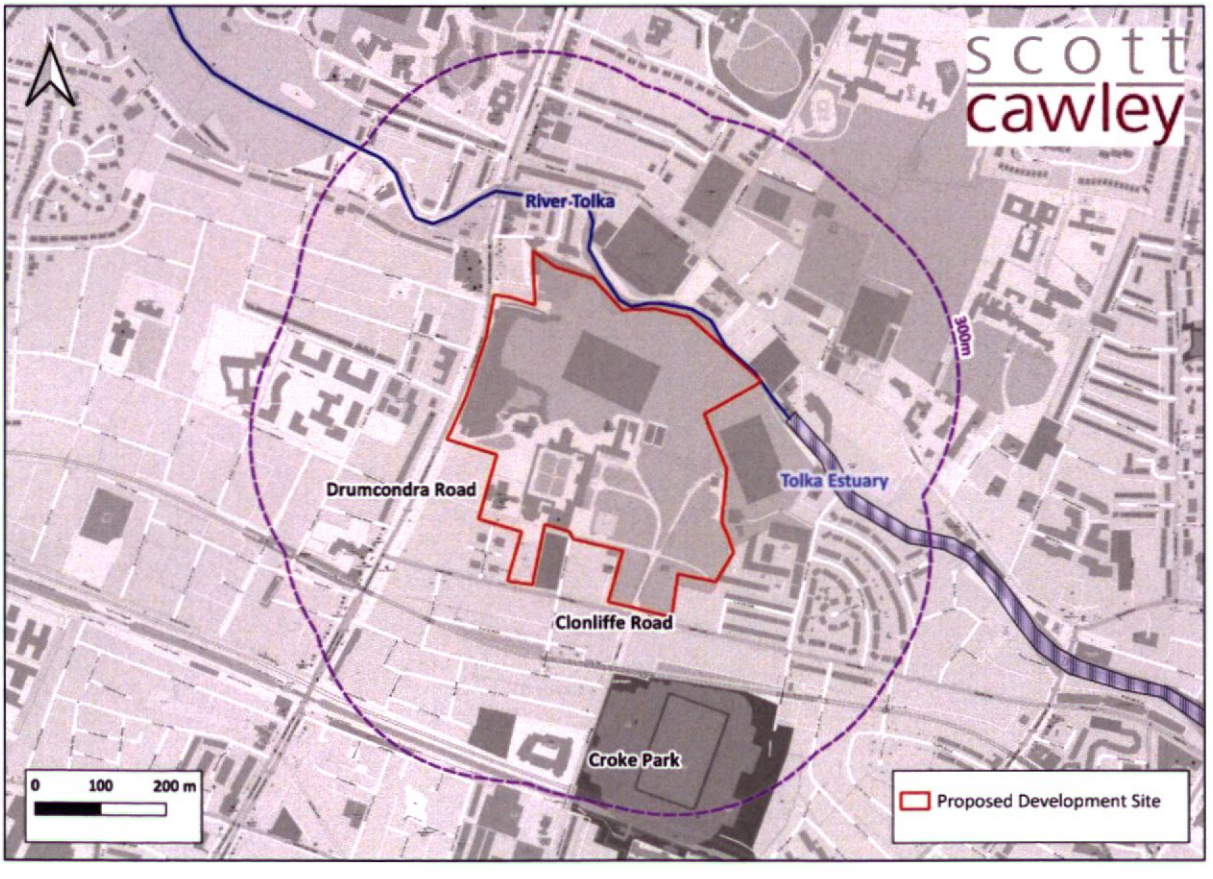
It provides an overview of the wintering bird baseline for lands at Clonliffe College, Clonliffe Road, Drumcondra, Dublin 3 (refer to Figure 1 for location) for the season 2020/21. The proposed development consists of a residential scheme to be constructed within the red line boundary illustrated in Figure 1, below.

The proposed development site consists of the Clonliffe College Campus, containing large amenity grassland areas, areas of parkland, woodland, and ornamental borders. A large area of open grassland habitat is located in the northern part of the lands, south of the River Tolka. There are scattered trees throughout the proposed development site, but particularly along the northern and western parts. The proposed development site is surrounded largely by residential development. There are also several sports complexes in the vicinity - the Belvedere Rugby grounds to the east, and Shelbourne Football Club across the River Tolka, to the north and Croke Park Stadium to the south.

The purpose of the report is to:

- Establish the presence/absence and use of the proposed development site and surrounding area by wintering birds; and
- To understand the importance of the proposed development site and surrounding area for wintering birds, including those Special Conservation Interest (SCI) species for which European sites have been designated.

Figure 1: The proposed development site in relation to the surrounding environment.



2 Planning, Policy and Legislation

The collation of ecological baseline data and the preparation of this assessment has had regard to the following legislation and policy documents. This is not an exhaustive list but the most relevant legislative and policy basis for the purposes of preparing this Wintering Bird Survey Report.

The following international legislation is relevant to the proposed development:

- Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora; hereafter, referred to as the 'Habitats Directive'. The Habitats Directive is the legislation under which the Natura 2000 network[1] was established and special areas of conservation (SACs) are designated for the protection of natural habitat types listed in Annex I, and habitats of the species listed in Annex II, of that directive.
- Directive 2009/147/EEC; hereafter, referred to as the 'Birds Directive'. The Birds Directive is the legislation under which special protection areas are designated for the protection of endangered species of wild birds listed in Annex I of that directive.

The following national legislation is relevant to the proposed development in the context of wintering wetland bird SCIs of European sites:

- *European Communities (EC) (Birds and Natural Habitats) Regulations 2011 to 2015*; hereafter the 'Birds and Habitats Regulations'. This legislation transposes the Habitats and Birds Directives into Irish law. It also contains regulations (49 and 50) that deal with invasive species (those included within the Third Schedule of the regulations).

The following plans and policies are relevant to the proposed development:

- National Biodiversity Action Plan 2017-2021 (Department of Culture Heritage and the Gaeltacht, 2017)
- Dublin City Development Plan 2016-2022 (Dublin City Council, 2016)
- Dublin City Biodiversity Action Plan 2015-2020 (Dublin City Council, 2015)

3 Methodology

3.1 Author Statement

This report was authored by Criostoir Mac Cuirc, and reviewed by Ashling Cronin of Scott Cawley Ltd. Survey methodologies were designed and supervised by Scott Cawley (Colm Clarke) and surveys were completed by Cathal O'Brien, Shane Brien of Scott Cawley, and independent ornithologists, Kate Bismilla and Kathryn Sheridan.

Criostoir Mac Cuirc is a Consultant Ecologist at Scott Cawley Ltd. He obtained an honours degree in Natural Sciences, with a specialisation in Botany, from Trinity College Dublin in 2019. Criostoir is a Qualifying Member of the Chartered Institute of Ecology and Environmental Management (CIEEM). He has

[1] The Natura 2000 network is a European network of important ecological sites, as defined under Article 3 of the Habitats Directive 92/43/EEC, which comprises both special areas of conservation and special protection areas. Special conservation areas are sites hosting the natural habitat types listed in Annex I, and habitats of the species listed in Annex II, of the Habitats Directive, and are established under the Habitats Directive itself. Special protection areas are established under Article 4 of the Birds Directive 2009/147/EC for the protection of endangered species of wild birds. The aim of the network is to aid the long-term survival of Europe's most valuable and threatened species and habitats.

In Ireland these sites are designed as *European sites* - defined under the Planning Acts and/or the Birds and Habitats Regulations as (a) a candidate site of Community importance, (b) a site of Community importance, (c) a candidate special area of conservation, (d) a special area of conservation, (e) a candidate special protection area, or (f) a special protection area. They are commonly referred to in Ireland as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

experience in field data collection of botanical habitat and mammal surveys in Ireland for a range of developments. Since joining Scott Cawley, Criostoir has primarily been involved in habitat classification fieldwork, data collection and analysis, and GIS for a major road infrastructural development. Criostoir also has experience in botanical and bird surveys.

11 Ashling Cronin is Technical Director at Scott Cawley. She holds a Masters in Ecological Assessment, an honours degree in Applied Ecology from University College Cork and an Advanced Diploma in Planning and Environmental Law from The Honourable Society of King's Inns. She has over ten years' experience in environmental management and environmental / ecological assessment across both the private and public sector. As Technical Director, Ashling provides technical review and quality assurance of surveys and documentation.

12 Colm Clarke is a Senior Ecologist with Scott Cawley and has over five years' experience in ecological consultancy. He obtained an honours degree in Natural Sciences, with a specialisation in Botany, from Trinity College Dublin, and a Masters in Biodiversity and Conservation from the same institution. Colm is an Associate Member of the Chartered Institute of Ecology and Environmental Management (CIEEM). Colm has been project manager and lead author on a large number of Ecological Assessments for Scott Cawley, and regularly undertakes both field work and report writing as part of his role. Colm was the project manager for Wintering Bird Surveys at Clonliffe College.

13 Shane Brien is a Consultant Ecologist with Scott Cawley. He holds an honours degree in Environmental Science from NUI Galway and completed his Masters in Ecological Assessment from University College Cork. Shane has professional experience working in Spain and different parts of Ireland for the last four years. His work has included conducting habitat surveys, floral species lists, bird surveys, mammal surveys (e.g. bats, otters, and badgers), and invertebrate surveys. He has a great interest and enthusiasm in ecology, with a special interest in botany. Since joining Scott Cawley his work has been focused on the collection of ecological data, data analysis, desktop work and preparation of Appropriate Assessment reports. Shane completed wintering bird surveys for the proposed development site under the supervision of Colm Clarke.

14 Cathal O'Brien is a Consultant Ecologist at Scott Cawley Ltd. with over two years' professional ecological consultancy experience. Cathal is a Qualifying Member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and holds a BSc (Hons) in Environmental Biology from University College Dublin and a MSc (Hons) in Ecology from the University of Bremen. He has a range of fieldwork experience conducting bird, botanical, habitat and mammal surveys in Ireland for a range of large- and small-scale developments. Cathal also has experience in botanical and bird surveys through citizens science programmes and initiatives. Since joining Scott Cawley, he has primarily been involved in fieldwork, recording data and data analysis, and mapping for residential and infrastructural developments as well as a large-scale agri-environmental scheme.

15

3.2 Desk Study

16 A desk study was undertaken in June 2020 prior to the commencement of field work. It was updated in April 2021 following the completion of field work. The purpose of the desk study was to collate available information on the local ecological environment. The following resources were used to inform the assessment presented in this report:

- Records of wetland bird species which are Special Conservation Interests (SCIs) for European sites, for the 10km grid square O13, as held by the National Biodiversity Data Centre www.biodiversityireland.ie – refer to Appendix I for all desk study records
- Irish Wetland Bird Survey (I-WeBS) summary data for the following sites: 0U404 Dublin Bay; 0U403 Baldoyle Bay; 0U408 Broadmeadow (Malahide) Estuary; 0U407 Rogerstown Estuary; 0U951 Ireland's Eye; and 0U903 Lambay Island. Summary data was downloaded from the BirdWatch Ireland website at https://birdwatchireland.ie/our-work/surveys-research/research-surveys/irish-wetland-bird-survey/

- Ordnance Survey Ireland mapping and aerial photography from http://map.geohive.ie/
- Information on the conservation status of birds in Ireland from *Birds of Conservation Concern in Ireland* (Colhoun & Cummins, 2013)
- Publicly available information on inland feeding sites for Light-bellied Brent Geese *Branta bernicla hrota* (herein referred to as Brent Geese) in the Dublin area contained within (Benson, 2009), Scott Cawley (2017) and Enviroguide (2020).

17 It is Scott Cawley's understanding that a three-year project studying the movements and behaviour of wintering bird species in Dublin Bay, and funded in part by the four Dublin local authorities (Dublin City Council, South Dublin County Council, Dún Laoghaire-Rathdown County Council, and Fingal County Council), is ongoing. The data was not publicly available at the time of writing of this report.

3.3 Field Survey

18 Surveys of wintering wetland birds utilising the proposed development site and the adjacent lands at Clonliffe College were undertaken between sunrise and sunset, four times per month, for the months of October 2020 through February 2021 and five surveys in March 2021, inclusive. All survey dates were completed and are listed in

19

20

21 Table 1, overleaf.

22 Each survey visit was conducted by two surveyors, who recorded observations of wintering birds entering and exiting the lands, and the behaviour and movements of birds within the lands. Observations were aided by the use of Binoculars (8x42) and a spotting scope. Where present and readable, ring codes of birds were collected. The surveyors kept to the margins of fields in the site so as to ensure that their presence did not prevent birds landing on site.

23 The survey effort in this instance is intended to provide a representative sample of use of the lands by wintering birds. The observations of bird movements in the lands were complemented by a search for evidence of wintering birds in the lands. Droppings and feathers of Brent Geese accumulate on well-used sites (Colm Clarke (Scott Cawley), pers. comm), and on survey dates where birds were not observed landing in the survey area, a search for evidence of wintering birds was undertaken. Data was collected at sampling points (c. 1m2 in total area, i.e. 1m x 1m) located equidistant from each other along a fixed transect line through the proposed development site (see Figure 2, overleaf). Data on the following variables was collected at each sampling point along the transect:

- The presence and abundance of signs of wintering birds (e.g. droppings and feathers)
- The height of the grass sward
- The proportion cover of bare ground
- The proportion cover of grass species
- The proportion cover of forb[2] species present

24 The results of field surveys have been contextualised against the 1% threshold of the international population of each species[3], as contained within Nagy & Langendoen (2018), and against the populations

[2] A forb is an herbaceous plant species that is not a grass, sedge or rush, e.g. the plant species daisy *Bellis perennis*.

[3] The 1% criterion is applied to identify sites of international importance for birds

of each species at nearby European sites. European sites in the vicinity of the proposed development are illustrated in Figure 3, overleaf.

Table 1 Winter bird survey dates

Survey Date(s)	Surveyor(s)
8th October 2020 15th October 2020 20th October 2020 30th October 2020	Shane Brien and Cathal O'Brien of Scott Cawley Ltd., and independent ornithologists Kate Bismilla and Kathryn Sheridan.
6th November 2020 11th November 2020 20st November 2020 27th November 2020	
4th December 2020 12th December 2020 16th December 2020 21st December 2020	
8th January 2021 20th January 2021 26th January 2021 29st January 2021	
3th February 2021 8th February 2021 10nd February 2021 22th February 2021	
4th March 2021 8th March 2021 18th March 2021 24th March 2021 31th March 2021	

Figure 2: Transect lines in relation to the survey area.

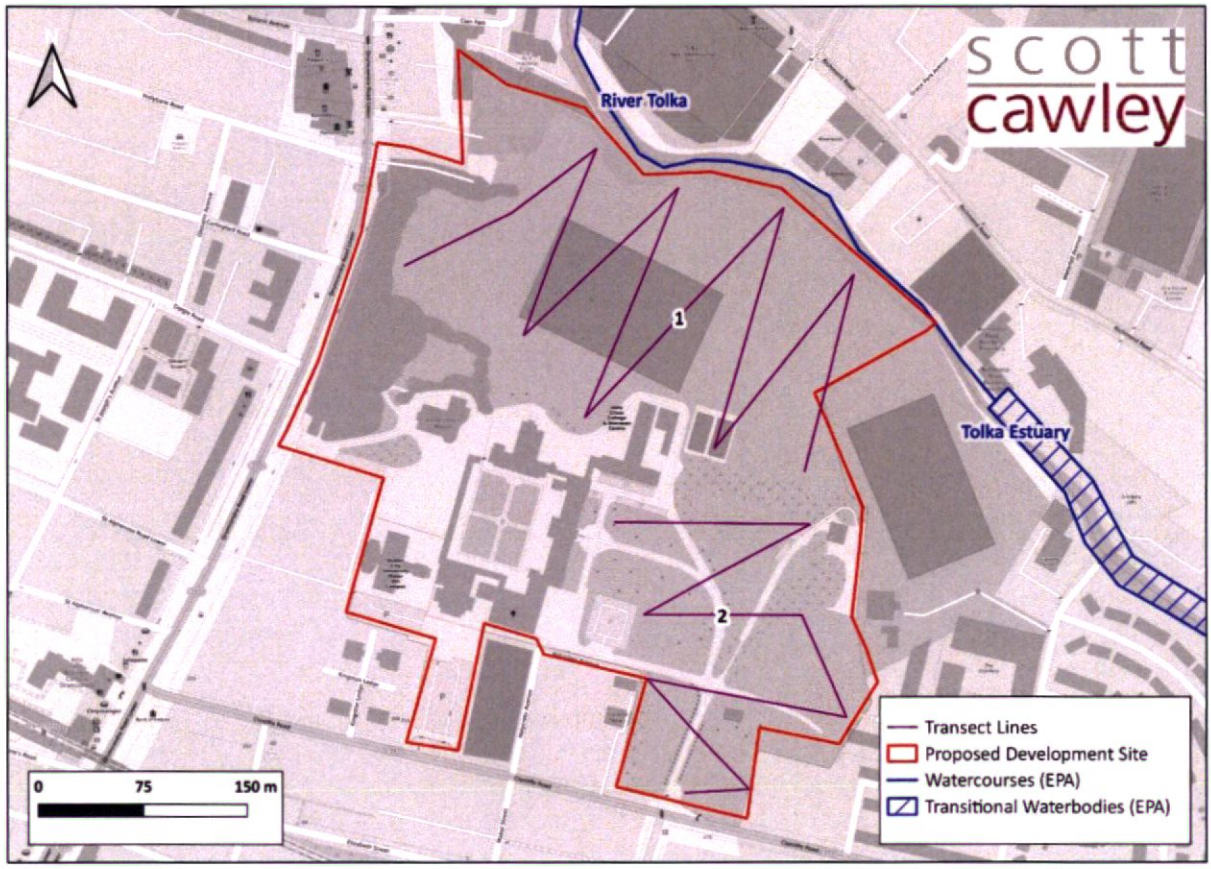
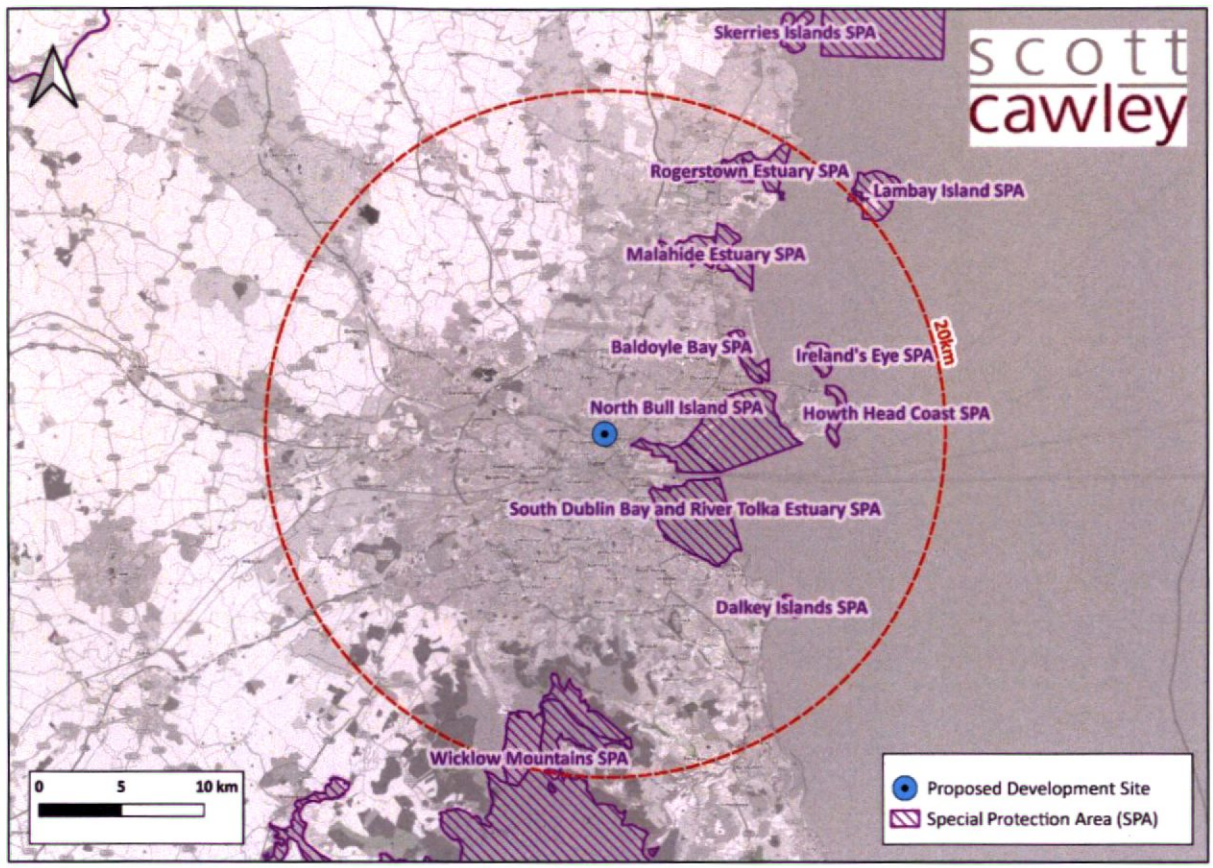


Figure 3: Proposed development site in the context of European sites within 20km.



3.3.1 Survey Limitations

25 It must be acknowledged that the surveys of the lands were undertaken across a single wintering bird survey season. It is possible that the number and frequency of use of inland feeding sites varies from season to season, based on forage resource, disturbance levels, changes to site suitability and other environmental factors. Desktop sources of information have been referenced to overcome this limitation. Most recent data on inland foraging sites for Brent Geese relates to the 2015/16 and 2016/17 wintering bird season, contained within Scott Cawley (2017) and wintering birds surveys of the site 2019/20 Scott Cawley (2020).

4 Wintering Bird Baseline

26 The results of desk study searches are presented in full in Appendix I of this report, while the full set of survey observations are included as Appendix II of this report. The results of desk and field surveys are summarised in this section of the report, and account of observations by species is included in the sections below.

27 Records of 49 species of wetland birds, for which European sites have been designated, were returned from the search of the NBDC database for the 10km grid square O13. The records have been reproduced in Appendix I of this report.

28 The following SCI species of European sites in the vicinity of the proposed development site were observed either flying over or foraging within the proposed development site in the 2020/2021 wintering bird season:

- Herring Gull *Larus argentatus*
- Light-bellied Brent Goose *Branta bernicla hrota*

- Cormorant *Phalacrocorax carbo*
- Curlew *Numenius arquata*
- Grey heron *Ardea cinerea*
- Kingfisher *Alcedo atthis*

29 Herring Gull were the most frequent visitors to the proposed development site, with observations of the species on all 25 survey dates. Light-bellied Brent Geese (hereafter referred to as Brent Geese) did not land to forage within the proposed development site on any date over the survey period, and were observed flying over the site on 16 dates between November 2020 and March 2021. Curlew were recorded foraging and flying over the proposed development site on four dates between October and December 2020. Cormorant were observed foraging in the River Tolka, flying over or within the proposed development site on 17 dates between October 2020 and March 2021. Kingfisher were observed foraging in and along the River Tolka on the northern boundary of the site on four of the 25 survey dates between October 2020 and March 2021. Grey Heron were observed foraging along the river Tolka or flying over or adjacent to the proposed development site 17 of the 25 survey dates.

30 The proposed development site has been closed off to the public since March 2020, and for all of the 2020/21 winter bird survey season, with restricted access to essential staff and visitors only.

31 Wetland bird species are mobile and can regularly travel up to 20km between roosting and feeding sites (Scottish Natural Heritage, 2010). For this reason, it is possible that birds observed at Clonliffe College could belong to populations of SCI species associated with European sites up to 20km from the survey area. Each of the eight SCI species observed foraging within or flying over the survey are discussed in more details in the subsections set out below.

4.1 Herring Gull *Larus argentatus* [A184]

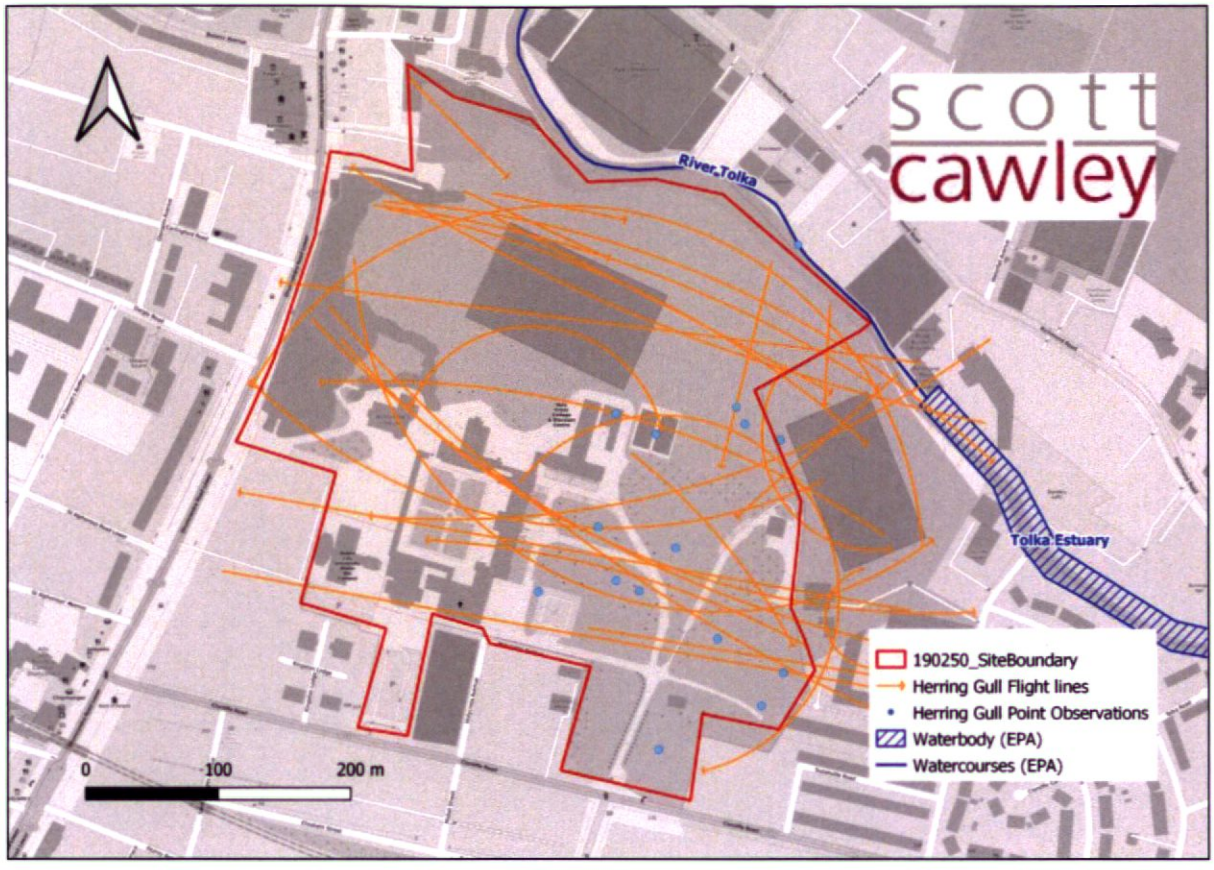
4.1.1 Results of Desk Study for Herring Gull

32 Herring Gull *Larus argentatus* [A148] is a SCI species for which the following European sites within 20km of the proposed development have been designated:

- Ireland's Eye SPA (004117), *c.* 12.5km north-east of the proposed development site. The European site encompasses the island of Ireland's Eye and the surrounding coastal waters. Ireland's Eye is an important breeding site for Herring Gull, and has a population of 250 birds (NPWS, 2018A).
- Lambay Island SPA (004069), *c.* 19.6km north-east of the proposed development site. The European site encompasses Lambay Island and its surrounding coastal waters. Lambay Island is an important breeding site for Herring Gull, and has a population of 1,806 birds (NPWS, 2018B).

33 There is potential that some members of the Ireland's Eye or Lambay Island breeding population utilise the proposed development site for forage during the winter months. This species is a commonly encountered urban bird species, with large populations residing in the urban area around Dublin.

Figure 4: Herring Gull activity in the survey area between October 2020 and March 2021



4.1.2 Field Survey Results for Herring Gull

34 Herring Gull were observed in the proposed development site on all 25 survey dates. On the vast majority of survey visits, a small number of birds (<20 birds) were observed foraging for earthworms on grassland areas of the site. Larger flocks of the species (>20 birds) were observed on 12 dates between October 2020 and March 2021 (full list of observations included in Appendix II of this report). The peak count for Herring Gull foraging in the proposed development site was 144 birds observed on 21st December 2020.

4.1.3 Herring Gull at Clonliffe College in the context of European sites within 20km

35 It is worth bearing in mind that nearby European sites have been designated for their breeding populations of Herring Gull as opposed to their wintering populations. The surveys undertaken to inform this report related to the winter season, when the resident population is likely to be boosted by winter migrants. A direct comparison against nearby European site populations, is therefore not possible.

36 In relation to wintering populations of the species in the vicinity, the peak count of birds in the proposed development site potentially represents:

- 30% of the wintering population in Dublin Bay, referencing the I-WeBS mean peak count of 471 birds for the period 2011/2013– 2017/18 (See Appendix I).
- 72% of the wintering population at Ireland's Eye, referencing the I-WeBS mean peak count of 200 birds over the period 2011/2013– 2017/18 (See Appendix I).

37 According to Nagy & Langendoen (2018), 1% of the international population of Herring Gull is 10,200 birds. The peak count of birds utilising the survey area did not reach or exceed this number in the 2020/21 survey season. The peak count of 144 birds observed in the survey area represents 1.4% of the 1% international population of the species.

4.2 Light-bellied Brent Goose *Branta bernicla hrota* [A046]

4.2.1 Results of Desk Study for Brent Goose

38 Light-bellied Brent Goose *Branta bernicla hrota* [A046] is a SCI species for which the following European sites within 20km of the proposed development have been designated:

- South Dublin Bay and River Tolka Estuary SPA (004024), *c.* 1.5km southeast. This European site encompasses the coastal and intertidal zones of Dublin Bay extending between the Bull Wall in the north and Dún Laoghaire West Pier in the south. The baseline population of Brent Geese in the European site, based on the five-year mean peak counts for the period 1995/96-1999/2000, is listed as 525 birds in the Conservation Objectives Supporting Document (NPWS, 2014). South Dublin Bay and River Tolka Estuary SPA (004024) is listed as the twelfth most important site in the country for this species. It should be noted that the number of Brent Geese in Dublin Bay has increased significantly since the original baseline population was estimated based on review of I-WeBS data for 0U404 Dublin Bay.

- North Bull Island SPA (004006), *c.* 4.5km east. This European site encompasses the coastal fringes of Bull Island, and surrounding intertidal and coastal zones extending between the North Bull wall in the south and Howth Head in the north. The baseline population of Brent Geese in the European site, based on the five-year mean peak counts for the period 1995/96-1999/2000, is listed as 1,548 birds in the Conservation Objectives Supporting Document (NPWS, 2014). North Bull Island SPA (004006) is the most important site in Ireland for wintering Brent Geese (NPWS, 2014). The site hosts a population of international importance for the species. It should be noted that the number of Brent Geese in Dublin Bay has increased significantly since the original baseline population was estimated based on review of I-WeBS data for 0U404 Dublin Bay

- Baldoyle Bay SPA (004016), *c.* 8.9km north-east. This European site encompasses the intertidal lagoon and tidal mouth of an estuary between Baldoyle Village and Portmarnock Village in North County Dublin. The baseline population for Brent Geese at this European site is 726 birds, based on the five-year mean peak counts for the period 1995/96-1999/2000 (NPWS, 2011). Baldoyle Estuary SPA is listed as the seventh most important site for Brent Geese in Ireland. The Baldoyle flock has decreased in size relative to the baseline population for the SPA based on review of recent I-WeBS data for the site.

- Malahide Estuary SPA (004025), *c.* 10.8km north. This European site encompasses the Malahide Estuary and Broadmeadow Water and surrounding coastal habitats. The baseline population for Brent Geese at this European site is 1,104 birds, based on the five-year mean peak counts for the period 1995/96-1999/2000 (NPWS, 2013A). Malahide Estuary SPA is listed as the fourth most important site for Brent Geese in Ireland. Recent I-WeBS data for Rogerstown Estuary does not include regular counts of Brent Geese, however older data from the period 2005/06-2009/10 indicates that the flock has increased in size relative to the baseline (NPWS, 2013B)

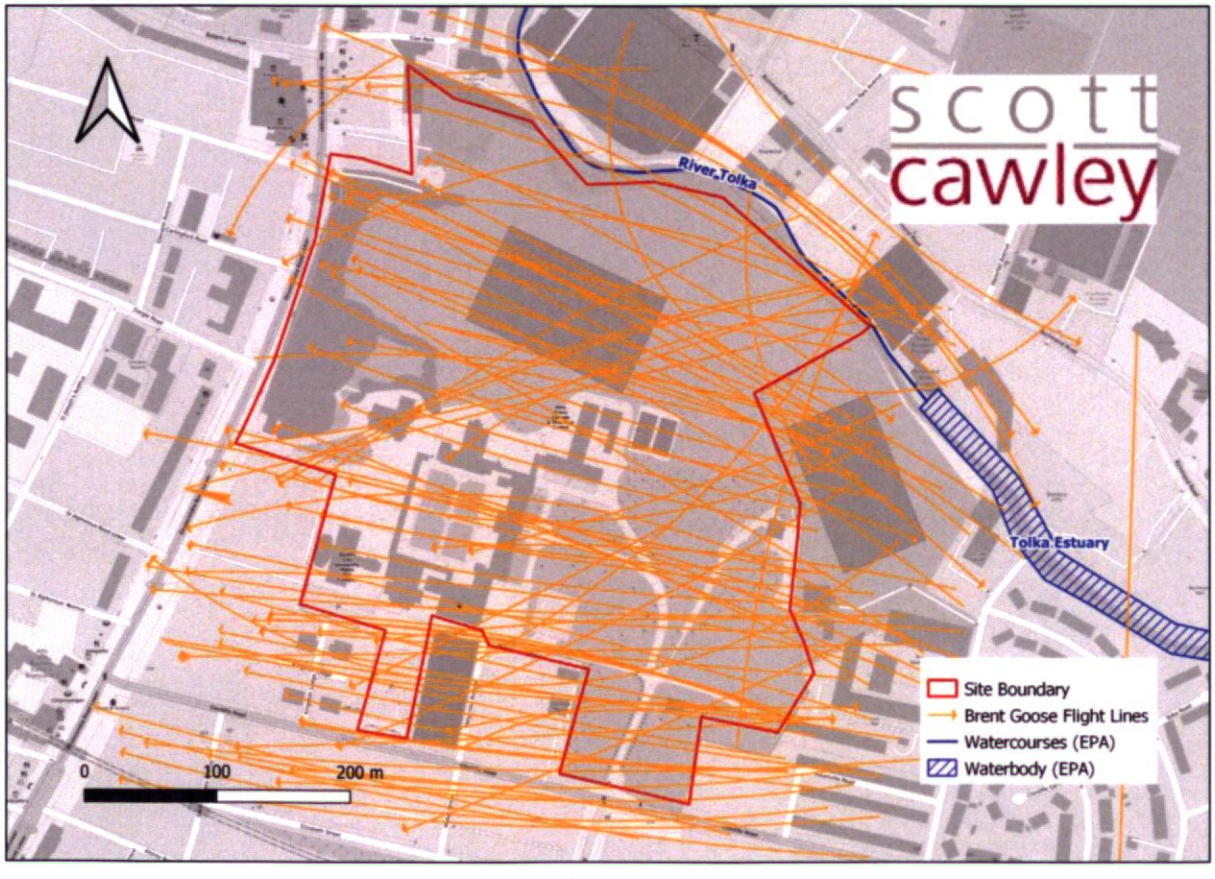
- Rogerstown Estuary SPA (004015), *c.* 15.4km north. The baseline population for Brent Geese at this European site is 1,069 birds, based on the five-year mean peak counts for the period 1995/96-1999/2000 (NPWS, 2013B). Rogerstown Estuary SPA is listed as the fifth most important site for Brent Geese in Ireland. The Rogerstown Estuary flock has decreased in size relative to the baseline population for the SPA based on review of recent I-WeBS data for the site

39 It is likely that there is some movement of birds between the aforementioned flocks over the winter period, based on changes in foraging resources and other variables. The flock in Dublin Bay (encompassing both the South Dublin Bay and River Tolka Estuary SPA, and North Bull Island SPA populations) forms a single unit, with roosting concentrated in the Lagoon east of Bull Island (NPWS, 2014). The Dublin Bay population forages on *Zostera* beds and algal mats in the bay. It also uses a range of terrestrial sites inland of Dublin Bay for foraging (NPWS 2014; Benson, 2009; Scott Cawley, 2017; Enviroguide, 2019). It is thought that the switch to inland terrestrial sites is linked to recent increases in population and/or depletion of coastal foraging resources through the winter season (NPWS, 2014; Benson, 2009).

40 The first published records of Brent Geese using inland feeding sites dates to 1991 (O'Briain & Healy, 1991). A study of the use of inland foraging sites by Brent Geese was undertaken and published in Benson (2009). Benson (2009) identified 60 sites across the Dublin area in her study. These sites were spread between Portmarnock in the North, Sandymount in the south and Ashtown and Greenhills in the west. The proposed development site at Clonliffe College does not appear in the list of 60 sites compiled by Benson (2009). More recent work on the range of Brent Geese in Dublin was undertaken to inform Natura Impact Statements for a residential development in St. Anne's Park (Scott Cawley, 2017; Enviroguide, 2019). Scott Cawley undertook surveys of a large number of sites across the Dublin area in the 2015/16 and 2016/17 winter bird seasons, identifying 119 inland foraging sites for Brent Geese across the Dublin Area. The lands at Clonliffe College were identified as a known inland feeding site in Scott Cawley (2017), where they are referred to as "Drumcondra/Holy Cross College". Data on the site relates to the season 2015/2016 when a peak count of 200 birds was recorded at the site on 13th January 2016. Surveys by Scott Cawley of the site in 2019/2020 recorded no Brent Geese within the proposed development as the playing fields reference above have become overgrown and unsuitable as feeding habitat.

4.2.2 Field Survey Results for Brent Geese

Figure 5: Light-bellied Brent goose activity in the survey area between October 2020 and March 2021



41 Brent Geese were not observed foraging within the lands on any survey dates across the seven-month survey period (See Appendix II), and no evidence of usage by Brent Geese was collected from completion of survey transects in the proposed development site. The most likely explanation for this is that the length of the grass in the proposed development site is suboptimal for the Geese, which favour a short, open sward. The grass across the northern part of the site remained relatively tall throughout the survey period. The full dataset for transect surveys, containing data on sward height across the survey season, is provided as Appendix III of this report.

42 Birds were observed flying over the proposed development site on 15 dates between October 2020 and March 2021 (see Figure 5). The peak count of birds flying over the lands was 660 birds, recorded on 10th February 2021. Birds tended to fly between 30m and 50m above ground level. Birds tended to fly east-west

in the mornings and west-east in the evenings, suggesting the birds were travelling from sites closer to Dublin Bay in the morning and returning to roost in Dublin Bay in the evenings. Several known inland feeding sites exist within the immediate vicinity of the lands, including St. Patrick's College in Drumcondra, and several sites off of Griffith Avenue.

4.3 Cormorant *Phalacrocorax carbo* [A017]

4.3.1 Results of Desk Study for Cormorant

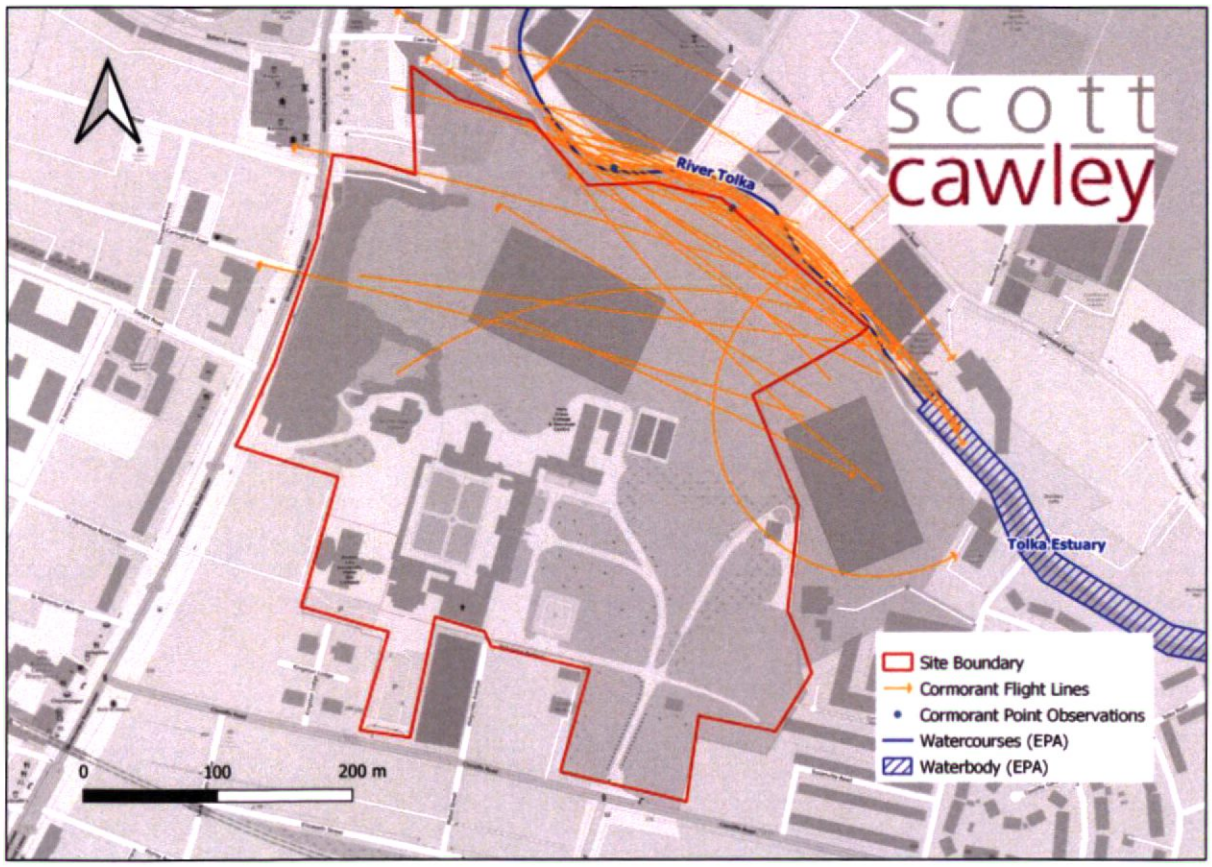
43 Cormorant *Phalacrocorax carbo* [A017] is a SCI species for which the following European sites within 20km of the proposed development have been designated:

- Ireland's Eye SPA (004117), *c.* 12.5km north-east of the proposed development site. The European site encompasses the island of Ireland's Eye and the surrounding coastal waters. Cormorant breed on the island in nationally important numbers (306 pairs) (NPWS, 2018A).
- Lambay Island SPA (004069), *c.* 19.6km north-east of the proposed development site. The European site encompasses Lambay Island and its surrounding coastal waters. Cormorant breed on the island in internationally important numbers (675 pairs), with smaller number of birds (29) overwintering at the site (NPWS, 2018B).

44 There is potential that some members of the Ireland's Eye or Lambay Island breeding population utilise the section of the River Tolka that runs along the northern boundary of the proposed development site.

4.3.2 Field Survey Results for Cormorant

Figure 6: Cormorant activity in the survey area between October 2020 and March 2021



45 Cormorant activity was chiefly concentrated along the River Tolka, which forms the northern boundary of the proposed development site. Members of the species were observed foraging in the River Tolka on two dates between December 2020 and March 2021. Observations were generally of a single individual foraging

in the river. Cormorant were observed flying over the proposed development site on 16 dates and are thought to be reoccurring passes of individual birds. Birds were generally observed flying upriver along the Tolka, as opposed to across the proposed development site (See Figure 6).

4.3.3 Cormorant at Clonliffe College in the context of European sites within 20km

46 It is worth bearing in mind that nearby European sites, Ireland's Eye SPA (004117) and Lambay Island SPA (004069) have been designated for their breeding populations of Cormorant as opposed to their wintering populations. The surveys undertaken to inform this report related to the winter season, when the resident population, and it is not clear how the wintering population relates to the breeding populations at Ireland's Eye and Lambay Island in this instance.

47 In relation to wintering populations of the species in the vicinity, the peak count of birds in the proposed development site potentially represents:

- 1.5% of the wintering population at Ireland's Eye, referencing the I-WeBS mean peak count of 136 birds over the period 2013/14 - 2017/18 (See Appendix I).
- 1% of the wintering population at Lambay Island, referencing the I-WeBS mean peak count of 200 birds over the period 2013/14 - 2017/18 (See Appendix I).

48 According to Nagy & Langendoen (2018), 1% of the international population of Cormorant is 1,200 birds. The peak count of birds utilising the survey area did not reach or exceed this number in the 2020/21 survey season. The peak count of one bird observed in the survey area represents 0.16% of the 1% of the international population of the species.

4.4 Curlew *Numenius arquata* [A160]

4.4.1 Results of Desk Study for Curlew

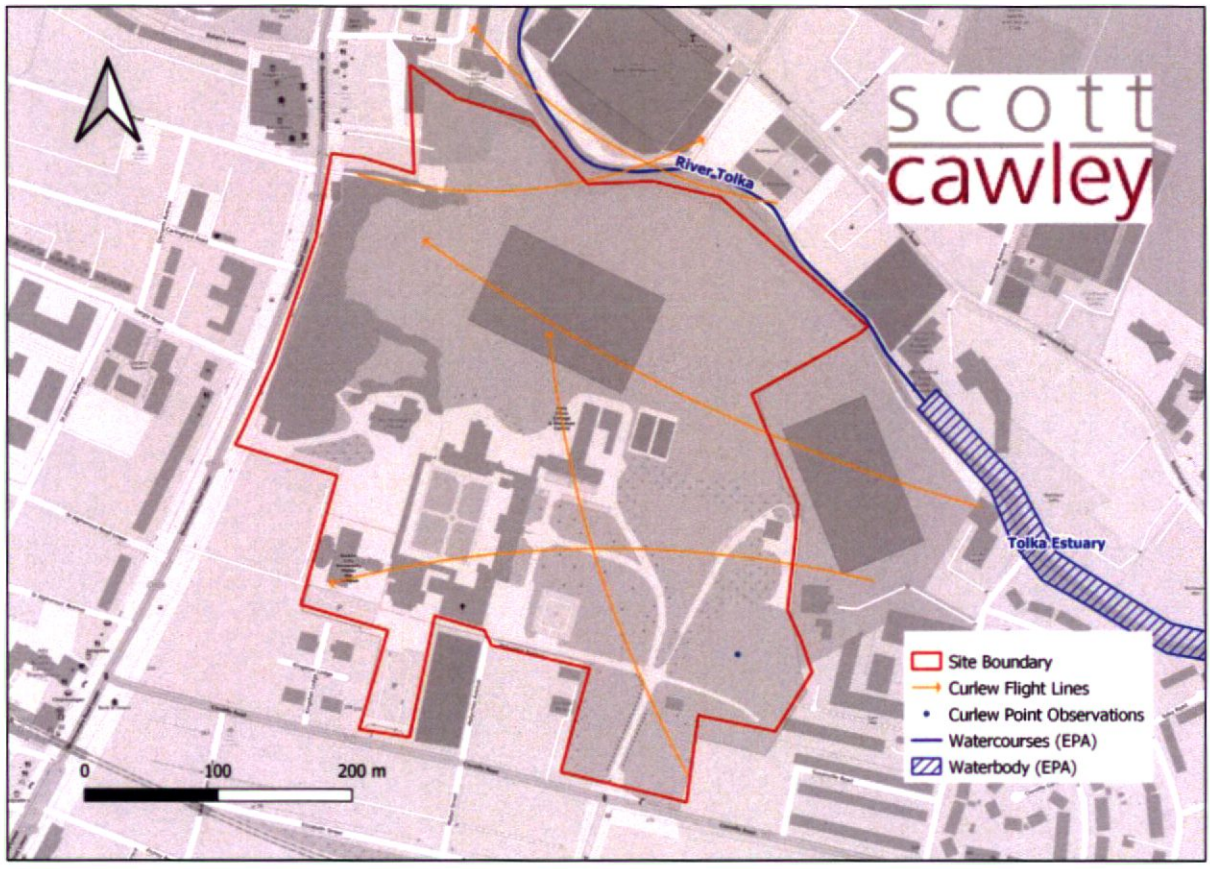
49 Curlew is a SCI species for which the following European site within 20km of the proposed development have been designated:

- North Bull Island SPA (004006), *c.* 4.5km east. The baseline population of Curlew in the European site, based on the five-year mean peak counts for the period 1995/96-1999/2000, is listed as 937 birds in the Conservation Objectives Supporting Document (NPWS, 2014). North Bull Island SPA (004006) is the 11th most important site in Ireland for wintering Curlew (NPWS, 2014). The site hosts a population of all-Ireland importance for the species. Data on the flock size at North Bull Island SPA contained within the *Conservation Objectives Supporting Document* (NPWS, 2014) and for Dublin Bay contained within I-WeBS data (See Appendix I) indicates that the SPA population has increased slightly relative to the baseline population.

50 Curlew are known to forage for earthworms on damp grassland on terrestrial sites (NPWS, 2014). The range of terrestrial sites in the Dublin area does not appear to be as well-documented as Brent Geese. Curlew are known to use inland feeding sites but the network of inland feeding sites is not as well-documented as for Brent Geese. The long-term trend (since the first I-WeBS population estimated, and the most recent population estimate in 2018) in the Irish overwintering population of Curlew has been a precipitous decline in numbers (Burke *et al.*, 2018).

4.4.2 *Field Survey Results for Curlew*

Figure 7: Curlew activity in the survey area between October 2020 and March 2021.



51 Curlew were recorded once foraging in the proposed development site on the 8th of October 2020 and observed flying over the site on three dates between November and December 2020. Flock sizes were smaller than Brent Goose flocks observed flying over the site, with a peak count of ten birds flying across the site on 20th of November 2020. Virtually all observations of Curlew flight lines were of movements east-west, e.g. from Dublin Bay inland. West-east movements were observed only on one occasions (see Figure 7).

4.4.3 *Curlew at Clonliffe College in the context of European sites within 20km*

52 The surveys undertaken to inform this report related to the winter season, when the resident population is likely to be boosted by winter migrants. A direct comparison against nearby European site populations, is therefore not possible.

53 In relation to wintering populations of the species in the vicinity, the peak count of birds in the proposed development site potentially represents:

- 0.17% of the wintering population in Dublin Bay, referencing the I-WeBS mean peak count of 850 birds for the period 2012/2013– 2017/18 (See Appendix I).

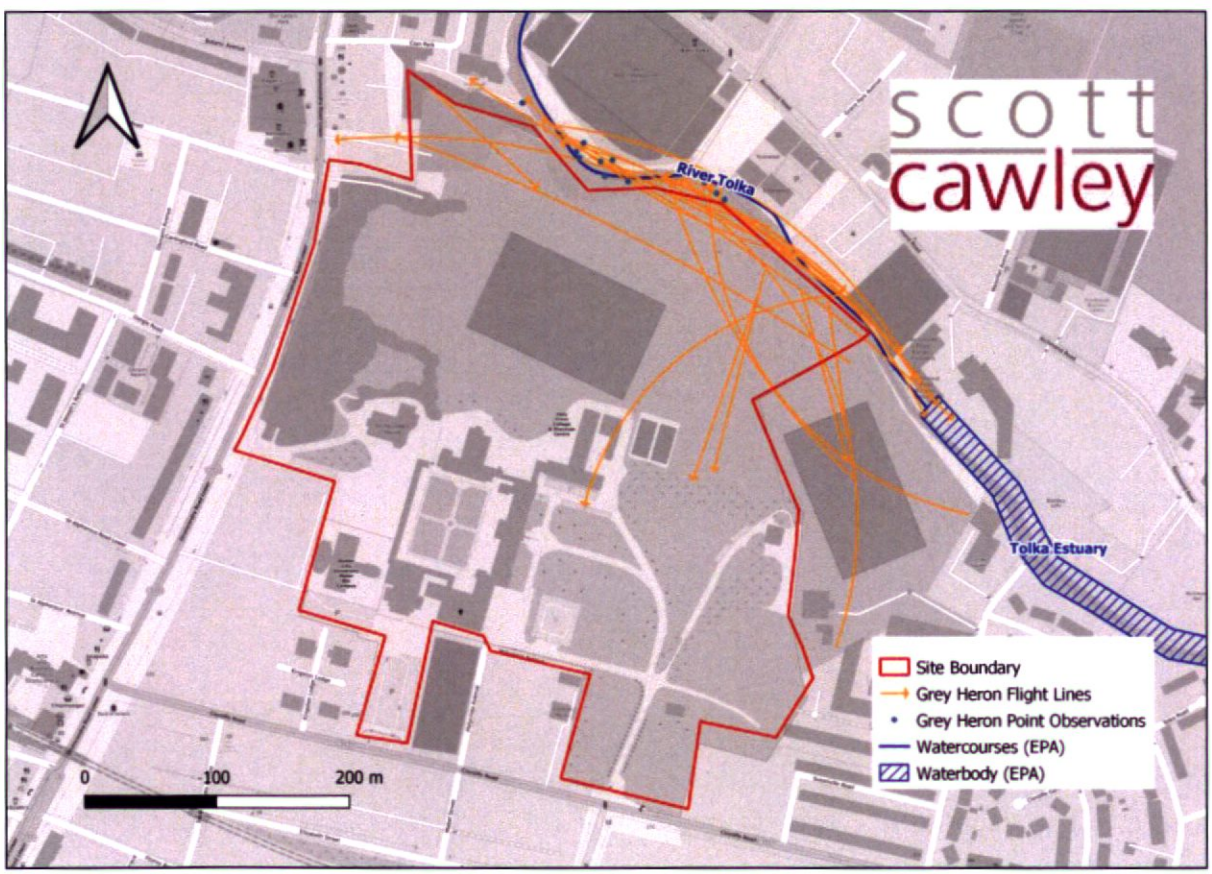
54 Based on Burfield and Bommel (2004), 1% of the international population for Curlew is estimated at 4800. The peak count of one bird observed in the survey area represents 0.02% of the 1% of the international population of the species.

4.5 Grey Heron *Ardea cinerea* [A028]

4.5.1 Results of Desk Study for Grey Heron

55 There are no European sites for which Grey Heron is an SCI species within the vicinity of the proposed development site. The closest European sites which includes Grey Heron as a designating feature is Wexford Harbour and Slobs SPA (004076), *c.* 99km south of the proposed development site. Grey Herons are generally sedentary in Ireland, meaning they do not travel long distances between their breeding and wintering grounds[4], and for this reason, the population of birds in the proposed development site is not part of any European site population.

56 ***Figure 8: Grey Heron activity in the survey area between October 2020 and March 2021.***



4.5.2 Field Survey Results for Grey Heron

57 Similar to observations of Cormorant, single Grey Herons were observed foraging in and along the River Tolka on 15 survey dates. The birds were also noted flying up and down river. The species was strongly associated with the River Tolka, with a small number of individuals recorded flying across the remainder of the proposed development site.

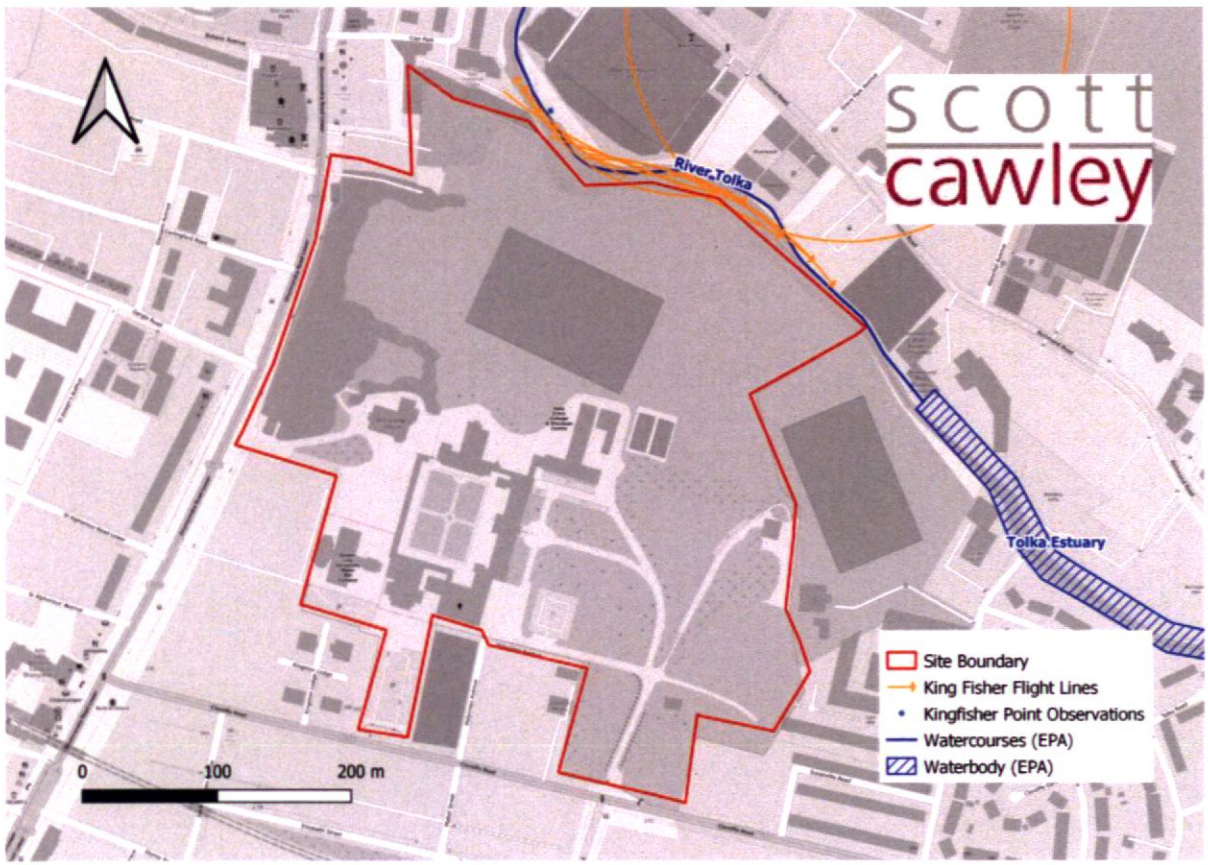
[4] From information on Grey Heron *Ardea cinerea* published on the BirdWatch Ireland website https://birdwatchireland.ie/birds/grey-Heron/. Accessed 13th June 2021

4.6 Kingfisher *Alcedo atthis* [A229]

4.6.1 Results of Desk Study for Kingfisher

58 There are no European sites for which Kingfisher is an SCI species within the vicinity of the proposed development site. The closest European sites which includes Kingfisher as a designating feature is the River Boyne and River Blackwater SPA (004232), *c.* 37km northeast of the proposed development site. The River Boyne and River Blackwater SPA is in a separate water catchment to the River Tolka and is therefore not directly connected to the proposed development site. The population on the River Tolka is not part of the River Boyne and River Blackwater SPA population on the basis of distance of separation between the two.

Figure 9: Kingfisher activity in the survey area between October 2020 and March 2021.



4.6.2 Field Survey Results for Kingfisher

59 Kingfisher were observed foraging and/or commuting along the River Tolka on five of the 25 completed survey visits. The species was noted perching on vegetation overhanging the River Tolka from within the proposed development site. Single birds were observed in all instances. The section of the River Tolka running along the northern boundary of the proposed development site is likely to form part of a breeding territory for a pair of Kingfisher (see Figure 8).

5 Conclusions

60 Observations of wintering birds in the proposed development site have been contextualised against the populations of these species in nearby European sites.

61 The proposed development site has been closed off to the public since March 2020, and for all of the 2020/21 winter bird survey season, with restricted access to essential staff and visitors only. Results of winter bird surveys from the 2019/20 and the 2020/21 season are comparable.

62 Brent Geese were not observed foraging within the lands on any survey dates across the seven-month survey period and no evidence of usage by Brent Geese was collected from completion of survey transects in the proposed development site.

63 In the case of Herring Gull, Brent Geese, Curlew, Cormorant, Grey Heron and Kingfisher, it has been demonstrated that the peak count of birds in the survey area in 2020/21 is less than 1% of the international population of these species.

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Appendix I – Desk Study Results

Wetland Bird Survey Records for O13 10km Grid Square, returned from the National Biodiversity Data Centre Database

A search for all species records contained within the O13 10km grid square was returned on 13th April 2021 The records have been reviewed by Criostoir Mac Cuirc of Scott Cawley and only records relating to wetland birds are presented in the table, below. A large proportion of records are of rare / vagrant species.

Appendix I - Table 1: Wetland bird records from the 10km grid square O13, as returned from the NBDC

Species name	Record count	Date of last record	Title of dataset
Arctic Tern *Sterna paradisaea*	2	31/12/2011	Bird Atlas 2007 - 2011
Barnacle Goose *Branta leucopsis*	1	15/02/2015	Birds of Ireland
Bar-tailed Godwit *Limosa lapponica*	5	31/12/2011	Bird Atlas 2007 - 2011
Black Brant *Branta bernicla subsp. Nigricans*	3	10/03/1995	Rare birds of Ireland
Black Guillemot *Cepphus grille*	23	05/06/2016	Birds of Ireland
Black-headed Gull *Larus ridibundus*	100	08/12/2017	Birds of Ireland
Black-legged Kittiwake *Rissa tridactyla*	4	10/03/2012	Birds of Ireland
Black-tailed Godwit *Limosa limosa*	5	10/03/2012	Birds of Ireland
Branta bernicla subsp. hrota	14	31/12/2011	Bird Atlas 2007 - 2011
Brent Goose *Branta bernicla*	39	17/02/2017	Birds of Ireland
Common Coot *Fulica atra*	31	27/10/2017	Birds of Ireland
Common Greenshank *Tringa nebularia*	2	31/12/2011	Bird Atlas 2007 - 2011
Common Guillemot *Uria aalge*	2	09/03/2009	Birds of Ireland
Common Kingfisher *Alcedo atthis*	28	15/08/2017	Birds of Ireland
Common Pochard *Aythya ferina*	3	31/12/2011	Bird Atlas 2007 - 2011
Common Redshank *Tringa totanus*	13	17/09/2017	Birds of Ireland
Common Sandpiper *Actitis hypoleucos*	1	31/07/1991	The Second Atlas of Breeding Birds in Britain and Ireland: 1988-1991
Common Shelduck *Tadorna tadorna*	9	31/12/2011	Bird Atlas 2007 - 2011
Common Snipe *Gallinago gallinago*	6	28/01/2017	Birds of Ireland
Common Tern *Sterna hirundo*	6	18/06/2017	Birds of Ireland
Dunlin *Calidris alpina*	6	31/12/2011	Bird Atlas 2007 - 2011
Eurasian Curlew *Numenius arquata*	16	04/12/2017	Birds of Ireland
Eurasian Oystercatcher *Haematopus ostralegus*)	22	17/09/2017	Birds of Ireland
Eurasian Teal *Anas crecca*	12	26/02/2017	Birds of Ireland
Eurasian Wigeon *Anas penelope*	4	31/12/2011	Bird Atlas 2007 - 2011
European Golden Plover *Pluvialis apricaria*	1	31/12/2011	Bird Atlas 2007 - 2011

Species name	Record count	Date of last record	Title of dataset
European Shag *Phalacrocorax aristotelis*	1	24/07/1994	European Seabirds at Sea (ESAS) bird sightings 1980-2003
Gadwall *Anas strepera*	2	31/12/2011	Bird Atlas 2007 - 2011
Great Cormorant *Phalacrocorax carbo*	35	03/12/2017	Birds of Ireland
Great Crested Grebe *Podiceps cristatus*	4	31/12/2011	Bird Atlas 2007 - 2011
Great Egret *Ardea alba*)	1	24/06/2013	Rare birds of Ireland
Great Northern Diver *Gavia immer*	1	31/12/2011	Bird Atlas 2007 - 2011
Greater Scaup *Aythya marila*	4	27/10/2017	Birds of Ireland
Grey Heron *Ardea cinerea*	87	15/12/2017	Birds of Ireland
Grey Plover *Pluvialis squatarola*	3	31/12/2011	Bird Atlas 2007 - 2011
Herring Gull *Larus argentatus*	113	26/11/2017	Birds of Ireland
Lesser Black-backed Gull *Larus fuscus*	33	24/07/2017	Birds of Ireland
Little Grebe *Tachybaptus ruficollis*	35	27/10/2017	Birds of Ireland
Little Tern *Sternula albifrons*	1	31/07/1972	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.
Mallard *Anas platyrhynchos*	110	02/12/2017	Birds of Ireland
Manx Shearwater *Puffinus puffinus*	4	18/08/1994	European Seabirds at Sea (ESAS) bird sightings 1980-2003
Northern Lapwing *Vanellus vanellus*	6	31/12/2011	Bird Atlas 2007 - 2011
Northern Shoveler *Anas clypeata*	3	31/12/2011	Bird Atlas 2007 - 2011
Red Knot *Calidris canutus*	6	31/12/2011	Bird Atlas 2007 - 2011
Red-breasted Merganser *Mergus serrator*	3	31/12/2011	Bird Atlas 2007 - 2011
Red-throated Diver *Gavia stellata*	2	31/12/2011	Bird Atlas 2007 - 2011
Ringed Plover *Charadrius hiaticula*	7	31/12/2011	Bird Atlas 2007 - 2011
Ruddy Turnstone *Arenaria interpres*	6	31/12/2011	Bird Atlas 2007 - 2011
Tufted Duck *Aythya fuligula*	54	06/12/2017	Birds of Ireland

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U404 Dublin Bay

The mean is based only on the most recent 5-season period, *i.e.* for the period 2013/14 - 2017/18. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 2: I-WeBS summary data for OU404 Dublin Bay

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	2017/ 18	MEAN
Arctic Tern			2					3						0
Bar-tailed Godwit	150.00	1200.00	2231	2138	1260	1540	1745	1917	2141	1710	1658	2173	1934	2026
Black-headed Gull		20000.00	3766	4358	3738	2234	2356	2269	1907	2649	1259	2768	3802	2642
Black-necked Grebe								4						0
Black-tailed Godwit	190.00	610.00	664	936	698	1449	1375	927	1362	1768	873	2185	1479	1516
Common Gull		16400.00	549	298	685	579	573	410	309	985	272	890	321	536
Common Scoter	140.00	5500.00		2	30		80	20	10	42		40	65	33
Common Tern			173	15	23		14	38	3	39		1	2	9
Common/ Arctic Tern				400*				163						21
Coot	220.00	17500.00	1										199	136
Cormorant	120.00	1200.00	309	182	82	211	98	151	53	198	41	71	494	850
Curlew	350.00	8400.00	1374	1017	742	1240	688	1169	874	932	1424	567		0
Curlew Sandpiper		10000.00						1	1				7484	5730
Dunlin	570.00	13300.00	7453	6124	6443	4270	6490	3559	4163	5907	3603	3376		0
Feral/hybrid Mallard type								2	1					1
Gadwall	20.00	600.00			4	19				2	2			0
Glaucous Gull		2200.00			1								2501	1298
Golden Plover	1200.00	9300.00	1020	162	2500	1360	430	390	404	1080	742	1155		1

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	2017/ 18	MEAN
Goldeneye	60.00	11500.00	23	23	6	6	5	11	6		2	1*	2	0
Great Black-backed Gull		4200.00	637	180	141	84	124	358	116	190	52	263	115	154
Great Crested Grebe	40.00	3500.00	97	198	105	255	421	930	254	755	143	307	60	292
Great Northern Diver	20.00	50.00	3	2		8		2		3		5	2	2
Greenshank	20.00	2300.00	33	47	68	28	43	40	46	34	47	78	47	48
Green-winged Teal						1								0
Grey Heron	25.00	2700.00	44	33	31	54	30	28	15	68	40	44	29	42
Grey Plover	30.00	2500.00	751	202	265	394	293	200	307	310	452	240	248	299
Herring Gull		10200.00	497	262	314	422	341	519	135	490	261	538	607	471
Kingfisher			1			1	1			1		1		0
Knot	280.00	4500.00	4519	5802	5832	4105	2799	3435	3022	4547	4950	2495		0
Lapwing	1100.00	20000.00	56	26	64	191	44	120	67	52	54	143	6555	4879
Lesser Black-backed Gull		5500.00	475	14	4	19	195	28	25	5	20	16	32	61
Light-bellied Brent Goose	360.00	400.00	2017	3819	4445	5536	3292	4102	6134	3717	4862	4195	14	12
Little Egret	20.00	1300.00	29	69	100	87	73	48	19	59	69	59	3331	4105
Little Grebe	20.00	4000.00					5	1	9	1	5		87	69
Little Gull		1100.00					1	1					4	3
Little Tern			1											0
Long-tailed Duck		17250.00		1					2	1				1
Mallard	290.00	20000.00	91	67	58	97	138	151	52	97	106	120	111	101
Mediterranean Gull		770.00	16	33	70	27	8	113	23	39	27	64	6	41

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	2017/ 18	MEAN
Moorhen		20000.00	4	9	4	6	7	7	5	5		5	2	3
Mute Swan	90.00		5		3	7	6	2	2	5	6	9	12	8
Oystercatcher	690.00	8200.00	3327	2933	3946	4324	2804	3408	3025	3074	3315	3588	3521	3508
Pintail	20.00	600.00	150	179	117	162	173	212	160	200	150	124	222	177
Purple Sandpiper	20.00	710.00		1	2		16	4	3	2	1	2		1
Red-breasted Merganser	20.00	1700.00	43	56	109	58	63	114	50	60	57	69	53	64
Red-necked Grebe										1				0
Redshank	300.00	3900.00	1758	2856	3621	2639	2790	2509	2077	2460	1889	1648	2274	1940
Red-throated Diver	20.00	3000.00	12	7	9	5	16	8	8	7	2	7	5	5
Ring-billed Gull		20000.00			1		1	2	1					0
Ringed Plover	100.00	730.00	849	355	146	267	205	314	217	139	121	109	285	172
Roseate Tern								3						0
Sanderling	60.00	1200.00	692	609	434	674	300	411	405	510	266	841	800	558
Sandwich Tern			342	122	38	2	43	6	23	52		8	9	14
Scaup	65.00	3100.00				2								0
Shag		2000.00	7	7	35	2	25	19	23	36	3	71	22	30
Shelduck	120.00	3000.00	761	1036	866	1142	821	603	731	961	2927	744	1611	1611
Shoveler	30.00	400.00	104	111	76	249	73	101	79	126	97	115	144	120
Slavonian Grebe		55.00					1							0
Snipe		20000.00	1		2	16	18	12	62	20		31	57	32
Spotted Redshank		900.00	1					1		1		3		1
Teal	340.00	5000.00	925	823	785	980	1358	909	981	1378	1233	1291	1092	1330
Tufted Duck	310.00	12000.00			1									0

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	2017/ 18	MEAN
Turnstone	95.00	1400.00	356	292	380	329	392	349	227	466	250	584	334	384
Unidentified Gull								10	85					0
Unidentified Tern			244											0
Water Rail			1	1				1						1
Whimbrel		6700.00			1		1		1	2	4		918	1351
Wigeon	630.00	15000.00	518	1302	663	1911	806	610	445	691	2201	1106		1
Yellow-legged Gull									1	1		2		1

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U403 Baldoyle Bay

The mean is based only on the most recent 5-season period, *i.e.* for the period 2013/14 - 2017/18. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 3: I-WeBS summary data for OU403 Baldoyle Bay

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Arctic Tern			8	24									0
Bar-tailed Godwit	170	1500	131	105				162	150	48	59	38	91
Black-headed Gull								242	281	52	120	13	142
Black-tailed Godwit	200	1100	175	270				389	139	296	172	189	237
Common Gull								64	11	4	61	3	29
Common Sandpiper				2									0
Common Scoter	110	7500	27	130				16	7				5
Common Tern			12	52									0
Cormorant	110	1200	14	20				10	4	3	4	1	4
Curlew	350	7600	138	148				90	61	106	49	44	70
Curlew Sandpiper			4	12									0

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Dunlin	460	13300	300	110				750	233	300	403	537	445
Egyptian Goose										1			0
Golden Plover	920	9300	750	672				2500	450	2000	1200		1230
Goldeneye	40	11400		15									0
Great Black-backed Gull								7	15	10	9	9	10
Great Crested Grebe	30	6300	22	63				124	189				63
Great Northern Diver	20	50	2	5				1	2				1
Green Sandpiper			2	1									0
Greenshank	20	3300	32	25				6	11	3	6	7	7
Grey Heron	25	5000	14	32				5	7	7	4	6	6
Grey Plover	30	2000	112	166				55	28	8	25	10	25
Herring Gull								47	91	58	112	48	71
Kingfisher			2	3									0
Knot	160	5300	47	112				553		19	600	800	394
Lapwing	850	72300	287	550				372	300	137	392	180	276
Lesser Black-backed Gull								4	18	1	1	1	5
Light-bellied Brent Goose	350	400	1120	956				580	588	342	753	663	585
Little Egret	20	1100	40	56				18	3	7	21	25	15
Little Grebe	20	4700		5				1				3	1
Long-tailed Duck				2									0
Mallard	280	53000	193	249				67	102	106	71	60	81
Mute Swan	90	100								2		2	1
Oystercatcher	610	8200	1014	880				277	1113	219	117	144	374
Pintail	20	600	23	12				4	4				2
Red-breasted Merganser	25	860	14	23				6	5	2	4		3

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Redshank	240	2400	330	284				144	152	125	96	154	134
Red-throated Diver	20	3000	5	2				14	64				16
Ringed Plover	120	540	150	168				34	59	123	4		44
Roseate Tern				12									0
Sanderling	85	2000	31	29				6					1
Sandwich Tern			37	31									0
Shag								7			1		2
Shelduck	100	2500	357	238				52	97	88	127	105	94
Shoveler	20	650									1		0
Snipe			17										0
Teal	360	5000	163	218				145	160	108	131	48	118
Turnstone	95	1400	126	139				17	12	13	10	4	11
Whimbrel			1	7									0
Wigeon	560	14000	125	178				54	54	32	266	332	148

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U408 Broadmeadow (Malahide) Estuary

The mean is based only on the most recent 5-season period, *i.e.* for the period 2013/14 - 2017/18. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 4: I-WeBS summary data for OU408 Broadmeadow (Malahide) Estuary

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Mute Swan	90	100	110	114	108	90	47	50	89	58	66	61	65
Whooper Swan	150	340	9			2		1					0
Black Swan									1				0
Greenland White-fronted Goose	100	190			1								0
Bar-headed Goose				1	1								0
Barnacle Goose	160	810			1								0
Light-bellied Brent Goose	350	400	1856	898	1411	943	1980	710	464	824	1565	1000	913
Shelduck	100	2500	246	341	479	8	262	120	222	303	569	321	307
Wigeon	560	14000	150	42	168		157		2	67	94	215	76
Gadwall	20	1200			2		120	4				4	2
Teal	360	5000	142	99	670	41	112	119	87	141	232	196	155
Mallard	280	53000	178	176	379	95	220	112	92	92	134	110	108
Pintail	20	600	72	66	72		29	6		15	23	39	17
Shoveler	20	650	14	6	50					9	24	30	13
Pochard	110	2000	18	35	8		2						0
Tufted Duck	270	8900	2	15	8				1				0
Scaup	25	3100	1		4				3		5	1	2
Long-tailed Duck					1		3				1		0
Common Scoter	110	7500	300	278			30						0
Goldeneye	40	11400	105	126	93	51	66	36	92	31	43	50	50
Red-breasted Merganser	25	860	39	161	78	87	57	80	35	26	237	23	80

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Ruddy Duck					1								0
Red-throated Diver	20	3000	8				4					3	1
Great Northern Diver	20	50		3				3		2			1
Little Grebe	20	4700	8	13	28	23	21	8	33	26	33	84	37
Great Crested Grebe	30	6300	96	54	44	34	120	60	72	84	83	54	71
Slavonian Grebe											1		0
Cormorant	110	1200	58	42	28	6	101	101	42	86	127	99	91
Shag			130	66	30		32	8	9	5	12	2	7
Little Egret	20	1100	26	17	3	2	17	13	16	35	35	22	24
Grey Heron	25	5000	28	77	20	12	19	19	27	26	30	21	25
Moorhen			3	7	12	4	4	6	9	4	3	6	6
Coot	190	15500	2		12								0
Oystercatcher	610	8200	1529	1285	1471	78	1300	1833	1355	1291	1523	1242	1449
Ringed Plover	120	540	16	14	25		71			13	152	240	81
Golden Plover	920	9300	1310	72	1000	260	1000	200	5		337	36	116
Grey Plover	30	2000	155	150	169	3	140	9	6	100	38	82	47
Lapwing	850	72300	434	315	642	1180	900	590	681	63	331	213	376
Knot	160	5300	331	354	870	4	440	110	49	9	202	800	234
Sanderling	85	2000	4		1		2	80	46		13	2	28
Curlew Sandpiper							2						0
Dunlin	460	13300	1173	416	1365	23	480	94	121	300	1489	445	490
Ruff			4	1	1	4	1	2	5			1	2
Jack Snipe							1					1	0
Snipe			44	5	46	20	25	56	25	36	25	3	29
Black-tailed Godwit	200	1100	366	478	258	296	355	206	167	121	293	245	206
Bar-tailed Godwit	170	1500	200	358	286	62	213	133	14	60	93	107	81

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Curlew	350	7600	240	545	330	1	500	244	83	246	363	349	257
Common Sandpiper			6	3	4	1	17		1				0
Green Sandpiper								27					5
Spotted Redshank			1						1				0
Greenshank	20	3300	59	29	26	26	43	64	30	34	46	43	43
Redshank	240	2400	589	459	364	87	374	171	130	363	487	575	345
Turnstone	95	1400	139	175	175	23	221	94	85	75	79	98	86
Little Gull			1										0
Black-headed Gull			1072	930	565	479	368	659	571	496	424	294	489
Common Gull			221	187	228	149	70	71	16	184	75	126	94
Lesser Black-backed Gull			28	5	5	4	3	15	8	196	20	6	49
Herring Gull			77	66	68	55	139	110	95	118	187	389	180
Iceland Gull						2							0
Great Black-backed Gull			18	20	20	15	44	93	9	42	71	69	57
Sandwich Tern			26	84	3	2	50	12		2	42		11
Common Tern				1									0

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U407 Rogerstown Estuary

The mean is based only on the most recent 5-season period, *i.e.* for the period 2012/13 – 2017/18. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 5: I-WeBS summary data for OU407 Rogerstown Estuary

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Mute Swan	90	100	6	3			4	2	2	2	2	2	2

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Whooper Swan	150	340			2					12	13	1	5
Pink-footed Goose										8			2
Greenland White-fronted Goose	100	190				3							0
Greylag Goose	35	980	87	134	19	33	89	5	33	95	30	17	36
Barnacle Goose	160	810	1										0
Brent Goose			1										0
Dark-Bellied Brent Goose								1					0
Light-bellied Brent Goose	350	400	2652	2749	1051	2661	1395	2217	1047	2662	2829	2197	2190
Ruddy Shelduck				1									0
Shelduck	100	2500	809	886	730	752	793	877	652	624	687	531	674
Wigeon	560	14000	580	690	490	813	585	686	1342	1532	1094	1695	1270
Gadwall	20	1200	1				2		3	2	4	7	3
Teal	360	5000	1054	1003	1448	1211	1469	685	2008	967	857	1280	1159
Mallard	280	53000	248	319	109	182	198	172	260	220	168	174	199
Pintail	20	600	16	6	2		1		4	5	2		2
Shoveler	20	650	79	36	21	26	34	42	15	25	33	20	27
Pochard	110	2000	2										0
Scaup	25	3100		27									0
Eider	55	9800										1	0
Common Scoter	110	7500									8		2
Goldeneye	40	11400	1	1	1		6						0

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Red-breasted Merganser	25	860	26	30	16	30	22	20	39	23	36	25	29
Red-throated Diver	20	3000	2	1		4	1	2	4	1	1	1	2
Great Northern Diver	20	50	1					2					0
Little Grebe	20	4700	12	18	10	24	15	15	22	25	15	20	19
Great Crested Grebe	30	6300	3	46	1	4	14	5	22	3	2	1	7
Cormorant	110	1200	55	77	23	17	33	32	21	27	29	53	32
Shag			28	28	44	40	47	36	21	11	10	17	19
Little Egret	20	1100	41	42	1	43	48	57	46	55	43	52	51
Grey Heron	25	5000	34	24	6	24	24	17	21	16	20	20	19
Great White Egret										1			0
Glossy Ibis											1		0
Spoonbill											3		1
Water Rail			1	1						1			0
Moorhen				3		1	1	8	5	2	2	3	4
Coot	190	15500					2	3		2	3	4	2
Oystercatcher	610	8200	1199	2024	1781	2116	2491	1531	1519	1697	1057	1161	1393
Ringed Plover	120	540	190	153	113	105	284	167	161	125	144	215	162
American Golden Plover				1									0
Golden Plover	920	9300	6590	664	40	530	3300	130	2000	2050	2152	700	1406
Grey Plover	30	2000	283	223	210	371	242	151	120	64	199	192	145
Lapwing	850	72300	5820	1268	710	2855	5805	897	2099	5185	2845	1290	2463
Knot	160	5300	500	501	88	190	256	30	130	89	12	175	87

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Sanderling	85	2000	14	30	6	20	300	31	1	130	76	35	55
Little Stint			1			1		3		1			1
Curlew Sandpiper				6		1	4			1		1	0
Purple Sandpiper	20	110	7	76	5	6	3	72	32	4	3		22
Dunlin	460	13300	2546	3151	1061	1904	1860	581	2264	3469	2356	1381	2010
Ruff				1			1			2	2	9	3
Jack Snipe											2		0
Snipe			35	37	10	4	20	9	5	24	8	8	11
Woodcock								1					0
Black-tailed Godwit	200	1100	1138	568	148	450	883	597	237	191	1113	1201	668
Bar-tailed Godwit	170	1500	31	126	1	76	44	120	149	99	676	100	229
Whimbrel			1	2		2	28	1	1	1	3	16	4
Curlew	350	7600	1055	803	33	922	518	684	600	625	530	888	665
Common Sandpiper			2										0
Green Sandpiper										1			0
Spotted Redshank			1	1			1						0
Greenshank	20	3300	40	50	14	83	32	36	35	59	64	48	48
Lesser Yellowlegs									1				0
Redshank	240	2400	907	987	378	1104	689	844	945	1007	597	880	855
Turnstone	95	1400	77	81	95	176	224	207	110	223	84	173	159
Mediterranean Gull				1			1	1			1		0
Black-headed Gull			764	1314	136	457	310	602	448	458	428	391	465
Common Gull			80	419	73	142	175	256	343	159	247	152	231

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Lesser Black-backed Gull			3	29	35	76	3	1	38	9	4	11	13
Herring Gull			906	596	45	739	189	237	300	332	488	1405	552
Great Black-backed Gull			170	119	16	107	84	106	37	53	109	27	66
Sandwich Tern			70	100			104	58	245	82	25	14	85
Roseate Tern							1						0
Common Tern			2					1	4	41			9
Kingfisher			1	1		1	12	2	1		5	1	2
SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Mute Swan	90	100	6	3			4	2	2	2	2	2	2

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U951 Ireland's Eye

The mean is based only on the most recent 5-season period, *i.e.* for the period 2010/11 - 2014/15. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 6: I-WeBS summary data for OU951 Ireland's Eye

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Black-headed Gull								50		6			19
Common Gull			10					60					20
Cormorant	110	1200	20					200		150			117
Curlew	350	7600	25					30	6*	5			12
Dunlin	460	13300						10					3
Great Black-backed Gull			200					250	200*	200			150
Greenshank	20	3300	1					1		2			1
Grey Heron	25	5000	2					1		1			1
Herring Gull			200					300	200*	300			200
Light-bellied Brent Goose	350	400	50					100		200			100
Little Egret	20	1100	2							1			0
Mallard	280	53000						5					2
Mediterranean Gull									1*				0
Oystercatcher	610	8200	100					200	150*	100			100
Purple Sandpiper	20	110	5					10		15			8
Redshank	240	2400	10					25	10*	25			17
Red-throated Diver	20	3000						2					1
Ringed Plover	120	540						10	5*	4			5

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Sanderling	85	2000						60					20
Sandwich Tern			2						15*				0
Shag								150		60			70
Shelduck	100	2500								20			7
Turnstone	95	1400	60					80	20*	150			77
Whimbrel			2							1			0

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U903 Lambay Island

The mean is based only on the most recent 5-season period, *i.e.* for the period 2010/11 - 2014/15. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 7: I-WeBS summary data for OU903 Lambay Island

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Bar-tailed Godwit	170	1500		2									0
Black-headed Gull			200*	10				50		5*			25
Common Gull				20									0
Cormorant	110	1200		50				200		20*			100
Curlew	350	7600	6*	200	100			350		200*			175
Golden Plover	920	9300			100								0
Great Black-backed Gull								300		400*			150
Great Northern Diver	20	50		2									0
Grey Heron	25	5000						2		1*			1
Herring Gull								300		500*			150
Lapwing	850	72300		100	10								0
Light-bellied Brent Goose	350	400		400	350					400*			0
Mallard	280	53000						10					5
Mediterranean Gull			1*	1				1					0
Oystercatcher	610	8200	10*	100	100			100		250*			50
Purple Sandpiper	20	110						2		10*			1
Redshank	240	2400		25	15			30		10*			15
Red-throated Diver	20	3000						2		2*			1

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Ringed Plover	120	540		2						2*			0
Sandwich Tern			4*										0
Shag								200		150*			100
Shelduck	100	2500	6*							4*			0
Turnstone	95	1400	5*	25	50			60		50*			30
Whimbrel				2	1			10		8*			5

Appendix II – Results of Survey Observations

Activity codes: HU – Hunting/Feeding; WA – Walking; FL – Flying; OG – On ground; GL – Gliding; PE – Perching; SO – Soaring; PR – Preening; WP – With prey; SW – Swimming; RO – Roosting

Habitat codes: GA1 – Improved Grassland; WD – Highly modified woodland; GS – Rough Grassland; WS1 – Scrub; GS4 – Wet Grassland; WS5 – Recently felled woodland; GM1 – Marsh; WL1 – Hedgerow; FL – Lake; WL2 – Treeline; FW – Watercourse; PB – Bog; FS1 – Reed/sedge swamp; PF – Fen/flush; FS2 – Tall-herb swamp; HH – Heath; WN – Semi natural woodland; HD – Bracken.

Appendix II - Table 1: Record of survey observations – consisting of both flight lines and point observations. Survey start time and survey end time relate to the start and end of the survey on the date of survey. Observation start relates to the time the species was observed on site.

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	08/10/2020	07:39	18:50	1/4	8/8	Dry	Excellent			MH	1	HU	FW
COB	08/10/2020	07:39	18:50	1/4	8/8	Dry	Excellent			SG	2	RO	BL3
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent	4	14:38	HG	1	HU	GA2
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent			MT	1	RO	WL1
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent			MT	1	RO	WL1
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent			MH	1	HU	FW
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent			MH	2	HU	FW
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent			H.	1	HU	FW
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent			MA	2	SW	FW
KS	30/10/2020	07:20	16:55	3/4	6/8	10% rain, showers from 07:30 to 09:00	Good	8	12:46	KF	1	FL	FW

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wetafternoon	Excellent	9	12:46	CA	1	SW/HU	FW
KS	30/10/2020	07:20	16:55	3/4	6/8	10% rain, showers from 07:30 to 09:00	Good	10	13:18	HG	10	HU	GA1
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			SG	1	RO	BL3
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			MH	1	HU	FW
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			MA	4	HU	FW
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			MH	1	HU	FW
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			GR	1	RO	WL1
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			MT	2	RO	WL1
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			Mistle Thrush	1	RO	WD5
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent			MA	2	SW	FW
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent			TC	1	HU	WD1
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent			MH	1	HU	FW
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent			MT	2	RO	WL2
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent			GR	1	RO	WD5
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent			H.	1	HU	FW
COB	04/12/2020	08:32	16:10	2/4	3/8	Dry	Excellent			MA	1	HU	FW

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	04/12/2020	08:32	16:10	2/4	3/8	Dry	Excellent			MH	1	HU	FW
COB	04/12/2020	08:32	16:10	2/4	3/8	Dry	Excellent			H.	1	HU	FW
COB	04/12/2020	08:32	16:10	2/4	3/8	Dry	Excellent			MA	2	HU	FW
COB	04/12/2020	08:32	16:10	2/4	3/8	Dry	Excellent			MA	2	HU	FW
COB	04/12/2020	08:32	16:10	2/4	3/8	Dry	Excellent			WW	1	HU	WL2
COB	04/12/2020	08:32	16:10	2/4	3/8	Dry	Excellent			MH	1	HU	FW
COB	04/12/2020	08:32	16:10	2/4	3/8	Dry	Excellent			MA	2	RO	FW
COB	04/12/2020	08:32	16:10	2/4	3/8	Dry	Excellent			BC	1	HU	WD1
SB	26/01/2021	08:15	16:55	1/4 E	8/8	Drizzle 08:15-10:00	Excellent	1	08:40	BZ	1	PE	WL
SB	26/01/2021	08:15	16:55	1/4 E	8/8	Drizzle 08:15-10:00	Excellent	4	08:58	H.	1	PE	FW/WL
SB	26/01/2021	08:15	16:55	1/4 E	8/8	Drizzle 08:15-10:00	Excellent	6	09:01	MA	2	SW	FW
SB	26/01/2021	08:15	16:55	1/4 E	8/8	Drizzle 08:15-10:00	Excellent	9	08:35	HG	11	OG/HU	GA
SB	26/01/2021	08:15	16:55	1/4 E	8/8	Drizzle 08:15-10:00	Excellent	14	11:47	BZ	1	PE	WL
SB	26/01/2021	08:15	16:55	1/4 E	8/8	Drizzle 08:15-10:00	Excellent	17	14:05	BZ	1	PE	WD
SB	26/01/2021	08:15	16:55	1/4 E	8/8	Drizzle 08:15-10:00	Excellent	18	14:15	MH	1	SW	FW
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	1	08:35	BZ	1	PE	WL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	3	08:50	MH	1	SW	FW
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	4	08:52	MA	2	SW	FW
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	13	14:20	MH	1	SW	FW
KS	15/10/2020	08:00	18:00	1/4	6/8	30% showers, 8-10am	Good	8	11.13	MH	1	WA	FW
KS	15/10/2020	08:00	18:00	1/4	6/8	30% showers, 8-10am	Good	9	15.46	H.	1	HU	FW
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wetafternoon	Excellent			MH	2	HU	FW
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wetafternoon	Excellent			MA	1	HU	FW
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wetafternoon	Excellent			MT	1	RO	WD1
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			R.	1	PE	WD1
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			R.	1	PE	WD1
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			MH	2	SW	FW
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			MA	2	RO	FW
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			R.	1	PE	WL2
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			R.	2	PE	WD1
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	8	10:28	HG	2	HU, OG	GA2

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			M.	1	PE	WL2
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			R.	1	PE	WD1
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			H.	1	HU	FW
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			R.	1	PE	WL2
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			R.	1	PE	WL2
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			R.	1	HU	WD1
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			MA	2	HU,SW	FW
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			MH	1	HU, SW	FW
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			R.	1	PE	WD1
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			R.	1	PE	WD1
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent	9	13:15	HG	2	HU	GA2
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent			MA	2	SW	FW
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent			MH	1	HU	FW
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent			BC	1	PE	WD5
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent			MA	2	SW	FW
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good			R.	1	PE	WL2

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good			MH	1	HU	FW
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good			MA	4	HU.SW	FW
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good			R.	1	PE	WL2
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good			R.	1	PE	WD1
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good			R.	2	PE	WL2/WS1
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good			MA	2	RO	FW
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good			R.	1	PE	FW/WS1
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	2	08:45	MA	Mallard	SW	FW
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	10	09:49	BZ	1	PE	WL
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	13	11:19	BZ	1	PE	WD
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	17	16:03	BZ	1	OG	GA
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	18	16:47	GL	1	FL	FW
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	7	10:19	SH	1	PE	WL
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	9	13:00	GL	1	PE	WL
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	10	13:06	MA	2	SW	FW
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	11	13:06	MH	1	SW	FW

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	13	16:20	HG	2	PE	BL
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain after 10:30	Excellent			M.	2	PE	WL2
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain after 10:30	Excellent			M.	1	PE	WL2
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain after 10:30	Excellent			M.	1	RO	WL2
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain after 10:30	Excellent			MH	1	HU	FW
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain after 10:30	Excellent			H.	1	PE	BL2/FW
COB	03/02/2021	08:05	17:12	2/4	5/8	Dry	Excellent	5	12:43	HG	1	HU	HG
COB	03/02/2021	08:05	17:12	2/4	5/8	Dry	Excellent			M.	2	PE	WL2
COB	03/02/2021	08:05	17:12	2/4	5/8	Dry	Excellent			SG	1	PE	WL2
COB	03/02/2021	08:05	17:12	2/4	5/8	Dry	Excellent			SG	2	PE	BL3
COB	03/02/2021	08:05	17:12	2/4	5/8	Dry	Excellent			MA	1	SW	FW
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent	6	09:21	ET	1	HU	FW
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent	11	14:53	HG	1	HU	GA2
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent			GW	1	HU	BL3
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent			MH	1	HU	FW
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent			MH	1	HU	FW

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent			MH	1	HU	FW
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent			MA	2	SW	FW
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent			H.	1	HU	FW
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent			M.	2	PE	WL2
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent			M.	1	PE	BL3
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	16	09:58	HG	2	RO	BL3
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	19	12:03	ET	1	HU	FW
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	12	13:05	HG	2	HU	GS
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	13	14:52	ET	1	HU	FW
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	15	12:03	H.	1	HU	FW
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	18	14:12	CA	1	HU	FW
COB	24/03/2021	06:17	18:46	Dry	1/4	2/8	Excellent			GW	2	HU	FW
COB	24/03/2021	06:17	18:46	Dry	1/4	2/8	Excellent			CC	1	PE	WL2
COB	24/03/2021	06:17	18:46	Dry	1/4	2/8	Excellent			GR	1	PE	WL2
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	5	09:47	H.	1	HU	FW
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	13	15:53	HG	2	RO	BL3

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	17	19:10	HG	2	HU	GS
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent			SG	2	PE	BL3
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent			MA	2	SW	FW
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent			M.	1	PE	WD1
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent			MH	1	HU	FW
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	7	08:41	HG	1	HU, OG	GA2
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	46	11:00	HG	2	PE	GA2
COB	08/10/2020	07:39	17:50	1/4	7/8	Dry	Excellent			SL	Swallow	1	FL
COB	08/10/2020	07:39	17:50	1/4	7/8	Dry	Excellent			SH	Sparrowhawk	1	FL
COB	08/10/2020	07:39	17:50	1/4	7/8	Dry	Excellent			MT	Mistle Thrush	4	FL
COB	08/10/2020	07:39	17:50	1/4	7/8	Dry	Excellent			BZ	Buzzard	0	FL
COB	08/10/2020	07:39	17:50	1/4	7/8	Dry	Excellent			SH	Sparrowhawk	1	FL
COB	08/10/2020	07:39	17:50	1/4	7/8	Dry	Excellent	10	14:47	CA	Cormorant	1	FL
COB	08/10/2020	07:39	17:50	1/4	7/8	Dry	Excellent			SH	Sparrowhawk	1	FL
COB	08/10/2020	07:39	17:50	1/4	7/8	Dry	Excellent	3	08:42	CA	Cormorant	1	FL
COB	08/10/2020	07:39	17:50	1/4	7/8	Dry	Excellent	4	09:02	MA	Mallard	2	

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent	2	08:35	CA	Cormorant	1	FL
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent	3	09:55	MS	Mute Swan	2	FL
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent			MT	Mistle Thrush	4	FL
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent			H.	Grey Heron	1	FL
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent			GW	Grey Wagtail	1	FL
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent			SH	Sparrowhawk	1	FL
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent			SM	Sand Martin	2	FL
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent			SH	Sparrowhawk	1	FL
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent			SG	Starling	1	FL
KS	15/10/2020	08:00	18:00	1/4	6/8	showers	Good	8	11:13	MA	Mallard	2	FL
KS	15/10/2020	08:00	18:00	1/4	6/8	showers	Good	14	16:30	HG	Herring gull	30	HU
KS	30/10/2020	07:20	16:55	3/4	6/8	Showers from 07:30 - 9:00, then dry	Good	3	07:50	HG	Herring gull	23	FL
KS	30/10/2020	07:20	16:55	3/4	6/8	Showers from 07:30 - 9:00, then dry	Good	4	08:28	MA	Mallard	2	FL
KS	30/10/2020	07:20	16:55	3/4	6/8	Showers from 07:30 - 9:00, then dry	Good	5	9:10	BZ	Buzzard	1	HU
KS	30/10/2020	07:20	16:55	3/4	6/8	Showers from 07:30 - 9:00, then dry	Good	6	10:44	MH	Moorhen	1	SW
KS	30/10/2020	07:20	16:55	3/4	6/8	Showers from 07:30 - 9:00, then dry	Good	7	10:45	MA	Mallard	2	SW

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
KS	30/10/2020	07:20	16:55	3/4	6/8	Showers from 07:30 - 9:00, then dry	Good	11	13:19	HG	Herring gull	73	HU
KS	30/10/2020	07:20	16:55	3/4	6/8	Showers from 07:30 - 9:00, then dry	Good	12	15:31	MH	Moorhen	3	SW
KS	30/10/2020	07:20	16:55	3/4	6/8	Showers from 07:30 - 9:00, then dry	Good	13	16:35	HG	Herring gull	29	FL
KS	30/10/2020	07:20	16:55	3/4	6/8	Showers from 07:30 - 9:00, then dry	Good	14	16:47	H.	Grey Heron	1	FL
KS	30/10/2020	07:20	16:55	3/4	6/8	Showers from 07:30 - 9:00, then dry	Good	15	16:47	HG	Herring gull	78	FL
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			MT	Mistle Thrush	18	FL
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			BZ	Buzzard	1	FL
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			SG	Starling	4	FL
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			BZ	Buzzard	1	FL
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			SH	Sparrowhawk	1	FL
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			MA	Mallard	2	FL
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			H.	Grey Heron	1	FL
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			H.	Grey Heron	1	FL
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			GW	Grey Wagtail	1	FL
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			MH	Moorhen	2	FL
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			SH	Sparrowhawk	1	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent	4	09:15	CU	Curlew	2	FL
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent	5	09:43	CU	Curlew	2	FL
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent	7	14:26	ET	Little Egret	1	FL
COB	20/11/2020	08:00	16:20	1/4	8/8	Dry/misty	Excellent	2	09:14	CU	Curlew	10	FL
COB	20/11/2020	08:00	16:20	1/4	8/8	Dry/misty	Excellent	3	09:51	MA	Mallard	2	FL
COB	20/11/2020	08:00	16:20	1/4	8/8	Dry/misty	Excellent	4	10:21	CU	Curlew	5	FL
COB	20/11/2020	08:00	16:20	1/4	8/8	Dry/misty	Excellent	5	15:15	SN	Snipe	1	FL/flushed
COB	20/11/2020	08:00	16:20	1/4	8/8	Dry/misty	Excellent	6	15:18	SN	Snipe	1	FL/flushed
COB	20/11/2020	08:00	16:20	1/4	8/8	Dry/misty	Excellent	7	16:10	PB	Brent geese	130	FL
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent	1	08:48	CA	Cormorant	1	FL
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent	2	09:15	PB	Brent geese	32	FL
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent	3	09:18	CA	Cormorant	1	FL
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent	4	10:05	PB	Brent geese	8	FL
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent	6	11:32	PB	Brent geese	82	FL
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent			SH	Sparowhawk	1	FL
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent			SH	Sparrowhawk	1	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent			BZ	Buzzard	1	FL
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent			SH	Sparrowhawk	1	FL
SB	26/01/2021	08:15	16:55	1/4	8/8	Drizzle 08:15-10:00	Excellent	2	08:52	BG	Brent geese	60	FL
SB	26/01/2021	08:15	16:55	1/4	8/8	Drizzle 08:15-10:00	Excellent	3	08:59	BG	Brent geese	30	FL
SB	26/01/2021	08:15	16:55	1/4	8/8	Drizzle 08:15-10:00	Excellent	5	09:00	BG	Brent geese	7	FL
SB	26/01/2021	08:15	16:55	1/4	8/8	Drizzle 08:15-10:00	Excellent	7	09:14	BG	Brent geese	6	FL
SB	26/01/2021	08:15	16:55	1/4	8/8	Drizzle 08:15-10:00	Excellent	8	09:24	BG	Brent geese	150	FL
SB	26/01/2021	08:15	16:55	1/4	8/8	Drizzle 08:15-10:00	Excellent	11	10:05	H.	Grey heron	1	FL
SB	26/01/2021	08:15	16:55	1/4	8/8	Drizzle 08:15-10:00	Excellent	12	10:24	CA	Cormorant	1	FL
SB	26/01/2021	08:15	16:55	1/4	8/8	Drizzle 08:15-10:00	Excellent	13	11:31	BG	Brent geese	30	FL
SB	26/01/2021	08:15	16:55	1/4	8/8	Drizzle 08:15-10:00	Excellent	15	12:20	BG	Brent geese	180	FL
SB	26/01/2021	08:15	16:55	1/4	8/8	Drizzle 08:15-10:00	Excellent	16	13:17	CA	Cormorant	1	FL
SB	26/01/2021	08:15	16:55	1/4	8/8	Drizzle 08:15-10:00	Excellent	19	14:39	BG	Brent geese	8	FL
SB	26/01/2021	08:15	16:55	1/4	8/8	Drizzle 08:15-10:00	Excellent	20	15:45	BG	Brent geese	160	FL
SB	26/01/2021	08:15	16:55	1/4	8/8	Drizzle 08:15-10:00	Excellent	21	16:35	BZ	Buzzard	1	FL
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	2	08:48	BG	Brent geese	6	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	5	08:59	BG	Brent geese	42	FL
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	6	09:5	BG	Brent geese	45	FL
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	7	09:09	SH	Sparrowhawk	1	FL
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	8	09:12	BG	Brent geese	32	FL
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	9	09:15	CA	Cormorant	1	FL
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	11	11:35	BZ	Buzzard	1	FL
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	12	14:04	BZ	Buzzard	1	FL
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	14	14:30	CA	Cormorant	1	FL
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	15	14:53	SH	Sparrowhawk	1	FL
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	16	15:07	H.	Grey heron	1	FL
KS	15/10/2020	08:00	18:00	1/4	6/8	30% showers, 8-10am	Good	3	10.12	H.	Grey heron	1	FL
KS	15/10/2020	08:00	18:00	1/4	6/8	30% showers, 8-10am	Good	4	10.27	SH	Sparrowhawk	1	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
KS	15/10/2020	08:00	18:00	1/4	6/8	30% showers, 8-10am	Good	5	10:38	H.	Grey heron	1	FL
KS	15/10/2020	08:00	18:00	1/4	6/8	30% showers, 8-10am	Good	6	10.54	ET	Little egret	1	FL
KS	15/10/2020	08:00	18:00	1/4	6/8	30% showers, 8-10am	Good	7	11.00	MA	Mallard	2	FL
KS	15/10/2020	08:00	18:00	1/4	6/8	30% showers, 8-10am	Good	10	15.46	KF	Kingfisher	1	FL
KS	15/10/2020	08:00	18:00	1/4	6/8	30% showers, 8-10am	Good	11	15:52	H.	Grey heron	1	FL
KS	15/10/2020	08:00	18:00	1/4	6/8	30% showers, 8-10am	Good	12	16.19	HG	Herring gull	20	HG
KS	15/10/2020	08:00	18:00	1/4	6/8	30% showers, 8-10am	Good	13	16:36	RI	Ring-necked parachetes	3	FL
KS	15/10/2020	08:00	18:00	1/4	6/8	30% showers, 8-10am	Good	15	16:38	HG	Herring gull	21	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent	1	08:23	PB	Brent geese	95	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent	2	08:23	PB	Brent geese	30	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent	3	08:27	PB	Brent geese	48	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent	4	08:28	PB	Brent geese	18	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent	5	08:33	PB	Brent geese	190	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent	6	08:34	PB	Brent geese	38	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent	7	08:47	PB	Brent geese	10	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent	8	09:13	PB	Brent geese	9	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent	9	10:55	CA	Cormorant	1	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent	11	16:07	PB	Brent geese	68	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent			SH	Sparrowhawk	1	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent			RN	Raven	2	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent			SH	Sparrowhawk	1	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent			BZ	Buzzard	1	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent			GW	Grey wagtail	1	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	2	08:32	PB	Brent geese	32	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	3	08:36	BG	Brent geese	3	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	4	09:10	BG	Brent geese	5	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	5	09:36	H.	Grey heron	1	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	6	09:41	ET	Little egret	1	FL/HU
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	7	09:46	PB	Brent geese	142	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	28	09:47	MH	Moorhen	1	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	36	10:22	BZ	Buzzard	1	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	54	11:34	SG	Starling	1	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	9	12:10	BG	Brent geese	184	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	66	12:22	RN	Raven	1	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	70	12:34	BZ	Buzzard	1	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	74	12:34	MS	Mute Swan	2	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	11	12:56	BG	Brent geese	17	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	12	12:57	PE	Peregrine	1	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	13	14:02	BG	Brent geese	24	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	14	16:05	BG	Brent geese	26	FL
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent	1	08:43	PB	Brent geese	55	FL
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent	2	08:54	PB	Brent geese	23	FL
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent	3	08:55	PB	Brent geese	14	FL
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent	4	08:55	PB	Brent geese	78	FL
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent	5	09:07	PB	Brent geese	42	FL
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent	6	09:08	PB	Brent geese	34	FL
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent	7	09:11	PB	Brent geese	7	FL
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent	8	10:36	H.	Grey heron	1	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent	11	16:03	CA	Cormorant	1	FL
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent			SH	Sparrowhawk	1	FL
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent			BZ	Buzzard	1	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	drizzle/light rain	Good	2	09:29	CA	Cormorant	1	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	drizzle/light rain	Good	26	10:20	BZ	Buzzard	1	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	drizzle/light rain	Good	50	11:58	RN	Raven	1	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	drizzle/light rain	Good	51	12:40	SH	Sparrowhawk	1	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	drizzle/light rain	Good	4	14:35	GB	Great black-backed gull	1	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	drizzle/light rain	Good	66	15:06	BZ	Buzzard	1	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	drizzle/light rain	Good	5	15:27	CU	Curlew	7	FL
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	1	08:30	CA	Cormorant	2	FL
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	3	08:54	CA	Comorant	1	FL
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	4	08:56	BG	Brent geese	140	FL
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	5	09:10	BG	Brent geese	40	FL
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	6	09:20	BG	Brent geese	20	FL
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	7	09:30	BG	Brent geese	280	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	8	09:32	CA	Cormorant	1	FL
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	9	09:42	BG	Brent geese	3	FL
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	11	10:14	BG	Brent geese	4	FL
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	12	11:05	BG	Brent geese	48	FL
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	14	12:04	SH	Sparrowhawk	1	FL/HU
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	15	14:34	BG	Brent geese	25	FL
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	16	15:14	BG	Brent geese	14	FL
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	1	07:16	BG	Brent geese	15	FL
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	2	07:41	MA	Mallard	3	FL
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	3	08:05	MA	Mallard	8	FL
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	4	08:34	H.	Grey Heron	1	FL
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	5	10:07	BZ	Buzzard	1	FL
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	6	10:09	H.	Grey Heron	1	FL
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	8	10:34	SH	Sparrowhawk	1	FL
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	12	13:45	KF	Kingfisher	1	FL
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	14	16:55	MA	Mallard	2	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	15	17:56	BG	Brent geese	130	FL
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	16	18:05	MA	Mallard	4	FL
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain from 10:20	Excellent	1	08:37	MA	Mallard	3	FL
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain from 10:20	Excellent	2	09:12	PB	Brent geese	47	FL
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain from 10:20	Excellent	3	09:13	PB	Brent geese	160	FL
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain from 10:20	Excellent	4	09:13	PB	Brent geese	32	FL
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain from 10:20	Excellent	7	16:34	CA	Cormorant	1	FL
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain from 10:20	Excellent			BZ	Buzzard	1	FL
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain from 10:20	Excellent			BZ	Buzzard	1	FL
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain from 10:20	Excellent			SG	Starling	9	FL
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain from 10:20	Excellent			SH	Sparrowhawk	1	FL
COB	03/02/2021	08:06	17:12	2/4	5/8	Dry	Excellent	1	09:45	PB	Brent geese	40	FL
COB	03/02/2021	08:06	17:12	2/4	5/8	Dry	Excellent	2	09:46	PB	Brent geese	33	FL
COB	03/02/2021	08:06	17:12	2/4	5/8	Dry	Excellent	3	09:57	PB	Brent geese	22	FL
COB	03/02/2021	08:06	17:12	2/4	5/8	Dry	Excellent	4	10:00	PB	Brent geese	20	FL
COB	03/02/2021	08:06	17:12	2/4	5/8	Dry	Excellent	7	16:17	CA	Cormorant	1	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	03/02/2021	08:06	17:12	2/4	5/8	Dry	Excellent	8	16:24	ET	Little egret	1	FL
COB	03/02/2021	08:06	17:12	2/4	5/8	Dry	Excellent			GR	Greenfinch	2	FL
COB	03/02/2021	08:06	17:12	2/4	5/8	Dry	Excellent			M.	Mistle thrush	4	FL
COB	03/02/2021	08:06	17:12	2/4	5/8	Dry	Excellent			MA	Mallard	2	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent	1	08:08	CA	Cormorant	1	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent	2	08:10	CA	Cormorant	1	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent	3	08:11	MA	Mallard	2	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent	4	08:18	MA	Mallard	1	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent	5	08:35	MS	Mute swan	2	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent	7	10:03	MS	Mute swan	2	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent	8	10:05	H.	Grey heron	1	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent	9	11:37	CA	Cormorant	1	HU/SW
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent	10	11:50	PB	Brent geese	c.600	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent	13	17:04	MA	Mallard	4	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent			SH	Sparrowhawk	1	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent			RN	Raven	1	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent			BZ	Buzzard	1	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent			RN	Raven	2	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent			M.	Mistle thrush	2	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent			SH	Sparrowhawk	1	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent	1	08:25	PB	Brent geese	230	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent	2	08:28	CA	Cormorant	1	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent	3	08:32	PB	Brent geese	18	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent	4	08:40	PB	Brent geese	25	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent	5	08:42	PB	Brent geese	29	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent	6	08:55	PB	Brent geese	65	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent	7	09:17	CA	Cormorant	1	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent	8	09:47	MA	Mallard	1	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent	9	10:02	CA	Cormorant	1	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent	10	10:13	ET	Little egret	1	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent	11	10:29	MA	Mallard	2	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent	13	12:52	PB	Brent geese	c.660	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent			BZ	Buzzard	1	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent			SH	Sparrowhawk	1	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent			BZ	Buzzard	1	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent			RN	Raven	1	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent			GW	Grey wagtail	1	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	1	07:14	MA	Mallard	5	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	2	07:28	MA	Mallard	2	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	3	07:46	CA	Cormorant	1	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	4	07:47	MA	Mallard	2	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	5	07:49	PB	Brent geese	28	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	6	07:50	PB	Brent geese	80	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	7	07:52	PB	Brent geese	65	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	8	07:52	PB	Brent geese	27	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	9	07:54	PB	Brent geese	11	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	10	07:56	PB	Brent geese	08:04	08:04
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	12	08:08	MA	Mallard	1	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	13	08:11	PB	Brent geese	3	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	14	08:14	PB	Brent geese	5	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	15	08:32	H.	Grey heron	1	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	17	11:55	MA	Mallard	5	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	18	11:56	H.	Grey heron	1	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	20	12:07	KF	Kingfisher	1	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	21	12:13	KF	Kingfisher	1	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	22	12:37	PB	Brent geese	230	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	23	13:01	ET	Little egret	1	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	24	15:19	ET	Little egret	1	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	1	06:46	MA	Mallard	5	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	2	07:44	MA	Mallard	3	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	3	08:17	CA	Cormorant	1	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	4	09:10	CA	Cormorant	1	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	5	09:12	CA	Cormorant	1	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	6	09:28	MA	Mallard	2	SW

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	7	10:55	PB	Brent geese	11	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	8	11:16	H.	Grey heron	1	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	9	11:31	H.	Grey heron	1	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	10	12:44	H.	Grey heron	1	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	11	13:03	MA	Mallard	2	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	14	14:57	KF	Kingfisher	1	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	15	15:02	KF	Kingfisher	1	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	16	15:04	KF	Kingfisher	1	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	17	15:24	KF	Kingfisher	1	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	19	17:29	KF	Kingfisher	1	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	2	06:28	PB	Brent geese	12	HU
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	3	06:33	CA	Cormorant	1	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	4	06:34	MA	Mallard	2	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	5	06:37	CA	Cormorant	1	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	6	06:47	PB	Brent geese	2	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	8	06:54	MA	Mallard	2	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	9	07:02	PB	Brent geese	5	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	10	07:19	Gj	Greylag geese	30	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	11	07:27	H.	Grey heron	1	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	12	07:32	CA	Cormorant	1	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	13	10:11	MA	Mallard	1	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	14	11:22	ET	Little egret	1	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	16	13:52	MA	Mallard	2	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	19	15:07	H.	Grey heron	1	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	20	17:43	MA	Mallard	2	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	21	18:36	PB	Brent geese	150	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	22	18:36	PB	Brent geese	70	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent			BZ	Buzzard	3	SO
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent			SH	Sparrowhawk	1	FL/SO
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	1	07:09	HG	Herring gull	5	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	2	07:24	MA	Mallard	1	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	3	08:21	MA	Mallard	2	SW

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	4	08:55	MA	Mallard	2	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	6	11:22	CA	Cormorant	1	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	7	12:48	MA	Mallard	1	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	8	13:10	MA	Mallard	3	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	9	13:26	CA	Cormorant	1	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	10	13:46	MA	Mallard	3	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	11	15:06	MA	Mallard	4	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	12	15:11	ET	Little egret	1	FL/SW
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	14	16:19	CA	Cormorant	1	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	15	16:47	H.	Grey heron	1	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	16	17:15	MA	Mallard	1	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	18	19:05	HG	Herring gull	45	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	19	19:05	HG	Herring gull	30	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent			BZ	Buzzard	1	SO
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent				RN	Raven	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent			SM	Sand martin	2	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent			M.	Mistle thrush	2	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent		08:32	HG	Herring gull	11	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent		08:32	BH	Black-headed gull	8	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	15	09:10	BG	Brent geese	5	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent		09:27	HG	Herring gull	3	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	26	09:44	CM	Common gull	1	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	30	09:49	BH	Black-headed gull	1	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent		09:49	HG	Herring gull	33	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	56	11:37	CM	Common gull	1	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	68	12:22	CM	Common gull	1	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	70	12:34	BZ	Buzzard	1	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent		09:49	BH	Black-headed gull	6	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent		12:57	HG	Herring gull	4	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent		14:00	HG	Herring gull	8	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent		14:00	BH	Black-headed gull	17	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	105	15:19	HG	Herring gull	55	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	105	15:19	BH	Black-headed gull	10	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent		15:37	BH	Black-headed gull	13	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent		15:38	HG	Herring gull	56	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	114	15:55	BH	Black-headed gull	50	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent		15:57	HG	Herring gull	36	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	116	16:01	BH	Black-headed gull	40	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	119	16:05	BH	Black-headed gull	48	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good	2	08:42	HG	Herring gull	38	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good		08:45	HG	Herring gull	23	FL/circling
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good		09:24	HG	Herring gull	10	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good		09:24	BH	Black-headed gull	30	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good	30	10:33	HG	Herring gull	16	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good	44	11:21	HG	Herring gull	44	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good	35	11:26	HG	Herring gull	4	FL, circling
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good		11:40	BH	Black-headed gull	17	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good		11:40	HG	Herring gull	25	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good	62	14:35	GB	Great black backed gull	1	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good	63	14:45	CM	Common gull	1	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good	68	15:07	HG	Herring gull	9	FL, circling
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good	69	15:23	HG	Herring gull	29	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good		15:27	HG	Herring gull	95	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good		15:27	BH	Black-headed gull	45	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good		15:48	BH	Black-headed gull	84	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good		15:48	HG	Herring gull	156	FL

Appendix III – Results of Survey Transects

Appendix III - Table 1: Results of survey transects sorted by date.

urveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Northern large field - grass very rank and overgrown. Not mown since summer 19	0	45	0	40	60	Yes
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Northern large field - grass very rank and overgrown. Not mown since summer 19	0	23	0	95	5	Yes
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Northern large field - grass very rank and overgrown. Not mown since summer 19	0	25	0	100	0	Yes
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Northern large field - grass very rank and overgrown. Not mown since summer 19	0	23	0	65	35	Yes
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Northern large field - grass very rank and overgrown. Not mown since summer 19	0	24	0	85	15	Yes
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Northern large field - grass very rank and overgrown. Not mown since summer 19	0	21	0	90	10	Yes
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Northern large field - grass very rank and overgrown. Not mown since summer 19	0	23	0	95	5	Yes
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Northern large field - grass very rank and overgrown. Not mown since summer 19	0	22	0	90	10	Yes
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Northern large field - grass very rank and overgrown. Not mown since summer 19	0	24	0	80	20	Yes
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Northern large field - grass very rank and overgrown. Not mown since summer 19	0	21	0	95	5	Yes
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Amenity grassland - recently mown, patches of ED3 with longer grass.	0	6	0	85	15	Yes, treelines
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Amenity grassland - recently mown, patches of ED3 with longer grass.	0	5	10	75	15	Yes, treelines
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Amenity grassland - recently mown, patches of ED3 with longer grass.	0	8	0	80	20	Yes, treelines
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Amenity grassland - recently mown, patches of ED3 with longer grass.	0	7	0	80	20	Yes, treelines
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Amenity grassland - recently mown, patches of ED3 with longer grass.	0	4	0	100	0	Yes, treelines
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Amenity grassland - recently mown, patches of ED3 with longer grass.	0	7	0	90	10	Yes, treelines
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Amenity grassland - recently mown, patches of ED3 with longer grass.	0	9	5	75	25	Yes, treelines
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Amenity grassland - recently mown, patches of ED3 with longer grass.	0	8	0	80	20	Yes, treelines
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Amenity grassland - recently mown, patches of ED3 with longer grass.	0	6	10	15	75	Yes, treelines
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Amenity grassland - recently mown, patches of ED3 with longer grass.	0	5	35	10	55	Yes, treelines
COB	20/10/2020	07:39	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	18	15	85	0	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	26	0	100	0	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	24	0	70	30	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	21	0	35	65	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	21	0	100	0	Yes

COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	16	0	90	10	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	17	0	70	30	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	19	0	80	20	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	15	0	90	10	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	16	0	95	5	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	13	0	85	15	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	6	0	55	45	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	11	0	70	30	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	10	0	80	20	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	8	0	85	15	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	8	0	75	25	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	9	0	75	25	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	8	0	80	20	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	9	10	80	10	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	11	0	75	25	Yes
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers 08:00 to 10:00	Good		0	30	0	50	50	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers 08:00 to 10:00	Good		0	50	0	60	40	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers 08:00 to 10:00	Good		0	40	0	40	60	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers 08:00 to 10:00	Good		0	60	0	80	20	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers 08:00 to 10:00	Good		0	30	0	90	10	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers 08:00 to 10:00	Good		0	5	0	90	10	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers 08:00 to 10:00	Good		0	15	0	90	10	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers 08:00 to 10:00	Good		0	20	0	80	20	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers 08:00 to 10:00	Good		0	20	0	80	20	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers 08:00 to 10:00	Good		0	20	0	90	10	
SB	26/01/2021	14:55	15:15	2/4 E	8/8	6C	nil	Excellent	Amenity Grassland	0	22	0	100	0	Yes, treelines
SB	26/01/2021	14:55	15:15	2/4 E	8/8	6C	nil	Excellent	Amenity Grassland	0	24	0	100	0	Yes, treelines
SB	26/01/2021	14:55	15:15	2/4 E	8/8	6C	nil	Excellent	Amenity Grassland	0	12	10	90	0	Yes, treelines
SB	26/01/2021	14:55	15:15	2/4 E	8/8	6C	nil	Excellent	Amenity Grassland	0	18	0	100	0	Yes, treelines

SB	26/01/2021	14:55	15:15	2/4 E	8/8	6C	nil	Excellent	Amenity Grassland	0	20	0	100	0	Yes, treelines
SB	26/01/2021	14:55	15:15	2/4 E	8/8	6C	nil	Excellent	Amenity Grassland	0	19	0	100	0	Yes, treelines
SB	26/01/2021	14:55	15:15	2/4 E	8/8	6C	nil	Excellent	Amenity Grassland	0	11	0	100	0	Yes, treelines
SB	26/01/2021	14:55	15:15	2/4 E	8/8	6C	nil	Excellent	Amenity Grassland	0	17	0	100	0	Yes, treelines
SB	26/01/2021	14:55	15:15	2/4 E	8/8	6C	nil	Excellent	Amenity Grassland	0	16	0	100	0	Yes, treelines
SB	26/01/2021	14:55	15:15	2/4 E	8/8	6C	nil	Excellent	Amenity Grassland	0	13	0	80	20	Yes, treelines
SB	26/01/2021	15:20	15:30	2/4 E	8/8	6C	nil	Excellent	Gaelic pitch	0	17	0	100	0	Yes
SB	26/01/2021	15:20	15:30	2/4 E	8/8	6C	nil	Excellent	Gaelic pitch	0	19	0	100	0	Yes
SB	26/01/2021	15:20	15:30	2/4 E	8/8	6C	nil	Excellent	Gaelic pitch	0	13	0	100	0	Yes
SB	26/01/2021	15:20	15:30	2/4 E	8/8	6C	nil	Excellent	Gaelic pitch	0	14	0	25	75	Yes
SB	26/01/2021	15:20	15:30	2/4 E	8/8	6C	nil	Excellent	Gaelic pitch	0	14	0	100	0	Yes
SB	26/01/2021	15:20	15:30	2/4 E	8/8	6C	nil	Excellent	Gaelic pitch	0	12	0	100	0	Yes
SB	26/01/2021	15:20	15:30	2/4 E	8/8	6C	nil	Excellent	Gaelic pitch	0	25	0	100	0	Yes
SB	26/01/2021	15:20	15:30	2/4 E	8/8	6C	nil	Excellent	Gaelic pitch	0	22	0	100	0	Yes
SB	26/01/2021	15:20	15:30	2/4 E	8/8	6C	nil	Excellent	Gaelic pitch	0	33	0	100	0	Yes
SB	26/01/2021	15:20	15:30	2/4 E	8/8	6C	nil	Excellent	Gaelic pitch	0	17	0	100	0	Yes
SB	29/01/2021	10:50	11:08	2/4 E	8/8	8C	Mist drizzle	Good	Amenity Grassland	0	20	0	95	5	Yes, treelines
SB	29/01/2021	10:50	11:08	2/4 E	8/8	8C	Mist drizzle	Good	Amenity Grassland	0	22	0	100	0	Yes, treelines
SB	29/01/2021	10:50	11:08	2/4 E	8/8	8C	Mist drizzle	Good	Amenity Grassland	0	14	0	100	0	Yes, treelines
SB	29/01/2021	10:50	11:08	2/4 E	8/8	8C	Mist drizzle	Good	Amenity Grassland	0	24	0	100	0	Yes, treelines
SB	29/01/2021	10:50	11:08	2/4 E	8/8	8C	Mist drizzle	Good	Amenity Grassland	0	17	0	95	5	Yes, treelines
SB	29/01/2021	10:50	11:08	2/4 E	8/8	8C	Mist drizzle	Good	Amenity Grassland	0	14	5	95	0	Yes, treelines
SB	29/01/2021	10:50	11:08	2/4 E	8/8	8C	Mist drizzle	Good	Amenity Grassland	0	9	5	95	0	Yes, treelines
SB	29/01/2021	10:50	11:08	2/4 E	8/8	8C	Mist drizzle	Good	Amenity Grassland	0	16	0	100	0	Yes, treelines
SB	29/01/2021	10:50	11:08	2/4 E	8/8	8C	Mist drizzle	Good	Amenity Grassland	0	17	0	100	0	Yes, treelines
SB	29/01/2021	10:50	11:08	2/4 E	8/8	8C	Mist drizzle	Good	Amenity Grassland	0	8	0	80	20	Yes, treelines
SB	29/01/2021	11:15	11:30	2/4 E	8/8	8C	Mist drizzle	Good	Gaelic pitch	0	25	0	100	0	Yes
SB	29/01/2021	11:15	11:30	2/4 E	8/8	8C	Mist drizzle	Good	Gaelic pitch	0	20	0	100	0	Yes
SB	29/01/2021	11:15	11:30	2/4 E	8/8	8C	Mist drizzle	Good	Gaelic pitch	0	15	0	100	0	Yes

SB	29/01/2021	11:15	11:30	2/4 E	8/8	8C	Mist drizzle	Good	Gaelic pitch	0	25	0	25	75	Yes
SB	29/01/2021	11:15	11:30	2/4 E	8/8	8C	Mist drizzle	Good	Gaelic pitch	0	23	0	90	10	Yes
SB	29/01/2021	11:15	11:30	2/4 E	8/8	8C	Mist drizzle	Good	Gaelic pitch	0	18	0	100	0	Yes
SB	29/01/2021	11:15	11:30	2/4 E	8/8	8C	Mist drizzle	Good	Gaelic pitch	0	18	0	100	0	Yes
SB	29/01/2021	11:15	11:30	2/4 E	8/8	8C	Mist drizzle	Good	Gaelic pitch	0	16	0	100	0	Yes
SB	29/01/2021	11:15	11:30	2/4 E	8/8	8C	Mist drizzle	Good	Gaelic pitch	0	27	0	100	0	Yes
SB	29/01/2021	11:15	11:30	2/4 E	8/8	8C	Mist drizzle	Good	Gaelic pitch	0	13	0	100	0	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Amenity grassland	0	19	0	90	10	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Amenity grassland	0	14	5	95	0	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Amenity grassland	0	8	0	90	10	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Amenity grassland	0	15	0	85	15	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Amenity grassland	0	17	10	90	0	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Amenity grassland	0	18	15	75	10	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Amenity grassland	0	9	5	95	0	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Amenity grassland	0	7	5	85	10	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Amenity grassland	0	12	0	100	10	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Amenity grassland	0	9	5	80	15	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Rough grassland	0	21	0	100	0	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Rough grassland	0	13	0	100	0	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Rough grassland	0	13	0	60	40	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Rough grassland	0	19	0	100	0	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Rough grassland	0	18	0	40	60	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Rough grassland	0	20	0	95	5	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Rough grassland	0	16	0	45	55	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Rough grassland	0	15	0	80	20	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Rough grassland	0	15	0	65	35	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Rough grassland	0	19	0	85	15	Yes
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers, 8-10am	Good	Two transects combined	0	30	0	50	50	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers, 8-10am	Good	Two transects combined	0	50	0	60	40	

KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers, 8-10am	Good	Two transects combined	0	40	0	40	60	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers, 8-10am	Good	Two transects combined	0	60	0	80	20	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers, 8-10am	Good	Two transects combined	0	30	0	90	10	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers, 8-10am	Good	Two transects combined	0	5	0	90	10	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers, 8-10am	Good	Two transects combined	0	15	0	90	10	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers, 8-10am	Good	Two transects combined	0	20	0	80	20	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers, 8-10am	Good	Two transects combined	0	20	0	80	20	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers, 8-10am	Good	Two transects combined	0	20	0	90	10	
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	21	0	100	0	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	13	0	100	0	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	13	0	60	40	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	19	0	100	0	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	18	0	40	60	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	20	0	95	5	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	16	0	45	55	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	15	0	80	20	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	15	0	65	35	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	19	0	85	15	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	19	0	90	10	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	9	5	95	0	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	14	5	95	0	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	8	0	90	10	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	15	0	85	15	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	7	5	85	10	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	17	10	90	0	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	18	15	75	10	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	12	0	100	0	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	9	5	80	15	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry	Excellent	Rough grassland	0	20	0	100	0	Yes

COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry	Excellent	Rough grassland	0	14	0	65	35	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry	Excellent	Rough grassland	0	13	0	95	5	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry	Excellent	Rough grassland	0	19	0	60	40	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry	Excellent	Rough grassland	0	17	0	100	0	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry	Excellent	Rough grassland	0	21	0	35	65	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry	Excellent	Rough grassland	0	16	0	85	15	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry	Excellent	Rough grassland	0	18	0	20	80	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry	Excellent	Rough grassland	0	15	0	60	40	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry	Excellent	Rough grassland	0	16	0	55	45	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry, wet afternoon	Excellent	Amenity grassland	0	13	0	100	0	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry, wet afternoon	Excellent	Amenity grassland	0	16	5	90	5	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry, wet afternoon	Excellent	Amenity grassland	0	7	5	85	10	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry, wet afternoon	Excellent	Amenity grassland	0	15	0	85	15	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry, wet afternoon	Excellent	Amenity grassland	0	17	0	100	0	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry, wet afternoon	Excellent	Amenity grassland	0	16	10	85	5	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry, wet afternoon	Excellent	Amenity grassland	0	8	5	85	10	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry, wet afternoon	Excellent	Amenity grassland	0	14	0	80	20	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry, wet afternoon	Excellent	Amenity grassland	0	10	15	70	15	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry, wet afternoon	Excellent	Amenity grassland	0	13	0	100	0	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Rough grassland	0	20	5	90	5	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Rough grassland	0	15	0	95	5	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Rough grassland	0	22	0	80	20	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Rough grassland	0	21	0	35	65	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Rough grassland	0	17	0	100	0	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Rough grassland	0	18	0	30	70	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Rough grassland	0	17	0	70	30	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Rough grassland	0	17	0	80	20	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Rough grassland	0	21	0	90	5	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Rough grassland	0	16	0	65	35	Yes

COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Amenity grassland	0	18	0	100	0	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Amenity grassland	0	17	10	90	0	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Amenity grassland	0	6	5	85	10	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Amenity grassland	0	17	0	90	10	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Amenity grassland	0	20	0	100	0	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Amenity grassland	0	14	10	85	5	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Amenity grassland	0	8	0	90	10	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Amenity grassland	0	8	0	95	5	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Amenity grassland	0	12	15	80	5	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Amenity grassland	0	11	0	85	15	Yes
SB	08/02/2021	10:45	10:59	2/4 W	8/8	4C	Periodic sleet	Good	Amenity Grassland	0	23	0	100	0	Yes, treelines
SB	08/02/2021	10:45	10:59	2/4 W	8/8	4C	Periodic sleet	Good	Amenity Grassland	0	20	0	100	0	Yes, treelines
SB	08/02/2021	10:45	10:59	2/4 W	8/8	4C	Periodic sleet	Good	Amenity Grassland	0	10	0	100	0	Yes, treelines
SB	08/02/2021	10:45	10:59	2/4 W	8/8	4C	Periodic sleet	Good	Amenity Grassland	0	15	10	90	0	Yes, treelines
SB	08/02/2021	10:45	10:59	2/4 W	8/8	4C	Periodic sleet	Good	Amenity Grassland	0	18	0	100	0	Yes, treelines
SB	08/02/2021	10:45	10:59	2/4 W	8/8	4C	Periodic sleet	Good	Amenity Grassland	0	11	5	95	0	Yes, treelines
SB	08/02/2021	10:45	10:59	2/4 W	8/8	4C	Periodic sleet	Good	Amenity Grassland	0	11	0	100	0	Yes, treelines
SB	08/02/2021	10:45	10:59	2/4 W	8/8	4C	Periodic sleet	Good	Amenity Grassland	0	15	5	95	0	Yes, treelines
SB	08/02/2021	10:45	10:59	2/4 W	8/8	4C	Periodic sleet	Good	Amenity Grassland	0	16	10	90	0	Yes, treelines
SB	08/02/2021	10:45	10:59	2/4 W	8/8	4C	Periodic sleet	Good	Amenity Grassland	0	6	0	25	75	Yes, treelines
SB	08/02/2021	12:25	12:45	2/4 W	8/8	4C	Periodic sleet	Good	Gaelic pitch	0	23	0	100	0	Yes
SB	08/02/2021	12:25	12:45	2/4 W	8/8	4C	Periodic sleet	Good	Gaelic pitch	0	25	0	100	0	Yes
SB	08/02/2021	12:25	12:45	2/4 W	8/8	4C	Periodic sleet	Good	Gaelic pitch	0	13	0	90	10	Yes
SB	08/02/2021	12:25	12:45	2/4 W	8/8	4C	Periodic sleet	Good	Gaelic pitch	0	15	0	25	75	Yes
SB	08/02/2021	12:25	12:45	2/4 W	8/8	4C	Periodic sleet	Good	Gaelic pitch	0	19	0	100	0	Yes
SB	08/02/2021	12:25	12:45	2/4 W	8/8	4C	Periodic sleet	Good	Gaelic pitch	0	14	0	100	0	Yes
SB	08/02/2021	12:25	12:45	2/4 W	8/8	4C	Periodic sleet	Good	Gaelic pitch	0	13	0	100	0	Yes
SB	08/02/2021	12:25	12:45	2/4 W	8/8	4C	Periodic sleet	Good	Gaelic pitch	0	18	0	100	0	Yes
SB	08/02/2021	12:25	12:45	2/4 W	8/8	4C	Periodic sleet	Good	Gaelic pitch	0	18	0	100	0	Yes

SB	08/02/2021	12:25	12:45	2/4 W	8/8	4C	Periodic sleet	Good	Gaelic pitch	0	9	0	75	25	Yes
SB	08/03/2021	15:30	15:47	0/4	3/8	11C	nil	Excellent		0	17	0	100	0	Yes
SB	08/03/2021	15:30	15:47	0/4	3/8	11C	nil	Excellent		0	15	0	40	60	Yes
SB	08/03/2021	15:30	15:47	0/4	3/8	11C	nil	Excellent		0	12	0	90	10	Yes
SB	08/03/2021	15:30	15:47	0/4	3/8	11C	nil	Excellent		0	16	0	75	25	Yes
SB	08/03/2021	15:30	15:47	0/4	3/8	11C	nil	Excellent		0	16	0	100	0	Yes
SB	08/03/2021	15:30	15:47	0/4	3/8	11C	nil	Excellent		0	13	0	100	0	Yes
SB	08/03/2021	15:30	15:47	0/4	3/8	11C	nil	Excellent		0	12	0	100	0	Yes
SB	08/03/2021	15:30	15:47	0/4	3/8	11C	nil	Excellent		0	14	0	100	0	Yes
SB	08/03/2021	15:30	15:47	0/4	3/8	11C	nil	Excellent		0	14	0	50	50	Yes
SB	08/03/2021	15:30	15:47	0/4	3/8	11C	nil	Excellent		0	10	5	90	5	Yes
SB	08/03/2021	15:59	16:10	0	3/8	11C	nil	Excellent	Amenity grassland	0	22	0	100	0	Yes, treelines
SB	08/03/2021	15:59	16:10	0	3/8	11C	nil	Excellent	Amenity grassland	0	24	0	100	0	Yes, treelines
SB	08/03/2021	15:59	16:10	0	3/8	11C	nil	Excellent	Amenity grassland	0	17	0	60	40	Yes, treelines
SB	08/03/2021	15:59	16:10	0	3/8	11C	nil	Excellent	Amenity grassland	0	19	0	100	0	Yes, treelines
SB	08/03/2021	15:59	16:10	0	3/8	11C	nil	Excellent	Amenity grassland	0	20	0	100	0	Yes, treelines
SB	08/03/2021	15:59	16:10	0	3/8	11C	nil	Excellent	Amenity grassland	0	22	10	80	10	Yes, treelines
SB	08/03/2021	15:59	16:10	0	3/8	11C	nil	Excellent	Amenity grassland	0	15	0	100	0	Yes, treelines
SB	08/03/2021	15:59	16:10	0	3/8	11C	nil	Excellent	Amenity grassland	0	22	0	100	0	Yes, treelines
SB	08/03/2021	15:59	16:10	0	3/8	11C	nil	Excellent	Amenity grassland	0	20	0	100	0	Yes, treelines
SB	08/03/2021	15:59	16:10	0	3/8	11C	nil	Excellent	Amenity grassland	0	10	0	100	0	Yes, treelines
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry morning, rain from 10:30	Excellent	Rough grassland	0	13	0	100	0	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry morning, rain from 10:30	Excellent	Rough grassland	0	12	0	85	15	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry morning, rain from 10:30	Excellent	Rough grassland	0	18	0	80	20	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry morning, rain from 10:30	Excellent	Rough grassland	0	13	0	40	60	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry morning, rain from 10:30	Excellent	Rough grassland	0	19	0	100	0	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry morning, rain from 10:30	Excellent	Rough grassland	0	24	0	25	75	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry morning, rain from 10:30	Excellent	Rough grassland	0	17	0	75	25	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry morning, rain from 10:30	Excellent	Rough grassland	0	16	0	100	0	Yes

COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry morning, rain from 10:30	Excellent	Rough grassland	0	17	0	90	10	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry morning, rain from 10:30	Excellent	Rough grassland	0	15	0	35	65	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry	Excellent	Amenity grassland	0	15	10	90	0	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry	Excellent	Amenity grassland	0	14	10	90	0	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry	Excellent	Amenity grassland	0	9	0	95	5	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry	Excellent	Amenity grassland	0	13	0	100	0	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry	Excellent	Amenity grassland	0	17	5	70	25	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry	Excellent	Amenity grassland	0	14	10	85	5	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry	Excellent	Amenity grassland	0	7	10	90	0	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry	Excellent	Amenity grassland	0	6	0	100	0	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry	Excellent	Amenity grassland	0	15	0	100	0	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry	Excellent	Amenity grassland	0	12	5	90	10	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Rough grassland	0	18	0	100	0	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Rough grassland	0	19	0	100	0	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Rough grassland	0	13	0	30	70	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Rough grassland	0	10	0	60	40	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Rough grassland	0	18	0	85	15	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Rough grassland	0	15	0	20	80	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Rough grassland	0	19	0	70	30	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Rough grassland	0	14	0	90	10	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Rough grassland	0	12	0	100	0	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Rough grassland	0	10	0	95	5	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Amenity grassland	0	17	0	100	0	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Amenity grassland	0	12	15	85	0	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Amenity grassland	0	12	0	100	0	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Amenity grassland	0	15	0	100	0	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Amenity grassland	0	14	0	100	0	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Amenity grassland	0	16	5	95	0	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Amenity grassland	0	6	5	95	0	Yes

COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Amenity grassland	0	8	0	100	0	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Amenity grassland	0	13	10	90	0	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Amenity grassland	0	10	5	90	5	Yes
COB	22/02/2021	07:27	17:46	1/4	1/8	4-11C	Dry	Excellent	Rough grassland	0	21	0	100	0	Yes
COB	22/02/2021	07:27	17:46	1/4	1/8	4-11C	Dry	Excellent	Rough grassland	0	17	0	100	0	Yes
COB	22/02/2021	07:27	17:46	1/4	1/8	4-11C	Dry	Excellent	Rough grassland	0	18	0	90	10	Yes
COB	22/02/2021	07:27	17:46	1/4	1/8	4-11C	Dry	Excellent	Rough grassland	0	13	0	30	70	Yes
COB	22/02/2021	07:27	17:46	1/4	1/8	4-11C	Dry	Excellent	Rough grassland	0	19	0	65	35	Yes
COB	22/02/2021	07:27	17:46	1/4	1/8	4-11C	Dry	Excellent	Rough grassland	0	12	0	25	75	Yes
COB	22/02/2021	07:27	17:46	1/4	1/8	4-11C	Dry	Excellent	Rough grassland	0	10	0	85	15	Yes
COB	22/02/2021	07:27	17:46	1/4	1/8	4-11C	Dry	Excellent	Rough grassland	0	14	0	100	0	Yes
COB	22/02/2021	07:27	17:46	1/4	1/8	4-11C	Dry	Excellent	Rough grassland	0	8	0	100	0	Yes
COB	22/02/2021	07:27	17:46	1/4	1/8	4-11C	Dry	Excellent	Rough grassland	0	9	0	95	5	Yes
COB	22/02/2021	07:27	17:46	1/4	2/8	4-11C	Dry	Excellent	Amenity grassland	0	17	0	100	0	Yes
COB	22/02/2021	07:27	17:46	1/4	2/8	4-11C	Dry	Excellent	Amenity grassland	0	13	15	85	0	Yes
COB	22/02/2021	07:27	17:46	1/4	2/8	4-11C	Dry	Excellent	Amenity grassland	0	10	5	95	0	Yes
COB	22/02/2021	07:27	17:46	1/4	2/8	4-11C	Dry	Excellent	Amenity grassland	0	17	0	100	0	Yes
COB	22/02/2021	07:27	17:46	1/4	2/8	4-11C	Dry	Excellent	Amenity grassland	0	18	5	95	0	Yes
COB	22/02/2021	07:27	17:46	1/4	2/8	4-11C	Dry	Excellent	Amenity grassland	0	9	0	100	0	Yes
COB	22/02/2021	07:27	17:46	1/4	2/8	4-11C	Dry	Excellent	Amenity grassland	0	14	15	85	0	Yes
COB	22/02/2021	07:27	17:46	1/4	2/8	4-11C	Dry	Excellent	Amenity grassland	0	12	5	95	0	Yes
COB	22/02/2021	07:27	17:46	1/4	2/8	4-11C	Dry	Excellent	Amenity grassland	0	14	0	100	0	Yes
COB	22/02/2021	07:27	17:46	1/4	2/8	4-11C	Dry	Excellent	Amenity grassland	0	14	0	100	0	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Rough grassland	0	16	0	100	0	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Rough grassland	0	14	0	90	10	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Rough grassland	0	17	0	60	40	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Rough grassland	0	12	5	35	60	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Rough grassland	0	12	0	30	70	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Rough grassland	0	11	0	45	55	Yes

COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Rough grassland	0	10	0	40	60	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Rough grassland	0	16	0	95	5	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Rough grassland	0	13	0	95	5	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Rough grassland	0	8	0	100	0	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Amenity grassland	0	16	0	100	0	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Amenity grassland	0	13	35	65	0	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Amenity grassland	0	14	0	100	0	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Amenity grassland	0	13	0	100	0	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Amenity grassland	0	15	0	100	0	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Amenity grassland	0	20	0	100	0	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Amenity grassland	0	11	0	100	0	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Amenity grassland	0	15	0	100	0	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Amenity grassland	0	13	0	90	10	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Amenity grassland	0	14	0	100	0	Yes
COB	04/03/2021	07:05	18:05	1/4	8/8	3-6C	Dry	Excellent	Rough grassland	0	16	5	95	0	Yes
COB	04/03/2021	07:05	18:05	1/4	8/8	3-6C	Dry	Excellent	Rough grassland	0	16	0	100	0	Yes
COB	04/03/2021	07:05	18:05	1/4	8/8	3-6C	Dry	Excellent	Rough grassland	0	20	0	80	20	Yes
COB	04/03/2021	07:05	18:05	1/4	8/8	3-6C	Dry	Excellent	Rough grassland	0	12	0	35	65	Yes
COB	04/03/2021	07:05	18:05	1/4	8/8	3-6C	Dry	Excellent	Rough grassland	0	9	0	65	35	Yes
COB	04/03/2021	07:05	18:05	1/4	8/8	3-6C	Dry	Excellent	Rough grassland	0	11	0	50	50	Yes
COB	04/03/2021	07:05	18:05	1/4	8/8	3-6C	Dry	Excellent	Rough grassland	0	15	0	100	0	Yes
COB	04/03/2021	07:05	18:05	1/4	8/8	3-6C	Dry	Excellent	Rough grassland	0	9	0	30	70	Yes
COB	04/03/2021	07:05	18:05	1/4	8/8	3-6C	Dry	Excellent	Rough grassland	0	14	5	95	5	Yes
COB	04/03/2021	07:05	18:05	1/4	8/8	3-6C	Dry	Excellent	Rough grassland	0	7	0	90	10	Yes
COB	04/03/2021	07:04	18:05	1/4	8/8	4-6C	Dry	Excellent	Amenity grassland	0	18	0	100	0	Yes
COB	04/03/2021	07:04	18:05	1/4	8/8	4-6C	Dry	Excellent	Amenity grassland	0	6	15	80	5	Yes
COB	04/03/2021	07:04	18:05	1/4	8/8	4-6C	Dry	Excellent	Amenity grassland	0	9	0	90	10	Yes
COB	04/03/2021	07:04	18:05	1/4	8/8	4-6C	Dry	Excellent	Amenity grassland	0	21	0	100	0	Yes
COB	04/03/2021	07:04	18:05	1/4	8/8	4-6C	Dry	Excellent	Amenity grassland	0	19	0	100	0	Yes

COB	04/03/2021	07:04	18:05	1/4	8/8	4-6C	Dry	Excellent	Amenity grassland	0	14	0	95	5	Yes
COB	04/03/2021	07:04	18:05	1/4	8/8	4-6C	Dry	Excellent	Amenity grassland	0	10	0	100	0	Yes
COB	04/03/2021	07:04	18:05	1/4	8/8	4-6C	Dry	Excellent	Amenity grassland	0	13	0	100	0	Yes
COB	04/03/2021	07:04	18:05	1/4	8/8	4-6C	Dry	Excellent	Amenity grassland	0	17	0	100	0	Yes
COB	04/03/2021	07:04	18:05	1/4	8/8	4-6C	Dry	Excellent	Amenity grassland	0	13	0	100	0	Yes
COB	18/03/2021	06:30	18:32	1/4	4/8	6-11C	Dry	Excellent	Rough grassland	0	13	0	95	5	Yes
COB	18/03/2021	06:30	18:32	1/4	4/8	6-11C	Dry	Excellent	Rough grassland	0	12	0	90	10	Yes
COB	18/03/2021	06:30	18:32	1/4	4/8	6-11C	Dry	Excellent	Rough grassland	0	22	0	95	5	Yes
COB	18/03/2021	06:30	18:32	1/4	4/8	6-11C	Dry	Excellent	Rough grassland	0	10	0	35	65	Yes
COB	18/03/2021	06:30	18:32	1/4	4/8	6-11C	Dry	Excellent	Rough grassland	0	16	0	35	65	Yes
COB	18/03/2021	06:30	18:32	1/4	4/8	6-11C	Dry	Excellent	Rough grassland	0	11	0	30	70	Yes
COB	18/03/2021	06:30	18:32	1/4	4/8	6-11C	Dry	Excellent	Rough grassland	0	13	0	40	60	Yes
COB	18/03/2021	06:30	18:32	1/4	4/8	6-11C	Dry	Excellent	Rough grassland	0	15	0	100	0	Yes
COB	18/03/2021	06:30	18:32	1/4	4/8	6-11C	Dry	Excellent	Rough grassland	0	9	0	75	25	Yes
COB	18/03/2021	06:30	18:32	1/4	4/8	6-11C	Dry	Excellent	Rough grassland	0	19	0	85	15	Yes
COB	18/03/2021	06:30	18:32	1/4	3/8	6-11C	Dry	Excellent	Amenity grassland - mown on day of survey	0	7	0	100	0	Yes
COB	18/03/2021	06:30	18:32	1/4	3/8	6-11C	Dry	Excellent	Amenity grassland - mown on day of survey	0	3	20	65	15	Yes
COB	18/03/2021	06:30	18:32	1/4	3/8	6-11C	Dry	Excellent	Amenity grassland - mown on day of survey	0	6	0	100	0	Yes
COB	18/03/2021	06:30	18:32	1/4	3/8	6-11C	Dry	Excellent	Amenity grassland - mown on day of survey	0	5	5	95	0	Yes
COB	18/03/2021	06:30	18:32	1/4	3/8	6-11C	Dry	Excellent	Amenity grassland - mown on day of survey	0	7	0	100	0	Yes
COB	18/03/2021	06:30	18:32	1/4	3/8	6-11C	Dry	Excellent	Amenity grassland - mown on day of survey	0	7	15	80	5	Yes
COB	18/03/2021	06:30	18:32	1/4	3/8	6-11C	Dry	Excellent	Amenity grassland - mown on day of survey	0	7	0	100	0	Yes
COB	18/03/2021	06:30	18:32	1/4	3/8	6-11C	Dry	Excellent	Amenity grassland - mown on day of survey	0	4	0	100	0	Yes
COB	18/03/2021	06:30	18:32	1/4	3/8	6-11C	Dry	Excellent	Amenity grassland - mown on day of survey	0	5	0	100	0	Yes
COB	18/03/2021	06:30	18:32	1/4	3/8	6-11C	Dry	Excellent	Amenity grassland - mown on day of survey	0	6	5	95	0	Yes
COB	24/03/2021	06:17	18:46	2/4	6/8	4-12C	Dry	Excellent	Rough grassland	0	13	0	85	15	Yes
COB	24/03/2021	06:17	18:46	2/4	6/8	4-12C	Dry	Excellent	Rough grassland	0	11	0	70	30	Yes
COB	24/03/2021	06:17	18:46	2/4	6/8	4-12C	Dry	Excellent	Rough grassland	0	15	0	75	25	Yes
COB	24/03/2021	06:17	18:46	2/4	6/8	4-12C	Dry	Excellent	Rough grassland	0	15	0	40	60	Yes

COB	24/03/2021	06:17	18:46	2/4	6/8	4-12C	Dry	Excellent	Rough grassland	0	13	0	55	45	Yes
COB	24/03/2021	06:17	18:46	2/4	6/8	4-12C	Dry	Excellent	Rough grassland	0	16	0	100	0	Yes
COB	24/03/2021	06:17	18:46	2/4	6/8	4-12C	Dry	Excellent	Rough grassland	0	19	0	85	15	Yes
COB	24/03/2021	06:17	18:46	2/4	6/8	4-12C	Dry	Excellent	Rough grassland	0	15	0	90	10	Yes
COB	24/03/2021	06:17	18:46	2/4	6/8	4-12C	Dry	Excellent	Rough grassland	0	9	5	85	10	Yes
COB	24/03/2021	06:17	18:46	2/4	6/8	4-12C	Dry	Excellent	Rough grassland	0	12	0	30	70	Yes
COB	24/03/2021	06:17	18:46	2/4	5/8	6-12C	Dry	Excellent	Amenity grassland	0	9	0	100	0	Yes
COB	24/03/2021	06:17	18:46	2/4	5/8	6-12C	Dry	Excellent	Amenity grassland	0	7	50	45	5	Yes
COB	24/03/2021	06:17	18:46	2/4	5/8	6-12C	Dry	Excellent	Amenity grassland	0	6	0	85	15	Yes
COB	24/03/2021	06:17	18:46	2/4	5/8	6-12C	Dry	Excellent	Amenity grassland	0	8	0	100	0	Yes
COB	24/03/2021	06:17	18:46	2/4	5/8	6-12C	Dry	Excellent	Amenity grassland	0	11	0	100	0	Yes
COB	24/03/2021	06:17	18:46	2/4	5/8	6-12C	Dry	Excellent	Amenity grassland	0	10	20	80	0	Yes
COB	24/03/2021	06:17	18:46	2/4	5/8	6-12C	Dry	Excellent	Amenity grassland	0	7	0	100	0	Yes
COB	24/03/2021	06:17	18:46	2/4	5/8	6-12C	Dry	Excellent	Amenity grassland	0	8	0	100	0	Yes
COB	24/03/2021	06:17	18:46	2/4	5/8	6-12C	Dry	Excellent	Amenity grassland	0	9	0	100	0	Yes
COB	24/03/2021	06:17	18:46	2/4	5/8	6-12C	Dry	Excellent	Amenity grassland	0	8	0	100	0	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Rough grassland	0	18	0	100	0	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Rough grassland	0	21	0	90	10	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Rough grassland	0	17	0	85	15	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Rough grassland	0	15	0	65	35	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Rough grassland	0	12	0	25	75	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Rough grassland	0	14	0	60	40	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Rough grassland	0	11	0	55	45	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Rough grassland	0	14	0	95	5	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Rough grassland	0	17	0	85	15	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Rough grassland	0	18	0	100	0	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Amenity grassland	0	13	0	100	0	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Amenity grassland	0	7	20	80	0	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Amenity grassland	0	8	0	85	15	Yes

COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Amenity grassland	0	13	0	90	10	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Amenity grassland	0	14	5	95	0	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Amenity grassland	0	12	0	90	10	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Amenity grassland	0	11	0	85	15	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Amenity grassland	0	14	0	100	0	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Amenity grassland	0	11	0	95	5	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Amenity grassland	0	10	0	90	10	Yes
KS	30/10/2020	16:00	16:45	3/4	6/8	13	Dry	Good	Transect data covers GS and GA2 areas	0	30	0	60	40	
KS	30/10/2020	16:00	16:45	3/4	6/8	13	Dry	Good	Transect data covers GS and GA2 areas	0	20	0	40	60	
KS	30/10/2020	16:00	16:45	3/4	6/8	13	Dry	Good	Transect data covers GS and GA2 areas	0	60	0	90	10	
KS	30/10/2020	16:00	16:45	3/4	6/8	13	Dry	Good	Transect data covers GS and GA2 areas	0	30	0	50	50	
KS	30/10/2020	16:00	16:45	3/4	6/8	13	Dry	Good	Transect data covers GS and GA2 areas	0	30	0	60	40	
KS	30/10/2020	16:00	16:45	3/4	6/8	13	Dry	Good	Transect data covers GS and GA2 areas	0	10	0	95	5	
KS	30/10/2020	16:00	16:45	3/4	6/8	13	Dry	Good	Transect data covers GS and GA2 areas	0	10	5	90	5	
KS	30/10/2020	16:00	16:45	3/4	6/8	13	Dry	Good	Transect data covers GS and GA2 areas	0	20	0	80	20	
KS	30/10/2020	16:00	16:45	3/4	6/8	13	Dry	Good	Transect data covers GS and GA2 areas	0	5	0	90	10	
KS	30/10/2020	16:00	16:45	3/4	6/8	13	Dry	Good	Transect data covers GS and GA2 areas	0	25	0	100	0	
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Rough grassland	0	25	0	75	25	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Rough grassland	0	19	0	90	10	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Rough grassland	0	22	0	25	75	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Rough grassland	0	15	0	45	55	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Rough grassland	0	14	0	85	15	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Rough grassland	0	17	0	80	20	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Rough grassland	0	19	0	25	75	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Rough grassland	0	20	0	85	15	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Rough grassland	0	18	0	90	10	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Rough grassland	0	19	0	100	0	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Amenity grassland	0	16	0	75	25	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Amenity grassland	0	15	0	80	20	Yes

COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Amenity grassland	0	7	5	90	10	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Amenity grassland	0	17	0	85	15	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Amenity grassland	0	12	0	60	40	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Amenity grassland	0	11	15	75	10	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Amenity grassland	0	6	0	80	20	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Amenity grassland	0	5	0	85	15	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Amenity grassland	0	12	10	65	35	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Amenity grassland	0	11	0	70	30	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Rough grassland	0	13	0	95	5	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Rough grassland	0	17	0	90	10	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Rough grassland	0	20	0	75	25	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Rough grassland	0	14	0	65	35	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Rough grassland	0	12	0	90	10	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Rough grassland	0	14	0	80	20	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Rough grassland	0	15	0	100	0	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Rough grassland	0	18	0	100	0	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Rough grassland	0	15	0	80	20	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Rough grassland	0	16	0	100	0	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Amenity grassland	0	18	0	90	10	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Amenity grassland	0	17	0	85	15	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Amenity grassland	0	8	5	85	10	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Amenity grassland	0	15	0	80	20	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Amenity grassland	0	18	0	70	30	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Amenity grassland	0	14	0	100	0	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Amenity grassland	0	5	40	55	5	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Amenity grassland	0	6	0	100	0	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Amenity grassland	0	11	20	55	25	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Amenity grassland	0	8	0	75	25	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Rough grassland	0	17	0	100	0	Yes

COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Rough grassland	0	14	0	100	0	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Rough grassland	0	25	0	20	80	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Rough grassland	0	18	0	70	30	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Rough grassland	0	23	0	35	65	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Rough grassland	0	25	0	15	85	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Rough grassland	0	22	0	75	25	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Rough grassland	0	21	0	100	0	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Rough grassland	0	19	0	80	20	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Rough grassland	0	16	0	70	30	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Amenity grassland	0	16	0	90	10	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Amenity grassland	0					Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Amenity grassland	0	8	5	95	0	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Amenity grassland	0	14	0	80	20	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Amenity grassland	0	19	5	95	5	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Amenity grassland	0	11	30	55	15	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Amenity grassland	0	8	5	80	15	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Amenity grassland	0	15	0	95	5	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Amenity grassland	0	14	5	80	15	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Amenity grassland	0	14	10	70	20	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Amenity grassland	0	21	1	95	4	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Amenity grassland	0	25	4	94	2	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Amenity grassland	0	10	25	70	5	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Amenity grassland	0	30	2	80	18	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Amenity grassland	0	20	0	95	5	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Amenity grassland	0	5	7	88	5	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Amenity grassland	0	18	0	77	3	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Amenity grassland	0	18	15	70	15	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Amenity grassland	0	15	0	98	2	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Amenity grassland	0	4	3	77	20	Yes

KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Rough grassland	0	34	0	60	40	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Rough grassland	0	22	0	55	45	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Rough grassland	0	30	0	75	25	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Rough grassland	0	32	0	100	0	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Rough grassland	0	35	0	30	70	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Rough grassland	0	25	0	100	0	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Rough grassland	0	50	0	75	25	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Rough grassland	0	15	0	100	0	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Rough grassland	0	55	0	90	10	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Rough grassland	0	28	0	60	40	Yes
KB	21/12/2020	08:37	16:05	2/4	8/8	8C	Dry	Good	Amenity grassland	0	17	1	90	9	Yes
KB	21/12/2020	08:37	16:05	2/4	8/8	8C	Dry	Good	Amenity grassland	0	21	3	90	9	Yes
KB	21/12/2020	08:37	16:05	2/4	8/8	8C	Dry	Good	Amenity grassland	0	7	20	70	10	Yes
KB	21/12/2020	08:37	16:05	2/4	8/8	8C	Dry	Good	Amenity grassland	0	29	10	80	10	Yes
KB	21/12/2020	08:37	16:05	2/4	8/8	8C	Dry	Good	Amenity grassland	0	20	10	80	10	Yes
KB	21/12/2020	08:37	16:05	2/4	8/8	8C	Dry	Good	Amenity grassland	0	20	4	93	3	Yes
KB	21/12/2020	08:37	16:05	2/4	8/8	8C	Dry	Good	Amenity grassland	0	8	2	78	20	Yes
KB	21/12/2020	08:37	16:05	2/4	8/8	8C	Dry	Good	Amenity grassland	0	10	2	95	3	Yes
KB	21/12/2020	08:37	16:05	2/4	8/8	8C	Dry	Good	Amenity grassland	0	17	20	55	25	Yes
KB	21/12/2020	08:37	16:05	2/4	8/8	8C	Dry	Good	Amenity grassland	0	7	3	57	40	Yes
KB	21/12/2020	08:37	16:05	1/4	8/8	8C	Drizzle	Good	Rough grassland	0	25	0	35	65	Yes
KB	21/12/2020	08:37	16:05	1/4	8/8	8C	Drizzle	Good	Rough grassland	0	27	2	90	8	Yes
KB	21/12/2020	08:37	16:05	1/4	8/8	8C	Drizzle	Good	Rough grassland	0	30	0	85	15	Yes
KB	21/12/2020	08:37	16:05	1/4	8/8	8C	Drizzle	Good	Rough grassland	0	32	0	98	2	Yes
KB	21/12/2020	08:37	16:05	1/4	8/8	8C	Drizzle	Good	Rough grassland	0	20	0	45	55	Yes
KB	21/12/2020	08:37	16:05	1/4	8/8	8C	Drizzle	Good	Rough grassland	0	21	0	90	10	Yes
KB	21/12/2020	08:37	16:05	1/4	8/8	8C	Drizzle	Good	Rough grassland	0	45	0	100	0	Yes
KB	21/12/2020	08:37	16:05	1/4	8/8	8C	Drizzle	Good	Rough grassland	0	35	0	100	0	Yes
KB	21/12/2020	08:37	16:05	1/4	8/8	8C	Drizzle	Good	Rough grassland	0	30	0	100	0	Yes

KB	21/12/2020	08:37	16:05	1/4	8/8	8C	Drizzle	Good	Rough grassland	0	33	0	50	50	Yes

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Wintering Bird Survey Report

For a Proposed Large-scale Residential Development

Lands at Clonliffe College, Clonliffe Road, Drumcondra, Dublin 3

Prepared for Hines Real Estate Ireland Ltd.

Scott Cawley, College House, 71 – 73 Rock Road, Blackrock, Co. Dublin, A94 F9X9, Ireland

Tel+353(1)676-9815 Fax +353(1) 676-9816

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This report has been prepared by Scott Cawley Ltd. in accordance with the particular instructions and requirements of our agreement with the Client, the project's budgetary and time constraints and in line with best industry standards. The methodology adopted and the sources of information used by Scott Cawley Ltd. in providing its services are outlined in this report. The scope of this report and the services are defined by these circumstances.

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The conclusions presented in this report represent Scott Cawley Ltd.'s best professional judgement based on review of site conditions observed during the site visit (if applicable) and the relevant information available at the time of writing. Scott Cawley Ltd. has used reasonable skill, care and diligence in compiling this report and no warranty is provided as to the report's accuracy.

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1 Introduction

This Wintering Bird Survey Report was authored by Cathal O'Brien MSc BSc (Hons) ACIEEM of Scott Cawley Ltd.

It provides an overview of the wintering bird baseline for a Large Scale Residential development at lands in Clonliffe College, Clonliffe Road, Drumcondra, Dublin 3 (refer to Figure 1 for location) for the wintering bird season 2023/24. The proposed development consists of a residential scheme to be constructed within the red line boundary illustrated in Figure 1, below.

The proposed development site consists of the Clonliffe College Seminary, containing large areas of rough grassland, woodland, treelines, built ground and ornamental borders. A large area of open grassland habitat is located in the northern part of the lands, south of the River Tolka. There are scattered trees throughout the proposed development site, particularly east of the Clonliffe College building. The proposed development site is surrounded largely by residential developments to the north and east as well as opposite the southern boundary which borders Clonliffe Road. There are also several sports complexes in the vicinity - the Belvedere Rugby grounds to the east, and Shelbourne Football Club across the River Tolka to the north and Croke Park Stadium to the southeast (see Figure 1).

The purpose of the report is to:

- Establish the presence/absence and use of the proposed development site and surrounding area by wintering birds;
- Determine flightlines of wintering birds traversing the proposed development, and the height at which they fly at, and;
- To understand the importance of the proposed development site and surrounding area for wintering birds, including those Special Conservation Interest (SCI) species for which nearby European sites have been designated.

The surveys follow two full seasons of wintering bird surveys which were conducted in 2019/2020 and 2020/2021 (September to March inclusive). The follow-up winter bird surveys conducted this wintering bird season (i.e. September 2023 to March 2024) largely follow the same methodology as employed in both 2019/2020 and 2020/2021. However, a reduced survey frequency (i.e. once monthly rather than once weekly) was adopted, given the surveys in the 2023/2024 season are confirmatory from the results of surveys conducted previously and are considered proportionate to the suitability of the lands for wintering birds. Monthly survey visits are also recommended as standard best practice for wintering bird surveys[1][2].

Wintering birds which include geese, gulls, waterfowl and waders commonly occur along Ireland's coastline and at inland wetland areas for foraging and/or roosting. However, some wintering birds such as curlew *Numenius arquata*, oystercatcher *Haematopus ostralegus*, light-bellied brent geese *Branta bernicla hrota* and gulls, including; herring gull *Larus argentatus*, black-headed gull *Chroicocephalus ridibundus* and common gull *Larus canus*, use drier amenity grassland habitats such as parkland, sports pitches and greens associated with residential areas[3]. Many species of wintering birds which occur in Ireland are listed as 'Special Conservation Interest' (SCI) of Special Protected Areas (SPAs) under the Birds Directive 2009/147/EEC, known as the 'Birds Directive'. In addition, several species are Red-listed (i.e. of high conservation concern) such as curlew and oystercatcher or Amber-listed (i.e. of medium conservation concern) such as black-headed gull and herring gull, as Birds of Conservation Concern in Ireland 2020-2026 (Gilbert et. al., 2021).

[1] Bird Survey Guidelines: Non-breeding walkover survey: https://birdsurveyguidelines.org/non-breeding-walkover-survey

[2] Gilbert at al., (1998). Bird Monitoring Methods - A Manual of Techniques for Key UK Species.

[3] BirdWatch Ireland - Herring Gull: https://birdwatchireland.ie/app/uploads/2019/03/Species-Focus-Herring-Gull.pdf



Figure 1: The proposed development site in relation to the surrounding environment.

2 Planning, Policy and Legislation

The collation of ecological baseline data and the preparation of this assessment has had regard to the following legislation and policy documents. This is not an exhaustive list but the most relevant legislative and policy basis for the purposes of preparing this Wintering Bird Survey Report.

The following international legislation is relevant to the proposed development:

- Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora; hereafter, referred to as the 'Habitats Directive'. The Habitats Directive is the legislation under which the Natura 2000 network[4] was established and Special Areas Of Conservation (SACs) are designated for the protection of natural habitat types listed in Annex I, and habitats of the species listed in Annex II, of that directive.

[4] The Natura 2000 network is a European network of important ecological sites, as defined under Article 3 of the Habitats Directive 92/43/EEC, which comprises both special areas of conservation and special protection areas. Special conservation areas are sites hosting the natural habitat types listed in Annex I, and habitats of the species listed in Annex II, of the Habitats Directive, and are established under the Habitats Directive itself. Special protection areas are established under Article 4 of the Birds Directive 2009/147/EC for the protection of endangered species of wild birds. The aim of the network is to aid the long-term survival of Europe's most valuable and threatened species and habitats.

In Ireland these sites are designed as *European sites* - defined under the Planning Acts and/or the Birds and Habitats Regulations as (a) a candidate site of Community importance, (b) a site of Community importance, (c) a candidate special area of conservation, (d) a special area of conservation, (e) a candidate special protection area, or (f) a special protection area. They are commonly referred to in Ireland as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

- Directive 2009/147/EEC; hereafter, referred to as the 'Birds Directive'. The Birds Directive is the legislation under which Special Protected Areas (SPAs) are designated for the protection of endangered species of wild birds listed in Annex I of that directive.

9 The following national legislation is relevant to the proposed development in the context of wintering wetland birds which are designated as SCIs within European sites:

- *S.I. No. 293/2021 - European Union (Birds and Natural Habitats) (Amendment) Regulations 2021*; hereafter the 'Birds and Habitats Regulations'. This legislation transposes the Habitats and Birds Directives into Irish law. It also contains regulations (49 and 50) that deal with invasive species (those included within the Third Schedule of the regulations).
- Wildlife Acts 1976 to 2022; hereafter collectively referred to as the 'Wildlife Acts'. The Wildlife Acts are the principal pieces of legislation at national level for the protection of wildlife and for the control of activities that may harm wildlife. All bird species, 22 other animal species or groups of species, and 86 species of flora are protected under this legislation.
- Planning and Development Acts 2000 to 2021; hereafter collectively referred to as the 'Planning and Development Acts'. This piece of legislation is the basis for Irish planning. Under the legislation, development plans (usually implemented at local authority level) must include mandatory objectives for the conservation of natural heritage and of European Sites. It also sets out the requirements in relation to environmental assessment with respect to planning matters, including transposition of the Habitats Directive and Birds Directive into Irish law.

10 The following plans and policies are relevant to the proposed development:

- Ireland's 4th National Biodiversity Action Plan (NBAP) 2023-2030 (Department of Housing, Local Government and Heritage, 2023)
- Dublin City Development Plan 2022-2028 (Dublin City Council, 2022)
- Dublin City Biodiversity Action Plan 2021-2025 (Dublin City Council, 2022)

3 Methodology

3.1 Author Statement

11 This report was authored by Cathal O'Brien, and reviewed by Siofra Quigley BSc (Hons) MSc MCIEEM and Colm Clarke BA MSc MCIEEM of Scott Cawley Ltd. Survey methodologies were designed by Scott Cawley (Colm Clarke) and surveys were completed by Wayne Daly BSc (Hons) MSc, Jamie Dempsey BEng MSc and Simon O'Carroll BA MSc of Scott Cawley.

12 Cathal O'Brien is a Consultant Ecologist at Scott Cawley Ltd. with over five years' professional ecological consultancy experience. Cathal is an Associate Member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and holds a BSc (Hons) in Environmental Biology from University College Dublin and a MSc (Hons) in Ecology from the University of Bremen. He also has over five years' experience across a range of field surveys such as wintering birds, tree inspections for bat roosts, invasive species and other mammal survey including for badger activity as well as habitat surveys. He also has over four years' consultancy experience report writing including, preparing Ecological Impact Assessments (EcIAs), Preliminary Ecological Appraisal reports (PEAs), Appropriate Assessment screening reports (AAs) and Planning Compliance and/or Technical Note reports.

13 Síofra Quigley is a Senior Ecologist with Scott Cawley Ltd. She obtained an honours degree in Zoology, from National University of Ireland Galway, and a Master's degree in Wildlife Biology and Conservation from Edinburgh Napier University. Síofra is a Full Member of the Chartered Institute of Ecology and Environmental Management (CIEEM). She has six years' professional experience working in the UK and Ireland on a range of projects, from residential to large-scale infrastructure. Síofra is experienced in carrying out field surveys in several protected species; bat, otter, badger, birds, red squirrel, reptile, pine marten, and undertakes and manages surveys for a range of projects. She has also been involved in radio tracking

mountain hares and bats, bat call analysis, badger bait marking, has acted as an Ecological Clerk of Works role on construction projects. Síofra is experienced in habitat classification (Joint Nature Conservation Committee, 2010, EU Habitats Directive and Fossitt classification) and mapping (QGIS and ArcGIS). Síofra's work in Scott Cawley Ltd., involves project management, and the preparation of reports, including Ecological Impact Assessment (EcIA) Appropriate Assessment (AA) Screening reports, and Natura Impact Statements (NIS) for residential, commercial, and infrastructure projects across Ireland. Síofra has also been involved in the preparation of bat derogation licence applications, prepared habitat management plans and advised on enhancement measures for planning applications.

Colm Clarke is a Principal Ecologist with Scott Cawley and has over nine year's professional experience in ecological consultancy. He obtained an honours degree in Natural Sciences from Trinity College Dublin, and a Masters in Biodiversity and Conservation from the same institution. Colm is a full member of the CIEEM and is on the CIEEM's EcIA Accreditation Working group, which aims to improve the quality of Ecological Impact Assessment (EcIA) Reports through an accreditation process, and he is an assessor on the EcIA Pilot Accreditation Scheme. Colm is experienced in scoping, preparing, and reviewing EcIA (including EIA Biodiversity Chapters) and in the completion of Appropriate Assessment (AA) Screening and Natura Impact Statement (NIS), and has prepared these reports and acted as internal reviewer (as part of Scott Cawley's quality assurance process) on a range of projects from residential to industrial and large scale infrastructure (e.g. national road and rail projects). Colm also regularly completes technical peer review and has assessed projects for local authority clients and renewable energy developers. As a member of the Irish Environmental Law Association and regular attendee at IELA seminars, Colm stays abreast of developments in environmental law and how these relate to changes to assessment practices.

Wayne Daly is a Senior Consultant Ecologist with Scott Cawley Ltd. He holds an honours degree in zoology from UCD and completed his Masters in Biodiversity and conservation at Trinity College Dublin. Wayne has professional experience working in The United States and different parts of Ireland for the last Seven years. His work has included conducting fauna and habitat surveys, Teaching Ecology through public lectures, and leading citizen science programs involving phenology in trees. Since joining Scott Cawley his work has involved carrying out breeding and wintering bird, bat, mammal, and habitat surveys, as well as project management, data analysis, and preparation of Ecological reports.

Jamie Dempsey is a Consultant Ecologist at Scott Cawley Ltd. who has over one year's experience in ecological and environmental consulting. He obtained a master's degree in Applied Environmental Science from University College Dublin. Jamie is a qualifying member of the Chartered Institute of Ecology and Environmental Management (CIEEM). He has experience surveying for a range of protected fauna species, including bats , birds, marsh fritillary butterfly, amphibians, and terrestrial mammals. Jamie has completed wintering bird surveys for projects across a variety of industries, including Large Housing Developments (LHDs) and linear infrastructure (road and rail) upgrades. He has authored and contributed to numerous ecological reports, including AA Screening Reports, Natura Impact Statements and EIAR Biodiversity Chapters.

Simon O'Carroll is a Consultant Ecologist with Scott Cawley Ltd and is a Qualifying Member of the Chartered Institute of Ecology and Environmental Management (CIEEM). He has received training from Scott Cawley for Winter bird ID and has carried out Winter Bird Surveys for multiple projects in 2023 and 2024. In addition, Simon has contributed Winter Bird ID records to the Irish Wetland Bird Survey (I-WeBS) for Dublin Bay 2023/2024.

3.2 Desk Study

A desk study was initially undertaken in April 2024 following the completion of field work. The purpose of the desk study was to collate available records within the surrounding area, specifically on SCI species of European sites in Dublin bay and ex-situ inland feeding sites. The following resources were used to inform the assessment presented in this report:

- Records of wetland bird species which are Special Conservation Interests (SCIs) for European sites, for the 10km grid square O13, as held by the National Biodiversity Data Centre www.biodiversityireland.ie – refer to Appendix I for all desk study records

- Irish Wetland Bird Survey (I-WeBS) summary data for the following sites: 0U404 Dublin Bay; 0U403 Baldoyle Bay; 0U408 Broadmeadow (Malahide) Estuary; 0U407 Rogerstown Estuary; 0U951 Ireland's Eye; and 0U903 Lambay Island. Summary data was downloaded from the BirdWatch Ireland website at https://birdwatchireland.ie/our-work/surveys-research/research-surveys/irish-wetland-bird-survey/
- Ordnance Survey Ireland mapping and aerial photography from http://map.geohive.ie/
- Information on the conservation status of birds in Ireland from *Birds of Conservation Concern in Ireland 4* (Gilbert et al., 2021)
- Publicly available information on inland feeding sites for Light-bellied brent geese *Branta bernicla hrota* (herein referred to as brent geese) in the Dublin area contained within (Benson, 2009), Scott Cawley (2017) and Enviroguide (2019).

3.3 Field Survey

3.3.1 Wintering Bird Surveys

19 Wintering bird surveys were undertaken of the proposed development site in which all wintering birds (identified to species level) were recorded utilising and/or flying within the boundary of the site (see Figure 1). Surveys commenced three hours before high tide and three hours after high tide, once per month, for the months of September 2023 through March 2024 inclusive. All surveys were completed on the dates and times by ecologists from Scott Cawley Ltd., as listed in Table 1.

Table 1 Winter bird survey dates and weather conditions

Survey Dates	Survey Times	Weather Conditions	Surveyor
28th September 2023	09:14 – 15:14	Dry and overcast in a gentle southerly breeze. Temperatures of 14°C with moderate visibility.	Wayne Daly
17th October 2023	10:45 - 16:45	Dry with scattered cloud in a moderate east to southeasterly breeze. Temperatures of 12°C with good visibility.	Simon O'Carroll
15th November 2023	09:24 - 15:24	Dry and clear in a strong east to northeasterly breeze. Temperatures of 7°C with good visibility.	Simon O'Carroll
14th December 2023	09:11 – 15:11	Dry with broken cloud in a light northerly breeze. Temperatures of 9°C with good visibility.	Simon O'Carroll
15th January 2024	11:19 – 17:19	Dry with scattered cloud in calm conditions. Temperatures of 0°C with good visibility	Simon O'Carroll
13th February 2024	10:57 – 16:57	Dry with broken cloud in calm conditions. Temperatures of 6°C with good visibility.	Simon O'Carroll
13th March 2024	10:34 – 16:34	Light drizzle and mostly cloudy in a gentle westerly breeze. Temperatures of 9°C with good visibility.	Jamie Dempsey

Each survey visit was conducted by one surveyor, who recorded observations of any wintering birds entering and exiting the lands, including the species (i.e. using BTO species codes[5]), number of birds within a flock, behaviour and movements of each species recorded within the lands. Flightlines of wintering birds moving over the proposed development site were also recorded, including the species, number of birds, height band the birds were flying at (see Table 2) and whether each flock was recorded landing within the site, nearby or flew out of sight. Flightlines were recorded to determine potential risk of collision with buildings within the proposed development[6].

All data was recorded on a digital tablet using the QField software package. Observations were aided using Binoculars (8x42). Where present and readable, ring codes of birds were collected on a digital tablet using a QField software package. The surveyors kept to the margins of fields within the site to ensure that their presence did not prevent any birds landing on site.

Table 2 Height bands recorded for each flightline

Height Band Number	Height Band Range (metres)
1	0-10
2	10-20
3	20-100
4	100-150
5	>150

The survey effort in this instance is intended to provide a representative sample of use of the lands by wintering birds. The observations of bird movements in the lands were complemented by a search for evidence of wintering birds in the lands. Droppings and feathers of brent geese accumulate on well-used sites. In order to avoid disturbance to any wintering birds within the proposed development, a search for evidence of wintering birds was undertaken along two pre-defined transect lines (see ***Figure 2***) when there were no birds on the site.

3.3.2 Transect Surveys

Data was collected at 10 sampling points (c. 1m2 in total area, i.e. 1m x 1m) located approximately equidistant from each other along each transect line through the proposed development site. Data on the following variables was collected at each sampling point along each transect:

- The presence and abundance of signs of wintering birds (e.g. droppings and feathers)
- The height of the grass sward (recorded in centimetres using a measuring tape)
- The percentage cover of bare ground
- The percentage cover of grass species
- The percentage cover of forb[7] species present.

[5] BTO Species Codes:
https://www.bto.org/sites/default/files/u16/downloads/forms_instructions/bto_bird_species_codes.pdf

[6] Scottish Natural Heritage (2017). Recommended bird survey methods to inform impact assessment of onshore wind farms. Version 2.

[7] A forb is an herbaceous plant species that is not a grass, sedge or rush, e.g. the plant species daisy *Bellis perennis*.

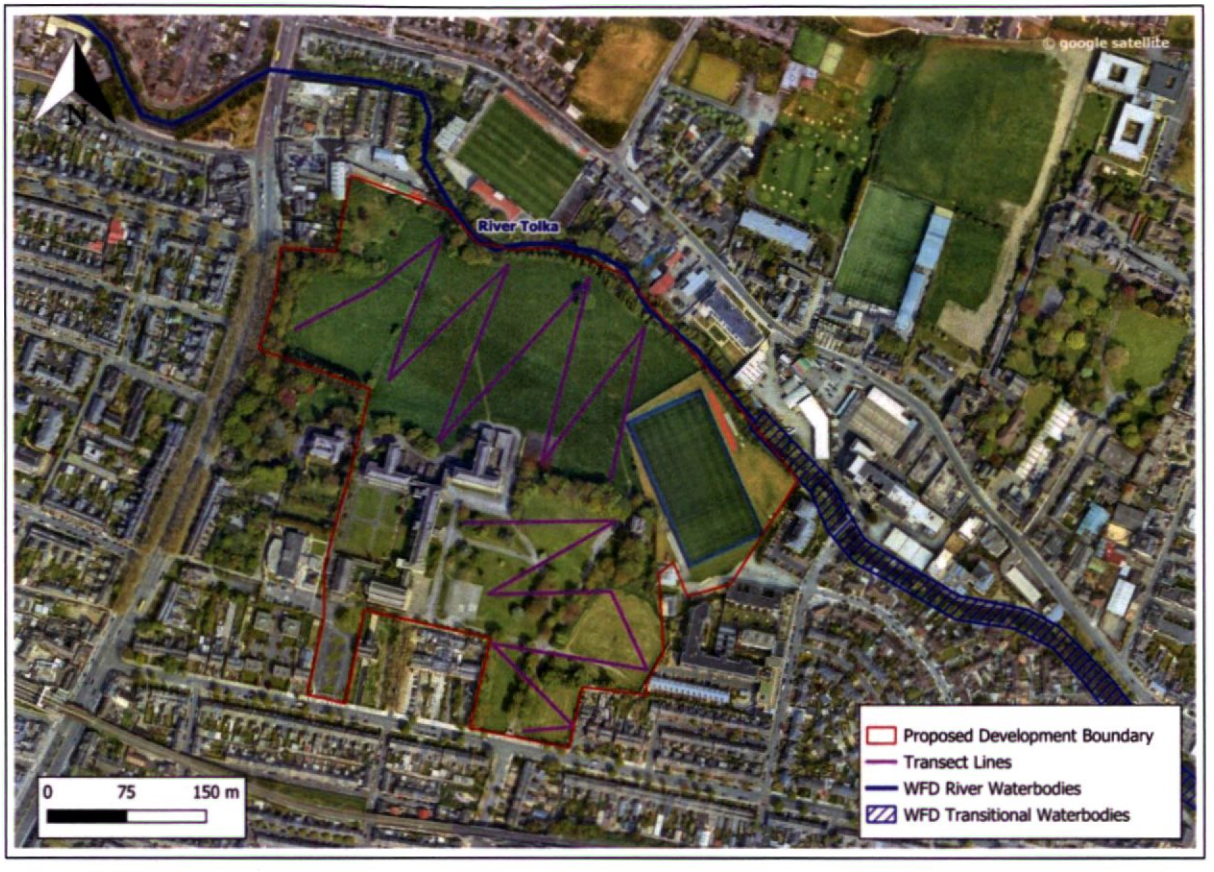


Figure 2: Transect lines in relation to the survey area.

24 The results of field surveys have been contextualised against the 1% threshold of the international population of each species[8], as contained within Nagy & Langendoen (2021), and against the populations of each species at nearby SPAs. The SPAs in the vicinity of the proposed development are illustrated in Figure 3, below.

[8] The 1% criterion is applied to identify sites of international importance for birds

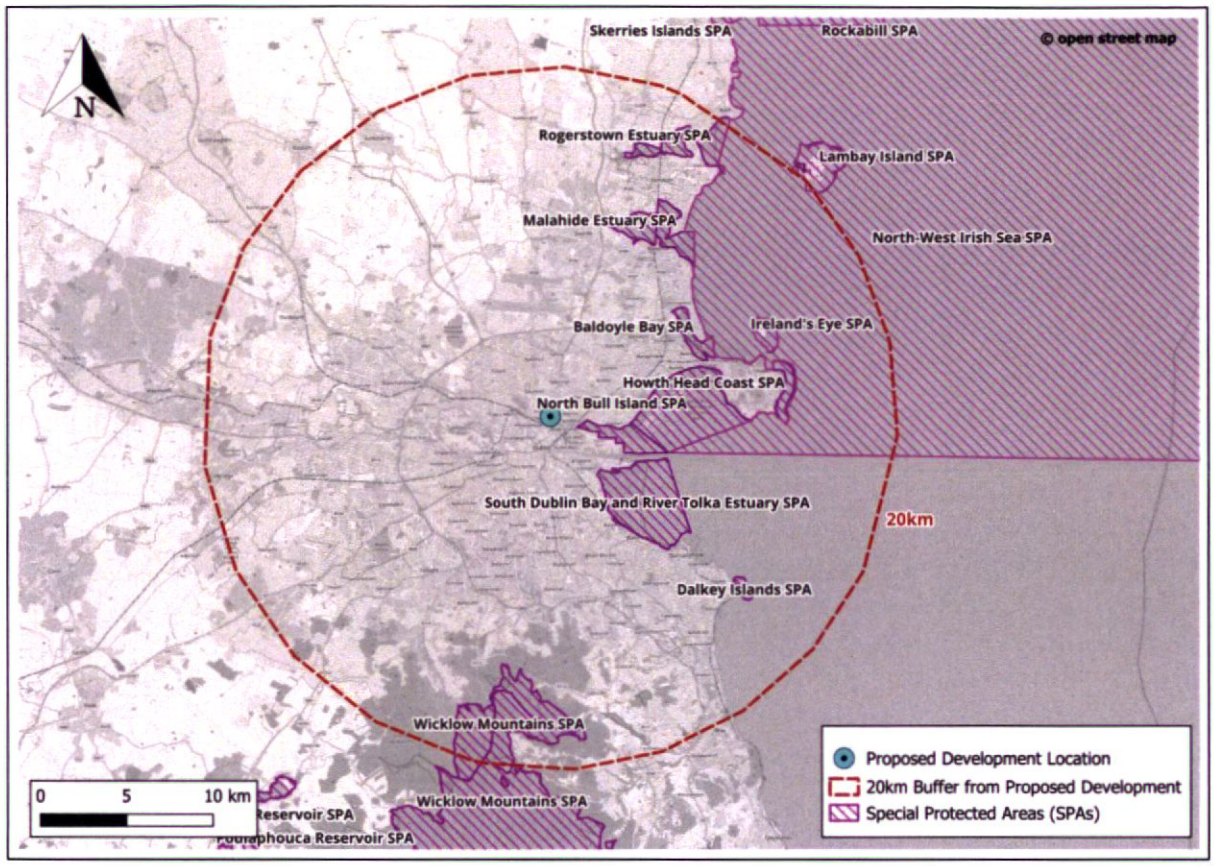


Figure 3: Proposed development site in the context of European sites within 20km.

Weather conditions were also recorded during each survey, full details of which are provided in Table 1.

3.3.3 Survey Limitations

26 It must be acknowledged that winter bird surveys of the lands were not undertaken in the 2021/2022 and 2022/2023 seasons, and it is possible that the number and frequency of use of inland feeding sites has varied during these seasons since the initial surveys in 2019/2020 and 2020/2021. Given that the management of the habitats within the lands did not change during these years since the initial surveys were carried out, it is not anticipated that the species and/or numbers of populations of species recorded on site in 2019/2020 and 2020/2021 would have significantly changed up to the latest season in 2023/2024. The survey effort for the 2023/2024 was reduced from both the 2019/2020 and 2020/2021 seasons from 4 no. surveys to 1 no. surveys per month and from dawn to dusk to 3 hours before and after high tide per visit. However, given the results from these initial surveys and the suitability of the lands for wintering birds, it is the author's professional judgement that the reduced survey effort in 2023/2024 will not compromise the results obtained from the surveys and which inform this report. The frequency of survey visits is in line with current best practice guidelines[1].

4 Wintering Bird Baseline

27 The results of desk study searches are presented in full in Appendix I of this report, while the full set of survey observations are included as Appendix II of this report. The results of desk and field surveys are summarised in this section of the report, and account of observations by species is included in the sections below.

28 Records of 41 species of wetland birds, for which nearby European sites (i.e. North Bull Island SPA (004006) and South Dublin Bay and River Tolka Estuary SPA (004024)) have been designated, were returned from the search of the NBDC database for the 10km grid square O13. The records have been reproduced in Appendix I of this report.

29 The following SCI species of European sites in the vicinity of the proposed development site were observed either flying over or foraging within the proposed development site in the 2023/2024 wintering bird season:

- Herring Gull *Larus argentatus* (amber-listed BoCCI): were the most frequent visitors to the proposed development site, with observations of the species on five survey dates (November and December 2023, and January, February and March 2024) and flying over the site on all survey dates (September 2023 to March 2024).
- Black-headed gull *Chroicocephalus ridibundus* (amber-listed BoCCI): was recorded flying over and in the vicinity of the proposed development site on all seven surveys but did not land within the proposed development site.
- Common gull *Larus canus* (amber-listed BoCCI): were noted flying over the site on one survey in March 2024 but were not observed on the proposed development.
- Light-bellied Brent Goose *Branta bernicla hrota* (amber-listed BoCCI): did not land to forage within the proposed development site on any date over the survey period, and were observed flying over the site on five surveys (November, December, January, February and March).
- Cormorant *Phalacrocorax carbo* (green-listed BoCCI): were observed flying over the River Tolka and within the proposed development site on one survey in March 2024.
- Curlew *Numenius arquata* (red-listed BoCCI): were recorded foraging and flying over the proposed development site on a single survey visit in February.
- Grey heron *Ardea cinerea* (green-listed BoCCI): Heron were observed flying over the River Tolka adjacent to the proposed development and over the site on four surveys in (September, October and November 2023, and March 2024).
- Kingfisher *Alcedo atthis* (amber-listed BoCCI): were observed foraging in and along the River Tolka on the northern boundary of the site during two surveys in October and November 2023.

Mallard *Anas platyrhynchos* (amber-listed BoCCI) were also observed in and/or flying over the River Tolka on three survey dates, namely September and October 2023, and January 2024. No other species of wintering birds listed as SCI and/or amber or red listed BoCCI were recorded in the 2023/2024 survey visits.

Wetland bird species are mobile and can regularly travel up to 20km between roosting and feeding sites[9]. For this reason, it is possible that birds observed at Clonliffe College could belong to populations of SCI species associated with European sites up to 20km from the survey area. Each of the eight SCI species observed foraging within or flying over the proposed development site are discussed in more detail in the subsections set out below.

4.1 Herring gull *Larus argentatus* [A184]

4.1.1 Results of Desk Study for Herring Gull

Herring gull *Larus argentatus* [A148] is an SCI species for which the following European sites within 20km of the proposed development have been designated:

- North-West Irish Sea (004236), *c.* 7km east of the proposed development site. This European site encompasses estuaries (i.e. Malahide, Rogerstown and the River Boyne) and, headlands and the extended coastline along north Dublin Bay, north County Dublin, County Meath as far north as the southern tip of Dundalk Bay in County Louth as well as a large area offshore covering 2,333km^2 (NPWS, 2023). The baseline population of this European site is estimated at 6,893 from survey undertaken within the site in 2016 during autumn and winter[10]. North-West Irish Sea SPA (004236) is listed as the most important site in the country for this species. As this European site was recently designated an SPA in July 2023, there is no I-WeBS data available for the site.
- Ireland's Eye SPA (004117), *c.* 12.5km north-east of the proposed development site. The European site encompasses the island of Ireland's Eye and the surrounding coastal waters. Ireland's Eye is an important breeding site for herring gull, and has a population of *c.* 250 birds[11].
- Lambay Island SPA (004069), *c.* 19.6km north-east of the proposed development site. The European site encompasses Lambay Island and its surrounding coastal waters. Lambay Island is an important breeding site for herring gull, and has a population of *c.* 1,806 birds [12].

There is potential that some members of the Ireland's Eye or Lambay Island breeding population utilise the proposed development site for foraging during the winter months. This species is a commonly encountered urban bird species, with large populations residing in the urban areas around Dublin.

[9] Scotland's Nature Agency (2023). Guidance Note 3: Guidance to support Offshore Wind applications: Marine Birds - Identifying theoretical connectivity with breeding site Special Protection Areas using breeding season foraging ranges. Version 1: January 2023.

[10] NPWS (2023). Site Synopsis. Site Name: North-West Irish Sea cSPA Site Code: 004236.

[11] NPWS (2020A). Natura 2000 Standard Data Form: IE0004117 Ireland's Eye SPA. National Parks and Wildlife Service, Dublin.

[12] NPWS (2020B). Natura 2000 Standard Data Form: IE0004069 Lambay Island SPA. National Parks and Wildlife Service, Dublin.

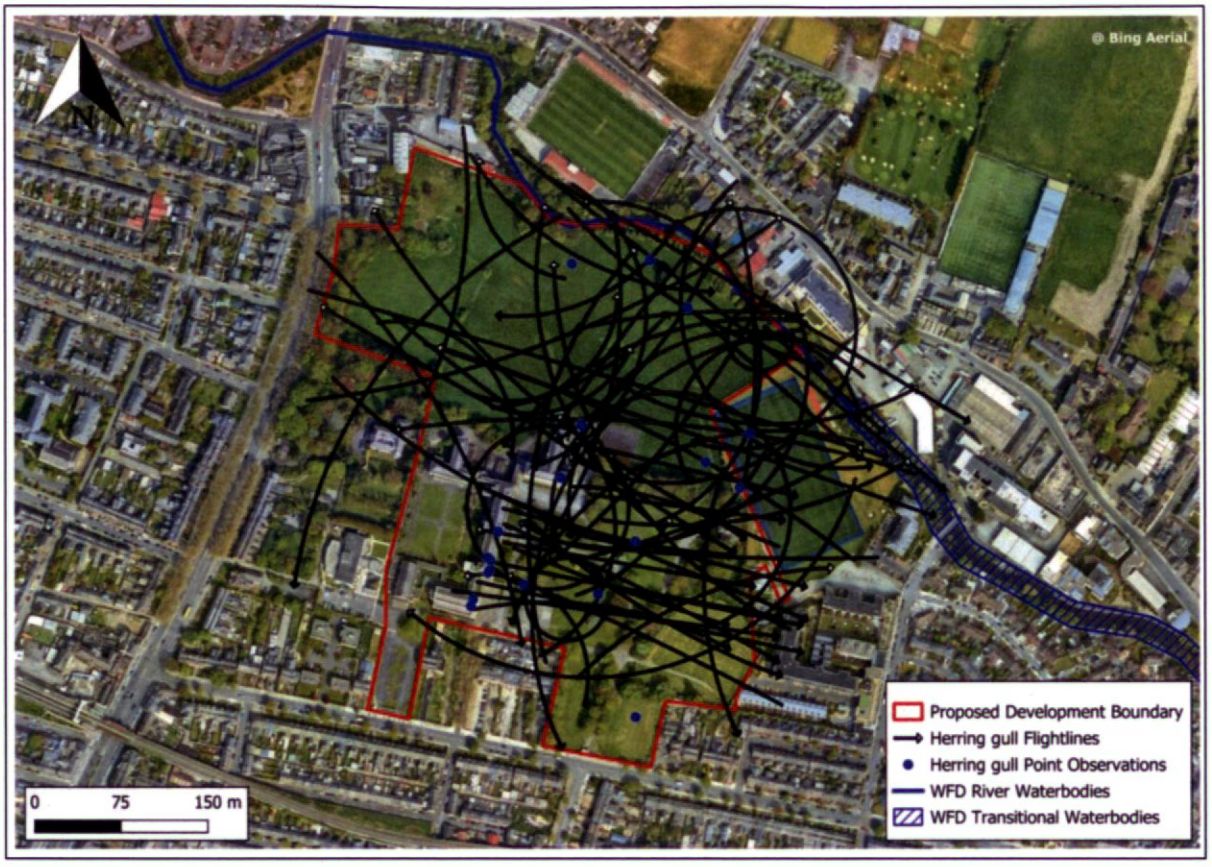


Figure 4: Herring gull activity in the survey area between September 2023 and March 2024

4.1.2 Field Survey Results for Herring Gull

34 Herring gull were observed in the proposed development site on five of the survey dates. On the majority of these survey visits, a small number of birds (<10 birds) were observed foraging for earthworms on grassland areas of the site with the largest flock of 11 birds observed on March 13th, 2024. A peak count of 74 herring gull were observed flying over the proposed development site on February 13th, 2024. A full list of observations included in Appendix II of this report.

4.1.3 Herring gull at Clonliffe College in the context of European sites within 20km

35 In order to evaluate the importance of the survey area for foraging herring gull, it is important to relate the number of birds observed foraging in the lands against the baseline populations of European sites in the vicinity, and against the international flocks.

36 It is worth bearing in mind that nearby European sites have been designated for their breeding populations of herring gull as opposed to their wintering populations. The surveys undertaken to inform this report related to the winter season, when the resident population is likely to be boosted by winter migrants. A direct comparison against nearby European site populations, is therefore not possible.

37 In relation to wintering populations of the species in the vicinity, the peak count of birds in the proposed development site potentially represents:

- 2% of the wintering population in Dublin Bay (0U404), referencing the I-WeBS mean peak count of 522 birds for the period 2016/2017– 2020/2021 (See Appendix I).
- 6% of the wintering population at Ireland's Eye (0U951), referencing the I-WeBS mean peak count of 200 birds over the period 2011/2013– 2017/18 (See Appendix I).

38 Based on the peak count from the data recorded in the 2019/20 surveys[13] against the current I-WeBS mean peak for Dublin Bay (0U404), the data reflects 27% of the I-WeBS mean peak count (2016/2017–2020/2021), and 2% of the mean peak count in the 2020/2021 surveys[14]. The data from the 2023/2024 surveys, also reflected 2% of the mean peak count for Dublin Bay (0U404). The peak count from the 2019/2020 surveys was 72% of the I-WeBS mean peak count for Ireland's Eye (0U951) and 5.5% of the peak count in both 2020/2021 and 2023/2024.

39 Flightlines recorded ranged from height band 1 to height band 3, the percentage of flightlines recorded in each height band is shown in

40 Table 3.

Table 3 Percentage of flightlines recorded for herring gull in height bands during survey visits from September 2023 to March 2024

Height Band	Height Band Range (m)	Percentage (%) per Height Band
1	0-10	9%
2	10-20	65%
3	20-100	26%

41 Observations of flightlines also recorded the majority of birds at height band 2 (75%) and, to a lesser extent band 3 (25%) in 2020/2021 while height bands were not recorded for herring gull in 2019/2020 survey visits, survey notes suggest broadly similar results to 2020/2021 and 2023/2024.

42 According to Nagy & Langendoen (2021), 1% of the international population of herring gull is 10,200 birds. The peak count of birds utilising the survey area did not reach or exceed this number in the 2023/24 survey season. The peak count of 11 birds observed in the survey area represents <1% of 1% of the international population of the species.

4.2 Black-headed gull *Chroicocephalus ridibundus* [A179]

4.2.1 Results of Desk Study for black-headed gull

43 Black-headed gull Chroicocephalus ridibundus [A179] is a SCI species for which the following European sites within 20km of the proposed development have been designated:

- South Dublin Bay and River Tolka Estuary SPA (004024), *c.* 1.5km southeast. This European site encompasses the coastal and intertidal zones of Dublin Bay extending between the Bull Wall in the north and Dún Laoghaire West Pier in the south. The baseline population of black-headed gull in the European site, based on the five-year mean peak counts for the period 1995/96-1999/2000, is listed as 3,040 birds in the Conservation Objectives Supporting Document[15]. South Dublin Bay and River Tolka Estuary SPA (004024) is listed as the fourth most important site in the country for this species.

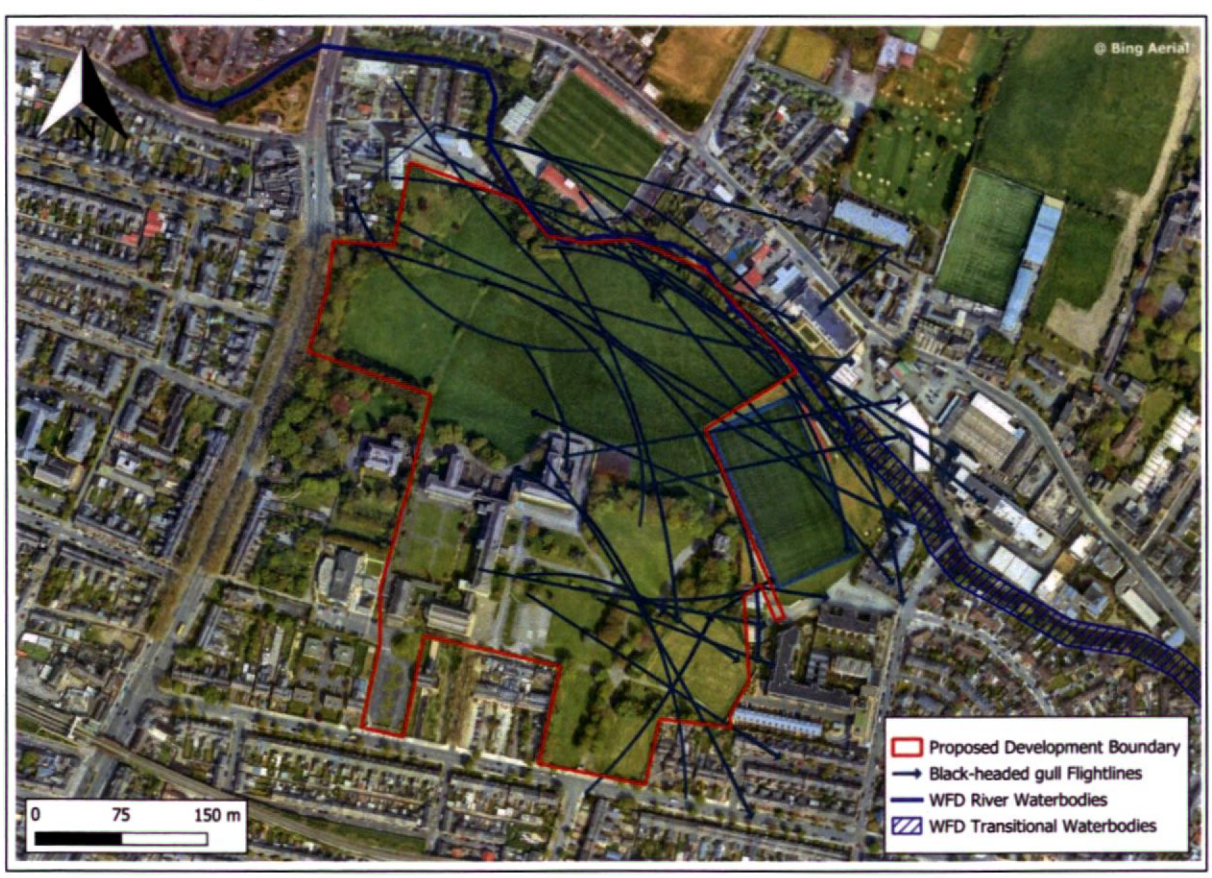
[13] Scott Cawley Ltd. (2020). Wintering Bird Survey Report For a Proposed Strategic Housing Development. Lands at Clonliffe College, Clonliffe Road, Drumcondra, Dublin 3.

[14] Scott Cawley Ltd. (2020). Wintering Bird Survey Report For a Proposed Strategic Housing Development. Lands at Clonliffe College, Clonliffe Road, Drumcondra, Dublin 3.

[15] NPWS (2015). Site Synopsis. Site Name: South Dublin Bay and River Tolka Estuary SPA. Site Code: 004024.

- North Bull Island SPA (004006), *c.* 4.5km east. This European site encompasses the coastal and intertidal zones of Dublin Bay extending between the Bull Wall in the north and Dún Laoghaire West Pier in the south. The baseline population of brent geese in the European site, based on the five-year mean peak counts for the period 1995/96-1999/2000, is listed as 2,196 birds in the Conservation Objectives Supporting Document[16]. North Bull Island SPA (004006) is the eighth most important site in Ireland for wintering black-headed gull and is of all-Ireland importance for the species. The flock in North Bull Island has decreased substantially since the population baseline was established in the late 1990s based on review of I-WeBS data for 0U404 Dublin Bay.
- North-West Irish Sea (004236), *c.* 7km east of the proposed development site. This European site encompasses estuaries (i.e. Malahide, Rogerstown and the River Boyne) and, headlands and the extended coastline along north Dublin Bay, north County Dublin, County Meath as far north as the southern tip of Dundalk Bay in County Louth as well as a large area offshore covering 2,333km^2 [10]. The baseline population of this European site is estimated at 508 from survey undertaken within the site in 2016 during autumn and winter. North-West Irish Sea SPA (004236) is listed as the 15th most important site in the country for this species. As this European site was recently designated an SPA in 2023, there is no I-WeBS data available for the site.

44 It is likely that there is some movement of birds between the aforementioned flocks over the winter period, based on changes in foraging resources and other variables. The flock in Dublin Bay (encompassing both the South Dublin Bay and River Tolka Estuary SPA, and North Bull Island SPA populations) forms a single unit, with roosting spread out across several subsites in the Bay[16]. The species forages both intertidally and subtidally in Dublin Bay.



45

[16] NPWS (2014A). Conservation Objectives Supporting Document: North Bull Island SPA (Site Code 4006) & South Dublin Bay and River Tolka Estuary SPA (Site Code 4024). Version 1. National Parks and Wildlife Service, Dublin.

Figure 5 Black-headed Gull activity in the survey area between September 2023 and March 2024.

4.2.2 Field Survey Results for Black-headed Gulls

Black-headed gull was not observed on the site during the surveys. However, this species was recorded flying over and in the vicinity of the proposed development site on all seven surveys (Figure 5). A peak flock of 75 birds was recorded flying over the site on February 13th, 2024.

Flightlines recorded ranged from height band 2 to height band 4, the percentage of flightlines recorded in each height band is shown in Table 4.

Table 4 Percentage of flightlines recorded for black-headed gull in height bands during survey visits from September 2023 to March 2024

Height Band	Height Band Range (m)	Percentage (%) per Height Band
2	10-20	44%
3	20-100	52%
4	100-150	4%

Flightline observations recorded in 2020/2021 show a slight variation in height at which birds were recorded at from 2023/2024, with the majority of observations at height band 2 (63%) with fewer at height band 3 (37%). Height bands were not recorded for black-headed gull in 2019/2020 survey visits.

There was a peak count of 16 birds recorded during the 2019/2020 surveys while black-headed gull were not observed on the lands during both the 2020/2021 and 2023/2024 surveys.

4.3 Common gull *Larus canus* [A182]

4.3.1 Results of Desk Study for common gull

Common gull *Larus canus* [A182] is a SCI species for which the following European sites within 20km of the proposed development have been designated:

- North-West Irish Sea SPA (004236), *c.* 7km east. This European site encompasses estuaries (i.e. Malahide, Rogerstown and the River Boyne) and, headlands and the extended coastline along north Dublin Bay, north County Dublin, County Meath as far north as the southern tip of Dundalk Bay in County Louth as well as a large area offshore covering 2,333km^{2}[10]. The baseline population of this European site is estimated at 2,866 from survey undertaken within the site in 2016 during autumn and winter. North-West Irish Sea SPA (004236) is listed as the second most important site in the country for this species. As this European site was recently designated an SPA in 2023, there is no I-WeBS data available for the site.

It is likely that there is some movement of birds between the aforementioned flock in the North-West Irish Sea SPA and Dublin Bay over the winter period, based on changes in foraging resources and other variables.

4.3.2 *Field Results for Common Gull*



Figure 6 Common Gull activity in the survey area between September 2023 and March 2024.

52 Common gull were observed on the lands on one of the seven survey dates, on March 13th, 2024. A peak count of 18 birds were observed foraging in the northern field (***Figure 6***). This species was not observed utilising grasslands in the south of the proposed development site.

53 Birds were observed flying over the proposed development site on two survey days. Flocks of birds flying over the site were substantially larger than the flocks utilising the site for foraging. A peak count of eight birds was observed flying over the site on 29th September 2023.

4.3.3 *Common Gull at Clonliffe College in the context of European sites within 20km*

54 In order to evaluate the importance of the survey area for foraging common gull, it is important to relate the number of birds observed foraging in the lands against the baseline populations of European sites in the vicinity, and against the international flocks. The peak count of foraging birds in the survey area (18 birds) potentially represents:

- 0.6% of the baseline population of the North-West Irish Sea SPA (004236) of 2,866 birds, should the flock utilising the survey area belong to this population.

55 According to Nagy & Langendoen (2021), 1% of the international population of common gull is 16,400 birds. The peak count of birds utilising the survey area did not reach or exceed this number in the 2023/24 survey season. The peak count of 18 birds observed in the survey area represents 0.1% of the international population of the species.

56 Flightlines recorded ranged from height band 1 to height band 4, the percentage of flightlines recorded in each height band is shown in Table 5.

Table 5 Percentage of flightlines recorded for common gull in height bands during survey visits from September 2023 to March 2024

Height Band	Height Band Range (m)	Percentage (%) per Height Band
1	0-10	20%
2	10-20	20%
3	20-100	37.5%
4	100-150	12.5%

Flightline observations recorded in 2020/2021 show a slight variation in height at which birds were recorded at from 2023/2024, with all 4 no. observations recorded at height band 2 (100%). There were no flightlines of common gull recorded in the 2019/2020 survey visits.

There were no observations of common gull recorded on the site during 2019/2020 or 2020/2021 winter bird surveys.

4.4 Light-bellied brent goose *Branta bernicla hrota* [A046]

4.4.1 Results of Desk Study for brent goose

Light-bellied brent goose *Branta bernicla hrota* [A046] is a SCI species for which the following European sites within 20km of the proposed development have been designated:

- South Dublin Bay and River Tolka Estuary SPA (004024), *c.* 1.5km southeast. This European site encompasses the coastal and intertidal zones of Dublin Bay extending between the Bull Wall in the north and Dún Laoghaire West Pier in the south. The baseline population of brent geese in the European site, based on the five-year mean peak counts for the period 1995/96-1999/2000, is listed as 368 birds in the Conservation Objectives Supporting Document. South Dublin Bay and River Tolka Estuary SPA (004024) are listed as the twelfth most important site in the country for this species. It should be noted that there has been along term increasing trend[17] in the population of brent geese in Dublin Bay since the original baseline population was estimated in the period 1995/96-1999/2000 up to the latest available data in 2019/2020 based on review of I-WeBS data for 0U404 Dublin Bay.
- North Bull Island SPA (004006), *c.* 4.5km east. This European site encompasses the coastal fringes of Bull Island, and surrounding intertidal and coastal zones extending between the North Bull wall in the south and Howth Head in the north. The baseline population of brent geese in the European site, based on the five-year mean peak counts for the period 1995/96-1999/2000, is listed as *c.* 1,548 birds in the Conservation Objectives Supporting Document[16]. North Bull Island SPA (004006) is one of the most important site in Ireland for wintering brent geese. The site hosts a population of international importance for the species.
- Baldoyle Bay SPA (004016), *c.* 8.9km north-east. This European site encompasses the intertidal lagoon and tidal mouth of an estuary between Baldoyle Village and Portmarnock Village in North County Dublin. The baseline population for brent geese at this European site is 726 birds, based

[17] BirdWatch Ireland (2023). I-WeBS Dublin Bay Trends Report: https://birdwatchireland.ie/app/uploads/2023/08/iwebs_trends_0U404_Dublin_Bay.html

on the five-year mean peak counts for the period 1995/96-1999/2000[18]. Baldoyle Estuary SPA is listed as the seventh most important site for brent geese in Ireland. The Baldoyle flock has decreased in size relative to the baseline population for the SPA on review of the five-year mean of the peak counts for the period 2016/2017 to 2020/2021 which was *c.* 521 for the most recently available I-WeBS data for the site.

- Malahide Estuary SPA (004025), *c.* 10.8km north. This European site encompasses the Malahide Estuary and Broadmeadow Water and surrounding coastal habitats. The baseline population for brent geese at this European site is 1,104 birds, based on the five-year mean peak counts for the period 1995/96-1999/2000[19]. Malahide Estuary SPA is listed as the fourth most important site for brent geese in Ireland. On review of the most recent I-WeBS data for Rogerstown Estuary for the five-year mean of the peak counts for the period 2016/2017 to 2020/2021, the mean peak number of *c.* 942 birds indicates a slight decrease in population size relative to the baseline.
- Rogerstown Estuary SPA (004015), *c.* 15.4km north. The baseline population for brent geese at this European site is 1,069 birds, based on the five-year mean peak counts for the period 1995/96-1999/2000[20]. Rogerstown Estuary SPA is listed as the fifth most important site for brent geese in Ireland. The Rogerstown Estuary mean flock size for the period 2016/2017 to 2020/2021 has increased in size to 2,461 birds relative to the baseline population for the SPA based on review of the most recent I-WeBS data for the site

60 It is likely that there is some movement of birds between the aforementioned flocks over the winter period, based on changes in foraging resources and other variables. The flock in Dublin Bay (encompassing both the South Dublin Bay and River Tolka Estuary SPA, and North Bull Island SPA populations) forms a single unit within Dublin Bay UNESCO Biosphere, with roosting concentrated in the Lagoon east of Bull Island[16]. The Dublin Bay population forages on Zostera beds and algal mats in the bay while these resources are available early in the wintering season. However, brent geese also use a range of terrestrial sites inland of Dublin Bay later in the season (i.e. between approximately late November and March) for foraging as resources in coastal European sites are exhausted[212223]. It is thought that the switch to inland terrestrial sites is also linked to recent increases in population.

61 The first published records of brent geese using inland feeding sites dates to 1991[24]. A study of the use of inland foraging sites by brent geese was undertaken and published in Benson (2009). Benson (2009) identified 60 sites across the Dublin area in her study. These sites were spread between Portmarnock in the North, Sandymount in the south and Ashtown and Greenhills in the west. The proposed development site at Clonliffe College does not appear in the list of 60 sites recognised in this study. More recent work on the range of brent geese in Dublin was undertaken to inform Natura Impact Statements for a residential development in St. Anne's Park[2122]. Scott Cawley Ltd. undertook surveys of a large number of sites across the Dublin area in the 2015/16 and 2016/17 winter bird seasons, identifying 119 inland foraging sites for brent geese across the Dublin Area. The lands at Clonliffe College were identified as a known inland feeding

[18] NPWS (2014B). Site Synopsis. Site Name: Baldoyle Bay SPA. Site Code: (004016).

[19] NPWS (2014C). Site Synopsis. Site Name: Malahide Estuary SPA. Site Code: (004025).

[20] NPWS (2014D). Site Synopsis. Site Name: Rogerstown Estuary SPA. Site Code: (004015).

[21] Benson, L. (2009). Use of Inland Feeding Sites by Light-bellied Brent Geese in Dublin 2008-2009: A New Conservation Concern? Irish Birds 8: 563-570.

[22] Scott Cawley (2017). Natura Impact Statement: Information for Stage 2 Appropriate Assessment – Proposed Residential Development, St. Paul's College, Sybil Hill, Raheny, Dublin 5. Report produced for Crekav by Scott Cawley.

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[24] O'Briain M., Healy B. (1991). Winter distribution of Light-bellied Brent Geese, 1981/82 to 1990/91. Irish Birds 4, 229 – 316.

site in Scott Cawley (2017), where they are referred to as "Drumcondra/Holy Cross College". Data on the site relates to the season 2015/2016 when a peak count of 200 birds was recorded at the site on 13th January 2016. Surveys by Scott Cawley Ltd. of the site in 2019/2020 and 2020/21 recorded no brent geese within the proposed development as the playing fields reference above have become overgrown and unsuitable as feeding habitat.



Figure 7 Light-bellied brent goose activity in the survey area between September 2023 and March 2024.

4.4.1 Field Survey Results for brent geese

62 Light-bellied brent geese were not observed foraging within the lands on any survey dates across the seven-month survey period (See Appendix II), and no evidence of usage by brent geese was collected from completion of survey transects in the proposed development site. The most likely explanation for this is that the length of the grass in the proposed development site is suboptimal for the brent geese, which favour a short, open regularly mown sward. The grass across the northern part of the site remained relatively tall throughout the survey period. The full dataset for transect surveys, containing data on sward height across the survey season, is provided as Appendix III of this report.

63 Birds were observed flying over the proposed development site on five surveys November 2023 to March 2024 (see Figure 7). The peak count of birds flying over the lands was 150 birds, recorded on 15th January 2024. Birds tended to fly between height bands 2 and 3 (i.e. from 10m - 20m and 20 - 200m) above ground level Table 6. Birds tended to fly east-west in the mornings and west-east in the evenings, suggesting the birds were travelling from sites within Dublin Bay in the morning and returning to roost in these coastal sites by the evenings. Several known inland feeding sites exist within the immediate vicinity of the lands, including St. Patrick's College in Drumcondra, and several sites off Griffith Avenue[2122].

64 A peak count of 550 birds were recorded flying along the River Tolka adjacent to the north of the site during the 2019/2020 surveys while a flock of 660 individuals were observed flying over the site during the

2020/2021 surveys. As per observations for 2023/2024 which inform this report, birds generally flew east-west shortly after dawn and west-east back to their roosting sites in the evenings before sunset.

Table 6 Percentage of flightlines recorded for brent geese in height bands during survey visits from September 2023 to March 2024

Height Band	Height Band Range (m)	Percentage (%) per Height Band
2	10-20	30%
3	20-100	70%

Flightlines were recorded at height band 3 during the 2019/2020 survey visits while the majority of flightlines were observed at height band 3 (61%) with the remainder recorded at height band 2 (39%) in 2020/2021 which broadly reflects observations recorded in 2023/2024.

4.5 Cormorant *Phalacrocorax carbo* [A017]

4.5.1 Results of Desk Study for Cormorant

65 Cormorant *Phalacrocorax carbo* [A017] is an SCI species for which the following European sites within 20km of the proposed development have been designated:

- Ireland's Eye SPA (004117), *c.* 12.5km north-east of the proposed development site. The European site encompasses the island of Ireland's Eye and the surrounding coastal waters. Cormorant breed on the island in nationally important numbers (306 pairs)[10].
- Lambay Island SPA (004069), *c.* 19.6km north-east of the proposed development site. The European site encompasses Lambay Island and its surrounding coastal waters. Cormorant breed on the island in internationally important numbers (675 pairs), with smaller number of birds (29) overwintering at the site[11].

66 There is potential that some members of the Ireland's Eye or Lambay Island breeding population utilise the section of the River Tolka that runs along the northern boundary of the proposed development site.



Figure 8 Cormorant activity in the survey area between September 2023 and March 2024.

4.5.2 Field Survey Results for Cormorant

Cormorant activity was chiefly concentrated along the River Tolka, which forms the northern boundary of the proposed development site. This species was observed flying over the vicinity of the River Tolka on one survey date, on March 13th, 2024. All observations were of a single individual and are thought to be reoccurring passes of individual birds. Birds were generally observed flying along the Tolka, as opposed to across the proposed development site (See Figure 8).

4.5.3 Cormorant at Clonliffe College in the context of European sites within 20km

It is worth bearing in mind that nearby European sites, Ireland's Eye SPA (004117) and Lambay Island SPA (004069) have been designated for their breeding populations of cormorant as opposed to their wintering populations. The surveys undertaken to inform this report related to the winter season, when the resident population, and it is not clear how the wintering population relates to the breeding populations at Ireland's Eye and Lambay Island in this instance.

In relation to wintering populations of the species in the vicinity, the peak count of birds in the proposed development site potentially represents:

- There is no data available for Ireland's Eye SPA from I-WeBS over the period 2016/2017 – 2020/2021. The most recent data from 2013/2014 and 2015/2016 suggest a mean peak count of 175 birds over the over the two I-WeBS seasons (See Appendix I).
- There is no data available for Lambay Island SPA from I-WeBS over the period 2016/2017 – 2020/2021 (See Appendix I).

According to Nagy & Langendoen (2021), 1% of the international population of cormorant is 1,200 birds. The peak count of birds utilising the survey area did not reach or exceed this number in the 2023/24 survey

season. The peak count of one bird observed in the survey area represents 0.16% of the 1% of the international population of the species.

71 The results from the latest surveys in 2023/2024 reflect observations from 2019/2020 and 2020/2021 in which one individual was observed in the River Tolka, adjacent to the northern boundary of the site. Flightlines were generally of one bird across surveys in all three seasons with the exception of one visit in December 2019 when a flightline of 2 individuals was observed. There were a total of three flightlines across the 2023/2024 survey visits, one across each of height bands 1, 2 and 3 which were typically observed along the River Tolka.

72 The majority of observations were recorded at height band 3 (66%) and the remainder at height band 2 (33%) in 2019/2020 survey visits while the opposite result was observed in 2020/2021, with the majority of observations recorded at height band 2 (66%) and the remainder at height band 3 (33%).

4.6 Curlew *Numenius arquata* [A160]

4.6.1 Results of Desk Study for Curlew

73 Curlew *Numenius arquata* is an SCI species for which the following European site within 20km of the proposed development have been designated:

- North Bull Island SPA (004006), *c.* 4.5km east. The baseline population of curlew in the European site, based on the five-year mean peak counts for the period 1995/96-1999/2000, is listed as 937 birds in the Site Synopsis Supporting Document[16]. North Bull Island SPA (004006) is the 11th most important site in Ireland for wintering curlew. The site hosts a population of all-Ireland importance for the species. Data on the baseline flock size at North Bull Island SPA and the most recent 5-year mean from 2016/17 – 2020/21 of 889 for Dublin Bay (0U404) contained within I-WeBS data (See Appendix I) indicates that the SPA population has decreased slightly relative to the baseline population.

74 Curlew are known to forage for earthworms on damp grassland on terrestrial sites[16]. The range of terrestrial sites in the Dublin area does not appear to be as well-documented as brent geese. Curlew are known to use inland feeding sites but the network of inland feeding sites is not as well-documented as for brent geese. The long-term trend (from the most recent I-WeBS population estimate) for curlew has seen an overall decline in numbers[25].

75 Although, Curlew is not designated an SCI in South Dublin Bay and River Toka Estuary SPA (004024), a wintering population of 127 occurs on the site[15].

[25] BirdWatch Ireland (2023). I-WeBS Dublin Bay Trends Report. I-WeBS Trends Report 1994/95 – 2019/20.

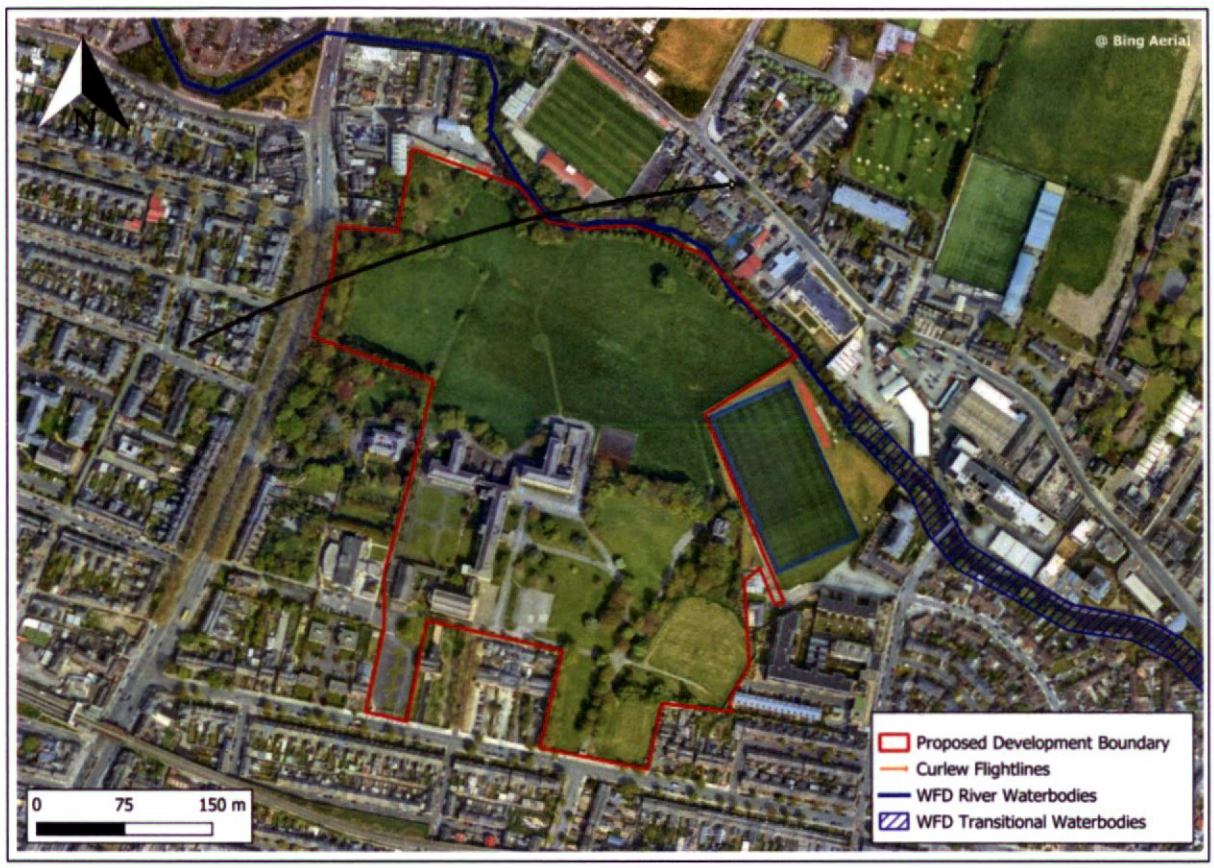


Figure 9 Curlew activity in the survey area between September 2023 and March 2024.

4.6.2 Field Survey Results for Curlew

76 Curlew were not recorded foraging in the proposed development site with a single observation of a flock of 15 birds flying over the site on 13th February 2024 (see Figure 7). Virtually all observations of curlew flight lines were of movements east-west, e.g. from Dublin Bay inland. West-east movements were observed only on one occasions (see Figure 9).

4.6.3 Curlew at Clonliffe College in the context of European sites within 20km

77 The surveys undertaken to inform this report related to the winter season, when the resident population is likely to be boosted by winter migrants. A direct comparison against nearby European site populations, is therefore not possible.

78 In relation to wintering populations of the species in the vicinity, the peak count of birds recorded flying over the proposed development site potentially represents:

- <2% of the wintering population in Dublin Bay, referencing the I-WeBS mean peak count of 889 birds for the period 2016/2017– 2020/21 (See Appendix I).

79 There were no curlew recorded on the proposed development in 2019/2020 as in the 2023/2024 surveys while an individual bird was recorded on the site in 2020/2021. Relatively small flocks were recorded flying over the site in 2019/2020 with a peak of 23 birds and similarly in 2020/2021, with a peak count of 20 birds.

80 The single observation of a flock of curlew was recorded at height band 2 (i.e. 10-20m) in 2023/2024 survey visits while observations were recorded at height band 3 in 2019/2020 and again in 2020/2021.

4.7 Grey Heron *Ardea cinerea* [A028]

4.7.1 Results of Desk Study for Grey Heron

81 There are no European sites for which grey heron is an SCI species within the vicinity of the proposed development site. The closest European sites which includes grey heron as a designating feature is Wexford Harbour and Slobs SPA (004076), *c.* 99km south of the proposed development site. Grey herons are generally sedentary in Ireland, meaning they do not travel long distances between their breeding and wintering grounds[26], and for this reason, the population of birds in the proposed development site is not part of any European site population.



Figure 10 Grey Heron activity in the survey area between October 2023 and March 2024.

4.7.2 Field Survey Results for Grey Heron

82 A single observation of grey heron was observed foraging in the River Tolka on 15th January 2024. The birds were also noted flying up and down river on a total of four survey dates. The species was generally observed close to the River Tolka, with a small number of individuals recorded flying across the remainder of the proposed development site (see Figure 8).

83 Regarding the data from previous seasons, a count of four birds was observed during a survey in November 2019 while numerous observations of a single bird were recorded across the 2020/2021 season.

84 Flightlines were recorded at height bands 2 and 3, the percentage of flightlines recorded in each height band is shown in Table 7.

[26] From information on Grey Heron *Ardea cinerea* published on the BirdWatch Ireland website https://birdwatchireland.ie/birds/grey-Heron/. Accessed 18th April 2024

Table 7 Percentage of flightlines recorded for grey heron in height bands during survey visits from September 2023 to March 2024

Height Band	Height Band Range (m)	Percentage (%) per Height Band
2	10-20	40%
3	20-100	60%

The vast majority of flightlines were recorded at height band 2 (95%) in 2020/2021 with just 1 no. observations recorded at height band 2 (5%), while height bands for this species were not recorded in 2019/2020 survey visits.

4.8 Kingfisher *Alcedo atthis* [A229]

4.8.1 Results of Desk Study for Kingfisher

There are no European sites for which kingfisher is an SCI species within the vicinity of the proposed development site. The closest European sites which includes kingfisher as a designating feature is the River Boyne and River Blackwater SPA (004232), *c.* 37km northeast of the proposed development site. The River Boyne and River Blackwater SPA is in a separate water catchment to the River Tolka and is therefore not directly connected to the proposed development site. The population on the River Tolka is not part of the River Boyne and River Blackwater SPA population based on distance of separation between the two.

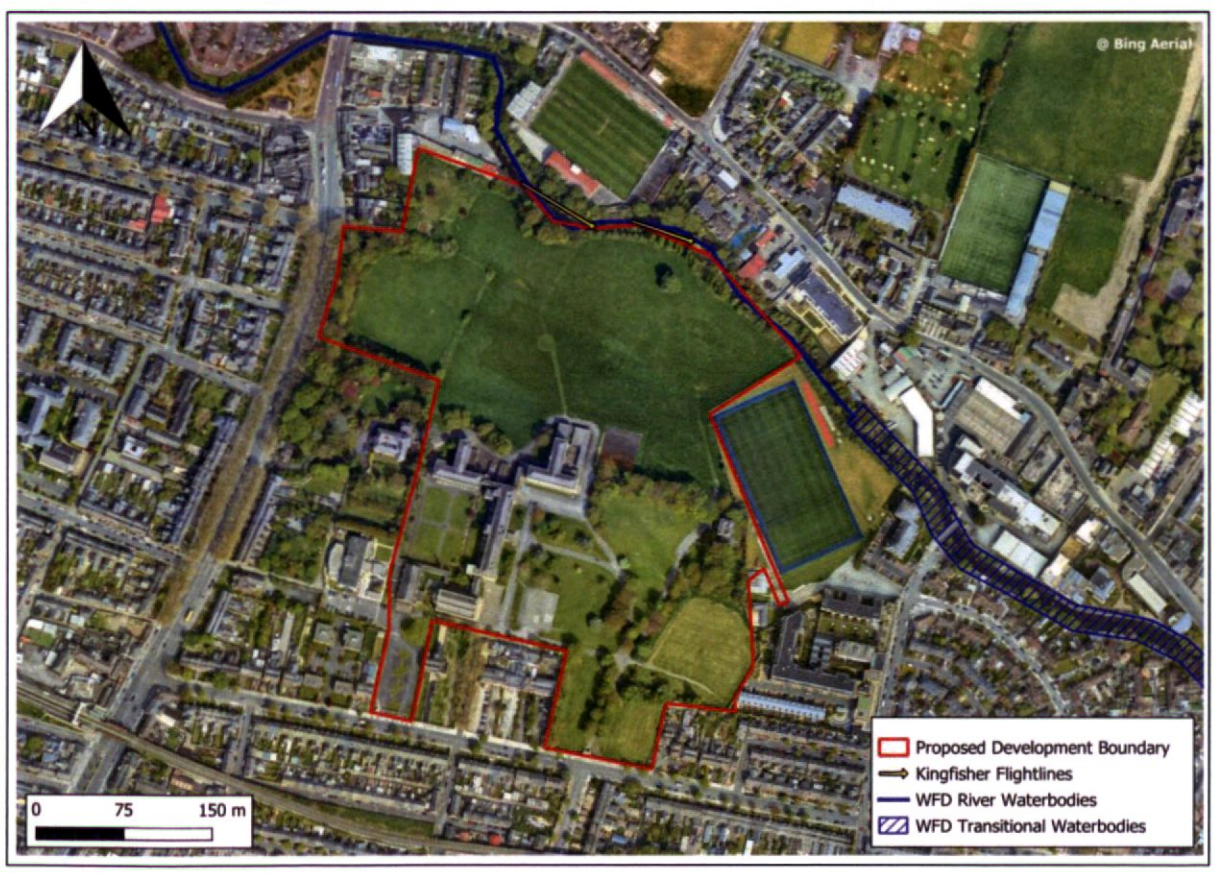


Figure 11 Kingfisher activity in the survey area between October 2023 and March 2024.

4.8.2 Field Survey Results for Kingfisher

Kingfisher were observed foraging and/or commuting along the River Tolka on two of the seven survey visits in 2023/2024. The species was noted flying downstream on the River Tolka adjacent to the proposed

development site. Single birds were observed in all instances. The section of the River Tolka running along the northern boundary of the proposed development site is likely to form part of a breeding territory for kingfisher (see Figure 11).

88 During the 2019/2020 surveys two birds were observed along the River Tolka while there were numerous observations of a single bird along the watercourse during the surveys in 2020/2021. Kingfisher were recorded flying close to the surface (i.e. height band 1, 0-10m), in both 2020/2021 and 2023/2024 in all instances while height bands for this species were not recorded in 2019/2020 survey visits, as a surveyor during the suit of surveys that season, the results reflect observations from 2020/2021 and 2023/2024.

5 Conclusions

89 Observations of wintering birds within and which traverse the proposed development site have been contextualised against the populations of these species in nearby European sites.

90 The frequency and duration of winter bird surveys was reduced from the 2019/2020 and 2020/2021 surveys which was considered proportionate in the professional judgement of Scott Cawley Ltd., based on the suitability of the site and results obtained in those years. Results of winter bird surveys from the 2019/20 and the 2020/21 season are therefore, comparable to data from the latest surveys in 2023/2024 which inform this report.

91 Brent geese were not observed foraging within the lands on any survey dates across the seven-month survey period as in both 2019/2020 and 2020/2021 and no evidence of usage by brent geese was collected from completion of survey transects in the proposed development site.

92 In the case of herring gull, common gull, brent geese, curlew, cormorant, grey heron, and kingfisher, it has been demonstrated that the peak count of birds in the survey area in 2023/24 is less than 1% of the international population of these species both on site and flocks for species which traverse the proposed development site.

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Appendix I – Desk Study Results

Wetland Bird Survey Records for O13 10km Grid Square, returned from the National Biodiversity Data Centre Database

A search for all species records contained within the O13 10km grid square was returned on 20th March 2024. The records have been reviewed by Cathal O'Brien of Scott Cawley Ltd. and only records relating to wetland birds are presented in the table, below. Species which are designated SCI and/or are listed as amber or red status Birds of Conservation Concern Ireland.

Appendix I - Table 1: Wetland bird records from the 10km grid square O13, as returned from the NBDC

Species name	Record count	Date of last record	Title of dataset
Arctic Tern *Sterna paradisaea*	2	31/12/2011	Bird Atlas 2007 - 2011
Bar-tailed Godwit *Limosa lapponica*	7	23/03/2023	Bird Atlas 2007 - 2011
Black Guillemot *Cepphus grille*	27	10/02/2023	Birds of Ireland
Black-headed Gull *Larus ridibundus*	143	15/03/2023	Birds of Ireland
Black-tailed Godwit *Limosa limosa*	8	15/03/2023	Birds of Ireland
Branta bernicla subsp. hrota	14	31/12/2011	Bird Atlas 2007 - 2011
Brent Goose *Branta bernicla*	88	10/03/2023	Birds of Ireland
Common Coot *Fulica atra*	60	27/03/2023	Birds of Ireland
Common Greenshank *Tringa nebularia*	2	31/12/2011	Bird Atlas 2007 - 2011
Mew Gull *Larus canus*	27	15/03/2023	Birds of Ireland
Common Kingfisher *Alcedo atthis*	44	25/02/2023	Birds of Ireland
Common Pochard *Aythya ferina*	5	27/03/2023	Birds of Ireland
Common Redshank *Tringa totanus*	18	23/03/2023	Birds of Ireland
Common Shelduck *Tadorna tadorna*	12	15/03/2023	Birds of Ireland
Common Snipe *Gallinago gallinago*	7	15/03/2023	Birds of Ireland
Common Tern *Sterna hirundo*	6	18/06/2017	Birds of Ireland
Dunlin *Calidris alpina*	6	31/12/2011	Bird Atlas 2007 - 2011
Eurasian Curlew *Numenius arquata*	45	06/02/2023	Birds of Ireland
Eurasian Oystercatcher *Haematopus ostralegus*)	29	23/03/2023	Birds of Ireland
Eurasian Teal *Anas crecca*	13	11/01/2023	Birds of Ireland
Eurasian Wigeon *Anas penelope*	4	31/12/2011	Bird Atlas 2007 - 2011
European Golden Plover *Pluvialis apricaria*	1	31/12/2011	Bird Atlas 2007 - 2011
Gadwall *Anas strepera*	2	31/12/2011	Bird Atlas 2007 - 2011
Great Black-backed Gull *Larus marinus*	21	15/03/2023	Birds of Ireland
Great Cormorant *Phalacrocorax carbo*	66	30/03/2023	Birds of Ireland
Greater Scaup *Aythya marila*	4	27/10/2017	Birds of Ireland
Grey Heron *Ardea cinerea*	167	27/03/2023	Birds of Ireland

Species name	Record count	Date of last record	Title of dataset
Grey Plover *Pluvialis squatarola*	3	31/12/2011	Bird Atlas 2007 - 2011
Herring Gull *Larus argentatus*	240	29/03/2023	Birds of Ireland
Lesser Black-backed Gull *Larus fuscus*	47	27/03/2023	Birds of Ireland
Little Egret *Egretta garzetta*	41	20/02/2023	Birds of Ireland
Little Grebe *Tachybaptus ruficollis*	50	03/03/2022	Birds of Ireland
Mallard *Anas platyrhynchos*	166	27/03/2023	Birds of Ireland
Mediterranean Gull *Larus melanocephalus*	5	15/03/2023	Birds of Ireland
Mute Swan *Cygnus olor*	148	24/03/2023	Birds of Ireland
Northern Lapwing *Vanellus vanellus*	6	31/12/2011	Bird Atlas 2007 - 2011
Northern Shoveler *Anas clypeata*	3	31/12/2011	Bird Atlas 2007 - 2011
Red Knot *Calidris canutus*	8	23/03/2023	Birds of Ireland
Red-breasted Merganser *Mergus serrator*	3	31/12/2011	Bird Atlas 2007 - 2011
Ringed Plover *Charadrius hiaticula*	7	31/12/2011	Bird Atlas 2007 - 2011
Tufted Duck *Aythya fuligula*	83	27/03/2023	Birds of Ireland

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U404 Dublin Bay

The mean is based only on the most recent 5-season period, *i.e.* for the period 2016/17 - 2020/21. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 2: I-WeBS summary data for OU404 Dublin Bay

Species	1% national	1% international	2011/12	2012/13	2013/ 14	2014 / 15	2015 / 16	2016/ 17	2017/ 18	2018/ 19	2019/ 20	2020/ 21	MEAN
Bar-tailed Godwit	150.00	1200.00	1895	2141	1710	1642	2164	2653	1599	1773	2736	1833	2119
Black-headed Gull		20000.00	2245	1907	2559	1259	2768	2393	1375	3243	3803	4842	3131
Black-tailed Godwit	190.00	610.00	891	1362	1768	873	2185	1274	1474	3369	2987	1499	2121
Common Gull		16400.00	249	300	984	272	890	213	141	387	538	286	313
Common Scoter	140.00	5500.00	20*	10*	42*		40	19		24	10		11
Cormorant	120.00	1200.00	132*	53	198*	41*	71	95*	112*	100*	157*	183*	129
Curlew	350.00	8400.00	1169	874	932	1424	567	750	494	1323	1162	715	889
Dunlin	570.00	13300.00	3559	4163	4897	3603	2557	8280	5884	7474	6017	10362	7603
Gadwall	20.00	600.00			2*	2*							0
Golden Plover	1200.00	9300.00	390*	404*	1080*	740*	1155	1010*	1322	1430*	1610	95*	1093
Goldeneye	60.00	11500.00	11*	6*		2*		1*		2			1
Great Black-backed Gull		4200.00	311	116	188	52	263	151	108	138	145	119	132
Great Crested Grebe	40.00	3500.00	898	87*	755	143	307	192	34	388	106*	262	196
Great Northern Diver	20.00	50.00	2		3*		5	1*	1	1*	2	1	1
Greenshank	20.00	2300.00	38	46	34	47	78	35	14	44	51	48	38
Grey Heron	25.00	2700.00	28	15*	68*	40*	44*	28*	24	27*	82*	19*	36
Grey Plover	30.00	2500.00	200	307*	310*	452*	235*	245*	198	499*	560*	208*	342
Herring Gull		10200.00	518	130	486	261	538	450	607	483	374	694	522
Kingfisher					1		1			4	1	1	1
Knot	280.00	4500.00	3435	3022	4547	3450	2405	5850	6554	7256	5781	5946	6277

Species	1% national	1% international	2011/12	2012/13	2013/ 14	2014 / 15	2015 / 16	2016/ 17	2017/ 18	2018/ 19	2019/ 20	2020/ 21	MEAN
Lapwing	1100.00	20000.00	120	67*	52	54*	143	25*	32	31	775	30	179
Lesser Black-backed Gull		5500.00	28	25	5	20	16	5	2	69	8	135	44
Light-bellied Brent Goose	360.00	400.00	4053	6134*	2262	4503	3501*	4420*	3331	3662	5848	1472	3747
Little Egret	20.00	1300.00	45*	19*	59*	69*	59*	70*	57	71*	130*	140*	94
Little Grebe	20.00	4000.00	1*	9*	1	5*		4	1*	3*	8	6	4
Long-tailed Duck		17250.00		2*				2				1	1
Mallard	290.00	20000.00	151*	52*	92*	106*	120	64*	82	221*	133*	96	119
Mediterranean Gull		770.00	113	23	39	27	64	68	6	14	32	7	25
Moorhen		20000.00	7	5*	5*		5*	3*	2	4	6	1	3
Mute Swan	90.00		2*	2*	4*	6*	9*	5*	11	9*	32*	7*	13
Oystercatcher	690.00	8200.00	3408	3025	3074*	2197	3572*	4042	2375	3378	3313	2466*	3115
Pintail	20.00	600.00	212	160	200*	150*	124*	190	214	318	192*	252	233
Purple Sandpiper	20.00	710.00	4	3	2	1	2				1	1	0
Red-breasted Merganser	20.00	1700.00	114*	50*	54*	57*	69*	80*	37	40*	96	36*	58
Redshank	300.00	3900.00	2273	2077	2460	1889	1648	1430	2274	2312	2299	2517	2166
Red-throated Diver	20.00	3000.00	8*	8*	7*	2	7	6	5	4	1		3
Ringed Plover	100.00	730.00	125	215*	101*	98*	109*	208	285	148	131	70	168
Sanderling	60.00	1200.00	411	405	510	266	841	374	301	736	588	748	549
Shag		2000.00	19*	23	36	3*	71	19	10	10	22*	1*	12
Shelduck	120.00	3000.00	603	731	956	605	744	1811	1241	1632	1619	2586	1778
Shoveler	30.00	400.00	101	79	126	47	115	116	144	122	124	81	117
Snipe		20000.00	12	62	20		31	53	10	43	15	5	25
Teal	340.00	5000.00	909*	981	1378	1233*	1291*	1654	1030	2187	1392	930*	1439

Species	1% national	1% international	2011/12	2012/13	2013/ 14	2014 / 15	2015 / 16	2016/ 17	2017/ 18	2018/ 19	2019/ 20	2020/ 21	MEAN
Turnstone	95.00	1400.00	328	227	466	250	584	286	334	216	445	259	308
Water Rail			1*										0
Wigeon	630.00	15000.00	610	445	691*	702*	1106*	1839	918	1314	1833	1082	1397

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U403 Baldoyle Bay

The mean is based only on the most recent 5-season period, *i.e.* for the period 2016/17 - 2020/21. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 3: I-WeBS summary data for OU403 Baldoyle Bay

SPECIES	1% NATIONAL	1% INTERNATIONAL	2011/12	2012/13	2013/ 14	2014 / 15	2015 / 16	2016/ 17	2017/ 18	2018/ 19	2019/ 20	2020/ 21	MEAN
Bar-tailed Godwit	170	1500			162	150	48	59	38	125	67	15	61
Black-headed Gull					242	281	52	120	13	102	37	83	71
Black-tailed Godwit	200	1100			389	139	296	172	189	250	234	17	172
Common Gull					64	11	4	61	3	8	19	34	25
Common Sandpiper										1			0
Common Scoter	110	7500			16	7							5
Cormorant	110	1200			10	4	3	4	1	1	5	2	3
Curlew	350	7600			90	61	106	49	44	100	119	40	70
Dunlin	460	13300			750	233	300	403	537	93	30	291	271
Golden Plover	920	9300			2500	450	2000	1200		600	1300	433	707
Great Black-backed Gull					7	15	10	9	9	10	12	7	9
Great Crested Grebe	30	6300			124	189							0
Great Northern Diver	20	50			1	2							0
Greenshank	20	3300			6	11	3	6	7	6	6	3	6
Grey Heron	25	5000			5	7	7	4	6	8	3	2	5

SPECIES	1% NATIONAL	1% INTERNATIONAL	2011/12	2012/13	2013/ 14	2014 / 15	2015 / 16	2016/ 17	2017/ 18	2018/ 19	2019/ 20	2020/ 21	MEAN
Grey Plover	30	2000			55	28	8	25	10	13	11	1	12
Herring Gull					47	91	58	112	48	133	79	136	102
Kingfisher										1			0
Knot	160	5300			553		19	600	800		201		320
Lapwing	850	72300			372	300	137	392	180	267	203	83	225
Lesser Black-backed Gull					4	18	1	1	1	1		1	1
Light-bellied Brent Goose	350	400			580	588	342	753	663	366	404	419	521
Little Egret	20	1100			18	3	7	21	25	8	7	27	18
Little Grebe	20	4700			1			3	1	4			1
Mallard	280	53000			67	102	106	71	60	124	90	119	93
Mute Swan	90	100			2		2				5	5	2
Oystercatcher	610	8200			277	1113	219	117	144	145	628	143	235
Pintail	20	600			4	4					1		0
Red-breasted Merganser	25	860			6	5	2	4		1	6	16	5
Redshank	240	2400			144	152	125	96	154	145	126	94	123
Red-throated Diver	20	3000			14	64							0
Ringed Plover	120	540			34	59	123	4					1
Sanderling	85	2000			6								0
Shag					7			1				1	0
Shelduck	100	2500			52	97	88	127	105	133	261	76	140
Shoveler	20	650						1					0
Snipe											1		0
Teal	360	5000			145	160	108	131	48	121	230	98	126
Turnstone	95	1400			17	12	13	10	4	8	18	16	11
Wigeon	560	14000			54	54	32	266	332	57	70	76	160

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U408 Broadmeadow (Malahide) Estuary

The mean is based only on the most recent 5-season period, *i.e.* for the period 2016/17 - 2020/21. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 4: I-WeBS summary data for OU408 Broadmeadow (Malahide) Estuary

SPECIES	1% NATIONAL	1% INTERNATIONAL	2011/12	2012/13	2013/14	2014 / 15	2015 / 16	2016/17	2017/18	2018/19	2019/20	2020/21	MEAN
Mute Swan	90	100	90	47	50	89		66	61	68	62	54	62
Whooper Swan	150	340	2		1								0
Light-bellied Brent Goose	350	400	943	1980	710	464	824	1565	605	1121	242	1177	942
Shelduck	100	2500	8	262	120			569	321	416	9	455	354
Wigeon	560	14000		157		1		94	215	135	12	104	112
Gadwall	20	1200		120	4				4	2			1
Teal	360	5000	41	80	119	8		163	196	190	70	85	141
Mallard	280	53000	95	167	112	23		81	110	127	82	136	107
Pintail	20	600		29	6			12	39	16		12	16
Shoveler	20	650						24	30	20	0	1	15
Pochard	110	2000		2									0
Tufted Duck	270	8900										3	1
Scaup	25	3100							1				0
Long-tailed Duck				3				1					0
Common Scoter	110	7500		30									0
Goldeneye	40	11400	51	50	36			43	14	24	20		20
Red-breasted Merganser	25	860	87	57	80			237	23	37	33	74	81
Red-throated Diver	20	3000		4					3		8	2	3
Great Northern Diver	20	50			3								0
Little Grebe	20	4700	23	11	8	5		33	84	39	52	35	49
Great Crested Grebe	30	6300	34	120	60	10		83	54	29	26	15	41

SPECIES	1% NATIONAL	1% INTERNATIONAL	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	MEAN
Slavonian Grebe								1					0
Cormorant	110	1200	6	101	101	21		118	99	39	97	121	95
Shag				32	8			12	2	4	4	23	9
Little Egret	20	1100	2	17	13	1		35	22	20	17	15	22
Grey Heron	25	5000	12	16	19	7	0	30	21	17	12	21	20
Kingfisher										1		1	0
Moorhen			4	4	6	6	0	3	4	8	7	5	5
Oystercatcher	610	8200	78	1300	1833	2		1523	1242	1150	1863	1438	1443
Ringed Plover	120	540		71				75	240	160	170	72	143
Golden Plover	920	9300	260	940	200	5			10	10	4		5
Grey Plover	30	2000	3	140	9			38	82	50	2	85	51
Lapwing	850	72300	1180	900	590	29		331	202	305	246	153	247
Knot	160	5300	4	440	110			202	760	950	200	156	454
Sanderling	85	2000		2	80			13	2				3
Curlew Sandpiper				2									0
Dunlin	460	13300	23	480	94	1		838	445	299	57	123	352
Ruff			4	1	2	5			1	2		3	1
Jack Snipe				1					1				0
Snipe			20	25	56	4		25	3	17	22	8	15
Black-tailed Godwit	200	1100	296	355	206	167		146	245	699	577	214	376
Bar-tailed Godwit	170	1500	62	213	133			93	107	185	9	78	94
Curlew	350	7600	1	500	244			363	349	232	328	387	332
Greenshank	20	3300	26	43	64	1		32	43	61	25	35	39
Redshank	240	2400	87	374	145	77		473	575	410	331	355	429
Turnstone	95	1400	23	221	94			54	98	32	138	48	74
Black-headed Gull			479	368	659	314		422	294	440	243	365	353

SPECIES	1% NATIONAL	1% INTERNATIONAL	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	MEAN
Common Gull			149	70	71	4		75	126	29	108	49	77
Lesser Black-backed Gull			4	3	11	2		20	6	5	6	11	10
Herring Gull			55	139	110	24		179	389	212	124	316	244
Great Black-backed Gull			15	44	93	6		70	69	44	30	39	50
Sandwich Tern			2	50	12			38	1	52		25	23

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U407 Rogerstown Estuary

The mean is based only on the most recent 5-season period, *i.e.* for the period 2016/17 – 2020/21. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 5: I-WeBS summary data for OU407 Rogerstown Estuary

SPECIES	1% NATIONAL	1% INTERNATIONAL	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	MEAN
Mute Swan	90	100		4	2	2	2	2	4	3	3		2
Whooper Swan	150	340					12	13	2	6	0	0	4
Pink-footed Goose							2				1	6	1
Greenland White-fronted Goose	100	190	3			3							0
Greylag Goose	35	980	33	89	5	33	95	30	34			1	13
Light-bellied Brent Goose	350	400	2661	1395	2217	1047	2662	2829	4367	1795	1271	2042	2461
Shelduck	100	2500	752	793	875	652	624	687	1062	513	502	814	716
Wigeon	560	14000	813	585	686	1342	1532	1094	3390	1451	1643	1161	1748
Gadwall	20	1200		2		3	2	4	14		9	7	7

SPECIES	1% NATIONAL	1% INTERNATIONAL	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	MEAN
Teal	360	5000	1211	1469	685	1968	682	857	2560	769	1686	1439	1462
Mallard	280	53000	182	198	172	260	160	168	348	133	99	102	170
Pintail	20	600	0	1		4	5	2				3	1
Shoveler	20	650	26	34	42	15	25	33	40	57	30	17	35
Common Scoter	110	7500						8		1			2
Goldeneye	40	11400		6									0
Red-breasted Merganser	25	860	30	22	20	39	18	36	50	18	34	52	38
Red-throated Diver	20	3000	4	1	2	4	1	1	2	2	4	2	2
Great Northern Diver	20	50			2								0
Little Grebe	20	4700	24	15	15	22	25	15	40	11	4	6	15
Great Crested Grebe	30	6300	4	14	5	22	3	2	1	3	8	5	4
Cormorant	110	1200	17	33	32	21	27	29	102	48	43	17	48
Shag			40	47	36	20	10	10	34	62	94	14	43
Little Egret	20	1100	43	48	57	46	55	43	104	35	51	50	57
Grey Heron	25	5000	24	24	17	21	16	20	40	18	30	16	25
Water Rail							1			2			0
Moorhen			1	1	8	5	2	2	6	1	5		3
Coot	190	15500		2	3		2	3	4	1			2
Oystercatcher	610	8200	2116	2491	1531	1519	1697	1057	2310	852	984	1304	1301
Ringed Plover	120	540	64	284	167	161	125	144	430	181	248	212	243
Golden Plover	920	9300	530	3300	130	2000	2050	2152	1429	3683	85	4000	2270
Grey Plover	30	2000	371	242	151	120	64	199	272	227	39	71	162

SPECIES	1% NATIONAL	1% INTERNATIONAL	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	MEAN
Lapwing	850	72300	2855	5805	897	2099	5185	2845	2580	2112	1720	3204	2492
Knot	160	5300	190	209	30	130	89	12	350	170	377	600	302
Sanderling	85	2000	20	300	31	1	130	76	40	13	45	248	84
Purple Sandpiper	20	110	6	3	72	32	4	3		4	4		2
Dunlin	460	13300	1904	1860	581	2264	3469	2356	1282	1508	539	3427	1822
Ruff				1			2	2	18	1	1	2	5
Jack Snipe								2		1	1		0
Snipe			4	20	9	5	24	8	16	7	12	13	11
Woodcock					1								0
Black-tailed Godwit	200	1100	450	883	597	237	191	1113	2402	742	367	213	967
Bar-tailed Godwit	170	1500	52	44	120	149	74	676	192	230	74	95	253
Curlew	350	7600	922	518	684	600	625	530	1776	687	1150	1330	1095
Greenshank	20	3300	83	32	36	35	59	64	96	52	49	46	61
Redshank	240	2400	1104	689	838	945	809	597	1756	861	569	452	847
Turnstone	95	1400	176	224	207	110	223	84	346	63	129	79	140
Mediterranean Gull				1	1			1				1	1
Black-headed Gull			457	310	601	432	458	422	782	1213	275	434	625
Common Gull			142	175	256	343	159	245	304	145	82	167	189
Lesser Black-backed Gull			76	3	1	38	9	4	22	2	0	1	6
Herring Gull			739	189	237	300	332	488	1293	258	221	445	451
Great Black-backed Gull			107	84	106	37	53	109	52	50	42	88	68
Sandwich Tern				104	58	245	82	25	28	114	73	62	60

SPECIES	1% NATIONAL	1% INTERNATIONAL	2011/12	2012/13	2013/ 14	2014 / 15	2015 / 16	2016/ 17	2017/ 18	2018/ 19	2019/ 20	2020/ 21	MEAN
Kingfisher			1	12	2	1		5	2	2	1	1	2
Mute Swan	90	100	6	3			4	2	2	2	2	2	2

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U951 Ireland's Eye

The mean is based only on the most recent 5-season period, *i.e.* for the period 2016/17 - 2020/21. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 6: I-WeBS summary data for OU951 Ireland's Eye

SPECIES	1% NATIONAL	1% INTERNATIONAL	2011/12	2012/13	2013/ 14	2014 / 15	2015 / 16	2016/ 17	2017/ 18	2018/ 19	2019/ 20	2020/ 21	MEAN
Black-headed Gull					50		6						0
Common Gull			10		60								0
Cormorant	110	1200	20		200		150						0
Curlew	350	7600	25		30	6	5						0
Dunlin	460	13300			10								0
Great Black-backed Gull			200		250	200	200						0
Greenshank	20	3300	1		1		2						0
Grey Heron	25	5000	2		1		1						0
Herring Gull			200		300	200	300						0
Light-bellied Brent Goose	350	400	50		100		200						0
Little Egret	20	1100	2				1						0
Mallard	280	53000			5								0
Mediterranean Gull						1							0
Oystercatcher	610	8200	100		200	150	100						0
Purple Sandpiper	20	110	5		10		15						0
Redshank	240	2400	10		25	10	25						0
Red-throated Diver	20	3000			2								0
Ringed Plover	120	540			10	5	4						0

SPECIES	1% NATIONAL	1% INTERNATIONAL	2011/12	2012/13	2013/ 14	2014 / 15	2015 / 16	2016/ 17	2017/ 18	2018/ 19	2019/ 20	2020/ 21	MEAN
Sanderling	85	2000			60								0
Sandwich Tern			2			15							0
Shag					150		60						0
Shelduck	100	2500					20						0
Turnstone	95	1400	60		80	20	150						0

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U903 Lambay Island

The mean is based only on the most recent 5-season period, *i.e.* for the period 2016/17 - 2020/21. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 7: I-WeBS summary data for OU903 Lambay Island

SPECIES	1% NATIONAL	1% INTERNATIONAL	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	MEAN
Black-headed Gull					50								0
Cormorant	110	1200			200								0
Curlew	350	7600			350								0
Great Black-backed Gull					300								0
Grey Heron	25	5000			2								0
Herring Gull					300								0
Mallard	280	53000			10								0
Mediterranean Gull					1								0
Oystercatcher	610	8200			100								0
Purple Sandpiper	20	110			2								0
Redshank	240	2400			30								0
Red-throated Diver	20	3000			2								0
Shag					200								0
Turnstone	95	1400			60								0

Appendix II – Results of Survey Observations

Appendix II - Table 1: Records of flightlines from survey observations.

BTO Code	BTO Name	Max Count	Activity[1]	Height Band	End Flight[2]	Notes	Date	Time[3]	Surveyor
HG	herring gull	2	Transit/Commuting	20-100m	Fly out of sight	N/A	28/09/2023	2023-09-28T09:20:40.	WD
HG	herring gull	1	Transit/Commuting	20-100m	Fly out of sight	N/A	28/09/2023	2023-09-28T09:21:18.	WD
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight	N/A	28/09/2023	2023-09-28T09:30:06.	WD
CM	common gull	8	Transit/Commuting	100-150m	Fly out of sight	N/A	28/09/2023	2023-09-28T09:38:59.	WD
MA	mallard	2	Transit/Commuting	10-20m	Fly out of sight	N/A	28/09/2023	2023-09-28T09:41:14.	WD
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight	N/A	28/09/2023	2023-09-28T10:51:09.	WD
CM	common gull	1	Transit/Commuting	20-100m	Fly out of sight	N/A	28/09/2023	2023-09-28T10:56:15.	WD
HG	herring gull	1	Transit/Commuting	20-100m	Fly out of sight	N/A	28/09/2023	2023-09-28T11:11:37.	WD
BH	black-headed gull	1	Transit/Commuting	20-100m	Fly out of sight	N/A	28/09/2023	2023-09-28T11:19:48.	WD
H.	grey heron	1	Transit/Commuting	10-20m	Fly out of sight	N/A	28/09/2023	2023-09-28T11:22:30.	WD
H.	grey heron	1	Transit/Commuting	10-20m	Fly out of sight	N/A	28/09/2023	2023-09-28T11:28:41.	WD
BH	black-headed gull	1	Transit/Commuting	20-100m	Fly out of sight	N/A	28/09/2023	2023-09-28T11:40:37.	WD
HG	herring gull	4	Transit/Commuting	20-100m	Fly out of sight	N/A	28/09/2023	2023-09-28T12:02:49.	WD
HG	herring gull	1	Transit/Commuting	20-100m	Fly out of sight	N/A	28/09/2023	2023-09-28T12:03:49.	WD
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight	N/A	28/09/2023	2023-09-28T12:08:04.	WD
BH	black-headed gull	1	Transit/Commuting	20-100m	Fly out of sight	N/A	28/09/2023	2023-09-28T12:08:16.	WD

[1] Activity – behaviour of birds in flightlines.

[2] End flight – whether flocks landed within the site or fly out of sight.

[3] Time – date and time each observation was recorded.

BTO Code	BTO Name	Max Count	Activity[1]	Height Band	End Flight[2]	Notes	Date	Time[3]	Surveyor
BZ	buzzard	1	Transit/Commuting	10-20m	Fly out of sight	N/A	28/09/2023	2023-09-28T12:11:42.	WD
HG	herring gull	2	Transit/Commuting	10-20m	Fly out of sight	N/A	28/09/2023	2023-09-28T12:27:17.	WD
SH	sparrowhawk	1	Transit/Commuting	10-20m	Land nearby	Harried by magpie flock	28/09/2023	2023-09-28T12:30:39.	WD
BH	black-headed gull	1	Transit/Commuting	10-20m	Fly out of sight	N/A	28/09/2023	2023-09-28T13:53:55.	WD
BH	black-headed gull	1	Transit/Commuting	10-20m	Fly out of sight	N/A	28/09/2023	2023-09-28T14:03:15.	WD
BH	black-headed gull	3	Transit/Commuting	20-100m	Fly out of sight	N/A	28/09/2023	2023-09-28T14:03:58.	WD
HG	herring gull	1	Transit/Commuting	20-100m	Fly out of sight	N/A	28/09/2023	2023-09-28T14:06:36.	WD
HG	herring gull	2	Transit/Commuting	20-100m	Fly out of sight	N/A	28/09/2023	2023-09-28T14:09:21.	WD
HG	herring gull	2	Transit/Commuting	10-20m	Fly out of sight	N/A	28/09/2023	2023-09-28T14:22:28.	WD
HG	herring gull	1	Transit/Commuting	0-10m	Fly out of sight	N/A	28/09/2023	2023-09-28T14:30:47.	WD
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight	N/A	28/09/2023	2023-09-28T14:33:12.	WD
BH	black-headed gull	1	Transit/Commuting	20-100m	Fly out of sight	N/A	28/09/2023	2023-09-28T14:45:20.	WD
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight	N/A	28/09/2023	2023-09-28T14:49:10.	WD
HG	herring gull	2	Transit/Commuting	20-100m	Fly out of sight	N/A	28/09/2023	2023-09-28T09:20:40.	WD
BZ	buzzard	1	Transit/Commuting	10-20m	Fly out of sight	N/A	17/10/2023	2023-10-17T10:56:11.	SOC
HG	herring gull	1	Transit/Commuting	20-100m	Fly out of sight	N/A	17/10/2023	2023-10-17T14:19:34.	SOC
KF	kingfisher	1	Flushed	0-10m	Fly out of sight	Alarm call then dashed off	17/10/2023	2023-10-17T14:24:34.	SOC
BH	black-headed gull	1	Transit/Commuting	10-20m	Fly out of sight	N/A	17/10/2023	2023-10-17T14:54:34.	SOC
BH	black-headed gull	4	Transit/Commuting	10-20m	Fly out of sight	N/A	17/10/2023	2023-10-17T15:42:00.	SOC
H.	grey heron	1	Transit/Commuting	20-100m	Fly out of sight	N/A	17/10/2023	2023-10-17T11:10:27.	SOC
HG	herring gull	6	Transit/Commuting	10-20m	Fly out of sight	N/A	17/10/2023	2023-10-17T16:02:59.	SOC
BG	brent goose	4	Transit/Commuting	20-100m	Fly out of sight	Flew back to coast a few mins after recording	15/11/2023	2023-11-15T09:18:19.781	SOC
BZ	buzzard	2	Transit/Commuting	10-20m	Land on the site	Mating pair?	15/11/2023	2023-11-15T09:05:59.	SOC
WP	woodpigeon	4	Transit/Commuting	10-20m	Fly out of sight	N/A	15/11/2023	2023-11-15T14:44:33.659	SOC
WP	woodpigeon	4	Transit/Commuting	10-20m	Fly out of sight	N/A	15/11/2023	2023-11-15T15:04:32.731	SOC

BTO Code	BTO Name	Max Count	Activity[1]	Height Band	End Flight[2]	Notes	Date	Time[3]	Surveyor
BH	black-headed gull	4	Transit/Commuting	20-100m	Fly out of sight	N/A	15/11/2023	2023-11-15T15:23:19.818	SOC
HG	herring gull	2	Transit/Commuting	10-20m	Fly out of sight	N/A	15/11/2023	2023-11-15T15:57:07.113	SOC
HG	herring gull	7	Transit/Commuting	20-100m	Fly out of sight	N/A	15/11/2023	2023-11-15T16:01:34.724	SOC
HG	herring gull	4	Transit/Commuting	10-20m	Fly out of sight	All juveniles	15/11/2023	2023-11-15T16:26:45.070	SOC
BH	black-headed gull	6	Transit/Commuting	20-100m	Fly out of sight	N/A	15/11/2023	2023-11-15T16:43:54.195	SOC
H.	grey heron	1	Transit/Commuting	20-100m	Fly out of sight	N/A	15/11/2023	2023-11-15T16:48:10.407	SOC
HG	herring gull	2	Transit/Commuting	10-20m	Fly out of sight	N/A	15/11/2023	2023-11-15T09:18:39.	SOC
KF	kingfisher	1	Transit/Commuting	0-10m	Fly out of sight	N/A	15/11/2023	2023-11-15T09:27:56.	SOC
HG	herring gull	21	Transit/Commuting	10-20m	Fly out of sight	N/A	14/12/2023	2023-12-14T08:58:59.667	SOC
BH	black-headed gull	4	Transit/Commuting	10-20m	Fly out of sight	N/A	14/12/2023	2023-12-14T09:00:54.667	SOC
BZ	buzzard	1	Transit/Commuting	10-20m	Land on the site	N/A	14/12/2023	2023-12-14T09:18:58.241	SOC
HG	herring gull	13	Soaring	20-100m	Fly out of sight	N/A	14/12/2023	2023-12-14T14:29:30.311	SOC
HG	herring gull	3	Transit/Commuting	10-20m	Fly out of sight	N/A	14/12/2023	2023-12-14T14:31:31.780	SOC
BG	brent goose	13	Transit/Commuting	10-20m	Fly out of sight	N/A	14/12/2023	2023-12-14T15:22:39.918	SOC
HG	herring gull	6	Transit/Commuting	20-100m	Fly out of sight	N/A	14/12/2023	2023-12-14T15:45:58.655	SOC
HG	herring gull	20	Transit/Commuting	10-20m	Fly out of sight	Staggered; first 11, then 5, then 4	14/12/2023	2023-12-14T16:10:53.999	SOC
HG	herring gull	3	Transit/Commuting	10-20m	Fly out of sight	N/A	14/12/2023	2023-12-14T16:17:51.192	SOC
HG	herring gull	11	Transit/Commuting	20-100m	Fly out of sight	N/A	14/12/2023	2023-12-14T16:24:06.706	SOC
BG	brent goose	3	Transit/Commuting	10-20m	Fly out of sight	N/A	15/01/2024	2024-01-15T16:28:25.272	SOC
BG	brent goose	80	Transit/Commuting	20-100m	Fly out of sight	Estimated count; flew out of sight too quickly	15/01/2024	2024-01-15T16:51:57.481	SOC
BH	black-headed gull	14	Transit/Commuting	10-20m	Fly out of sight	N/A	15/01/2024	2024-01-15T16:32:21.253	SOC
HG	herring gull	20	Transit/Commuting	20-100m	Fly out of sight	N/A	15/01/2024	2024-01-15T16:36:41.048	SOC
BG	brent goose	150	Transit/Commuting	20-100m	Fly out of sight	Rough estimate; moved too quickly to get accurate figure	15/01/2024	2024-01-15T16:49:04.844	SOC

BTO Code	BTO Name	Max Count	Activity[1]	Height Band	End Flight[2]	Notes	Date	Time[3]	Surveyor
BG	light-bellied Brent goose	14	Transit/Commuting	10-20m	Fly out of sight	N/A	13/02/2024	2024-02-13T08:54:32	SOC
HG	herring gull	1	Transit/Commuting	0-10m	Fly out of sight	N/A	13/02/2024	2024-02-13T09:15:33	SOC
BH	black-headed gull	3	Transit/Commuting	10-20m	Fly out of sight	N/A	13/02/2024	2024-02-13T09:17:39	SOC
CU	curlew	15	Transit/Commuting	10-20m	Fly out of sight	N/A	13/02/2024	2024-02-13T12:05:30	SOC
BH	black-headed gull	5	Transit/Commuting	20-100m	Fly out of sight	N/A	13/02/2024	2024-02-13T12:43:34	SOC
BH	black-headed gull	6	Transit/Commuting	10-20m	Fly out of sight	N/A	13/02/2024	2024-02-13T15:37:23	SOC
HG	herring gull	5	Transit/Commuting	10-20m	Fly out of sight	N/A	13/02/2024	2024-02-13T15:45:37	SOC
HG	herring gull	8	Soaring	10-20m	Land on the site	N/A	13/02/2024	2024-02-13T15:47:52	SOC
BH	black-headed gull	14	Transit/Commuting	10-20m	Fly out of sight	N/A	13/02/2024	2024-02-13T15:49:21	SOC
BH	black-headed gull	10	Transit/Commuting	10-20m	Fly out of sight	N/A	13/02/2024	2024-02-13T15:59:23	SOC
BH	black-headed gull	13	Transit/Commuting	20-100m	Fly out of sight	N/A	13/02/2024	2024-02-13T16:17:27	SOC
BH	black-headed gull	28	Transit/Commuting	20-100m	Fly out of sight	N/A	13/02/2024	2024-02-13T16:23:55	SOC
BH	black-headed gull	55	Transit/Commuting	20-100m	Fly out of sight	N/A	13/02/2024	2024-02-13T16:26:03	SOC
HG	herring gull	5	Transit/Commuting	10-20m	Fly out of sight	N/A	13/02/2024	2024-02-13T16:30:40	SOC
HG	herring gull	74	Transit/Commuting	10-20m	Fly out of sight	N/A	13/02/2024	2024-02-13T16:36:53	SOC
BH	black-headed gull	75	Transit/Commuting	10-20m	Fly out of sight	N/A	13/02/2024	2024-02-13T16:39:28	SOC
HG	herring gull	10	Social display	10-20m	Land on the site	N/A	13/02/2024	2024-02-13T16:42:00	SOC
HG	herring gull	21	Transit/Commuting	10-20m	Fly out of sight	N/A	13/02/2024	2024-02-13T16:50:08	SOC
LB	lesser black-backed gull	2	Transit/Commuting	20-100m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 10:28:37	JD
BZ	buzzard	1	Transit/Commuting	10-20m	Land on the site	N/A	13/03/2024	Wed Mar 13 10:30:54	JD
HG	herring gull	1	Transit/Commuting	0-10m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 10:31:28	JD
HG	herring gull	1	Transit/Commuting	10-20m	Land on the site	N/A	13/03/2024	Wed Mar 13 10:32:46	JD
BH	black-headed gull	2	Transit/Commuting	100-150m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 10:33:51	JD
HG	herring gull	1	Transit/Commuting	0-10m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 10:38:08	JD
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 10:39:52	JD
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 10:42:43	JD

BTO Code	BTO Name	Max Count	Activity[1]	Height Band	End Flight[2]	Notes	Date	Time[3]	Surveyor
MA	mallard	3	Transit/Commuting	20-100m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 10:45:24	JD
BH	black-headed gull	4	Transit/Commuting	20-100m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 10:46:03	JD
HG	herring gull	1	Transit/Commuting	20-100m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 10:48:50	JD
CM	common gull	1	Transit/Commuting	10-20m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 10:53:13	JD
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 11:08:09	JD
HG	herring gull	2	Transit/Commuting	10-20m	Land on the site	N/A	13/03/2024	Wed Mar 13 11:14:32	JD
BG	light-bellied Brent goose	15	Transit/Commuting	20-100m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 11:17:25	JD
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 11:20:00	JD
HG	herring gull	1	Transit/Commuting	0-10m	Land on the site	N/A	13/03/2024	Wed Mar 13 11:27:20	JD
CM	common gull	1	Transit/Commuting	0-10m	Land on the site	N/A	13/03/2024	Wed Mar 13 11:32:45	JD
CA	cormorant	1	Transit/Commuting	0-10m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 11:34:12	JD
CM	common gull	4	Transit/Commuting	0-10m	Land on the site	N/A	13/03/2024	Wed Mar 13 11:36:45	JD
HG	herring gull	1	Transit/Commuting	10-20m	Land on the site	N/A	13/03/2024	Wed Mar 13 11:44:06	JD
CA	cormorant	1	Transit/Commuting	20-100m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 11:51:49	JD
HG	herring gull	2	Transit/Commuting	0-10m	Land on the site	N/A	13/03/2024	Wed Mar 13 11:53:51	JD
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 12:03:17	JD
HG	herring gull	2	Transit/Commuting	20-100m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 12:14:19	JD
HG	herring gull	1	Transit/Commuting	20-100m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 12:21:14	JD
BG	light-bellied Brent goose	24	Transit/Commuting	20-100m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 12:33:19	JD
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 12:48:06	JD
HG	herring gull	1	Transit/Commuting	20-100m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 12:55:17	JD
MA	mallard	1	Transit/Commuting	10-20m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 13:10:30	JD
MA	mallard	3	Transit/Commuting	10-20m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 13:12:52	JD
other	other	1	Transit/Commuting	10-20m	Land on the site	N/A	13/03/2024	Wed Mar 13 13:15:17	JD
MA	mallard	1	Transit/Commuting	20-100m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 13:17:38	JD
MA	mallard	2	Transit/Commuting	20-100m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 13:25:48	JD

BTO Code	BTO Name	Max Count	Activity[1]	Height Band	End Flight[2]	Notes	Date	Time[3]	Surveyor
BG	light-bellied Brent goose	8	Transit/Commuting	20-100m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 13:28:10	JD
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 13:45:42	JD
HG	herring gull	1	Transit/Commuting	0-10m	Land on the site	N/A	13/03/2024	Wed Mar 13 13:46:56	JD
BG	light-bellied Brent goose	10	Transit/Commuting	20-100m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 13:47:47	JD
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 13:57:07	JD
HG	herring gull	2	Transit/Commuting	10-20m	Land on the site	N/A	13/03/2024	Wed Mar 13 14:03:12	JD
CA	cormorant	1	Transit/Commuting	10-20m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 14:06:36	JD
HG	herring gull	1	Transit/Commuting	20-100m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 14:10:23	JD
BH	black-headed gull	2	Transit/Commuting	20-100m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 14:12:36	JD
HG	herring gull	3	Transit/Commuting	10-20m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 14:14:06	JD
BH	black-headed gull	1	Transit/Commuting	20-100m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 14:18:32	JD
CM	common gull	1	Transit/Commuting	20-100m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 14:20:15	JD
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 14:28:58	JD
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 14:32:39	JD
HG	herring gull	1	Transit/Commuting	10-20m	Land on the site	N/A	13/03/2024	Wed Mar 13 14:36:44	JD
H.	grey heron	1	Transit/Commuting	20-100m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 14:38:10	JD
BH	black-headed gull	1	Transit/Commuting	10-20m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 14:46:58	JD
HG	herring gull	1	Transit/Commuting	10-20m	Land on the site	N/A	13/03/2024	Wed Mar 13 15:02:36	JD
HG	herring gull	1	Transit/Commuting	10-20m	Land on the site	N/A	13/03/2024	Wed Mar 13 15:06:22	JD
CM	common gull	1	Transit/Commuting	20-100m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 15:13:57	JD
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 15:16:55	JD
HG	herring gull	2	Social display	10-20m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 15:24:55	JD
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 15:27:46	JD
MA	mallard	2	Transit/Commuting	20-100m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 15:30:20	JD
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 15:37:44	JD
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 16:01:30	JD

BTO Code	BTO Name	Max Count	Activity[1]	Height Band	End Flight[2]	Notes	Date	Time[3]	Surveyor
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 16:08:03	JD
CM	common gull	1	Transit/Commuting	10-20m	Fly out of sight	N/A	13/03/2024	Wed Mar 13 16:19:20	JD

Appendix II - Table 2: Records of point observations from within and adjacent to the proposed development site.

BTO Code	BTO Name	Max Count	Activity[4]	Habitat	Notes	Date	Time[5]	Surveyor
MA	mallard	2	Flushed	Watercourses	1m, 1f	17/10/2023	12:37:31	SOC
HG	herring gull	2	Perched	Built land (e.g. buildings and stonework)	N/A	15/11/2023	09:00:31	SOC
HG	herring gull	2	Roosting/Loafing	Built land (e.g. buildings and stonework)	1 A; 1 juv	15/11/2023	14:48:03	SOC
HG	herring gull	1	Roosting/Loafing	Built land (e.g. buildings and stonework)	N/A	14/12/2023	12:02:07	SOC
HG	herring gull	2	Roosting/Loafing	Built land (e.g. buildings and stonework)	N/A	14/12/2023	16:13:07	SOC
BZ	buzzard	2	Perched	Hedgerows/treelines	N/A	17/10/2023	09:27:11	SOC
MA	mallard	3	Flushed	Watercourses	All Female	15/01/2024	09:39:49	SOC

[4] Activity – behaviour of birds in flightlines.

[5] Time – date and time each observation was recorded.

BTO Code	BTO Name	Max Count	Activity[4]	Habitat	Notes	Date	Time[5]	Surveyor
HG	herring gull	2	Roosting/Loafing	Built land (e.g. buildings and stonework)	N/A	15/01/2024	10:14:46	SOC
H.	grey heron	1	Perched	Watercourses	N/A	15/01/2024	11:32:54	SOC
HG	herring gull	3	Roosting/Loafing	Grassland - improved (dry)	N/A	15/01/2024	14:16:57	SOC
HG	herring gull	2	Perched	Built land (e.g. buildings and stonework)	N/A	15/01/2024	16:47:35	SOC
HG	herring gull	3	Foraging	Grassland - improved (dry)	N/A	13/03/2024	11:06:32	JD
HG	herring gull	2	Foraging	Grassland - improved (dry)	N/A	13/03/2024	11:22:51	JD
HG	herring gull	10	Roosting/Loafing	Built land (e.g. buildings and stonework)	Artificial grass	13/03/2024	11:35:06	JD
HG	herring gull	11	Flushed	Grassland - improved (dry)	N/A	13/03/2024	11:38:59	JD
HG	herring gull	3	Perched	Built land (e.g. buildings and stonework)	N/A	13/03/2024	11:41:00	JD
HG	herring gull	5	Foraging	Grassland - improved (dry)	N/A	13/03/2024	11:55:55	JD
CM	common gull	18	Foraging	Grassland - improved (dry)	N/A	13/03/2024	12:24:17	JD
HG	herring gull	1	Perched	Built land (e.g. buildings and stonework)	N/A	13/03/2024	12:43:37	JD
CM	common gull	1	Foraging	Grassland - improved (dry)	N/A	13/03/2024	15:15:24	JD
HG	herring gull	6	Foraging	Grassland - improved (dry)	N/A	13/03/2024	15:23:43	JD
HG	herring gull	2	Roosting/Loafing	Grassland - improved (dry)	N/A	13/03/2024	15:44:26	JD
HG	herring gull	2	Roosting/Loafing	Built land (e.g. buildings and stonework)	NA	13/02/2024	08:52:24	SOC
other	other	1	Roosting/Loafing	Hedgerows/treelines	1/2 of roosting pair	13/02/2024	09:04:38	SOC
other	other	1	Perched	Hedgerows/treelines	Potentially half of mating pair	13/02/2024	09:03:02	SOC
HG	herring gull	4	Flushed	Grassland - improved (dry)	NA	13/02/2024	11:13:44	SOC
MA	mallard	5	Flushed	Watercourses	4males, 1female	13/02/2024	11:49:54	SOC
HG	herring gull	2	Roosting/Loafing	Built land (e.g. buildings and stonework)	NA	13/02/2024	14:11:10	SOC

Appendix III – Results of Survey Transects

Appendix III - Table 1: Results of survey transects sorted by date.

Transect Referenct	Quadrat No. Reference	Dropping Count	Sward Height (cm)	Bare Ground Cover (%)	Grass Cover (%)	Forb Cover (%)	Transect length (m)	Date	Time	Surveyor	Notes
S	1	0	21	0	95	5	750	28/09/2023	2023-09-28T09:26:27.	WD	N/A
S	2	0	30	0	50	50	750	28/09/2023	2023-09-28T09:30:36.	WD	N/A
S	3	0	28	0	95	5	750	28/09/2023	2023-09-28T09:33:33.	WD	N/A
S	4	0	35	0	90	10	750	28/09/2023	2023-09-28T09:36:52.	WD	N/A
S	5	0	16	10	40	50	750	28/09/2023	2023-09-28T09:42:09.	WD	N/A
S	6	0	32	5	90	5	750	28/09/2023	2023-09-28T09:44:13.	WD	N/A
S	7	0	18	20	40	40	750	28/09/2023	2023-09-28T09:45:55.	WD	N/A
S	8	0	16	10	80	10	750	28/09/2023	2023-09-28T09:48:40.	WD	N/A
S	9	0	23	0	95	5	750	28/09/2023	2023-09-28T09:50:58.	WD	N/A
S	10	0	17	0	35	65	750	28/09/2023	2023-09-28T11:05:19.877	WD	N/A
N	1	0	36	0	90	10	1258	28/09/2023	2023-09-28T11:05:03.817	WD	N/A
N	2	0	39	0	85	15	1258	28/09/2023	2023-09-28T11:00:51.	WD	N/A
N	3	0	35	0	80	20	1258	28/09/2023	2023-09-28T11:02:33.	WD	N/A
N	4	0	28	0	70	30	1258	28/09/2023	2023-09-28T11:04:00.696	WD	N/A
N	5	0	25	0	90	10	1258	28/09/2023	2023-09-28T11:07:55.	WD	N/A
N	6						1258	28/09/2023	2023-09-28T11:12:28.122	WD	N/A
N	7	0	21	5	65	30	1258	28/09/2023	2023-09-28T11:13:51.568	WD	N/A
N	8	0	30	0	80	20	1258	28/09/2023	2023-09-28T11:15:56.558	WD	N/A
N	9	0	27	0	50	50	1258	28/09/2023	2023-09-28T11:17:19.133	WD	N/A
N	10	0	21	0	25	75	1258	28/09/2023	2023-09-28T09:26:27.	WD	N/A
S	1	0	6	0	95	5	750	17/10/2023	2023-10-17T11:24:34.	SOC	N/A
S	2	0	5	30	10	60	750	17/10/2023	2023-10-17T11:30:23.	SOC	N/A
S	3	0	10	0	95	5	750	17/10/2023	2023-10-17T11:33:36.	SOC	N/A

S	4	0	8	0	70	30	750	17/10/2023	2023-10-17T11:36:55.	SOC	N/A
S	5	0	7	0	100	0	750	17/10/2023	2023-10-17T11:41:09.	SOC	N/A
S	6	0	10	0	85	15	750	17/10/2023	2023-10-17T11:46:23.	SOC	N/A
S	7	0	15	0	100	0	750	17/10/2023	2023-10-17T11:50:18.	SOC	N/A
S	8	0	22	0	95	5	750	17/10/2023	2023-10-17T11:51:55.	SOC	N/A
S	9	0	24	0	20	80	750	17/10/2023	2023-10-17T11:56:34.	SOC	N/A
S	10	0	19	0	98	2	750	17/10/2023	2023-10-17T11:59:30.	SOC	N/A
N	1	0	19	0	60	40	1258	17/10/2023	2023-10-17T15:02:08.	SOC	N/A
N	2	0	40	0	98	2	1258	17/10/2023	2023-10-17T15:06:47.	SOC	N/A
N	3	0	29	0	90	10	1258	17/10/2023	2023-10-17T15:11:25.	SOC	N/A
N	4	0	19	0	85	15	1258	17/10/2023	2023-10-17T15:20:12.169	SOC	N/A
N	5	0	17	0	95	5	1258	02/11/2023	2023-11-02T15:46:38.244	SOC	N/A
N	6	0	44	0	90	10	1258	17/10/2023	2023-10-17T15:35:08.573	SOC	N/A
N	7	0	36	0	25	75	1258	17/10/2023	2023-10-17T15:35:17.	SOC	N/A
N	8	0	23	0	99	1	1258	17/10/2023	2023-10-17T15:43:37.898	SOC	N/A
N	9	0	42	0	100	0	1258	17/10/2023	2023-10-17T15:50:57.537	SOC	N/A
N	10	0	10	1	25	74	1258	02/11/2023	2023-11-02T15:47:09.144	SOC	N/A
S	1	0	9	5	10	85	750	15/11/2023	2023-11-15T11:10:20.284	SOC	N/A
S	2	0	5	90	5	5	750	15/11/2023	2023-11-15T11:09:57.560	SOC	N/A
S	3	0	10	0	95	5	750	15/11/2023	2023-11-15T11:15:58.158	SOC	N/A
S	4	0	12	0	55	45	750	15/11/2023	2023-11-15T11:20:56.153	SOC	N/A
S	5	0	14	0	100	0	750	15/11/2023	2023-11-15T11:23:50.776	SOC	N/A
S	6	0	75	0	85	15	750	15/11/2023	2023-11-15T11:32:14.728	SOC	Lots of saplings around 1m quadrat (Oak?)
S	7	0	15	0	100	0	750	15/11/2023	2023-11-15T11:34:56.078	SOC	N/A
S	8	0	22	0	95	5	750	15/11/2023	2023-11-15T11:37:24.206	SOC	N/A
S	9	0	11	0	90	10	750	15/11/2023	2023-11-15T11:45:33.264	SOC	N/A
S	10	0	19	0	95	5	750	15/11/2023	2023-11-15T11:54:32.779	SOC	N/A

N	1	0	19	0	70	30	1258	15/11/2023	2023-11-15T16:07:41.969	SOC	N/A
N	2	0	28	0	98	2	1258	15/11/2023	2023-11-15T16:10:45.567	SOC	N/A
N	3	0	32	0	90	10	1258	15/11/2023	2023-11-15T16:14:01.938	SOC	N/A
N	4	0	18	0	75	25	1258	15/11/2023	2023-11-15T16:17:04.651	SOC	N/A
N	5	0	19	0	90	10	1258	15/11/2023	2023-11-15T16:20:42.573	SOC	N/A
N	6	0	34	0	90	10	1258	15/11/2023	2023-11-15T16:25:12.492	SOC	N/A
N	7	0	26	0	25	75	1258	15/11/2023	2023-11-15T16:30:39.789	SOC	N/A
N	8	0	13	0	99	1	1258	15/11/2023	2023-11-15T16:33:57.476	SOC	N/A
N	9	0	42	0	100	0	1258	15/11/2023	2023-11-15T16:36:00.335	SOC	N/A
N	10	0	10	1	74	25	1258	15/11/2023	2023-11-15T16:38:52.243	SOC	N/A
S	1	0	10	0	90	10	750	14/12/2023	2023-12-14T15:12:41.893	SOC	N/A
S	2	0	3	90	5	5	750	14/12/2023	2023-12-14T15:15:52.197	SOC	N/A
S	3	0	3	0	95	5	750	14/12/2023	2023-12-14T15:21:10.048	SOC	N/A
S	4	0	6	0	55	45	750	14/12/2023	2023-12-14T15:28:32.181	SOC	N/A
S	5	0	10	0	55	45	750	14/12/2023	2023-12-14T15:39:56.534	SOC	N/A
S	6	0	3	0	100	0	750	14/12/2023	2023-12-14T15:44:39.921	SOC	Grassland mowed by landscaping company
S	7	0	7	0	100	0	750	14/12/2023	2023-12-14T15:48:25.171	SOC	Grass cut by landscaping company
S	8	0	7	0	100	0	750	14/12/2023	2023-12-14T15:51:18.082	SOC	Grass cut by landscaping company
S	9	0	8	0	90	10	750	14/12/2023	2023-12-14T15:52:42.094	SOC	N/A
S	10	0	6	0	95	5	750	14/12/2023	2023-12-14T15:55:22.949	SOC	N/A
N	1	0	21	0	80	20	1258	14/12/2023	2023-12-14T11:05:13.511	SOC	N/A
N	2	0	30	0	95	5	1258	14/12/2023	2023-12-14T11:11:56.613	SOC	Landscaping team mowing grass;
N	3	0	42	0	90	10	1258	14/12/2023	2023-12-14T11:16:03.925	SOC	N/A
N	4	0	13	0	20	80	1258	14/12/2023	2023-12-14T11:19:24.263	SOC	N/A

N	5	0	7	0	95	5	1258	14/12/2023	2023-12-14T11:24:32.595	SOC	In the path of landscaper's lawnmower; forbs n grass all chopped up
N	6	0	35	0	65	35	1258	14/12/2023	2023-12-14T11:31:18.961	SOC	N/A
N	7	0	34	0	90	10	1258	14/12/2023	2023-12-14T11:37:22.918	SOC	Next to path of landscaper's lawnmower
N	8	0	40	0	99	1	1258	14/12/2023	2023-12-14T11:42:27.722	SOC	N/A
N	9	0	53	10	70	20	1258	14/12/2023	2023-12-14T11:48:35.393	SOC	N/A
N	10	0	4	15	84	1	1258	14/12/2023	2023-12-14T11:53:03.526	SOC	N/A
S	1	0	4	90	10	0	750	15/01/2024	2024-01-15T10:25:45.658	SOC	Archaeological works done in Dec 23, hence a change in grass-forb-bare ground mosaic
S	2	0	9	90	5	5	750	15/01/2024	2024-01-15T10:31:08.858	SOC	S
S	3	0	3	60	35	5	750	15/01/2024	2024-01-15T10:37:19.525	SOC	S
S	4	0	6	0	80	20	750	15/01/2024	2024-01-15T10:42:03.678	SOC	S
S	5	0	9	0	55	45	750	15/01/2024	2024-01-15T10:47:05.210	SOC	S
S	6	0	4	0	100	0	750	15/01/2024	2024-01-15T10:54:51.948	SOC	S
S	7	0	8	0	100	0	750	15/01/2024	2024-01-15T10:58:20.254	SOC	S
S	8	0	8	0	98	2	750	15/01/2024	2024-01-15T11:03:18.507	SOC	S
S	9	0	8	0	90	10	750	15/01/2024	2024-01-15T11:05:48.633	SOC	S
S	10	0	6	0	95	5	750	15/01/2024	2024-01-15T11:09:40.717	SOC	S
N	1	0	10	0	80	20	1258	15/01/2024	2024-01-15T15:33:09.920	SOC	N/A
N	2	0	16	0	100	0	1258	15/01/2024	2024-01-15T15:37:29.844	SOC	Landscaping team mowing grass;
N	3	0	33	0	95	5	1258	15/01/2024	2024-01-15T15:39:46.424	SOC	N/A
N	4	0	15	0	60	40	1258	15/01/2024	2024-01-15T15:43:45.042	SOC	N/A
N	5	0	7	0	90	10	1258	15/01/2024	2024-01-15T15:46:23.570	SOC	N/A
N	6	0	4	35	30	35	1258	15/01/2024	2024-01-15T15:52:06.692	SOC	Caterpillar track led to an increase in bare ground

N	7	0	15	20	60	20	1258	15/01/2024	2024-01-15T16:01:29.125	SOC	N/A
N	8	0	25	0	99	1	1258	15/01/2024	2024-01-15T16:04:50.286	SOC	N/A
N	9	0	50	10	80	10	1258	15/01/2024	2024-01-15T16:08:25.910	SOC	N/A
N	10	0	4	15	70	15	1258	15/01/2024	2024-01-15T16:11:10.557	SOC	N/A
S	1	0	0	100	0	0	750	16/02/2024	2024-02-16T16:31:33.694	SOC	Grass moved/dug up due to heavy machinery tracks
S	2	0	0	100	0	0	750	16/02/2024	2024-02-16T16:31:33.741	SOC	NA
S	3	0	3	5	60	35	750	16/02/2024	2024-02-16T16:31:33.788	SOC	NA
S	4	0	4	0	55	45	750	16/02/2024	2024-02-16T16:31:33.819	SOC	NA
S	5	0	7	0	100	0	750	16/02/2024	2024-02-16T16:31:33.867	SOC	NA
S	6	0	0	100	0	0	750	16/02/2024	2024-02-16T16:31:33.898	SOC	Dead leaves and cut up saplings; borehole within 10m
S	7	0	6	0	100	0	750	16/02/2024	2024-02-16T16:31:33.946	SOC	NA
S	8	0	9	0	95	5	750	16/02/2024	2024-02-16T16:31:33.993	SOC	NA
S	9	0	20	0	90	10	750	16/02/2024	2024-02-16T16:31:34.024	SOC	NA
S	10	0	7	0	70	30	750	16/02/2024	2024-02-16T16:31:34.071	SOC	NA
N	1	0	9	0	99	1	1235	16/02/2024	2024-02-16T16:31:33.316	SOC	NA
N	2	0	7	0	100	0	1235	16/02/2024	2024-02-16T16:31:33.348	SOC	NA
N	3	0	5	2	88	10	1235	16/02/2024	2024-02-16T16:31:33.395	SOC	NA
N	4	0	8	0	98	2	1235	16/02/2024	2024-02-16T16:31:33.426	SOC	NA
N	5	0	7	0	99	1	1235	16/02/2024	2024-02-16T16:31:33.458	SOC	NA
N	6	1	10	75	25	0	1235	16/02/2024	2024-02-16T16:31:33.505	SOC	Unsure of dropping (see photo attached in folder)
N	7	0	4	0	100	0	1235	16/02/2024	2024-02-16T16:31:33.537	SOC	NA
N	8	0	9	0	100	0	1235	16/02/2024	2024-02-16T16:31:33.584	SOC	NA
N	9	0	0	2	0	98	1235	16/02/2024	2024-02-16T16:31:33.615	SOC	Mosses and occasional forbs over tarmac space
N	10	0	9	10	90	0	1235	16/02/2024	2024-02-16T16:31:33.662	SOC	NA

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Wintering Bird Survey Report 2024/2025

For a Proposed Large-scale Residential Development

Lands at Clonliffe College, Clonliffe Road, Drumcondra, Dublin 3

Prepared for Hines Real Estate Ireland Ltd.

Scott Cawley, College House, 71 – 73 Rock Road, Blackrock, Co. Dublin, A94 F9X9, Ireland

Tel+353(1)676-9815 Fax +353(1) 676-9816

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1 Introduction

1 This Wintering Bird Survey Report was authored by Scott Bastow Bsc. (Hons) of Scott Cawley Ltd.

2 It provides an overview of the wintering bird baseline for a Large Scale Residential development at lands in Clonliffe College, Clonliffe Road, Drumcondra, Dublin 3, for the 2024/2025 wintering bird season . The proposed development consists of a residential scheme to be constructed within the red line boundary illustrated in Figure 1 below.

3 The proposed development site consists of the Clonliffe College Seminary, containing large areas of rough grassland, woodland, treelines, built grounds and ornamental borders. A large area of open grassland habitat is located in the northern part of the lands, south of the River Tolka. There are scattered trees throughout the proposed development site, particularly east of the Clonliffe College building. The proposed development site is largely surrounded by residential developments to the north and east, as well as opposite the southern boundary which borders Clonliffe Road. There are also several sports complexes in the vicinity - the Belvedere Rugby grounds to the east, and Shelbourne Football Club across the River Tolka to the north and Croke Park Stadium to the southeast (see Figure 1).

4 The purpose of the report is to:

- Establish the presence/absence and use of the proposed development site and surrounding area by wintering birds;
- Determine flightlines of wintering birds traversing the proposed development, and the height at which they fly, and
- To understand the importance of the proposed development site and surrounding area for wintering birds, including Special Conservation Interest (SCI) species for which nearby European sites have been designated.

5 The surveys follow three full seasons of wintering bird surveys which were conducted in 2019/2020, 2020/2021 and 2023/2024 (September to March inclusive). The follow-up winter bird surveys conducted this wintering bird season (i.e. October 2024 to March 2025) largely follow the same methodology as employed in both 2019/2020, 2020/2021 and 2023/2024. The survey methodology follows that which was employed in the 2023/2024 wintering bird survey season. Given that the surveys in 2024/2025 are confirmatory from the results of surveys conducted and are considered proportionate to the suitability of the lands for wintering birds, undertaking surveys once a month rather than four times a month will not negatively impact the study results. Monthly survey visits are also recommended as standard best practice for wintering bird surveys[1][2].

6 Wintering birds, including geese, gulls, waterfowl and waders, commonly occur along Ireland's coastline and at inland wetland areas for foraging and/or roosting. However, some wintering birds such as curlew *Numenius arquata*, oystercatcher *Haematopus ostralegus*, light-bellied brent geese *Branta bernicla hrota* and gull species, including herring gull *Larus argentatus*, black-headed gull *Chroicocephalus ridibundus* and common gull *Larus canus* use drier amenity grassland habitats such as parkland, sports pitches and greens associated with residential areas[3]. Many species of wintering birds which occur in Ireland are listed as 'Special Conservation Interest' (SCI) of Special Protected Areas (SPAs) under the Birds Directive 2009/147/EEC, known as the 'Birds Directive'. In addition, several species are Red-listed (i.e. of high conservation concern) such as curlew and oystercatcher, or Amber-listed (i.e. of medium conservation

[1] Bird Survey Guidelines: Non-breeding walkover survey: https://birdsurveyguidelines.org/non-breeding-walkover-survey

[2] Gilbert at al., (1998). Bird Monitoring Methods - A Manual of Techniques for Key UK Species.

[3] BirdWatch Ireland - Herring Gull: https://birdwatchireland.ie/app/uploads/2019/03/Species-Focus-Herring-Gull.pdf

concern) such as black-headed gull and herring gull, as Birds of Conservation Concern in Ireland 2020-2026 (Gilbert et. al., 2021).



Figure 1: The proposed development site and its surrounding environment.

2 Planning, Policy and Legislation

The collation of ecological baseline data and the preparation of this assessment have had regard to the following legislation and policy documents. This is not an exhaustive list but the most relevant legislative and policy basis for the purposes of preparing this Wintering Bird Survey Report.

The following international legislation is relevant to the proposed development:

- Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora; hereafter, referred to as the 'Habitats Directive'. The Habitats Directive is the legislation under which the Natura 2000 network[4] was established and Special Areas of Conservation (SACs) are

[4] The Natura 2000 network is a European network of important ecological sites, as defined under Article 3 of the Habitats Directive 92/43/EEC, which comprises both special areas of conservation and special protection areas. Special conservation areas are sites hosting the natural habitat types listed in Annex I, and habitats of the species listed in Annex II, of the Habitats Directive, and are established under the Habitats Directive itself. Special protection areas are established under Article 4 of the Birds Directive 2009/147/EC for the protection of endangered species of wild birds. The aim of the network is to aid the long-term survival of Europe's most valuable and threatened species and habitats.

In Ireland these sites are designed as *European sites* - defined under the Planning Acts and/or the Birds and Habitats Regulations as (a) a candidate site of Community importance, (b) a site of Community importance, (c) a candidate special area of conservation, (d) a special area of conservation, (e) a candidate special protection area, or (f) a special protection area. They are commonly referred to in Ireland as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

designated for the protection of natural habitat types listed in Annex I, and habitats of the species listed in Annex II, of that directive.

- Directive 2009/147/EEC; hereafter, referred to as the 'Birds Directive'. The Birds Directive is the legislation under which Special Protected Areas (SPAs) are designated for the protection of endangered species of wild birds listed in Annex I of that directive.

9 The following national legislation is relevant to the proposed development in the context of wintering wetland birds which are designated as SCIs within European sites:

- *S.I. No. 293/2021 - European Union (Birds and Natural Habitats) (Amendment) Regulations 2021*; hereafter the 'Birds and Habitats Regulations'. This legislation transposes the Habitats and Birds Directives into Irish law. It also contains regulations (49 and 50) that deal with invasive species (those included within the Third Schedule of the regulations).
- Wildlife Acts 1976 to 2022; hereafter collectively referred to as the 'Wildlife Acts'. The Wildlife Acts are the principal pieces of legislation at the national level for the protection of wildlife and for the control of activities that may harm wildlife. All bird species, 22 other animal species or groups of species, and 86 species of flora are protected under this legislation.
- Planning and Development Acts 2000 to 2021; hereafter collectively referred to as the 'Planning and Development Acts'. This piece of legislation is the basis for Irish planning. Under the legislation, development plans (usually implemented at local authority level) must include mandatory objectives for the conservation of natural heritage and of European Sites. It also sets out the requirements in relation to environmental assessment with respect to planning matters, including transposition of the Habitats Directive and Birds Directive into Irish law.

10 The following plans and policies are relevant to the proposed development:

- Ireland's 4th National Biodiversity Action Plan (NBAP) 2023-2030 (Department of Housing, Local Government and Heritage, 2023)
- Dublin City Development Plan 2022-2028 (Dublin City Council, 2022)
- Dublin City Biodiversity Action Plan 2021-2025 (Dublin City Council, 2022)

3 Methodology

3.1 Author Statement

11 This report was authored by Scott Bastow, and reviewed by Amir Glick BSc MSc and Cathal O'Brien of Scott Cawley Ltd. Survey methodologies were designed by Scott Cawley (Colm Clarke) and surveys were completed by Scott Bastow of Scott Cawley.

12 Scott Bastow is a Consultant Ecologist with Scott Cawley Ltd. since Sept 2024. He obtained his undergraduate degree in Zoology from Trinity College Dublin. His previous experience consists of a mix of ecological surveying and academic research and authorship. Since joining Scott Cawley Ltd., Scott has worked on a range of projects including major road schemes, solar farms and data centres through undertaking surveys for bats, wintering and breeding birds, protected mammals and habitats. Scott is a capable ecologist and is adept at data management through QGIS and Excel and has experience both with project and data management, as well as report writing.

13 Amir Glick is a Senior Ecologist with Scott Cawley Ltd. He obtained an honours degree in Biology and Geography from Tel-Aviv University and an MSc in Ecology from Ben-Gurion University of the Negev. Amir has over six years of professional experience in ecological and environmental consultancy, with extensive experience in ecological and environmental impact assessments, peer reviewing and ecological surveys.

14 Cathal O'Brien is a Senior Consultant Ecologist at Scott Cawley Ltd. with over six years' professional ecological consultancy experience. Cathal is an Associate Member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and holds a BSc (Hons) in Environmental Biology from University College Dublin and a MSc (Hons) in Ecology from the University of Bremen. He also has over seven years'

experience across a range of field surveys such as wintering birds, tree inspections for bat roosts, invasive species and other mammal survey including for badger activity as well as habitat surveys. He also has over five years' consultancy experience report writing including, preparing Ecological Impact Assessments (EcIAs), Preliminary Ecological Appraisal reports (PEAs), Appropriate Assessment screening reports (AAs) and Planning Compliance and/or Technical Note reports.

3.2 Desk Study

An updated desk study was undertaken in March 2025 following the completion of field work for the 2024/2025 wintering bird survey season. The purpose of the desk study was to collate available records within the surrounding area, specifically on SCI species of European sites in Dublin bay and ex-situ inland feeding sites. The following resources were used to inform the assessment presented in this report:

- Records of wetland bird species which are Special Conservation Interests (SCIs) for European sites, for the 10km grid square O13, as held by the National Biodiversity Data Centre www.biodiversityireland.ie – refer to Appendix I for all desk study records
- Irish Wetland Bird Survey (I-WeBS) summary data for the following sites: 0U404 Dublin Bay; 0U403 Baldoyle Bay; 0U408 Broadmeadow (Malahide) Estuary; 0U407 Rogerstown Estuary; 0U951 Ireland's Eye; and 0U903 Lambay Island. Summary data was downloaded from the BirdWatch Ireland website at https://birdwatchireland.ie/our-work/surveys-research/research-surveys/irish-wetland-bird-survey/
- Ordnance Survey Ireland mapping and aerial photography from http://map.geohive.ie/
- Information on the conservation status of birds in Ireland from *Birds of Conservation Concern in Ireland 4* (Gilbert et al., 2021)
- Publicly available information on inland feeding sites for Light-bellied brent geese *Branta bernicla hrota* (herein referred to as brent geese) in the Dublin area contained within (Benson, 2009), Scott Cawley (2017) and Enviroguide (2019).

3.3 Field Survey

3.3.1 Wintering Bird Surveys

Wintering bird surveys were undertaken of the proposed development site, in which all wintering birds (identified to species level) were recorded utilising and/or flying within the boundary of the site (see Figure 1). Surveys commenced three hours before high tide and three hours after high tide, once per month, for October 2024 through March 2025 inclusive. All surveys were completed on the dates and times by ecologists from Scott Cawley Ltd., as listed in Table 1.

Table 1 Winter bird survey dates and weather conditions

Survey Dates	Survey Times	Weather Conditions	Surveyor
October 30th 2024	07:40-14:10	Dry with scattered cloud and a gentle north-easterly breeze. Temperatures of 16°C with good visibility.	Scott Bastow
November 19th 2024	10:30-16:35	Rain with broken cloud and a light south-easterly breeze. Temperatures of 4°C with good visibility.	Scott Bastow
December 17th 2024	09:38-15:38	Dry with broken cloud in a gentle westerly breeze. Temperatures of 8°C with good visibility.	Scott Bastow

January 14th 2025	08:45-14:45	Dry with scattered cloud and a light south-westerly breeze. Temperatures of 10°C with excellent visibility	Scott Bastow
February 11th 2025	07:53-13:53	Light drizzle with a broken cloud and a north-westerly light breeze. Temperatures of 5°C with good visibility.	Scott Bastow
March 14th 2025	07:30-14:45	Light drizzle with a broken cloud and a gentle south-westerly breeze. Temperatures of 7°C with good visibility.	Scott Bastow

17 Each survey visit was conducted by one surveyor, who recorded observations of any wintering birds entering and exiting the lands, including the species (i.e. using BTO species codes[5]), number of birds within a flock, behaviour and movements of each species recorded within the lands. Flightlines of wintering birds moving over the proposed development site were also recorded, including the species, number of birds, height band the birds were flying at (see Table 2) and whether each flock was recorded landing within the site, nearby, or flew out of sight. Flightlines were recorded to determine potential risk of collision with buildings within the proposed development[6].

18 All data was recorded on a digital tablet using the QField software package. Observations were aided using Binoculars (8x42). Where present and readable, ring codes of birds were collected on a digital tablet using QField software package. The surveyors kept to the margins of fields within the site to ensure that their presence did not prevent any birds from landing on site.

Table 2 Height bands recorded for each flightline

Height Band Number	Height Band Range (metres)
1	0-10
2	10-20
3	20-100
4	100-150
5	>150

19 The survey effort in this instance is intended to provide a representative sample of the use of the lands by wintering birds. The observations of bird movements in the lands were complemented by a search for evidence of wintering birds in the lands. Droppings and feathers of Brent geese accumulate on well-used sites. In order to avoid disturbance to any wintering birds within the proposed development, a search for evidence of wintering birds was undertaken along two pre-defined transect lines (see Figure 2) when there were no birds on the site.

[5] BTO Species Codes:
https://www.bto.org/sites/default/files/u16/downloads/forms_instructions/bto_bird_species_codes.pdf

[6] Scottish Natural Heritage (2017). Recommended bird survey methods to inform impact assessment of onshore wind farms. Version 2.

3.3.2 *Transect Surveys*

Data was collected at 10 sampling points (c. 1m^2 in total area, i.e. 1m x 1m) located approximately equidistant from each other along each transect line through the proposed development site. Data on the following variables were collected at each sampling point along each transect:

- The presence and abundance of signs of wintering birds (e.g. droppings and feathers)
- The height of the grass sward (recorded in centimetres using a measuring tape)
- The percentage cover of bare ground
- The percentage cover of grass species
- The percentage cover of forb[7] species present.



Figure 2: Transect lines in relation to the survey area.

The results of field surveys have been contextualised against the 1% threshold of the international population of each species[8], as contained within Nagy & Langendoen (2021), and against the populations of each species at nearby SPAs. The SPAs in the vicinity of the proposed development are illustrated in Figure 3 below.

[7] A forb is an herbaceous plant species that is not a grass, sedge or rush, e.g. the plant species daisy *Bellis perennis*.

[8] The 1% criterion is applied to identify sites of international importance for birds

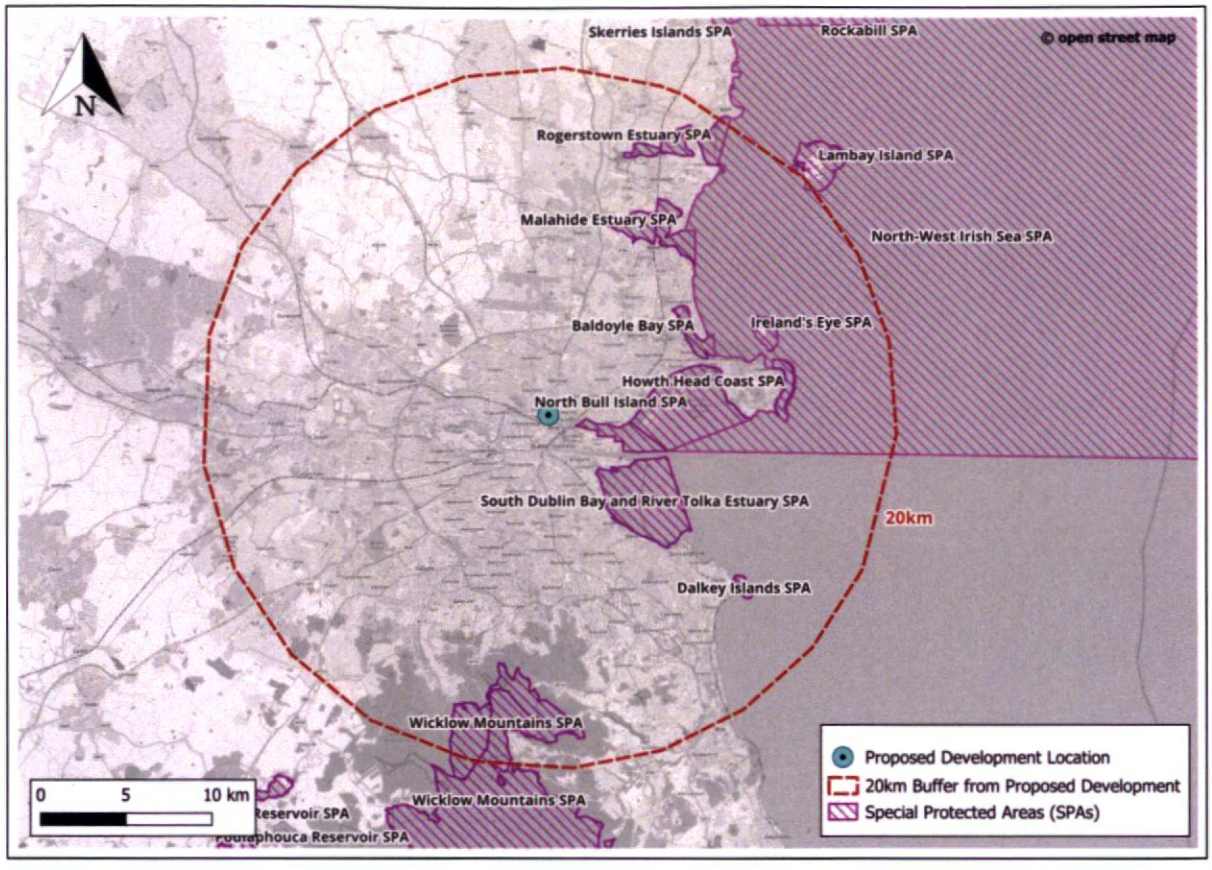


Figure 3: Proposed development site in the context of European sites within 20km.

Weather conditions were also recorded during each survey, full details of which are provided in Table 1.

3.3.3 *Survey Limitations*

It must be acknowledged that winter bird surveys of the lands were not undertaken in the 2021/2022 and 2022/2023 seasons, and it is possible that the number and frequency of use of inland feeding sites has varied during these seasons since the initial surveys in 2019/2020 and 2020/2021. Given that management of the habitats within the lands did not change during these years since the initial surveys were carried out, it is not anticipated that the species and/or numbers of populations of species recorded on site in 2019/2020 and 2020/2021 would have significantly changed up to the latest seasons in 2023/2024 and 2024/2025. The survey effort for the 2023/2024 and 2024/2025 seasons was reduced from 4 no. surveys as during the 2019/2020 and 2020/2021 seasons to 1 no. surveys per month and from dawn to dusk to 3 hours before and after high tide per visit. However, given the results from these initial surveys and the suitability of the lands for wintering birds, it is the author's professional judgement that the reduced survey effort in 2023/2024 and 2024/2025 will not compromise the results obtained from the surveys and which inform this report. The frequency of survey visits is in line with current best practice guidelines[1].

It is also important to acknowledge that during the November 11th 2024 survey, only nine points along T1 (the north-most, 1258 metre long transect) were inspected for brent goose droppings rather than the standard 10. This was due to an error on behalf of the surveyor but it is the author's professional judgement that this error does not compromise the results arising from the 2024/2025 transect surveys for brent goose droppings.

4 Wintering Bird Baseline

The results of desk study searches are presented in full in Appendix I of this report, while the full set of survey observations is included as Appendix II of this report. The results of desk and field surveys are summarised in this section of the report, and an account of observations by species is included in the sections below.

Records of 54 species of wetland birds, which have been designated as SCI species and/or are listed as amber or red status Birds of Conservation Concern Ireland and/or are listed as Annex I species under the EU Birds Directive were returned from the search of the NBDC database for the 10km grid square O13. The records have been reproduced in Appendix I of this report.

The following SCI species of European sites in the vicinity of the proposed development site were observed either flying over or foraging within the proposed development site in the 2024/2025 wintering bird season:

- Herring Gull *Larus argentatus* (amber-listed BoCCI) were the most frequent visitors to the proposed development site, with observations of the species on all survey dates, as well as observations of this species flying over the site on all survey dates (October 2024 to March 2025).
- Black-headed gull *Chroicocephalus ridibundus* (amber-listed BoCCI) was recorded on the site once in November 2024 alongside observations of this species flying over and in the vicinity of the proposed development site on five surveys (November and December 2024, January, February and March 2025).
- Light-bellied Brent Goose *Branta bernicla hrota* (amber-listed BoCCI) did not land to forage within the proposed development site on any date over the survey period, and were observed flying over the site on three surveys (January, February and March 2025).
- Cormorant *Phalacrocorax carbo* (green-listed BoCCI) were observed flying over the River Tolka and within the proposed development site on three surveys in November 2024, January and February 2025.
- Grey heron *Ardea cinerea* (green-listed BoCCI): Herons were observed flying over the River Tolka and over the site on one survey in November 2024.
- Kingfisher *Alcedo atthis* (amber-listed BoCCI) were observed foraging in and along the River Tolka on the northern boundary of the site during one survey in October 2024.

- Mallard *Anas platyrhynchos* (amber-listed BoCCI) were also observed in and/or flying over the River Tolka on three survey dates, namely September and October 2023, and January 2024.
- Coot *Fulica altra* (amber-listed BoCCI) were observed flying over the site and on the River Tolka on two survey dates, namely November 2024 and February 2025.

28 No other species of wintering birds listed as SCI and/or amber or red listed BoCCI were recorded in the 2023/2024 survey visits.

29 Wetland bird species are mobile and can regularly travel up to 20km between roosting and feeding sites[9]. For this reason, it is possible that birds observed at Clonliffe College could belong to populations of SCI species associated with European sites up to 20km from the survey area. Each of the eight SCI species observed foraging within or flying over the proposed development site are discussed in more detail in the subsections set out below.

30 It is also worth mentioning that an invasive bird species, the ring-necked parakeet, was observed flying over the site on one occasion during the March 14th 2025 survey and was also observed flying adjacent to the site two other times - once on November 19th 2024 and again on March 14th 2025. While only a single individual flew through the site, a peak flock count of seven individuals was observed flying adjacent to the site during the November 19th 2024 survey.

4.1 Herring gull *Larus argentatus* [A184]

4.1.1 Results of Desk Study for Herring Gull

31 Herring gull *Larus argentatus* [A148] is an SCI species for which the following European sites within 20km of the proposed development have been designated:

- North-West Irish Sea (004236), *c.* 7km east of the proposed development site. This European site encompasses estuaries (i.e. Malahide, Rogerstown and the River Boyne) and headlands and the extended coastline along north Dublin Bay, north County Dublin, County Meath as far north as the southern tip of Dundalk Bay in County Louth, as well as a large area offshore covering 2,333km^2 (NPWS, 2023). The baseline population of this European site is estimated at 6,893 from survey undertaken within the site in 2016 during autumn and winter[10]. North-West Irish Sea SPA (004236) is listed as the most important site in the country for this species. As this European site was recently designated an SPA in July 2023, there is no I-WeBS data available for the site.
- Ireland's Eye SPA (004117), *c.* 12.5km north-east of the proposed development site. The European site encompasses the island of Ireland's Eye and the surrounding coastal waters. Ireland's Eye is an important breeding site for herring gull, and has a population of *c.* 250 birds[11].
- Lambay Island SPA (004069), *c.* 19.6km north-east of the proposed development site. The European site encompasses Lambay Island and its surrounding coastal waters. Lambay Island is an important breeding site for herring gull, and has a population of *c.* 1,806 birds [12].

[9] Scotland's Nature Agency (2023). Guidance Note 3: Guidance to support Offshore Wind applications: Marine Birds - Identifying theoretical connectivity with breeding site Special Protection Areas using breeding season foraging ranges. Version 1: January 2023.

[10] NPWS (2023). Site Synopsis. Site Name: North-West Irish Sea cSPA Site Code: 004236.

[11] NPWS (2020A). Natura 2000 Standard Data Form: IE0004117 Ireland's Eye SPA. National Parks and Wildlife Service, Dublin.

[12] NPWS (2020B). Natura 2000 Standard Data Form: IE0004069 Lambay Island SPA. National Parks and Wildlife Service, Dublin.

32 There is potential that some members of the Ireland's Eye or Lambay Island breeding population utilise the proposed development site for foraging during the winter months. This species is a commonly encountered urban bird species, with large populations residing in the urban areas around Dublin.

4.1.2 Field Survey Results for Herring Gull

33 Herring gull were observed in the proposed development (Figure 4) on all six survey dates. On the majority of these survey visits, a small number of birds (<10 birds) were observed foraging for earthworms on grassland areas of the site with the largest flock of 50 birds observed on February 11th, 2025. A peak count of 30 herring gulls were observed flying over the proposed development site on December 17th, 2024. A full list of observations is included in Appendix II of this report.

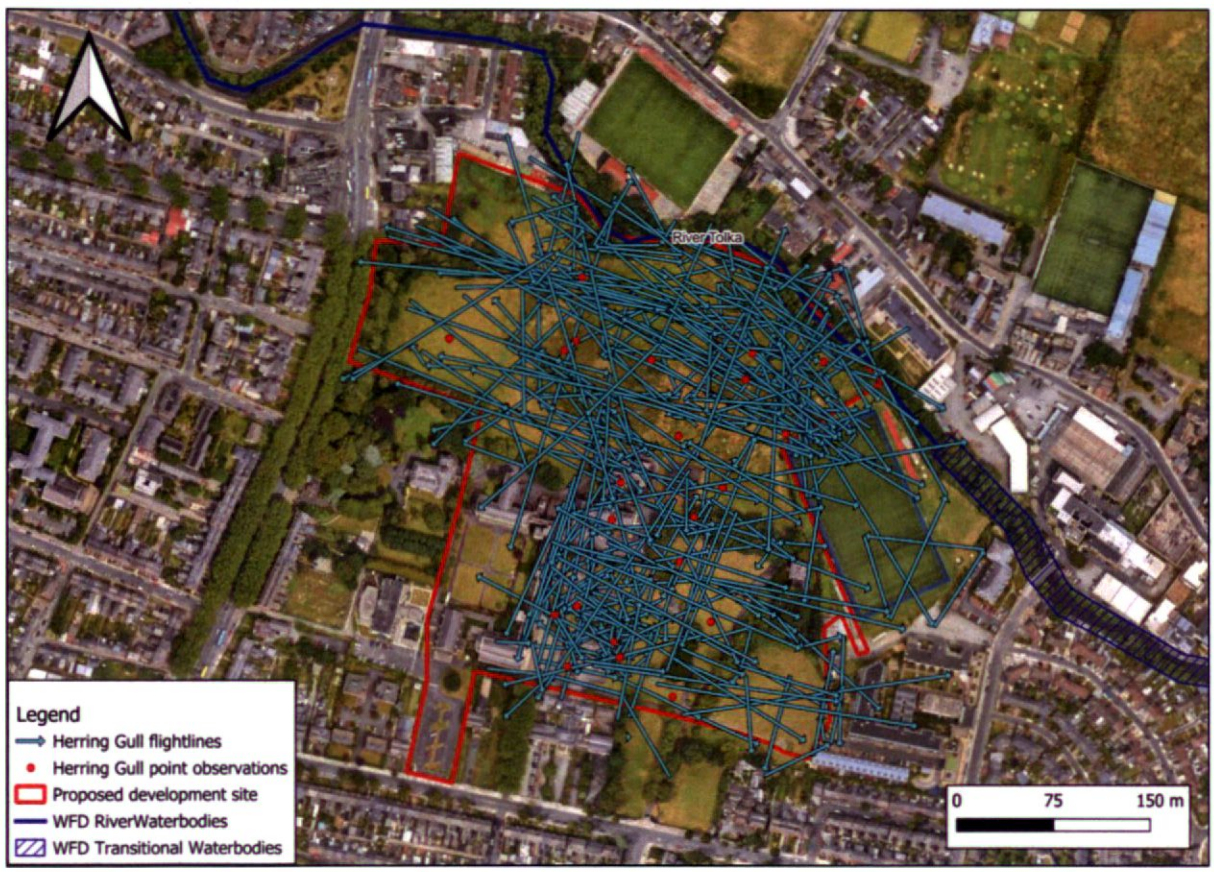


Figure 4 Herring gull activity in the survey area between September 2023 and March 2024

4.1.3 Herring gull at Clonliffe College in the context of European sites within 20km

34 In order to evaluate the importance of the survey area for foraging herring gull, it is important to relate the number of birds observed foraging in the lands against the baseline populations of European sites in the vicinity, and against the international flocks.

35 It is worth bearing in mind that nearby European sites have been designated for their breeding populations of herring gull as opposed to their wintering populations. The surveys undertaken to inform this report related to the winter season, when the resident population is likely to be boosted by winter migrants. A direct comparison against nearby European site populations is therefore not possible.

36 In relation to wintering populations of the species in the vicinity, the peak count of birds in the proposed development site potentially represents:

- 10% of the wintering population in Dublin Bay (0U404), referencing the I-WeBS mean peak count of 522 birds for the period 2016/2017– 2020/2021 (See Appendix I).
- 19% of the wintering population at Ireland's Eye (0U951), referencing the I-WeBS mean peak count of 200 birds over the period 2011/2013– 2017/18 (See Appendix I).

37 Based on the peak count from the data recorded in the 2019/20 surveys[13] against the current I-WeBS mean peak for Dublin Bay (0U404), the data reflects 27% of the I-WeBS mean peak count (2016/2017–2020/2021), and 2% of the mean peak count in the 2020/2021 and 2023/2024 surveys[14]. The data from the 2024/2025 surveys reflected 10% of the mean peak count for Dublin Bay (0U404). The peak count from the 2019/2020 surveys was 72% of the I-WeBS mean peak count for Ireland's Eye (0U951) and 5.5% of the peak count in both 2020/2021 and 2023/2024, increasing to 19% of the I-WeBS mean peak count for Ireland's Eye (0U951) in 2024/2025.

38 Flightlines recorded ranged from height band 1 to height band 5, the percentage of flightlines recorded in each height band is shown in

39 Table 3.

Table 3 Percentage of flightlines recorded for herring gull in height bands during survey visits from October 2024 to March 2025

Height Band	Height Band Range (m)	Percentage (%) per Height Band
1	0-10	9.8%
2	10-20	51.6%
3	20-100	31.14%
4	100-150	6.5%
5	>150	0.82%

40 Observations of flightlines also recorded the majority of birds at height band 2 (75%) and, to a lesser extent band 3 (25%) in 2020/2021 while height bands were not recorded for herring gull in 2019/2020 survey visits, survey notes suggest broadly similar results to 2020/2021, 2023/2024 and 2024/2025.

41 According to Nagy & Langendoen (2021), 1% of the international population of herring gull is 10,200 birds. The peak count of birds utilising the survey area did not reach or exceed this number in the 2024/25 survey season. The peak count of 50 birds observed in the survey area represents <1% of 1% of the international population of the species.

4.2 Black-headed gull *Chroicocephalus ridibundus* [A179]

4.2.1 Results of Desk Study for black-headed gull

42 Black-headed gull *Chroicocephalus ridibundus* [A179] is an SCI species for which the following European sites within 20km of the proposed development have been designated:

[13] Scott Cawley Ltd. (2020). Wintering Bird Survey Report For a Proposed Strategic Housing Development. Lands at Clonliffe College, Clonliffe Road, Drumcondra, Dublin 3.

[14] Scott Cawley Ltd. (2020). Wintering Bird Survey Report For a Proposed Strategic Housing Development. Lands at Clonliffe College, Clonliffe Road, Drumcondra, Dublin 3.

- South Dublin Bay and River Tolka Estuary SPA (004024), *c.* 1.5km southeast. This European site encompasses the coastal and intertidal zones of Dublin Bay extending between the Bull Wall in the north and Dún Laoghaire West Pier in the south. The baseline population of black-headed gull in the European site, based on the five-year mean peak counts for the period 1995/96-1999/2000, is listed as 3,040 birds in the Conservation Objectives Supporting Document[15]. South Dublin Bay and River Tolka Estuary SPA (004024) is listed as the fourth most important site in the country for this species.
- North Bull Island SPA (004006), *c.* 4.5km east. This European site encompasses the coastal and intertidal zones of Dublin Bay extending between the Bull Wall in the north and Dún Laoghaire West Pier in the south. The baseline population of black-headed gull in the European site, based on the five-year mean peak counts for the period 1995/96-1999/2000, is listed as 2,196 birds in the Conservation Objectives Supporting Document[16]. North Bull Island SPA (004006) is the eighth most important site in Ireland for wintering black-headed gull and is of all-Ireland importance for the species. The flock in North Bull Island has decreased substantially since the population baseline was established in the late 1990s based on review of I-WeBS data for 0U404 Dublin Bay.
- North-West Irish Sea (004236), *c.* 7km east of the proposed development site. This European site encompasses estuaries (i.e. Malahide, Rogerstown and the River Boyne) and headlands and the extended coastline along north Dublin Bay, north County Dublin, County Meath as far north as the southern tip of Dundalk Bay in County Louth as well as a large area offshore covering 2,333km^2 [10]. The baseline population of this European site is estimated at 508 from survey undertaken within the site in 2016 during autumn and winter. North-West Irish Sea SPA (004236) is listed as the 15th most important site in the country for this species. As this European site was recently designated an SPA in 2023, there is no I-WeBS data available for the site.

It is likely that there is some movement of birds between the aforementioned flocks over the winter period, based on changes in foraging resources and other variables. The flock in Dublin Bay (encompassing both the South Dublin Bay and River Tolka Estuary SPA, and North Bull Island SPA populations) forms a single unit, with roosting spread out across several subsites in the Bay[16]. The species forages both intertidally and subtidally in Dublin Bay.

[15] NPWS (2015). Site Synopsis. Site Name: South Dublin Bay and River Tolka Estuary SPA. Site Code: 004024.

[16] NPWS (2014A). Conservation Objectives Supporting Document: North Bull Island SPA (Site Code 4006) & South Dublin Bay and River Tolka Estuary SPA (Site Code 4024). Version 1. National Parks and Wildlife Service, Dublin.

4.2.2 *Field Survey Results for Black-headed Gulls*

45 Black-headed gull was observed on one instance on site on November 19th 2024. Furthermore, this species was recorded flying over and in the vicinity of the proposed development site on five out of six surveys, with only October 2024 not having any black-headed gull records (Figure 5). A peak count of 11 birds was recorded foraging on site on November 19th 2024.

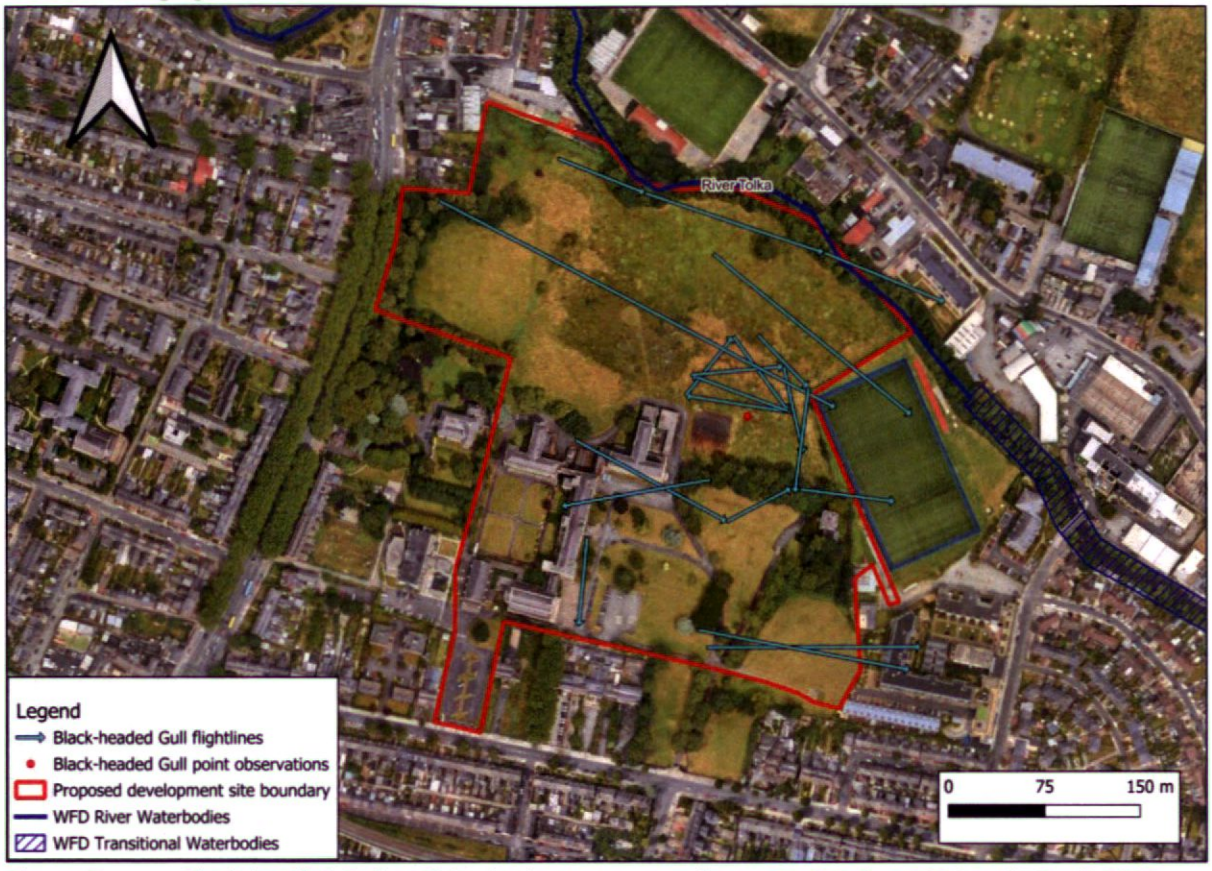


Figure 5 Black-headed Gull activity in the survey area between October 2024 and March 2025.

46 Flightlines recorded ranged from height band 1 to height band 4, the percentage of flightlines recorded in each height band is shown in Table 4.

Table 4 Percentage of flightlines recorded for black-headed gull in height bands during survey visits from October 2024 to March 2025

Height Band	Height Band Range (m)	Percentage (%) per Height Band
1	0-10	20%
2	10-20	40%
3	20-100	30%
4	100-150	10%
5	>150	0%

47 Flightline observations recorded in 2020/2021 show a similar height pattern at which birds were recorded at from 2024/2025, with the majority of observations at height band 2 (40%) and fewer at height band 3 (30%), height band 1 (20%) and height band 4 (10%). Height bands were not recorded for black-headed gull in 2019/2020 survey visits.

48 There was a peak count of 16 birds recorded during the 2019/2020 surveys while black-headed gulls were not observed on the lands during both the 2020/2021 and 2023/2024 surveys. The peak count for the 2024/2025 season is 11 birds.

4.2.3 Black-headed gull at Clonliffe College in the context of European sites within 20km

49 In order to evaluate the importance of the survey area for foraging black-headed gull, it is important to relate the number of birds observed foraging in the lands against the baseline populations of European sites in the vicinity, and against the international flocks.

50 It is worth bearing in mind that nearby European sites have been designated for their wintering populations of black-headed gull as opposed to their breeding populations. The surveys undertaken to inform this report are related to the winter season, when the resident population is likely to be boosted by winter migrants. A direct comparison against nearby European site populations is therefore possible.

51 In relation to wintering populations of the species in the vicinity, the peak count of birds in the proposed development site potentially represents:

- <1% of the wintering population in Dublin Bay (0U404), referencing the I-WeBS mean peak count of 3131 birds for the period 2011/2012– 2020/2021 (See Appendix I).
- 36% of the wintering population at Ireland's Eye (0U951), referencing the I-WeBS mean peak count of 36 birds from the periods 2013/2014 and 2015/2016. (See Appendix I).

52 While data is lacking on a precise population estimate for this species, the peak count of 11 birds recorded on site during the 2024/2025 season can be reliably determined to be far below the 1% threshold of both the national and international total population, with the site being of no significance to the species internationally or nationally.

4.3 Light-bellied brent goose *Branta bernicla hrota* [A046]

4.3.1 Results of Desk Study for brent goose

54 Light-bellied brent goose *Branta bernicla hrota* [A046] is an SCI species for which the following European sites within 20km of the proposed development have been designated:

- South Dublin Bay and River Tolka Estuary SPA (004024), *c.* 1.5km southeast. This European site encompasses the coastal and intertidal zones of Dublin Bay extending between the Bull Wall in the north and Dún Laoghaire West Pier in the south. The baseline population of brent geese in the European site, based on the five-year mean peak counts for the period 1995/96-1999/2000, is listed as 368 birds in the Conservation Objectives Supporting Document. South Dublin Bay and River Tolka Estuary SPA (004024) are listed as the twelfth most important site in the country for this species. It should be noted that there has been a long term increasing trend[17] in the population of brent geese in Dublin Bay since the original baseline population was estimated in the period 1995/96-1999/2000 up to the latest available data in 2020/2021 based on review of I-WeBS data for 0U404 Dublin Bay.
- North Bull Island SPA (004006), *c.* 4.5km east. This European site encompasses the coastal fringes of Bull Island and the surrounding intertidal and coastal zones extending between the North Bull wall in the south and Howth Head in the north. The baseline population of brent geese in the European site, based on the five-year mean peak counts for the period 1995/96-1999/2000, is listed as *c.* 1,548 birds in the Conservation Objectives Supporting Document[16]. North Bull Island

[17] BirdWatch Ireland (2023). I-WeBS Dublin Bay Trends Report: https://birdwatchireland.ie/app/uploads/2023/08/iwebs_trends_0U404_Dublin_Bay.html

SPA (004006) is one of the most important sites in Ireland for wintering brent geese. The site hosts a population of international importance for the species.

- Baldoyle Bay SPA (004016), *c.* 8.9km north-east. This European site encompasses the intertidal lagoon and tidal mouth of an estuary between Baldoyle Village and Portmarnock Village in North County Dublin. The baseline population for brent geese at this European site is 726 birds, based on the five-year mean peak counts for the period 1995/96-1999/2000[18]. Baldoyle Estuary SPA is listed as the seventh most important site for brent geese in Ireland. The Baldoyle flock has decreased in size relative to the baseline population for the SPA on review of the five-year mean of the peak counts for the period 2016/2017 to 2020/2021 which was *c.* 521 for the most recently available I-WeBS data for the site.
- Malahide Estuary SPA (004025), *c.* 10.8km north. This European site encompasses the Malahide Estuary and Broadmeadow Water and surrounding coastal habitats. The baseline population for brent geese at this European site is 1,104 birds, based on the five-year mean peak counts for the period 1995/96-1999/2000[19]. Malahide Estuary SPA is listed as the fourth most important site for brent geese in Ireland. On review of the most recent I-WeBS data for Rogerstown Estuary for the five-year mean of the peak counts for the period 2016/2017 to 2020/2021, the mean peak number of *c.* 942 birds indicates a slight decrease in population size relative to the baseline.
- Rogerstown Estuary SPA (004015), *c.* 15.4km north. The baseline population for brent geese at this European site is 1,069 birds, based on the five-year mean peak counts for the period 1995/96-1999/2000[20]. Rogerstown Estuary SPA is listed as the fifth most important site for brent geese in Ireland. The Rogerstown Estuary mean flock size for the period 2016/2017 to 2020/2021 has increased in size to 2,461 birds relative to the baseline population for the SPA based on review of the most recent I-WeBS data for the site.

54 It is likely that there is some movement of birds between the aforementioned flocks over the winter period, based on changes in foraging resources and other variables. The flock in Dublin Bay (encompassing both the South Dublin Bay and River Tolka Estuary SPA, and North Bull Island SPA populations) forms a single unit within Dublin Bay UNESCO Biosphere, with roosting concentrated in the Lagoon east of Bull Island[16]. The Dublin Bay population forages on Zostera beds and algal mats in the bay while these resources are available early in the wintering season. However, brent geese also use a range of terrestrial sites inland of Dublin Bay later in the season (i.e. between approximately late November and March) for foraging as resources in coastal European sites are exhausted[21,22,23]. It is thought that the switch to inland terrestrial sites is also linked to recent increases in population.

55 The first published records of brent geese using inland feeding sites dates to 1991[24]. A study of the use of inland foraging sites by brent geese was undertaken and published in Benson (2009). Benson (2009) identified 60 sites across the Dublin area in her study. These sites were spread between Portmarnock in

[18] NPWS (2014B). Site Synopsis. Site Name: Baldoyle Bay SPA. Site Code: (004016).

[19] NPWS (2014C). Site Synopsis. Site Name: Malahide Estuary SPA. Site Code: (004025).

[20] NPWS (2014D). Site Synopsis. Site Name: Rogerstown Estuary SPA. Site Code: (004015).

[21] Benson, L. (2009). Use of Inland Feeding Sites by Light-bellied Brent Geese in Dublin 2008-2009: A New Conservation Concern? Irish Birds 8: 563-570.

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[24] O'Briain M., Healy B. (1991). Winter distribution of Light-bellied Brent Geese, 1981/82 to 1990/91. Irish Birds 4, 229 – 316.

the North, Sandymount in the south and Ashtown and Greenhills in the west. The proposed development site at Clonliffe College does not appear in the list of 60 sites recognised in this study. More recent work on the range of brent geese in Dublin was undertaken to inform Natura Impact Statements for a residential development in St. Anne's Park[21,22]. Scott Cawley Ltd. undertook surveys of a large number of sites across the Dublin area in the 2015/16 and 2016/17 winter bird seasons, identifying 119 inland foraging sites for brent geese across the Dublin Area. The lands at Clonliffe College were identified as a known inland feeding site in Scott Cawley (2017), where they are referred to as "Drumcondra/Holy Cross College". Data on the site relates to the season 2015/2016 when a peak count of 200 birds was recorded at the site on 13th January 2016. Surveys by Scott Cawley Ltd. of the site in 2019/2020, 2020/21 and 2023/2024 recorded no brent geese within the proposed development as the playing fields reference above have become overgrown and unsuitable as feeding habitat.

4.3.1 Field Survey Results for brent geese

Light-bellied brent geese were not observed foraging within the lands on any survey dates across the six-month survey period (See Appendix II), though potential evidence of usage by brent geese was collected from survey transects in the proposed development site during three surveys. (See Figure 6). This evidence included 1 recorded dropping on the north-most transect during the December 17th 2024 survey, 4 droppings on the north-most transect during the January 14th 2025 survey and 1 dropping on the north-most transect during the February 11th 2025 survey. As seen in Figure 6, these droppings were recorded entirely within the western half of the north-most transect, while no droppings were recorded at all on the southern transect. These results indicate that the western half of the northern field may be in use as an inland feeding site for light-bellied brent geese, however none were observed on site during surveys, only flying over. Given the volume of flyovers (peak count of 400 during the February 11th 2025 survey) observed from January to March 2025 it may also be possible that these droppings were left by birds in flight as they passed. The most likely explanation for why no observations of brent geese were recorded on site during the surveys is that the length of the grass in the proposed development site is suboptimal for the species, which favour a short, open, regularly mown sward. The grass across the northern part of the site remained relatively tall throughout the survey period. Thus, as noted, it is likely that isolated incidents of droppings recorded in the western half of the field were from birds flying-over, rather than landing on the site. The full dataset for transect surveys, containing data on sward height across the survey season, is provided as Appendix III of this report.

57 Birds were observed flying over the proposed development site on three surveys from January 2025 to March 2025 (see Figure 6). The peak count of birds flying over the lands was 400 birds, recorded on February 11th 2025. Birds tended to fly between height bands 2 and 3 (i.e. from 10m - 20m and 20 - 100m) above ground level (See Table 5). Birds tended to fly east-west in the mornings and west-east in the evenings, suggesting the birds were travelling from sites within Dublin Bay in the morning and returning to roost in these coastal sites by the evenings. Several known inland feeding sites exist within the immediate vicinity of the lands, including St. Patrick's College in Drumcondra, and several sites off Griffith Avenue[21,22].



Figure 6 Light-bellied brent goose activity in the survey area between October 2024 and March 2025.

58 A peak count of 550 birds were recorded flying along the River Tolka adjacent to the north of the site during the 2019/2020 surveys while a flock of 660 individuals were observed flying over the site during the 2020/2021 surveys. The peak count of birds flying over the site during the 2023/2024 survey season was 150 birds. As per observations for 2024/2025 which inform this report, birds generally flew east-west shortly after dawn and west-east back to their roosting sites in the evenings before sunset.

59 It is considered unlikely that the site is used by brent geese, but cannot be entirely ruled out due to the presence of small numbers of droppings recorded within the northern field in December 2024, January and February 2025 surveys. However, should any brent geese land within the site, numbers would be far below the 1% threshold for international and national populations due to the suboptimal height of the sward in the rough grassland across the site.

Table 5 Percentage of flightlines recorded for brent geese in height bands during survey visits from September 2023 to March 2024

Height Band	Height Band Range (m)	Percentage (%) per Height Band
2	10-20	27%
3	20-100	73%

Flightlines were recorded at height band 3 during the 2019/2020 survey visits while the majority of flightlines were observed at height band 3 (61%) with the remainder recorded at height band 2 (39%) in 2020/2021, and similarly in 2023/2024 at height band 3 (73%) and height band 2 (27%), which broadly reflects observations recorded in 2024/2025.

4.4 Cormorant *Phalacrocorax carbo* [A017]

4.4.1 Results of Desk Study for Cormorant

Cormorant *Phalacrocorax carbo* [A017] is an SCI species for which the following European sites within 20km of the proposed development have been designated:

- Ireland's Eye SPA (004117), *c.* 12.5km north-east of the proposed development site. The European site encompasses the island of Ireland's Eye and the surrounding coastal waters. Cormorant breed on the island in nationally important numbers (306 pairs)[10].
- Lambay Island SPA (004069), *c.* 19.6km north-east of the proposed development site. The European site encompasses Lambay Island and its surrounding coastal waters. Cormorant breed on the island in internationally important numbers (675 pairs), with smaller number of birds (29) overwintering at the site[11].

There is potential that some members of the Ireland's Eye or Lambay Island breeding population utilise the section of the River Tolka that runs along the northern boundary of the proposed development site.

4.4.2 *Field Survey Results for Cormorant*

63 Cormorant activity was chiefly concentrated adjacent to the River Tolka, which forms the northern boundary of the proposed development site. This species was observed flying over the vicinity of the River Tolka on three survey dates, which include November 19th 2024, January 14th and February 11th 2025. All observations were of a single individual. Birds were observed both flying along the Tolka, and across the proposed development site (See Figure 7).



Figure 7 ***Cormorant activity in the survey area between October 2024 and March 2025.***

4.4.3 *Cormorant at Clonliffe College in the context of European sites within 20km*

64 It is worth bearing in mind that nearby European sites, Ireland's Eye SPA (004117) and Lambay Island SPA (004069) have been designated for their breeding populations of cormorant as opposed to their wintering populations. The surveys undertaken to inform this report related to the winter season, when the resident population is likely to be boosted by winter migrants, and it is not clear how the wintering population relates to the breeding populations at Ireland's Eye and Lambay Island in this instance.

65 In relation to wintering populations of the species in the vicinity, the peak count of birds in the proposed development site potentially represents:

- There is no data available for Ireland's Eye SPA from I-WeBS over the period 2016/2017 – 2020/2021. The most recent data from 2013/2014 and 2015/2016 suggest a mean peak count of 175 birds over the over the two I-WeBS seasons (See Appendix I).
- There is no data available for Lambay Island SPA from I-WeBS over the period 2016/2017 – 2020/2021 (See Appendix I).

66 According to Nagy & Langendoen (2021), 1% of the international population of cormorant is 1,200 birds. The peak count of birds utilising the survey area did not reach or exceed this number in the 2024/25 survey season. The peak count of one bird observed in the survey area represents 0.16% of the 1% of the international population of the species.

The results from the latest surveys in 2024/2025 broadly reflect observations from 2019/2020 and 2020/2021 in which one individual was observed in the River Tolka, adjacent to the northern boundary of the site. Flightlines were generally of one bird across surveys in all four seasons (2019/2020, 2020/2021, 2023/2024 and 2024/2025) with the exception of one visit in December 2019 when a flightline of 2 individuals was observed. There were a total of four flightlines across the 2024/2025 survey visits, with two flightlines across height band 2 (50%) and two flightlines across height band 3 (50%).

The majority of observations were recorded at height band 3 (66%) and the remainder at height band 2 (33%) in 2019/2020 survey visits while the opposite result was observed in 2020/2021, with the majority of observations recorded at height band 2 (66%) and the remainder at height band 3 (33%). For the 2023/2024 season, there were three flightlines split across height bands 1-3 with one at each of these three bands.

4.5 Grey Heron *Ardea cinerea* [A028]

4.5.1 Results of Desk Study for Grey Heron

There are no European sites for which grey heron is an SCI species within the vicinity of the proposed development site. The closest European sites which includes grey heron as a designating feature is Wexford Harbour and Slobs SPA (004076), *c.* 99km south of the proposed development site. Grey herons are generally sedentary in Ireland, meaning they do not travel long distances between their breeding and wintering grounds[25], and for this reason, the population of birds in the proposed development site is not part of any European site population.

[25] From information on Grey Heron *Ardea cinerea* published on the BirdWatch Ireland website https://birdwatchireland.ie/birds/grey-Heron/. Accessed 18th April 2024

4.5.2 *Field Survey Results for Grey Heron*

70 Two observations of grey heron were observed flying through the proposed development site and along the River Tolka on a single survey date: November 19th 2024 (see Figure 8).



Figure 8 Grey Heron activity in the survey area between October 2024 and March 2025.

71

72 Regarding the data from previous seasons, there were five observations of this species during the 2023/2024 season and there was a count of four birds was observed during a survey in November 2019 while numerous observations of a single bird were recorded across the 2020/2021 season.

73 Flightlines were recorded entirely at height band 2 for the 2024/2025 season.

Table 6 Percentage of flightlines recorded for grey heron in height bands during survey visits from October 2024 to March 2025

Height Band	Height Band Range (m)	Percentage (%) per Height Band
2	10-20	100%

74 The vast majority of flightlines were recorded at height band 2 (95%) in 2020/2021 with just 1 no. observations recorded at height band 2 (5%) with the majority of flightlines at height band 3 (60%) instead of height band 2 (40%) in 2023/2024 , while height bands for this species were not recorded in 2019/2020 survey visits.

4.6 Kingfisher *Alcedo atthis* [A229]

4.6.1 *Results of Desk Study for Kingfisher*

75 There are no European sites for which kingfisher is an SCI species within the vicinity of the proposed development site. The closest European sites which includes kingfisher as a designating feature is the River

Boyne and River Blackwater SPA (004232), *c.* 37km northeast of the proposed development site. The River Boyne and River Blackwater SPA is in a separate water catchment to the River Tolka and is therefore not directly connected to the proposed development site. The population on the River Tolka is not part of the River Boyne and River Blackwater SPA population based on distance of separation between the two.

4.6.2 Field Survey Results for Kingfisher

Kingfisher were observed foraging and/or commuting along the River Tolka on one of the six survey visits in 2024/2025. The species was noted flying once upstream and once downstream on the River Tolka adjacent to the proposed development site on the October 30th survey. Single birds were observed in both instances. The section of the River Tolka running along the northern boundary of the proposed development site is likely to form part of a breeding territory for kingfisher (see Figure 9).



Figure 9 Kingfisher activity in the survey area between October 2024 and March 2025.

During the 2019/2020 surveys two birds were observed along the River Tolka while there were numerous observations of a single bird along the watercourse during the surveys in 2020/2021. Kingfisher were recorded flying close to the surface (i.e. height band 1, 0-10m), in 2020/2021,2023/2024 and 2024/2025 in all instances. While height bands for this species were not recorded in 2019/2020 survey visits, according to the surveyor during that season, the results reflect observations from 2020/2021, 2023/2024 and 2024/2025.

4.7 Mallard *Anas platyrhynchos* [A053]

4.7.1 Results of Desk Study for Mallard

There are no European sites for which mallard is an SCI species within the vicinity of the proposed development site. The closest European site which includes mallard as a designating feature is Dundalk Bay SPA (004026), *c.* 69km north of the proposed development site. It is worth bearing in mind that European sites have been designated for wintering populations of mallard only as opposed to their breeding populations. The surveys undertaken to inform this report are related to the winter season, when the

resident population is likely to be boosted by winter migrants. Though the distance from the proposed development site and the nearest designated SPA for this species is large (*c.* 69km), there is a scarcity of data on the foraging distances of wintering mallard populations and as such it cannot be ruled out that the individuals recorded on and adjacent to the site may belong to an SPA population.

4.7.2 Field Survey Results for Mallard

79 Mallard was observed foraging and rafting along the River Tolka adjacent to and just inside the proposed development boundary (See Figure 10). These observations occurred across three survey dates: November 19th 2024, January 14th and February 11th 2025. The peak count for point observations for this species was four individuals on the November 19th 2024 survey.

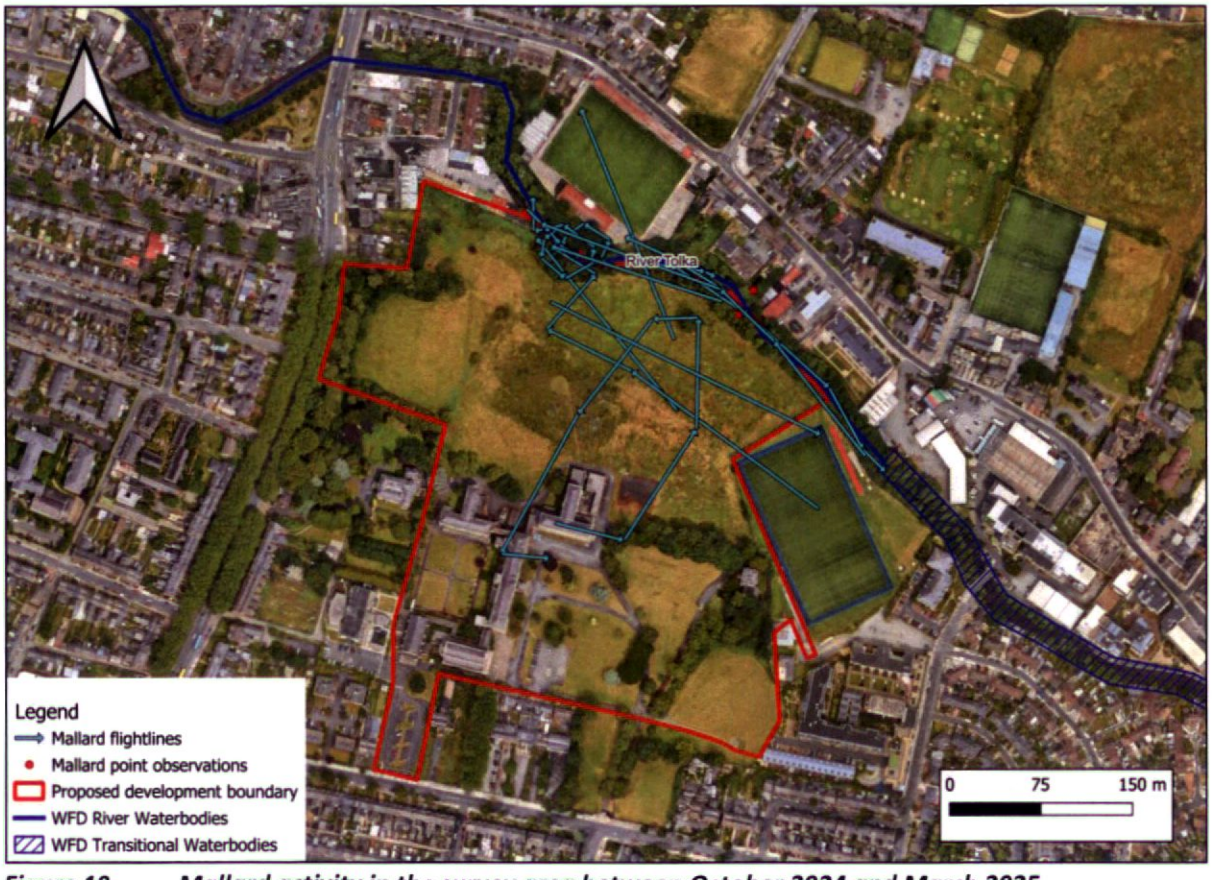


Figure 10 Mallard activity in the survey area between October 2024 and March 2025.

80 Mallard was observed flying through the proposed development site and along the River Tolka 13 times across four survey dates: November 19th 2024, December 17th 2024, February 11th and March 14th 2025. The peak count of birds in flight was 5 individuals during the survey on March 14th 2025. The peak count of birds observed on site for the 2024/2025 season was 4 individuals on the River Tolka during the November 19th 2024 survey. In the 2023/2024 season the peak count of birds observed on site was 5 individuals, with all point observations occurring on or along the River Tolka. For the 2020/2021 season the peak count of birds observed on site was 4 individuals, with all point observations occurring on the River Tolka. For the 2019/2020 season the peak count of mallard observed on site was 4 individuals, with all point observations occurring on the River Tolka.

81 Flightlines were recorded at height bands 1, 2 and 3 for the 2024/2025 season. There were no flight observations recorded for mallard during the 2023/2024 and 2020/2021 seasons, and while flight observations for this species were recorded during the 2019/2020 season, no flight heights were recorded save for a single pair recorded flying in height band 2 (10-20m) during the December 20th 2019 survey. Of note is the peak flight count for mallard for the 2019/2020 season, totalling 25 individuals on the September 19th 2019 survey.

Table 8 Percentage of flightlines recorded for mallard in height bands during survey visits from October 2024 to March 2025

Height Band	Height Band Range (m)	Percentage (%) per Height Band
1	0-10	46%
2	10-20	39%
2	20-100	15%

4.8 Coot *Fulica atra* [A125]

4.8.1 Results of Desk Study for Coot

There are no European sites for which coot is an SCI species within the vicinity of the proposed development site. The closest European sites which include coot as a designating feature is Lough Ennell SPA (004044), *c.* 77km west of the proposed development site. It is worth bearing in mind that European sites have been designated for wintering populations of coot only as opposed to their breeding populations. The surveys undertaken to inform this report are related to the winter season, when the resident population is likely to be boosted by winter migrants. Though the distance from the proposed development site and the nearest designated SPA for this species is large (*c.* 77km), there is a scarcity of data on the foraging distances of wintering mallard populations and as such it cannot be ruled out that the individuals recorded on and adjacent to the site may belong to an SPA population.

4.8.2 Field Survey Results for Coot

Coot was observed once on the River Tolka adjacent to the proposed development boundary and once flying over the proposed development boundary. These observations occurred on two survey dates: November 19th 2024 and February 11th 2025. The peak count for point observations for this species was one individual on the February 11th 2025 survey. This species was not recorded during the surveys in 2019/2020, 2020/2021 and 2023/2024.

A single flightline observation for this species in the 2024/2025 season was recorded (See Figure 11) at height band 3 (20-100m). There were no observations of coot on site during the prior wintering bird survey seasons.



Figure 11 Coot activity in the survey area between October 2024 and March 2025.

5 Conclusions

84 Observations of wintering birds within and which traverse the proposed development site have been contextualised against the populations of these species in nearby European sites.

85 The frequency and duration of winter bird surveys were reduced from the 2019/2020 and 2020/2021 surveys, which were considered proportionate in the professional judgement of Scott Cawley Ltd., based on the suitability of the site and results obtained in those years. Results of winter bird surveys from the 2019/20 and the 2020/21 season are therefore comparable to data from the 2023/2024 surveys and the latest surveys in 2024/2025 which inform this report.

86 Brent geese were not observed foraging within the lands on any survey dates across the six-month survey period as in 2019/2020, 2020/2021, 2023/2024 and 2024/2025. Although potential evidence of usage by brent geese was collected in the form of isolated incidents of small numbers of droppings during the walkover transect surveys in the proposed development site in the 2024/2025 season. However, the site remains sub-optimal for usage by this species in appreciable numbers relative to the 1% international and national population thresholds.

87 In the case of herring gull, black-headed gull, cormorant, grey heron, kingfisher, mallard and coot it has been determined that the peak count of birds in the survey area in 2024/2025 is less than 1% of the international population of these species both on site and regarding flocks for species which traverse the proposed development site.

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Appendix I – Desk Study Results

Wetland Bird Survey Records for O13 10km Grid Square, returned from the National Biodiversity Data Centre Database

A search for all species records contained within the O13 10km grid square was returned on 20th March 2025. The records have been reviewed by Cathal O'Brien of Scott Cawley Ltd. and only records relating to wetland birds are presented in the table, below. The species in the table below are all wetland birds returned from the 013 grid square which are designated SCI and/or are listed as amber or red status Birds of Conservation Concern Ireland and/or listed as Annex I species under the EU Birds Directive.

Appendix I - Table 1: Wetland bird records from the 10km grid square O13, as returned from the NBDC

Species name	Record count	Date of last record	Title of dataset
Arctic Tern *Sterna paradisaea*	2	31/12/2011	Bird Atlas 2007 - 2011
Barnacle Goose *Branta leucopsis*	1	15/02/2015	Birds of Ireland
Bar-tailed Godwit *Limosa lapponica*	7	23/03/2023	Bird Atlas 2007 - 2011
Black Guillemot *Cepphus grille*	41	08/05/2023	Birds of Ireland
Black-headed Gull *Larus ridibundus*	212	15/03/2023	Birds of Ireland
Black-legged Kittiwake *Rissa tridactyla*	5	01/03/2018	Birds of Ireland
Black-tailed Godwit *Limosa limosa*	18	15/03/2023	Birds of Ireland
Brent Goose *Branta bernicla*	117	10/03/2023	Birds of Ireland
Common Coot *Fulica atra*	74	07/04/2023	Birds of Ireland
Common Goldeneye *Bucephala clangula*	2	31/12/2011	Birds of Ireland
Common Greenshank *Tringa nebularia*	3	23/01/2021	Bird Atlas 2007 - 2011
Common Guillemot *Uria aalge*	2	09/03/2009	Birds of Ireland
Mew Gull *Larus canus*	39	15/03/2023	Birds of Ireland
Common Kingfisher *Alcedo atthis*	66	01/01/2024	Birds of Ireland
Common Pochard *Aythya ferina*	5	27/03/2023	Birds of Ireland
Common Redshank *Tringa totanus*	25	16/04/2023	Birds of Ireland
Common Shelduck *Tadorna tadorna*	13	15/03/2023	Birds of Ireland
Common Snipe *Gallinago gallinago*	8	15/03/2023	Birds of Ireland
Common Tern *Sterna hirundo*	8	30/07/2020	Birds of Ireland
Dunlin *Calidris alpina*	6	31/12/2011	Bird Atlas 2007 - 2011
Eurasian Curlew *Numenius arquata*	46	06/02/2023	Birds of Ireland
Eurasian Oystercatcher *Haematopus ostralegus*)	38	23/03/2023	Birds of Ireland
Eurasian Teal *Anas crecca*	14	11/01/2023	Birds of Ireland
Eurasian Wigeon *Anas penelope*	4	31/12/2011	Bird Atlas 2007 - 2011

Species name	Record count	Date of last record	Title of dataset
European Golden Plover *Pluvialis apricaria*	1	31/12/2011	Bird Atlas 2007 - 2011
Gadwall *Anas strepera*	2	31/12/2011	Bird Atlas 2007 - 2011
Great Black-backed Gull *Larus marinus*	28	28/04/2023	Birds of Ireland
Great Cormorant *Phalacrocorax carbo*	89	08/05/2023	Birds of Ireland
Great Crested Grebe *Podiceps cristatus*	5	30/07/2020	Birds of Ireland
Great Northern Diver *Gavia immer*	1	31/12/2011	Bird atlas 2007 – 2011
Greater Scaup *Aythya marila*	4	27/10/2017	Birds of Ireland
Grey Heron *Ardea cinerea*	273	21/04/2023	Birds of Ireland
Grey Plover *Pluvialis squatarola*	3	31/12/2011	Bird Atlas 2007 - 2011
Grey Wagtail *Motacilla cinerea*	210	31/05/2023	Birds of Ireland
Greylag Goose *Ardea cinerea*	273	21/04/2023	Birds of Ireland
Herring Gull *Larus argentatus*	240	29/03/2023	Birds of Ireland
Lesser Black-backed Gull *Larus fuscus*	78	28/04/2023	Birds of Ireland
Little Egret *Egretta garzetta*	65	11/04/2023	Birds of Ireland
Little Grebe *Tachybaptus ruficollis*	58	03/03/2022	Birds of Ireland
Mallard *Anas platyrhynchos*	166	27/03/2023	Birds of Ireland
Mediterranean Gull *Larus melanocephalus*	5	15/03/2023	Birds of Ireland
Mute Swan *Cygnus olor*	205	28/04/2023	Birds of Ireland
Northern Lapwing *Vanellus vanellus*	6	31/12/2011	Bird Atlas 2007 - 2011
Northern Shoveler *Anas clypeata*	5	25/02/2019	Bird Atlas 2007 - 2011
Red Knot *Calidris canutus*	8	23/03/2023	Birds of Ireland
Red-breasted Merganser *Mergus serrator*	7	02/03/2021	Bird Atlas 2007 - 2011
Red-throated Diver *Gavia stellata*	2	31/12/2011	Bird atlas 2007 - 2011
Ringed Plover *Charadrius hiaticula*	8	23/01/2021	Bird Atlas 2007 - 2011
Turnstone *Arenaria interpres*	11	23/03/2023	Birds of Ireland
Sanderling *Calidris alba*	8	10/12/2018	Birds of Ireland
Sandwich Tern *Sterna sandvicensis*	1	30/07/2020	Birds of Ireland
Tufted Duck *Aythya fuligula*	83	27/03/2023	Birds of Ireland
Water Rail *Rallus aquaticus*	4	31/12/2011	Bird Atlas 2007-2011
Whooper swan *Cygnus cygnus*	1	04/03/2020	Birds of Ireland

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U404 Dublin Bay

The mean is based only on the most recent 5-season period, *i.e.* for the period 2016/17 - 2020/21. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 2: I-WeBS summary data for OU404 Dublin Bay

Species	1% national	1% international	2011/12	2012/13	2013/ 14	2014 / 15	2015 / 16	2016/ 17	2017/ 18	2018/ 19	2019/ 20	2020/ 21	MEAN
Bar-tailed Godwit	150.00	1200.00	1895	2141	1710	1642	2164	2653	1599	1773	2736	1833	2119
Black-headed Gull		20000.00	2245	1907	2559	1259	2768	2393	1375	3243	3803	4842	3131
Black-tailed Godwit	190.00	610.00	891	1362	1768	873	2185	1274	1474	3369	2987	1499	2121
Common Gull		16400.00	249	300	984	272	890	213	141	387	538	286	313
Common Scoter	140.00	5500.00	20*	10*	42*		40	19		24	10		11
Cormorant	120.00	1200.00	132*	53	198*	41*	71	95*	112*	100*	157*	183*	129
Curlew	350.00	8400.00	1169	874	932	1424	567	750	494	1323	1162	715	889
Dunlin	570.00	13300.00	3559	4163	4897	3603	2557	8280	5884	7474	6017	10362	7603
Gadwall	20.00	600.00			2*	2*							0
Golden Plover	1200.00	9300.00	390*	404*	1080*	740*	1155	1010*	1322	1430*	1610	95*	1093
Goldeneye	60.00	11500.00	11*	6*		2*		1*		2			1
Great Black-backed Gull		4200.00	311	116	188	52	263	151	108	138	145	119	132
Great Crested Grebe	40.00	3500.00	898	87*	755	143	307	192	34	388	106*	262	196
Great Northern Diver	20.00	50.00	2		3*		5	1*	1	1*	2	1	1
Greenshank	20.00	2300.00	38	46	34	47	78	35	14	44	51	48	38
Grey Heron	25.00	2700.00	28	15*	68*	40*	44*	28*	24	27*	82*	19*	36
Grey Plover	30.00	2500.00	200	307*	310*	452*	235*	245*	198	499*	560*	208*	342
Herring Gull		10200.00	518	130	486	261	538	450	607	483	374	694	522
Kingfisher					1		1			4	1	1	1
Knot	280.00	4500.00	3435	3022	4547	3450	2405	5850	6554	7256	5781	5946	6277

Species	1% national	1% international	2011/12	2012/13	2013/ 14	2014 / 15	2015 / 16	2016/ 17	2017/ 18	2018/ 19	2019/ 20	2020/ 21	MEAN
Lapwing	1100.00	20000.00	120	67*	52	54*	143	25*	32	31	775	30	179
Lesser Black-backed Gull		5500.00	28	25	5	20	16	5	2	69	8	135	44
Light-bellied Brent Goose	360.00	400.00	4053	6134*	2262	4503	3501*	4420*	3331	3662	5848	1472	3747
Little Egret	20.00	1300.00	45*	19*	59*	69*	59*	70*	57	71*	130*	140*	94
Little Grebe	20.00	4000.00	1*	9*	1	5*		4	1*	3*	8	6	4
Long-tailed Duck		17250.00		2*				2				1	1
Mallard	290.00	20000.00	151*	52*	92*	106*	120	64*	82	221*	133*	96	119
Mediterranean Gull		770.00	113	23	39	27	64	68	6	14	32	7	25
Moorhen		20000.00	7	5*	5*		5*	3*	2	4	6	1	3
Mute Swan	90.00		2*	2*	4*	6*	9*	5*	11	9*	32*	7*	13
Oystercatcher	690.00	8200.00	3408	3025	3074*	2197	3572*	4042	2375	3378	3313	2466*	3115
Pintail	20.00	600.00	212	160	200*	150*	124*	190	214	318	192*	252	233
Purple Sandpiper	20.00	710.00	4	3	2	1	2				1	1	0
Red-breasted Merganser	20.00	1700.00	114*	50*	54*	57*	69*	80*	37	40*	96	36*	58
Redshank	300.00	3900.00	2273	2077	2460	1889	1648	1430	2274	2312	2299	2517	2166
Red-throated Diver	20.00	3000.00	8*	8*	7*	2	7	6	5	4	1		3
Ringed Plover	100.00	730.00	125	215*	101*	98*	109*	208	285	148	131	70	168
Sanderling	60.00	1200.00	411	405	510	266	841	374	301	736	588	748	549
Shag		2000.00	19*	23	36	3*	71	19	10	10	22*	1*	12
Shelduck	120.00	3000.00	603	731	956	605	744	1811	1241	1632	1619	2586	1778
Shoveler	30.00	400.00	101	79	126	47	115	116	144	122	124	81	117
Snipe		20000.00	12	62	20		31	53	10	43	15	5	25
Teal	340.00	5000.00	909*	981	1378	1233*	1291*	1654	1030	2187	1392	930*	1439

Species	1% national	1% international	2011/12	2012/13	2013/ 14	2014 / 15	2015 / 16	2016/ 17	2017/ 18	2018/ 19	2019/ 20	2020/ 21	MEAN
Turnstone	95.00	1400.00	328	227	466	250	584	286	334	216	445	259	308
Water Rail			1*										0
Wigeon	630.00	15000.00	610	445	691*	702*	1106*	1839	918	1314	1833	1082	1397

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U403 Baldoyle Bay

The mean is based only on the most recent 5-season period, *i.e.* for the period 2016/17 - 2020/21. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 3: I-WeBS summary data for OU403 Baldoyle Bay

SPECIES	1% NATIONAL	1% INTERNATIONAL	2011/12	2012/13	2013/ 14	2014 / 15	2015 / 16	2016/ 17	2017/ 18	2018/ 19	2019/ 20	2020/ 21	MEAN
Bar-tailed Godwit	170	1500			162	150	48	59	38	125	67	15	61
Black-headed Gull					242	281	52	120	13	102	37	83	71
Black-tailed Godwit	200	1100			389	139	296	172	189	250	234	17	172
Common Gull					64	11	4	61	3	8	19	34	25
Common Sandpiper										1			0
Common Scoter	110	7500			16	7							5
Cormorant	110	1200			10	4	3	4	1	1	5	2	3
Curlew	350	7600			90	61	106	49	44	100	119	40	70
Dunlin	460	13300			750	233	300	403	537	93	30	291	271
Golden Plover	920	9300			2500	450	2000	1200		600	1300	433	707
Great Black-backed Gull					7	15	10	9	9	10	12	7	9
Great Crested Grebe	30	6300			124	189							0
Great Northern Diver	20	50			1	2							0
Greenshank	20	3300			6	11	3	6	7	6	6	3	6
Grey Heron	25	5000			5	7	7	4	6	8	3	2	5

SPECIES	1% NATIONAL	1% INTERNATIONAL	2011/12	2012/13	2013/ 14	2014 / 15	2015 / 16	2016/ 17	2017/ 18	2018/ 19	2019/ 20	2020/ 21	MEAN
Grey Plover	30	2000			55	28	8	25	10	13	11	1	12
Herring Gull					47	91	58	112	48	133	79	136	102
Kingfisher										1			0
Knot	160	5300			553		19	600	800		201		320
Lapwing	850	72300			372	300	137	392	180	267	203	83	225
Lesser Black-backed Gull					4	18	1	1	1	1		1	1
Light-bellied Brent Goose	350	400			580	588	342	753	663	366	404	419	521
Little Egret	20	1100			18	3	7	21	25	8	7	27	18
Little Grebe	20	4700			1			3	1	4			1
Mallard	280	53000			67	102	106	71	60	124	90	119	93
Mute Swan	90	100			2		2				5	5	2
Oystercatcher	610	8200			277	1113	219	117	144	145	628	143	235
Pintail	20	600			4	4					1		0
Red-breasted Merganser	25	860			6	5	2	4		1	6	16	5
Redshank	240	2400			144	152	125	96	154	145	126	94	123
Red-throated Diver	20	3000			14	64							0
Ringed Plover	120	540			34	59	123	4					1
Sanderling	85	2000			6								0
Shag					7			1				1	0
Shelduck	100	2500			52	97	88	127	105	133	261	76	140
Shoveler	20	650						1					0
Snipe											1		0
Teal	360	5000			145	160	108	131	48	121	230	98	126
Turnstone	95	1400			17	12	13	10	4	8	18	16	11
Wigeon	560	14000			54	54	32	266	332	57	70	76	160

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U408 Broadmeadow (Malahide) Estuary

The mean is based only on the most recent 5-season period, *i.e.* for the period 2016/17 - 2020/21. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 4: I-WeBS summary data for OU408 Broadmeadow (Malahide) Estuary

SPECIES	1% NATIONAL	1% INTERNATIONAL	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	MEAN
Mute Swan	90	100	90	47	50	89		66	61	68	62	54	62
Whooper Swan	150	340	2		1								0
Light-bellied Brent Goose	350	400	943	1980	710	464	824	1565	605	1121	242	1177	942
Shelduck	100	2500	8	262	120			569	321	416	9	455	354
Wigeon	560	14000		157		1		94	215	135	12	104	112
Gadwall	20	1200		120	4				4	2			1
Teal	360	5000	41	80	119	8		163	196	190	70	85	141
Mallard	280	53000	95	167	112	23		81	110	127	82	136	107
Pintail	20	600		29	6			12	39	16		12	16
Shoveler	20	650						24	30	20	0	1	15
Pochard	110	2000		2									0
Tufted Duck	270	8900										3	1
Scaup	25	3100							1				0
Long-tailed Duck				3				1					0
Common Scoter	110	7500		30									0
Goldeneye	40	11400	51	50	36			43	14	24	20		20
Red-breasted Merganser	25	860	87	57	80			237	23	37	33	74	81
Red-throated Diver	20	3000		4					3		8	2	3
Great Northern Diver	20	50			3								0
Little Grebe	20	4700	23	11	8	5		33	84	39	52	35	49
Great Crested Grebe	30	6300	34	120	60	10		83	54	29	26	15	41

SPECIES	1% NATIONAL	1% INTERNATIONAL	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	MEAN
Slavonian Grebe								1					0
Cormorant	110	1200	6	101	101	21		118	99	39	97	121	95
Shag				32	8			12	2	4	4	23	9
Little Egret	20	1100	2	17	13	1		35	22	20	17	15	22
Grey Heron	25	5000	12	16	19	7	0	30	21	17	12	21	20
Kingfisher										1		1	0
Moorhen			4	4	6	6	0	3	4	8	7	5	5
Oystercatcher	610	8200	78	1300	1833	2		1523	1242	1150	1863	1438	1443
Ringed Plover	120	540		71				75	240	160	170	72	143
Golden Plover	920	9300	260	940	200	5			10	10	4		5
Grey Plover	30	2000	3	140	9			38	82	50	2	85	51
Lapwing	850	72300	1180	900	590	29		331	202	305	246	153	247
Knot	160	5300	4	440	110			202	760	950	200	156	454
Sanderling	85	2000		2	80			13	2				3
Curlew Sandpiper				2									0
Dunlin	460	13300	23	480	94	1		838	445	299	57	123	352
Ruff			4	1	2	5			1	2		3	1
Jack Snipe				1					1				0
Snipe			20	25	56	4		25	3	17	22	8	15
Black-tailed Godwit	200	1100	296	355	206	167		146	245	699	577	214	376
Bar-tailed Godwit	170	1500	62	213	133			93	107	185	9	78	94
Curlew	350	7600	1	500	244			363	349	232	328	387	332
Greenshank	20	3300	26	43	64	1		32	43	61	25	35	39
Redshank	240	2400	87	374	145	77		473	575	410	331	355	429
Turnstone	95	1400	23	221	94			54	98	32	138	48	74
Black-headed Gull			479	368	659	314		422	294	440	243	365	353

SPECIES	1% NATIONAL	1% INTERNATIONAL	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	MEAN
Common Gull			149	70	71	4		75	126	29	108	49	77
Lesser Black-backed Gull			4	3	11	2		20	6	5	6	11	10
Herring Gull			55	139	110	24		179	389	212	124	316	244
Great Black-backed Gull			15	44	93	6		70	69	44	30	39	50
Sandwich Tern			2	50	12			38	1	52		25	23

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U407 Rogerstown Estuary

The mean is based only on the most recent 5-season period, *i.e.* for the period 2016/17 – 2020/21. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 5: I-WeBS summary data for OU407 Rogerstown Estuary

SPECIES	1% NATIONAL	1% INTERNATIONAL	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	MEAN
Mute Swan	90	100		4	2	2	2	2	4	3	3		2
Whooper Swan	150	340					12	13	2	6	0	0	4
Pink-footed Goose							2				1	6	1
Greenland White-fronted Goose	100	190	3			3							0
Greylag Goose	35	980	33	89	5	33	95	30	34			1	13
Light-bellied Brent Goose	350	400	2661	1395	2217	1047	2662	2829	4367	1795	1271	2042	2461
Shelduck	100	2500	752	793	875	652	624	687	1062	513	502	814	716
Wigeon	560	14000	813	585	686	1342	1532	1094	3390	1451	1643	1161	1748
Gadwall	20	1200		2		3	2	4	14		9	7	7

SPECIES	1% NATIONAL	1% INTERNATIONAL	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	MEAN
Teal	360	5000	1211	1469	685	1968	682	857	2560	769	1686	1439	1462
Mallard	280	53000	182	198	172	260	160	168	348	133	99	102	170
Pintail	20	600	0	1		4	5	2				3	1
Shoveler	20	650	26	34	42	15	25	33	40	57	30	17	35
Common Scoter	110	7500						8		1			2
Goldeneye	40	11400		6									0
Red-breasted Merganser	25	860	30	22	20	39	18	36	50	18	34	52	38
Red-throated Diver	20	3000	4	1	2	4	1	1	2	2	4	2	2
Great Northern Diver	20	50			2								0
Little Grebe	20	4700	24	15	15	22	25	15	40	11	4	6	15
Great Crested Grebe	30	6300	4	14	5	22	3	2	1	3	8	5	4
Cormorant	110	1200	17	33	32	21	27	29	102	48	43	17	48
Shag			40	47	36	20	10	10	34	62	94	14	43
Little Egret	20	1100	43	48	57	46	55	43	104	35	51	50	57
Grey Heron	25	5000	24	24	17	21	16	20	40	18	30	16	25
Water Rail							1			2			0
Moorhen			1	1	8	5	2	2	6	1	5		3
Coot	190	15500		2	3		2	3	4	1			2
Oystercatcher	610	8200	2116	2491	1531	1519	1697	1057	2310	852	984	1304	1301
Ringed Plover	120	540	64	284	167	161	125	144	430	181	248	212	243
Golden Plover	920	9300	530	3300	130	2000	2050	2152	1429	3683	85	4000	2270
Grey Plover	30	2000	371	242	151	120	64	199	272	227	39	71	162

SPECIES	1% NATIONAL	1% INTERNATIONAL	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	MEAN
Lapwing	850	72300	2855	5805	897	2099	5185	2845	2580	2112	1720	3204	2492
Knot	160	5300	190	209	30	130	89	12	350	170	377	600	302
Sanderling	85	2000	20	300	31	1	130	76	40	13	45	248	84
Purple Sandpiper	20	110	6	3	72	32	4	3		4	4		2
Dunlin	460	13300	1904	1860	581	2264	3469	2356	1282	1508	539	3427	1822
Ruff				1			2	2	18	1	1	2	5
Jack Snipe								2		1	1		0
Snipe			4	20	9	5	24	8	16	7	12	13	11
Woodcock					1								0
Black-tailed Godwit	200	1100	450	883	597	237	191	1113	2402	742	367	213	967
Bar-tailed Godwit	170	1500	52	44	120	149	74	676	192	230	74	95	253
Curlew	350	7600	922	518	684	600	625	530	1776	687	1150	1330	1095
Greenshank	20	3300	83	32	36	35	59	64	96	52	49	46	61
Redshank	240	2400	1104	689	838	945	809	597	1756	861	569	452	847
Turnstone	95	1400	176	224	207	110	223	84	346	63	129	79	140
Mediterranean Gull				1	1			1				1	1
Black-headed Gull			457	310	601	432	458	422	782	1213	275	434	625
Common Gull			142	175	256	343	159	245	304	145	82	167	189
Lesser Black-backed Gull			76	3	1	38	9	4	22	2	0	1	6
Herring Gull			739	189	237	300	332	488	1293	258	221	445	451
Great Black-backed Gull			107	84	106	37	53	109	52	50	42	88	68
Sandwich Tern				104	58	245	82	25	28	114	73	62	60

SPECIES	1% NATIONAL	1% INTERNATIONAL	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	MEAN
Kingfisher			1	12	2	1		5	2	2	1	1	2
Mute Swan	90	100	6	3			4	2	2	2	2	2	2

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U951 Ireland's Eye

The mean is based only on the most recent 5-season period, *i.e.* for the period 2016/17 - 2020/21. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 6: I-WeBS summary data for OU951 Ireland's Eye

SPECIES	1% NATIONAL	1% INTERNATIONAL	2011/12	2012/13	2013/ 14	2014 / 15	2015 / 16	2016/ 17	2017/ 18	2018/ 19	2019/ 20	2020/ 21	MEAN
Black-headed Gull					50		6						0
Common Gull			10		60								0
Cormorant	110	1200	20		200		150						0
Curlew	350	7600	25		30	6	5						0
Dunlin	460	13300			10								0
Great Black-backed Gull			200		250	200	200						0
Greenshank	20	3300	1		1		2						0
Grey Heron	25	5000	2		1		1						0
Herring Gull			200		300	200	300						0
Light-bellied Brent Goose	350	400	50		100		200						0
Little Egret	20	1100	2				1						0
Mallard	280	53000			5								0
Mediterranean Gull						1							0
Oystercatcher	610	8200	100		200	150	100						0
Purple Sandpiper	20	110	5		10		15						0
Redshank	240	2400	10		25	10	25						0
Red-throated Diver	20	3000			2								0
Ringed Plover	120	540			10	5	4						0

SPECIES	1% NATIONAL	1% INTERNATIONAL	2011/12	2012/13	2013/ 14	2014 / 15	2015 / 16	2016/ 17	2017/ 18	2018/ 19	2019/ 20	2020/ 21	MEAN
Sanderling	85	2000			60								0
Sandwich Tern			2			15							0
Shag					150		60						0
Shelduck	100	2500					20						0
Turnstone	95	1400	60		80	20	150						0

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U903 Lambay Island

The mean is based only on the most recent 5-season period, *i.e.* for the period 2016/17 - 2020/21. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 7: I-WeBS summary data for OU903 Lambay Island

SPECIES	1% NATIONAL	1% INTERNATIONAL	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	MEAN
Black-headed Gull					50								0
Cormorant	110	1200			200								0
Curlew	350	7600			350								0
Great Black-backed Gull					300								0
Grey Heron	25	5000			2								0
Herring Gull					300								0
Mallard	280	53000			10								0
Mediterranean Gull					1								0
Oystercatcher	610	8200			100								0
Purple Sandpiper	20	110			2								0
Redshank	240	2400			30								0
Red-throated Diver	20	3000			2								0
Shag					200								0
Turnstone	95	1400			60								0

Appendix II – Results of Survey Observations

Appendix II - Table 1: Records of flightlines from survey observations.

BTO_Code	BTO_Name	MaxCount	Activity	HeightBand	EndFlight	Notes	Date	Time	Surveyor
HG	herring gull	1	Transit/Commuting	0-10m	Fly out of sight		30/10/2024	Wed Oct 30 08:16:48	SCB
ET	little egret	1	Transit/Commuting	10-20m	Fly out of sight		30/10/2024	Wed Oct 30 08:46:02	SCB
BZ	buzzard	1	Flushed	10-20m	Fly out of sight	Buzzard flushed and mobbed by two hooded crows	30/10/2024	Wed Oct 30 08:47:34	SCB
HG	herring gull	6	Transit/Commuting	10-20m	Fly out of sight		30/10/2024	Wed Oct 30 08:48:17	SCB
BZ	buzzard	1	Transit/Commuting	10-20m	Fly out of sight	Flushed by smaller birds. Remained callÃ¬ng while obscured for further 10 minutes	30/10/2024	Wed Oct 30 09:11:02	SCB
SN	snipe	1	Flushed	20-100m	Fly out of sight	Was already flushed and high in sky when I heard the call	30/10/2024	Wed Oct 30 09:39:01	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		30/10/2024	Wed Oct 30 10:09:00	SCB
BZ	buzzard	2	Social display	10-20m	Fly out of sight	2 buzzards calling and soaring together, one left while another perched on treeline south of this flightline before leaving in direction of flightline end	30/10/2024	Wed Oct 30 11:10:11	SCB
KF	kingfisher	1	Transit/Commuting	0-10m	Fly out of sight		30/10/2024	Wed Oct 30 11:34:31	SCB
BZ	buzzard	1	Transit/Commuting	10-20m	Fly out of sight		30/10/2024	Wed Oct 30 12:07:52	SCB

KF	kingfisher	1	Transit/Commuting	0-10m	Fly out of sight		30/10/2024	Wed Oct 30 12:11:20	SCB
BZ	buzzard	1	Flushed	10-20m	Fly out of sight	Mobbed by two hooded crows and a magpie	30/10/2024	Wed Oct 30 13:16:00	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		30/10/2024	Wed Oct 30 13:17:55	SCB
BZ	buzzard	2	Soaring	>150m	Fly out of sight	Two buzzard soaring with sparrowhawk soaring nearby, pair of hooded crows following further below and occasionally attempting to mob buzzards	30/10/2024	Wed Oct 30 13:28:14	SCB
SH	sparrowhawk	1	Soaring	>150m	Fly out of sight	Soaring at height near and above pair of buzzards with pair of hooded crows further below	30/10/2024	Wed Oct 30 13:31:43	SCB
BZ	buzzard	1	Transit/Commuting	0-10m	Fly out of sight	Calling and travelling towards other bird heard calling	30/10/2024	Wed Oct 30 13:35:15	SCB
HG	herring gull	3	Transit/Commuting	10-20m	Fly out of sight		30/10/2024	Wed Oct 30 13:39:38	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		30/10/2024	Wed Oct 30 13:49:37	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		30/10/2024	Wed Oct 30 13:59:07	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		30/10/2024	Wed Oct 30 14:02:49	SCB
HG	herring gull	3	Transit/Commuting	10-20m	Fly out of sight		30/10/2024	Wed Oct 30 14:03:23	SCB
HG	herring gull	2	Transit/Commuting	10-20m	Fly out of sight		30/10/2024	Wed Oct 30 14:07:42	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		19/11/2024	Tue Nov 19 10:40:21	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		19/11/2024	Tue Nov 19 11:35:17	SCB

HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		19/11/2024	Tue Nov 19 11:36:02	SCB
HG	herring gull	2	Transit/Commuting	20-100m	Fly out of sight		19/11/2024	Tue Nov 19 11:36:39	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		19/11/2024	Tue Nov 19 11:37:19	SCB
HG	herring gull	1	Transit/Commuting	20-100m	Fly out of sight		19/11/2024	Tue Nov 19 11:40:52	SCB
CO	coot	1	Transit/Commuting	20-100m	Fly out of sight		19/11/2024	Tue Nov 19 11:45:01	SCB
HG	herring gull	3	Transit/Commuting	20-100m	Fly out of sight		19/11/2024	Tue Nov 19 11:46:16	SCB
BH	black-headed gull	1	Transit/Commuting	0-10m	Fly out of sight	Calling, seemed agitated by the buzzard on the goalpost	19/11/2024	Tue Nov 19 12:32:52	SCB
H.	grey heron	2	Transit/Commuting	10-20m	Fly out of sight		19/11/2024	Tue Nov 19 12:41:29	SCB
MA	mallard	2	Transit/Commuting	10-20m	Fly out of sight		19/11/2024	Tue Nov 19 12:56:08 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		19/11/2024	Tue Nov 19 12:56:43 202	SCB
H.	grey heron	2	Transit/Commuting	10-20m	Fly out of sight		19/11/2024	Tue Nov 19 13:09:05 202	SCB
CA	cormorant	1	Transit/Commuting	10-20m	Fly out of sight		19/11/2024	Tue Nov 19 13:21:49 202	SCB
CA	cormorant	1	Transit/Commuting	10-20m	Fly out of sight		19/11/2024	Tue Nov 19 13:22:18 202	SCB
HG	herring gull	11	Transit/Commuting	0-10m	Fly out of sight		19/11/2024	Tue Nov 19 13:24:15 202	SCB

HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		19/11/2024	Tue Nov 19 14:33:56 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Land on the site		19/11/2024	Tue Nov 19 14:34:45 202	SCB
BZ	buzzard	1	Flushed	0-10m	Fly out of sight	Mobbed by corvids	19/11/2024	Tue Nov 19 14:41:01 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		19/11/2024	Tue Nov 19 14:48:56 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		19/11/2024	Tue Nov 19 14:50:52 202	SCB
HG	herring gull	1	Transit/Commuting	0-10m	Land nearby	Landed on floodlight	19/11/2024	Tue Nov 19 14:51:17 202	SCB
MA	mallard	2	Transit/Commuting	0-10m	Land on the site		19/11/2024	Tue Nov 19 15:11:25 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		19/11/2024	Tue Nov 19 15:12:00 202	SCB
BZ	buzzard	1	Flushed	10-20m	Fly out of sight	Perched on building briefly, then moved to perch in treeline and then moved to perch on pitch floodlight before being flushed by gulls	19/11/2024	Tue Nov 19 15:24:20 202	SCB
HG	herring gull	2	Transit/Commuting	10-20m	Fly out of sight		19/11/2024	Tue Nov 19 15:26:07 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		19/11/2024	Tue Nov 19 15:26:30 202	SCB

BZ	buzzard	1	Transit/Commuting	0-10m	Land on the site	Flew towards direction of distant buzzard call while itself calling	19/11/2024	Tue Nov 19 15:35:29 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		19/11/2024	Tue Nov 19 15:54:13 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		19/11/2024	Tue Nov 19 15:55:44 202	SCB
HG	herring gull	2	Transit/Commuting	0-10m	Fly out of sight		19/11/2024	Tue Nov 19 15:58:21 202	SCB
HG	herring gull	4	Transit/Commuting	20-100m	Fly out of sight		19/11/2024	Tue Nov 19 16:03:52 202	SCB
HG	herring gull	2	Transit/Commuting	10-20m	Fly out of sight		19/11/2024	Tue Nov 19 16:04:26 202	SCB
HG	herring gull	3	Transit/Commuting	10-20m	Fly out of sight		19/11/2024	Tue Nov 19 16:12:42 202	SCB
HG	herring gull	1	Transit/Commuting	20-100m	Fly out of sight		19/11/2024	Tue Nov 19 16:13:13 202	SCB
HG	herring gull	17	Transit/Commuting	20-100m	Fly out of sight		19/11/2024	Tue Nov 19 16:15:06 202	SCB
BZ	buzzard	3	Transit/Commuting	10-20m	Fly out of sight		19/11/2024	Tue Nov 19 16:17:21 202	SCB
HG	herring gull	8	Transit/Commuting	20-100m	Fly out of sight		19/11/2024	Tue Nov 19 16:19:15 202	SCB
HG	herring gull	4	Transit/Commuting	10-20m	Fly out of sight		19/11/2024	Tue Nov 19 16:19:42 202	SCB

HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		19/11/2024	Tue Nov 19 16:23:35 202	SCB
HG	herring gull	5	Transit/Commuting	10-20m	Fly out of sight		19/11/2024	Tue Nov 19 16:25:16 202	SCB
BH	black-headed gull	2	Transit/Commuting	10-20m	Fly out of sight		19/11/2024	Tue Nov 19 16:25:43 202	SCB
HG	herring gull	3	Transit/Commuting	20-100m	Fly out of sight		19/11/2024	Tue Nov 19 16:26:28 202	SCB
BH	black-headed gull	1	Transit/Commuting	20-100m	Fly out of sight		19/11/2024	Tue Nov 19 16:26:54 202	SCB
HG	herring gull	2	Transit/Commuting	20-100m	Fly out of sight		19/11/2024	Tue Nov 19 16:28:34 202	SCB
BZ	buzzard	1	Flushed	10-20m	Land on the site	Flushed and mobbed by herring gulls	19/11/2024	2024-11-19T12:45:26.168	SCB
BZ	buzzard	1	Transit/Commuting	0-10m	Land on the site	Perched on goal post calling, with a buzzard heard responding to the distant east and another to the west	19/11/2024	2024-11-19T12:45:39.635	SCB
RI	ring-necked parakeet	7	Transit/Commuting	20-100m	Fly out of sight	7 ring-necked parakeets	19/11/2024	2024-11-19T13:11:48.455	SCB
BZ	buzzard	2	Transit/Commuting	0-10m	Land on the site		17/12/2024	2025-01-20T15:26:23.159	SCB
HG	herring gull	10	Transit/Commuting	100-150m	Fly out of sight		17/12/2024	2025-01-20T15:27:09.855	SCB

HG	herring gull	30	Transit/Commuting	20-100m	Fly out of sight		17/12/2024	2025-01-20T15:28:54.786	SCB
HG	herring gull	6	Transit/Commuting	10-20m	Fly out of sight		17/12/2024	2025-01-20T15:29:31.926	SCB
BH	black-headed gull	12	Transit/Commuting	20-100m	Fly out of sight		17/12/2024	2025-01-20T15:30:24.735	SCB
HG	herring gull	6	Transit/Commuting	10-20m	Fly out of sight		17/12/2024	2025-01-20T15:31:22.279	SCB
BZ	buzzard	1	Flushed	10-20m	Fly out of sight		17/12/2024	2025-01-20T15:34:24.563	SCB
BH	black-headed gull	1	Transit/Commuting	10-20m	Fly out of sight		17/12/2024	2025-01-20T15:35:05.713	SCB
MA	mallard	2	Transit/Commuting	20-100m	Fly out of sight		17/12/2024	2025-01-20T15:35:33.168	SCB
BZ	buzzard	1	Transit/Commuting	0-10m	Fly out of sight		14/01/2025	Tue Jan 14 08:52:01 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		14/01/2025	Tue Jan 14 08:52:25 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		14/01/2025	Tue Jan 14 08:58:12 202	SCB
BH	black-headed gull	1	Transit/Commuting	10-20m	Fly out of sight		14/01/2025	Tue Jan 14 08:58:48 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		14/01/2025	Tue Jan 14 08:59:17 202	SCB

BG	Brent goose	15	Transit/Commuting	10-20m	Fly out of sight		14/01/2025	Tue Jan 14 09:06:51 202	SCB
BZ	buzzard	1	Flushed	0-10m	Land on the site		14/01/2025	Tue Jan 14 09:30:53 202	SCB
BG	Brent goose	110	Transit/Commuting	20-100m	Fly out of sight		14/01/2025	Tue Jan 14 09:33:19 202	SCB
BG	Brent goose	20	Transit/Commuting	20-100m	Fly out of sight		14/01/2025	Tue Jan 14 09:34:13 202	SCB
HG	herring gull	2	Transit/Commuting	20-100m	Fly out of sight		14/01/2025	Tue Jan 14 09:50:11 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		14/01/2025	Tue Jan 14 09:54:22 202	SCB
BG	Brent goose	12	Transit/Commuting	20-100m	Fly out of sight		14/01/2025	Tue Jan 14 09:58:44 202	SCB
HG	herring gull	3	Transit/Commuting	100-150m	Fly out of sight		14/01/2025	Tue Jan 14 10:12:32 202	SCB
HG	herring gull	2	Transit/Commuting	20-100m	Fly out of sight		14/01/2025	Tue Jan 14 10:13:35 202	SCB
BZ	buzzard	1	Flushed	0-10m	Fly out of sight	Mobbed by gulls	14/01/2025	Tue Jan 14 10:29:28 202	SCB
HG	herring gull	3	Transit/Commuting	0-10m	Fly out of sight		14/01/2025	Tue Jan 14 10:30:03 202	SCB
BZ	buzzard	1	Transit/Commuting	10-20m	Fly out of sight	Flying towards the call of another buzzard nearby while being mobbed by a hooded crow	14/01/2025	Tue Jan 14 10:37:37 202	SCB

HG	herring gull	1	Transit/Commuting	20-100m	Fly out of sight		14/01/2025	Tue Jan 14 10:42:54 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		14/01/2025	Tue Jan 14 10:55:13 202	SCB
HG	herring gull	3	Transit/Commuting	>150m	Fly out of sight		14/01/2025	Tue Jan 14 11:01:00 202	SCB
BH	black-headed gull	2	Transit/Commuting	0-10m	Fly out of sight		14/01/2025	Tue Jan 14 11:09:59 202	SCB
BZ	buzzard	1	Soaring	10-20m	Fly out of sight	Mobbed by gulls and hooded crows	14/01/2025	Tue Jan 14 11:16:34 202	SCB
SH	sparrowhawk	1	Transit/Commuting	0-10m	Fly out of sight		14/01/2025	Tue Jan 14 11:22:08 202	SCB
BZ	buzzard	1	Transit/Commuting	10-20m	Fly out of sight		14/01/2025	Tue Jan 14 11:55:51 202	SCB
HG	herring gull	3	Transit/Commuting	100-150m	Fly out of sight		14/01/2025	Tue Jan 14 11:56:27 202	SCB
BZ	buzzard	1	Flushed	0-10m	Fly out of sight	Flushed from perch in tree	14/01/2025	Tue Jan 14 12:32:10 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		14/01/2025	Tue Jan 14 12:47:21 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		14/01/2025	Tue Jan 14 12:56:25 202	SCB
HG	herring gull	1	Transit/Commuting	0-10m	Fly out of sight		14/01/2025	Tue Jan 14 13:02:54 202	SCB

HG	herring gull	1	Transit/Commuting	0-10m	Fly out of sight		14/01/2025	Tue Jan 14 13:06:50 202	SCB
HG	herring gull	1	Transit/Commuting	0-10m	Fly out of sight		14/01/2025	Tue Jan 14 13:08:33 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		14/01/2025	Tue Jan 14 13:09:28 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		14/01/2025	Tue Jan 14 13:12:01 202	SCB
HG	herring gull	1	Transit/Commuting	0-10m	Fly out of sight		14/01/2025	Tue Jan 14 13:31:33 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Land on the site		14/01/2025	Tue Jan 14 13:33:28 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		14/01/2025	Tue Jan 14 13:39:10 202	SCB
HG	herring gull	2	Transit/Commuting	100-150m	Fly out of sight		14/01/2025	Tue Jan 14 13:42:38 202	SCB
HG	herring gull	2	Soaring	100-150m	Fly out of sight		14/01/2025	Tue Jan 14 13:49:11 202	SCB
HG	herring gull	1	Transit/Commuting	20-100m	Fly out of sight		14/01/2025	Tue Jan 14 13:52:23 202	SCB
HG	herring gull	1	Transit/Commuting	20-100m	Fly out of sight		14/01/2025	Tue Jan 14 13:57:15 202	SCB
BH	black-headed gull	1	Transit/Commuting	100-150m	Fly out of sight		14/01/2025	Tue Jan 14 14:00:47 202	SCB

HG	herring gull	1	Transit/Commuting	100-150m	Fly out of sight		14/01/2025	Tue Jan 14 14:01:15 202	SCB
CA	cormorant	1	Transit/Commuting	20-100m	Fly out of sight		14/01/2025	Tue Jan 14 14:03:02 202	SCB
HG	herring gull	1	Transit/Commuting	20-100m	Fly out of sight		14/01/2025	Tue Jan 14 14:08:08 202	SCB
HG	herring gull	2	Transit/Commuting	20-100m	Fly out of sight		14/01/2025	Tue Jan 14 14:09:55 202	SCB
HG	herring gull	1	Transit/Commuting	20-100m	Fly out of sight		14/01/2025	Tue Jan 14 14:10:11 202	SCB
BZ	buzzard	1	Soaring	20-100m	Fly out of sight		14/01/2025	Tue Jan 14 14:11:07 202	SCB
HG	herring gull	15	Soaring	20-100m	Fly out of sight		14/01/2025	Tue Jan 14 14:15:56 202	SCB
BZ	buzzard	1	Transit/Commuting	20-100m	Fly out of sight		14/01/2025	Tue Jan 14 14:17:33 202	SCB
BG	Brent goose	18	Transit/Commuting	10-20m	Fly out of sight		14/01/2025	Tue Jan 14 14:18:00 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		14/01/2025	Tue Jan 14 14:18:21 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		14/01/2025	Tue Jan 14 14:22:46 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		14/01/2025	Tue Jan 14 14:23:20 202	SCB

HG	herring gull	1	Transit/Commuting	100-150m	Fly out of sight		14/01/2025	Tue Jan 14 14:25:39 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		14/01/2025	Tue Jan 14 14:26:16 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		14/01/2025	Tue Jan 14 14:26:35 202	SCB
HG	herring gull	1	Transit/Commuting	20-100m	Fly out of sight		14/01/2025	Tue Jan 14 14:32:28 202	SCB
BZ	buzzard	1	Flushed	0-10m	Fly out of sight		14/01/2025	2025-01-14T08:50:54.839	SCB
BZ	buzzard	1	Soaring	20-100m	Fly out of sight	Attacked hooded crow towards end of flight	14/01/2025	2025-01-14T14:18:59.614	SCB
BG	Brent goose	400	Transit/Commuting	20-100m	Fly out of sight	Several flocks of 10 to 50 birds over 2 minutes	11/02/2025	Tue Feb 11 08:25:50	SCB
HG	herring gull	4	Transit/Commuting	10-20m	Fly out of sight		11/02/2025	Tue Feb 11 08:29:50	SCB
BG	Brent goose	143	Transit/Commuting	20-100m	Fly out of sight		11/02/2025	Tue Feb 11 08:35:50	SCB
HG	herring gull	7	Transit/Commuting	10-20m	Fly out of sight		11/02/2025	Tue Feb 11 08:40:35	SCB
BG	Brent goose	50	Transit/Commuting	20-100m	Fly out of sight		11/02/2025	Tue Feb 11 08:50:14	SCB
BZ	buzzard	1	Flushed	0-10m	Fly out of sight	Mobbed by gull, mewing also	11/02/2025	Tue Feb 11 08:50:44	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight	Mobbing buzzard	11/02/2025	Tue Feb 11 08:51:28	SCB
BG	Brent goose	70	Transit/Commuting	20-100m	Fly out of sight		11/02/2025	Tue Feb 11 08:57:06	SCB
BG	Brent goose	50	Transit/Commuting	20-100m	Fly out of sight		11/02/2025	Tue Feb 11 09:19:56	SCB

MA	mallard	2	Transit/Commuting	10-20m	Fly out of sight		11/02/2025	Tue Feb 11 09:26:27	SCB
MA	mallard	2	Transit/Commuting	10-20m	Fly out of sight		11/02/2025	Tue Feb 11 09:28:19	SCB
MA	mallard	2	Transit/Commuting	10-20m	Fly out of sight		11/02/2025	Tue Feb 11 09:28:48	SCB
MA	mallard	2	Transit/Commuting	10-20m	Fly out of sight		11/02/2025	Tue Feb 11 09:35:00	SCB
HG	herring gull	1	Soaring	10-20m	Fly out of sight		11/02/2025	Tue Feb 11 09:50:21	SCB
HG	herring gull	1	Soaring	20-100m	Fly out of sight		11/02/2025	Tue Feb 11 09:50:52	SCB
BH	black-headed gull	7	Transit/Commuting	20-100m	Fly out of sight		11/02/2025	Tue Feb 11 10:06:08	SCB
HG	herring gull	2	Soaring	20-100m	Fly out of sight		11/02/2025	Tue Feb 11 10:27:31	SCB
HG	herring gull	1	Transit/Commuting	0-10m	Fly out of sight		11/02/2025	Tue Feb 11 10:38:05	SCB
CA	cormorant	1	Transit/Commuting	20-100m	Fly out of sight		11/02/2025	Tue Feb 11 10:41:54	SCB
HG	herring gull	4	Transit/Commuting	0-10m	Fly out of sight		11/02/2025	Tue Feb 11 12:30:54	SCB
HG	herring gull	2	Transit/Commuting	10-20m	Fly out of sight		11/02/2025	Tue Feb 11 12:42:29	SCB
HG	herring gull	2	Transit/Commuting	100-150m	Fly out of sight		11/02/2025	Tue Feb 11 12:51:17	SCB
HG	herring gull	1	Transit/Commuting	20-100m	Fly out of sight		11/02/2025	Tue Feb 11 12:59:19	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		11/02/2025	Tue Feb 11 13:01:19	SCB
HG	herring gull	1	Transit/Commuting	0-10m	Fly out of sight		11/02/2025	Tue Feb 11 13:04:02	SCB
HG	herring gull	1	Transit/Commuting	20-100m	Fly out of sight		11/02/2025	Tue Feb 11 13:09:40	SCB
HG	herring gull	1	Transit/Commuting	20-100m	Fly out of sight		11/02/2025	Tue Feb 11 13:09:59	SCB

HG	herring gull	4	Transit/Commuting	10-20m	Land on the site		11/02/2025	Tue Feb 11 13:29:57	SCB
HG	herring gull	2	Transit/Commuting	10-20m	Fly out of sight		11/02/2025	Tue Feb 11 13:30:15	SCB
HG	herring gull	1	Transit/Commuting	20-100m	Fly out of sight		11/02/2025	Tue Feb 11 13:37:52	SCB
HG	herring gull	2	Transit/Commuting	20-100m	Fly out of sight		11/02/2025	Tue Feb 11 13:38:07	SCB
HG	herring gull	1	Transit/Commuting	20-100m	Fly out of sight		11/02/2025	Tue Feb 11 13:43:54	SCB
DI	dipper	1	Transit/Commuting	0-10m	Fly out of sight	1 of two separate individuals observed on site	14/03/2025	Fri Mar 14 07:43:00	SCB
DI	dipper	1	Transit/Commuting	0-10m	Fly out of sight	1 of 2 separate individuals. Briefly landed on bank opposite kfvp1 before flying back in the direction it came	14/03/2025	Fri Mar 14 07:44:33	SCB
MA	mallard	2	Transit/Commuting	0-10m	Fly out of sight		14/03/2025	Fri Mar 14 08:02:03	SCB
MA	mallard	2	Transit/Commuting	0-10m	Fly out of sight		14/03/2025	Fri Mar 14 08:28:41	SCB
MA	mallard	3	Transit/Commuting	0-10m	Fly out of sight		14/03/2025	Fri Mar 14 08:53:23 202	SCB
DI	dipper	1	Transit/Commuting	0-10m	Land nearby		14/03/2025	Fri Mar 14 08:01:04	SCB
DI	dipper	1	Transit/Commuting	0-10m	Land nearby	Vocalising while flying. Landed briefly on river to forage and then left again	14/03/2025	Fri Mar 14 08:51:49 202	SCB
MA	mallard	4	Transit/Commuting	20-100m	Fly out of sight		14/03/2025	Fri Mar 14 09:59:20 202	SCB

HG	herring gull	3	Transit/Commuting	20-100m	Fly out of sight		14/03/2025	Fri Mar 14 09:59:52 202	SCB
GL	grey wagtail	2	Transit/Commuting	0-10m	Land nearby		14/03/2025	Fri Mar 14 09:30:39 202	SCB
DI	dipper	1	Transit/Commuting	0-10m	Fly out of sight	Vocalising while flying	14/03/2025	Fri Mar 14 09:14:53 202	SCB
BZ	buzzard	1	Soaring	0-10m	Fly out of sight	One of 2 individual birds observed on site. Soaring and calling	14/03/2025	Fri Mar 14 09:48:17 202	SCB
BZ	buzzard	1	Soaring	10-20m	Fly out of sight	Second of two individual buzzards observed on site	14/03/2025	Fri Mar 14 09:49:23 202	SCB
HG	herring gull	3	Transit/Commuting	20-100m	Fly out of sight		14/03/2025	Fri Mar 14 10:28:20 202	SCB
BZ	buzzard	2	Soaring	10-20m	Fly out of sight		14/03/2025	Fri Mar 14 10:23:51 202	SCB
RI	ring-necked parakeet	3	Transit/Commuting	10-20m	Fly out of sight	Ring necked parakeets	14/03/2025	Fri Mar 14 10:27:54 202	SCB
RI	ring-necked parakeet	1	Transit/Commuting	10-20m	Fly out of sight	Ring necked parakeet commuting and vocalising	14/03/2025	Fri Mar 14 10:32:55 202	SCB
MA	mallard	5	Transit/Commuting	0-10m	Fly out of sight		14/03/2025	Fri Mar 14 11:23:01 202	SCB
HG	herring gull	7	Flushed	20-100m	Fly out of sight		14/03/2025	Fri Mar 14 11:21:56 202	SCB
BG	Brent goose	31	Transit/Commuting	10-20m	Fly out of sight		14/03/2025	Fri Mar 14 11:22:46 202	SCB

HG	herring gull	3	Transit/Commuting	10-20m	Fly out of sight		14/03/2025	Fri Mar 14 12:03:43 202	SCB
HG	herring gull	3	Transit/Commuting	10-20m	Fly out of sight		14/03/2025	Fri Mar 14 12:55:56 202	SCB
BZ	buzzard	1	Soaring	0-10m	Fly out of sight		14/03/2025	Fri Mar 14 12:03:23 202	SCB
HG	herring gull	1	Transit/Commuting	20-100m	Fly out of sight		14/03/2025	Fri Mar 14 13:09:57 202	SCB
HG	herring gull	1	Transit/Commuting	20-100m	Fly out of sight		14/03/2025	Fri Mar 14 13:10:16 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		14/03/2025	Fri Mar 14 13:31:36 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		14/03/2025	Fri Mar 14 13:49:12 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		14/03/2025	Fri Mar 14 13:53:41 202	SCB
HG	herring gull	2	Transit/Commuting	20-100m	Fly out of sight		14/03/2025	Fri Mar 14 13:56:36 202	SCB
BZ	buzzard	1	Transit/Commuting	10-20m	Land on the site	Perched up on tree	14/03/2025	Fri Mar 14 13:16:55 202	SCB
HG	herring gull	1	Transit/Commuting	20-100m	Fly out of sight		14/03/2025	Fri Mar 14 14:09:29 202	SCB
HG	herring gull	3	Transit/Commuting	20-100m	Fly out of sight		14/03/2025	Fri Mar 14 14:09:47 202	SCB

HG	herring gull	1	Transit/Commuting	20-100m	Fly out of sight		14/03/2025	Fri Mar 14 14:09:57 202	SCB
HG	herring gull	1	Transit/Commuting	20-100m	Fly out of sight		14/03/2025	Fri Mar 14 14:19:11 202	SCB
HG	herring gull	2	Transit/Commuting	10-20m	Fly out of sight		14/03/2025	Fri Mar 14 14:20:27 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		14/03/2025	Fri Mar 14 14:32:12 202	SCB
HG	herring gull	5	Transit/Commuting	10-20m	Fly out of sight		14/03/2025	Fri Mar 14 14:38:50 202	SCB
HG	herring gull	1	Transit/Commuting	10-20m	Fly out of sight		14/03/2025	Fri Mar 14 14:39:02 202	SCB
BZ	buzzard	1	Transit/Commuting	10-20m	Fly out of sight		14/03/2025	Fri Mar 14 14:19:16 202	SCB
BH	black-headed gull	6	Transit/Commuting	10-20m	Fly out of sight		14/03/2025	Fri Mar 14 14:31:49 202	SCB
MA	mallard	2	Transit/Commuting	0-10m	Land nearby		14/03/2025	2025-03-14T08:02:40.579	SCB

Appendix II - Table 2: Records of point observations from within and adjacent to the proposed development site.

BTO_Code	BTO_Name	MaxCount	Activity	Habitat	Notes	Date	Time	Surveyor
HG	herring gull	20	Foraging	Disturbed ground		30/10/2024	2024-10-30T08:44:19.640	SCB
GL	grey wagtail	1	Flying over	Watercourses		30/10/2024	12:02:41	SCB
HG	herring gull	29	Foraging	Disturbed ground		19/11/2024	2024-11-19T12:43:11.168	SCB
HG	herring gull	1	Perched	Disturbed ground		19/11/2024	11:38:01	SCB
HG	herring gull	1	Foraging	Grassland - improved (dry)		19/11/2024	11:38:55	SCB
HG	herring gull	22	Foraging	Grassland - improved (dry)		19/11/2024	12:42:06	SCB
HG	herring gull	2	Foraging	Grassland - improved (dry)		19/11/2024	12:42:49	SCB
BH	black-headed gull	11	Foraging	Grassland - improved (dry)		19/11/2024	13:23:04	SCB
HG	herring gull	1	Foraging	Grassland - improved (dry)		19/11/2024	13:23:40	SCB
MA	mallard	4	Foraging	Watercourses		19/11/2024	14:21:33	SCB
HG	herring gull	2	Roosting/Loafing	Built land (e.g. buildings and stonework)		19/11/2024	14:35:15	SCB
HG	herring gull	6	Roosting/Loafing	Grassland - improved (dry)		19/11/2024	14:38:04	SCB
MA	mallard	2	Rafting	Watercourses		19/11/2024	14:47:44	SCB
HG	herring gull	1	Foraging	Grassland - improved (dry)		19/11/2024	15:48:42	SCB

HG	herring gull	20	Foraging	Grassland - improved (dry)		17/12/2024	15:36:43	SCB
HG	herring gull	42	Foraging	Grassland - improved (dry)	Flock foraging grew from 3 to 40+ over course of an hour	14/01/2025	2025-01-14T11:39:56.928	SCB
HG	herring gull	2	Foraging	Grassland - improved (dry)		14/01/2025	2025-01-14T13:15:21.852	SCB
BZ	buzzard	1	Perched	Disturbed ground		14/01/2025	09:23:52	SCB
MA	mallard	2	Flushed	Watercourses		14/01/2025	10:01:59	SCB
DI	dipper	1	Flushed	Watercourses		14/01/2025	12:36:25	SCB
HG	herring gull	1	Foraging	Grassland - improved (wet)		14/01/2025	12:40:33	SCB
HG	herring gull	1	Foraging	Grassland - improved (dry)		14/01/2025	13:03:22	SCB
HG	herring gull	2	Foraging	Grassland - improved (dry)		14/01/2025	13:10:18	SCB
HG	herring gull	2	Roosting/Loafing	Built land (e.g. buildings and stonework)		14/01/2025	13:31:18	SCB
HG	herring gull	50	Foraging	Grassland - improved (dry)		11/02/2025	2025-02-11T12:11:31.819	SCB
HG	herring gull	2	Foraging	Grassland - improved (dry)		11/02/2025	2025-02-11T12:59:32.726	SCB
HG	herring gull	23	Foraging	Grassland - improved (dry)		11/02/2025	2025-02-11T13:25:47.785	SCB
CO	coot	1	Flushed	Watercourses		11/02/2025	09:15:24	SCB
HG	herring gull	1	Foraging	Grassland - improved (dry)		11/02/2025	12:51:00	SCB
HG	herring gull	2	Foraging	Grassland - improved (dry)		14/03/2025	2025-03-14T13:30:35.752	SCB
MH	moorhen	1	Foraging	Watercourses		14/03/2025	07:37:16	SCB
MA	mallard	1	Foraging	Watercourses		14/03/2025	09:14:20	SCB

GL	grey wagtail	2	Foraging	Watercourses	Pair of grey wagtails	14/03/2025	09:25:38	SCB
HG	herring gull	12	Foraging	Grassland - improved (dry)		14/03/2025	09:26:35	SCB
HG	herring gull	7	Foraging	Grassland - improved (dry)		14/03/2025	12:02:36	SCB

Appendix III – Results of Survey Transects

Appendix III - Table 1: Results of survey transects sorted by date.

Transect Reference	Sample Point Reference	Dropping Count	Sward Height	Bare Ground Cover	Grass Cover	Forb Cover	Transect Length	Date	Time	Surveyor	Notes
T1 (1258m)	1	0	16	0	90	10	1258	30/10/2024	Wed Oct 30 08:57:12 202	SCB	
T1 (1258m)	3	0	17	0	100	0	1258	30/10/2024	2024-10-30T11:12:49.212	SCB	
T1 (1258m)	4	0	22	0	100	0	1258	30/10/2024	2024-10-30T11:13:01.360	SCB	
T1 (1258m)	5	0	7	0	40	60	1258	30/10/2024	2024-10-30T11:13:22.764	SCB	
T1 (1258m)	6	0	3	85	5	10	1258	30/10/2024	2024-10-30T11:13:35.405	SCB	
T1 (1258m)	7	0	0	10	0	90	1258	30/10/2024	2024-10-30T11:13:47.762	SCB	
T1 (1258m)	8	0	5	95	3	2	1258	30/10/2024	2024-10-30T11:13:59.842	SCB	
T1 (1258m)	9	0	3	95	4	1	1258	30/10/2024	2024-10-30T11:14:22.520	SCB	
T1 (1258m)	10	0	12	55	35	10	1258	30/10/2024	2024-10-30T11:14:34.173	SCB	
T1 (1258m)	2	0	23	0	100	0	1258	30/10/2024	Wed Oct 30 11:12:00 202	SCB	
T2 (750m)	1	0	10	0	100	0	750	30/10/2024	Wed Oct 30 07:48:12	SCB	
T2 (750m)	2	0	20	0	70	30	750	30/10/2024	2024-10-30T07:53:08.297	SCB	
T2 (750m)	3	0	25	0	80	20	750	30/10/2024	Wed Oct 30 07:54:45	SCB	
T2 (750m)	4	0	25	0	100	0	750	30/10/2024	Wed Oct 30 07:57:55	SCB	
T2 (750m)	5	0	16	0	100	0	750	30/10/2024	Wed Oct 30 08:01:06	SCB	
T2 (750m)	6	0	25	0	100	0	750	30/10/2024	Wed Oct 30 08:05:04	SCB	
T2 (750m)	7	0	19	0	65	35	750	30/10/2024	Wed Oct 30 08:07:36	SCB	
T2 (750m)	8	0	53	0	40	60	750	30/10/2024	Wed Oct 30 08:12:27	SCB	
T2 (750m)	9	0	30	0	100	0	750	30/10/2024	Wed Oct 30 08:15:26	SCB	
T2 (750m)	10	0	26	0	100	0	750	30/10/2024	Wed Oct 30 08:19:18 202	SCB	Blue wooden barrier for building site prevented me from doing quadrat directly on transect line
T1 (1258m)	1	0	20	0	70	30	670	19/11/2024	Tue Nov 19 11:50:05 202	SCB	
T1 (1258m)	2	0	22	0	95	5	1258	19/11/2024	Tue Nov 19 11:54:02 202	SCB	

T1 (1258m)	3	0	22	0	55	45	1258	19/11/2024	Tue Nov 19 12:03:42 202	SCB	
T1 (1258m)	4	0	23	0	100	0	1258	19/11/2024	Tue Nov 19 12:09:49 202	SCB	
T1 (1258m)	5	0	12	0	5	95	1258	19/11/2024	Tue Nov 19 12:15:24 202	SCB	
T1 (1258m)	6	0	11	90	2	8	1258	19/11/2024	Tue Nov 19 12:48:04 202	SCB	
T1 (1258m)	7	0	0	40	0	60	1258	19/11/2024	Tue Nov 19 12:53:45 202	SCB	
T1 (1258m)	8	0	12	85	10	5	1258	19/11/2024	Tue Nov 19 13:00:01 202	SCB	
T1 (1258m)	10	0	13	5	95	0	1258	19/11/2024	Tue Nov 19 13:08:03 202	SCB	
T2 (750m)	1	0	16	0	90	10	670	19/11/2024	Tue Nov 19 10:34:27 202	SCB	Track partially blocked by construction fence so did this point as close to line as possible
T2 (750m)	2	0	30	0	100	0	670	19/11/2024	Tue Nov 19 10:39:09 202	SCB	
T2 (750m)	3	0	0	0	0	100	670	19/11/2024	Tue Nov 19 10:44:29 202	SCB	
T2 (750m)	4	0	17	0	65	35	670	19/11/2024	Tue Nov 19 10:57:18 202	SCB	
T2 (750m)	5	0	14	25	75	0	670	19/11/2024	Tue Nov 19 11:04:04 202	SCB	
T2 (750m)	6	0	20	0	85	15	670	19/11/2024	Tue Nov 19 11:07:36 202	SCB	
T2 (750m)	7	0	20	0	70	30	670	19/11/2024	Tue Nov 19 11:17:32 202	SCB	
T2 (750m)	8	0	35	0	80	20	670	19/11/2024	Tue Nov 19 11:24:09 202	SCB	
T2 (750m)	9	0	30	0	100	0	670	19/11/2024	Tue Nov 19 11:26:54 202	SCB	
T2 (750m)	10	0	10	0	70	30	670	19/11/2024	Tue Nov 19 11:29:31 202	SCB	
T1 (1258m)	1	0	8	0	100	0	1258	17/12/2024	2025-01-20T15:02:37.690	SCB	
T1 (1258m)	2	0	22	0	90	10	1258	17/12/2024	2025-01-20T15:03:45.750	SCB	
T1 (1258m)	3	1	19	10	70	20	1258	17/12/2024	2025-01-20T15:04:47.473	SCB	
T1 (1258m)	4	0	17	60	40	0	1258	17/12/2024	2025-01-20T15:08:38.567	SCB	
T1 (1258m)	5	0	13	5	20	75	1258	17/12/2024	2025-01-20T15:14:39.124	SCB	
T1 (1258m)	6	0	9	85	10	5	1258	17/12/2024	2025-01-20T15:10:25.926	SCB	
T1 (1258m)	8	0	8	65	30	5	1258	17/12/2024	2025-01-20T15:12:05.184	SCB	
T1 (1258m)	9	0	5	85	10	5	1258	17/12/2024	2025-01-20T15:12:59.964	SCB	
T1 (1258m)	10	0	14	0	60	40	1258	17/12/2024	2025-01-20T15:13:45.901	SCB	
T1 (1258m)	7	0	0	10	0	90	1258	17/12/2024	2025-01-20T15:15:18.242	SCB	

T2 (750m)	1	0	10	0	100	0	750	17/12/2024	2025-01-20T14:55:15.912	SCB	
T2 (750m)	2	0	15	0	70	30	750	17/12/2024	2025-01-20T14:55:50.997	SCB	
T2 (750m)	3	0	70	0	90	10	750	17/12/2024	2025-01-20T14:56:32.214	SCB	
T2 (750m)	4	0	8	0	95	5	750	17/12/2024	2025-01-20T14:57:20.180	SCB	
T2 (750m)	5	0	13	0	100	0	750	17/12/2024	2025-01-20T14:57:56.061	SCB	
T2 (750m)	6	0	12	0	100	0	750	17/12/2024	2025-01-20T14:58:31.170	SCB	
T2 (750m)	7	0	9	0	75	25	750	17/12/2024	2025-01-20T14:59:05.579	SCB	
T2 (750m)	8	0	11	0	95	5	750	17/12/2024	2025-01-20T14:59:39.725	SCB	
T2 (750m)	9	0	14	0	100	0	750	17/12/2024	2025-01-20T15:00:38.804	SCB	
T2 (750m)	10	0	14	0	100	0	750	17/12/2024	2025-01-20T15:01:17.822	SCB	
T1 (1258m)	1	0	8	0	100	0	1258	14/01/2025	Tue Jan 14 09:36:50 202	SCB	
T1 (1258m)	2	0	22	0	90	10	1258	14/01/2025	Tue Jan 14 09:43:15 202	SCB	
T1 (1258m)	3	0	19	10	70	20	1258	14/01/2025	Tue Jan 14 09:52:53 202	SCB	
T1 (1258m)	4	0	17	60	40	0	1258	14/01/2025	Tue Jan 14 09:57:37 202	SCB	
T1 (1258m)	5	4	13	5	20	75	1258	14/01/2025	Tue Jan 14 10:07:52 202	SCB	
T1 (1258m)	6	0	9	85	10	5	1258	14/01/2025	Tue Jan 14 10:15:39 202	SCB	
T1 (1258m)	7	0	0	10	0	90	1258	14/01/2025	Tue Jan 14 10:20:11 202	SCB	
T1 (1258m)	8	0	8	65	30	5	1258	14/01/2025	Tue Jan 14 10:27:36 202	SCB	
T1 (1258m)	9	0	5	85	10	5	1258	14/01/2025	Tue Jan 14 10:34:56 202	SCB	
T1 (1258m)	10	0	14	0	60	40	1258	14/01/2025	Tue Jan 14 10:41:38 202	SCB	
T2 (750m)	1	0	10	0	100	0	750	14/01/2025	Tue Jan 14 08:48:03 202	SCB	
T2 (750m)	2	0	15	0	70	30	750	14/01/2025	Tue Jan 14 08:53:06 202	SCB	
T2 (750m)	3	0	70	0	90	10	750	14/01/2025	Tue Jan 14 08:55:05 202	SCB	
T2 (750m)	4	0	8	0	95	5	750	14/01/2025	Tue Jan 14 08:57:02 202	SCB	
T2 (750m)	5	0	13	0	100	0	750	14/01/2025	Tue Jan 14 09:00:41 202	SCB	
T2 (750m)	6	0	12	0	100	0	750	14/01/2025	Tue Jan 14 09:02:28 202	SCB	
T2 (750m)	7	0	9	0	75	25	750	14/01/2025	Tue Jan 14 09:04:08 202	SCB	

T2 (750m)	8	0	11	0	95	5	750	14/01/2025	Tue Jan 14 09:08:53 202	SCB	
T2 (750m)	9	0	14	0	100	0	750	14/01/2025	Tue Jan 14 09:11:22 202	SCB	
T2 (750m)	10	0	14	0	100	0	750	14/01/2025	Tue Jan 14 09:13:22 202	SCB	
T1 (1258m)	1	0	17	0	100	0	1258	11/02/2025	Tue Feb 11 08:53:30 202	SCB	
T1 (1258m)	2	0	17	0	100	0	1258	11/02/2025	Tue Feb 11 08:56:12 202	SCB	
T1 (1258m)	3	0	25	10	85	5	1258	11/02/2025	Tue Feb 11 08:59:39 202	SCB	
T1 (1258m)	4	0	12	5	85	10	1258	11/02/2025	Tue Feb 11 09:03:10 202	SCB	
T1 (1258m)	5	1	11	5	90	5	1258	11/02/2025	2025-02-11T09:19:43.297	SCB	
T1 (1258m)	6	0	15	10	90	0	1258	11/02/2025	Tue Feb 11 09:22:43 202	SCB	
T1 (1258m)	7	0	14	70	20	10	1258	11/02/2025	Tue Feb 11 09:25:43 202	SCB	
T1 (1258m)	8	0	8	90	5	5	1258	11/02/2025	Tue Feb 11 09:30:18 202	SCB	
T1 (1258m)	9	0	0	20	0	80	1258	11/02/2025	Tue Feb 11 09:34:20 202	SCB	
T1 (1258m)	10	0	10	85	10	5	1258	11/02/2025	Tue Feb 11 09:37:29 202	SCB	
T2 (750m)	1	0	11	0	100	0	750	11/02/2025	Tue Feb 11 08:12:48	SCB	
T2 (750m)	2	0	12	0	100	0	750	11/02/2025	Tue Feb 11 08:15:17	SCB	
T2 (750m)	3	0	85	0	100	0	750	11/02/2025	Tue Feb 11 08:17:07	SCB	
T2 (750m)	4	0	13	0	100	0	750	11/02/2025	2025-02-11T08:20:48.149	SCB	
T2 (750m)	5	0	10	0	65	35	750	11/02/2025	Tue Feb 11 08:21:34	SCB	
T2 (750m)	6	0	15	0	100	0	750	11/02/2025	Tue Feb 11 08:23:30	SCB	
T2 (750m)	7	0	13	0	85	15	750	11/02/2025	2025-02-11T08:28:47.258	SCB	
T2 (750m)	8	0	26	0	100	0	750	11/02/2025	2025-02-11T08:35:39.532	SCB	
T2 (750m)	9	0	28	0	100	0	750	11/02/2025	Tue Feb 11 08:34:45 202	SCB	
T2 (750m)	10	0	8	30	70	0	750	11/02/2025	Tue Feb 11 08:37:21 202	SCB	
T1 (1258m)	1	0	15	0	100	0	1258	14/03/2025	Fri Mar 14 09:50:11	SCB	
T1 (1258m)	2	0	18	0	100	0	1258	14/03/2025	Fri Mar 14 09:54:28	SCB	
T1 (1258m)	3	0	16	5	95	0	1258	14/03/2025	Fri Mar 14 09:58:49	SCB	
T1 (1258m)	4	0	14	15	85	0	1258	14/03/2025	Fri Mar 14 10:02:20	SCB	

T1 (1258m)	5	0	8	30	50	20	1258	14/03/2025	Fri Mar 14 10:05:12	SCB	
T1 (1258m)	6	0	13	60	30	70	1258	14/03/2025	Fri Mar 14 10:08:37	SCB	
T1 (1258m)	7	0	0	0	0	100	1258	14/03/2025	Fri Mar 14 10:17:55	SCB	Sward height ref for grass only, forbs approx 70cm tall
T1 (1258m)	8	0	11	40	60	0	1258	14/03/2025	Fri Mar 14 10:23:03	SCB	
T1 (1258m)	9	0	15	0	100	0	1258	14/03/2025	Fri Mar 14 10:27:02	SCB	
T1 (1258m)	10	0	7	80	20	0	1258	14/03/2025	Fri Mar 14 10:32:19	SCB	
T2 (750m)	1	0	12	0	100	0	750	14/03/2025	Fri Mar 14 10:54:49	SCB	
T2 (750m)	2	0	16	0	100	0	750	14/03/2025	Fri Mar 14 10:56:23	SCB	
T2 (750m)	3	0	17	0	35	65	750	14/03/2025	Fri Mar 14 10:57:40	SCB	
T2 (750m)	4	0	9	0	95	5	750	14/03/2025	Fri Mar 14 10:59:23	SCB	
T2 (750m)	5	0	12	0	108	0	750	14/03/2025	Fri Mar 14 11:01:09	SCB	
T2 (750m)	6	0	12	0	100	0	750	14/03/2025	Fri Mar 14 11:02:34	SCB	
T2 (750m)	7	0	7	0	85	15	750	14/03/2025	Fri Mar 14 11:03:45	SCB	
T2 (750m)	8	0	11	0	90	10	750	14/03/2025	Fri Mar 14 11:07:47	SCB	
T2 (750m)	9	0	16	0	100	0	750	14/03/2025	Fri Mar 14 11:10:10	SCB	
T2 (750m)	10	0	6	75	25	0	750	14/03/2025	Fri Mar 14 11:11:24	SCB	

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Breeding Birds and Kingfisher Survey Technical Note

For a Proposed Large-scale Residential Development

Lands at Clonliffe College, Clonliffe Road, Drumcondra, Dublin 3

prepared for Hines Real Estate Ireland Ltd.

Scott Cawley, College House, 71 – 73 Rock Road, Blackrock, Co. Dublin, A94 F9X9, Ireland

Tel+353(1)676-9815 Fax +353(1) 676-9816

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This report has been prepared by Scott Cawley Ltd. in accordance with the particular instructions and requirements of our agreement with the Client, the project's budgetary and time constraints and in line with best industry standards. The methodology adopted and the sources of information used by Scott Cawley Ltd. in providing its services are outlined in this report. The scope of this report and the services are defined by these circumstances.

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The conclusions presented in this report represent Scott Cawley Ltd.'s best professional judgement based on review of site conditions observed during the site visit (if applicable) and the relevant information available at the time of writing. Scott Cawley Ltd. has used reasonable skill, care and diligence in compiling this report and no warranty is provided as to the report's accuracy.

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1 Introduction

This Breeding Bird and Kingfisher Survey Technical Note was authored by Cathal O'Brien MSc BSc (Hons) ACIEEM and Scott Bastow B.A. (Hons) of Scott Cawley Ltd.

It provides an overview of the breeding bird baseline for a Large Scale Residential development at lands in Clonliffe College, Clonliffe Road, Drumcondra, Dublin 3, for the 2025 breeding bird season. The Technical Note also describes the baseline for kingfisher along the River Tolka which abounds the northern boundary of the site following the completion of 3 no. breeding bird surveys and 4 no. dedicated kingfisher surveys. The proposed development consists of a residential scheme to be constructed within the red line boundary illustrated in Figure 1 below.

The proposed development site consists of the Clonliffe College Seminary, containing large areas of rough grassland, woodland, treelines, built grounds and ornamental borders. A large area of open grassland habitat is in the northern part of the lands, south of the River Tolka. There are scattered trees throughout the proposed development site, particularly east of the Clonliffe College building. The proposed development site is largely surrounded by residential developments to the north and east, as well as opposite the southern boundary which borders Clonliffe Road. There are also several sports complexes in the vicinity - the Belvedere Rugby grounds to the east, and Shelbourne Football Club across the River Tolka to the north and Croke Park Stadium to the southeast (see Figure 1).



Figure 1: The proposed development site and its surrounding environment.

The purpose of the Technical Note is to:

- Establish species of breeding birds in the proposed development and within 50 metres of the site boundary, including species of Special Conservation Interest (SCI) and Amber and Red-listed species listed as Birds of Conservation Concern in Ireland 2020-2026[1];
- To determine the presence/absence of breeding kingfisher along a section of the River Tolka which abounds the northern boundary of the proposed development site and in the immediate vicinity, upstream/downstream of the site boundary.

1.1 Policy and Legislation

The collection of breeding bird and kingfisher data, and the preparation of this technical report has had regard to the following legislation and policy documents:

- Directive 2009/147/EEC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds; hereafter, referred to as the 'Birds Directive'. The Birds Directive is the legislation under which special protection areas are designated for the protection of endangered species of wild birds listed in Annex I of that directive.
- Wildlife Acts 1976 to 2023 hereafter collectively referred to as the 'Wildlife Acts'. The Wildlife Acts are the principal pieces of legislation at national level for the protection of wildlife and for the control of activities that may harm wildlife. Bird species are protected under the Wildlife Acts whereby it is an offence to disturb birds while on their nests, or to wilfully take, remove, destroy, injure or mutilate their eggs or nests (i.e. from 1st March – 31st August). In the absence of adoption of protocols for the protection of birds and their nests, there is potential for direct impacts on nesting birds and/or mortality of birds arising from the proposed development.

2 Methodology

2.1 Author Statement

This Technical Note report was authored by Cathal O'Brien, and reviewed by Amir Glick of Scott Cawley Ltd.

Cathal O'Brien is a Senior Consultant Ecologist at Scott Cawley Ltd. with over six years' professional ecological consultancy experience in preparing Ecological Impact Assessment Reports (EcIAs). Cathal is an Associate Member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and holds a BSc (Hons) in Environmental Biology from University College Dublin and a MSc (Hons) in Ecology from the University of Bremen. He also has over six years' experience across a range of field surveys such as breeding birds, tree inspections for bat roosts, invasive species and other mammal survey including for badger activity as well as habitat surveys. He also has four years' consultancy experience report writing including, preparing Ecological Impact Assessments (EcIAs), Preliminary Ecological Appraisal reports (PEAs), Appropriate Assessment screening reports (AAs) and Planning Compliance and/or Technical Note reports.

Scott Bastow is a Consultant Ecologist with Scott Cawley Ltd. since Sept 2024. He obtained his undergraduate degree in Zoology from Trinity College Dublin. His previous experience consists of a mix of ecological surveying and academic research and authorship. Since joining Scott Cawley Ltd., Scott has worked on a range of projects including major road schemes, undertaking surveys for bats, wintering and breeding birds, protected mammals and habitats. Scott is a capable ecologist and is adept at data management through QGIS and Excel.

Amir Glick is a Senior Ecologist with Scott Cawley Ltd. He obtained an honours degree in Biology and Geography from Tel-Aviv University and an MSc in Ecology from Ben-Gurion University of the Negev. Amir

[1] Gilbert, G., Gibbons, D.W. & Evans, J. (1998) Bird Monitoring Methods - A Manual of Techniques for Key UK Species. RSPB:Sandy, Bedfordshire, England.

has over seven years of professional experience in ecological and environmental consultancy, with extensive experience in ecological and environmental impact assessments, peer reviewing and ecological surveys.

2.2 Field Surveys

10 Breeding bird surveys and kingfisher surveys were undertaken of the proposed development on the 14th March, 4th April, 29th April and 22nd May 2025 by Cathal O'Brien MSc BSc. ACIEEM and Scott Bastow BSc. (Hons) of Scott Cawley Ltd.

2.2.1 Kingfisher Surveys

11 Kingfisher surveys were conducted along a section of the River Tolka bordering the site (see Figure 1) following a methodology adapted from Road Safety Authority (RSA) guidelines, Ecological Surveying Techniques for Protected Flora and Fauna during the Panning of National Road Schemes2. Surveys were undertaken during the optimal time of the year, over four visits during the breeding season (mid-March – early July). The first survey on 14th March was preceded by an assessment of suitable nesting habitat in which areas of suitable as feeding grounds, potential feeding perches (i.e. overhanging branches) and suitable nesting habitat such as steep sided banks with soft material in which any nesting pairs of kingfisher can dig their burrows. During the assessment of suitable nesting habitat, 2 no. vantage points were identified along the section of river in which 2 hour vantage point surveys were undertaken during each of the four site visits (see Figure 2).

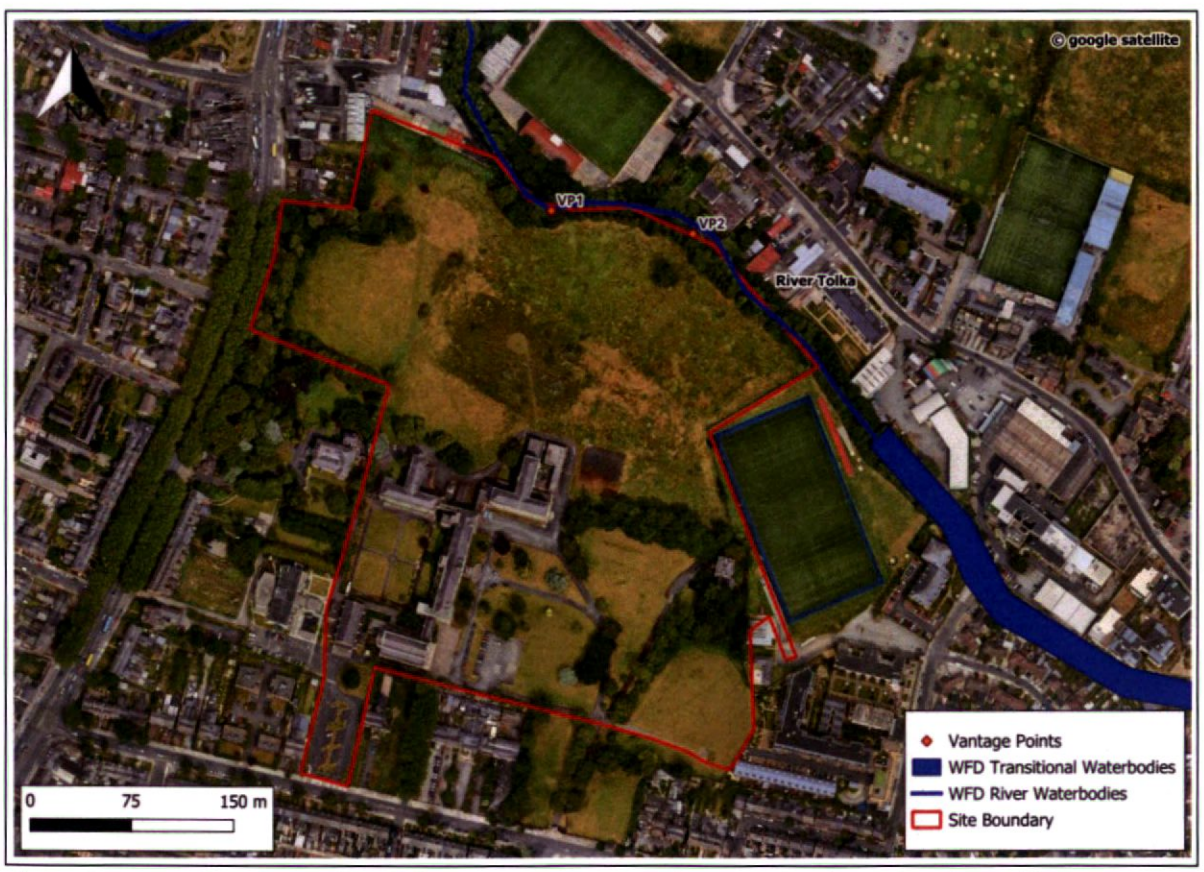


Figure 2 Locations of kingfisher survey vantage points 1 and 2 along the River Tolka.

[2] National Roads Authority (2008). Ecological Surveying Techniques for Protected Flora and Fauna during the Panning of National Road Schemes.

12 Details of survey dates, times and weather conditions for kingfisher surveys are provided in Table 1.

Table 1 Survey dates, times and weather conditions for Kingfisher surveys.

Date	Start Time	Finish Time	Weather Conditions
14th March 2025	07:30	09:30	Mostly cloudy with light drizzle in a gently southwesterly breeze with temperatures of 7°C.
4th April 2025	05:50	07:50	Dry with a few clouds in a gently southerly breeze with temperatures of 11°C.
29th April 2025	05:35	07:35	Dry and mostly clear in calm conditions with temperatures of 11°C.
22nd May 2025	05:15	07:15	Dry and partly cloudy in calm conditions with temperatures of 10°C.

2.3 Breeding Bird Surveys

13 Breeding bird surveys were undertaken on the 4th April, 29th April and 22nd May 2025 by Cathal O'Brien and Scott Bastow, following completion of three of the kingfisher surveys. The survey methodology from Bird Monitoring Methods - A Manual of Techniques for Key UK Species[1] was followed. The survey area encompassed the lands within and 50m from the site boundary. All habitats suitable for breeding birds were surveyed, including treelines such as along the River Tolka and an area of mixed deciduous woodland along the western boundary, bordering the N1 (R132) (see Figure 1). Birds were identified by sight and song, and general location and activity were recorded using the British Trust for Ornithology (BTO) species and activity codes. Details of survey dates, times and weather conditions during the breeding bird surveys are shown in ***Table 2*** below.

Table 2 Survey dates, times and weather conditions for breeding bird surveys.

Date	Start Time	Finish Time	Weather Conditions
4th April 2025	05:50	07:50	Dry with a few clouds in a gently southerly breeze with temperatures of 11°C.
29th April 2025	05:35	07:35	Dry and mostly clear in calm conditions with temperatures of 11°C.
22nd May 2025	05:15	07:15	Dry and partly cloudy in calm conditions with temperatures of 10°C.

2.4 Survey Limitations

14 The kingfisher surveys were undertaken during the optimal time of year and over the minimum requirement of 4 no. site visits. However, it was not possible to observe 500m sections upstream and downstream of the proposed development site boundary, as per standard guidelines for kingfisher surveys[1], due to restricted access to the adjacent private lands immediately downstream and upstream of the site. The limit visibility of these 500m sections of river is not considered a limitation to the data gathered to inform this technical note, as observations during the habitat suitability assessment noted that the reaches visible outside the site (i.e. upstream *c.* 75m and downstream *c.* 350m), of the site boundary do not provide suitable nesting habitat for kingfisher. As the riverbank is highly modified and/or comprise artificial surfaces such as concrete walls in discrete sections. As such, it is not considered these reaches provide suitable habitat for nesting sites. The modified nature of the river channel is particularly acute upstream of the proposed development where the Frank Flood Bridge crosses the river along the N1 (R132), where the river abuts concrete retaining walls of adjacent premises and/or green space, both upstream and downstream of the bridge. The riverbanks downstream of the site were visible to a distance of *c.* 350m to the bridge on Distillery Road. Further downstream the river is largely channelised on both sides, based on available aerial imagery. Therefore, the restricted visibility regarding the standard 500m

buffer from the site boundary during the kingfisher vantage point surveys is not considered a limitation of the data collected to inform this technical note report.

3 Survey Results

3.1 Kingfisher

3.1.1 Habitat Suitability Assessment

15 The stretch of the River Tolka which runs by the northern end of the site has been determined as unsuitable for breeding kingfisher due to a lack of suitable riverbanks in which a kingfisher could create a cavity to nest in. However, this stretch of the River Tolka has been determined to contain suitable foraging habitat for kingfisher given observations of suitable perches (See Figure 3 below), fish in the river and foraging cormorants by Scott Bastow while undertaking the initial habitat suitability assessment, as well as throughout the kingfisher vantage point surveys undertaken throughout the season.



Figure 3 Suitable Kingfisher perches along the Tolka north of the site and the location of the breeding Kingfisher survey vantage points.

3.1.2 VP Survey Results

16 Kingfisher was observed twice during the survey undertaken on the 29th April 2025. In the first case, a single bird was seen from vantage point 1 commuting above the river travelling eastwards and shortly after this a bird was heard in flight from vantage point 2 to the west of this vantage point (See Figure 4 below). It is likely that this bird too was commuting through the habitat.

17 It is worth mentioning that during prior wintering bird surveys undertaken on-site during the 2024/2025 wintering bird season resulted in an observation of Kingfisher using the site once again to commute.

It can be definitively concluded therefore that the stretch of the Tolka river that runs along the northern boundary of the site is not in-use by breeding Kingfisher and furthermore is not suitable for this purpose given the lack of suitable riverbanks. Rather, this stretch is used to commute and, due to the aforementioned suitability, as foraging habitat.



Figure 4 Observations of Kingfisher during breeding Kingfisher surveys undertaken during the 2025 season.

3.2 Breeding Birds

3.2.1 Survey Results

A total of 31 bird species were recorded on site (See Figure 5 and Table 3 below), of which 24 are green-listed and 6 are amber-listed on the Birds of Conservation Concern Ireland list (see Figure 6 below). No red-listed species were observed. Little egret, a green-listed species observed foraging in the River Tolka which borders the northern boundary of the site, is also an Annex I species under the EU Birds Directive. Five SCI species (Including Kingfisher) were observed: cormorant, grey heron, herring gull, kingfisher and mallard. One non-native species, the ring-necked parakeet, was observed on site. This species is considered as an

invasive species outside of their native range. These birds are likely part of the known Drumcondra population which has been present in the area for several years.

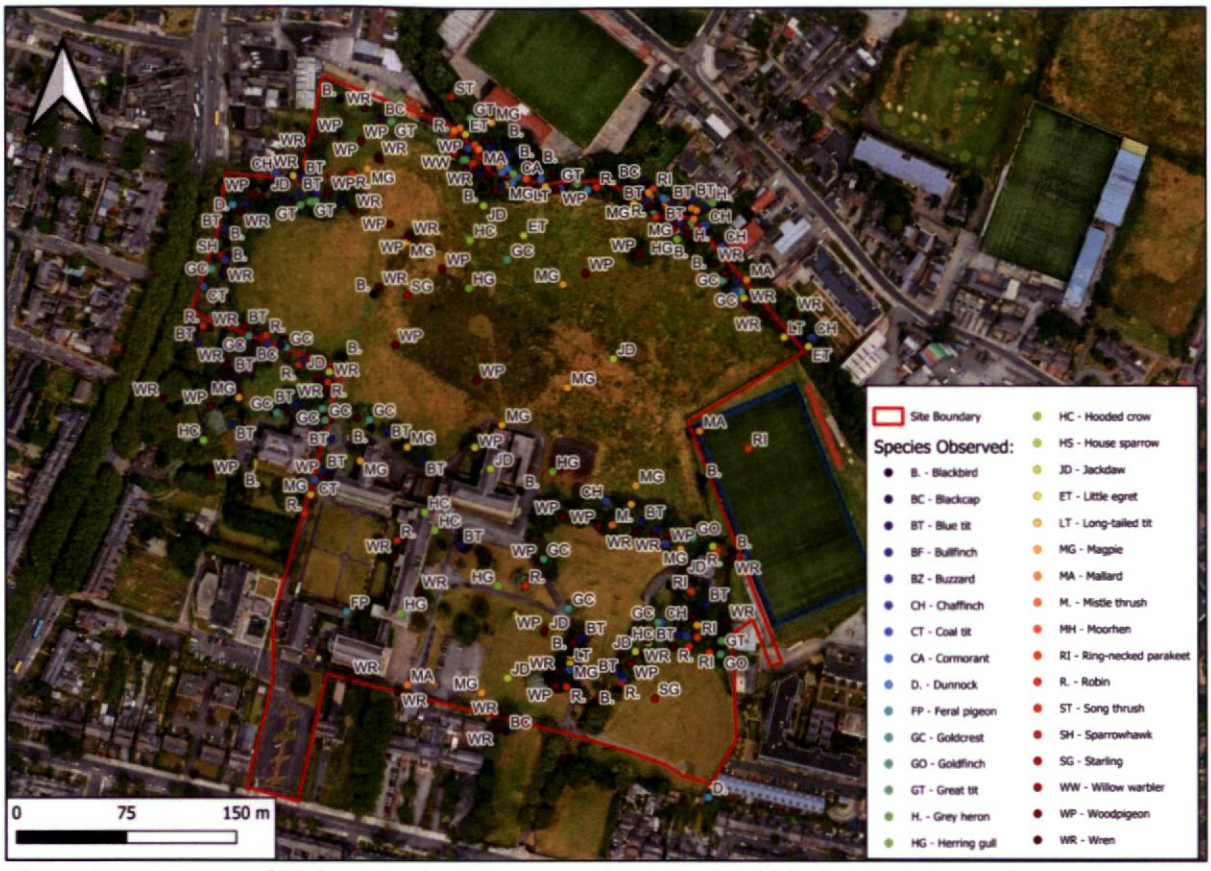


Figure 5 ***Map of bird species and the areas of the site in which they have been observed.***



Figure 6 ***Map of bird species according to BOCCI designation.***

Table 3 ***List of species observed on-site and their corresponding BOCCI and Annex I designations.***

Species	BOCCI Designation	Annex I species (Yes/No)	SCI Species (Yes/No)
Blackbird *Turdus merula*	Green	No	No
Blackcap *Sylvia atricapilla*	Green	No	No
Blue tit *Cyanistes caeruleus*	Green	No	No
Bullfinch *Pyrrhula pyrrhula*	Green	No	No
Buzzard *Buteo buteo*	Green	No	No
Chaffinch *Fringilla coelebs*	Green	No	No
Coal tit *Periparus ater*	Green	No	No
Common kingfisher *Alcedo atthis*	Green	No	Yes
Cormorant *Phalacrocorax carbo*	Amber	No	Yes
Dunnock *Prunella modularis*	Green	No	No
Feral pigeon *Columba livia f. domestica*	Green	No	No
Goldcrest *Regulus regulus*	Amber	No	No
Goldfinch *Carduelis carduelis*	Green	No	No
Great tit *Parus major*	Green	No	No
Grey heron *Ardea cinerea*	Green	No	Yes
Herring gull *Larus argentatus*	Amber	No	Yes
Hooded crow *Corvus corone*	Green	No	No
Jackdaw *Corvus monedula*	Green	No	No
Little egret *Egretta garzetta*	Green	Yes	No

Long-tailed tit *Aegithalos caudatus*	Green	No	No
Magpie *Pica pica*	Green	No	No
Mallard *Anas platyrhynchos*	Amber	No	Yes
Mistle thrush *Turdus viscivorus*	Green	No	No
Moorhen *Gallinula chloropus*	Green	No	No
Ring-necked parakeet *Psittacula krameri*	N/A	No	No
Robin *Erithacus rubecula*	Green	No	No
Song thrush *Turdus philomelos*	Green	No	No
Sparrowhawk *Accipiter nisus*	Green	No	No
Starling *Sturnus vulgaris*	Amber	No	No
Willow warbler *Phylloscopus trochilus*	Amber	No	No
Woodpigeon *Columba palumbus*	Green	No	No
Wren *Troglodytes troglodytes*	Green	No	No

4 Discussion

The results of 4 no. dedicated kingfisher surveys determined that there is no suitable breeding habitat for kingfisher on or adjacent to the site, the only kingfisher observations were in a commuting capacity. Therefore, it can be determined that breeding kingfisher is not present along the River Tolka in the vicinity of the proposed development.

While no bird nests were confirmed on-site, it is highly likely that several green- listed species (listed in Table 3) are using the hedgerows and treelines within the site as nesting habitat, with each green listed species observed recorded as 'possible breeder' or 'probable breeder' in at least once instance, according to the BTO Breeding Status Codes. All six amber listed species observed on-site (i.e. cormorant, goldcrest, herring gull, mallard, starling and willow warbler) were recorded in at least one instance as being possible and/or probable breeders except for the starling, which was only recorded in a non-breeding context. Typical breeding habitat for each of these amber-listed species exists on site – this includes trees within woodland and treelines for cormorant, goldcrest and starling (with starling also using cavities within buildings), dense hedgerow and shrubbery for willow warbler, rooftops for herring gull and along water features within ground cover for mallard. The little egret, an Annex I species, was recorded as a 'probable breeder' along the stretch of the Tolka which runs along the northern edge of the proposed development when a pair were observed foraging within the river. However, there was no evidence of nesting activity

along the sections of River Tolka which run along the site boundary or immediately upstream and downstream of the site.

22 It is also possible that the invasive ring-necked parakeet is breeding on or near the site, with all observations recorded as either 'possible breeder' and 'probable breeding'. The patch of woodland on the eastern edge of the site below the Belvedere College sports grounds may be in use as a breeding site by this species, where this species was recorded mostly prevalently. There is currently no Irish guidance for the control and/or management of this species.

4.1 SCI Species

23 Five SCI species were observed on-site: cormorant, grey heron, herring gull, kingfisher and mallard. These species are discussed in the context of the proposed development below.

4.1.1 Cormorant

24 Cormorant activity was chiefly concentrated adjacent to the River Tolka, which forms the northern boundary of the proposed development site. Observations included flyovers and foraging behaviour on the river. Cormorant *Phalacrocorax carbo* [A017] is an SCI species for which the closest European site to the proposed development have been designated:

- Ireland's Eye SPA (004117), *c.* 12.5km north-east of the proposed development site. The European site encompasses the island of Ireland's Eye and the surrounding coastal waters. Cormorant breed on the island in nationally important numbers (306 pairs)[3].
- Lambay Island SPA (004069), *c.* 19.6km north-east of the proposed development site. The European site encompasses Lambay Island and its surrounding coastal waters. Cormorant breed on the island in internationally important numbers (675 pairs), with smaller number of birds (29) overwintering at the site[4].

25 The potential that some members of the Ireland's Eye SPA and Lambay Island SPA breeding populations utilise the section of the River Tolka that runs along the northern boundary of the proposed development site, was considered, given that both of these SPAs are within the known foraging range of this species of up to 25km[5], though this can be considered relatively unlikely given the suitable alternative foraging grounds that exist far closer to these breeding colonies (i.e. open marine waters adjacent to both sites). Furthermore, for development purposes, guidelines[6] recommend a distance of 750 meters from an SPA designated for breeding populations of cormorant, in terms of disturbance and displacement. Therefore, it is considered unlikely that individuals of cormorant recorded during the breeding bird surveys are connected to SPA colonies. Despite the presence of this species within the site during breeding bird surveys, there was no evidence of breeding activity along the section of suitable habitat in the form of the River Tolka.

[3] NPWS (2020A). Natura 2000 Standard Data Form: IE0004117 Ireland's Eye SPA. National Parks and Wildlife Service, Dublin.

[4] NPWS (2020B). Natura 2000 Standard Data Form: IE0004069 Lambay Island SPA. National Parks and Wildlife Service, Dublin.

[5] Paillisson J-M., Carpentier, A., Le Gentil, J., Marion, L. (2004). Space utilization by a cormorant (Phalacrocorax carbo L.) colony in a multi-wetland complex in relation to feeding strategies. C. R. Biologies 327 (2004) 493–500.

[6] BES (2020). Guidance on Disturbance to Birds during Forestry Operations (Felling and Reforestation). For use in the Preparation of AA Screening Reports and Natura Impact Statements, in conjunction with "Guidance on the Assessment of SPA QIs on Coillte Sites". Prepared for Coillte.

4.1.2 *Grey heron*

There are no European sites for which grey heron is an SCI species within the vicinity of the proposed development site. The closest European sites which include grey heron as a designating feature is Wexford Harbour and Slobs SPA (004076), *c.* 99km south of the proposed development site. Grey herons are generally sedentary in Ireland, meaning they do not travel long distances between their breeding and wintering grounds[7], and for this reason, the population of birds in the proposed development site is not part of any European site population.

4.1.3 *Herring gull*

Herring gull *Larus argentatus* [A148] is an SCI species for which the following European sites within 20km of the proposed development have been designated:

- North-West Irish Sea SPA (004236), *c.* 7km east of the proposed development site. This European site encompasses estuaries (i.e. Malahide, Rogerstown and the River Boyne) and headlands and the extended coastline along north Dublin Bay, north County Dublin, County Meath as far north as the southern tip of Dundalk Bay in County Louth, as well as a large area offshore covering 2,333km[8]. The baseline population of this European site is estimated at 6,893 from survey undertaken within the site in 2016 during autumn and winter[9]. North-West Irish Sea SPA (004236) is listed as the most important site in the country for this species. This SPA contains valuable foraging habitat for the breeding populations of this species within the adjacent Ireland's Eye SPA and Lambay Island SPA.
- Ireland's Eye SPA (004117), *c.* 12.5km north-east of the proposed development site. The European site encompasses the island of Ireland's Eye and the surrounding coastal waters. Ireland's Eye is an important breeding site for herring gull, and has a population of *c.* 250 birds[3]. While this population count is below the threshold for national significance, given the amber-listed designation of this species on the list of birds of conservation concern Ireland this is nonetheless an important breeding population for the species – particularly on the east coast.
- Lambay Island SPA (004069), *c.* 19.6km north-east of the proposed development site. The European site encompasses Lambay Island and its surrounding coastal waters. Lambay Island is an important breeding site for herring gull, and has a population of *c.* 1,806 birds [4]. This population constitutes 0.2% of the global population for this species and as such, while data is lacking on total herring gull number in Ireland, it is likely that this is an important population for this species in Ireland.

There is potential that some members of the Ireland's Eye or Lambay Island breeding population utilise the proposed development site for foraging during the breeding season, however for development purposes guidelines state that there need only be a distance of 750 meters from the breeding area in terms of disturbance and displacement[6]. This species is a commonly encountered urban bird species, with large populations residing and breeding in the urban areas around Dublin[10]. The rooftops of the buildings within the Clonliffe site constitute suitable breeding habitat in an urban context for herring gulls outside of the SCI populations, though no evidence of breeding by the species was observed on-site.

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[7] From information on Grey Heron *Ardea cinerea* published on the BirdWatch Ireland website https://birdwatchireland.ie/birds/grey-Heron/. Accessed 18th April 2024

[8] NPWS (2023). Site Synopsis. Site Name: North-West Irish Sea cSPA Site Code: 004236.

[9] NPWS (2023). Site Synopsis. Site Name: North-West Irish Sea cSPA Site Code: 004236.

[10] BirdWatch Ireland (2021). Urban Gulls, BirdWatch Ireland's view from the roof-tops.

4.1.4 Kingfisher

29 There are no European sites for which kingfisher is an SCI species within the vicinity of the proposed development site. The closest European sites which includes kingfisher as a designating feature is the River Boyne and River Blackwater SPA (004232), *c.* 37km northeast of the proposed development site. The River Boyne and River Blackwater SPA is in a separate water catchment to the River Tolka and is therefore not directly connected to the proposed development site. The population on the River Tolka is not part of the River Boyne and River Blackwater SPA population based on distance of separation between the two.

4.1.5 Mallard

30 There are no European sites for which mallard is an SCI species within the vicinity of the proposed development site. The closest European site which includes mallard as a designating feature is Dundalk Bay SPA (004026), *c.* 69km north of the proposed development site. It is worth bearing in mind that European sites have been designated for wintering populations of mallard only as opposed to their breeding populations. The distance from the proposed development site and the nearest designated SPA for this species is large (*c.* 69km). However, for development purposes, guidelines recommend a distance of up to 750 meters[6] from an SPA breeding population in terms of disturbance and displacement. Therefore, it is not considered that observations of the species within the River Tolka along and in the immediate vicinity of the site during the breeding bird surveys are connected to populations within an SPA designated for the species. Mallard habitually breed in a wide variety of settings, including in urban park ponds and in vegetated riverbanks. However, there was no evidence of nesting activity of mallard during the surveys, despite the presence of suitable breeding habitat along the banks of the River Tolka adjacent and immediately upstream and downstream of the proposed development site.

5 Conclusion

31 Based on the results of the 2025 breeding kingfisher surveys, it can be concluded that there are no kingfisher breeding on or adjacent to the site.

32 Although no actively breeding birds of other species have been confirmed on site, it is probable that several green and amber-listed species are breeding on or adjacent to the site. Although there is potential for several of the five SCI species observed on site (i.e. cormorant, herring gull and mallard) to breed within the site, no evidence of breeding was observed.

Appendix 8.3 Invasive Species Management Plan

Invasive Species Management Plan

Clonliffe Lands, Drumcondra, Dublin 3.



June 2025

Prepared by: INVAS Biosecurity
Tel: +353876468609
Email: tomdonovan@invas.ie
Web: www.invasbiosecurity.ie

Rev	Date	Details	Prepared by	Checked by	Approved by
0	June 2025	IAPS Management	Tom Donovan (Director)	Dr. William Earle (Biosecurity manager)	Tom Donovan (Director)

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1. INTRODUCTION

At the request of Virtus Project Management (VPM), INVAS Biosecurity Ltd. (INVAS) was commissioned to carry out a survey and produce a Management Plan for the removal / control of the Invasive Alien Plant Species (IAPS) at the location of the former Holy Cross, Seminary, Drumcondra, Dublin 1. An initial survey of the site was carried out in 2021 and a further survey was carried out by INVAS personnel on 18th June 2025.

1.1. Project Background

It is intended to construct a mixed housing development in a number of phases at this site. The project will consist of the construction of several residential apartment complexes. Japanese knotweed (*Reynoutria japonica*) has been detected on the perimeters of the north west and south west boundaries of the site. To date no groundworks have taken place in either location.

1.2. Legal Requirements and Implications for Management

Japanese knotweed is subject to restrictions under Regulations 49 and 50 (the latter not currently commenced) of the European Communities (Birds and Natural Habitats) Regulations 2011 (SI No. 477), being listed in the Third Schedule (Part 1) of this legislative Act. Soil taken from a place that is infested with Japanese knotweed (vector material) is also restricted under Part 3 of this Third Schedule. The law relating to Japanese knotweed is primarily contained in Regulation 49 (2), which states that it is an offence to 'allow or cause to disperse' plants listed in the Third Schedule, of which Japanese knotweed is one. As such, any Japanese knotweed plant material or contaminated soil that is to be removed from an infested site can only be done so under a licence issued by the National Parks and Wildlife Service (NPWS).

1.3. Objectives

The aim of the survey was to identify all Invasive Alien Plant Species (IAPS) at this location, and to generate a site map for all IAPS using the GPS locations recorded. The management plan will provide a list of control options with recommendations for the most appropriate control methods for the site. The management plan will also outline biosecurity measures that must be established to prevent the spread of IAPS within and beyond their current distributions.

2. SURVEY RESULTS

2.1. Survey Details

The survey was conducted on the 18th[th] June 2025 by INVAS Biosecurity personnel. Survey points were recorded using a Garmin® GPSmap78 at a height of one meter. Points were recorded at 0.5-meter intervals around the perimeter of the infestation and where the accuracy of the survey was not impacted the interval spacing was increased. In some cases, points may have been taken along the extremities of the Japanese knotweed infestations due to dangerous terrain, inaccessibility of sites located on neighbouring property or due to overgrowth of vegetation other than Japanese knotweed. Digital photographs were taken at each site to show the full extent of the IAPS infestation at each location. Survey observations and photographs illustrating the IAPS infestation have been provided in the following sections of this document.

2.2. IAPS Distribution

Evidence of extensive Japanese knotweed growth was recorded at the north west perimeter (Plates 3, 4 & 5) of the site adjacent to Cian Park Industrial Units and a second stand was located to the perimeter bordering the Archbishops Residence grounds. Two plants were recorded growing further east along the headland bounding the river.

Himalayan balsam (*Impatiens glandulifera*) and Giant Hogweed (GH) (*Heracleum mantgazzianum*) were present along the banks of the river Tolka. There was previous evidence of three cornered leek on the west perimeter, however, due to the timing of the survey, it was not possible to confirm the extent the infestations of this species. These three species are also included in Third Schedule (Part 1).



Plate 3a: Japanese Knotweed plant locations at north west corner of site



Plate 3b: Japanese Knotweed plant locations adjacent to Archbishops Residence

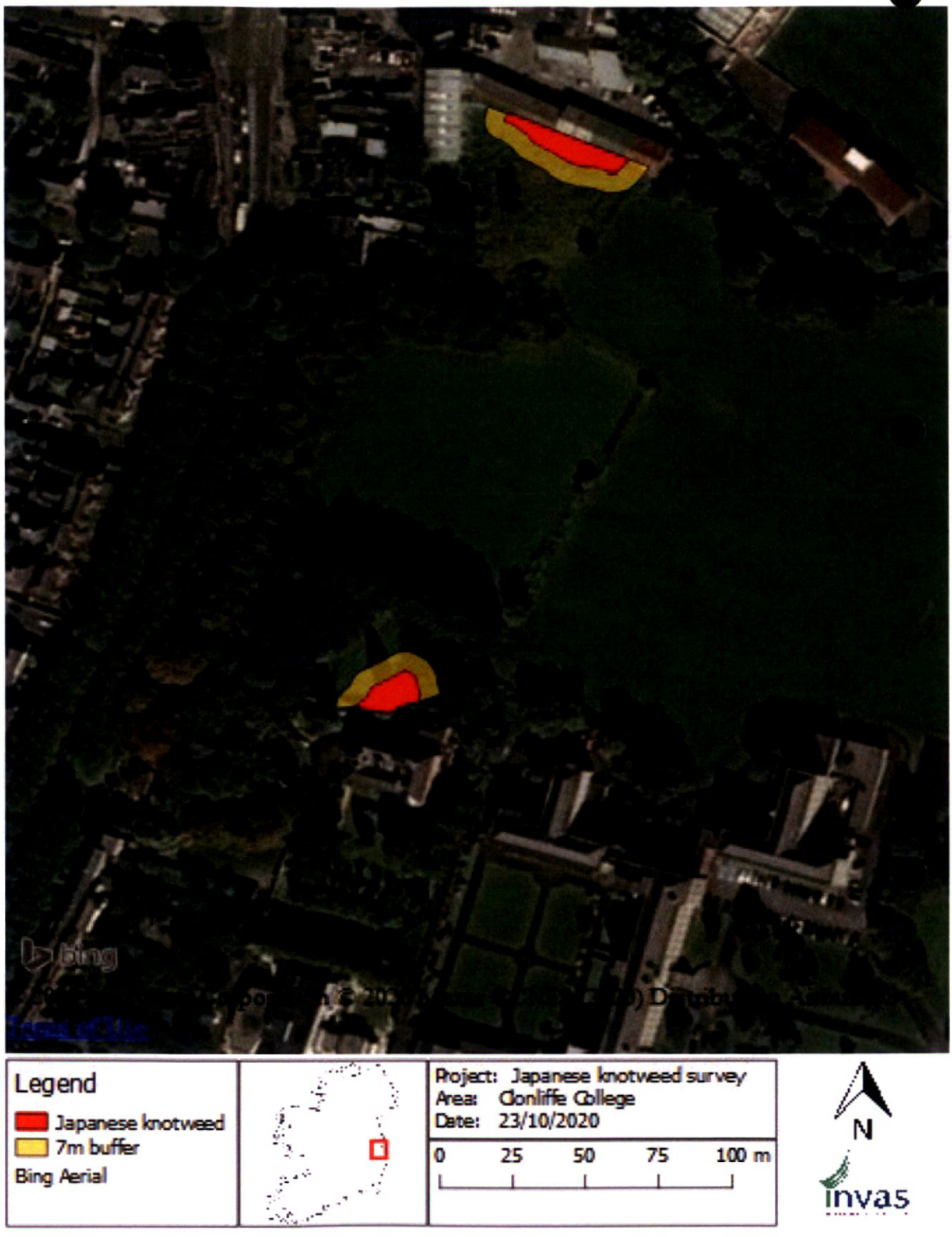


Plate 4: Extent of Japanese knotweed infestations.

SPECIES DESCRIPTIONS

2.3. Himalayan balsam

Himalayan balsam (Plate 5) is a non-native invasive riparian plant species that is widespread throughout the Republic of Ireland and Northern Ireland. An individual plant may produce as many as 2,500 seeds with its method of dispersal contributing towards its invasiveness. When seed pods have fully matured, they explosively split open, propelling the contents a few meters from the parent plant which, in large stands, can lead to densities of up to 6,000 seeds per square metre. Seeds can also float leading to dispersal throughout an infested watercourse. The plant species is frequently found as dense monocultures in riparian zones and moist woodlands or floodplains in close proximity to watercourses. Himalayan balsam becomes dominant through its rapid growth pattern with plants reaching up to 3 meters in height. It can outcompete native vegetation by shading leading to severe impacts on local biodiversity. When parent plants die back in winter, they leave riverbanks exposed and vulnerable to erosion. This can lead to siltation and the further dispersal of seeds downstream. (Plat**Plate 5.** Himalayan balsam at Clonliffe



Plate 5: Himalayan Balsam on Tolka at Clonliffe.

2.4. Giant hogweed

Giant hogweed (Plate 6) is a tall invasive herbaceous plant that can establish dense monocultures especially along riverbanks. Mature plants will flower just once after 2-4 years and can produce up to 50,000 seeds from large umbrella shaped seed heads. These are then dispersed primarily by wind and along watercourses. Giant hogweed can be distinguished from native species of hogweed such as cow parsley by its height (2-5 meters), the size of its foliage (up to 3 meters), and its hollow purple/red mottled stem. The large leaves are capable of outcompeting native vegetation through shading allowing giant hogweed to dominate an area once a few individuals have become established. By eliminating native vegetation on roadsides and riverbanks, the plant can also cause seriously damaging subsidence and biodiversity loss. When parent plants die back in winter, they leave riverbanks exposed and vulnerable to erosion. This can lead to siltation and the further dispersal of seeds downstream. Most importantly however, the weed poses a serious risk to human health. Giant hogweed produces a sap that can cause long lasting painful blisters on human skin when exposed to sunlight. The effects of these skin damage can persist for several years and often leave permanent scarring.



Plate 6. Giant hogweed on river bank at Clonliffe

2.5. Three-cornered leek

The Three-cornered leek (Plate 7) is a spring flowering bulb normally only observed in the first 6 months of the calendar year. In spring it can be easily identified by the sharply angled leaves and small bell like white flowers. When crushed they have a distinctly garlic aroma which sometimes leads to them being known by the name Three-cornered garlic. Bulbs are easily spread during groundworks, transporting this species to new areas on contaminated PPE, machinery and equipment.



Plate 7. Three cornered leek

2.6. Japanese knotweed

Japanese knotweed is a non-native and highly invasive perennial plant that spreads rapidly *via* rhizome growth and fragmentation. Only female plants have been recorded in Ireland and, although the plant can produce seeds, they rarely survive. The plant overwinters as an extensive and intricate underground rhizome matrix. The rhizome system may achieve a depth of 3 metres and can extend up to 7 metres from the visible parent plant. Japanese knotweed rhizomes have extremely high regenerative potential and a fragment as small as 1 cm in length can produce a new population. Rhizomes may remain dormant for many years.

The robust and extensive woody rhizomes of Japanese knotweed are capable of penetrating asphalt, cracked foundations, walls, land drainage works and other built structures, causing significant structural damage. By eliminating native vegetation on roadsides and riverbanks, the plant can also cause seriously damaging subsidence. Failure to manage Japanese knotweed would result in its spread and proliferation in the infested area.



Plate 8. Japanese knotweed

3. CONTROL / ERADICATION OPTIONS

3.1. Himalayan balsam control

One Himalayan balsam plant is capable of producing 2,500 seeds and since the dispersal of the plant is almost entirely by seeds it is vital to prevent the plant from flowering. To successfully eradicate Himalayan balsam, it is important to implement an integrated control program over a period of four years, as the seed remains viable in the seed bank for up to three years. Hand pulling plants in May/June, July/August and September prevents plants achieving maturity and seeding. Pulled plants should be broken to prevent the plant producing seed and can be left in situ. This program must be maintained over the following four years. Health and Safety concerns are of prime concern and proper PPE must be used by all operatives who are tasked with its eradication.

3.2. Giant hogweed

An application of systemic herbicide by should be made to all plants in May/June and this must be followed by monitoring in late June/July with follow-up treatments and removal of seed heads as required, to prevent plants achieving maturity and seeding. In the event of a plant flowering, the flower head should be cut off, sealed in a black bag and the remaining plant treated with a systemic herbicide. The cut seed heads must be disposed of in a licenced landfill. This program must be maintained over the following four years. Should the sap of Giant hogweed come into contact with the skin a phototoxic reaction can be activated by the ultraviolet rays of the sun within 15 minutes of contact. This can lead to severe burns and scarring. Blindness may occur if the sap gets into the eye. Health and Safety are of prime concern when dealing with this plant and the proper PPE is used by all operatives who are tasked with its eradication.

3.3. Control for Three-cornered leek

The Three-cornered leek is best managed using a combination of chemical and mechanical methods. Foliar herbicide treatment should be carried out using a glyphosate-based product (Round-up Biactive) at a rate of 5l/ha. Herbicide application must be carried out to the manufacturer's guidelines and by staff wearing suitable PPE and in possession of the relevant qualifications. Records of herbicide use must be kept in accordance with relevant legislation and will be retained after the treatment. Foliar herbicide application must be carried out when above ground vegetation has emerged. This is usually in early spring depending on weather conditions. Any subsequent regrowth will be treated with

glyphosate over a two-year period, until complete eradication is achieved. An eradication program of spot spraying and monitoring should be put in place to treat plants that have dispersed throughout the property.

It will be necessary to inspect the treatment site and any other possible areas of infestation for Three-cornered leek regrowth in the years following the control works to ensure that all of the infestation has been removed. Strict biosecurity protocols must be adhered to during herbicide and in all follow up surveys and treatments.

3.4. Control options for Japanese knotweed

Below is a description of the control options for Japanese knotweed outlining the suitability of each method in relation to this project. For the clients preferred control option, a method statement outlining the specific actions for each stage of the operation will be provided.

Any Japanese knotweed plant material or contaminated soil that is to be removed from an infested site can only be done so under a licence issued by the National Parks and Wildlife Service (NPWS).

3.4.1. Excavation and disposal off-site to a Licenced Landfill

This will require site operations to excavate all Japanese knotweed plants and associated contaminated soil. The soil and plant material will be carefully excavated and loaded onto bio secure trucks that will transport the contaminated material to an appropriate licenced landfill location. Strict biosecurity protocols must be adhered to at all times during this process. It is deemed prudent to remove soil in the infested areas to a depth of at least 1.8 metres and 7 metres from the last visible plant in order to be certain that no rhizomes remain in the soil following excavation operations. The material will be disposed of at a licenced landfill subject to acquiring an NPWS licence. Demarcation and securing of the area of Japanese knotwood along with warning and information signage is required. Detailed records of all operations will be maintained by throughout the project. This will specifically focus on the exact areas excavated, the method of excavation, the depth of excavation, the volume of material (as numbers of truck loads) removed, an inventory of personnel and equipment entering and leaving the Japanese knotweed demarcated areas, and the operation of cleaning and disinfection facilities provided at each area. Any problems encountered during the operation will also be recorded.

3.4.2. Excavation and disposal on-site by Deep Burial.

Deep burial in an on-site containment cell can be used in certain scenarios. The site selection should take into account services, landscaping, transport routes, possibility of erosion and the future use of the site. Excavation must remove all Japanese knotweed rhizome material and should be carried out in the same manner as for the 'Excavation and disposal off-site' method. The distance for contaminated material to be transported throughout the site should be minimised with the deep burial site located as close as possible to the site of infestation. If the burial site is located in a different area to the infestation biosecurity measures must be put in place including decontamination facilities and designated work and haulage areas. Prior to excavation, the invasive plant material should be treated with a non-persistent herbicide and left in situ for the herbicide's prescribed "active" period. The disposal site will require the construction of a containment cell made from root barrier membrane. Once filed with Japanese knotweed contaminated material the cell should be sealed and then buried beneath 5 metres of inert backfill or uncontaminated soil. This method must map the location of the containment cell but will not require an ongoing management plan.

3.4.3. Excavation and Disposal On-Site by Bunding

Disposal of Japanese knotweed contaminated waste in a Licenced Landfill or Deep Burial On-Site can be expensive. An alternative method may be to use a bund where suitable land is available. A bund is an area of ground that is cordoned off and where the contaminated soil is placed on top of a root barrier membrane, to a depth not exceeding 1 metre. The bund will be constructed using a proprietary root barrier membrane, which is a reinforced, impermeable, polyethylene membrane and should have a life expectancy of at least 50 years. The aim of this disposal method is to isolate contaminated soil and encourage Japanese knotweed regrowth, which can then be treated with approved herbicides. An excavator will be used to remove the soil and plant material from the infested areas to a depth of at least 1.8 metres below ground level. The soil and plant material will be carefully loaded onto bio secure trucks that will transport the material to the appropriate location on the bund site. Strict biosecurity protocols must be adhered to at all times during this process and a long-term herbicide management plan must be put in place. A protective fence will be placed around the bund and fitted with appropriate warning or information signage. This fence may be put in place before or after the bund construction operation. Access to the completed bund must be restricted to authorised persons. An ongoing management plan (herbicide/further screening) would also be required for this option.

3.4.4. Excavation and soil screening

Screening is a process that is offered by some companies in the UK. This method involves excavating all of the contaminated soil before passing it through a screening machine that extracts the heavy rhizomes. The second phase of this process will pass the soil along a belt where the remaining fragments are extracted by hand. This method can greatly improve the site and is far less intrusive as there is no transfer of soil from the infested site. However, this method does not carry a guarantee of eradication and can be a time consuming, expensive process. An eradication guarantee cannot be provided with this method as all minor rhizome fragments may not be removed from the soil. This may result in the regrowth of rhizomes throughout the site which would necessitate further treatment. An ongoing management plan (herbicide/further screening) would also be required for this option.

3.4.5. Foliar herbicide treatment

Due to the extent of underground rhizome growth and its highly invasive capacity, control of Japanese knotweed following herbicide treatment in a single season is rarely possible. It generally takes three to four seasons of herbicidal treatment to deplete the rhizome reserves and to effectively control the target vegetation. Treatment using a glyphosate-based herbicide has proved to be highly effective. Herbicide application must be carried out to the manufacturer's guidelines and by staff wearing suitable PPE and in possession of the relevant qualifications. Records of herbicide use must be kept in accordance with relevant legislation and will be retained after each treatment. It will be necessary to inspect the treatment site and any other possible areas of infestation for any Japanese knotweed growth for the following three to four years. This will be carried out in June/July each year with any required follow up herbicide treatment taking place between August and October of the same year. Herbicide treatment will follow the same process as outlined above. Strict biosecurity protocols will be adhered to in all follow up surveys and treatments.

3.4.6. Stem injection of herbicide

All Japanese knotweed should be treated by injection of a glyphosate-based herbicide (Roundup® Gold) directly into each stem between the first and second node. An inert dye should be mixed with the solution to ensure all plants at the site are treated. Stem injection should be carried out at a ratio of 5:1 using a purpose designed stem injection kit. Stem injection is considered equally effective as foliar herbicide application in the treatment of Japanese knotweed (Jones et al. 2018). Injection is however more labour intensive and time consuming requiring each individual stem to be treated. Stem injection

may be an appropriate treatment method in sensitive habitats or other areas where foliar treatment is not suitable. Treatment should be carried out between mid-August to mid-October when plants have started to flower ensuring an effective kill is achieved during this time in the growth season.

3.4.7. Cut/fill with herbicide

This is a targeted herbicide application method used to treat plants in sensitive habitats or areas near watercourses. Japanese knotweed stems are cut between the first and second node before the remaining stem is filled with a glyphosate-based herbicide solution. This allows individual plants to be targeted without any impact on non-target vegetation in the area. All cut vegetation must be stored on an impermeable membrane or container and allowed to desiccate before being removed under licence to a Japanese knotweed licenced disposal facility.

3.4.8. Spot wipe/paint with herbicide

This is a targeted herbicide application method used to treat plants in sensitive habitats or areas near watercourses. This allows individual plants to be targeted without any impact on non-target vegetation in the area.

3.4.9. Leave in situ.

If the footprint of the proposed development does not impinge on the infested sites and that these sites can be isolated from the development works as well as from the completed works, it would be an option to isolate these areas by installing vertical root barrier membrane and leave the Japanese knotwood in the ground. It may also be possible to include the sites as a component of an overall biodiversity plan.

The sites would be fenced off or isolated from the development and a management plan implemented that would include annual monitoring and treatment of regrowth if required. The sites would also be recorded as JK infested sites.

Himalayan balsam only – Hand Removal

Manual control methods can be highly successful in the management of Himalayan balsam. Two treatments should be carried out before plants have produced explosive seed pods between early May and July (dependent on growth conditions). All seedlings and established plants should be pulled by hand ensuring that the root ball has been completely removed from the soil. The stem between the root

ball and first node should then be crushed or completely severed to prevent regrowth. Flowering structures should be removed from the plant and the remaining stem should be broken into several parts. All plant material should be piled away from any nearby watercourses and covered with biodegradable jute matting. Manual removal should only be carried out by staff/volunteers that understand the eradication process and wearing suitable PPE. It should also be noted that for the long-term control of this weed the treatment process needs to be carried out on a catchment wide basis.

RECOMMENDATIONS FOR THE ERADICATION OF JAPANESE KNOTWEED

Below is a description of the control options for the eradication of the Japanese knotweed on the Archbishops residence site with a table outlining the suitability of each method in relation to this project. This will provide guidance to for the selection of an appropriate control method for the Japanese knotweed infestations. For the clients preferred control option, a method statement outlining the specific actions for each stage of the operation will be provided.

1.1. Control/eradication options for Japanese knotweed

Treatment method	Suitability (Yes/No)	Why	Expected start date
3.4.1 Excavation and disposal off-site to Licensed Landfill	Yes	Guaranteed eradication. Most expensive option	N/A
3.4.2 Excavation and deep burial on-site	Yes	Dependent on bedrock levels, work schedules and land availability on-site.	N/A
3.4.3 Excavation and bunding on-site	Yes	This will be dependent on land availability on-site.	N/A
3.4.4 Excavation and soil screening	No	No guarantee of eradication. Ongoing monitoring and treatment required	N/A
3.4.5 Foliar herbicide treatment	Yes	If development footprint does not impinge on infested areas. May be suitable treatment around existing trees.	N/A
3.4.6 Stem injection of herbicide	No	JK canes not developed as a consequence of previous treatments	N/A
3.4.7 Cut/fill with herbicide	No	JK canes not developed as a consequence of previous treatments	N/A
3.4.8 Spot wipe/paint with herbicide	No	JK not developed as a consequence of previous treatments	N/A
3.4.9 Leave in situ monitor and treat	Yes	If development footprint does not impinge on infested sites	N/A

4. SUMMARY

Herbicide treatment of Japanese knotweed offers excellent control, however, it does not guarantee eradication, as the rhizomes of the plant may lie dormant for many years only to regrow 10/20 years later. This is evidenced by viable rhizomes exposed during the slit trench survey (2020) at the southern site. (Plate 5).

The long-term success of programs to eradicate Giant hogweed and Himalayan balsam on the Clonliffe stretch of the river is dependent on control works being implemented up river by the relevant authorities, as the seeds of these plants will continue to flow down river and continue to infest river banks.

It is recommended however, that control programs are instigated for these species, because if left uncontrolled the riverbanks will be destabilised and secondly Giant hogweed presents a considerable health hazard

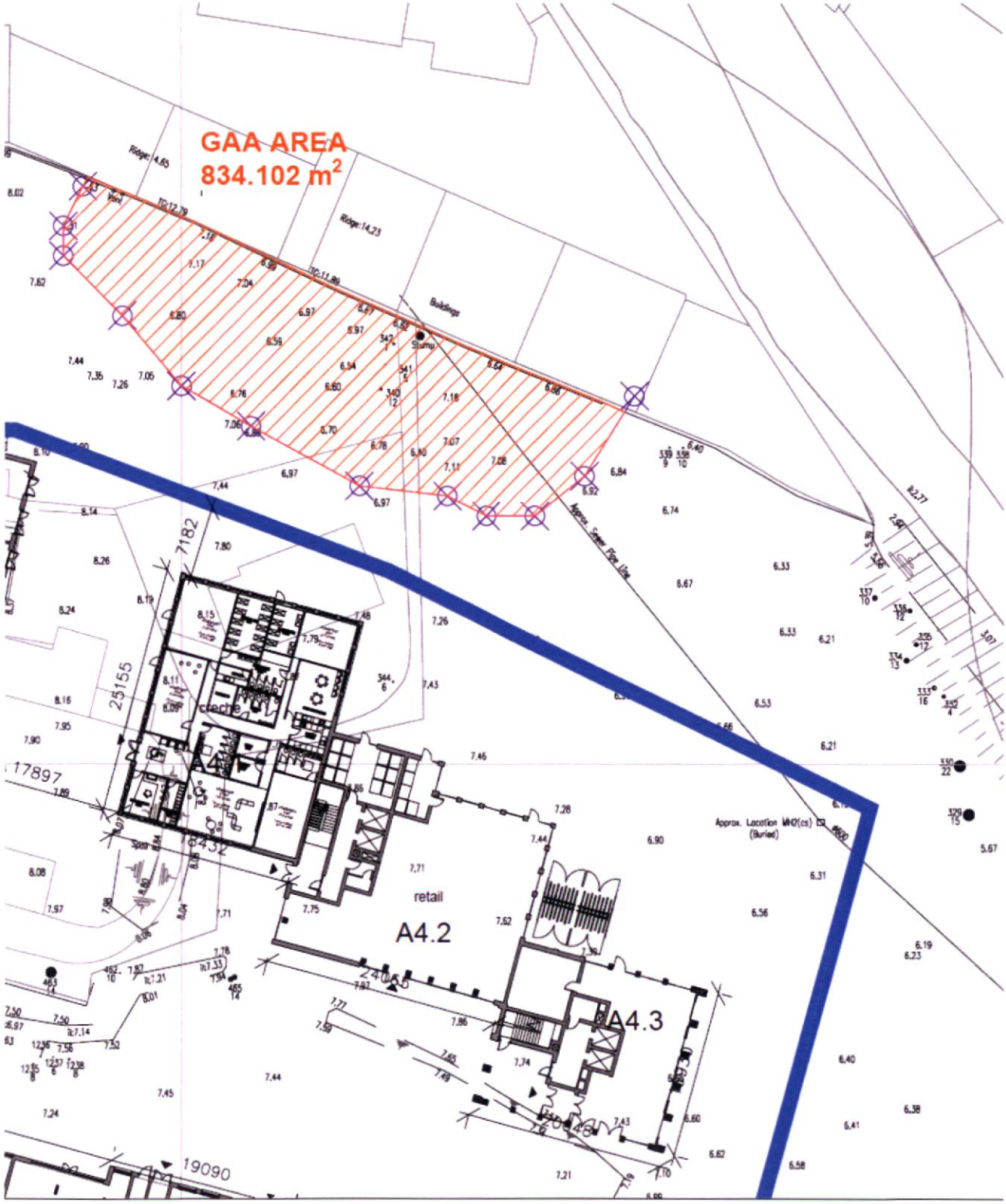


Plate 10: GPS Coordinates marking extent of JK infestation at north west corner

4.1. North West site.

Evidence of strong, viable and mature rhizomes were recorded on this site indicating mature growth. However, if this area of open ground is excavated to the inside wall of slit trench and disposed off site in a licenced landfill, the Japanese knotweed will be eradicated from this site up to the footings of the adjacent premises in Cian Park Industrial Park.

It is probable that the rhizomes will have penetrated the foundations of these structures. It is likely that underpinning of the foundations would be required in order to excavate up to the boundary of this area and this scope of works would need to be determined by a structural engineer. It would also be necessary to install a vertical root barrier membrane at the base of the foundations of these buildings to prevent encroachment of the rhizomes back onto the subject site. The area between the root barrier and the foundations of the industrial buildings will require to be monitored and treated over a minimum of five years.

It is estimated that the area to be excavated including buffer zone is 834 sq m.
The projected minimum depth of the excavation is 1.8 meters.
Anticipated volume of material to be excavated is 1,480 cubic meters.

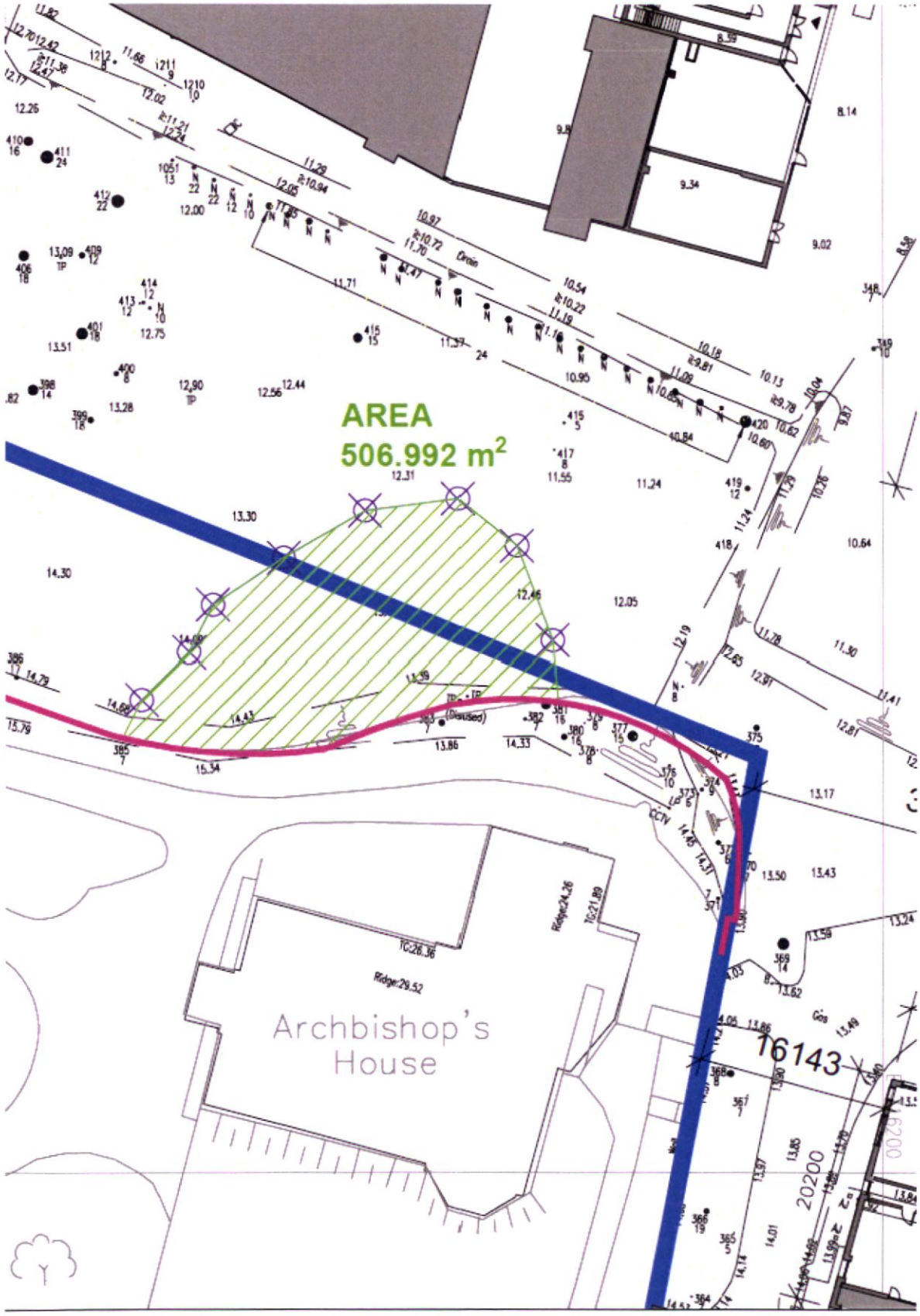


Plate 11: GPS Coordinates marking extent of JK infestation at Archbishops Residence

4.2. Archbishops Residence site.

The investigation in this location did not eztend beyond the existing boundary of the site so it is probable that the rhizomes will have penetrated the beyond the boundary with the Archbishops Residence and possibly under mature trees that are scheduled to be retained. In order to retain the trees it will be necessary to implement an ongoing monitoring and treatment program to ensure that any emergent growth within the grounds of the Archbishops residence's will be controlled. Excavation of the area of open ground between the boundary and the inner wall of the slit trench will ensure that the Japanese knotweed in this area will have been eradicated. It would also be necessary to install a vertical root barrier membrane at the line of the boundary between the two premises to prevent encroachment of the rhizomes back onto the subject site

It is estimated that the area to be excavated including buffer zone is 507 sq m.
The projected minimum depth of the excavation is 1.8 meters.
Anticipated volume of material to be excavated is 936 cubic meters.

5. BIOSECURITY

A number of high impact aquatic and riparian IAS are currently present in Ireland and most are continuing to spread aggressively. Prominent among the terrestrial IAPS are: Japanese knotweed (*Reynoutria japonica*), Giant knotweed (*Reynoutria sachalinensis*), Bohemian knotweed (*Reynoutria x bohemica*), Giant hogweed (*Heracleum mantegazzianum*) and Himalayan balsam (*Impatiens glandulifera*). All of the above are listed in the Third Schedule (Parts 1 and 2) of the Habitats Directive (S.I. 477/2011) and some are included among the list of 49 EU IAS of Union Concern (http://ec.europa.eu/environment/nature/pdf/IAS_brochure_species.pd) in the EU Invasive Alien Species Regulations (1143/2014).

The ecological effects of IAS are often irreversible and, once established, they are extremely difficult and costly to control and eradicate; hence, the urgent need to prevent their introduction and spread. Prevention is clearly more cost-effective and less environmentally damaging than long-term containment, control or eradication. The most effective measure to reduce introductions and halt spread of IAS in aquatic situations is to promote and implement good biosecurity practice.

6. REFERENCES

The following guidance documents were consulted for the preparation of this report.

- *ISI 2012. Allium triquetrum. Risk analysis and prioritisation access database: Invasive Species Ireland. NATIONAL BIODIVERSITY DATA CENTRE. 2014Inland*
- *Fisheries Ireland guidance regarding aquatic invasive species control. (http://www.fisheriesireland.ie/Research/invasive-species.com)*
- Invasive Species Ireland guidance (http://invasivespeciesireland.com)
- *Irish Water (2016) Information and Guidance Document on Japanese knotweed*
- *NPWS (2011) Actions for Biodiversity 2011-2016.*
- *EA (2006) The Knotweed Code of Practice. Managing Japanese knotweed on development sites*
- *NRA (2010) Guidelines on management of noxious weeds and non-native invasive plant species on national roads.*
- *Stokes et al. (2004) Invasive species in Ireland*
- *Dept Of Environment (2013) An Invasive Alien Species Strategy for N. Ireland*

Appendices

Table 1: Survey details for the site at the Archbishop's residence.

Contactor name	INVAS Biosecurity
Surveyor name	Tom Donovan
Survey date	18-6-2025
County	Dublin
Area	*c.* 5h
Site ID	Archbishops residence
Risk assessment (Potential hazards)	Slipping/falling
Health and safety (PPE required)	Safety boots – Hi Viz - Safety gloves – Hard hat
Species recorded	Japanese knotweed, Giant hogweed, 3 cornered leek, Himalayan balsam
GPS details	53.365572 0.253973
Area located	2 JK stands on fallow ground to rear of Archbishops residence Giant hogweed on river bordering north end of site. Himalayan balsam infestation runs along the entire right bank. Three cornered leek infestsions alon west perimeter.
Site details	Proposed development site
Pervious treatment/Interference	Herbicide treatment has previously been carried out by grounds maintenance contractor.
Infestation beyond fence line	Industrial buildings border the JK infestation at the north site. Himalayan balsam and Giant knotweed infestations along both banks of river.
Photos	Yes
Is the site within or proximate to an ecologically sensitive area (SAC/SPA)	No

Daily Biosecurity Record Sheet				
Site ID	Copies to be supplied by enabling contractor			
Project details	This depends on the type of works			
Biosecurity supervisor				
Date				
Infestation /works boundary in place (Yes/No)		Vehicle access demarcated (Yes/No)		
Staff access/egress decontamination in place (Yes/No)		Vehicle/equipment decontamination in place (Yes/No)		
Vehicle (description/reg)	Activity	Time decontaminated	Picture	Driver signature
Notes/Comments:				

Table 2: Decontamination record sheets for the JK infestation at Archbishop's residence.

Signed:_____ **Date:**_____

Table 3: Schedule of activities for the site at Archbishop's residence

Schedule of Activities			
Site ID	Copy to be supplied by INVAS		
Project details			
Biosecurity supervisor			
Date			
	Phase	Date	Additional comments
Site survey and development of Management Plan	1		
Establish and implement biosecurity protocol	2		
Toolbox talks to appropriate staff	3		
Implementation of Management Plan	4		
Decontamination of vehicles and equipment	5		
Sign off	6		



INVAS Biosecurity
Tel: +353872519966
Email: tomdonovan@invas.ie
Web: www.invasbiosecurity.ie

Company Registration Number: 509929
VAT Number: Ie 98205960

Appendix 9.1 Ground Investigations Report

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

Catherinestown House,
Hazelhatch Road,
Newcastle,
Co. Dublin.
D22 YD52

Tel: 01 601 5175 / 5176
Email: info@gii.ie
Web: www.gii.ie

Ground Investigations Ireland

Project Calvary

Virtus Project Management

Ground Investigation Report

July 2020

Directors: Fergal McNamara (MD), James Lombard, Conor Finnerty, Aisling McDonnell & Barry Sexton
Ground Investigations Ireland Limited | Registered in Ireland Company Regsitration No.: 405726

www.gii.ie

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

Catherinestown House,
Hazelhatch Road,
Newcastle,
Co. Dublin.
D22 YD52

Tel: 01 601 5175 / 5176
Email: info@gii.ie
Web: www.gii.ie

DOCUMENT CONTROL SHEET

Project Title	Project Calvary
Engineer	Barrett Mahony Consulting Engineers
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Rev.	Status	Author(s)	Reviewed By	Approved By	Office of Origin	Issue Date
B	Final	J Cashen	S Kealy	C Finnerty	Dublin	29 October 2020
A	Final	J Cashen	S Kealy	C Finnerty	Dublin	15 July 2020

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.

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

Catherinestown House,
Hazelhatch Road,
Newcastle,
Co. Dublin.
D22 YD52

Tel: 01 601 5175 / 5176
Email: info@gii.ie
Web: www.gii.ie

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GROUND INVESTIGATIONS IRELAND
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Catherinestown House,
Hazelhatch Road,
Newcastle,
Co. Dublin.
D22 YD52

Tel: 01 601 5175 / 5176
Email: info@gii.ie
Web: www.gii.ie

APPENDICES

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Appendix 6	Insitu Plate Bearing Test Records
Appendix 7	Laboratory Testing
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1.0 Preamble

On the instructions of Barrett Mahony Consulting Engineers, a site investigation was carried out by Ground Investigations Ireland Ltd., between February and June 2020 at the site of the proposed residential development in Drumcondra, Dublin 3. A further visit to the site was carried out in October 2020 to complete another sequence of rotary boreholes.

2.0 Overview

2.1. Background

It is proposed to construct a new residential development with associated services, access roads and car parking at the proposed site. The site is the Holy Cross College lands at Clonliffe Road, Drumcondra, Dublin 3. It currently comprises of a number of protected buildings set in a mature landscaped area. The proposed development comprises of multiple residential apartment blocks ranging in height from 4 to 12 storeys and single level basements. The proposed construction is envisaged to consist of conventional foundations and pavement make up with some local excavations for services, plant and basements.

2.2. Purpose and Scope

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

- Visit project site to observe existing conditions
- Carry out 14 No. Trial Pits to a maximum depth of 3.20m BGL
- Carry out 10 No. Foundation Inspection Pits to determine existing foundation details
- Carry out 3 No. Soakaways to determine a soil infiltration value to BRE digest 365
- Carry out 20 No. Cable Percussion boreholes to a maximum depth of 7.20m BGL
- Carry out 19 No. Rotary Core Boreholes to a maximum depth of 23.30m BGL
- Carry out 9 No. Insitu Plate Bearing Test for pavement design
- Installation of 4 No. Groundwater monitoring wells
- Chemical & Environmental Laboratory testing
- Geotechnical 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 subsurface 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 5 Tonne Tracked 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.

3.3. 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 3 of this Report.

3.4. 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 4 of this Report.

3.5. 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.

3.6. 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.

3.7. Surveying

The exploratory hole locations have been recorded using a Trimble R10 GNSS System which records the coordinates and elevation of the locations to ITM as required by the project specification. The coordinates and elevations are provided on the exploratory hole logs in the appendices of this Report.

3.8. Groundwater Monitoring Installations

Groundwater Installations were installed upon the completion of the rotary boreholes to enable sampling and the determination of the equilibrium groundwater level. The typical groundwater monitoring installation

consists of a 50mm 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. Dataloggers are then placed in the standpipes to record groundwater level and pressure over a period of time. The installation details are provided on the exploratory hole logs in the appendices of this Report.

3.9. 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 6 of this Report.

3.10. Laboratory Testing

Samples were selected from the exploratory holes for a range of environmental and geotechnical testing to assist in the classification of soils and to provide information for the proposed design.
Environmental & Chemical testing as required by the specification, including the Rilta Suite, pH and sulphate testing was carried out by Element Materials Technology Laboratory in the UK. The Rilta suite testing includes both Solid Waste and Leachate Waste Acceptance Criteria.
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 variable across the site and are generally comprised;

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

TOPSOIL: Topsoil was encountered in the majority of the exploratory holes and was present to a maximum depth of 0.90m BGL. Tarmacadam or Concrete surfacing was present typically to a depth of 0.20m BGL in all the foundation pits and at the location of BH07 and BH14.

MADE GROUND: Made Ground deposits were encountered from ground level or beneath the Topsoil/Surfacing and were present to a variable depth of between 0.15m and 2.00m BGL. These deposits were described generally as *brown slightly sandy slightly gravelly CLAY with some cobbles and boulders and contained occasional fragments of concrete, brick, glass, ceramic, timber, animal bone and plastic.*

COHESIVE DEPOSITS: Cohesive deposits were encountered beneath the Made Ground and were described typically as *brown slightly sandy gravelly CLAY with occasional cobbles and boulders* overlying a *stiff dark grey slightly 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 to stiff or stiff below 2.00m BGL in the majority of the exploratory holes. These deposits had some, occasional or many cobble and boulder content where noted on the exploratory hole logs.

GRANULAR DEPOSITS: The granular deposits were encountered beneath the cohesive deposits at TR1 & TR2. These deposits were typically described as *Brown/grey clayey sandy subangular to subrounded fine to coarse GRAVEL with some subangular to subrounded cobbles and occasional boulders*. At the location of BH05 and BH06, the drillers described SAND and GRAVEL deposits within and below the cohesive deposits at depth. The secondary sand/gravel and silt/clay constituents varied across the site and with depth while occasional some or many cobble and boulder content were also present where noted on the exploratory hole logs.

Based on the SPT N values the deposits are typically dense at the location of BH05 and BH06. It should be noted that many 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.

BEDROCK: The rotary core boreholes recovered interbedded weak to medium strong *MUDSTONE interbedded with LIMESTONE* in the rotary core boreholes. This is typical of the Lucan Formation, which is noted on the geological mapping of the proposed site. The depth to rock varies from 12.15m BGL in RC02A01, to a maximum of 19.60m BGL in BH05. No rock was found to a depth of between 15m to 15.80m BGL in BH06, BH14, RC3A, RC6A, RC7A, RC8A, RC10A, RC12A and RC14A.

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 BH01, BH05, BH06, BH14 and BH17 to allow the equilibrium groundwater level to be determined. Dataloggers have been placed in each standpipe, and their data will be downloaded and placed in a revision of the final report. The groundwater monitoring will be included in Appendix 8 of the final Report.

4.3. Laboratory Testing

4.3.1. 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.

4.3.2. Environmental Laboratory Testing

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

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

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

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

The allowable bearing capacities are outlined in Table 1 below and are recommended for conventional strip or pad foundations to permit the foundation assessment. Where 350 kN/m^2 is advised, a settlement assessment should be carried out to ensure the structure can deal with the potential settlement, total and differential due to this increased loading. The floor slab is recommended to be suspended where the depth of Made Ground is greater than 0.9m or where soft deposits are present.

Allowable Bearing Capacities (ABC) - Borehole Locations								
Shallowest Practical Depth			**Depth to 250 kN/m2**			**Depth to 350 kN/m2**		
Exploratory Hole No.	ABC kN/m2	Depth m BGL	Exploratory Hole No.	ABC kN/m2	Depth m BGL	Exploratory Hole No.	ABC kN/m2	Depth m BGL
BH01	250	2.2	BH01	-	-	BH01	350	3.0
BH02	250	1.8	BH02	250	1.3	BH02	350	3.1
BH03	200	2.0	BH03	250	2.8	BH03	350	4.0
BH04	250	3.0	BH04	250	3.0	BH04	350	3.5
BH05	250	3.0	BH05	250	3.2	BH05	350	4.0
BH06	200	3.0	BH06	250	3.5	BH06	350	4.0
BH07	350	4.0	BH07	-	-	BH07	350	4.0
BH08	200	2.0	BH08	250	3.3	BH08	350	4.0
BH09	200	2.0	BH09	250	3.6	BH09	350	4.0
BH10	100	3.0	BH10	250	4.0	BH10	350	4.5
BH11	200	3.3	BH11	250	3.3	BH11	350	4.0
BH12	200	2.0	BH12	250	2.8	BH12	350	4.0
BH13	200	2.0	BH13	250	3.0	BH13	350	4.5
BH14	100	2.0	BH14	250	3.0	BH14	350	4.0
BH15	100	2.0	BH15	250	3.2	BH15	350	4.0
BH16	200	2.0	BH16	250	3.0	BH16	350	4.0
BH17	200	1.9	BH17	250	2.3	BH17	350	3.5
BH18	125	2.3	BH18	250	5.3	BH18	350	8.0
BH19	150	1.0	BH19	250	2.0	BH19	350	5.0
BH20	100	1.0	BH20	250	3.0	BH20	350	5.0
RC03A	150	5.0	RC03A	250	6.5	RC03A	350	8.0
RC04A	100	2.0	RC04A	250	3.5	RC04A	350	6.0
RC05A	150	2.0	RC05A	250	5.0	RC05A	350	8.0
RC15A	125	2.3	RC15A	250	5.3	RC15A	350	8.0
					350 kN/m2 - subject to settlement assessment			

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.

Alternatively, 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. The floor slab is recommended be suspended and also supported on the building piles.

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.

5.3. External Pavements

The proposed pavements are recommended to be designed in accordance with the CBR test results included in the Appendixes 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 should be consulted when determining the most appropriate construction methods for excavations. 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.

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

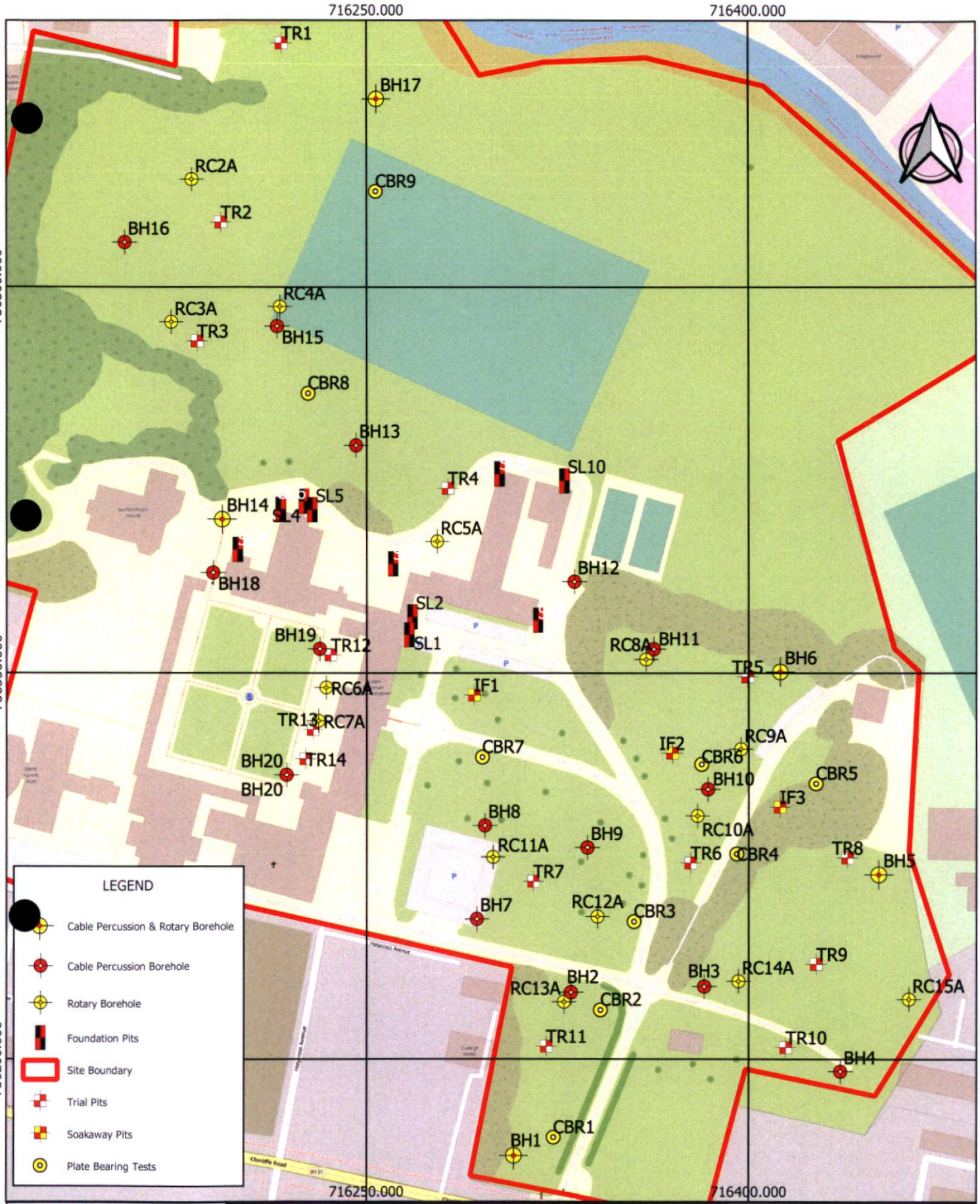
The environmental testing completed during the ground investigation is reported under the cover of a separate GII Waste Classification Report.

5.5. Soakaway Design

Infiltration rates of f = 4.448 x 10^{-6} m/s and 4.933 x 10^{-6} m/s respectively were calculated for the soakaway locations IT02 and IT03. At the location of IT01 the water level dropped too slowly to allow calculation of 'f' the soil infiltration rate. This location is therefore not recommended as suitable for soakaway design and construction.

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



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

Client: VIRTUS

Project Title:
Project Calvary

Drawing Title:
Figure 1 Site Location

GII Project Reference:
9363-01-20

0 20 40 60 m

Drawn By:
SK

Date:
06/03/2019

APPENDIX 2 – Trial Pit Records

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Site Project Calvary			**Trial Pit Number** TR1
Machine : 5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 3.00m X 0.40m X 2.40m	**Ground Level (mOD)** 7.89	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716216.7 E 736595.2 N	**Dates** 12/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	ES				(0.30)	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks and ceramic		
				7.59	0.30	Soft brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles and boulders		
					(0.60)			
				6.99	0.90	Brown/grey clayey sandy subangular to subrounded fine to coarse GRAVEL with some subangular to subrounded cobbles and occasional boulders		
1.00 1.00-2.40	B ES				(0.60)			
				6.39	1.50	Grey slightly clayey sandy subangular to subrounded fine to coarse GRAVEL with some subangular to subrounded cobbles and occasional boulders		
2.00	B				(0.90)			
				5.49	2.40	Complete at 2.40m		

Plan

Remarks

No groundwater encountered
Trial pit unstable; side walls collapsed
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.TR1

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Site Project Calvary			**Trial Pit Number** TR2
Machine : 5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 3.00m X 0.40m X 2.40m	**Ground Level (mOD)** 7.15	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716193.2 E 736525.1 N	**Dates** 12/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	ES				(0.20)	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks and ceramic		
				6.95	0.20	Soft brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
					(1.00)			
1.00 1.00-2.40	B ES			5.95	1.20	Firm brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
					(0.40)			
			seepage(1) at 1.60m.	5.55	1.60	Brown clayey sandy subangular to subrounded fine to coarse GRAVEL with some subangular to subrounded cobbles and occasional boulders (view obstructed by groundwater)		▽1
2.00	B		fast ingress(2) at 2.00m.		(0.80)			▽2
				4.75	2.40	Complete at 2.40m		

Plan

Remarks

Groundwater seepage at 1.60m BGL
Second groundwater strike at 2.00m BGL; fast ingress
Trial pit unstable; side walls spalling
Terminated at 2.40m BGL due to groundwater ingress
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.TR2

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Site Project Calvary			**Trial Pit Number** TR3
Machine : 5 Tonne Tracked Excavator **Method** : Trial Pit	**Dimensions** 3.00m X 0.40m X 3.00m	**Ground Level (mOD)** 9.71	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716184.1 E 736478.5 N	**Dates** 12/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	ES				(0.25)	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks and ceramic		
				9.46	0.25	Soft to firm brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
					(0.55)			
				8.91	0.80	Firm brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
1.00 1.00-3.00	B ES		seepage(1) at 1.20m.		(1.00)			▽1
				7.91	1.80	Firm to stiff brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
2.00	B				(0.70)			
				7.21	2.50	Stiff brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
					(0.50)			
3.00	B			6.71	3.00	Complete at 3.00m		

Plan

Remarks

Groundwater seepage at 1.20m BGL
Trial pit unstable; side walls spalling
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.TR3

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Site Project Calvary			**Trial Pit Number** TR4
Machine : 5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.50m X 0.40m X 3.00m	**Ground Level (mOD)** 9.34	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716282.3 E 736421.6 N	**Dates** 12/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-2.00	ES			9.24	(0.10) 0.10	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks and ceramic		
						MADE GROUND: Brown/dark grey slightly sandy slightly gravelly Clay with occasional cobbles and boulders, and fragments of bricks, mortar, ceramic pipe and shells		
1.00	B				(1.90)			
2.00	B			7.34	2.00	Soft to firm brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
2.00-3.00	ES				(1.00)			
3.00	B			6.34	3.00	Complete at 3.00m		

Plan

Remarks

No groundwater encountered
Trial pit unstable; side walls spalling
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.TR4

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Site Project Calvary			**Trial Pit Number** TR5
Machine : 5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.50m X 0.40m X 3.00m	**Ground Level (mOD)** 8.68	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716399.6 E 736348.2 N	**Dates** 12/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.10	ES			8.58	(0.10) 0.10	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks and ceramic		
					(1.00)	MADE GROUND: Brown/dark brown slightly sandy slightly gravelly Clay with some bricks, mortar, timber and animal bone		
1.10	B			7.58	1.10	Firm brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
1.10-3.00	ES				(0.40)			
			seepage(1) at 1.50m.	7.18	1.50	Firm brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles and granular lenses		▽1
2.00	B				(1.10)			
				6.08	2.60	Firm to stiff brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles and granular lenses		
					(0.40)			
3.00	B			5.68	3.00	Complete at 3.00m		

Plan

Remarks

Groundwater seepage at 1.50m BGL
Trial pit unstable; side walls spalling
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.TR5

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Site Project Calvary			**Trial Pit Number** TR6
Machine : 5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.80m X 0.40m X 3.00m	**Ground Level (mOD)** 8.65	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716377.3 E 736275.7 N	**Dates** 11/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.10	ES				(0.20)	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks and ceramic		
				8.45	0.20	MADE GROUND: Dark brown/grey slightly sandy slightly gravelly Clay with some bricks, mortar, scrap metal and timber		
					(0.90)			
			seepage(1) at 0.80m.					▽1
1.10-3.00	ES			7.55	1.10	Firm light brown mottled grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
1.50	B				(0.70)			
				6.85	1.80	Firm brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles and granular lenses		
			fast ingress(2) at 2.30m.					▽2
2.50	B				(1.20)			
				5.65	3.00	Complete at 3.00m		

Plan

Remarks

Groundwater seepage at 0.80m BGL
Second groundwater strike at 2.30m BGL; fast ingress
Trial pit unstable; side walls spalling
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.TR6

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Site Project Calvary			**Trial Pit Number** TR7
Machine : 5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.50m X 0.40m X 3.20m	**Ground Level (mOD)** 10.14	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716315.8 E 736268.6 N	**Dates** 11/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	ES				(0.30)	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks and ceramic		
				9.84	0.30	Soft to firm brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
					(0.70)			
1.00	B			9.14	1.00	Soft to firm brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles and occasional granular lenses		
1.00-2.00	ES							
			seepage(1) at 1.40m.		(0.90)			▽1
				8.24	1.90	Firm brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles		
2.00	B				(0.30)			
				7.94	2.20	Firm to stiff brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles		
			seepage(2) at 2.50m.		(0.70)			▽2
				7.24	2.90	Stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles and occasional boulders		
3.00	B				(0.30)			
				6.94	3.20	Complete at 3.20m		

Plan

Remarks

Groundwater seepage at 1.40m BGL
Second groundwater strike at 2.50m BGL; seepage
Trial pit unstable; side walls spalling
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.TR7

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Site Project Calvary			**Trial Pit Number** TR8
Machine : 5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.80m X 0.40m X 3.00m	**Ground Level (mOD)** 6.81	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716438.3 E 736277.7 N	**Dates** 11/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.70	ES				(0.70)	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks, shells, pottery and ceramic		
0.70-3.00	ES			6.11	0.70	Soft light brown mottled grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
1.00	B				(0.50)			
			seepage(1) at 1.20m.	5.61	1.20	Soft brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles and granular lenses		▽1
					(0.80)			
2.00	B		fast ingress(2) at 2.00m.	4.81	2.00	Firm brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles and granular lenses		▽2
					(1.00)			
3.00	B			3.81	3.00	Complete at 3.00m		

Plan

Remarks

Groundwater seepage at 1.20m BGL
Second groundwater strike at 2.00m BGL; fast ingress
Trial pit unstable; side walls spalling
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.TR8

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Site Project Calvary			**Trial Pit Number** TR9
Machine : 5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.80m X 0.40m X 3.00m	**Ground Level (mOD)** 7.51	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716426.1 E 736236.5 N	**Dates** 11/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.55	ES			7.41	(0.10) 0.10	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks and ceramic		
					(0.45)	MADE GROUND: Brown/dark brown slightly sandy slightly gravelly Clay with fragments of brick, ceramic, plastic, glass and mortar		
0.55-3.00	ES			6.96	0.55	Soft to firm brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
					(0.35)			
			seepage(1) at 0.90m.	6.61	0.90	Soft brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles and granular lenses		▽1
1.00	B							
					(1.40)			
2.00	B							
				5.21	2.30	Soft brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles and lenses of dark grey fine to coarse Sand		
					(0.70)			
3.00	B			4.51	3.00	Complete at 3.00m		

Plan

Remarks

Groundwater seepage at 0.90m BGL
Trial pit unstable; side walls collapsed
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.TR9

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Site Project Calvary			**Trial Pit Number** TR10
Machine : 5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.80m X 0.40m X 3.10m	**Ground Level (mOD)** 7.87	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716414.4 E 736204.3 N	**Dates** 11/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.60	ES			7.72	(0.15) 0.15	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks and ceramic		
					(0.45)	MADE GROUND: Brown/dark brown slightly sandy slightly gravelly Clay with fragments of brick, ceramic, plastic, glass and mortar		
0.60-2.00	ES			7.27	0.60	Soft to firm brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles		
					(0.40)			
1.00	B			6.87	1.00	Firm brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
			seepage(1) at 1.40m.		(0.80)			▽1
2.00 2.00-3.00	B ES			6.07	1.80	Firm to stiff brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
					(0.80)			
			fast ingress(2) at 2.60m.	5.27	2.60	Firm to stiff brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles (groundwater obstructing view and washing away clay content)		▽2
					(0.50)			
3.00	B			4.77	3.10	Complete at 3.10m		

Plan

Remarks

Groundwater seepage at 1.40m BGL
Second groundwater strike at 2.60m BGL; fast ingress
Trial pit unstable; side walls collapsed
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.TR10

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Site Project Calvary			**Trial Pit Number** TR11
Machine : 5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.50m X 0.40m X 3.10m	**Ground Level (mOD)** 8.06	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716321.1 E 736204.7 N	**Dates** 11/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	ES			7.91	(0.15) 0.15	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks and ceramic		
					(1.05)	Soft to firm brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles and boulders		
1.00 1.00-2.00	B ES		seepage(1) at 1.40m.	6.86	1.20	Soft to firm brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles and occasional granular lenses		▽1
					(0.80)			
2.00 2.00-3.00	B ES		medium ingress(2) at 2.20m.	6.06	2.00	Firm brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles		▽2
				5.76	(0.30) 2.30	Firm to stiff brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles and occasional lenses of dark grey fine to coarse Sand		
					(0.50)			
3.00	B			5.26	2.80	Stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles, occasional boulders and lenses of dark grey fine to coarse Sand		
				4.96	(0.30) 3.10	Complete at 3.10m		

Plan

Remarks

Groundwater seepage at 1.40m BGL
Second groundwater strike at 2.20m BGL; medium ingress
Trial pit unstable; side walls spalling
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.TR11

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Site Project Calvary Additional Work			**Trial Pit Number** TR12
Machine : 3.5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 3.20m X 0.40m X 2.10m	**Ground Level (mOD)** 12.29	**Client** Virtus Project Management	**Job Number** 9645-05-20
	Location (dGPS) 716235.8 E 736356.6 N	**Dates** 24/06/2020	**Engineer** Barret Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.60	ES			12.19	(0.10) 0.10	MADE GROUND: Dark brown slightly sandy slightly gravelly organic Clay with rootlets		
					(0.50)	MADE GROUND Dark brown slightly sandy slightly gravelly Clay with many bricks, stone blocks, and occasional pieces of glass, mortar, concrete and ceramic		
0.50	B			11.69	0.60	MADE GROUND: Brown slightly sandy slightly gravelly Clay with some subangular to subrounded cobbles and occasional bricks, plant remains, clay pipe and ceramic.		
0.60-1.60	ES				(1.00)			
1.50	B			10.69	1.60	Stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
1.60-2.10	ES				(0.50)			
2.00	B					Obstruction: excavator not advancing		
				10.19	2.10	Complete at 2.10m		

Plan

Remarks

No groundwater encountered
Trial pit stable
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9645-05-20.TR12

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Site Project Calvary Additional Work			**Trial Pit Number** TR13
Machine : 3.5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.80m X 0.40m X 2.40m	**Ground Level (mOD)** 12.06	**Client** Virtus Project Management	**Job Number** 9645-05-20
	Location (dGPS) 716228.9 E 736327.6 N	**Dates** 24/06/2020	**Engineer** Barret Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.50	ES			11.96	(0.10) 0.10	MADE GROUND: Dark brown slightly sandy slightly gravelly organic Clay with rootlets		
					(0.40)	MADE GROUND Dark brown slightly gravelly sandy Clay with occasional subangular to subrounded cobbles and pieces of brick, glass, metal, mortar and ceramic		
0.40	B							
0.50-2.10	ES			11.56	0.50	Possible MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles		
					(0.40)			
				11.16	0.90	Firm brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles		
					(0.70)			
1.50	B			10.46	1.60	Firm to stiff brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles		
					(0.50)			
				9.96	2.10	Stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles and occasional cobbles		
					(0.30)	Obstruction: excavator not advancing		
2.40	B			9.66	2.40	Complete at 2.40m		

Plan

Remarks

No groundwater encountered
Trial pit stable
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9645-05-20.TR13

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Site Project Calvary Additional Work			**Trial Pit Number** TR14
Machine : 3.5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 3.20m X 0.40m X 2.70m	**Ground Level (mOD)** 11.89	**Client** Virtus Project Management	**Job Number** 9645-05-20
	Location (dGPS) 716226 E 736316.1 N	**Dates** 24/06/2020	**Engineer** Barret Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.60	ES			11.79	(0.10) 0.10	MADE GROUND: Dark brown slightly sandy slightly gravelly organic Clay with rootlets		
					(0.50)	MADE GROUND Dark brown slightly gravelly sandy Clay with occasional subangular to subrounded cobbles and pieces of brick, glass, metal, mortar and ceramic		
0.50	B			11.29	0.60	Possible MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles		
0.60-2.30	ES				(0.30)			
				10.99	0.90	Firm brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles		
					(0.80)			
1.50	B			10.19	1.70	Firm to stiff brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles		
					(0.30)			
				9.89	2.00	Stiff brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles		
					(0.30)			
				9.59	2.30	Stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles and occasional cobbles		
2.50	B				(0.40)			
						Obstruction: excavator not advancing		
				9.19	2.70	Complete at 2.70m		

Plan

Remarks

No groundwater encountered
Trial pit stable
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9645-05-20.TR14

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Project Calvary – Trial Pit Photographs

TR1



TR1



Project Calvary – Trial Pit Photographs

TR1



TR1



Project Calvary – Trial Pit Photographs

TR2



TR2



Project Calvary – Trial Pit Photographs

TR2



TR2

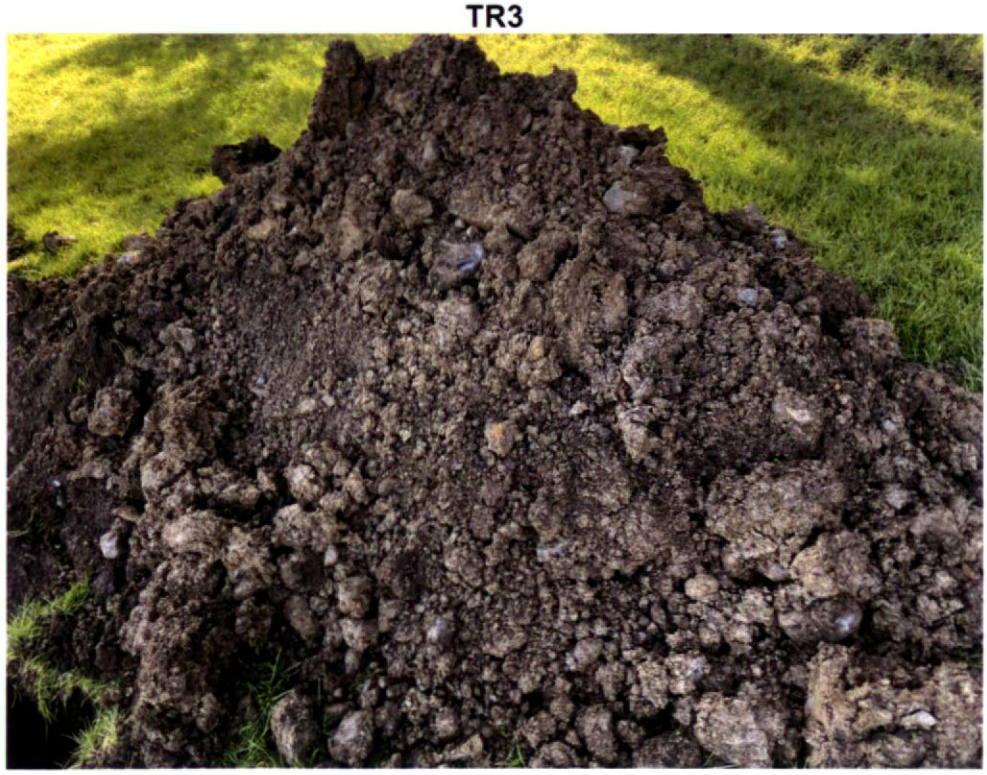


Project Calvary – Trial Pit Photographs

TR3



TR3



Project Calvary – Trial Pit Photographs

TR3



TR3



Project Calvary – Trial Pit Photographs

TR4



TR4



Project Calvary – Trial Pit Photographs

TR4



TR4



Project Calvary – Trial Pit Photographs

TR5



TR5



Project Calvary – Trial Pit Photographs

TR5



TR5



Project Calvary – Trial Pit Photographs

TR5



Project Calvary – Trial Pit Photographs

TR6



TR6



Project Calvary – Trial Pit Photographs

TR6



TR6



Project Calvary – Trial Pit Photographs

TR7



TR7



Project Calvary – Trial Pit Photographs

TR7



TR7



Project Calvary – Trial Pit Photographs

TR7



Project Calvary – Trial Pit Photographs

TR8



TR8



Project Calvary – Trial Pit Photographs

TR8



TR8



Project Calvary – Trial Pit Photographs

TR9



TR9



Project Calvary – Trial Pit Photographs

TR9



TR9



Project Calvary – Trial Pit Photographs

TR10



TR10



Project Calvary – Trial Pit Photographs

TR10



TR10



Project Calvary – Trial Pit Photographs

TR10



TR10



Project Calvary – Trial Pit Photographs

TR11



TR11



Project Calvary – Trial Pit Photographs

TR11



TR11



Project Calvary – Trial Pit Photographs

TR12



TR12



Project Calvary – Trial Pit Photographs

TR12



TR12



Project Calvary – Trial Pit Photographs

TR12



TR12



Project Calvary – Trial Pit Photographs

TR13



TR13



Project Calvary – Trial Pit Photographs

TR13



TR13



Project Calvary – Trial Pit Photographs

TR13



TR13



Project Calvary – Trial Pit Photographs

TR14



TR14



Project Calvary – Trial Pit Photographs

TR14



TR14



Project Calvary – Trial Pit Photographs

TR14



TR14



APPENDIX 3 – Soakaway Testing Records

Ground Investigations Ireland Ltd
www.gii.ie

Site Project Calvary			**Trial Pit Number** IF1
Machine : 5 Tonne Tracked Excavator **Method** : Trial Pit	**Dimensions** 1.40m X 0.35m X 1.50m	**Ground Level (mOD)** 10.78	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716292.4 E 736341 N	**Dates** 11/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks and ceramic		
				10.58	0.20	Soft brown slightly sandy slightly gravelly CLAY		
					(0.70)			
				9.88	0.90	Soft to firm brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles		
			seepage(1) at 1.30m.		(0.60)			
				9.28	1.50	Complete at 1.50m		

Plan

Remarks

Groundwater seepage at 1.30m BGL
Trial pit stable
Soakaway test carried out in trial pit
Trial pit backfilled on completion of test

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.IF1

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Site Project Calvary			**Trial Pit Number** IF2
Machine : 5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 1.60m X 0.35m X 1.50m	**Ground Level (mOD)** 8.67	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716370.1 E 736318.4 N	**Dates** 11/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.50	ES				(0.20)	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks and ceramic		
				8.47	0.20	MADE GROUND: Brown/grey slightly sandy gravelly CLAY with many bricks, concrete blocks, scrap metal, timber and waste ash (General Builders Rubble)		
					(1.10)			
				7.37	1.30	MADE GROUND: Brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles		
					(0.20)			
			seepage(1) at 1.50m.	7.17	1.50	Complete at 1.50m		▽1

Plan

Remarks

Groundwater seepage at 1.50m BGL
Trial pit unstable; side walls spalling
Soakaway test carried out in trial pit
Trial pit backfilled on completion of test

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.IF2

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Site Project Calvary			**Trial Pit Number** IF3
Machine : 5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 1.70m X 0.35m X 1.50m	**Ground Level (mOD)** 7.62	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716412 E 736297.4 N	**Dates** 11/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.50	ES				(0.40)	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks and ceramic		
				7.22	0.40	MADE GROUND: Brown/dark brown slightly sandy slightly gravelly CLAY with occasional cobbles and fagments of bricks, timber, mortar and ceramic		
					(0.90)			
				6.32	1.30	Possible MADE GROUND: Soft to firm brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
					(0.20)			
				6.12	1.50	Complete at 1.50m		

Plan

Remarks

No groundwater encountered
Trial pit stable
Soakaway test carried out in trial pit
Trial pit backfilled on completion of test

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.IF3

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Geotechnical & Environmental

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Co. Dublin.
D22 YD52

Tel: 01 601 5175 / 5176
Email: info@gii.ie
Web: www.gii.ie

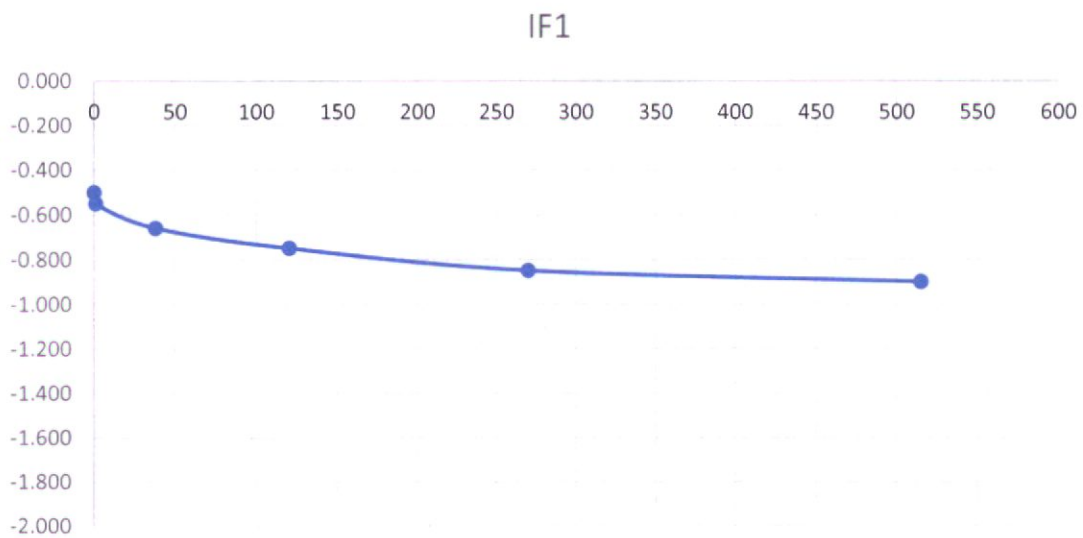
IF1

Soakaway Test to BRE Digest 365
Trial Pit Dimensions: 1.40m x 0.35m 1.50m (L x W x D)

Date	Time	Water level (m bgl)
11/02/2020	0	-0.500
11/02/2020	1	-0.550
11/02/2020	38	-0.660
11/02/2020	120	-0.750
11/02/2020	270	-0.850
11/02/2020	515	-0.900

***Soakaway failed - Pit backfilled**

Start depth	Depth of Pit	Diff	75% full	25%full
0.50	1.500	1.000	0.75	1.25



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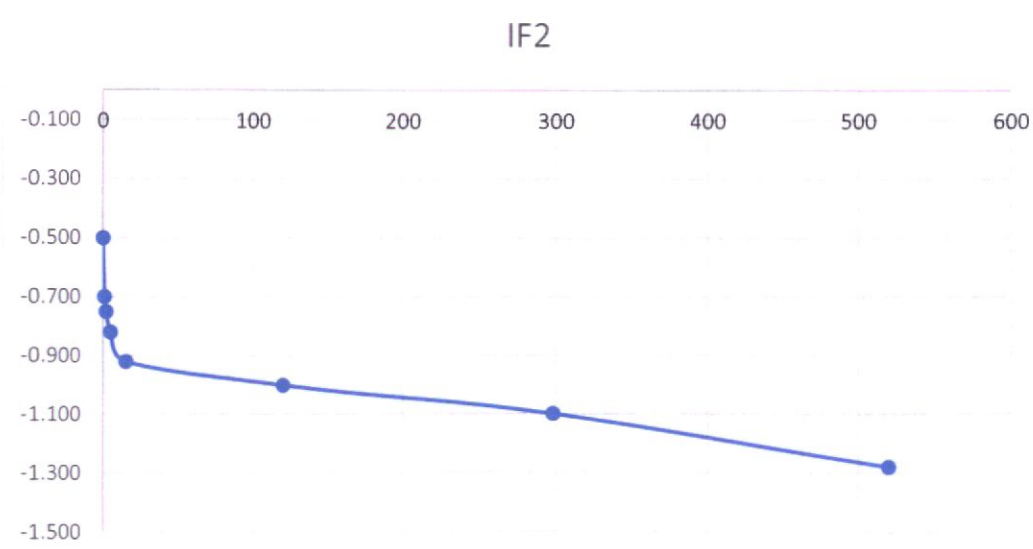
Tel: 01 601 5175 / 5176
Email: info@gii.ie
Web: www.gii.ie

IF2

Soakaway Test to BRE Digest 365
Trial Pit Dimensions: 1.60m x 0.35m 1.50m (L x W x D)

Date	Time	Water level (m bgl)
11/02/2020	0	-0.500
11/02/2020	1	-0.700
11/02/2020	2	-0.750
11/02/2020	5	-0.820
11/02/2020	15	-0.920
11/02/2020	120	-1.000
11/02/2020	298	-1.100
11/02/2020	520	-1.280

Start depth	Depth of Pit		Diff	75% full	25%full
0.50	**1.500**		**1.000**	**0.75**	**1.25**
Length of pit (m)	Width of pit (m)			75-25Ht (m)	Vp75-25 (m3)
1.600	0.350			0.500	0.28
Tp75-25 (from graph) (s)		**25080**		50% Eff Depth	ap50 (m2)
				0.500	2.51
f =	**4.448E-06**	**m/s**			



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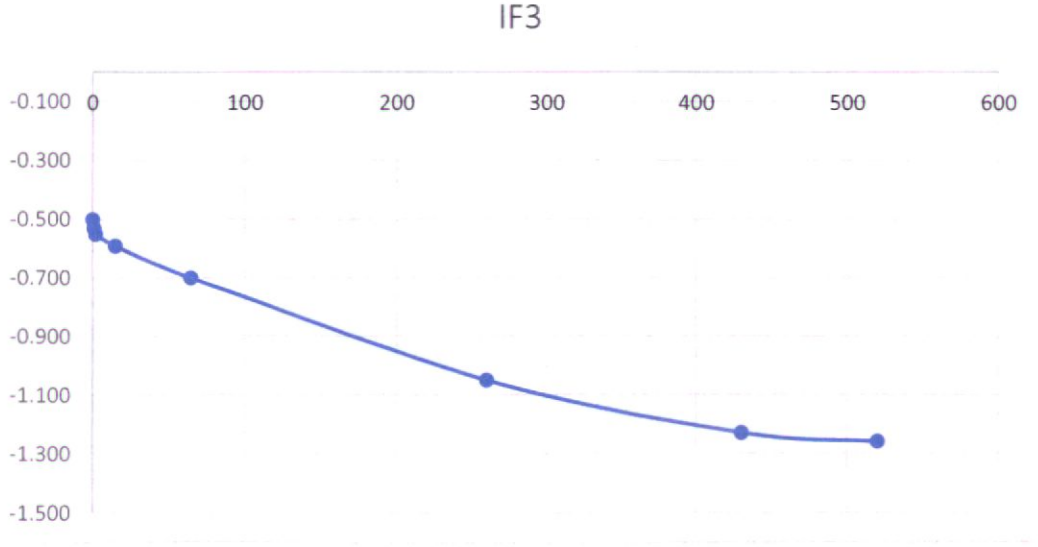
Tel: 01 601 5175 / 5176
Email: info@gii.ie
Web: www.gii.ie

IF3

Soakaway Test to BRE Digest 365
Trial Pit Dimensions: 1.70m x 0.35m 1.50m (L x W x D)

Date	Time	Water level (m bgl)
11/02/2020	0	-0.500
11/02/2020	1	-0.530
11/02/2020	2	-0.550
11/02/2020	15	-0.590
11/02/2020	65	-0.700
11/02/2020	260	-1.050
11/02/2020	430	-1.230
11/02/2020	520	-1.260

Start depth	Depth of Pit		Diff	75% full	25%full
0.50	**1.500**		**1.000**	**0.75**	**1.25**
Length of pit (m)	Width of pit (m)			75-25Ht (m)	Vp75-25 (m3)
1.700	0.350			0.500	0.30
Tp75-25 (from graph) (s)		**22800**		50% Eff Depth	ap50 (m2)
				0.500	2.645
f =	**4.933E-06**	**m/s**			



Project Calvary – Soakaway Testing Photographs

IF1



IF1



Project Calvary – Soakaway Testing Photographs

IF1



IF1



Project Calvary – Soakaway Testing Photographs

IF1



Project Calvary – Soakaway Testing Photographs

IF2



IF2

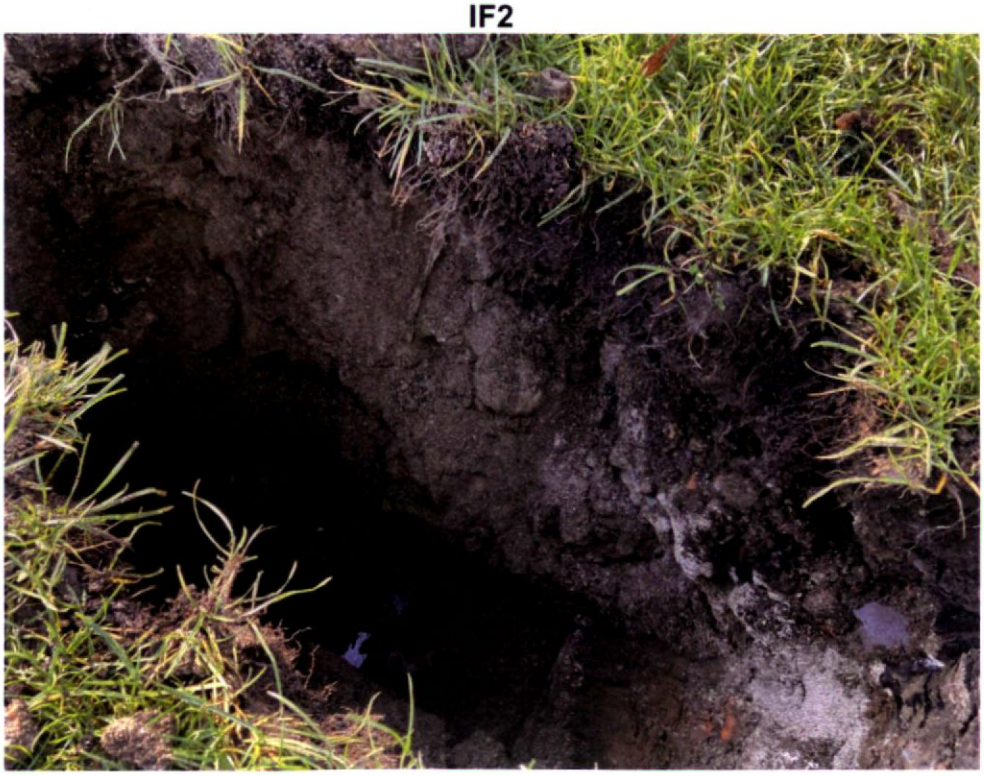


Project Calvary – Soakaway Testing Photographs

IF2



IF2



Project Calvary – Soakaway Testing Photographs

IF2



Project Calvary – Soakaway Testing Photographs

IF3

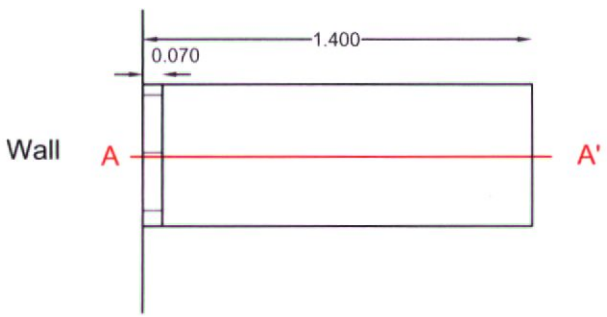


APPENDIX 4 – Foundation Pit Records

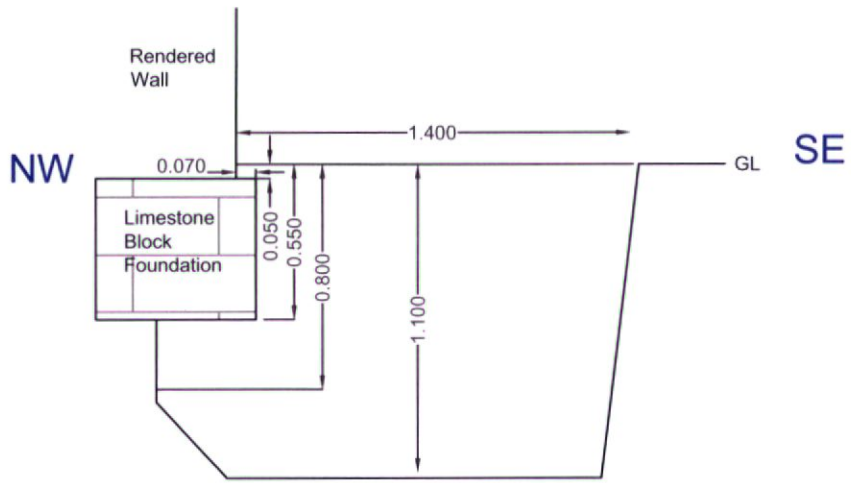
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SL1

Plan View



X-Section A-A'



From (m)	To (m)	Description
0.00	0.20	Concrete
0.20	0.70	MADE GROUND: Brown/grey slightly sandy slightly gravelly Clay with some subangular to subrounded cobbles and pieces of brick, mortar, ceramic and concrete
0.70	1.10	Stiff brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles

DATE OF EXCAVATION : 13/02/20

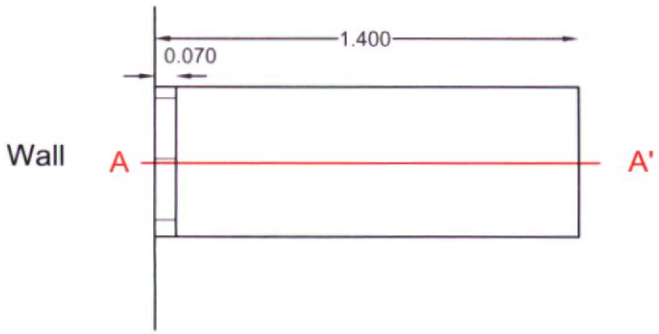
GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

PROJECT:	Project Calvary
DRAWING No.:	9363-01-20 SL1
DATE:	February 2020
CLIENT:	Virtus Project Management
SCALE:	NTS @ A4

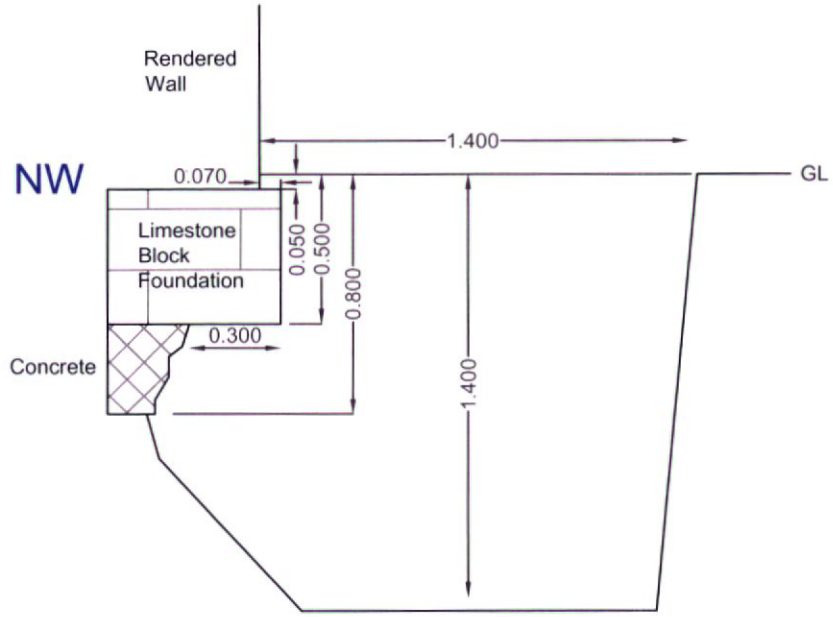
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No.	Initials	Initials	Initials
	18/02/20	JC	SK

SL2

Plan View



X-Section A-A'



From (m)	To (m)	Description
0.00	0.20	Concrete
0.20	0.80	MADE GROUND: Brown/grey slightly sandy slightly gravelly Clay with some subangular to subrounded cobbles and pieces of brick, mortar, ceramic and concrete
0.80	1.40	Stiff brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles

DATE OF EXCAVATION : 13/02/20

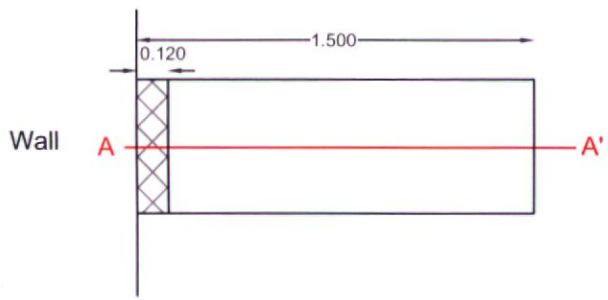
GROUND INVESTIGATIONS IRELAND
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DRAWING No.:	9363-01-20 SL2
DATE:	February 2020
CLIENT:	Virtus Project Management
SCALE:	NTS @ A4

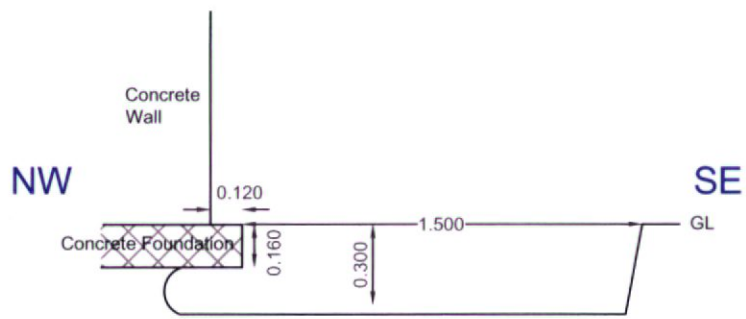
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No.	Initials	Initials	Initials
	18/02/20	JC	SK

SL3

Plan View



X-Section A-A'



From (m)	To (m)	Description
0.00	0.07	Tarmacadam
0.07	0.30	MADE GROUND: Grey slightly clayey sandy angular to subangular fine to coarse Gravel with pieces of concrete, brick, ceramic pipe and mortar

DATE OF EXCAVATION : 12/02/20

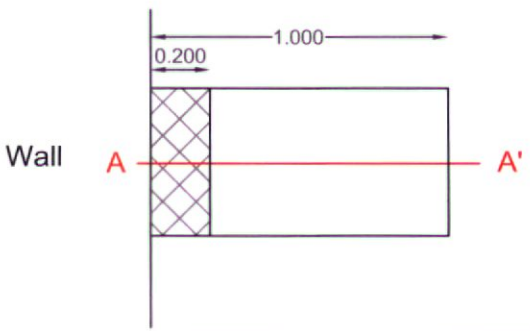
GROUND INVESTIGATIONS IRELAND
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PROJECT:	Project Calvary
DRAWING No.:	9363-01-20 SL3
DATE:	February 2020
CLIENT:	Virtus Project Management
SCALE:	NTS @ A4

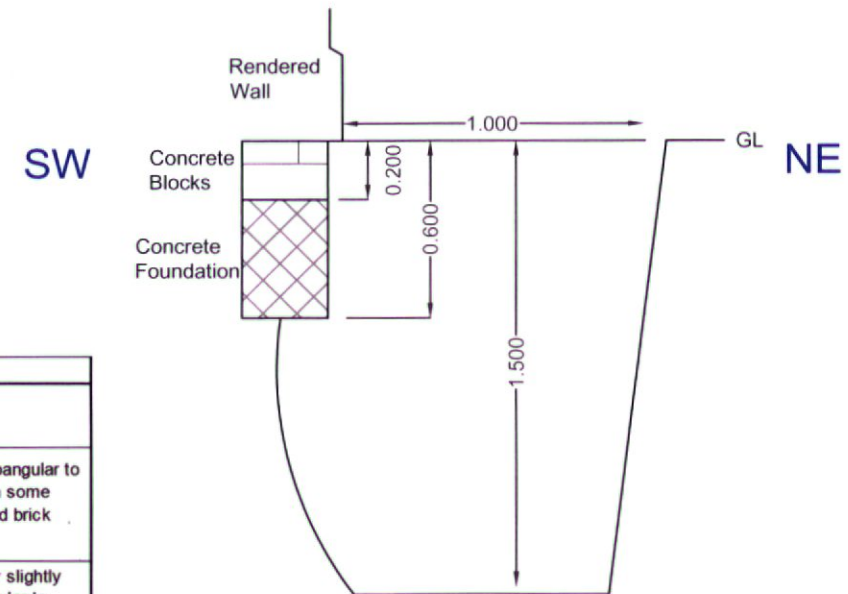
Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	18/02/20	JC	SK

SL4

Plan View



X-Section A-A'



From (m)	To (m)	Description
0.00	0.13	Tarmacadam
0.13	0.30	MADE GROUND: Grey clayey sandy subangular to subrounded fine to coarse Gravel with some subangular to subrounded cobbles and brick fragments
0.30	0.60	MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional subangular to subrounded cobbles and pieces of brick, concrete and roots
0.60	1.50	Firm brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles

	Y/N	Depth
Groundwater	Y	1.50

DATE OF EXCAVATION : 14/02/20

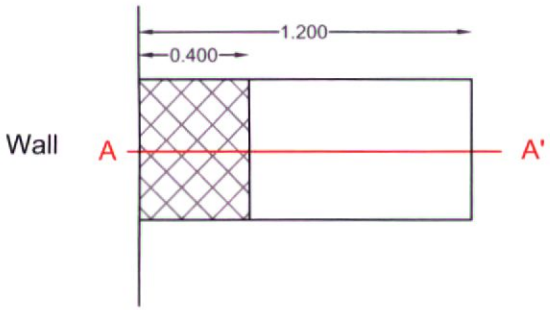
GROUND INVESTIGATIONS IRELAND
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PROJECT:	Project Calvary
DRAWING No:	9363-01-20 SL4
DATE:	February 2020
CLIENT:	Virtus Project Management
SCALE:	NTS @ A4

Version:	Date:	Drawn By:	Checked
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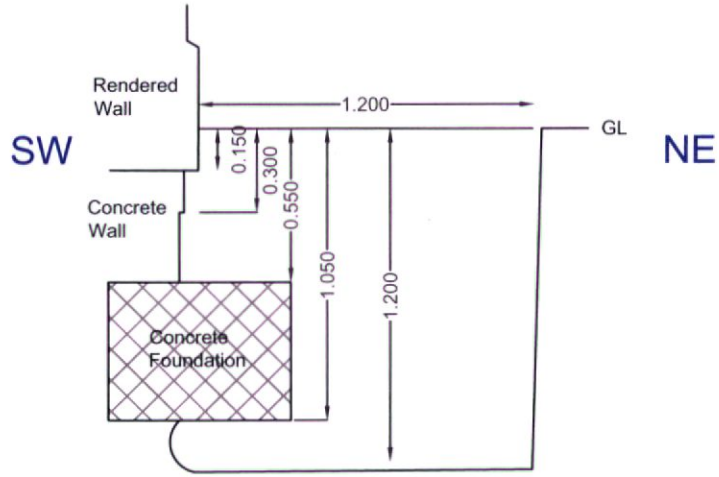
SL5

Plan View



From (m)	To (m)	Description
0.00	0.12	Concrete
0.15	1.05	MADE GROUND: Brown/dark brown slightly sandy slightly gravelly Clay with some subangular to subrounded cobbles and pieces of brick, mortar, concrete and shells
1.05	1.20	Stiff brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles

X-Section A-A'



DATE OF EXCAVATION : 13/02/20

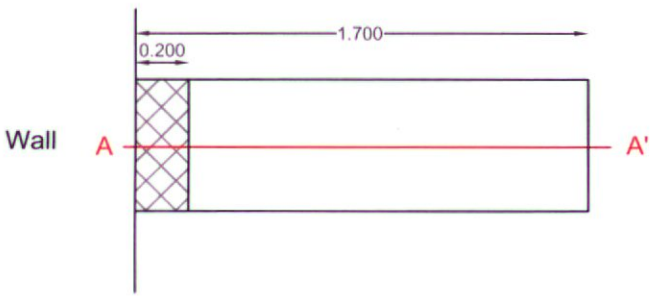
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PROJECT:	Project Calvary
DRAWING No:	9363-01-20 SL5
DATE:	February 2020
CLIENT:	Virtus Project Management
SCALE:	NTS @ A4

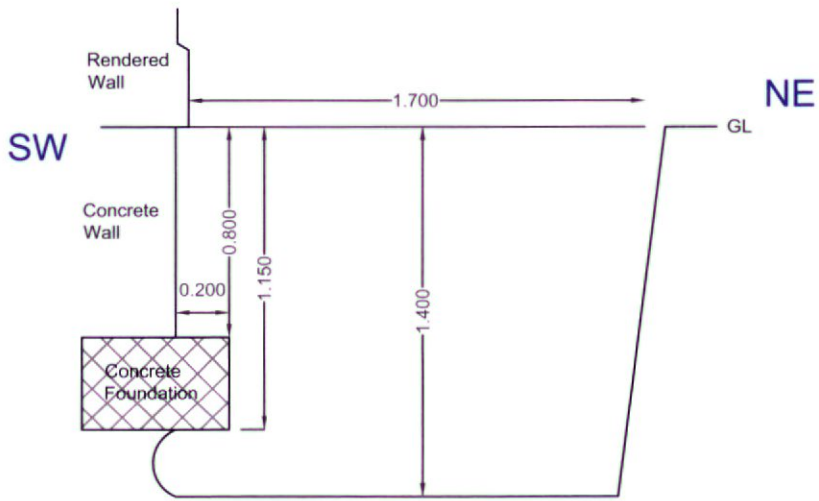
Version	Date	Drawn By	Checked
No.	Initials	Initials	Initials
	18/02/20	JC	SK

SL6

Plan View



X-Section A-A'



From (m)	To (m)	Description
0.00	0.15	Concrete
0.15	1.15	MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional subangular to subrounded cobbles and pieces of brick, ceramic and roots
1.15	1.40	Stiff brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles

Groundwater	Y/N	Depth
	Y	1.40

DATE OF EXCAVATION : 13/02/20

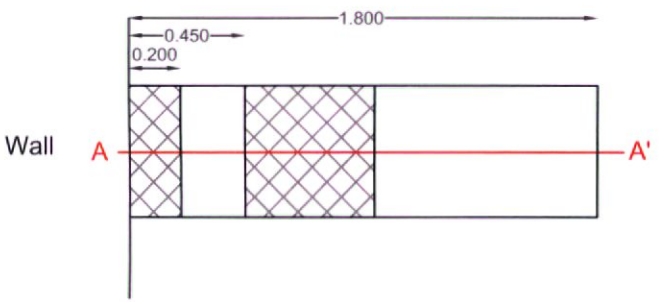
GROUND INVESTIGATIONS IRELAND
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PROJECT:	Project Calvary
DRAWING No.:	9363-01-20 SL6
DATE:	February 2020
CLIENT:	Virtus Project Management
SCALE:	NTS @ A4

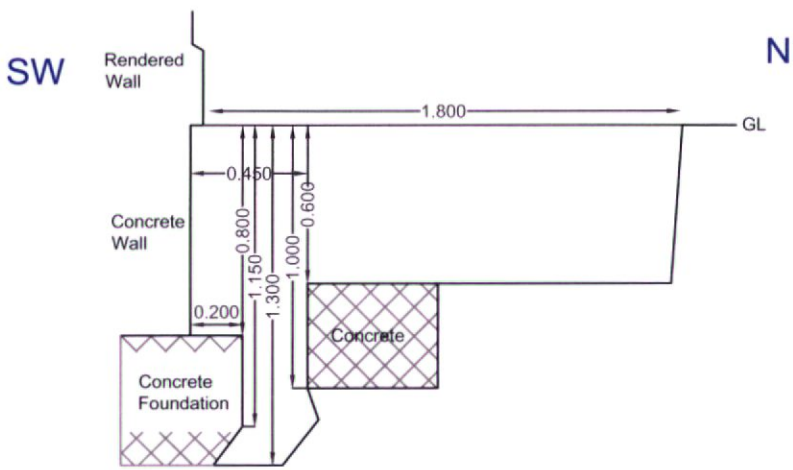
Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	18/02/20	JC	SK

SL7

Plan View



X-Section A-A'



From (m)	To (m)	Description
0.00	0.20	Concrete
0.20	0.80	MADE GROUND: Brown/grey slightly sandy slightly gravelly Clay with some subangular to subrounded cobbles and pieces of brick, mortar, ceramic and concrete
0.80	1.30	Firm brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles

Groundwater	Y/N	Depth
	Y	1.15

DATE OF EXCAVATION : 12/02/20

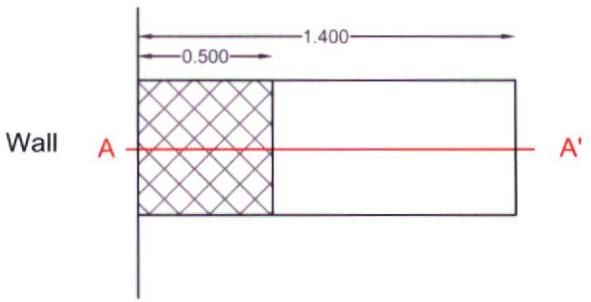
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PROJECT:	Project Calvary
DRAWING No:	9363-01-20 SL7
DATE:	February 2020
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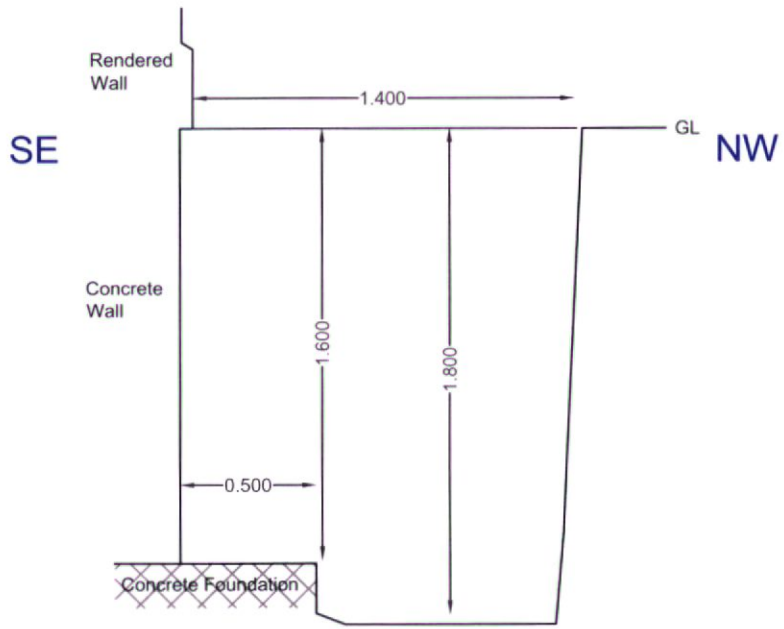
Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	18/02/20	JC	SK

SL8

Plan View



X-Section A-A'



From (m)	To (m)	Description
0.00	0.15	Concrete
0.15	1.60	MADE GROUND: Brown/dark brown slightly sandy slightly gravelly Clay with occasional subangular to subrounded cobbles and pieces of brick and roots
1.60	1.80	Stiff brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles

Groundwater	Y/N	Depth
	Y	1.60

DATE OF EXCAVATION : 13/02/20

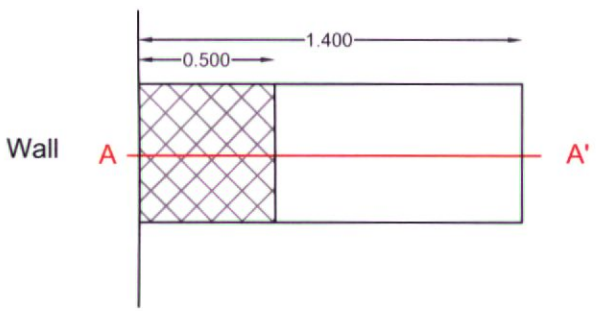
GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

PROJECT:	Project Calvary
DRAWING No:	9363-01-20 SL8
DATE:	February 2020
CLIENT:	Virtus Project Management
SCALE:	NTS @ A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	18/02/20	JC	SK

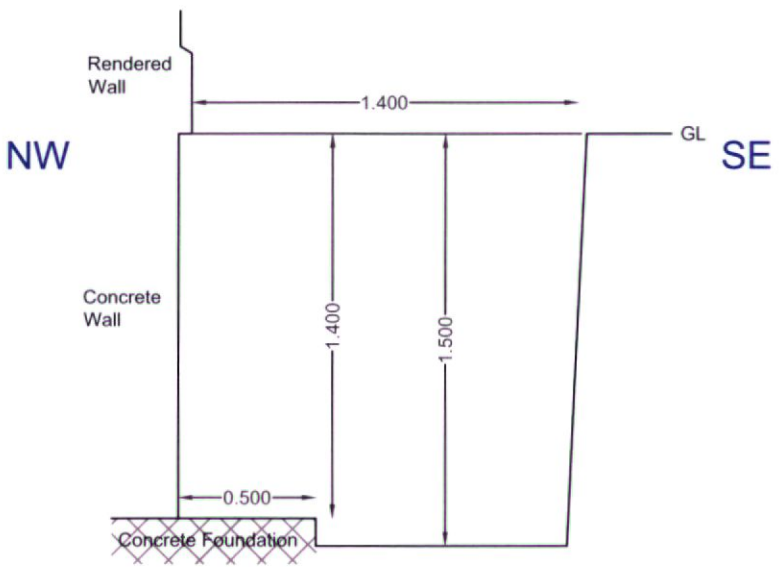
SL9

Plan View



From (m)	To (m)	Description
0.00	0.15	Concrete
0.15	0.60	MADE GROUND: Brown/grey slightly sandy gravelly Clay with many concrete blocks, bricks, mortar, glass and scrap metal
0.60	1.50	MADE GROUND: Brown slightly sandy gravelly Clay with occasional cobbles, bricks and mortar

X-Section A-A'



DATE OF EXCAVATION : 13/02/20

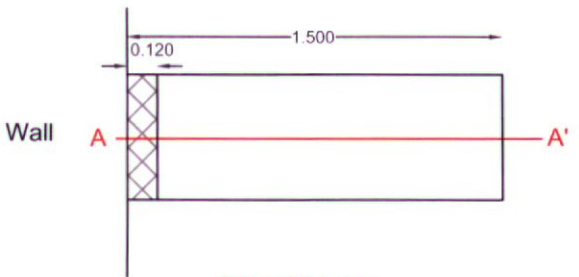
GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

PROJECT:	Project Calvary
DRAWING No.	9363-01-20 SL9
DATE:	February 2020
CLIENT:	Virtus Project Management
SCALE:	NTS @ A4

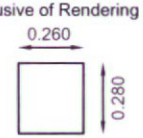
Version	Date	Drawn By:	Checked:
No.	Initials	Initials	Initials
	18/02/20	JC	SK

SL10

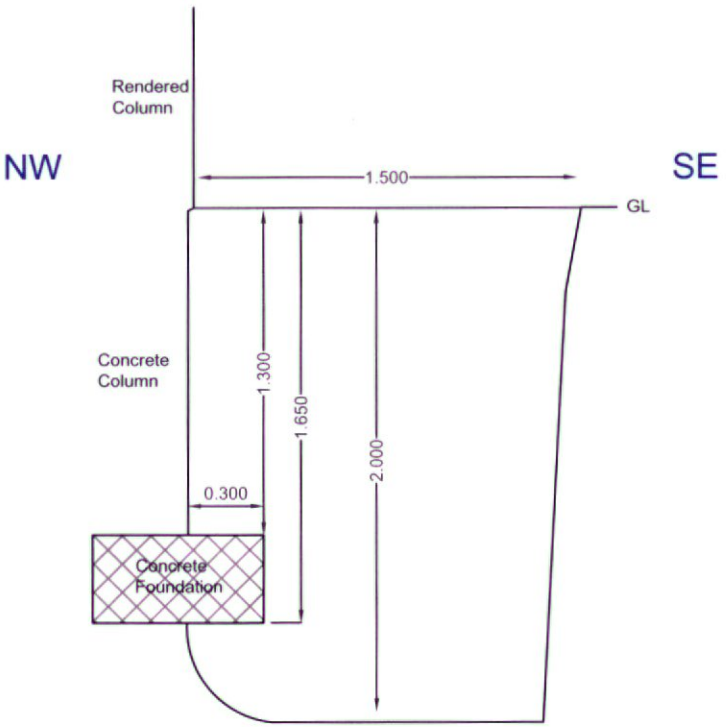
Plan View



Column Dimensions
Inclusive of Rendering



X-Section A-A'



From (m)	To (m)	Description
0.00	0.06	Concrete Tile
0.06	0.20	MADE GROUND: Grey/brown slightly gravelly fine to coarse Sand
0.20	1.30	MADE GROUND: Brown slightly sandy gravelly Clay with many pieces of brick, concrete, mortar, glass and scrap metal
1.30	2.00	Firm to stiff brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles

DATE OF EXCAVATION : 14/02/20

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

PROJECT:	Project Calvary
DRAWING No.:	9363-01-20 SL10
DATE:	February 2020
CLIENT:	Virtus Project Management
SCALE:	NTS @ A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	18/02/20	JC	SK

Project Calvary – Foundation Pit Photographs

SL1



SL1



Project Calvary – Foundation Pit Photographs

SL1



SL1



Project Calvary – Foundation Pit Photographs

SL1



SL1



Project Calvary – Foundation Pit Photographs

SL2



SL2



Project Calvary – Foundation Pit Photographs

SL2



SL2



Project Calvary – Foundation Pit Photographs

SL2



SL2



Project Calvary – Foundation Pit Photographs

SL2



Project Calvary – Foundation Pit Photographs

SL3



SL3



Project Calvary – Foundation Pit Photographs

SL3



SL3



Project Calvary – Foundation Pit Photographs

SL4



SL4



Project Calvary – Foundation Pit Photographs

SL4



SL4



Project Calvary – Foundation Pit Photographs

SL4



Project Calvary – Foundation Pit Photographs

SL5



SL5



Project Calvary – Foundation Pit Photographs

SL5



SL5



Project Calvary – Foundation Pit Photographs

SL5



SL5



Project Calvary – Foundation Pit Photographs

SL6



SL6



Project Calvary – Foundation Pit Photographs

SL6



SL6



Project Calvary – Foundation Pit Photographs

SL6



SL6



Project Calvary – Foundation Pit Photographs

SL7



SL7



Project Calvary – Foundation Pit Photographs

SL7



SL7



Project Calvary – Foundation Pit Photographs

SL7



SL7



Project Calvary – Foundation Pit Photographs

SL7



Project Calvary – Foundation Pit Photographs

SL8



SL8



Project Calvary – Foundation Pit Photographs

SL8



SL8



Project Calvary – Foundation Pit Photographs

SL8



SL8



Project Calvary – Foundation Pit Photographs

SL8



SL8



Project Calvary – Foundation Pit Photographs

SL8



SL8



Project Calvary – Foundation Pit Photographs

SL9



SL9



Project Calvary – Foundation Pit Photographs

SL9



SL9



Project Calvary – Foundation Pit Photographs

SL9



SL9



Project Calvary – Foundation Pit Photographs

SL10



SL10



Project Calvary – Foundation Pit Photographs

SL10



SL10



APPENDIX 5 – Borehole Records

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Site Project Calvary			**Borehole Number** BH01
Machine : Dando 2000 & Beretta T47S **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 6.60m 100mm cased to 17.00m	**Ground Level (mOD)** 6.91	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location (dGPS) 716308.4 E 736162 N	**Dates** 26/02/2020-24/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					6.61	(0.30) 0.30	MADE GROUND: Brown slightly sandy slightly gravelly TOPSOIL			
							MADE GROUND: Brown mottled grey slightly sandy slightly gravelly Clay with rare brick and timber fragments			
1.00	B					(1.70)				
1.20-1.65	SPT(C) N=5			1,1/1,1,1,2						
2.00	B				4.91	2.00				
2.00-2.45	SPT(C) N=32			4,5/7,8,8,9	4.71	(0.20) 2.20	Stiff brown slightly sandy gravelly CLAY			
							Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles			
3.00	B									
3.00-3.45	SPT(C) N=49			8/8,13,13,15						
4.00	B									
4.00-4.16	SPT(C) 25*/80 50/80			23,2/50		(4.40)				
5.00	B									
5.00-5.06	SPT(C) 25*/30 50/30			25/50						
6.00	B									
6.00-6.06	SPT(C) 25*/30 50/30			25/50						
	TCR / SCR / RQD / FI									
6.60					0.31	6.60	Poor recovery - recovery consists of dark grey slightly sandy gravelly Clay with cobble fragments. Drillers notes: black gravelly Clay (Very stiff)			
	31					(1.10)				
8.00-8.18				8,17/50 SPT(C) 25*/120 50/60	-0.79	7.70	Poor recovery - recovery consists of grey subangular to angular Gravel with cobble fragments. Drillers notes: Black gravelly boulder Clay (Very stiff)			
8.00						(0.50)				
	63				-1.29	8.20	Very stiff light grey slightly sandy gravelly CLAY with cobble fragments			
9.50-9.66				16,21/50 SPT(C) 37*/120 50/40						
9.50										

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
No groundwater encountered during cable percussion drilling
50mm slotted standpipe with a pea gravel surround installed from 17.00m to 2.00m BGL. 50mm plain standpipe with a bentonite seal installed from 2.00m BGL to GL, with a flush cover.
Chiselling from 6.60m to 6.60m for 1 hour.

Scale (approx)	Logged By
1:50	JC

Figure No. 9363-01-20.BH01

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Site Project Calvary			**Borehole Number** BH01
Machine : Dando 2000 & Beretta T47S **Flush** : Water **Core Dia** : 63 mm **Method** : Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 6.60m 100mm cased to 17.00m	**Ground Level (mOD)** 6.91	**Client** Virtus Project Management
	Location (dGPS) 716308.4 E 736162 N	**Dates** 26/02/2020-24/03/2020	**Engineer** Barrett Mahony Consulting Engineers

Job Number 9363-01-20

Sheet 2/2

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
	83						(4.30)				
11.00-11.20					19,6/50 SPT(C) 25*/100						
11.00	80				50/100						
12.50-12.55					25/50 SPT(C) 25*/50						
12.50	100				50/0	-5.59	12.50	Very stiff dark grey slightly sandy gravelly CLAY with cobble fragments			
13.90							(1.50)				
14.00	100	76	69	9		-7.09	14.00	Medium strong fine to medium grained thinly laminated grey LIMESTONE partially weathered with Clay smearing Sequence contains two sets of fractures, F1 are very closely to closely spaced, dipping 0 - 20 degrees, planar to undulose rough, F2 are closely to medium spaced, dipping 30 - 50 degrees, rough planar			
14.90				7		-7.89	14.80				
15.50	100	75	62	15			(2.20)	Strong fine to medium grained thinly laminated grey LIMESTONE unweathered to partially weathered interbedded with weak fine grained thinly laminated dark grey MUDSTONE partially weathered Sequence contains two sets of fractures, F1 are very closely to closely spaced, dipping 0 - 20 degrees, planar to undulose rough, F2 are closely to medium spaced, dipping 30 - 50 degrees, rough planar			
16.00											
17.00						-10.09	17.00	Complete at 17.00m			

Remarks

Scale (approx) 1:50

Logged By JC

Figure No. 9363-01-20.BH01

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Site Project Calvary			**Borehole Number** BH02
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 5.70m	**Ground Level (mOD)** 8.81	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location (dGPS) 716330.7 E 736225.9 N	**Dates** 27/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					8.61	(0.20) 0.20	Possible MADE GROUND: Brown slightly sandy slightly gravelly TOPSOIL		
						(0.80)	Possible MADE GROUND: Brown slightly sandy slightly gravelly CLAY		
1.00	B				7.81	1.00	Soft to firm brown slightly sandy slightly gravelly CLAY		
1.20-1.65	SPT(C) N=8			3,3/4,1,2,1		(0.80)			▼1
2.00-2.45 2.00	SPT(C) N=26 B			4,6/6,6,7,7	7.01	1.80	Stiff brown slightly sandy gravelly CLAY		
						(1.30)			▽1
3.00	B			Water strike(1) at 3.00m, rose to 1.70m in 20 mins.	5.71	3.10	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
3.00-3.41	SPT(C) 50/260			3,5/11,13,13,13					
4.00-4.06 4.00	SPT(C) 25*/30 50/30 B			25/50		(2.60)			
5.00-5.06 5.00	SPT(C) 25*/30 50/30 B			25/50					
					3.11	5.70	Complete at 5.70m		

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
Groundwater encountered at 3.00m BGL; rose to 1.70m BGL after 20 mins
Chiselling from 5.70m to 5.70m for 1 hour.

Scale (approx)	Logged By
1:50	JC

Figure No. 9363-01-20.BH02

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Site Project Calvary				**Borehole Number** BH03
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 6.30m	**Ground Level (mOD)** 8.01	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location (dGPS) 716382.5 E 736228.2 N	**Dates** 25/02/2020-26/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.60)	MADE GROUND: Grey sandy angular fine to coarse Gravel (Crushed Rock Fill)		
					7.41	0.60	MADE GROUND: Brown slightly sandy slightly gravelly Clay with fragments of brick		
1.00	B					(1.00)			
1.20-1.65	SPT(C) N=4			0,2/1,1,1,1					
					6.41	1.60	Soft brown slightly sandy gravelly CLAY		
						(0.40)			
2.00-2.45	SPT(C) N=20			2,4/5,5,5,5	6.01	2.00	Stiff brown slightly sandy gravelly CLAY		
2.00	B					(0.80)			
					5.21	2.80	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
3.00-3.45	SPT(C) N=36			5,9/9,9,8,10					
3.00	B								
4.00-4.14	SPT(C) 25*/90 50/50			21,4/50					
4.00	B					(3.50)			
5.00-5.16	SPT(C) 25*/80 50/80			22,3/50					
5.00	B								
6.00-6.07	SPT(C) 25*/30 50/40			25/50					
6.00	B				1.71	6.30	Complete at 6.30m		

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
No groundwater encountered
Chiselling from 6.30m to 6.30m for 1 hour.

Scale (approx)	Logged By
1:50	JC

Figure No. 9363-01-20.BH03

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Site Project Calvary			**Borehole Number** BH04
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 6.80m	**Ground Level (mOD)** 7.74	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location (dGPS) 716435.4 E 736195.1 N	**Dates** 24/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.40)	MADE GROUND: Brown slightly sandy slightly gravelly TOPSOIL		
					7.34	0.40	MADE GROUND: Dark brown/grey slightly sandy slightly gravelly Clay with fragments of brick, glass and mortar		
						(0.60)			
1.00	B				6.74	1.00	MADE GROUND: Brown slightly sandy slightly gravelly CLAY with fragments of brick		
1.20-1.65	SPT(C) N=6			2,3/1,2,1,2		(0.70)			
					6.04	1.70			
						(0.30)	Soft brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles		
2.00-2.45	SPT(C) N=10			1,1/3,2,2,3	5.74	2.00	Firm brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles		
2.00	B								
						(1.00)			
3.00-3.45	SPT(C) N=30			5,6/8,7,8,7	4.74	3.00	Very stiff brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles		
3.00	B					(0.50)			
					4.24	3.50	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
4.00-4.45	SPT(C) N=48			9,9/11,14,11,12					▼1
4.00	B								
5.00-5.34	SPT(C) 50/190			14,16/18,19,13		(3.30)			
5.00	B								
				Water strike(1) at 5.50m, rose to 4.30m in 20 mins.					▽1
6.00-6.20	SPT(C) 25*/120			16,9/50					
6.00	50/80 B								
6.80-6.80	SPT(C) 25*/0			25/50	0.94	6.80			
	50/0						Complete at 6.80m		

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
Groundwater encountered at 5.50m BGL; rose to 4.30m BGL after 20 mins
Pinselling from 5.70m to 5.70m for 1 hour.

Scale (approx)	Logged By
1:50	JC

Figure No. 9363-01-20.BH04

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Site Project Calvary			**Borehole Number** BH05
Machine : Dando 2000 & Beretta T44 **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 7.20m 100mm cased to 21.00m	**Ground Level (mOD)** 6.65	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location (dGPS) 716450.7 E 736271.4 N	**Dates** 25/02/2020-25/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						(0.40)	Brown slightly sandy slightly gravelly TOPSOIL			
					6.25	0.40	MADE GROUND: Brown/grey slightly sandy slightly gravelly Clay with timber, red brick and shell fragments			
1.00	B					(1.00)				
1.20-1.65	SPT(C) N=5			1,1/2,1,1,1	5.25	1.40	Soft brown slightly sandy gravelly CLAY			
2.00	B					(1.10)				
2.00-2.45	SPT(C) N=4			2,2/1,1,1,1						
					4.15	2.50	Soft greyish brown slightly sandy gravelly CLAY			
						(0.50)				
3.00	B				3.65	3.00				
3.00-3.45	SPT(C) N=33			2,7/7,13,7,6		(0.20)	Stiff greyish brown slightly sandy gravelly CLAY			
					3.45	3.20	Very stiff dark grey slightly sandy gravelly CLAY with occasional cobbles			
4.00	B									
4.00-4.45	SPT(C) N=47			3,7/9,13,13,12						
5.00	B									
5.00-5.39	SPT(C) 50/235			6,9/11,17,16,6		(4.00)				
6.00	B									
6.00-6.31	SPT(C) 50/160			12,19/20,25,5						
7.00	B 50/0									
7.00-7.06	SPT(C) 25*/60			25/50						
	TCR / SCR / RQD / FI				-0.55	7.20	Poor recovery - recovery consists of grey subrounded to angular fine to coarse Gravel with cobble fragments. Drillers notes: Black gravelly sandy Clay (Very stiff)			
7.20	25					(0.80)				
8.00-8.42	SPT(C) 50/270			12,13/12,13,15,10						
8.00	66				-1.35	8.00	Dense grey gravelly fine to coarse Sand. Drillers notes: Grey gravelly Sand with cobbles			
						(1.50)				
9.50-9.91	SPT(C) 50/260			10,10/14,13,14,9						
9.50					-2.85	9.50	Poor recovery - recovery consists of grey clayey sandy subangular fine to coarse Gravel. Drillers notes: Grey silty Sand with cobbles (Dense)			

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
No groundwater enountered during cable percussion drilling
50mm slotted standpipe with a pea gravel surround installed from 21.00m to 1.00m BGL. 50mm plain standpipe with a bentonite seal installed from 1.00m BGL to GL, with a raised cover.
Chiselling from 7.20m to 7.20m for 1 hour.

Scale (approx)	Logged By
1:50	JC

Figure No. 9363-01-20.BH05

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Site Project Calvary			**Borehole Number** BH05
Machine : Dando 2000 & Beretta T44 **Flush** : Water **Core Dia**: 63 mm **Method** : Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 7.20m 100mm cased to 21.00m **Location** (dGPS) 716450.7 E 736271.4 N	**Ground Level (mOD)** 6.65 **Dates** 25/02/2020-25/03/2020	**Client** Virtus Project Management **Engineer** Barrett Mahony Consulting Engineers	**Job Number** 9363-01-20 **Sheet** 2/3

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
	40						(1.15)				
						-4.00	10.65 (0.20)	Very stiff grey slightly sandy gravelly CLAY			
11.00-11.38 11.00					14,11/17,15,15,3 SPT(C) 25*/120 50/260	-4.20	10.85	Poor recovery - recovery consists of grey slightly clayey slightly sandy subangular fine to coarse Gravel. Drillers notes: Grey gravelly Sand with cobbles (Dense)			
	47										
12.50-12.73 12.50					15,10/22,19,9 SPT(C) 25*/100 50/130		(3.15)				
	73										
14.00-14.20 14.00					16,9/50 SPT(C) 25*/100 50/100	-7.35	14.00	Very stiff light grey slightly sandy gravelly CLAY with occasional cobble fragments			
	70										
15.50-15.68 15.50					21,4/50 SPT(C) 25*/90 50/90		(3.00)				
	99										
17.00-17.05 17.00					25/50 SPT(C) 25*/20 50/30	-10.35	17.00	Very stiff dark grey slightly sandy gravelly CLAY with occasional cobble fragments			
	100						(2.50)				
18.50											
	100	22	13			-12.85	19.50	Weak fine grained thinly laminated dark grey MUDSTONE partially weathered interbedded with weak to medium strong grey fine to medium grained thinly laminated LIMESTONE partially			
19.50											
20.00											

Remarks

Scale (approx)	Logged By
1:50	JC

Figure No. 9363-01-20.BH05

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Site Project Calvary			**Borehole Number** BH05
Machine : Dando 2000 & Beretta T44 **Flush** : Water **Core Dia** : 63 mm **Method** : Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 7.20m 100mm cased to 21.00m	**Ground Level (mOD)** 6.65	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location (dGPS) 716450.7 E 736271.4 N	**Dates** 25/02/2020-25/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 3/3

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
	100	93	79	12			(1.50)	weathered with Clay smearing Sequence contains three sets of fractures, F1 are very closely to closely spaced, dipping 0 - 25 degrees, rough to smooth planar, F2 are closely to medium spaced, dipping 35 - 50 degrees, smooth planar, F3 are closely spaced, dipping 80 - 90 degrees, rough planar			
21.00						-14.35	21.00	Complete at 21.00m			

Remarks

Scale (approx)	Logged By
1:50	JC

Figure No. 9363-01-20.BH05

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Site Project Calvary			**Borehole Number** BH06
Machine : Dando 2000 & Beretta T47S **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm to 6.00m 100mm to 15.00m	**Ground Level (mOD)** 8.45	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716412.6 E 736350.4 N	**Dates** 02/03/2020-27/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/2

Depth (m)	Sample / Tests	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
									8.15	(0.30) 0.30	Brown slightly sandy slightly gravelly TOPSOIL			
											MADE GROUND: Brown mottled grey slightly sandy slightly gravelly Clay with rare brick and timber fragments			
1.00	B									(1.20)			▼1	
1.20-1.65	SPT(C) N=6							2,2/1,2,1,2	6.95	1.50	Soft to firm brown slightly sandy gravelly CLAY			
2.00	B									(0.50)				
2.00-2.45	SPT(C) N=10							1,2/2,4,2,2	6.45	2.00	Firm brown slightly sandy gravelly CLAY			
								Water strike(1) at 2.50m, rose to 1.20m in 20 mins, sealed at 3.00m.		(1.00)			▽1	
3.00	B													
3.00-3.45	SPT(C) N=25							5,6/5,6,7,7	5.45	3.00	Stiff brown slightly sandy gravelly CLAY			
										(0.50)				
									4.95	3.50	Stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles			
										(0.50)				
4.00	B								4.45	4.00	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles			
4.00-4.34	SPT(C) 50/190							9,9/10,17,23						
5.00	B													
5.00-5.07	SPT(C) 25*/70 50/0							25/50		(2.00)				
6.00		TCR	SCR	RQD	FI			25/50						
6.00-6.06	B SPT(C) 25*/60 50/0								2.45	6.00	Driller notes dark grey slightly sandy gravelly CLAY with cobbles (Very Stiff)			
6.00										(0.50)				
		75							1.95	6.50	Driller notes dark grey cobbles with Sands over gravelly silty Clay			
										(1.50)				
		50												
8.00-8.20								21,4/50 SPT(C) 25*/100 50/100	0.45	8.00	Driller notes grey silty GRAVEL with cobbles (Dense)			
8.00										(1.50)				
		55												
9.50-9.76								12,12/15,35 SPT(C) 50/110	-1.05	9.50	Driller notes dark grey silty sandy gravelly CLAY with cobbles (Very Stiff)			
9.50														

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
Groundwater encountered at 2.50m BGL
50mm slotted standpipe with a pea gravel surround installed from 15.00m to 2.00m BGL. 50mm plain standpipe with a bentonite seal installed from 2.00m BGL to GL, with a flush cover.
Original core lost on site due to vandalism, only drillers notes to reference
Chiselling from 6.00m to 6.00m for 1 hour.

Scale (approx)	Logged By
1:50	JC

Figure No. 9363-01-20.BH06

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Site Project Calvary			**Borehole Number** BH06
Machine : Dando 2000 & Beretta T47S **Flush :** Water **Core Dia:** 63 mm **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm to 6.00m 100mm to 15.00m	**Ground Level (mOD)** 8.45	**Client** Virtus Project Management **Job Number** 9363-01-20
	Location 716412.6 E 736350.4 N	**Dates** 02/03/2020-27/03/2020	**Engineer** Barrett Mahony Consulting Engineers **Sheet** 2/2

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
	25				25/50 SPT(C)		(1.50)				
11.00-11.12 11.00						-2.55	11.00	Driller notes dark grey sandy gravelly CLAY with cobbles (Very Stiff)			
	85						(1.50)				
12.50-12.65 12.50					19,6/50 SPT(C) 25*/100 50/50	-4.05	12.50	Driller notes large Gravel with cobbles (Dense)			
	40						(1.50)				
14.00-14.16 14.00					21,4/50 SPT(C) 25*/100 50/60	-5.55	14.00	Driller notes Gravel (Dense)			
	20						(1.00)				
15.00						-6.55	15.00	Complete at 15.00m			

Remarks

Scale (approx)	Logged By
1:50	JC

Figure No. 9363-01-20.BH06

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Site Project Calvary			**Borehole Number** BH07
Machine : Dando 2000 **Method :**	**Casing Diameter** 200mm to 6.10m	**Ground Level (mOD)** 10.63	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716293.6 E 736254.3 N	**Dates** 05/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.40)	Grey fine to coarse angular to subangular crushed rock FILL		
					10.23	0.40	MADE GROUND: Brown slightly sandy slightly gravelly silty Clay with rare brick and plastic fragments		
1.00	B					(1.40)			
1.20-1.65	SPT(C) N=3			0,0/1,0,1,1					
					8.83	1.80	Possible MADE GROUND: Very soft brown slightly sandy gravelly CLAY		
2.00-2.45	SPT(C) N=2			1,1/0,0,1,1					
2.00	B					(1.20)			
					7.63	3.00	Firm brown slightly sandy gravelly CLAY		
3.00-3.45	SPT(C) N=10			3,3/3,3,2,2		(0.40)			
3.00	B				7.23	3.40	Firm dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
						(0.60)			
					6.63	4.00	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
4.00-4.45	SPT(C) N=46			8,11/11,11,12,12					
4.00	B					(2.10)			
5.00-5.06	SPT(C) 25*/60 50/0			25/50					
5.00	B								
6.00-6.06	SPT(C) 25*/60 50/0			25/50	4.53	6.10	Complete at 6.10m		
6.00	B								

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
No groundwater encountered
Chiselling from 6.10m to 6.10m for 1 hour.

Scale (approx)	Logged By
1:50	

Figure No. 9363-01-20.BH06

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Site Project Calvary			**Borehole Number** BH08
Machine : Dando 2000 **Method :**	**Casing Diameter** 200mm to 6.40m	**Ground Level (mOD)** 10.93	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716296.8 E 736290.5 N	**Dates** 04/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.40)	Brown slightly gravelly TOPSOIL		
					10.53	0.40	MADE GROUND: Brown slightly sandy slightly gravelly Clay with rare brick and plastic fragments		
1.00	B					(1.50)			
1.20-1.65	SPT(C) N=8			2,3/2,2,3,1					
					9.03	1.90	Stiff brown slightly sandy gravelly CLAY		
2.00-2.45	SPT(C) N=24			4,5/6,6,6,6					
2.00	B					(1.40)			
3.00-3.45	SPT(C) N=29			5,5/6,7,8,8					
3.00	B				7.63	3.30	Stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
						(0.70)			
4.00-4.05	SPT(C) 25*/50 50/0			25/50	6.93	4.00	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
4.00	B								
5.00-5.06	SPT(C) 25*/60 50/0			25/50					
5.00	B					(2.40)			
6.00-6.06	SPT(C) 25*/60 50/0			25/50					
6.00	B				4.53	6.40	Complete at 6.40m		

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
No groundwater encountered
Chiselling from 6.40m to 6.40m for 1 hour.

Scale (approx) 1:50

Logged By

Figure No. 9363-01-20.BH08

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Site Project Calvary			**Borehole Number** BH09
Machine : Dando 2000 **Method :**	**Casing Diameter** 200mm to 6.30m	**Ground Level (mOD)** 9.93	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716337 E 736281.9 N	**Dates** 04/03/2020-05/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.40)	Brown slightly gravelly TOPSOIL		
					9.53	0.40	MADE GROUND: Brown slightly sandy slightly gravelly Clay with rare brick and plastic fragments		
1.00	B								
1.20-1.65	SPT(C) N=6			1,1/1,2,1,2		(1.60)			
2.00-2.45	SPT(C) N=23			4,4/6,5,6,6	7.93	2.00	Stiff brown slightly sandy gravelly CLAY		
2.00	B								
						(1.60)			
3.00-3.45	SPT(C) N=24			3,3/4,6,6,8					
3.00	B								
					6.33	3.60	Stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
						(0.40)			
4.00-4.27	SPT(C) 50/115			16,17/24,26	5.93	4.00	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
4.00	B								
5.00-5.07	SPT(C) 25*/70 50/0			25/50		(2.30)			
5.00	B								
6.00-6.07	SPT(C) 25*/70 50/0			25/50					
6.00	B				3.63	6.30	Complete at 6.30m		

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
No groundwater encountered
Pressiselling from 6.30m to 6.30m for 1 hour.

Scale (approx)	Logged By
1:50	

Figure No. 9363-01-20.BH09

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Site Project Calvary			**Borehole Number** BH10
Machine : Dando 2000 **Method :**	**Casing Diameter** 200mm to 6.30m	**Ground Level (mOD)** 8.43	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716384 E 736304.6 N	**Dates** 02/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					8.23	(0.20) 0.20	Brown slightly gravelly TOPSOIL		
							MADE GROUND: Brown slightly sandy slightly gravelly Clay with rare brick and timber fragments		
						(1.10)			
1.00	B								
1.20-1.65	SPT(C) N=4			1,0/1,1,1,1	7.13	1.30			
					6.93	(0.20) 1.50	MADE GROUND: Old Topsoil: Brown slightly gravelly Clay		
						(0.50)	Possible MADE GROUND: Brown slightly sandy slightly gravelly Clay		
2.00	B			Water strike(1) at 2.00m, rose to 1.50m in 20 mins, sealed at 3.00m.	6.43	2.00	Soft to firm brown slightly sandy gravelly CLAY		
2.00-2.45	SPT(C) N=7			1,1/1,4,1,1		(1.00)			
3.00-3.45	SPT(C) N=11			1,2/3,3,2,3	5.43	3.00	Firm brown slightly sandy gravelly CLAY		
3.00	B					(1.00)			
4.00	B			Water strike(2) at 3.70m, rose to 1.50m in 20 mins, sealed at 4.50m.	4.43	4.00	Very stiff brown slightly sandy gravelly CLAY		
4.00-4.45	SPT(C) N=48			7,11/11,12,12,13		(0.50)			
					3.93	4.50	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
5.00-5.07	SPT(C) 25*/70 50/0			25/50					
5.00	B					(1.80)			
6.00-6.07	SPT(C) 25*/70 50/0			25/50					
6.00	B				2.13	6.30	Complete at 6.30m		

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
Groundwater encountered at 2.00m BGL and 3.70m BGL
Chiselling from 6.30m to 6.30m for 1 hour.

Scale (approx) 1:50

Logged By

Figure No. 9363-01-20.BH10

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Site Project Calvary			**Borehole Number** BH11
Machine : Dando 2000 **Method :**	**Casing Diameter** 200mm to 6.60m	**Ground Level (mOD)** 9.15	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716362.9 E 736359.3 N	**Dates** 03/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.90)	Brown slightly gravelly TOPSOIL		
					8.25	0.90			
1.00	B					(0.30)	MADE GROUND: Brown slightly sandy slightly gravelly organic Clay with rare brick fragments		
1.20-1.65	SPT(C) N=12			1,1/3,3,3,3	7.95	1.20	Possible MADE GROUND: Brown slightly sandy slightly gravelly Clay		
						(0.80)			
2.00-2.45	SPT(C) N=7			2,1/3,1,1,2	7.15	2.00	Soft to firm brown slightly sandy gravelly CLAY		
2.00	B					(1.30)			
3.00-3.45	SPT(C) N=23			1,2/3,5,7,8					
3.00	B				5.85	3.30	Stiff brown slightly sandy gravelly CLAY		
						(0.40)			
					5.45	3.70	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
4.00-4.14	SPT(C) 25*/135 50/0			25/50					
4.00	B								
5.00-5.07	SPT(C) 25*/70 50/0			25/50		(2.90)			
5.00	B								
6.00-6.05	SPT(C) 25*/50 50/0			25/50					
6.00	B								
					2.55	6.60	Complete at 6.60m		

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
No groundwater encountered
Pressuremeter selling from 6.60m to 6.60m for 1 hour.

Scale (approx)	Logged By
1:50	

Figure No. 9363-01-20.BH11

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Site Project Calvary			**Borehole Number** BH12
Machine : Dando 2000 **Method :**	**Casing Diameter** 200mm to 5.80m	**Ground Level (mOD)** 9.70	**Client** Virtus Project Management
	Location 716331.9 E 736385.6 N	**Dates** 12/03/2020	**Engineer** Barrett Mahony Consulting Engineers

Job Number 9363-01-20

Sheet 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(1.20)	MADE GROUND: Grey/brown fine to coarse angular to subangular crushed rock FILL with red brick fragments		
1.00	B								
1.20-1.65	SPT(C) N=17			3,7/7,5,3,2	8.50	1.20			
						(0.40)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with some red brick fragments		
					8.10	1.60	Stiff brown slightly sandy gravelly CLAY		
2.00-2.45	SPT(C) N=22			5,5/5,4,7,6					
2.00	B					(1.20)			
					6.90	2.80	Very stiff greyish brown slightly sandy gravelly CLAY		
3.00-3.45	SPT(C) N=48			6,11/11,10,16,11					
3.00	B					(1.50)			
4.00-4.14	SPT(C) 23*/135 50/0			23/50					
4.00	B				5.40	4.30	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
5.00-5.06	SPT(C) 25*/60 50/0			25/50		(1.50)			
5.00	B								
					3.90	5.80	Complete at 5.80m		

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
No groundwater encountered
Chiselling from 5.80m to 5.80m for 1 hour.

Scale (approx) 1:50

Logged By

Figure No. 9363-01-20.BH12

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Site Project Calvary			**Borehole Number** BH13
Machine : Dando 2000 **Method :**	**Casing Diameter** 200mm to 6.90m	**Ground Level (mOD)** 9.27	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716245.7 E 736438.4 N	**Dates** 10/03/2020-11/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.60)	Brown slightly gravelly TOPSOIL		
					8.67	0.60	MADE GROUND: Orangish brown slightly sandy slightly gravelly organic Clay with rare brick fragments		
1.00	B								
1.20-1.65	SPT(C) N=10			1,2/3,2,3,2		(1.40)			
2.00-2.45	SPT(C) N=23			3,3/5,5,6,7	7.27	2.00	Stiff brown slightly sandy gravelly CLAY		
2.00	B								
3.00-3.45	SPT(C) N=24			5,5/5,5,6,8		(2.00)			
3.00	B								
4.00-4.45	SPT(C) N=39			6,6/8,10,8,13	5.27	4.00	Very stiff brown slightly sandy gravelly CLAY		
4.00	B					(0.50)			
					4.77	4.50	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
5.00-5.06	SPT(C) 25*/60 50/0			25/50					
5.00	B					(2.20)			
6.00-6.06	SPT(C) 25*/60 50/0			25/50					
6.00	B								
					2.57	6.70	OBSTRUCTION: Large boulder or bedrock		
					2.37	(0.20) 6.90	Complete at 6.90m		

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
No groundwater encountered
Coreselling from 6.70m to 6.90m for 1.5 hours.

Scale (approx)	Logged By
1:50	

Figure No. 9363-01-20.BH13

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Site Project Calvary			**Borehole Number** BH14
Machine : Dando 2000 & Beretta T44 **Method :** Cable percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 5.70m 100mm cased to 15.00m	**Ground Level (mOD)** 13.98	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716194.1 E 736409.9 N	**Dates** 11/03/2020-27/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/2

Depth (m)	Sample / Tests	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
									13.88	0.10	Tarmacadam			
									13.78	0.20	FILL: Grey fine to coarse angular to subangular crushed rock Fill			
										(1.00)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with rare brick fragments			
1.00	B													
1.20-1.65	SPT(C) N=9							2,2/1,2,4,2	12.78	1.20	Firm brown slightly sandy gravelly CLAY			
2.00	B													
2.00-2.45	SPT(C) N=10							2,3/2,2,3,3		(1.80)				
3.00	B													
3.00-3.45	SPT(C) N=34							5,3/3,9,11,11	10.98	3.00	Very stiff brown slightly sandy gravelly CLAY			
										(0.30)				
									10.68	3.30	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles			
4.00	B													
4.00-4.29	SPT(C) 50/135							14,15/12,38						
										(2.40)				
5.00	B													
5.00-5.07	SPT(C) 25*/70 50/0							25/50						
		TCR	SCR	RQD	FI									
5.70									8.28	5.70	Poor recovery - recovery consists of light grey slightly sandy gravelly Clay. Drillers notes: Gray Sand (Medium dense)			
		43								(0.60)				
6.50-6.95								6,8/7,7,8,8 SPT(C) N=30	7.68	6.30	Poor recovery - recovery consists of grey slightly clayey subrounded to subangular fine to coarse Gravel with cobble fragments. Drillers notes: Black boulder Clay (Very stiff)			
6.50														
		10												
										(2.70)				
8.00-8.29								9,16/25,25 SPT(C) 50/140						
8.00														
		50												
									4.98	9.00	Very stiff light grey slightly sandy gravelly CLAY			
										(0.50)				
9.50-9.65								10,15/50 SPT(C) 25*/120 50/30	4.48	9.50	Poor recovery - recovery consists of grey slightly clayey subrounded to angular fine to coarse Gravel with cobble fragments. Drillers notes: Brown gravelly Clay (Very stiff)			
9.50														

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
No groundwater encountered during cable percussion drilling
50mm slotted standpipe with a pea gravel surround installed from 15.00m to 2.00m BGL. 50mm plain standpipe with a bentonite seal installed from 2.00m BGL to GL, with a raised cover.
Chiselling from 5.70m to 5.70m for 1 hour.

Scale (approx)	Logged By
1:50	JC

Figure No. 9363-01-20.BH14

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Site Project Calvary			**Borehole Number** BH14
Machine : Dando 2000 & Beretta T44 **Flush** : Water **Core Dia**: 63 mm **Method** : Cable percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 5.70m 100mm cased to 15.00m **Location** 716194.1 E 736409.9 N	**Ground Level (mOD)** 13.98 **Dates** 11/03/2020-27/03/2020	**Client** Virtus Project Management **Engineer** Barrett Mahony Consulting Engineers	**Job Number** 9363-01-20 **Sheet** 2/2

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
	39				19,6/50 SPT(C) 25*/100 50/40		(1.50)				
11.00-11.14 11.00						2.98	11.00	Very stiff grey slightly sandy gravelly CLAY			
	100						(1.50)				
50-12.64 50					/ SPT(C) 0*/100 0/40	1.48	12.50	Very stiff dark grey slightly sandy gravelly CLAY			
							(0.35)				
						1.13	12.85	Grey subrounded to angular fine to coarse Gravel. Drillers notes: Black boulder Clay (Very stiff)			
	66						(0.75)				
						0.38	13.60	Very stiff dark grey slightly sandy gravelly CLAY with cobble fragments			
14.00-14.23 14.00					19,6/50 SPT(C) 50/75		(1.05)				
	70										
						-0.67	14.65	Grey subrounded to angular fine to coarse Gravel. Drillers notes: Black gravelly boulder Clay (Very stiff)			
							(0.35)				
15.00						-1.02	15.00	Complete at 15.00m			

Remarks

Scale (approx)	Logged By
1:50	JC

Figure No. 9363-01-20.BH14

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Site Project Calvary			**Borehole Number** BH15
Machine : Dando 2000 **Method :**	**Casing Diameter** 200mm to 6.10m	**Ground Level (mOD)** 7.67	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716214.8 E 736484.6 N	**Dates** 07/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.30)	Brown slightly gravelly TOPSOIL		
					7.37	0.30	MADE GROUND: Brown slightly sandy slightly gravelly organic Clay with some red brick and ceramic fragments		
						(1.20)			
1.00	B								
1.20-1.65	SPT(C) N=8			0,1/2,2,2,2					
					6.17	1.50	Firm brown slightly sandy gravelly CLAY		
						(0.50)			
2.00-2.45	SPT(C) N=14			2,2/3,4,4,3	5.67	2.00	Firm to stiff brown slightly sandy gravelly CLAY		
2.00	B								
						(1.20)			
3.00-3.45	SPT(C) N=26			3,4/6,6,7,7					
3.00	B				4.47	3.20	Stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
						(0.80)			
4.00-4.06	SPT(C) 25*/60 50/0			25/50	3.67	4.00	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
4.00	B								
5.00-5.06	SPT(C) 25*/60 50/0			25/50		(2.10)			
5.00	B								
6.00-6.07	SPT(C) 25*/70 50/0			25/50	1.57	6.10	Complete at 6.10m		
6.00	B								

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
No groundwater encountered
Chiselling from 6.10m to 6.10m for 1 hour.

Scale (approx) 1:50

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Figure No. 9363-01-20.BH15

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Site Project Calvary			**Borehole Number** BH16
Machine : Dando 2000 **Method :**	**Casing Diameter** 200mm to 6.50m	**Ground Level (mOD)** 9.11	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716155.8 E 736517.4 N	**Dates** 09/03/2020-10/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.30)	Brown slightly gravelly TOPSOIL		
					8.81	0.30	MADE GROUND: Brown slightly sandy slightly gravelly Clay with rare brick fragments and some cobbles		
1.00	B					(1.60)			
1.20-1.65	SPT(C) N=4			4,1/1,1,1,1					
					7.21	1.90	Stiff brown slightly sandy gravelly CLAY		
2.00-2.45 2.00	SPT(C) N=24 B			3,4/5,5,6,8		(1.20)			
3.00-3.45 3.00	SPT(C) N=28 B			3,2/2,8,9,9	6.01	3.10	Stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		▼1
						(0.90)			
4.00	B			Water strike(1) at 4.00m, rose to 3.20m in 20 mins, sealed at 4.50m.	5.11	4.00	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		▽1
4.00-4.40	SPT(C) 50/245			6,9/12,15,15,8					
5.00-5.28 5.00	SPT(C) 50/125 B			17,20/26,24		(2.50)			
6.00-6.07 6.00	SPT(C) 25*/70 50/0 B			25/50					
					2.61	6.50	Complete at 6.50m		

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
Groundwater encountered at 4.00m BGL
Chiselling from 6.50m to 6.50m for 1 hour.

Scale (approx)	Logged By
1:50	

Figure No. 9363-01-20.BH16

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Site Project Calvary			**Borehole Number** BH17
Machine : Dando 2000 & Beretta T44 **Method :** Cable Percussion and Rotary Coring	**Casing Diameter** 200mm to 5.80m 100mm to 15.50m	**Ground Level (mOD)** 6.62	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716254.2 E 736573.8 N	**Dates** 07/03/2020-09/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/2

Depth (m)	Sample / Tests	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
									6.62	(0.30) 0.30	Brown slightly gravelly TOPSOIL			
									6.32		MADE GROUND: Brown slightly sandy gravelly Clay with rare red brick and plastic fragments			
1.00	B									(1.60)				
1.20-1.65	SPT(C) N=5							2,1/2,1,1,1						
2.00	B								4.72	1.90	Very stiff greyish brown slightly sandy gravelly CLAY			
2.00-2.31	SPT(C) 50/160							11,14/21,17,12		(0.40)				
									4.32	2.30	Very stiff brown slightly sandy gravelly CLAY			
										(0.90)				
3.00	B													
3.00-3.27	SPT(C) 50/115							14,14/20,30						
									3.42	3.20	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles			
4.00	B													
4.00-4.07	SPT(C) 25*/70 50/0							25/50						
										(2.60)				
5.00	B													
5.00-5.07	SPT(C) 25*/70 50/0							25/50						
5.80		TCR	SCR	RQD	FI				0.82	5.80				
										(0.35)	Poor recovery - recovery consists of grey subrounded to angular fine to coarse Gravel with cobble fragments. Drillers notes: Grey sandy gravelly Clay (Very stiff)			
		29							0.47	6.15				
								12,13/50		(0.35)				
6.50-6.58	SPT(C) 25*/75 50/0													
6.50									0.12	6.50	Very stiff dark grey slightly sandy gravelly CLAY			
		43									Poor recovery - recovery consists of grey slightly sandy gravelly Clay with cobble fragments. Drillers notes: Black boulder Clay (Very stiff)			
								8,8/9,9,10,12						
8.00-8.45	SPT(C) N=40													
8.00										(3.00)				
		68												
9.50									-2.88	9.50	Poor recovery - recovery consists of grey clayey angular fine to coarse Gravel. Drillers notes: Black boulder Clay (Very stiff)			

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
No groundwater encountered
50mm slotted standpipe with a pea gravel surround installed from 15.50m to 2.00m BGL. 50mm plain standpipe with a bentonite seal installed from 2.00m BGL to GL, with a raised cover.
Chiselling from 5.80m to 5.80m for 1 hour.

Scale (approx) 1:50

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Figure No. 9363-01-7

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Site Project Calvary			**Borehole Number** BH17
Machine : Dando 2000 & Beretta T44 **Flush :** **Core Dia :** mm **Method :** Cable Percussion and Rotary Coring	**Casing Diameter** 200mm to 5.80m 100mm to 15.50m	**Ground Level (mOD)** 6.62	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716254.2 E 736573.8 N	**Dates** 07/03/2020-09/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 2/2

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
	71						(1.20)				
					19,6/50 SPT(C) 50/0	-4.08	10.70	Very stiff grey slightly sandy gravelly CLAY			
11.00-11.15 11.00							(0.50)				
	76					-4.58	11.20	Poor recovery - recovery consists of grey slightly clayey angular to subangular fine to coarse Gravel with boulder fragments. Drillers notes: Grey gravelly boulder Clay (Very stiff)			
							(1.40)				
12.50 12.60						-5.98	12.60	Strong grey fine to medium grained thinly laminated LIMESTONE unweathered to partially weathered			
	100	58	54	7							
14.00							(2.90)				
14.30				NI				14.00m to 14.30m BGL: Black clayey sandy angular fine to coarse Gravel lens			
	100	60	46	10				Sequence contains two sets of fractures, F1 are closely spaced, dipping 0 - 15 degrees, rough to smooth planar, F2 are medium spaced, dipping 35 - 50 degrees, rough to smooth planar			
15.50						-8.88	15.50	Complete at 15.50m			

Remarks

Scale (approx)	Logged By
1:50	

Figure No. 9363-01-7

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Site Project Calvary Additional Work				**Borehole Number** BH18
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 7.20m	**Ground Level (mOD)** 15.35	**Client** Virtus Project Management	**Job Number** 9645-05-20
	Location (dGPS) 716190.1 E 736389.1 N	**Dates** 26/06/2020-29/06/2020	**Engineer** Barret Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					15.25	0.10	TARMACADAM		
					15.15	0.20	FILL: Grey coarse angular Gravel with many angular cobbles (Crushed Rock Fill)		
0.20	B					(1.00)	Brown slightly sandy gravelly CLAY. Gravel is fine to coarse, angular to subangular		
1.00	B				14.15	1.20			
1.20-1.65	SPT(C) N=16			2,4/4,4,4,4			Stiff brown slightly sandy gravelly CLAY. Gravel is fine to coarse, angular to subangular		
						(0.80)			
2.00-2.45	SPT(C) N=48			6,7/10,12,13,13	13.35	2.00	Very stiff brown slightly sandy gravelly CLAY. Gravel is fine to coarse, angular to subangular		
2.00	B					(0.60)			
					12.75	2.60	Very stiff dark grey slightly sandy gravelly CLAY with occasional subangular cobbles. Gravel is fine to coarse, angular to subangular		
3.00-3.45	SPT(C) N=28			4,4/6,7,7,8					
3.00	B								
4.00-4.45	SPT(C) N=30			4,5/6,7,8,9					
4.00	B								
						(4.60)			
5.00-5.10	SPT(C) 50*/95 50/0			30,20/50					
5.00	B								
6.00-6.40	SPT(C) 50/245			10,12/13,13,16,8					
6.00	B								
7.00-7.19	SPT(C) 50/40			15,19/50					
7.00	B				8.15	7.20	OBSTRUCTION due to possible boulder or bedrock		
7.20	B						Complete at 7.20m		

Remarks
No Groundwater encountered
Hand dug pit to 1.20m BGL
Refusal at 7.20m BGL
Borehole backfilled upon completion
Chiselling from 5.00m to 5.30m for 1 hour. Chiselling from 7.20m to 7.20m for 1 hour. Excavating from 0.00m to 1.20m for 1.5 hours.

Scale (approx)	Logged By
1:50	AB

Figure No. 9645-05-20.BH18

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Site Project Calvary Additional Work			**Borehole Number** BH19
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 6.30m	**Ground Level (mOD)** 12.84	**Client** Virtus Project Management	**Job Number** 9645-05-20
	Location (dGPS) 716231.4 E 736359.3 N	**Dates** 29/06/2020-30/06/2020	**Engineer** Barret Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					12.74	0.10 (0.20)	TARMACADAM		
0.20	B				12.54	0.30	FILL: Grey coarse angular Gravel with many angular cobbles (Crushed Rock Fill)		
						(0.90)	Brown slightly sandy gravelly CLAY with occasional subrounded cobbles. Gravel is fine to coarse, angular to subangular		
1.00	B								
1.20-1.65	SPT(C) N=15			2,2/3,4,4,4	11.64	1.20	Stiff brown slightly sandy gravelly CLAY with occasional subrounded cobbles. Gravel is fine to coarse, angular to subangular		
						(0.90)			
2.00-2.45	SPT(C) N=24			5,6/5,6,6,7	10.74	2.10	Stiff dark grey slightly sandy gravelly CLAY with occasional subangular cobbles. Gravel is fine to coarse, angular to subangular		
2.00	B					(0.90)			
3.00-3.45	SPT(C) N=28			4,5/6,6,7,9	9.84	3.00	Very stiff dark grey slightly sandy gravelly CLAY with occasional subangular cobbles. Gravel is fine to coarse, angular to subangular		
3.00	B								
4.00-4.45	SPT(C) N=30			4,6/6,8,8,8					
4.00	B					(3.30)			▼1
5.00	B			Water strike(1) at 5.00m, rose to 4.60m in 20 mins.					▽1
5.00-5.45	SPT(C) N=44			7,8/10,10,11,13					
6.00-6.24	SPT(C) 50/85			7,11/15,35					
6.00	B								
6.30	B				6.54	6.30	OBSTRUCTION due to possible boulder or bedrock		
							Complete at 6.30m		

Remarks
Groundwater encountered at 5.00m BGL
Hand dug pit to 1.20m BGL
Refusal at 6.30m BGL
Borehole backfilled upon completion
Chiselling from 6.30m to 6.30m for 1 hour. Excavating from 0.00m to 1.20m for 1.5 hours.

Scale (approx)	Logged By
1:50	AB

Figure No. 9645-05-20.BH19

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Site Project Calvary Additional Work			**Borehole Number** BH20
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 6.70m	**Ground Level (mOD)** 12.49	**Client** Virtus Project Management	**Job Number** 9645-05-20
	Location (dGPS) 716218.4 E 736310.1 N	**Dates** 30/06/2020-01/07/2020	**Engineer** Barret Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					12.39	0.10	TARMACADAM		
						(0.30)			
0.20	B				12.09	0.40	FILL: Grey coarse angular Gravel with many angular cobbles (Crushed Rock Fill)		
						(0.60)	MADE GROUND: Reddish brown mottled black slightly sandy gravelly Clay with occasional fragments of concrete and shells		
1.00	B				11.49	1.00			
						(0.20)			
1.20-1.65	SPT(C) N=12			1,2/3,3,3,3	11.29	1.20	Brown slightly sandy gravelly CLAY with occasional subrounded cobbles. Gravel is fine to coarse, angular to subangular		
							Firm to stiff brown slightly sandy gravelly CLAY with occasional subrounded cobbles. Gravel is fine to coarse, angular to subangular		
2.00-2.45	SPT(C) N=13			2,2/3,3,3,4		(1.80)			
2.00	B								
3.00-3.45	SPT(C) N=40			5,5/7,9,11,13	9.49	3.00	Very stiff dark grey slightly sandy gravelly CLAY with occasional subangu;lar cobbles. Gravel is fine to coarse, subangular to subrounded		
3.00	B								
4.00-4.45	SPT(C) N=31			4,7/7,7,7,10					
4.00	B								
						(3.70)			
5.00-5.45	SPT(C) N=46			5,7/10,11,12,13					
5.00	B								
6.00-6.40	SPT(C) 50/245			6,7/11,14,14,11					
6.00	B								
6.70	B				5.79	6.70	OBSTRUCTION due to possible boulder or bedrock		
							Complete at 6.70m		

Remarks
No groundwater encountered
Hand dug pit to 1.20m BGL
Refusal at 6.70m BGL
Borehole backfilled upon completion
Chiselling from 6.70m to 6.70m for 1 hour. Excavating from 0.00m to 1.20m for 1.5 hours.

Scale (approx)	Logged By
1:50	AB

Figure No. 9645-05-20.BH20

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Site Project Calvary Clonliffe Road			**Borehole Number** RC02A
Machine : Beretta T44 **Flush :** Water **Core Dia:** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15.8m	**Ground Level (mOD)** 7.14	**Client** Virtus	**Job Number** 9791-07-20
	Location 716182 E 736542 N	**Dates** 05/10/2020-06/10/2020	**Engineer** Barrett Mahony	**Sheet** 1/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00						6.89	(0.25) 0.25	TOPSOIL: Soft to firm dark brown slightly sandy slightly gravelly Clay with grass and rootlets. Gravel is fine to medium subangular to rounded.		
						6.49	(0.40) 0.65	Soft to firm light brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subangular to rounded.		
	34					6.14	(0.35) 1.00	Soft to firm light brown slightly sandy gravelly CLAY with occasional subangular cobbles. Gravel is fine to coarse subangular to subrounded.		
						5.94	(0.20) 1.20	Brown slightly sandy clayey fine to coarse subangular to rounded GRAVEL with occasional subangular to subrounded cobbles.		
							(1.10)	Poor recovery. Recovery consists of brown to grey clayey sandy fine to coarse subangular to rounded Gravel with frequent cobbles of Limestone. Driller notes brown sandy gravelly clay with boulders.		
2.30 2.30-2.75					8,9/13,37 SPT(C) N=50	4.84	2.30	Poor recovery. Recovery consists of fine to coarse subangular to subrounded Gravel with frequent cobbles of Limestone. Driller notes brown sandy gravelly clay (very stiff).		
	21						(1.50)			
3.80 3.80-4.25					3,5/5,3,4,4 SPT(C) N=16	3.34	3.80	Poor recovery. Recovery consists of dark grey/brown sandy very gravelly CLAY with frequent cobbles and occasional boulders of Limestone. Gravel is fine to coarse subangular to subrounded. Driller notes black sandy gravelly clay (stiff).		
	23									
5.30-5.75					5,6/6,5,7,5 SPT(C) N=23					
5.80										
	22									
6.80 6.80-7.25					7,8/6,6,5,7 SPT(C) N=24		(6.00)			
	26									
8.30 8.30-8.75					8,6/7,8,7,7 SPT(C) N=29					
	47									
9.80 9.80-10.25					9,11/12,12,13,13 SPT(C) N=50	-2.66	9.80	Poor recovery. Recovery consists of dark grey/brown sandy		

Remarks
Inspection pit carried out to 1.20m BGL.
Inspection pit sidewalls stable.
No groundwater encountered.
Rotary core follow on from 1.20m BGL.
Borehole complete at 15.80m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC02A

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Site Project Calvary Clonliffe Road				**Borehole Number** RC02A
Machine : Beretta T44 **Flush** : Water **Core Dia** : 64 mm **Method** : Rotary Cored	**Casing Diameter** 64mm to 15.8m	**Ground Level (mOD)** 7.14	**Client** Virtus	**Job Number** 9791-07-20
	Location 716182 E 736542 N	**Dates** 05/10/2020-06/10/2020	**Engineer** Barrett Mahony	**Sheet** 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	63						(2.35)	very gravelly CLAY with frequent cobbles and occasional boulders of Limestone. Gravel is fine to coarse subangular to subrounded. Driller notes black sandy gravelly clay (very stiff).		
11.30 11.30-11.75					11,14/15,14,16,5 SPT(C) N=50					
12.15	75	45	28			-5.01	12.15	Strong narrowly banded dark grey fine grained LIMESTONE with rare pyrite veins and dark brown slightly sandy slightly gravelly Clay lenses. Predominantly unweathered. 12.15m - 14.50m BGL: 2 Fracture sets. F1: 5 - 20 degrees, closely spaced, undulating to planar, rough to smooth, slight clay smearing. F2: 45 - 60 degrees, closely to widely spaced, undulating to planar, rough, clay smearing.		
12.80 12.80-13.25	100	70	23	8	25,25/50 SPT(C) N=50		(1.25)			
13.40	41	25	21			-6.26	13.40	Medium strong to strong narrowly banded dark grey fine grained LIMESTONE with rare pyrite veins. Predominantly unweathered.		
14.50 14.80	100	85	35	11			(2.40)	Non intact zones between 14.50m - 14.60m BGL and 15.55m - 15.63m BGL. 14.60m - 15.80m BGL: 2 Fracture sets: F1: 5 - 20 degrees, very close to closely spaced, undulating to planar, rough to smooth, slight clay smearing. F2: 70 - 80 degrees, closely spaced, undulating to planar, rough to smooth, some clay infilling and slight brown oxidation staining.		
15.80						-8.66	15.80	Complete at 15.80m		

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC02A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC03A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15.5m	**Ground Level (mOD)** 9.00	**Client** Virtus	**Job Number** 9791-07-20
	Location 716174 E 736486 N	**Dates** 07/10/2020	**Engineer** Barrett Mahony	**Sheet** 1/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00						8.70	(0.30) 0.30	TOPSOIL: Firm brown slightly sandy gravelly Clay with grass, rootlets, and occasional fragments of red brick, plastic and charcoal. Gravel is fine to coarse subangular to subrounded.		
							(0.90)	Firm light brown slightly sandy gravelly CLAY with frequent subangular to subrounded cobbles. Gravel is fine to coarse subangular to rounded.		
	17					7.80	1.20	Poor recovery. Recovery consists of grey to brown slightly clayey slightly sandy fine to coarse angular to subrounded Gravel with cobbles of Limestone. Driller notes gravelly clay and cobbles.		
[illegible]0										
	26						(3.80)			
3.80										
	20									
5.00 5.00-5.45					2,3/3,4,4,5 SPT N=16	4.00	5.00	Poor recovery. Recovery consists of dark grey slightly clayey slightly sandy fine to coarse subangular to subrounded Gravel with cobbles of Limestone. Driller notes gravelly clay and cobbles (stiff).		
	17						(1.50)			
[illegible]0 6.50-6.95					3,6/7,6,5,8 SPT N=26	2.50	6.50	Poor recovery. Recovery consists of dark brown slightly clayey slightly gravelly fine to medium Sand. Gravel is fine to medium subangular to subrounded. Driller notes brown sandy gravel (medium dense).		
	35						(1.10)			
8.00 8.00-8.45					7,7/6,8,8,9 SPT N=31	1.40	7.60	Poor recovery. Recovery consists of grey slightly clayey slightly sandy fine to coarse subangular to rounded Gravel with frequent cobbles of Limestone. Driller notes black sandy gravelly clay (very stiff).		
	15						(1.90)			
9.50 9.50-9.95					8,8/5,8,9,9 SPT N=31	-0.50	9.50	Poor recovery. Recovery consists of grey fine to coarse subangular to subrounded Gravel with frequent cobbles of Limestone. Driller notes brown sandy gravel (dense).		

Remarks
[illegible]spection pit carried out to 1.20m BGL.
[illegible]pection pit sidewalls stable.
[illegible] groundwater encountered.
Rotary core follow on from 1.20m BGL.
Borehole complete at 15.50m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC03A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC03A
Machine : Beretta T44 **Flush :** Water **Core Dia:** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15.5m	**Ground Level (mOD)** 9.00	**Client** Virtus	**Job Number** 9791-07-20
	Location 716174 E 736486 N	**Dates** 07/10/2020	**Engineer** Barrett Mahony	**Sheet** 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	12									
11.00 11.00-11.45	18				6,6/7,8,7,8 SPT N=30		(5.30)			
12.50 12.50-12.95	15				8,9/11,8,9,9 SPT N=37					
14.00 14.00-14.45	46				6,9/9,9,10,10 SPT N=38	-5.80	14.80	Poor recovery. Recovery consists of dark grey clayey slightly sandy fine to coarse subangular to subrounded Gravel with cobbles and boulders of Limestone. Driller notes black sandy gravelly clay (very stiff).		
							(0.70)			
15.50						-6.50	15.50	Complete at 15.50m		

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC03A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC04A
Machine : Beretta T44 **Flush :** Water **Core Dia:** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 17.0m	**Ground Level (mOD)** 7.23	**Client** Virtus	**Job Number** 9791-07-20
	Location 716216 E 736492 N	**Dates** 07/10/2020-08/10/2020	**Engineer** Barrett Mahony	**Sheet** 1/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00						6.93	(0.30) 0.30	TOPSOIL: Brown slightly sandy slightly gravelly Clay with rare ceramic fragments. Gravel is fine to medium subangular to subrounded.		
						6.73	(0.20) 0.50	Soft light brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subangular to subrounded.		
	19						(0.70)	Soft to firm light brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subangular to subrounded.		
						6.03	1.20	Poor recovery. Recovery consists of firm brown sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded. Driller notes light brown sandy clay.		
2.00 2.00-2.45					2,2/1,2,4,3 SPT N=10		(1.80)			
	41					4.23	3.00	Poor recovery. Recovery consists of grey slightly clayey slightly sandy fine to coarse subangular to subrounded GRAVEL with occasional cobbles of Limestone. Driller notes large gravels and brown sand (medium dense).		
							(0.50)			
3.50 3.50-3.95					3,4/25,25 SPT N=50	3.73	3.50	Poor recovery. Recovery consists of grey slightly clayey slightly sandy fine to coarse subangular to subrounded GRAVEL with occasional cobbles of Limestone. Driller notes large gravels and brown sand (very dense).		
	19						(1.50)			
5.00 5.00-5.45					6,5/6,7,7,8 SPT N=28	2.23	5.00	Poor recovery. Recovery consists of dark grey clayey slightly sandy Gravel with occasional cobbles of Limestone. Driller notes black sandy gravelly clay (stiff).		
	22						(1.50)			
6.50-6.95					9,20/50 SPT N=50	0.73	6.50	Poor recovery. Recovery consists of grey slightly clayey slightly sandy GRAVEL with occasinoal cobbles of Limestone. Driller notes large gravels and small boulder (very dense).		
	25									
8.00 8.00-8.45					12,12/14,11,25 SPT N=50					
	22						(4.13)			
9.50 9.50-9.95					11,13/13,17,20 SPT N=50					

Remarks
Inspection pit carried out to 1.20m BGL.
Inspection pit sidewalls stable.
No groundwater encountered.
Rotary core follow on from 1.20m BGL.
Borehole complete at 17.0m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC04A

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Site Project Calvary Clonliffe Road				**Borehole Number** RC04A
Machine : Beretta T44 **Flush :** Water **Core Dia:** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 17.0m	**Ground Level (mOD)** 7.23	**Client** Virtus	**Job Number** 9791-07-20
	Location 716216 E 736492 N	**Dates** 07/10/2020-08/10/2020	**Engineer** Barrett Mahony	**Sheet** 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	30					-3.40	10.63 (0.17)	Poor recovery. Recovery consists of dense dark brown slightly clayey slightly silty fine to medium SAND.		
11.00 11.00-11.45	60				25,25/50 SPT N=50	-3.57	10.80	Very stiff dark brown to black slightly sandy gravelly CLAY with cobbles and boulders of Limestone. Gravel is fine to coarse subangular to subrounded.		
12.40 12.50-12.95	88	24			15,19/50 SPT N=50		(2.90)			
13.70						-6.47	13.70	Strong narrowly banded dark grey fine grained LIMESTONE. Predominantly unweathered.		
14.00	100	69	40	NI				13.70m - 14.20m BGL: Predominantly non intact but recovery indicates 2 fracture sets. F1: 5 - 30 degrees, very closely to medium spaced, planar, rough to smooth, slight clay smearing. F2: 60 - 80 degrees, very closely to medium sapced, extremely closely to medium spaced, planar, rough to smooth, occasional clay smearing.		
14.70										
15.50	100	98	93	5			(3.30)	14.20m - 17.00m BGL: 2 fracture sets. F1: 5 - 30 degrees, extremely close to medium spaced, planar, rough to smooth, occasional clay smearing. F2: one fracture occurring between 14.50m BGL - 14.70m BGL, dipping 70 degrees, undulating, rough.		
17.00						-9.77	17.00	Complete at 17.00m		

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC04A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC05A
Machine : Beretta T44 **Flush :** Water **Core Dia:** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 21.5m	**Ground Level (mOD)** 10.64	**Client** Virtus	**Job Number** 9791-07-20
	Location 716278 E 736401 N	**Dates** 08/10/2020-09/10/2020	**Engineer** Barrett Mahony	**Sheet** 1/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00						10.44	(0.20) 0.20	TOPSOIL: Brown slightly sandy slightly gravelly Clay. Gravel is fine to medium subrounded to rounded.		
	11						(1.00)	MADE GROUND: Brown sandy gravelly Clay with subangular to subrounded cobbles and boulders and occasional fragments of red brick, plastic, charcoal and metal. Gravel is fine to coarse subangular to subrounded.		
						9.44	1.20	Poor recovery. Recovery consists of brownish grey slightly clayey slightly sandy fine to coarse subangular to subrounded GRAVEL with occasional cobbles of Limestone. Driller notes brown clayey gravels and cobbles (medium dense).		
2.00 2.00-2.45	16				3,5/5,6,4,5 SPT N=20					
3.50 3.50-3.95	22				6,4/4,5,5,4 SPT N=18		(5.30)			
5.00 5.00-5.45	18				4,5/5,6,7,6 SPT N=24					
6.50-6.95	0				5,5/7,8,6,6 SPT N=27	4.14	6.50	No recovery. Driller notes brown SAND (medium dense).		
							(1.50)			
8.00 8.00-8.45	18				25,25/50 SPT N=50	2.64	8.00	Poor recovery. Recovery consists of grey slightly clayey slightly sandy fine to coarse subangular to subrounded GRAVEL with occasinoal cobbles of Limestone. Driller notes gravels and cobbles (dense).		
9.50 9.50-9.95					9,13/9,8,10,11 SPT N=38					

Remarks
Inspection pit carried out to 1.20m BGL.
Inspection pit sidewalls stable.
No groundwater encountered.
Rotary core follow on from 1.20m BGL.
Borehole complete at 21.50m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC05A

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Site Project Calvary Clonliffe Road				**Borehole Number** RC05A
Machine : Beretta T44 **Flush :** Water **Core Dia:** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 21.5m	**Ground Level (mOD)** 10.64	**Client** Virtus	**Job Number** 9791-07-20
	Location 716278 E 736401 N	**Dates** 08/10/2020-09/10/2020	**Engineer** Barrett Mahony	**Sheet** 2/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	20						(4.50)			
11.00 11.00-11.45	21				8,8/9,9,11,13 SPT N=42					
12.50 12.50-12.95	18				8,12/12,12,14,12 SPT N=50	-1.86	12.50	Poor recovery. Recovery consists of dark brown slightly gravelly very sandy Clay. Gravel is fine to medium subangular to subrounded. Driller notes fine grey sand with gravel (very stiff).		
14.00 14.00-14.45	22				12,10/11,14,16,9 SPT N=50		(2.85)			
15.50 15.50-15.95	26				10,17/17,18,15 SPT N=50	-4.71	15.35	Poor recovery. Recovery consists of fine to coarse subangular to rounded GRAVEL with occasional cobbles of Limestone. Driller notes fine sand and gravel (very dense).		
17.00						-6.36	(1.65) 17.00	Poor recovery. Recovery consists of grey to dark brown slightly clayey slightly sandy GRAVEL with cobbles and boulders of Limestone.		
17.93	65	37	15			-7.29	(0.93) 17.93	Strong narrowly banded light grey fine grained LIMESTONE with rare pyrite. Partially weathered. 17.93m - 19.10m BGL: 2 Fracture sets. F1: 5 - 30 degrees, closely to medium spaced, planar to undulating, rough, clay smearing, orange to brown oxidation staining. F2: 70 - 90 degrees, medium sapced, undulating, rough, clay smearing, occasional slight orange ocidation staining.		
18.50				9			(1.27)			
19.10				NI						
19.20	100	63	47	8		-8.56	19.20	Strong narrowly banded dark to light grey fine grained LIMESTONE with rare pyrite. Partially weathered. 19.20m - 19.80m BGL: 2 Fracture sets. F1: 5 - 20 degrees, very closely to medium spaced, planar, smooth to rough, clay smearing. F2: 70 - 90 degrees, medium to widely spaced, undulating, rough to smooth,		
19.80										
20.00				NI						

Remarks

Scale (approx)	Logged By
1:50	JMD

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Site Project Calvary Clonliffe Road			**Borehole Number** RC05A
Machine : Beretta T44 **Flush :** Water **Core Dia:** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 21.5m	**Ground Level (mOD)** 10.64	**Client** Virtus	**Job Number** 9791-07-20
	Location 716278 E 736401 N	**Dates** 08/10/2020-09/10/2020	**Engineer** Barrett Mahony	**Sheet** 3/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	100	37	15	15			(2.30)	clay smearing. 20.00m - 20.44m BGL: 2 Fracture sets. F1: 5 - 30 degrees, closely spaced, undulating to planar, rough to smooth, slight clay smearing. F2: 70 - 90 degrees, closely spaced, undulating to planar, rough to smooth, slight clay smearing, orange to brown oxidation staining. 20.57m - 21.50m BGL: Predominantly non intact but recovery indicates 2 fracture sets. F1: 5 - 30 degrees, very closely to closely spaced, undulating to planar, rough to smooth. F2: 70 - 90 degrees, closely spaced, undulating to planar, rough to smooth, slight clay smearing, orange to brown oxidation staining.		
21.50						-10.86	21.50	Complete at 21.50m		

Remarks

Scale (approx)	Logged By
1:50	JMD

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Site Project Calvary Clonliffe Road				**Borehole Number** RC06A
Machine : Beretta T44 **Flush :** Water **Core Dia:** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15m	**Ground Level (mOD)** 10.70	**Client** Virtus	**Job Number** 9791-07-20
	Location 716234 E 736344 N	**Dates** 12/10/2020-13/10/2020	**Engineer** Barrett Mahony	**Sheet** 1/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(1.00)	MADE GROUND: Dark brown slightly sandy gravelly Clay with grass, rootlets and occasional fragments of red brick and ceramic. Gravel is fine to coarse subangular to subrounded.		
						9.70	1.00 (0.20)	Soft to firm brown mottled grey silty slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is fine to coarse subangular to rounded.		
						9.50	1.20	No recovery (open hole to 7.00m BGL). Driller notes black sandy gravelly clay.		
							(5.80)			
7.00	30					3.70	7.00 (1.00)	Poor recovery. Recovery consists of dark grey/brown slightly sandy gravelly CLAY with occasional cobbles of Limestone. Gravel is fine to coarse angular to subrounded. Driller notes black sandy gravelly clay.		
8.00 8.00-8.45	32				5,5/6,8,9,11 SPT N=34	2.70	8.00 (1.20)	Poor recovery. Recovery consists of dark grey/brown slightly sandy gravelly CLAY with occasional cobbles of Limestone. Gravel is fine to coarse angular to subrounded. Driller notes black sandy gravelly clay (very stiff).		
9.50 9.50-9.95					15,25/50 SPT N=50	1.50	9.20	Poor recovery. Recovery consists of dark grey fine to coarse subangular to subrounded Gravel with cobbles of Limestone. Driller notes black sandy gravelly clay (very stiff).		

Remarks
Inspection pit carried out to 1.20m BGL.
Inspection pit sidewalls stable.
No groundwater encountered.
Rotary core follow on from 1.20m BGL.
Open hole to 7.00m BGL.
Borehole complete at 15.0m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC06A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC06A
Machine : Beretta T44 **Flush :** Water **Core Dia:** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15m	**Ground Level (mOD)** 10.70	**Client** Virtus	**Job Number** 9791-07-20
	Location 716234 E 736344 N	**Dates** 12/10/2020-13/10/2020	**Engineer** Barrett Mahony	**Sheet** 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	26						(1.80)			
11.00 11.00-11.45	17				6,9/8,9,12,15 SPT N=44	-0.30	11.00	Poor recovery. Recovery consists of dark grey/brown slightly sandy gravelly CLAY with occasional cobbles of Limestone. Gravel is fine to coarse subangular to subrounded. Driller notes black sandy gravelly clay (very stiff).		
12.50-12.95	20				8,11/11,13,17,9 SPT N=50		(2.86)			
14.00 14.00-14.45	40				25,25/50 SPT N=50	-3.16	13.86	Poor recovery. Recovery consists of dark grey/brown slightly clayey slightly sandy fine to coarse subangular to subrounded Gravel with occasional cobbles and boulders of Limestone. Driller notes black sandy gravelly clay (very stiff).		
15.00						-4.30	(1.14) 15.00	Complete at 15.00m		

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC06A

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Site Project Calvary Clonliffe Road				**Borehole Number** RC07A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15.0m	**Ground Level (mOD)** 12.00	**Client** Virtus	**Job Number** 9791-07-20
	Location 716231 E 736331 N	**Dates** 13/10/2020	**Engineer** Barrett Mahony	**Sheet** 1/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(0.60)	MADE GROUND: Dark brown slightly sandy gravelly Clay with occasional fragments of ceramic and red brick.		
						11.40	0.60			
							(0.60)	Soft to firm brown silty slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is fine to coarse subangular to subrounded.		
						10.80	1.20	No recovery (open hole to 7.00m BGL). Driller notes grey sandy gravelly clay.		
							(5.80)			
7.00	49					5.00	7.00	Poor recovery. Recovery consists of dark grey/brown slightly clayey slightly sandy fine to coarse subangular to subrounded Gravel with occasional cobbles of Limestone. Driller notes grey sandy gravelly clay.		
							(1.00)			
8.00 8.00-8.45	31				4,6/6,8,10,11 SPT N=35	4.00	8.00	Poor recovery. Recovery consists of dark grey/brown slightly clayey slightly sandy fine to coarse subangular to subrounded Gravel with occasional cobbles of Limestone. Driller notes grey sandy gravelly clay (very stiff).		
9.50 9.50-9.95					19,25/50 SPT N=50					

Remarks
Inspection pit carried out to 1.20m BGL.
Inspection pit sidewalls stable.
No groundwater encountered.
Rotary core follow on from 1.20m BGL.
Open hole to 7.00m BGL.
Borehole complete at 15.0m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC07A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC07A
Machine : Beretta T44 **Flush :** Water **Core Dia:** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15.0m	**Ground Level (mOD)** 12.00	**Client** Virtus	**Job Number** 9791-07-20
	Location 716231 E 736331 N	**Dates** 13/10/2020	**Engineer** Barrett Mahony	**Sheet** 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	17						(5.65)			
11.00 11.00-11.45	18				12,17/50 SPT N=50					
50 12.50-12.95	44				11,13/16,34 SPT N=50					
						-1.65	13.65	Poor recovery. Recovery consists of very stiff dark grey/brown sandy gravelly CLAY with occasional cobbles of Limestone. Gravel is fine to coarse angular to subrounded.		
14.00 14.00-14.45	45				25,25/50 SPT N=50		(1.35)			
15.00						-3.00	15.00	Complete at 15.00m		

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC07A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC08A
Machine : Beretta T44 **Flush :** **Core Dia:** mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15.8m **Location** 716360 E 736355 N	**Ground Level (mOD)** 9.21 **Dates** 13/10/2020	**Client** Virtus **Engineer** Barrett Mahony	**Job Number** 9791-07-20 **Sheet** 1/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						9.01	(0.20) 0.20	TOPSOIL: Dark brown sandy slightly gravelly Clay with grass and rootlets. Gravel is subangular to subrounded fine to coarse.		
						8.71	(0.30) 0.50	Firm brown sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse.		
						8.51	(0.20) 0.70	Firm brown/grey sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse.		
						8.41	0.80	Firm brown sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse.		
						8.01	(0.40) 1.20	Firm brown mottled light grey slightly sandy gravelly CLAY with some angular to subangular cobbles. Gravel is subangular to subrounded fine to coarse.		
								No recovery (open hole to 6.80m BGL). Driller notes brown to black sandy gravelly clay.		
							(5.60)			
6.80						2.41	6.80	Poor recovery. Recovery consists of dark grey slightly clayey slightly sandy fine to coarse subangular to subrounded Gravel with occasional cobbles of Limestone. Driller notes black sandy gravelly clay.		
	25						(1.50)			
8.30 8.30-8.75					9,8/10,7,8,8 SPT N=33	0.91	8.30	Poor recovery. Recovery consists of dark grey slightly clayey fine to coarse Sand. Driller notes black sandy gravelly clay onto gravel (dense).		
	20						(1.50)			
9.80 9.80-10.25					6,8/8,9,7,10 SPT N=34	-0.59	9.80	Poor recovery. Recovery consists of dark grey/brown		

Remarks
Inspection pit carried out to 1.20m BGL.
Inspection pit sidewalls stable.
No groundwater encountered.
Rotary core follow on from 1.20m.
Open hole to 6.80m BGL.
Borehole complete at 15.80m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC08A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC08A
Machine : Beretta T44 **Flush :** **Core Dia:** mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15.8m	**Ground Level (mOD)** 9.21	**Client** Virtus	**Job Number** 9791-07-20
	Location 716360 E 736355 N	**Dates** 13/10/2020	**Engineer** Barrett Mahony	**Sheet** 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	30						(1.35)	slightly sandy clayey fine to coarse subangular to subrounded GRAVEL. Driller notes gravel (dense).		
11.30 11.30-11.75	25				9,8/9,11,8,7 SPT N=35	-1.94 -2.09	11.15 (0.15) 11.30	Poor recovery. Recovery consists of dark grey/brown sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded. Driller notes black sandy gravelly clay (stiff).		
							(1.50)	Poor recovery. Recovery consists of grey slightly clayey slightly sandy fine to coarse subangular to subrounded Gravel. Driller notes black sandy gravelly clay (very stiff).		
12.80 12.80-13.25	32				9,9/12,10,11,11 SPT N=44	-3.59	12.80	Poor recovery. Recovery consists of grey slightly clayey slightly sandy fine to coarse subangular to subrounded Gravel with cobbles and boulders of Limestone. Driller ntoes black sandy gravelly clay (very stiff).		
14.30 14.30-14.75	23				10,10/12,14,11,13 SPT N=50		(3.00)			
15.80 15.80-16.25					13,12/13,14,23 SPT N=50	-6.59	15.80	Complete at 15.80m		

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC08A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC09A
Machine : Beretta T44 **Flush :** Water **Core Dia:** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 22.8m	**Ground Level (mOD)** 8.40	**Client** Virtus	**Job Number** 9791-07-20
	Location 716397 E 736320 N	**Dates** 28/09/2020-01/10/2020	**Engineer** Barrett Mahony	**Sheet** 1/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						8.10	(0.30) 0.30	TOPSOIL: Dark brown sandy slightly gravelly Clay with grass and rootlets. Gravel is subangular to subrounded fine to coarse.		
							(0.80)	MADE GROUND: Brown sandy gravelly Clay with some angular to subrounded cobbles and concrete and red brick fragments. Gravel is subangular to subrounded fine to coarse.		
						7.30 7.20	1.10 1.20	Soft to firm brown sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse.		
								No recovery (open hole to 6.80m BGL). Driller notes brown clay.		
							(5.60)			
6.80						1.60	6.80	Poor recovery. Recovery consists of grey clayey slightly sandy fine to coarse subangular to subrounded Gravel with occasional cobbles of Limestone. Driller notes brown to black sandy gravelly clay.		
	22						(1.50)			
8.30 8.30-8.75					7,6/6,7,8,7 SPT(C) N=28	0.10	8.30	Poor recovery. Recovery consists of grey clayey slightly sandy fine to coarse subangular to subrounded Gravel with occasional cobbles of Limestone. Driller notes brown to black sandy gravelly clay (stiff).		
	25									
9.80										

Remarks
Inspection pit carried out to 1.20m BGL.
Inspection pit sidewalls stable.
No groundwater encountered.
Rotary core follow on from 1.20m.
Open hole to 6.80m BGL.
Borehole complete at 22.80m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC09A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC09A
Machine : Beretta T44 **Flush :** Water **Core Dia:** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 22.8m	**Ground Level (mOD)** 8.40	**Client** Virtus	**Job Number** 9791-07-20
	Location 716397 E 736320 N	**Dates** 28/09/2020-01/10/2020	**Engineer** Barrett Mahony	**Sheet** 2/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	20						(4.50)			
11.30										
	15									
12.80						-4.40	12.80			
12.80-13.25	22				18,23/50 SPT(C) N=50			Poor recovery. Recovery consists of dark grey/brown slightly sandy very gravelly CLAY with occasional cobbles of Limestone. Driller notes black sandy gravelly clay (very stiff).		
14.30							(3.00)			
14.30-14.75	17				17,20/26,24 SPT(C) N=50					
15.80						-7.40	15.80			
15.80-16.25	78				15,16/16,14,15,5 SPT(C) N=50			Very stiff dark grey/brown sandy very gravelly CLAY. Gravel is fine to coarse subangular to subrounded.		
17.30										
17.30-17.75	85				17,27/50 SPT(C) N=50		(3.40)			
18.80										
18.80-19.25					25,25/50 SPT(C) N=50					
19.20						-10.80	19.20	Medium strong to strong narrowly banded grey fine grained LIMESTONE. Predominantly unweathered. 19.20m - 19.87m BGL: Predominantly non intact but recovery indicates 2 fracture sets. F1: 10 - 30 degrees, closely spaced, planar, rough to smooth, clay smearing. F2: 60 - 80 degrees, closely spaced,		
19.94	100	53	29	NI						

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC09A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC09A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 22.8m	**Ground Level (mOD)** 8.40	**Client** Virtus	**Job Number** 9791-07-20
	Location 716397 E 736320 N	**Dates** 28/09/2020-01/10/2020	**Engineer** Barrett Mahony	**Sheet** 3/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				11				undulating to planar, rough to smooth, clay smearing, slight orange oxidation staining.		
20.30				NI				19.94m - 21.30m BGL: 3 Fracture sets. F1: 5 - 20 degrees, closely to medium spaced, undulating, rough. F2: 20 - 40 degrees, very closely to medium spaced, planar, rough to smooth, slight clay smearing. F2: 60 - 80 degrees, closely to medium spaced, undulating to planar, rough to smooth, slight clay smearing.		
20.77	100	41	16	12			(3.60)			
21.30				21				21.30m - 22.80m BGL: 2 Fracture sets. F1: 20 - 40 degrees, very closely to medium spaced, planar, rough to smooth, slight clay smearing. F2: 60 - 80 degrees, closely to medium spaced, undulating to planar, rough to smooth, slight clay smearing.		
21.80	100	27	11							
22.80						-14.40	22.80	Complete at 22.80m		

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC09A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC10A
Machine : Beretta T44 **Flush :** Water **Core Dia:** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15.8m **Location** 716380 E 736294 N	**Ground Level (mOD)** 8.69 **Dates** 23/09/2020-28/09/2020	**Client** Virtus **Engineer** Barrett Mahony	**Job Number** 9791-07-20 **Sheet** 1/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00						8.59	0.10	TOPSOIL: Dark brown sandy slightly gravelly Clay with grass and rootlets. Gravel is subangular to subrounded fine to coarse.		
							(0.90)	MADE GROUND: Brown/grey sandy gravelly Clay with occasional fragments of concrete, old pipe and red brick. Gravel is angular to subrounded fine to coarse.		
	6					7.69	1.00			
							(0.20)	Soft brown sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse.		
						7.49	1.20			
							(1.10)	Poor recovery. Recovery consists of brown very clayey sandy fine to coarse subangular to subrounded GRAVEL. Driller notes brown clay.		
2.30 2.30-2.75	33				3,4/4,5,4,3 SPT(C) N=16	6.39	2.30	Poor recovery. Recovery consists of brown very clayey sandy fine to coarse subangular to subrounded Gravel. Driller notes brown sandy gravelly clay (stiff).		
							(2.60)			
3.80 3.80-4.25	51				5,6/5,3,4,4 SPT(C) N=16					
						3.79	4.90	Stiff dark grey slightly sandy gravelly CLAY with occasional cobbles. Gravel is fine to coarse subangular to subrounded.		
5.30 5.30-5.75	67				8,8/7,10,9,10 SPT(C) N=36					
							(1.90)			
6.80 6.80-7.25	8				11,11/14,13,12,11 SPT(C) N=50	1.89	6.80	Poor recovery. Recovery consists of grey slightly clayey slightly sandy fine to coarse subangular to subrounded Gravel. Driller notes black boulder clay (very stiff).		
8.30 8.30-8.75	35				7,9/9,8,7,6 SPT(C) N=30					
							(4.50)			
9.80 9.80-10.25					9,6/9,7,8,8 SPT(C) N=32					

Remarks
Inspection pit carried out to 1.20m BGL.
Inspection pit sidewalls stable.
No groundwater encountered.
Rotary core follow on from 1.20m.
Borehole complete at 15.80m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC10A

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Site Project Calvary Clonliffe Road				**Borehole Number** RC10A
Machine : Beretta T44 **Flush :** Water **Core Dia:** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15.8m	**Ground Level (mOD)** 8.69	**Client** Virtus	**Job Number** 9791-07-20
	Location 716380 E 736294 N	**Dates** 23/09/2020-28/09/2020	**Engineer** Barrett Mahony	**Sheet** 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	27									
11.30 11.30-11.75	17				8,8/7,6,7,8 SPT(C) N=28	-2.61	11.30 (1.50)	Poor recovery. Recovery consists of dark grey slightly sandy gravelly CLAY with occasional cobbles and boulders of Limestone (stiff).		
12.80 12.80-13.25	31				12,14/14,16,13,7 SPT(C) N=50	-4.11	12.80	Poor recovery. Recovery consists of dark grey slightly sandy gravelly CLAY with occasional cobbles and boulders of Limestone (very stiff).		
14.30 14.30-14.75	37				13,12/10,10,8,11 SPT(C) N=39		(3.00)			
15.80 15.80-16.25					14,15/17,15,16,2 SPT(C) N=50	-7.11	15.80	Complete at 15.80m		

Remarks

Scale (approx)	Logged By
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Figure No. 9791-07-20.RC10A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC11A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 18.3m	**Ground Level (mOD)** 10.50	**Client** Virtus	**Job Number** 9791-07-20
	Location 716300 E 736278 N	**Dates** 21/09/2020-22/09/2020	**Engineer** Barrett Mahony	**Sheet** 1/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						10.30	(0.20) 0.20	TOPSOIL: Dark brown sandy slightly gravelly Clay with grass and rootlets. Gravel is subangular to subrounded fine to coarse.		
						10.00	(0.30) 0.50	Soft dark brown sandy slightly gravelly CLAY with some subrounded to rounded cobbles. Gravel is subangular to subrounded fine to coarse.		
						9.30	(0.70) 1.20	Soft brown mottled light grey sandy gravelly CLAY with some subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse.		
								No recovery (open hole to 6.80m BGL). Driller notes brown to black sandy gravelly clay.		
							(5.60)			
6.80						3.70	6.80	Poor recovery. Recovery consists of dark brown to black sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded. Driller notes black sandy gravelly clay.		
	33						(1.50)			
8.30 8.30-8.75					8,8/10,9,7,8 SPT(C) N=34	2.20	8.30	Very stiff dark brown to black sandy gravelly CLAY with occasional cobbles and boulders of Limestone. Gravel is fine to coarse subangular to subrounded.		
	32									
9.80 9.80-10.25					9,9/11,10,8,13 SPT(C) N=42					

Remarks
Inspection pit carried out to 1.20m BGL.
Inspection pit sidewalls stable.
No groundwater encountered.
Rotary core follow on from 1.2m BGL.
Open hole to 6.80m BGL.
Borehole complete at 18.80m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC11A

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Site Project Calvary Clonliffe Road				**Borehole Number** RC11A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 18.3m	**Ground Level (mOD)** 10.50	**Client** Virtus	**Job Number** 9791-07-20
	Location 716300 E 736278 N	**Dates** 21/09/2020-22/09/2020	**Engineer** Barrett Mahony	**Sheet** 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	66						(5.70)			
11.30 11.30-11.75	100				18,21/24,26 SPT(C) N=50					
12.30	20									
12.80 12.80-13.25	79	17	9		20,23/28,22 SPT(C) N=50					
14.00				9		-3.50	14.00	Medium strong dark grey fine grained LIMESTONE. Mostly unweathered. 14.00m - 14.88m BGL: 2 Fracture sets. F1: 5 - 20 degrees, closely spaced, undulating to planar, rough, slight clay smearing. F2: 60 - 75 degrees, medium to widely spaced, planar, rough to smooth, slight clay smearing and brown oxidation staining.		
14.30										
14.88	93	27	14	15				14.50m - 14.60m BGL: Non intact zone. 14.88m - 15.80m BGL: 3 Fracture sets. F1: 5 - 20 degrees, very closely to medium spaced, undulating to planar, rough, clay smearing. F2: 50 - 60 degrees, medium to widely spaced, undulating to planar, rough to smooth, clay smearing. F3: 70 - 85 degrees, closely to medium spaced, undulating, rough, slight clay smearing.		
15.80							(4.30)			
16.20	100	80	50	12				15.80m - 17.00m BGL: 3 Fracture sets. F1: 5 - 20 degrees, very closely to medium spaced, planar, rough to smooth, occasional clay smearing. F2: 40 - 60 degrees, closely to widely spaced, undulating, rough, slight clay smearing. F3: 70 - 85 degrees, widely spaced, undulating to planar, rough, slight clay smearing.		
17.00										
17.30	100	81	81	9				17.00m - 18.30m BGL: 2 Fracture sets. F1: 10 - 30 degrees, closely to medium spaced, undulating to planar, rough, clay smearing. F2: 70 - 85 degrees, widely spaced, undulating, rough, slight clay smearing and brown oxidation staining.		
18.30						-7.80	18.30	Complete at 18.30m		

Remarks

Scale (approx)	**Logged By**
1:50	JMD

Figure No. 9791-07-20.RC11A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC12A
Machine : Beretta T44 **Flush :** Water **Core Dia:** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15.80m	**Ground Level (mOD)** 8.78	**Client** Virtus	**Job Number** 9791-07-20
	Location 716341 E 736255 N	**Dates** 18/09/2020-21/09/2020	**Engineer** Barrett Mahony	**Sheet** 1/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(0.40)	TOPSOIL: Dark brown sandy slightly gravelly Clay with grass and rootlets. Gravel is subangular to subrounded fine to coarse.		
						8.38	0.40			
							(0.30)	Soft to firm brown sandy gravelly CLAY with gravel lenses. Gravel is angular to subrounded fine to coarse.		
						8.08	0.70			
							(0.20)			
						7.88	0.90	Soft to firm brown sandy gravelly CLAY with some angular to subangular cobbles. Gravel is angular to subrounded fine to coarse.		
							(0.30)			
						7.58	1.20	Firm brown sandy gravelly CLAY with occasional angular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse.		
								No recovery (open hole to 6.80m BGL). Driller notes black sandy gravelly clay.		
							(5.60)			
6.80						1.98	6.80	Poor recovery. Recovery consists of dark grey sandy gravelly CLAY with occasional cobbles of Limestone. Gravel is fine to coarse subangular to subrounded. Driller notes black sandy gravelly clay.		
	19						(1.50)			
8.30 8.30-8.75					7,6/7,8,9,9 SPT(C) N=33	0.48	8.30	Poor recovery. Recovery consists of dark grey sandy gravelly CLAY with occasional cobbles of Limestone. Gravel is fine to coarse subangular to subrounded. Driller notes black sandy gravelly clay (very stiff).		
	43									
9.80 9.80-10.25					10,13/14,16,15,5 SPT(C) N=50		(3.00)			

Remarks
Inspection pit carried out to 1.20m BGL.
Inspection pit sidewalls stable.
No groundwater encountered.
Rotary core follow on from 1.20m BGL.
Open hole to 6.80m BGL.
Borehole complete at 15.80m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC12A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC12A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15.80m	**Ground Level (mOD)** 8.78	**Client** Virtus	**Job Number** 9791-07-20
	Location 716341 E 736255 N	**Dates** 18/09/2020-21/09/2020	**Engineer** Barrett Mahony	**Sheet** 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	85									
11.30 11.30-11.75	36				13,14/16,18,16 SPT(C) N=50	-2.52	11.30 (1.50)	Poor recovery. Recovery consists of grey slightly clayey slightly sandy Gravel with cobbles. Driller notes black sandy gravelly clay (very stiff).		
12.80 12.80-13.25	77				15,18/16,16,17,1 SPT(C) N=50	-4.02	12.80	Very stiff dark grey sandy gravelly CLAY with cobbles and boulders of Limestone. Gravel is fine to coarse subangular to subrounded.		
14.30 14.30-14.75	27				18,18/16,21,13 SPT(C) N=50		(3.00)			
15.80 15.80-16.25					19,23/27,23 SPT(C) N=50	-7.02	15.80	Complete at 15.80m		

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC12A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC13A
Machine : Beretta T44 **Flush :** Water **Core Dia:** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 18.8m	**Ground Level (mOD)** 8.20	**Client** Virtus	**Job Number** 9791-07-20
	Location 716328 E 736222 N	**Dates** 14/09/2020-16/09/2020	**Engineer** Barrett Mahony	**Sheet** 1/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(6.80)	No recovery (open hole to 6.80m BGL). Driller notes brown to black sandy gravelly clay.		
6.80						1.40	6.80			
	37						(1.50)	Poor recovery. Recovery consists of dark grey fine to coarse subangular to subrounded Gravel. Driller notes black sandy gravelly clay.		
8.30 8.30-8.75					7,8/7,9,10,10 SPT(C) N=36	-0.10	8.30			
	13						(1.50)	Poor recovery. Recovery consists of black slightly gravelly fine to medium SAND. Gravel is fine to medium subangular to subrounded. Driller notes sand (dense).		
9.80 9.80-10.25					10,8/8,9,7,10 SPT(C) N=34	-1.60	9.80	Very stiff dark grey/brown slightly sandy gravelly CLAY with		

Remarks
Open hole to 6.80m BGL.
No groundwater encountered.
Borehole complete at 18.80m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC13A

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Site Project Calvary Clonliffe Road				**Borehole Number** RC13A
Machine : Beretta T44 **Flush** : Water **Core Dia** : 64 mm **Method** : Rotary Cored	**Casing Diameter** 64mm to 18.8m	**Ground Level (mOD)** 8.20	**Client** Virtus	**Job Number** 9791-07-20
	Location 716328 E 736222 N	**Dates** 14/09/2020-16/09/2020	**Engineer** Barrett Mahony	**Sheet** 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	15							occasional cobbles and possible boulder fragments of Limestone. Gravel is fine to coarse subangular to subrounded.		
11.30 11.30-11.75	73				22,23/50 SPT(C) N=50		(2.90)			
12.80 12.80-13.25	55	17	7		10,10/14,16,20 SPT(C) N=50	-4.50	12.70 (1.60)	WEATHERED ROCK: Recovered as black slightly sandy clayey fine to coarse angular to subrounded Gravel with cobbles and boulders of Limestone with occasional pyrite. Driller notes rock with clay bands.		
14.30 14.30-14.75	69	32	20	10	17,28/50 SPT(C) N=50	-6.10	14.30	Medium strong to strong dark grey fine grained LIMESTONE with occasional pyrite. Unweathered to partially weathered. 14.30m - 15.30m BGL: 3 Fracture sets. F1: 5 - 20 degrees, very closely to medium spaced, planar, rough, slight clay smearing. F2: 45 - 60 degrees, medium spaced, undulating, rough, slight clay smearing. F3: 70 - 85 degrees, medium spaced, undulating, rough, slight clay smearing.		
15.30 15.60 15.80	75	59	45	NI 7			(4.50)	15.60m - 17.50m BGL: 3 Fracture sets. F1: 5 - 20 degrees, very closely to medium spaced, planar, smooth to rough, slight clay smearing. F2: 50 - 65 degrees, medium spaced, undulating to planar, rough, clay smearing, brown oxidation staining. F3: 70 - 85 degrees, medium to widely spaced, undulating to planar, rough, clay smearing, brown oxidation staining.		
17.30 17.50	81	45	16	14				17.50m - 18.80m BGL: 3 Fracture sets. F1: 5 - 20 degrees, extremely close to closely spaced, planar, smooth to rough, clay smearing, occasional brown oxidation staining. F2: 50 - 65 degrees, medium spaced, undulating, rough, clay smearing, brown oxidation staining. F3: 70 - 85 degrees, medium spaced, undulating, rough, slight clay smearing, orange to brown oxidation staining.		
18.80						-10.60	18.80	Complete at 18.80m		

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC13A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC14A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15.80m	**Ground Level (mOD)** 7.70	**Client** Virtus	**Job Number** 9791-07-20
	Location 716396 E 736230 N	**Dates** 17/09/2020-18/09/2020	**Engineer** Barrett Mahony	**Sheet** 1/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						7.40	(0.30) 0.30	TOPSOIL: Dark brown sandy slightly gravelly Clay with grass and rootlets. Gravel is subangular to subrounded fine to coarse.		
						7.10	(0.30) 0.60	MADE GROUND: Brown sandy gravelly Clay with tile and plastic fragments. Gravel is subangular to subrounded fine to coarse.		
						6.70	(0.40) 1.00	Soft to firm brown sandy gravelly CLAY with some cobbles. Gravel is subangular to subrounded fine to coarse.		
						6.50	(0.20) 1.20	Firm brown mottled grey sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse.		
							(5.60)	No recovery (open hole to 6.80m BGL). Driller notes brown to black sandy gravelly clay.		
6.80						0.90	6.80	Dark grey to black sandy gravelly CLAY with occasional cobbles of Limestone. Gravel is fine to coarse subangular to subrounded.		
	49						(1.50)			
8.30 8.30-8.75					7,7/9,6,8,9 SPT(C) N=32	-0.60	8.30	Very stiff dark grey to black sandy gravelly CLAY with occasional cobbles of Limestone. Gravel is fine to coarse subangular to subrounded.		
	62									
9.80 9.80-10.25					11,13/16,34 SPT(C) N=50		(3.00)			

Remarks
Inspection pit carried out to 1.20m BGL.
Inspection pit sidewalls stable.
No groundwater encountered.
Rotary core follow on from 1.20m.
Open hole to 6.80m BGL.
Borehole complete at 15.80m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC14A

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Site Project Calvary Clonliffe Road				**Borehole Number** RC14A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15.80m	**Ground Level (mOD)** 7.70	**Client** Virtus	**Job Number** 9791-07-20
	Location 716396 E 736230 N	**Dates** 17/09/2020-18/09/2020	**Engineer** Barrett Mahony	**Sheet** 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	82									
11.30 11.30-11.75	75				18,21/26,24 SPT(C) N=50	-3.60	11.30	Very stiff black sandy gravelly CLAY with cobbles of Limestone. Gravel is fine to coarse subangular to subrounded.		
12.80 12.80-13.25	48				16,23/27,23 SPT(C) N=50		(4.50)			
14.30 14.30-14.75	51				13,15/19,23,8 SPT(C) N=50					
15.80 15.80-16.25					21,25/50 SPT(C) N=50	-8.10	15.80	Complete at 15.80m		

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC14A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC15A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 23.3m	**Ground Level (mOD)** 6.99	**Client** Virtus	**Job Number** 9791-07-20
	Location 716462 E 736223 N	**Dates** 16/09/2020-17/09/2020	**Engineer** Barrett Mahony	**Sheet** 1/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00										
						6.59	(0.40) 0.40	TOPSOIL: Dark brown sandy slightly gravelly CLAY with grass and rootlets. Gravel is subangular to subrounded fine to coarse.		
						6.19	(0.40) 0.80	MADE GROUND: Brown sandy gravelly CLAY with animal bone fragments. Gravel is subangular to subrounded fine to coarse.		
	25					5.79	(0.40) 1.20	Soft to firm brown sandy gravelly CLAY with some subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse.		
							(1.10)	Poor recovery. Recovery consists of brown sandy gravelly CLAY. Gravel is fine to medium subangular to subrounded. Driller notes brown clay with stones.		
2.30 2.30-2.75	11				3,3/4,3,4,5 SPT(C) N=16	4.69	2.30	Poor recovery. Recovery consists of grey slightly clayey slightly sandy fine to coarse subangular to subrounded GRAVEL. Driller notes gravelly clay.		
3.80 3.80-4.25	22				2,3/2,4,4,3 SPT(C) N=13		(3.00)			
5.30 5.30-5.75	14				5,5/7,6,7,7 SPT(C) N=27	1.69	5.30	Poor recovery. Recovery consists of dark grey to black sandy gravelly CLAY with occasional cobbles of Limestone. Gravel is fine to coarse subangular to rounded (very stiff).		
6.80 6.80-7.25	13				7,7/8,6,8,9 SPT(C) N=31					
8.30 8.30-8.75	24				7,8/7,9,9,10 SPT(C) N=35					
9.30-9.75					12,11/11,12,14,13 SPT(C) N=50					
9.80							(9.00)			

Remarks
Inspection pit carried out to 1.20m BGL.
Inspection pit sidewalls stable.
No groundwater encountered.
Rotary core follow on from 1.20m.
Borehole complete at 23.30m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC15A

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Ground Investigations Ireland Ltd
www.gii.ie

Site Project Calvary Clonliffe Road			**Borehole Number** RC15A
Machine : Beretta T44 **Flush** : Water **Core Dia**: 64 mm **Method** : Rotary Cored	**Casing Diameter** 64mm to 23.3m	**Ground Level (mOD)** 6.99	**Client** Virtus	**Job Number** 9791-07-20
	Location 716462 E 736223 N	**Dates** 16/09/2020-17/09/2020	**Engineer** Barrett Mahony	**Sheet** 2/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	26									
11.30 11.30-11.75	25				14,12/11,14,15,10 SPT(C) N=50					
12.80 12.80-13.25	12				8,10/7,9,10,9 SPT(C) N=35					
14.30	13	5				-7.31	14.30	Poor recovery. Recovery consists of black sandy gravelly CLAY with cobbles and boulders of Limestone with pyrite. Gravel is fine to coarse subangular to rounded. Driller notes black sandy gravelly clay with large cobbles (stiff).		
15.80	19	14					(5.00)			
17.30 17.30-17.75	15	5			6,7/7,8,7,6 SPT(C) N=28					
18.80 18.80-19.25					7,8/7,6,8,8 SPT(C) N=29					
19.30	67	47	37			-12.31	19.30	Medium strong dark grey fine grained LIMESTONE. Unweathered to partially weathered. 19.30m - 21.20m BGL: 3 Fracture sets. F1: 5 - 20 degrees, closely to medium sapced, planar, rough to smooth, slight clay smearing, slight brown oxidation		

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC15A

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Ground Investigations Ireland Ltd
www.gii.ie

Site Project Calvary Clonliffe Road			**Borehole Number** RC15A
Machine : Beretta T44 **Flush :** Water **Core Dia:** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 23.3m	**Ground Level (mOD)** 6.99	**Client** Virtus	**Job Number** 9791-07-20
	Location 716462 E 736223 N	**Dates** 16/09/2020-17/09/2020	**Engineer** Barrett Mahony	**Sheet** 3/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				9				staining. F2: 45 - 60 degrees, closely to widely spaced, undulating, rough, occasional brown oxidation staining. F3: 70 - 85 degrees, medium spaced, undulating to planar, rough to smooth, clay smearing, occasional brown oxidation staining.		
20.30	100	53	43							
21.20	45	22	22	NI			(4.00)			
21.65 21.80								21.65m - 23.30m BGL: 3 Fracture sets. F1: 5 - 20 degrees, closely to medium spaced, undulating to planar, rough, clay smearing. F2: 30 - 50 degrees, closely to medium spaced, planar, rough to smooth, slight clay smearing. F3: 70 - 85 degrees, closely to medium spaced, undulating to planar, rough to smooth, clay smearing.		
	77	24	9	12						
23.30						-16.31	23.30	Complete at 23.30m		

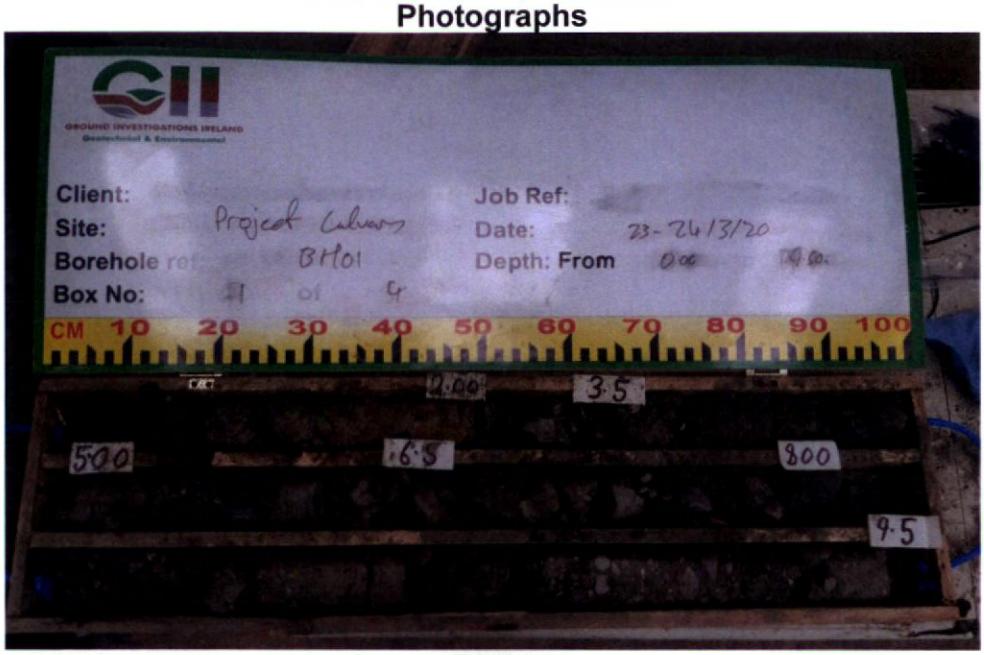
Remarks

Scale (approx)	Logged By
1:50	JMD

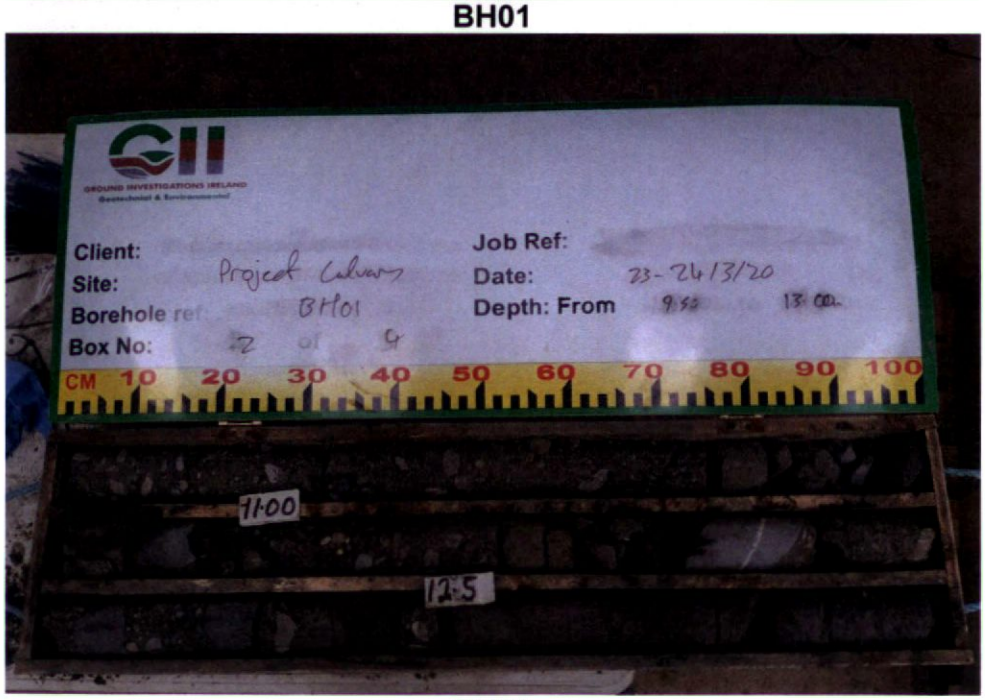
Figure No. 9791-07-20.RC15A

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Project Calvary Borehole
Photographs



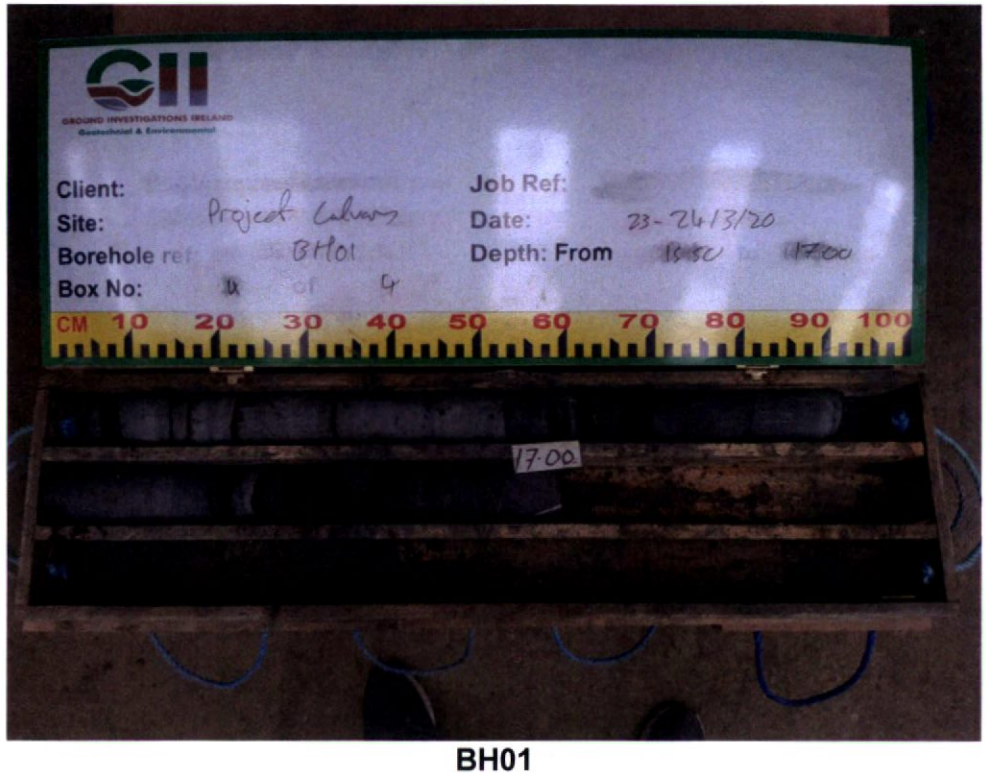
BH01



BH01


GII
GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client:
Site: Project Culvers
Borehole ref: BH01
Box No: 3 of 4
Job Ref:
Date: 23-24/3/20
Depth: From 1300 1550
CM 10 20 30 40 50 60 70 80 90 100
14.00
15.5

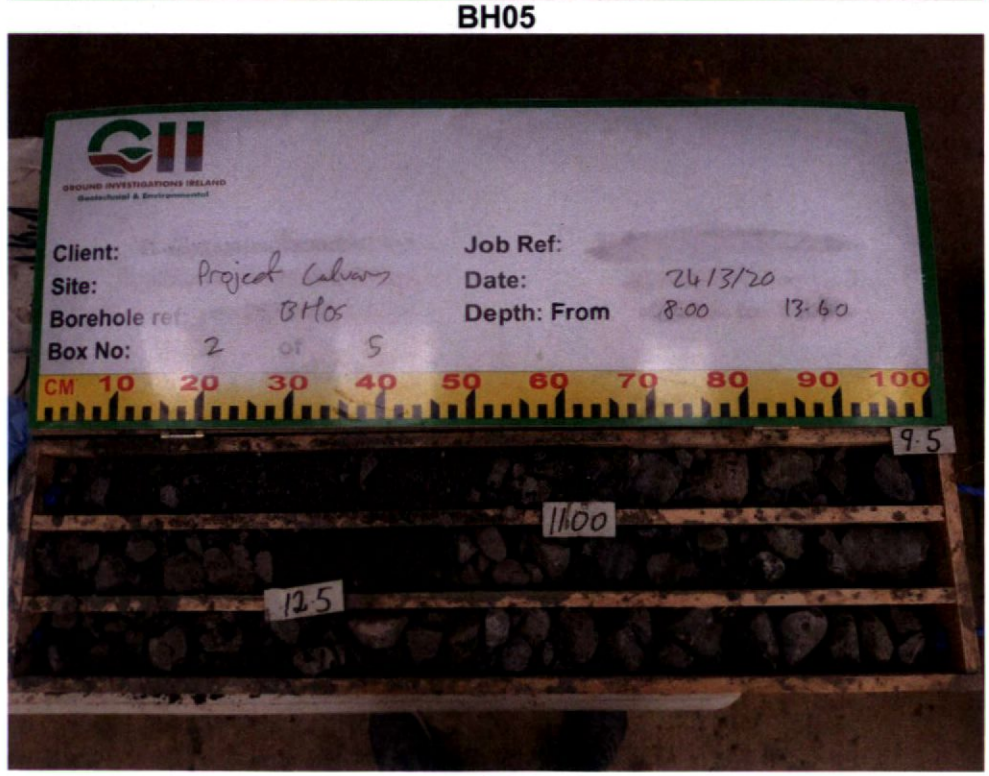
BH01


GII
GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client:
Site: Project Culvers
Borehole ref: BH01
Box No: 4 of 4
Job Ref:
Date: 23-24/3/20
Depth: From 1550 1700
CM 10 20 30 40 50 60 70 80 90 100
17.00

BH01


GII
GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client:
Site: Project Culvers
Borehole ref: BH05
Box No: 1 of 5
Job Ref:
Date: 26/3/20
Depth: From 0.00 8.00
CM 10 20 30 40 50 60 70 80 90 100
0.00
3.5
5.00
6.5
8.00

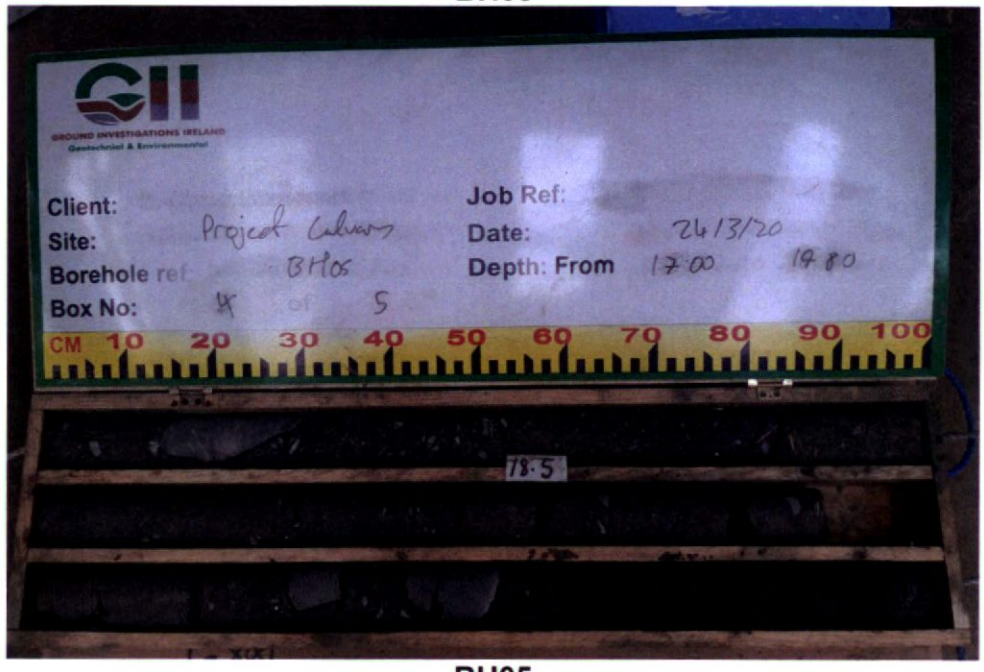
BH05


GII
GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client:
Site: Project Culvers
Borehole ref: BH05
Box No: 2 of 5
Job Ref:
Date: 26/3/20
Depth: From 8.00 13.60
CM 10 20 30 40 50 60 70 80 90 100
9.5
11.00
12.5

BH05


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client:
Site: Project Culvers
Borehole ref: BH05
Box No: 3 of 5
Job Ref:
Date: 26/3/20
Depth: From 13.60 17.00
CM 10 20 30 40 50 60 70 80 90 100
14.00
15.5
17.00

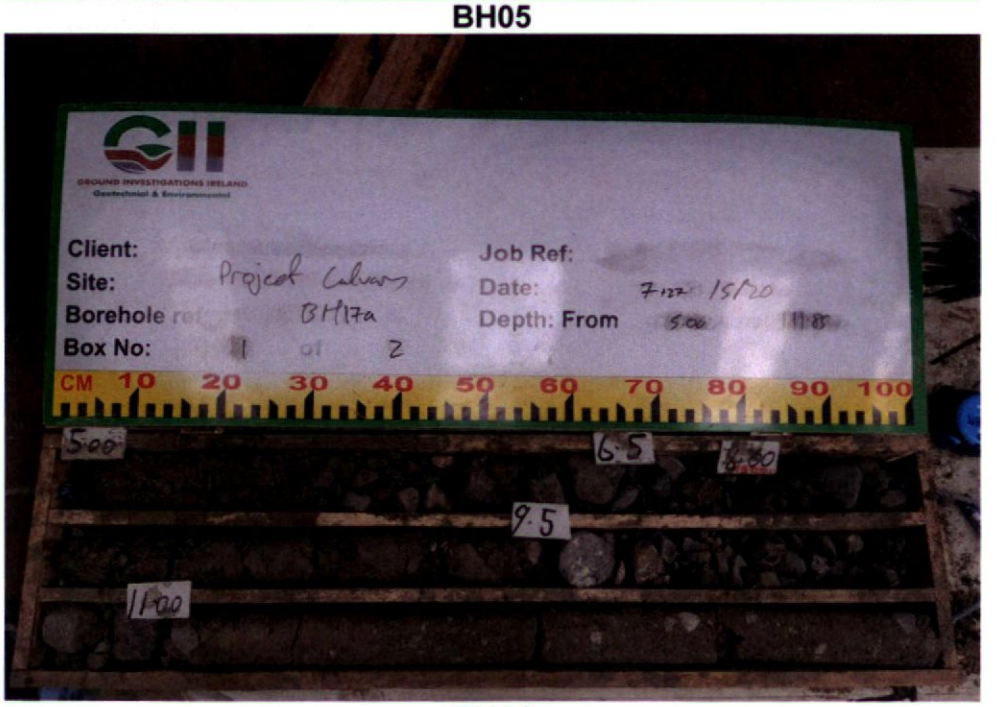
BH05


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client:
Site: Project Culvers
Borehole ref: BH05
Box No: 4 of 5
Job Ref:
Date: 26/3/20
Depth: From 17.00 19.80
CM 10 20 30 40 50 60 70 80 90 100
18.5

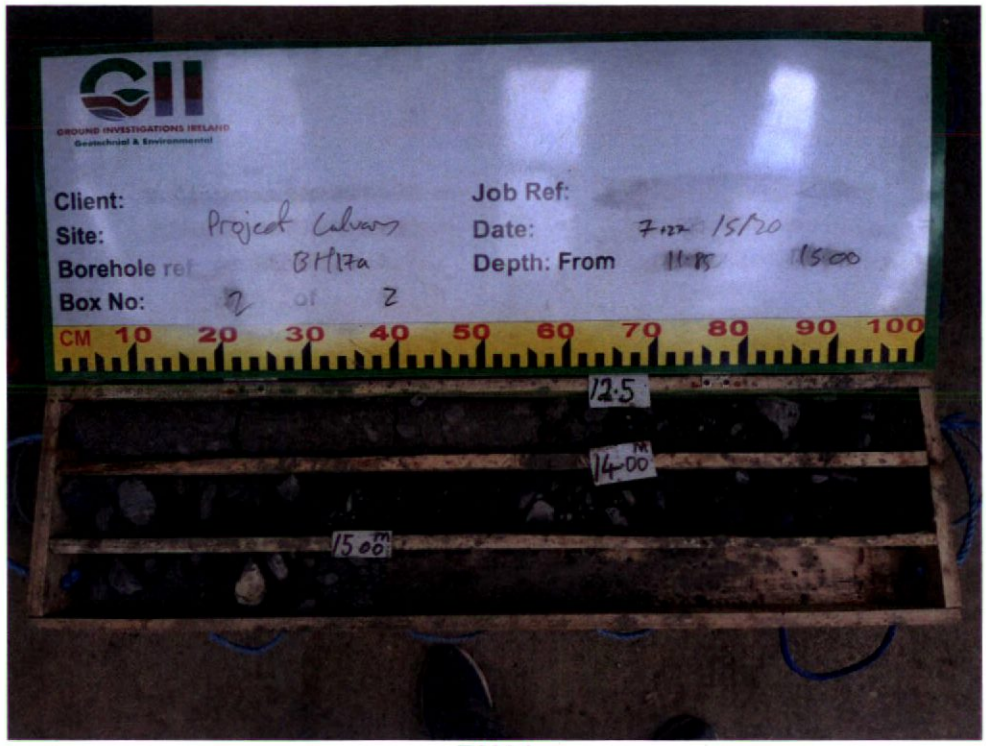
BH05


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client:
Site: Project Calvary
Borehole ref: BH05
Box No: 5 of 5
Job Ref:
Date: 24/3/20
Depth: From 19.80 21.00
CM 10 20 30 40 50 60 70 80 90 100
20.00
21.00

BH05


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client:
Site: Project Calvary
Borehole ref: BH17a
Box No: 1 of 2
Job Ref:
Date: 7/22 15/20
Depth: From 5.00 11.85
CM 10 20 30 40 50 60 70 80 90 100
5.00
6.5
9.5
11.00

BH14


GII
GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client:
Site: Project Culvers
Borehole ref: BH17a
Box No: 2 of 2
Job Ref:
Date: 7/12/20 15/12/20
Depth: From 11.85 15.00
CM 10 20 30 40 50 60 70 80 90 100
12.5
14.00m
15.00m

BH14


GII
GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client:
Site: Project Culvers
Borehole ref: BH17
Box No: 1 of 3
Job Ref:
Date: 7-8 5/20
Depth: From 0.00 1.20
CM 10 20 30 40 50 60 70 80 90 100
2.00m
3.5m
5.00m
6.5m
8.00m

BH17


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client:
Site: Project Calvary
Borehole ref: BH17
Box No: 2 of 3
Job Ref:
Date: 7-8/5/20
Depth: From 9.20 to 13.00
CM 10 20 30 40 50 60 70 80 90 100
9.5m
11.0m
12.5m

BH17

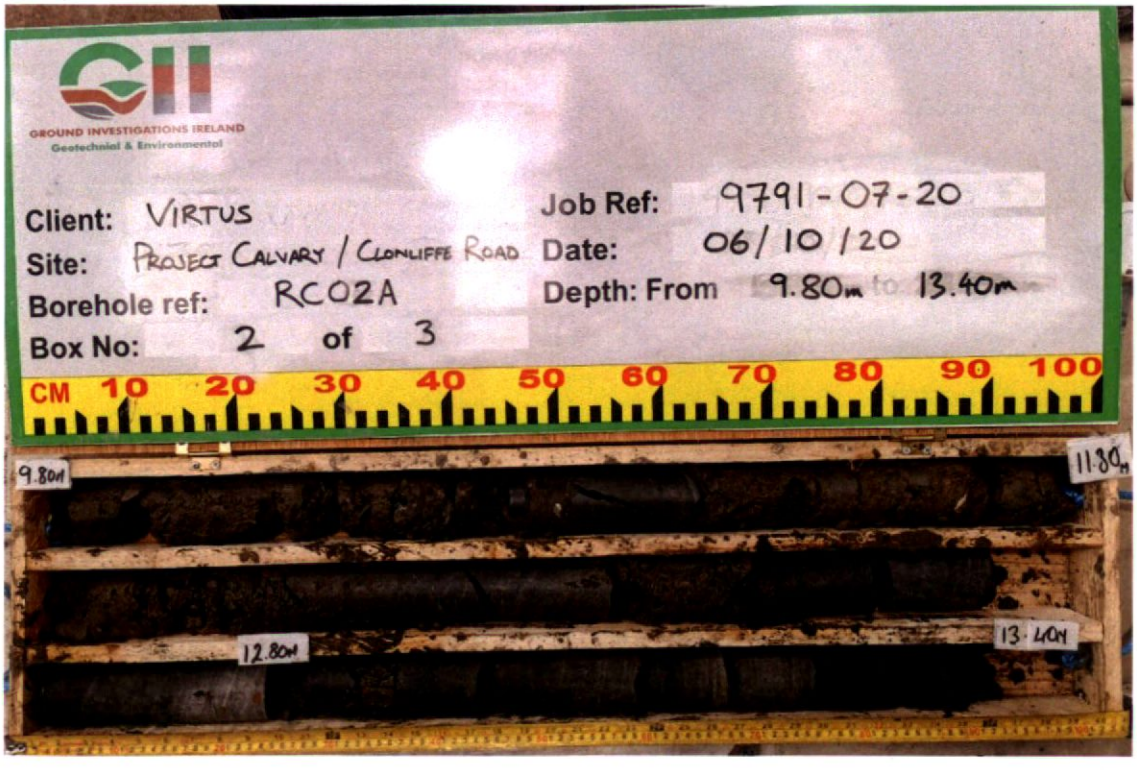

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client:
Site: Project Calvary
Borehole ref: BH17
Box No: 3 of 3
Job Ref:
Date: 7-8/5/20
Depth: From 13.00 to 15.50
CM 10 20 30 40 50 60 70 80 90 100
14.00m
15.5m

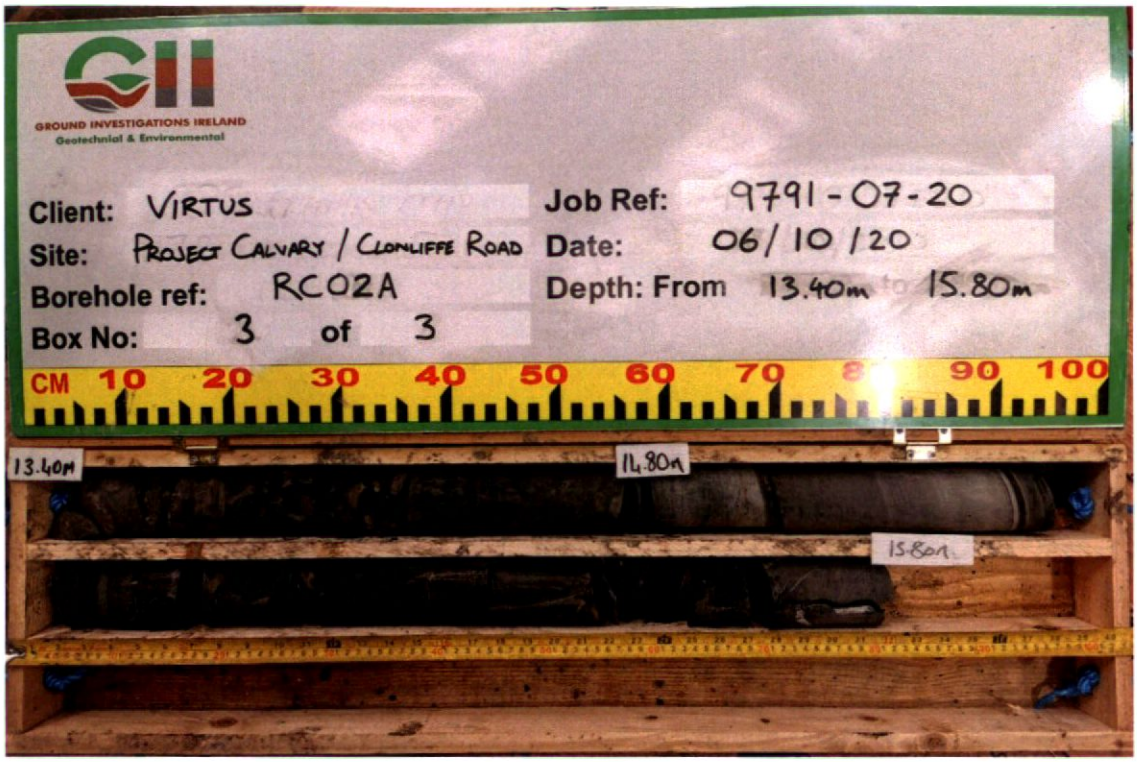
BH17

Project Calvary Additional Rotary Coring Photographs

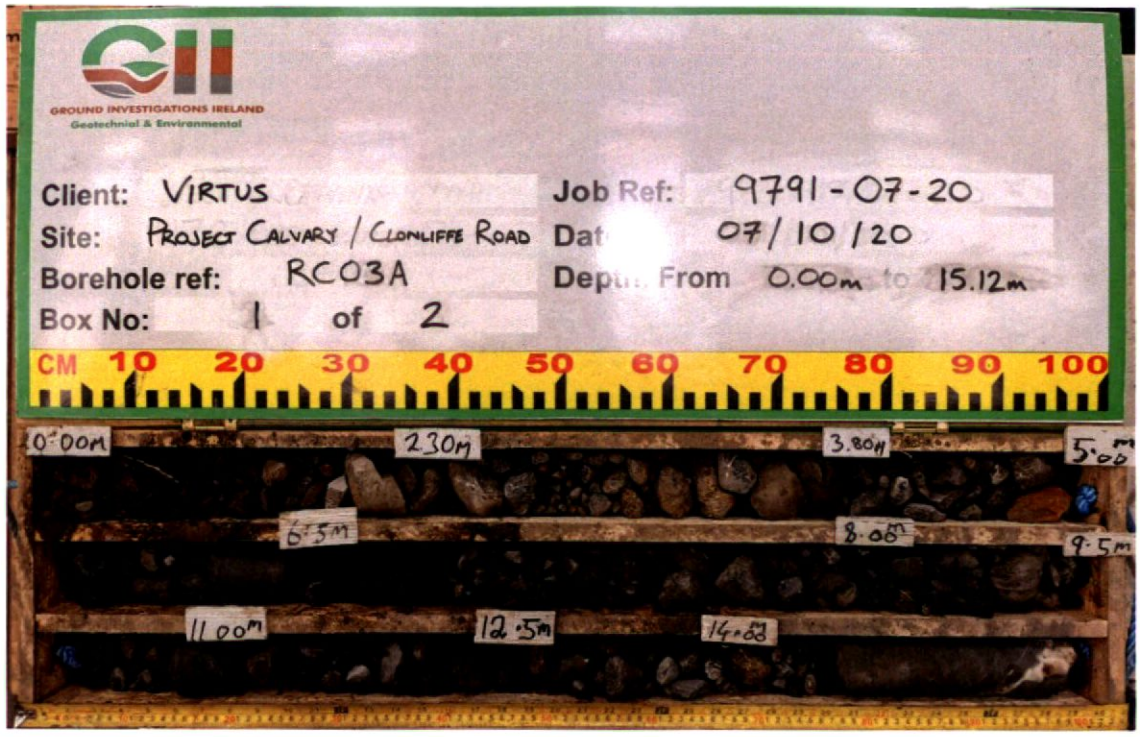
RC02A






GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Job Ref: 9791-07-20
Site: PROJECT CALVARY / CLONLIFFE ROAD
Date: 06/10/20
Borehole ref: RC02A
Depth: From 13.40m to 15.80m
Box No: 3 of 3
CM 10 20 30 40 50 60 70 80 90 100
13.40M
14.80m
15.80m

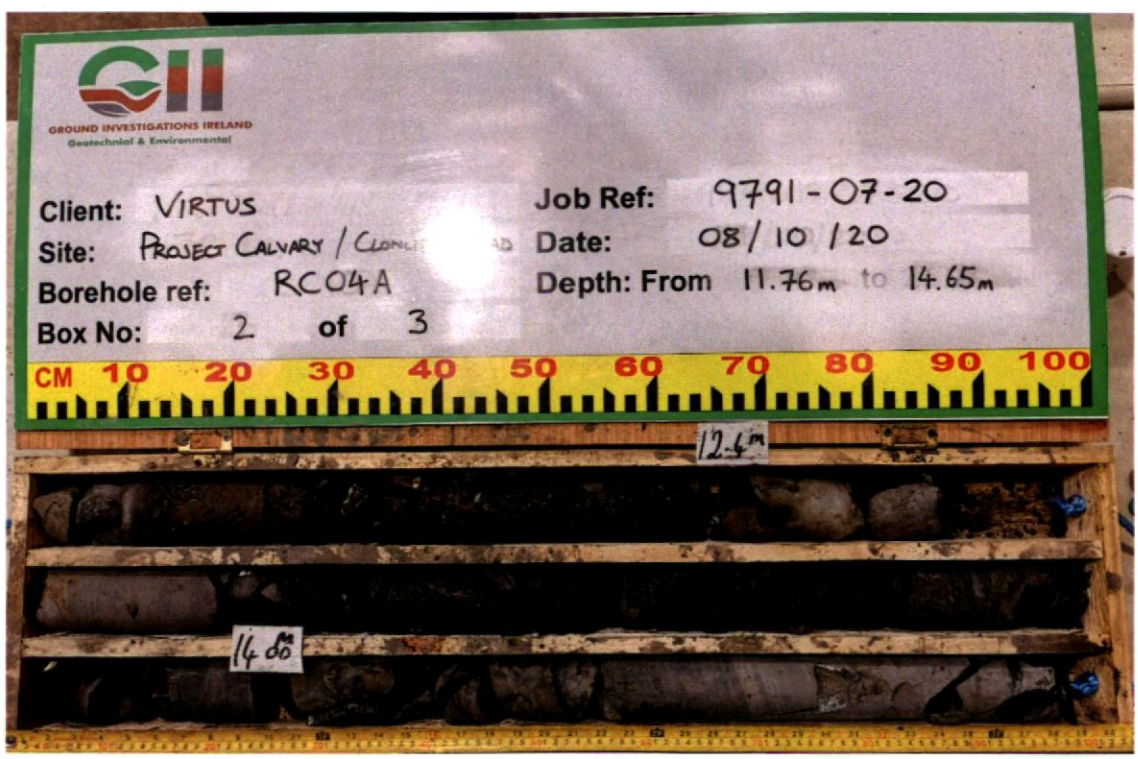
RC03A

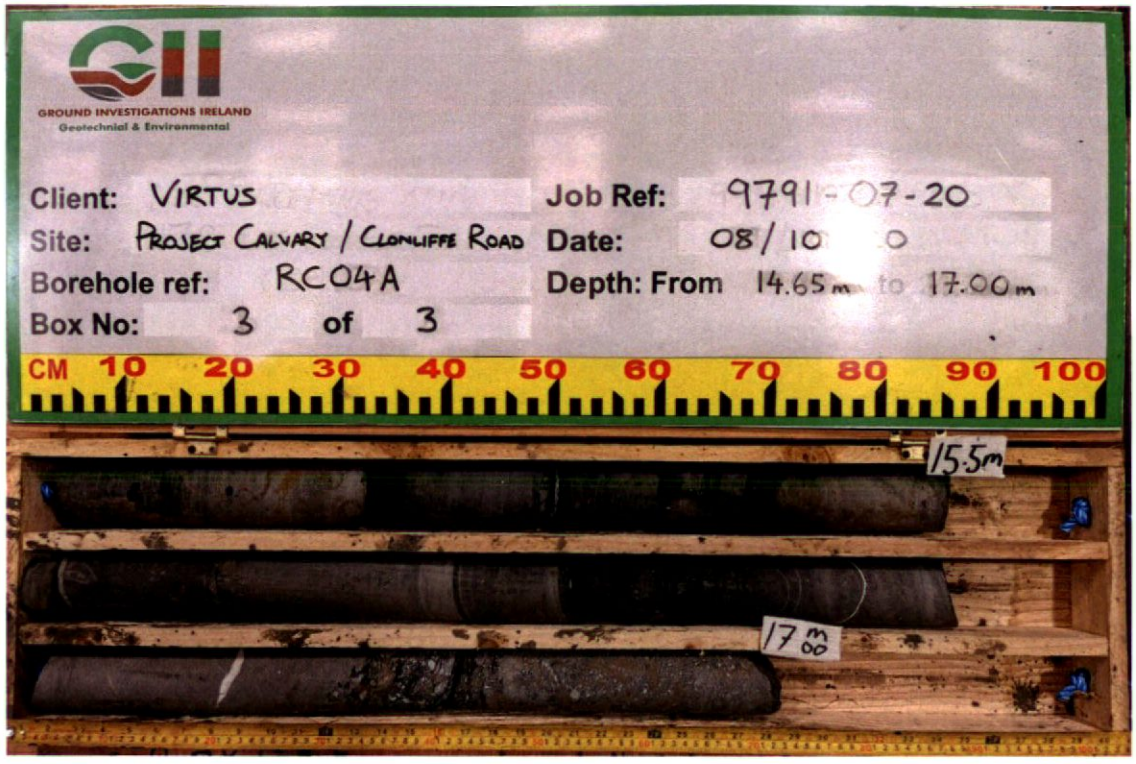

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Job Ref: 9791-07-20
Site: PROJECT CALVARY / CLONLIFFE ROAD
Date: 07/10/20
Borehole ref: RC03A
Depth: From 0.00m to 15.12m
Box No: 1 of 2
CM 10 20 30 40 50 60 70 80 90 100
0.00M
2.30M
3.80M
5.00M
6.5M
8.00M
9.5M
11.00M
12.5M
14.00M


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Job Ref: 9791-07-20
Site: PROJECT CALVARY / CLONLIFFE ROAD
Date: 07/10/20
Borehole ref: RC03A
Depth: From 15.12m to 15.50m
Box No: 2 of 2
CM 10 20 30 40 50 60 70 80 90 100

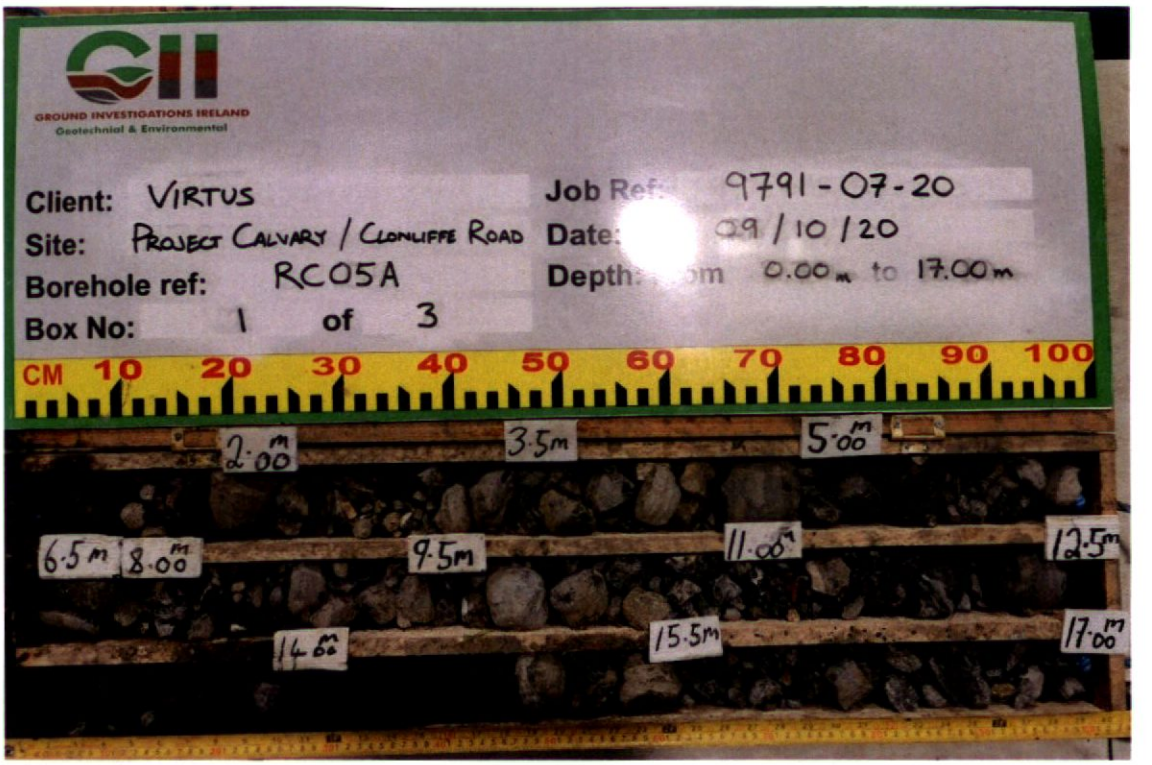
RC04A

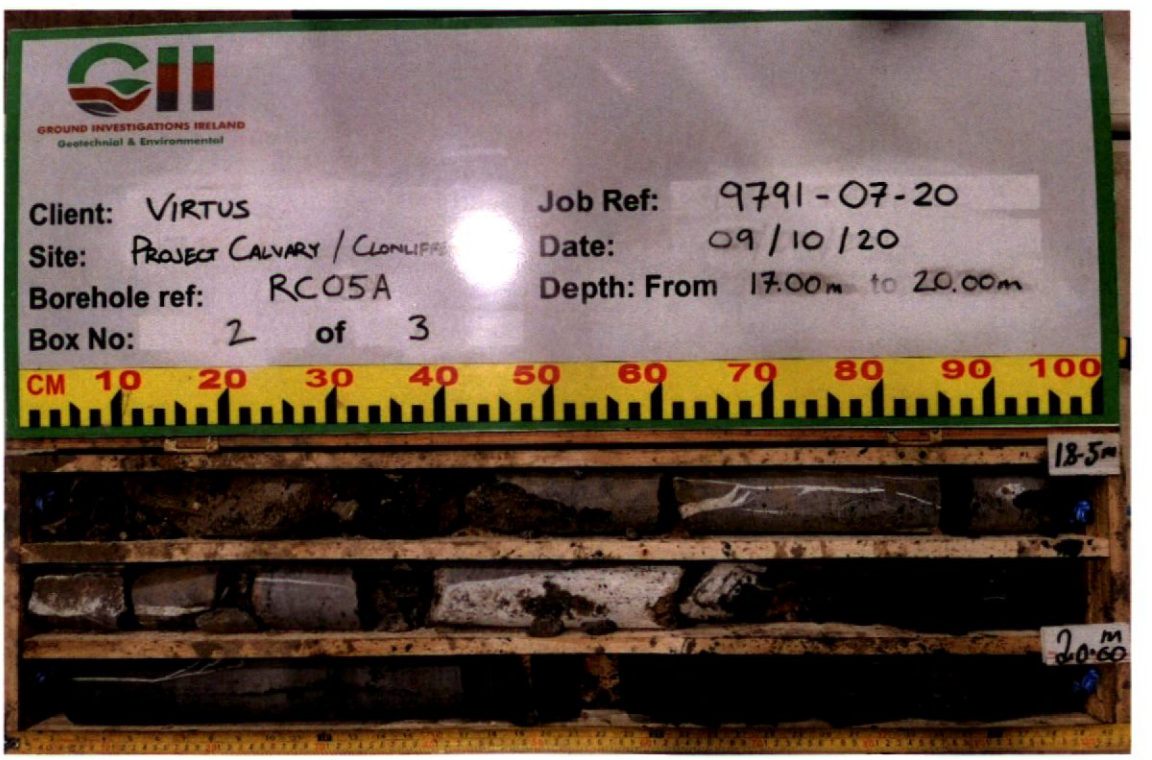

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Job Ref: 9791-07-20
Site: PROJECT CALVARY / CLONLIFFE ROAD
Date: 08/10/20
Borehole ref: RC04A
Depth from 0.00m to 11.76m
Box No: 1 of 3
CM 10 20 30 40 50 60 70 80 90 100
2.00m
3.5m
5.00m
6.5m
8.00m
9.5m
11.00m


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Job Ref: 9791-07-20
Site: PROJECT CALVARY / CLONLIFFE ROAD
Date: 08/10/20
Borehole ref: RC04A
Depth: From 11.76m to 14.65m
Box No: 2 of 3
CM 10 20 30 40 50 60 70 80 90 100
12.6m
14.00m


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Job Ref: 9791-07-20
Site: PROJECT CALVARY / CLONLIFFE ROAD
Date: 08/10
Borehole ref: RC04A
Depth: From 14.65m to 17.00m
Box No: 3 of 3
CM 10 20 30 40 50 60 70 80 90 100
15.5m
17.00m

RC05A


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Site: PROJECT CALVARY / CLONLIFFE ROAD
Borehole ref: RC05A
Box No: 1 of 3
Job Ref: 9791-07-20
Date: 09/10/20
Depth: From 0.00m to 17.00m
CM 10 20 30 40 50 60 70 80 90 100
2.00m
3.5m
5.00m
6.5m
8.00m
9.5m
11.00m
12.5m
14.6m
15.5m
17.00m

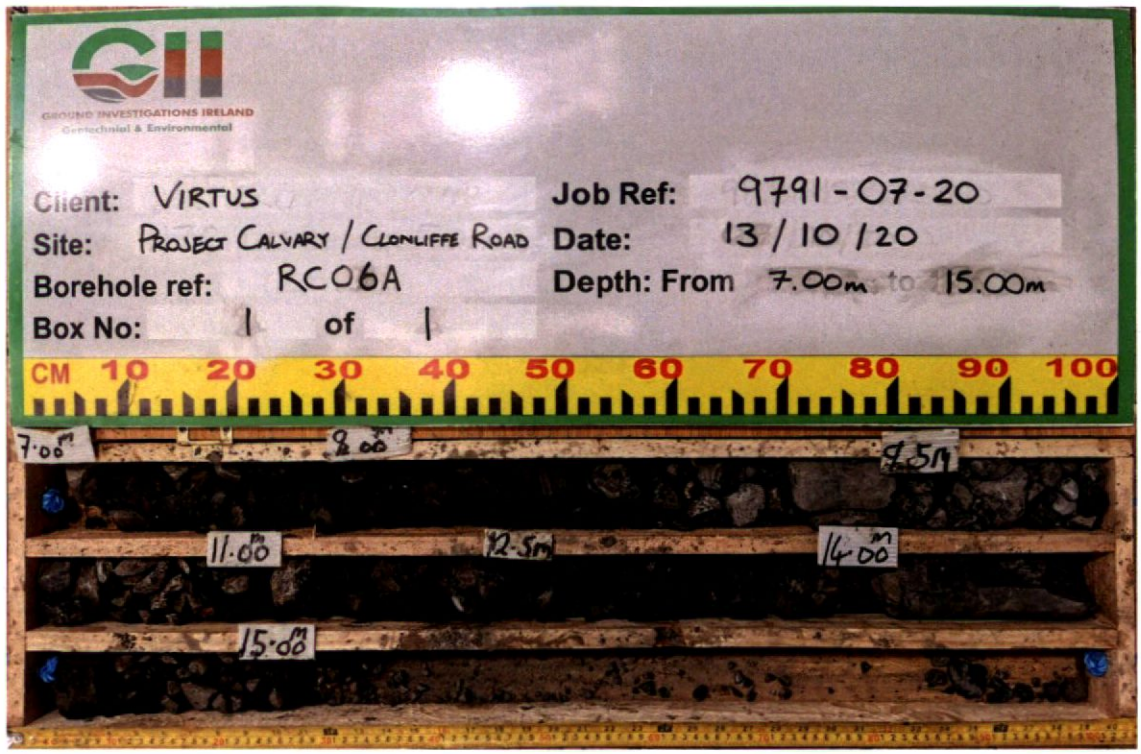

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Site: PROJECT CALVARY / CLONLIFFE
Borehole ref: RC05A
Box No: 2 of 3
Job Ref: 9791-07-20
Date: 09/10/20
Depth: From 17.00m to 20.00m
CM 10 20 30 40 50 60 70 80 90 100
18.5m
20.00m

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

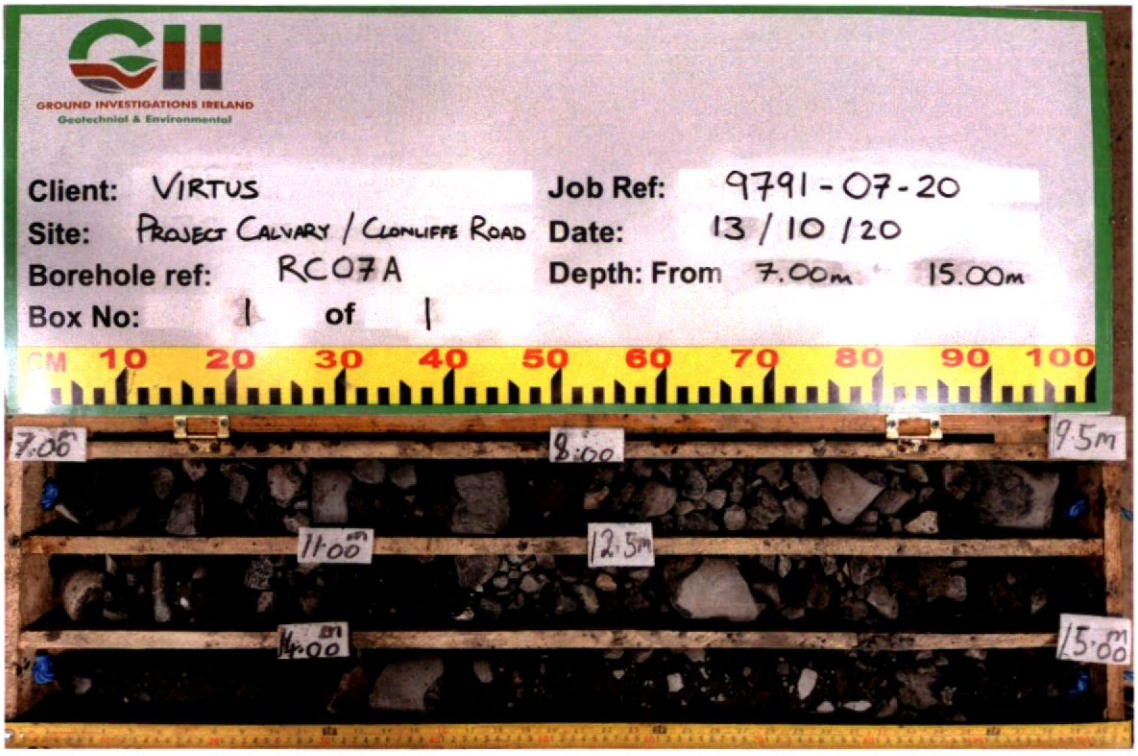
Client: VIRTUS
Job Ref: 9791-07-20
Site: PROJECT CALVARY / CLONLIFFE ROAD
Date: 09/10/20
Borehole ref: RC05A
Depth: From 20.00m to 21.50m
Box No: 3 of 3



RC06A


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Job Ref: 9791-07-20
Site: PROJECT CALVARY / CLONLIFFE ROAD
Date: 13/10/20
Borehole ref: RC06A
Depth: From 7.00m to 15.00m
Box No: 1 of 1
CM 10 20 30 40 50 60 70 80 90 100
7.00m
8.00m
9.5m
11.00m
12.5m
14.00m
15.00m

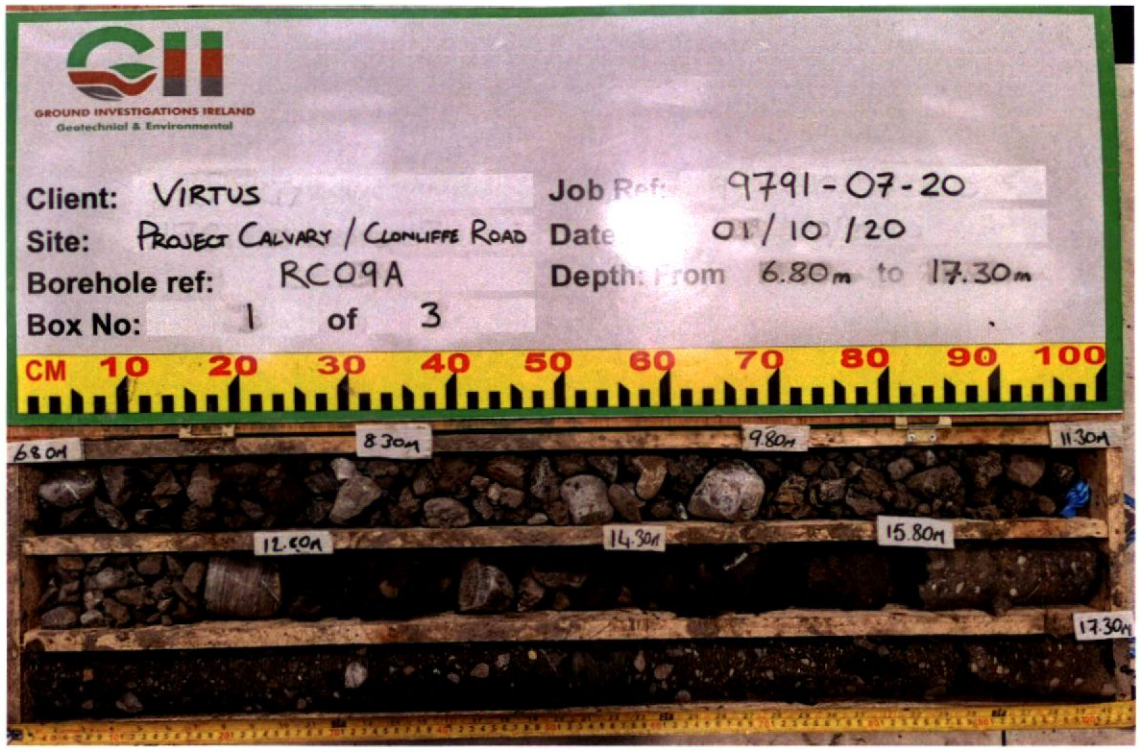
RC07A


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Job Ref: 9791-07-20
Site: PROJECT CALVARY / CLONLIFFE ROAD
Date: 13/10/20
Borehole ref: RC07A
Depth: From 7.00m 15.00m
Box No: 1 of 1
CM 10 20 30 40 50 60 70 80 90 100
7.00
8.00
9.5m
11.00
12.5m
14.00
15.00

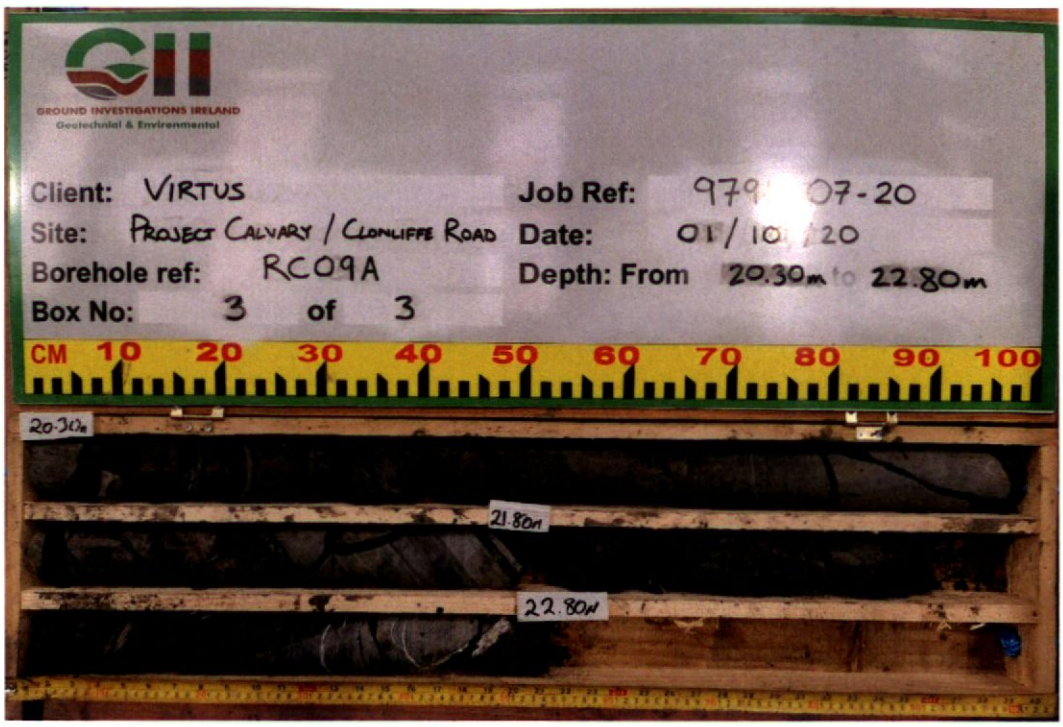
RC08A


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Job Ref: 9791-07-20
Site: PROJECT CALVARY / CLONLIFFE ROAD
Date: 13/10/20
Borehole ref: RC08A
Depth: From 6.80m to 15.80m
Box No: 1 of 1
CM 10 20 30 40 50 60 70 80 90 100
6.80m
8.30m
9.80m
17.30m
12.80m
14.30m
15.80m

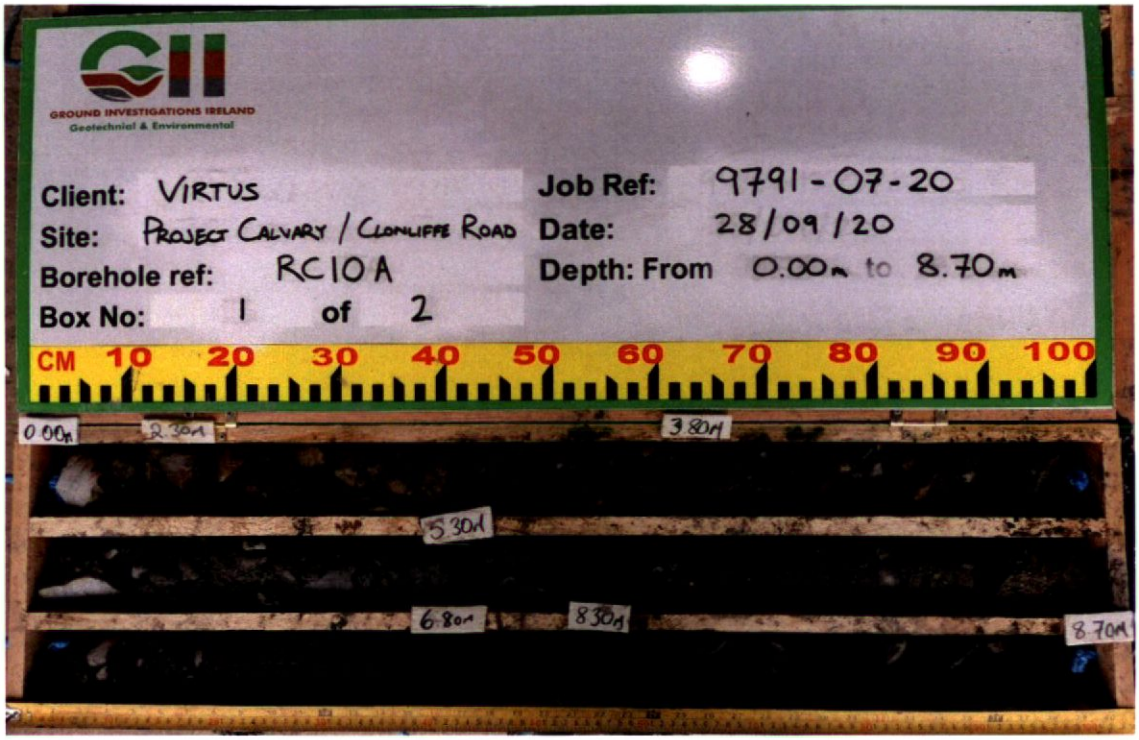
RC09A

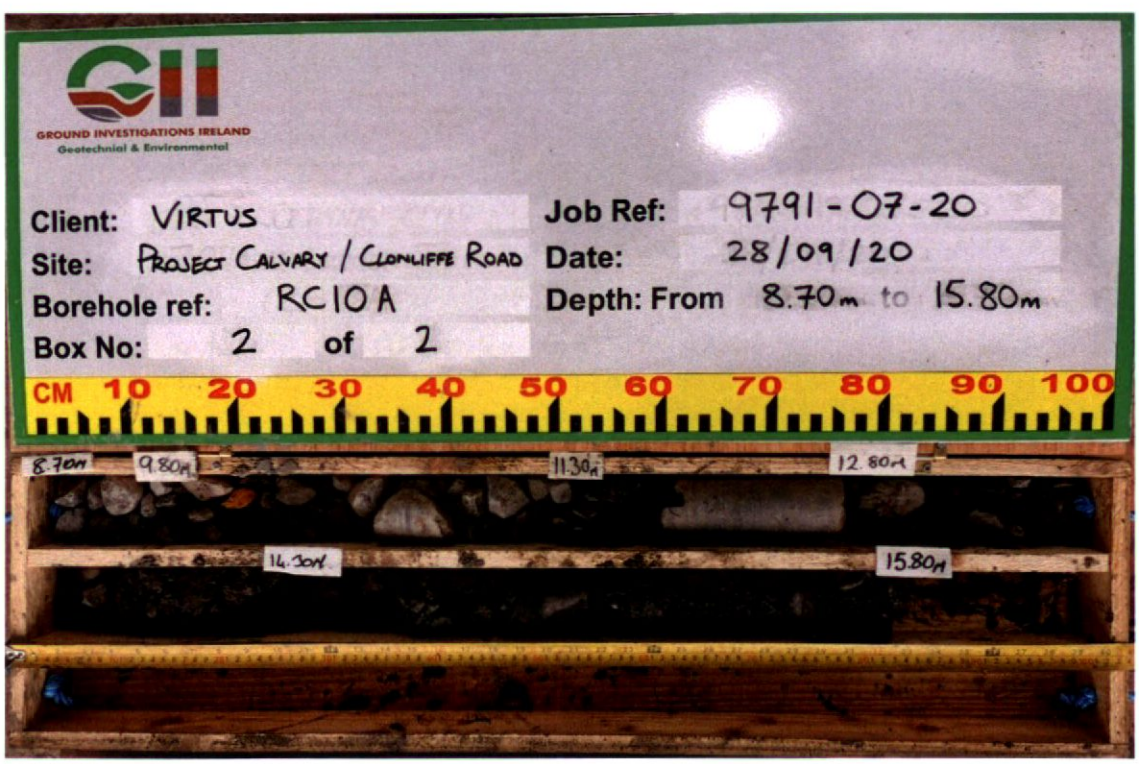

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Site: PROJECT CALVARY / CLONLIFFE ROAD
Borehole ref: RC09A
Box No: 1 of 3
Job Ref: 9791-07-20
Date: 01/10/20
Depth: From 6.80m to 17.30m
CM 10 20 30 40 50 60 70 80 90 100
6.80m
8.30m
9.80m
11.30m
12.80m
14.30m
15.80m
17.30m


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Site: PROJECT CALVARY / CLONLIFFE
Borehole ref: RC09A
Box No: 2 of 3
Job Ref: 9791-07-20
Date: 01/10/20
Depth: From 17.30m to 20.30m
CM 10 20 30 40 50 60 70 80 90 100
17.30m
18.80m
20.30

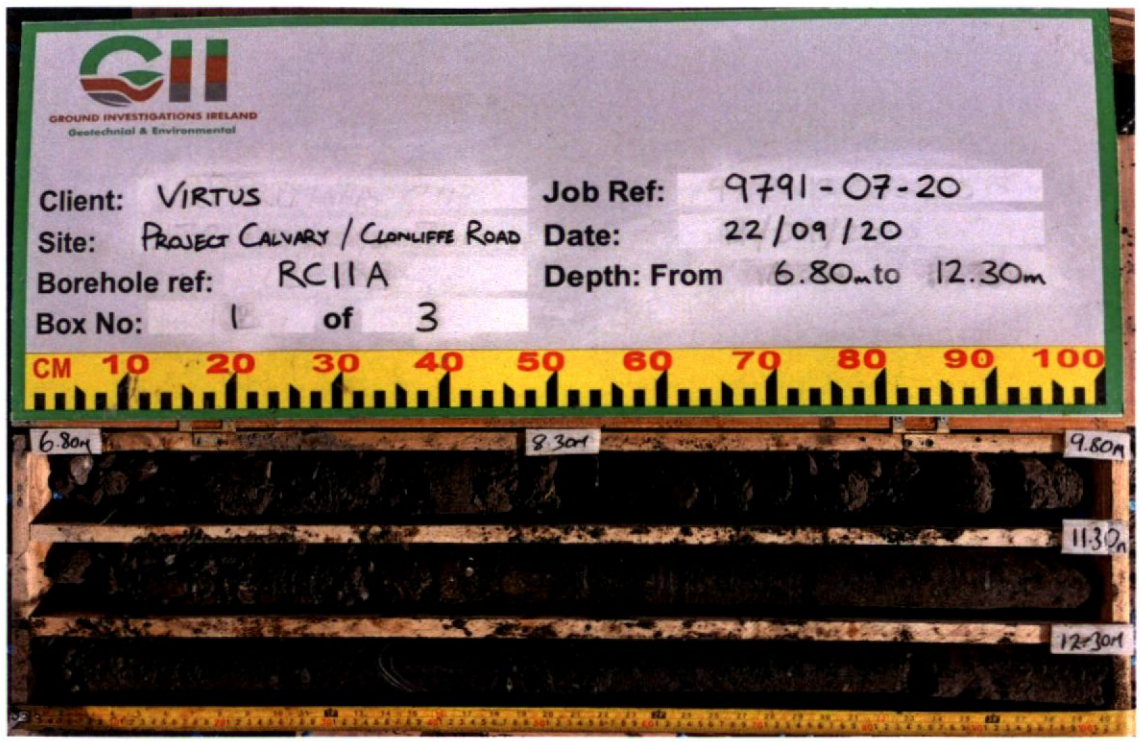

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Job Ref: 979 07-20
Site: PROJECT CALVARY / CLONLIFFE ROAD
Date: 01/10/20
Borehole ref: RC09A
Depth: From 20.30m to 22.80m
Box No: 3 of 3
CM 10 20 30 40 50 60 70 80 90 100
20.30m
21.80m
22.80m

RC10A

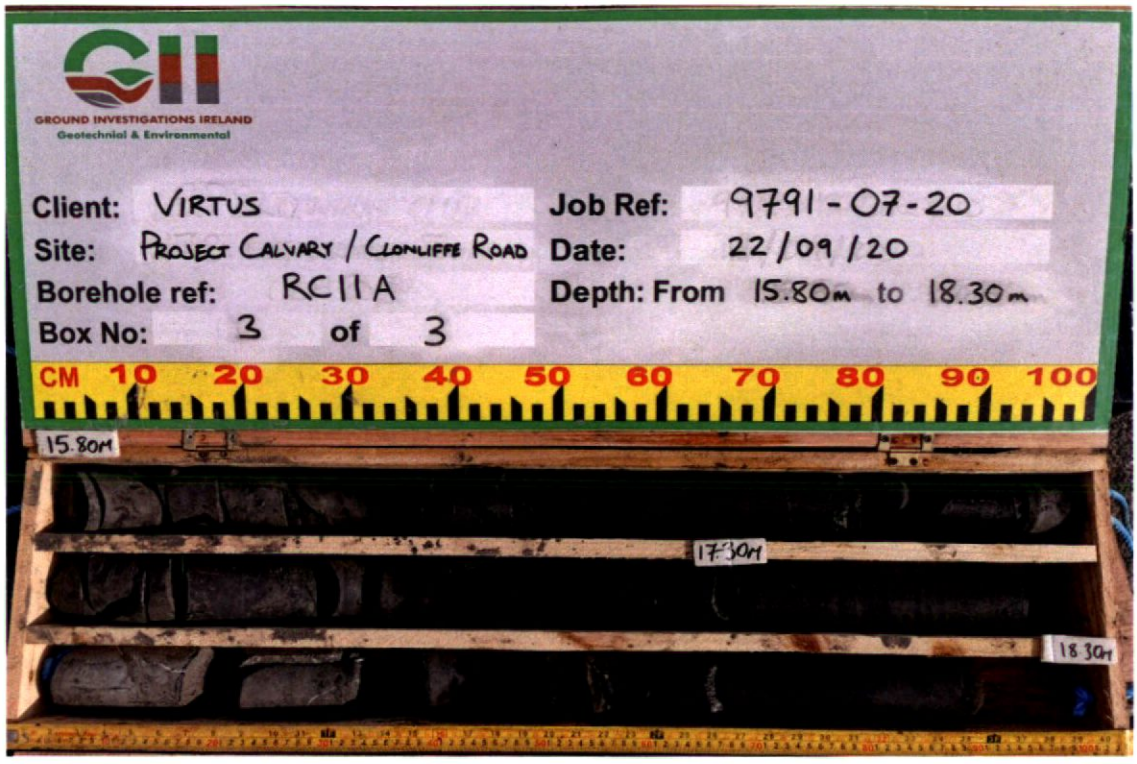

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Site: PROJECT CALVARY / CLONLIFFE ROAD
Borehole ref: RC10A
Box No: 1 of 2
Job Ref: 9791-07-20
Date: 28/09/20
Depth: From 0.00m to 8.70m
CM 10 20 30 40 50 60 70 80 90 100
0.00m
2.30m
3.80m
5.30m
6.80m
8.30m
8.70m


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Site: PROJECT CALVARY / CLONLIFFE ROAD
Borehole ref: RC10A
Box No: 2 of 2
Job Ref: 9791-07-20
Date: 28/09/20
Depth: From 8.70m to 15.80m
CM 10 20 30 40 50 60 70 80 90 100
8.70m
9.80m
11.30m
12.80m
14.30m
15.80m

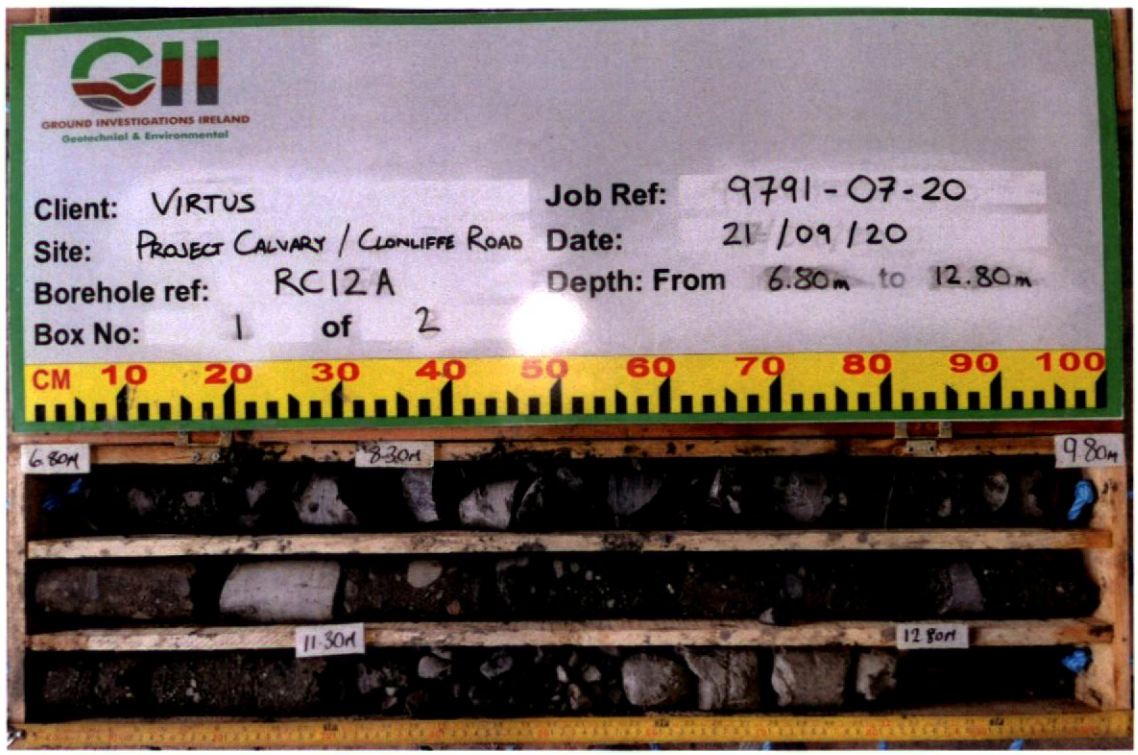
RC11A

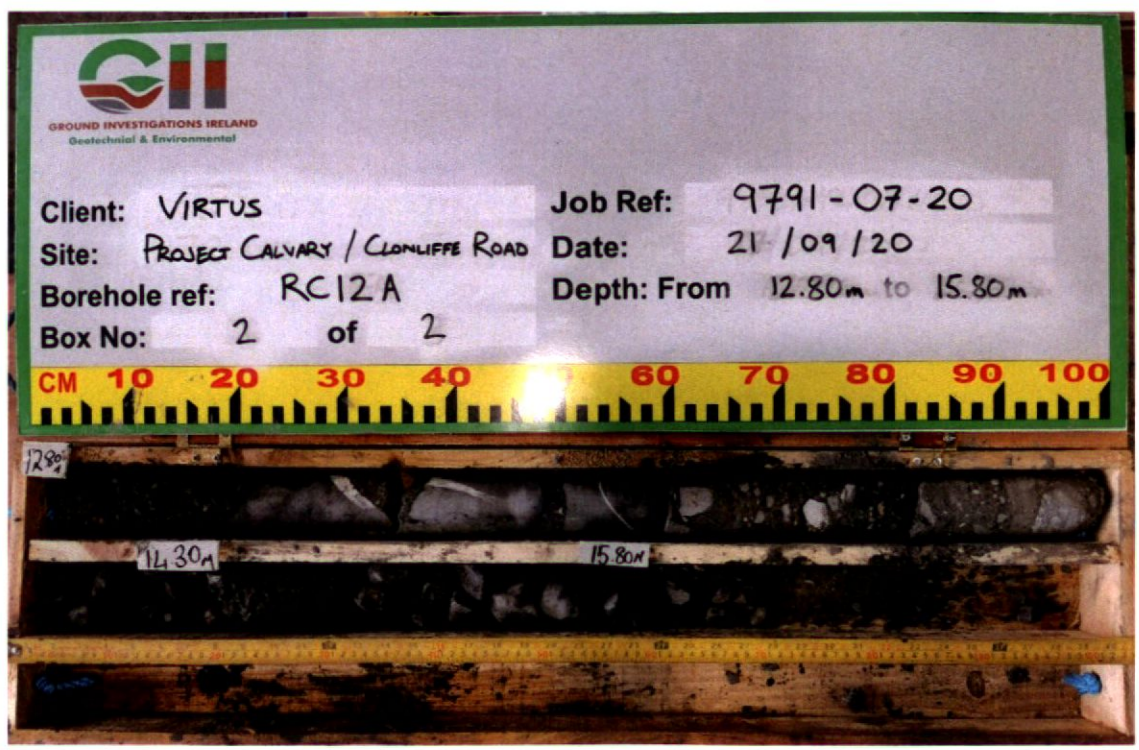

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Site: PROJECT CALVARY / CLONLIFFE ROAD
Borehole ref: RC11A
Box No: 1 of 3
Job Ref: 9791-07-20
Date: 22/09/20
Depth: From 6.80m to 12.30m
CM 10 20 30 40 50 60 70 80 90 100
6.80m
8.30m
9.80m
11.30m
12.30m


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Site: PROJECT CALVARY / CLONLIFFE ROAD
Borehole ref: RC11A
Box No: 2 of 3
Job Ref: 9791-07-20
Date: 22/09/20
Depth: From 12.30m to 15.80m
CM 10 20 30 40 50 60 70 80 90 100
12.80m
14.30m
15.80m

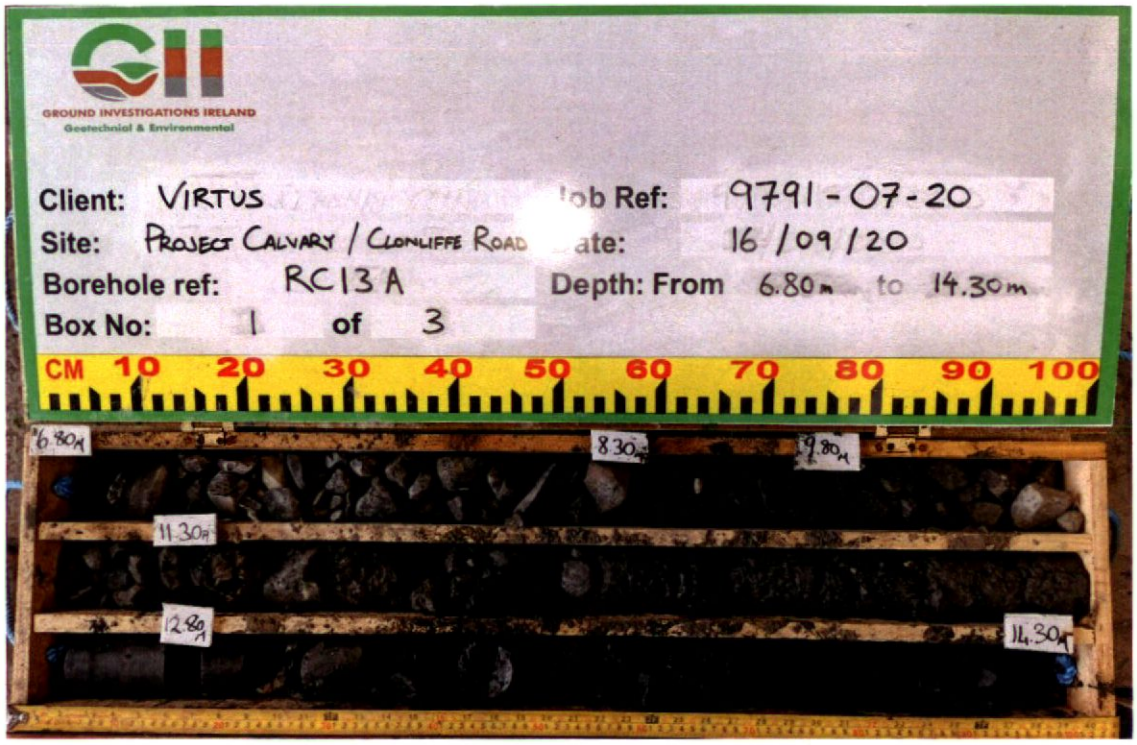

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Job Ref: 9791-07-20
Site: PROJECT CALVARY / CLONLIFFE ROAD
Date: 22/09/20
Borehole ref: RC11A
Depth: From 15.80m to 18.30m
Box No: 3 of 3
CM 10 20 30 40 50 60 70 80 90 100
15.80M
17.30M
18.30M

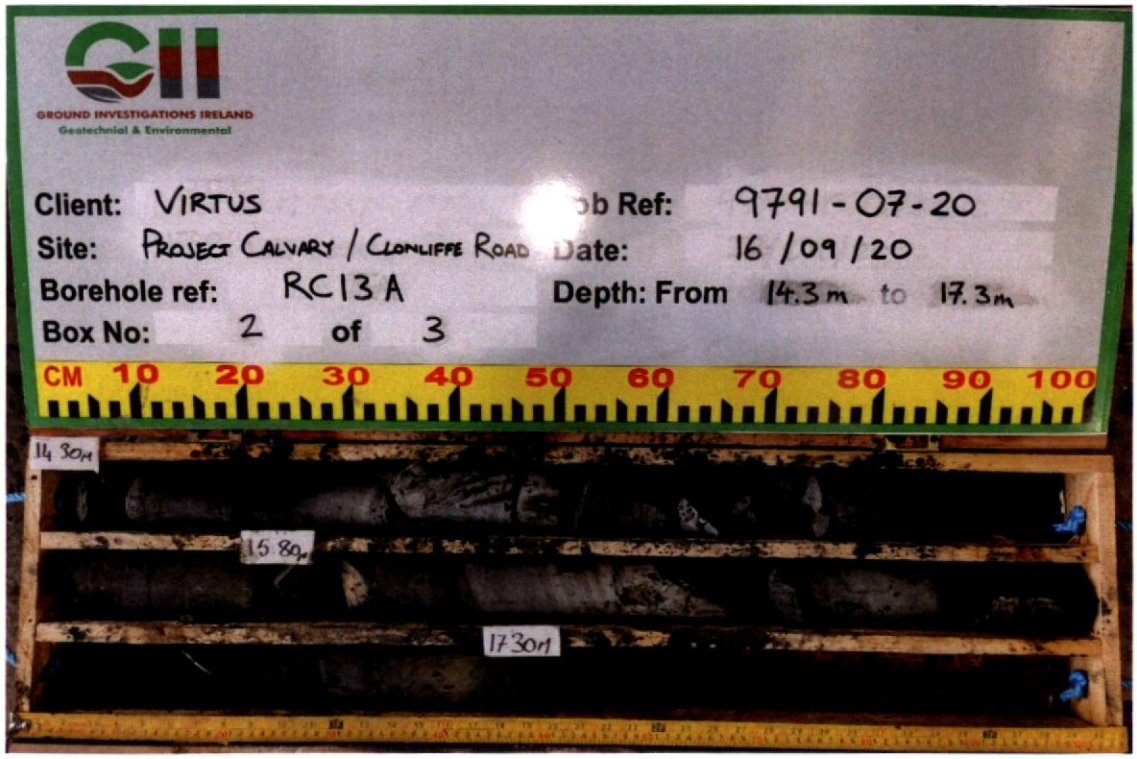
RC12A

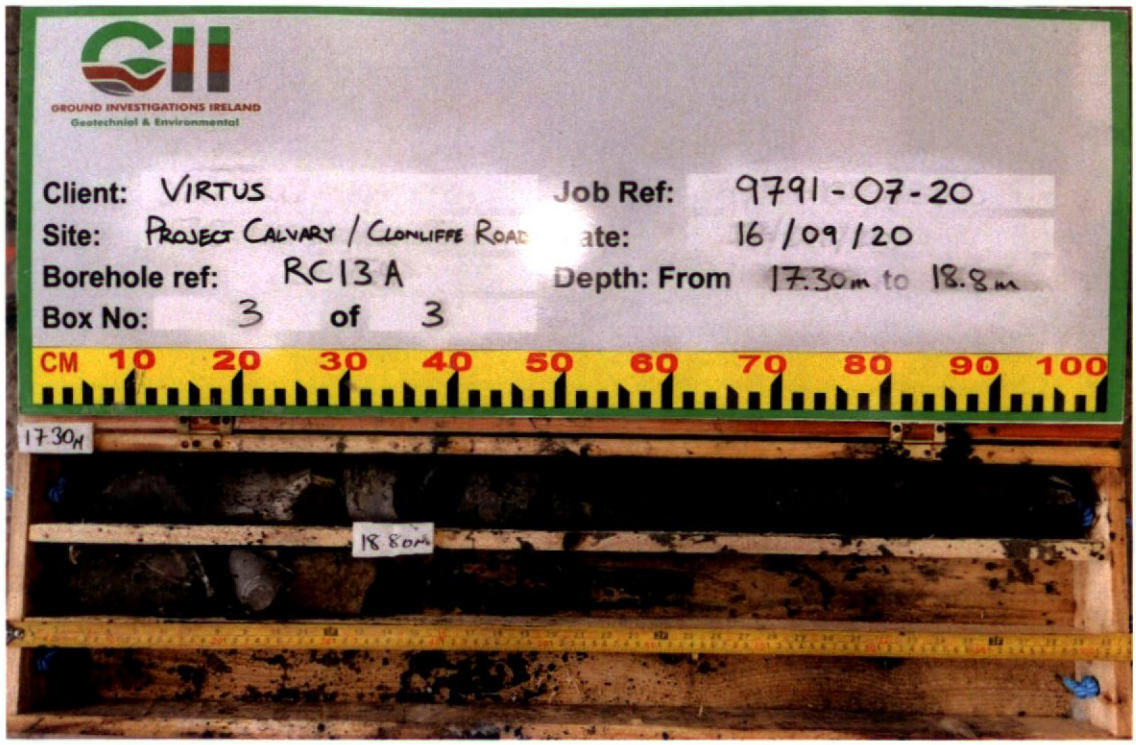

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Site: PROJECT CALVARY / CLONLIFFE ROAD
Borehole ref: RC12A
Box No: 1 of 2
Job Ref: 9791-07-20
Date: 21/09/20
Depth: From 6.80m to 12.80m
CM 10 20 30 40 50 60 70 80 90 100
6.80M
8.30M
9.80M
11.30M
12.80M


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Site: PROJECT CALVARY / CLONLIFFE ROAD
Borehole ref: RC12A
Box No: 2 of 2
Job Ref: 9791-07-20
Date: 21/09/20
Depth: From 12.80m to 15.80m
CM 10 20 30 40 60 70 80 90 100
12.80M
14.30M
15.80M

RC13A

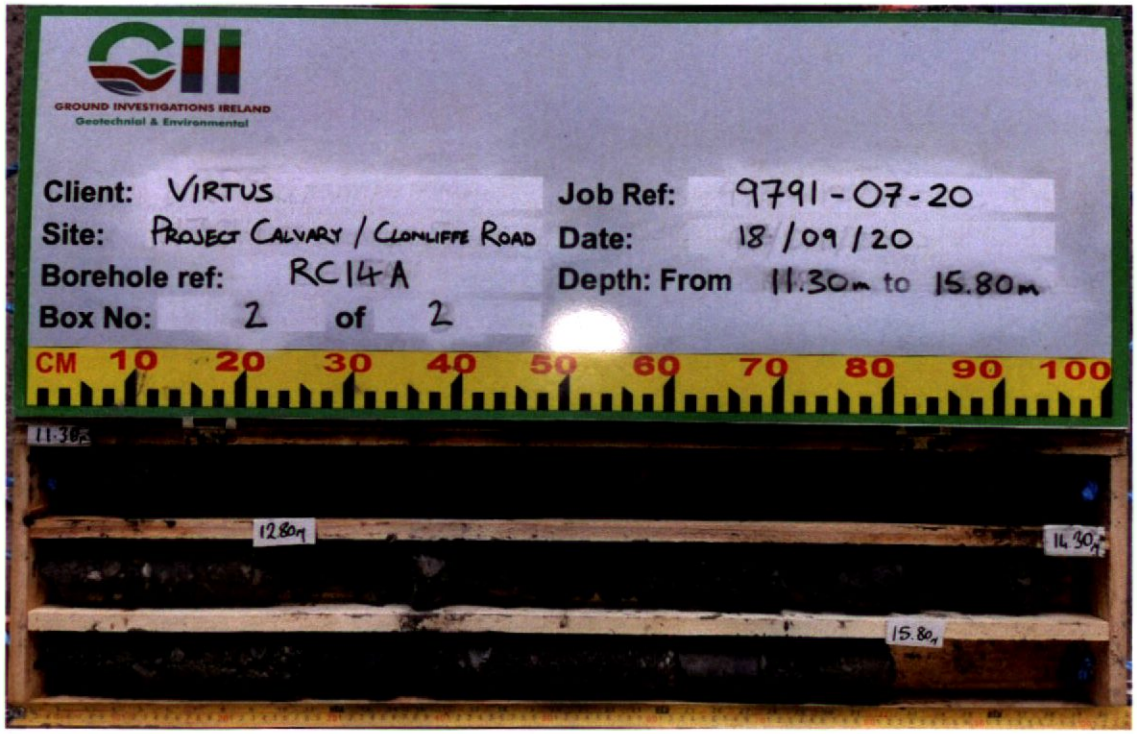

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Job Ref: 9791-07-20
Site: PROJECT CALVARY / CLONLIFFE ROAD
Date: 16/09/20
Borehole ref: RC13A
Depth: From 6.80m to 14.30m
Box No: 1 of 3
CM 10 20 30 40 50 60 70 80 90 100
6.80m
8.30m
9.80m
11.30m
12.80m
14.30m


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Job Ref: 9791-07-20
Site: PROJECT CALVARY / CLONLIFFE ROAD
Date: 16/09/20
Borehole ref: RC13A
Depth: From 14.3m to 17.3m
Box No: 2 of 3
CM 10 20 30 40 50 60 70 80 90 100
14.30m
15.80m
17.30m

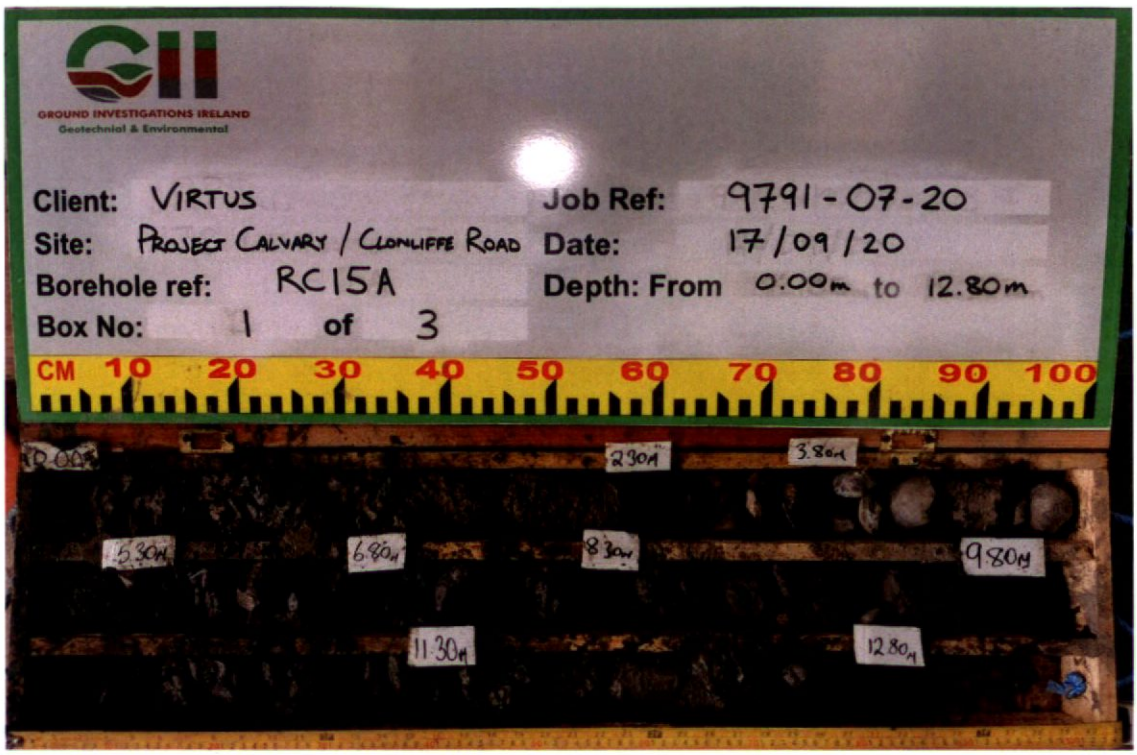

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Job Ref: 9791-07-20
Site: PROJECT CALVARY / CLONLIFFE ROAD
Date: 16/09/20
Borehole ref: RC13A
Depth: From 17.30m to 18.8m
Box No: 3 of 3
CM 10 20 30 40 50 60 70 80 90 100
17.30M
18.80M

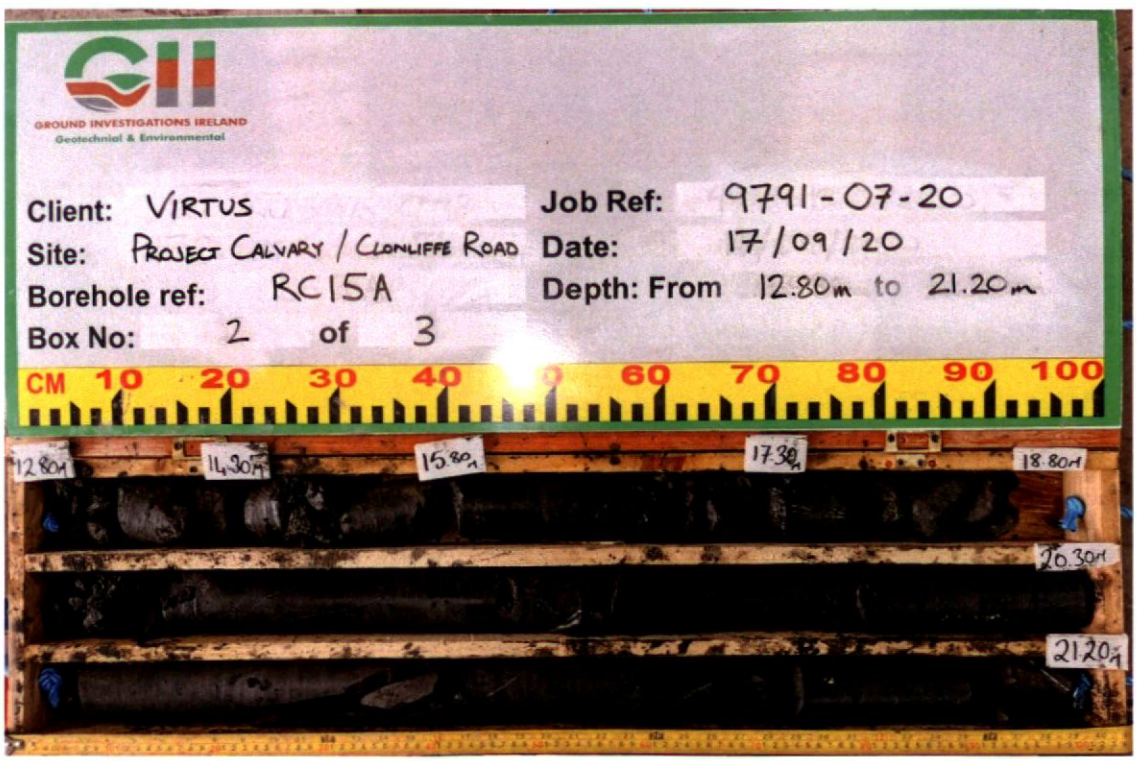
RC14A


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Ref: 9791-07-20
Site: PROJECT CALVARY / CLONLIFFE ROAD
Date: 18/09/20
Borehole ref: RC14A
Depth: From 6.80m to 11.30m
Box No: 1 of 2
CM 10 20 30 40 50 60 70 80 90 100
6.80
8.30
9.80
11.30


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Job Ref: 9791-07-20
Site: PROJECT CALVARY / CLONLIFFE ROAD
Date: 18/09/20
Borehole ref: RC14A
Depth: From 11.30m to 15.80m
Box No: 2 of 2
CM 10 20 30 40 50 60 70 80 90 100
11.30
12.80
14.30
15.80

RC15A


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Site: PROJECT CALVARY / CLONLIFFE ROAD
Borehole ref: RC15A
Box No: 1 of 3
Job Ref: 9791-07-20
Date: 17/09/20
Depth: From 0.00m to 12.80m
CM 10 20 30 40 50 60 70 80 90 100
2.30m
3.80m
5.30m
6.80m
8.30m
9.80m
11.30m
12.80m


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: VIRTUS
Site: PROJECT CALVARY / CLONLIFFE ROAD
Borehole ref: RC15A
Box No: 2 of 3
Job Ref: 9791-07-20
Date: 17/09/20
Depth: From 12.80m to 21.20m
CM 10 20 30 40 60 70 80 90 100
12.80m
14.30m
15.80m
17.30m
18.80m
20.30m
21.20m

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

Client: VIRTUS
Job Ref: 9791-07-20
Site: PROJECT CALVARY / CLONLIFFE ROAD
Date: 17/09/20
Borehole ref: RC15A
Depth: From 21.20m to 23.30m
Box No: 3 of 3

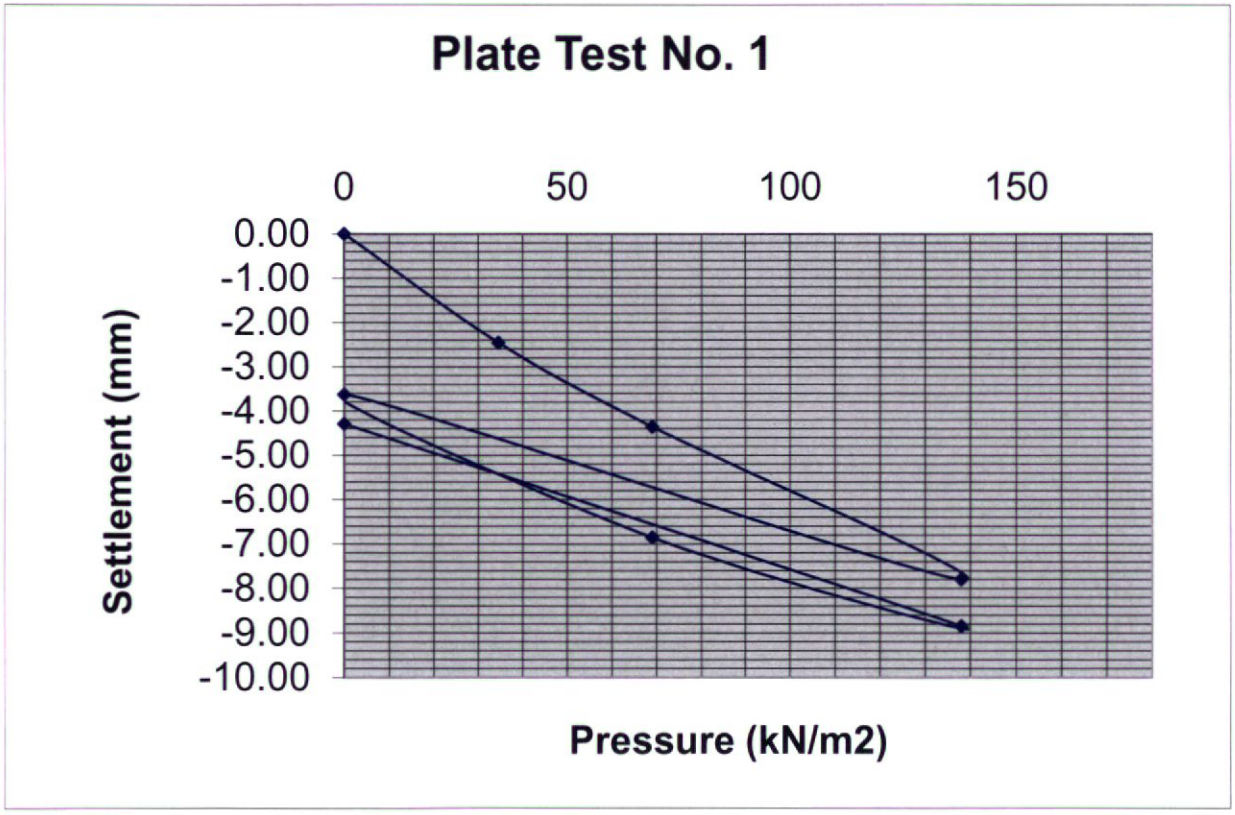


APPENDIX 6 – Insitu Plate Bearing Test Records

Applied Load	Gauge settlement
0	**0.00**
34.5	-2.46
69	-4.36
138	-7.80
0	-3.63
69	-6.86
138	-8.85
0	-4.30

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Project Calvary	**MATERIAL**	MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional cobbles and fragments of ceramic
CONTRACT NO.	9363-01-20		
DATE	14/02/2020		
CLIENT	Virtus	**DEPTH**	0.50m
PLATE DIAMETER	457mm	**NOTES**	CBR moved due to power reading from CAT
TEST NO.	CBR1	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **10.69 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **14.43 MN/m2/m**

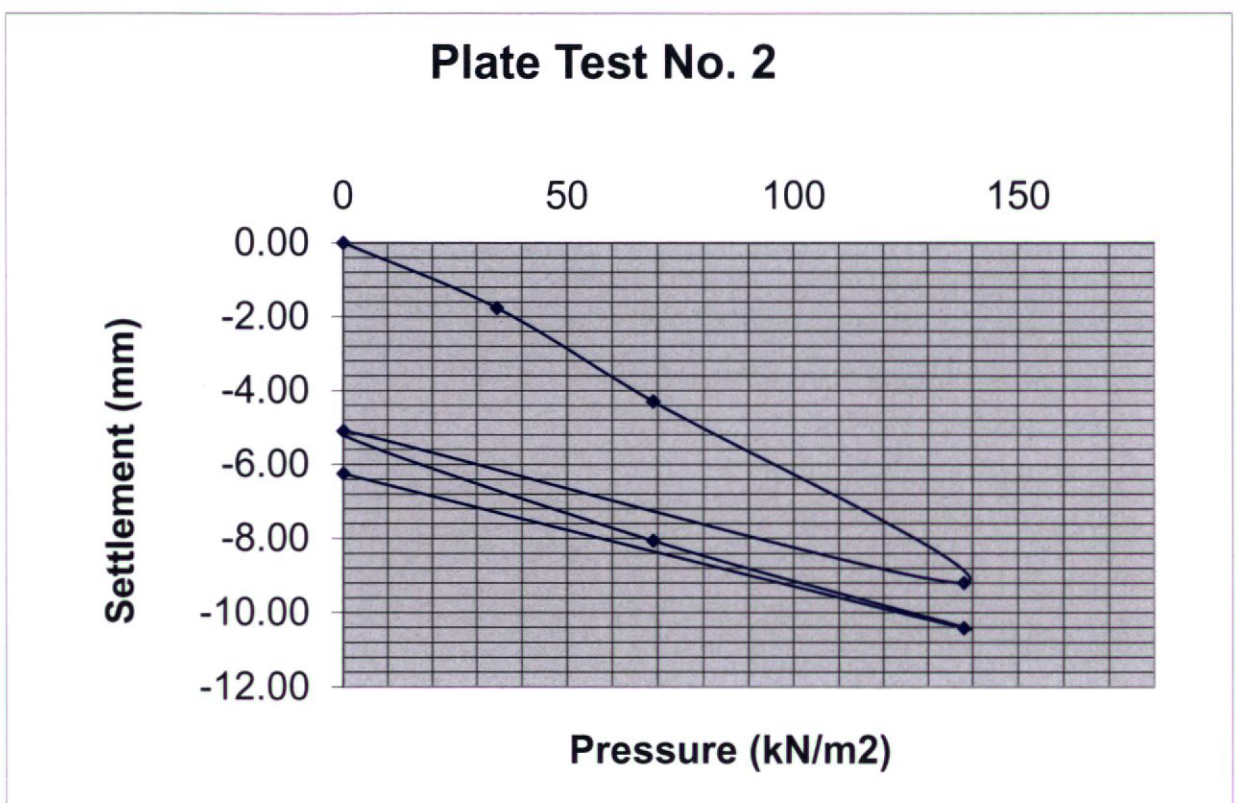
Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.59 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **0.99 %**

Applied Load	Gauge settlement
0	**0.00**
34.5	-1.77
69	-4.30
138	-9.20
0	-5.10
69	-8.07
138	-10.42
0	-6.26

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Project Calvary	**MATERIAL**	Brown slightly sandy slightly gravelly CLAY with roots
CONTRACT NO.	9363-01-20		
DATE	14/02/2020		
CLIENT	Virtus	**DEPTH**	0.50m
PLATE DIAMETER	457mm	**NOTES**	CBR moved due to power reading from CAT
TEST NO.	CBR2	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **10.84 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **15.70 MN/m2/m**

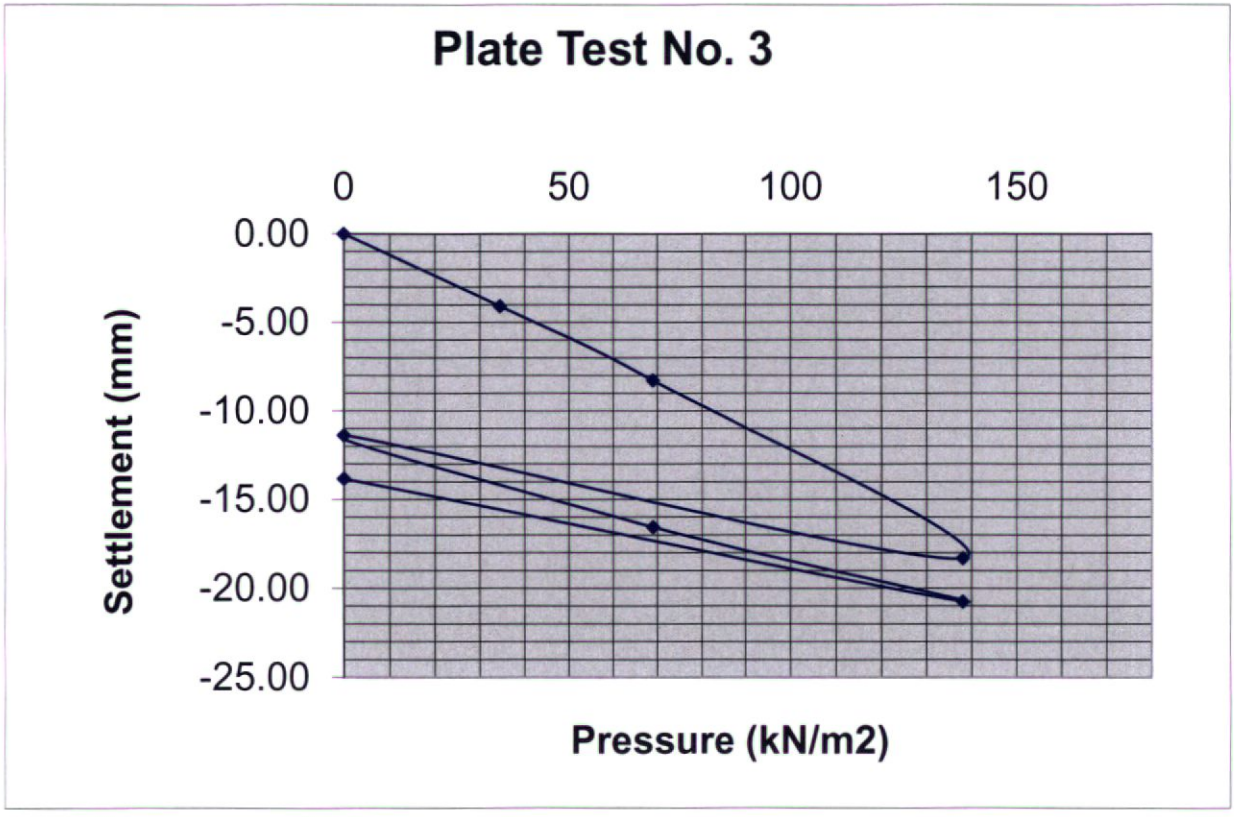
Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.60 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **1.14 %**

Applied Load	Gauge settlement
0	**0.00**
34.5	-4.10
69	-8.29
138	-18.32
0	-11.40
69	-16.57
138	-20.75
0	-13.85

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Project Calvary	**MATERIAL**	MADE GROUND: Dark brown slightly sandy slightly gravelly Clay with fragments of brick and ceramic
CONTRACT NO.	9363-01-20		
DATE	14/02/2020		
CLIENT	Virtus	**DEPTH**	0.50m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR3	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **5.62 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **9.02 MN/m2/m**

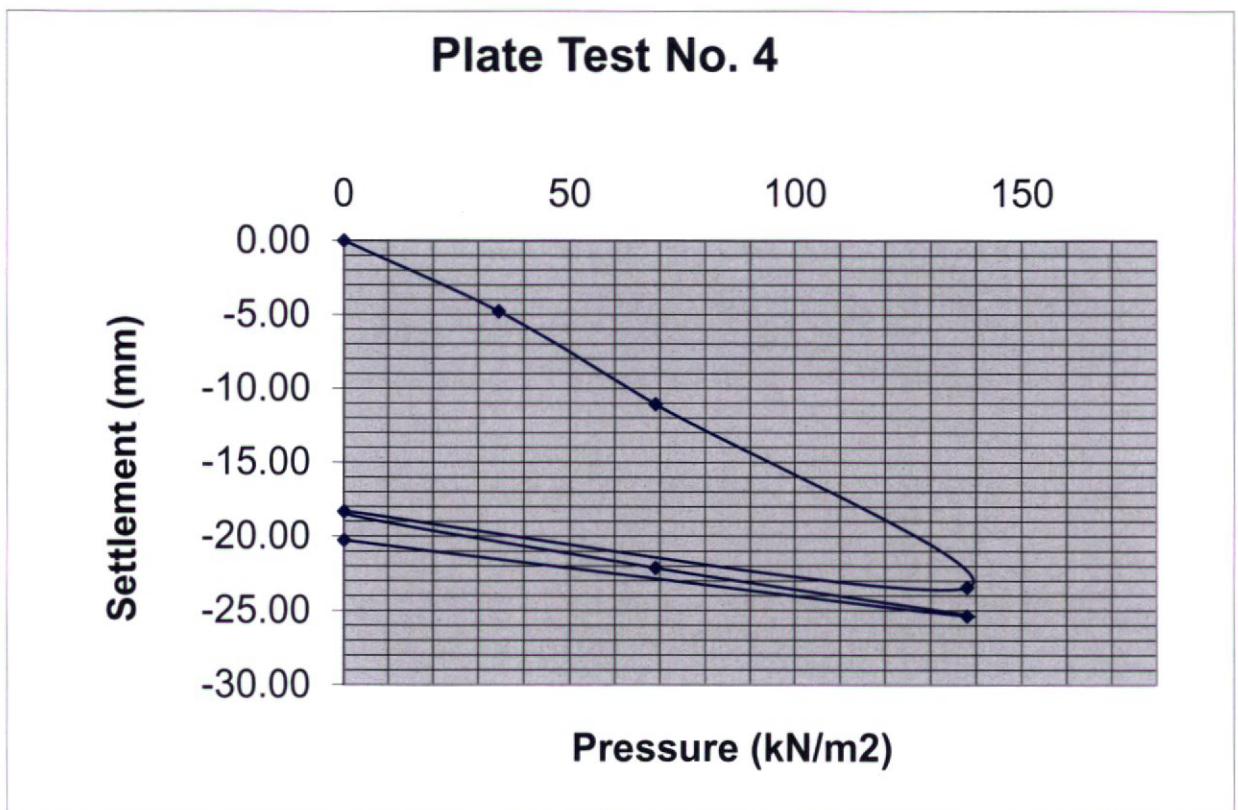
Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.19 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **0.44 %**

Applied Load	Gauge settlement
0	**0.00**
34.5	-4.80
69	-11.08
138	-23.46
0	-18.34
69	-22.14
138	-25.38
0	-20.28

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Project Calvary	**MATERIAL**	MADE GROUND: Dark brown slightly sandy slightly gravelly Clay with roots and fragments of brick and ceramic
CONTRACT NO.	9363-01-20		
DATE	14/02/2020		
CLIENT	Virtus	**DEPTH**	0.80m BGL
PLATE DIAMETER	457mm	**NOTES**	CBR moved due to tree roots
TEST NO.	CBR4	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **4.21 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **12.27 MN/m2/m**

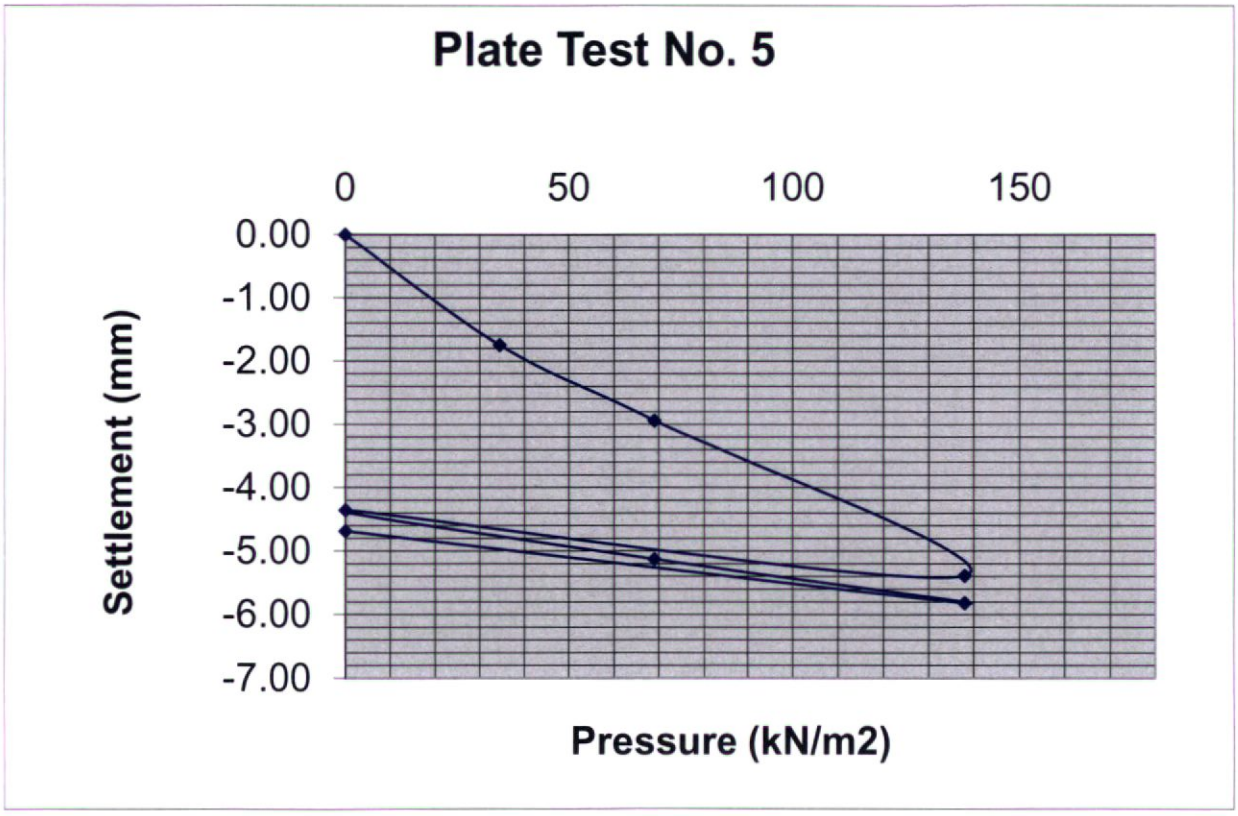
Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.12 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **0.74 %**

Applied Load	Gauge settlement
0	**0.00**
34.5	-1.75
69	-2.94
138	-5.39
0	-4.36
69	-5.13
138	-5.82
0	-4.69

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Project Calvary	**MATERIAL**	MADE GROUND: Dark brown/grey slightly sandy slightly gravelly Clay with cobbles, bricks, ceramic and glass
CONTRACT NO.	9363-01-20		
DATE	14/02/2020		
CLIENT	Virtus	**DEPTH**	0.80m BGL
PLATE DIAMETER	457mm	**NOTES**	CBR moved due to trees and victorian drain
TEST NO.	CBR5	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **15.86 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **60.55 MN/m2/m**

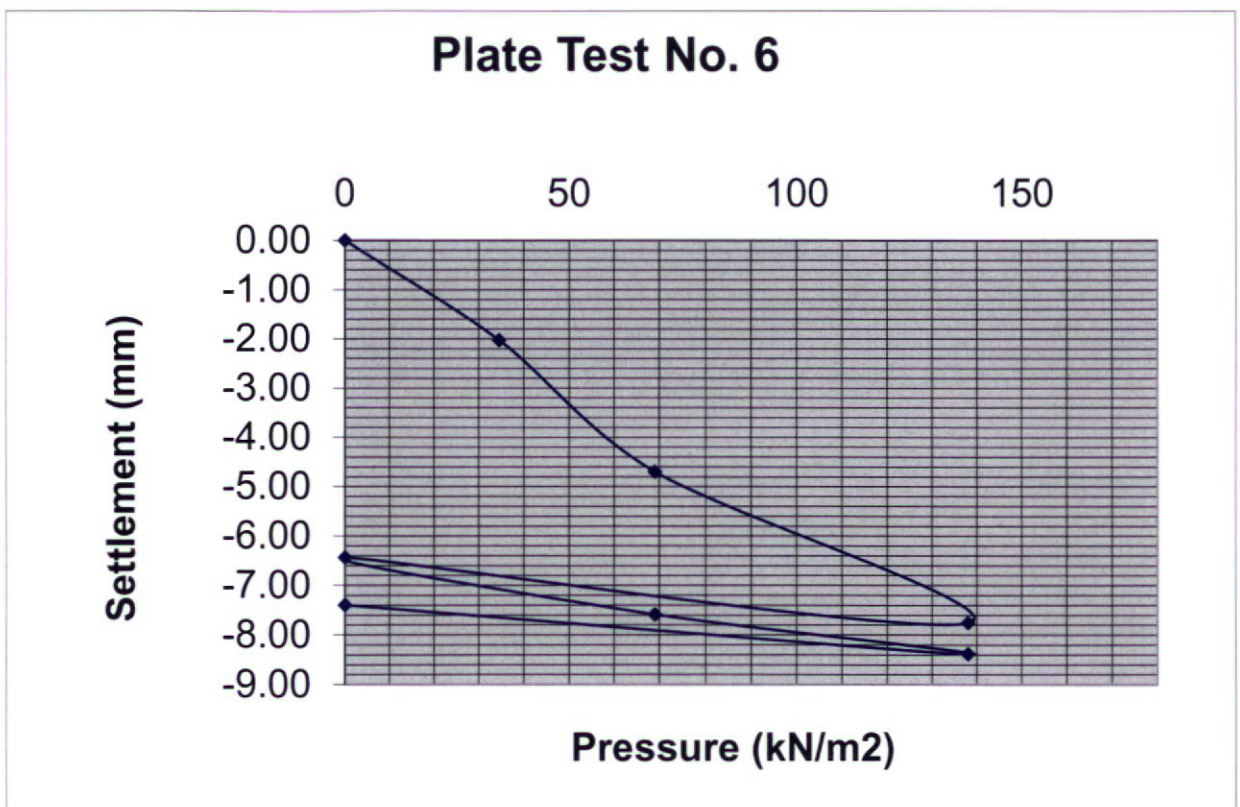
Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **1.16 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **11.82 %**

Applied Load	Gauge settlement
0	**0.00**
34.5	-2.03
69	-4.70
138	-7.76
0	-6.44
69	-7.59
138	-8.39
0	-7.40

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Project Calvary	**MATERIAL**	MADE GROUND: Dark brown/grey slightly sandy slightly gravelly Clay with many cobbles, bricks, ceramic, concrete and animal bones
CONTRACT NO.	9363-01-20		
DATE	14/02/2020		
CLIENT	Virtus		
PLATE DIAMETER	457mm	**DEPTH**	0.80m BGL
TEST NO.	CBR6	**NOTES**	



Modulus of subgrade reaction, K (Initial) = **9.92 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **40.54 MN/m2/m**

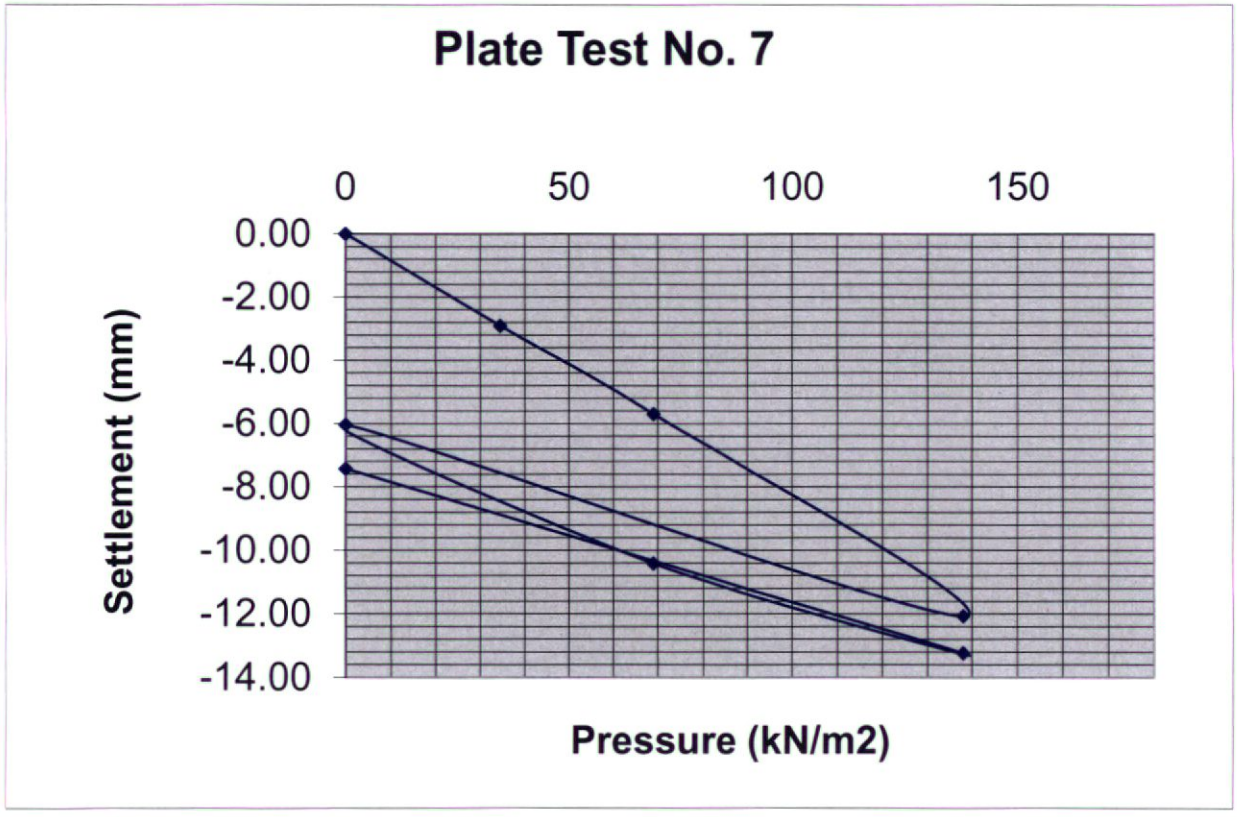
Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.51 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **5.90 %**

Applied Load	Gauge settlement
0	**0.00**
34.5	-2.91
69	-5.70
138	-12.08
0	-6.05
69	-10.42
138	-13.24
0	-7.44

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Project Calvary	**MATERIAL**	MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional cobbles and fragments of bricks, ceramic and glass
CONTRACT NO.	9363-01-20		
DATE	14/02/2020		
CLIENT	Virtus		
PLATE DIAMETER	457mm	**DEPTH**	0.80m BGL
TEST NO.	CBR7	**NOTES**	



Modulus of subgrade reaction, K (Initial) = **8.18 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **10.67 MN/m2/m**

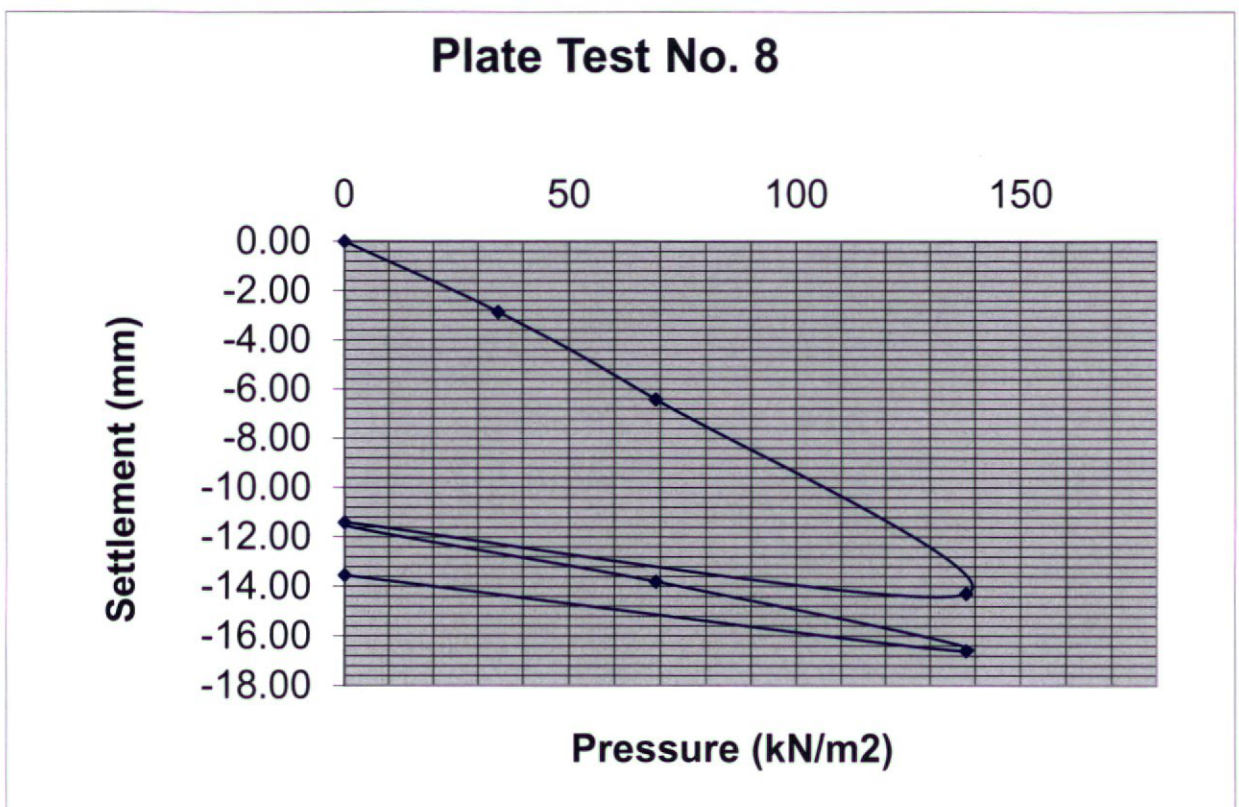
Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.37 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **0.58 %**

Applied Load	Gauge settlement
0	**0.00**
34.5	-2.87
69	-6.42
138	-14.30
0	-11.43
69	-13.81
138	-16.61
0	-13.55

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Project Calvary	**MATERIAL**	Soft to firm brown slightly sandy slightly gravelly CLAY with occasional cobbles
CONTRACT NO.	9363-01-20		
DATE	14/02/2020		
CLIENT	Virtus		
PLATE DIAMETER	457mm	**DEPTH**	0.50m BGL
TEST NO.	CBR8	**NOTES**	



Modulus of subgrade reaction, K (Initial) = **7.26 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **19.59 MN/m2/m**

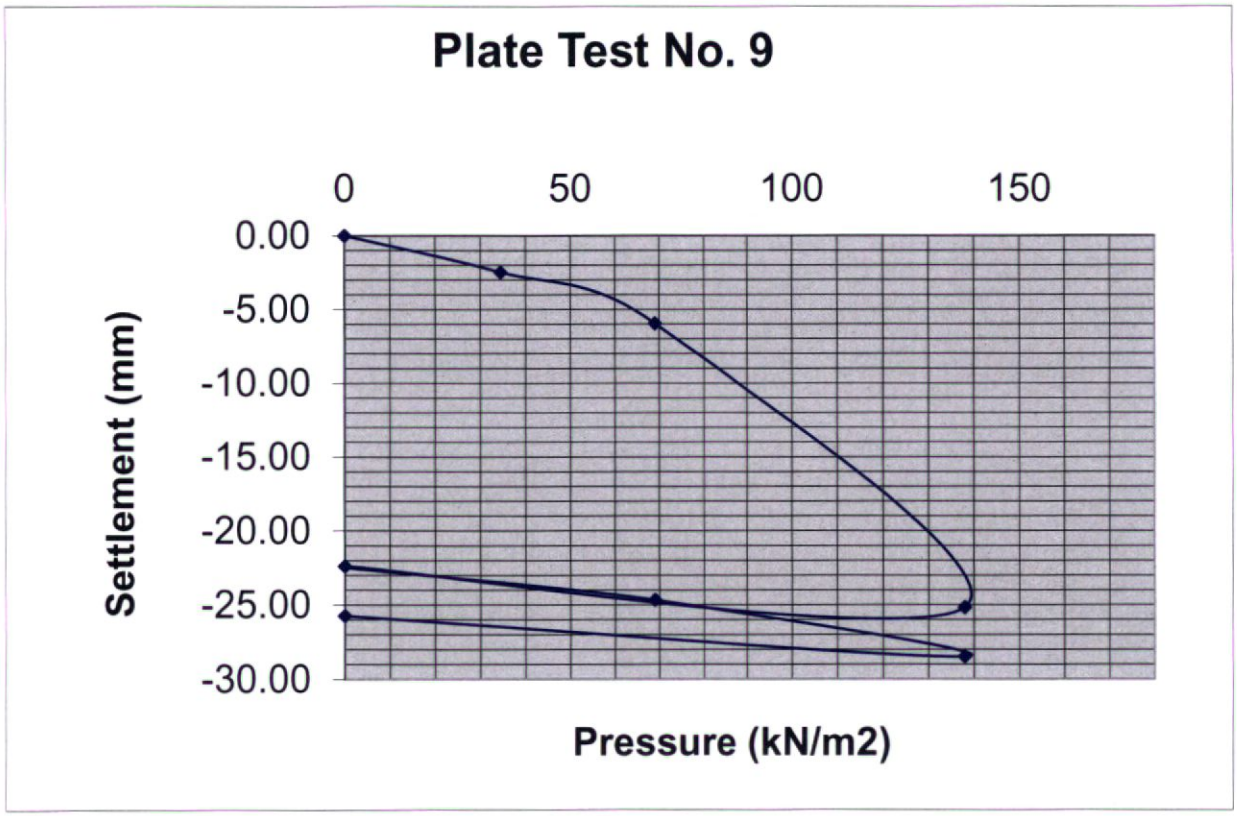
Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.30 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **1.67 %**

Applied Load	Gauge settlement
0	**0.00**
34.5	-2.49
69	-5.96
138	-25.18
0	-22.40
69	-24.68
138	-28.50
0	-25.76

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Project Calvary	**MATERIAL**	Soft to firm brown slightly sandy slightly gravelly CLAY with occasional cobbles
CONTRACT NO.	9363-01-20		
DATE	14/02/2020		
CLIENT	Virtus		
PLATE DIAMETER	457mm	**DEPTH**	0.50m BGL
TEST NO.	CBR9	**NOTES**	



Modulus of subgrade reaction, K (Initial) = **7.82 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **20.45 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.34 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **1.80 %**

APPENDIX 7 – Laboratory Testing

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

P: +44 (0) 1244 833780
F: +44 (0) 1244 833781
W: www.element.com

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

4225

Attention :	Stephen Kealy
Date :	6th April, 2020
Your reference :	Project Cavalry
Our reference :	Test Report 20/2403 Batch 1
Location :	Project Calvary
Date samples received :	17th February, 2020
Status :	Final report
Issue :	2

Twenty four samples were received for analysis on 17th February, 2020 of which twenty three were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Bruce Leslie
Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : Solid

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

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	TR1	TR1	TR2	TR2	TR3	TR3	TR4	TR4	TR5	TR5			
Depth	0.00-1.00	1.00-2.40	0.00-1.00	1.00-2.40	0.00-1.00	1.00-2.40	0.00-2.00	2.00-3.00	0.00-1.10	1.10-3.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020			
Antimony	1	1	3	1	3	1	3	2	3	2	<1	mg/kg	TM30/PM15
Arsenic #	6.5	6.9	15.1	9.8	12.5	7.7	16.2	10.5	13.1	8.9	<0.5	mg/kg	TM30/PM15
Barium #	36	96	136	59	71	53	95	149	83	73	<1	mg/kg	TM30/PM15
Cadmium #	0.8	1.7	2.0	1.4	2.1	1.8	1.7	3.1	2.2	2.0	<0.1	mg/kg	TM30/PM15
Chromium #	21.5	19.7	39.8	23.0	23.2	19.0	28.7	30.8	26.3	16.4	<0.5	mg/kg	TM30/PM15
Copper #	15	20	46	24	44	24	65	24	38	30	<1	mg/kg	TM30/PM15
Lead #	14	28	103	19	42	28	113	21	37	16	<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Molybdenum #	1.0	1.8	5.3	2.5	5.2	2.2	4.0	2.9	3.2	3.0	<0.1	mg/kg	TM30/PM15
Nickel #	30.4	35.7	53.9	38.6	47.3	37.4	40.8	29.9	45.1	36.9	<0.7	mg/kg	TM30/PM15
Selenium #	<1	2	2	1	2	1	2	1	<1	2	<1	mg/kg	TM30/PM15
Zinc #	44	128	154	81	113	79	115	88	98	75	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	<0.03	0.06	<0.03	<0.03	<0.03	0.10	<0.03	0.06	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	<0.03	0.08	<0.03	<0.03	<0.03	0.17	<0.03	0.11	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	<0.03	0.06	<0.03	<0.03	<0.03	0.14	<0.03	0.09	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	0.13	<0.06	0.09	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	<0.02	0.05	<0.02	<0.02	<0.02	0.12	<0.02	0.08	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	0.18	<0.07	0.13	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.10	<0.04	0.07	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.07	<0.04	0.05	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.07	<0.04	0.05	<0.04	<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 6 Total #	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	0.59	<0.22	0.41	<0.22	<0.22	mg/kg	TM4/PM8
PAH 17 Total	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	1.08	<0.64	0.73	<0.64	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.13	<0.05	0.09	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05	<0.02	0.04	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	97	95	94	97	95	95	93	90	94	94	<0	%	TM4/PM8
Mineral Oil (C10-C40)	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	mg/kg	TM5/PM8/PM16

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : Solid

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

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	TR1	TR1	TR2	TR2	TR3	TR3	TR4	TR4	TR5	TR5			
Depth	0.00-1.00	1.00-2.40	0.00-1.00	1.00-2.40	0.00-1.00	1.00-2.40	0.00-2.00	2.00-3.00	0.00-1.10	1.10-3.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020			
TPH CWG													
Aliphatics													
>C5-C6 #	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	0.4 SV	<0.1	0.2	0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 SV	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 SV	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C35-C40	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 SV	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C25	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
>C25-C35	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
Aromatics													
>C5-EC7 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 SV	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 SV	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 SV	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 #	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	<7	<7	<7	<7	<7	<7	10	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	<7	<7	<7	<7	<7	<7	14	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC35-EC40	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40)	<52	<52	<52	<52	<52	<52	<52	<52	<52	<52	<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 SV	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC25	<10	<10	<10	<10	<10	<10	24	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
>EC25-EC35	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
MTBE #	<5	<5	<5	<5	<5	<5	<5 SV	<5	<5	<5	<5	ug/kg	TM36/PM12
Benzene #	<5	<5	<5	<5	<5	<5	<5 SV	<5	<5	<5	<5	ug/kg	TM36/PM12
Toluene #	<5	<5	<5	<5	<5	<5	<5 SV	<5	<5	<5	<5	ug/kg	TM36/PM12
Ethylbenzene #	<5	<5	<5	<5	<5	<5	<5 SV	<5	<5	<5	<5	ug/kg	TM36/PM12
m/p-Xylene #	<5	<5	<5	<5	<5	<5	<5 SV	<5	<5	<5	<5	ug/kg	TM36/PM12
o-Xylene #	<5	<5	<5	<5	<5	<5	<5 SV	<5	<5	<5	<5	ug/kg	TM36/PM12
PCB 28 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5 SV	<5	ug/kg	TM17/PM8
PCB 52 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5 SV	<5	ug/kg	TM17/PM8
PCB 101 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5 SV	<5	ug/kg	TM17/PM8
PCB 118 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5 SV	<5	ug/kg	TM17/PM8
PCB 138 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5 SV	<5	ug/kg	TM17/PM8
PCB 153 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5 SV	<5	ug/kg	TM17/PM8
PCB 180 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5 SV	<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35 SV	<35	ug/kg	TM17/PM8

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : Solid

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

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	TR1	TR1	TR2	TR2	TR3	TR3	TR4	TR4	TR5	TR5			
Depth	0.00-1.00	1.00-2.40	0.00-1.00	1.00-2.40	0.00-1.00	1.00-2.40	0.00-2.00	2.00-3.00	0.00-1.10	1.10-3.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020			
Natural Moisture Content	10.1	7.4	26.0	16.0	15.0	13.6	19.6	22.1	17.4	13.4	<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	9.1	6.9	20.7	13.8	13.0	12.0	16.4	18.1	14.8	11.8	<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0077	-	0.0024	-	0.0185	-	0.0163	-	0.0126	-	<0.0015	g/l	TM38/PM20
Chromium III	21.5	19.7	39.8	23.0	23.2	19.0	28.7	30.8	26.3	16.4	<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	0.36	0.52	1.66	0.43	1.03	0.32	2.42	0.48	1.19	0.40	<0.02	%	TM21/PM24
pH #	8.90	8.62	8.24	8.55	8.55	8.48	8.14	8.21	8.44	8.66	<0.01	pH units	TM73/PM11
Mass of raw test portion	0.1015	0.1021	0.1103	0.129	0.111	0.1018	0.1183	0.1134	0.1105	0.1026		kg	NONE/PM17
Mass of dried test portion	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		kg	NONE/PM17

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : Solid

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

EMT Sample No.	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54	55-57	58-60	LOD/LOR	Units	Method No.
Sample ID	TR6	TR6	TR7	TR7	TR8	TR8	TR9	TR9	TR10	TR10			
Depth	0.00-1.10	1.10-3.00	0.00-1.00	1.10-3.00	0.00-0.70	0.70-3.00	0.00-0.55	0.55-3.00	0.00-0.60	0.60-2.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020			
Antimony	3	2	3	2	3	2	3	3	4	3	<1	mg/kg	TM30/PM15
Arsenic #	15.1	9.8	11.9	11.1	22.7	9.3	25.4	13.7	28.5	13.4	<0.5	mg/kg	TM30/PM15
Barium #	210	60	67	60	109	56	122	81	131	80	<1	mg/kg	TM30/PM15
Cadmium #	1.3	2.3	2.4	2.4	1.6	1.9	1.7	2.6	1.7	2.9	<0.1	mg/kg	TM30/PM15
Chromium #	26.6	21.4	21.6	18.3	25.0	28.4	25.9	18.4	26.6	20.5	<0.5	mg/kg	TM30/PM15
Copper #	51	28	39	35	59	26	75	38	80	44	<1	mg/kg	TM30/PM15
Lead #	276	18	24	19	231	21	198	20	178	21	<5	mg/kg	TM30/PM15
Mercury #	0.2	<0.1	<0.1	<0.1	0.4	<0.1	0.6	<0.1	0.6	<0.1	<0.1	mg/kg	TM30/PM15
Molybdenum #	2.1	3.1	4.6	2.8	3.0	3.1	3.2	6.4	4.7	5.2	<0.1	mg/kg	TM30/PM15
Nickel #	38.3	34.4	45.7	44.5	47.4	34.4	51.7	42.7	55.5	50.0	<0.7	mg/kg	TM30/PM15
Selenium #	<1	<1	1	<1	1	<1	2	2	1	<1	<1	mg/kg	TM30/PM15
Zinc #	204	84	92	91	125	73	156	98	146	115	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	0.27	<0.03	<0.03	<0.03	<0.03	<0.03	0.18	<0.03	0.21	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene #	0.08	<0.04	<0.04	<0.04	0.10	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.38	<0.03	<0.03	<0.03	<0.03	<0.03	0.36	<0.03	0.37	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene #	0.35	<0.03	<0.03	<0.03	<0.03	<0.03	0.31	<0.03	0.31	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.23	<0.06	<0.06	<0.06	<0.06	<0.06	0.28	<0.06	0.24	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene #	0.24	<0.02	<0.02	<0.02	<0.02	<0.02	0.25	<0.02	0.25	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.40	<0.07	<0.07	<0.07	<0.07	<0.07	0.42	<0.07	0.37	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.21	<0.04	<0.04	<0.04	<0.04	<0.04	0.21	<0.04	0.19	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene	0.15	<0.04	<0.04	<0.04	<0.04	<0.04	0.16	<0.04	0.12	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.15	<0.04	<0.04	<0.04	<0.04	<0.04	0.15	<0.04	0.12	<0.04	<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 6 Total #	1.29	<0.22	<0.22	<0.22	<0.22	<0.22	1.30	<0.22	1.17	<0.22	<0.22	mg/kg	TM4/PM8
PAH 17 Total	2.46	<0.64	<0.64	<0.64	<0.64	<0.64	2.32	<0.64	2.18	<0.64	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.29	<0.05	<0.05	<0.05	<0.05	<0.05	0.30	<0.05	0.27	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.11	<0.02	<0.02	<0.02	<0.02	<0.02	0.12	<0.02	0.10	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	90	94	100	91	93	94	94	94	93	94	<0	%	TM4/PM8
Mineral Oil (C10-C40)	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	mg/kg	TM5/PM8/PM16

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : Solid

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

EMT Sample No.	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54	55-57	58-60	LOD/LOR	Units	Method No.
Sample ID	TR6	TR6	TR7	TR7	TR8	TR8	TR9	TR9	TR10	TR10			
Depth	0.00-1.10	1.10-3.00	0.00-1.00	1.10-3.00	0.00-0.70	0.70-3.00	0.00-0.55	0.55-3.00	0.00-0.60	0.60-2.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020			
TPH CWG													
Aliphatics													
>C5-C6 #	<0.1 SV	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1 SV	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1 SV	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C35-C40	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10	<0.1 SV	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C25	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
>C25-C35	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
Aromatics													
>C5-EC7 #	<0.1 SV	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1 SV	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1 SV	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 #	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	<7	<7	<7	<7	<7	<7	9	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	<7	<7	<7	<7	<7	<7	60	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC35-EC40	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40	<26	<26	<26	<26	<26	<26	69	<26	<26	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40)	<52	<52	<52	<52	<52	<52	69	<52	<52	<52	<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10 #	<0.1 SV	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC25	<10	<10	<10	<10	<10	<10	26	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
>EC25-EC35	<10	<10	<10	<10	<10	<10	47	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
MTBE #	<5 SV	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
Benzene #	<5 SV	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
Toluene #	<5 SV	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
Ethylbenzene #	<5 SV	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
m/p-Xylene #	<5 SV	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
o-Xylene #	<5 SV	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
PCB 28 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 52 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 101 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 118 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 138 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 153 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 180 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	ug/kg	TM17/PM8

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : Solid

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

EMT Sample No.	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54	55-57	58-60	LOD/LOR	Units	Method No.
Sample ID	TR6	TR6	TR7	TR7	TR8	TR8	TR9	TR9	TR10	TR10			
Depth	0.00-1.10	1.10-3.00	0.00-1.00	1.10-3.00	0.00-0.70	0.70-3.00	0.00-0.55	0.55-3.00	0.00-0.60	0.60-2.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020			
Natural Moisture Content	26.2	12.0	14.6	16.6	25.3	12.4	22.8	15.5	24.6	16.1	<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	20.8	10.7	12.8	14.2	20.2	11.1	18.6	13.4	19.7	13.8	<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.1559	-	0.0080	-	0.0099	-	0.0185	-	0.0073	-	<0.0015	g/l	TM38/PM20
Chromium III	26.6	21.4	21.6	18.3	25.0	28.4	25.9	18.4	26.6	20.5	<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	3.60	0.30	0.72	0.35	3.34	0.45	6.98	0.56	5.58	0.42	<0.02	%	TM21/PM24
pH #	8.05	8.23	8.41	8.53	8.18	8.63	7.96	8.38	8.16	8.51	<0.01	pH units	TM73/PM11
Mass of raw test portion	0.1124	0.1035	0.1061	0.1	0.1154	0.1056	0.1132	0.1093	0.1137	0.1046		kg	NONE/PM17
Mass of dried test portion	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		kg	NONE/PM17

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : Solid

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

EMT Sample No.	61-63	64-66	67-69								LOD/LOR	Units	Method No.
Sample ID	TR10	TR11	TR11										
Depth	2.00-3.00	0.00-1.00	1.00-2.00										
COC No / misc													
Containers	V J T	V J T	V J T										
Sample Date	13/02/2020	13/02/2020	13/02/2020										
Sample Type	Soil	Soil	Soil										
Batch Number	1	1	1										
Date of Receipt	17/02/2020	17/02/2020	17/02/2020										
Antimony	-	3	2								<1	mg/kg	TM30/PM15
Arsenic #	-	11.3	10.3								<0.5	mg/kg	TM30/PM15
Barium #	-	147	53								<1	mg/kg	TM30/PM15
Cadmium #	-	3.5	2.0								<0.1	mg/kg	TM30/PM15
Chromium #	-	20.8	18.2								<0.5	mg/kg	TM30/PM15
Copper #	-	33	28								<1	mg/kg	TM30/PM15
Lead #	-	23	18								<5	mg/kg	TM30/PM15
Mercury #	-	<0.1	<0.1								<0.1	mg/kg	TM30/PM15
Molybdenum #	-	4.2	2.7								<0.1	mg/kg	TM30/PM15
Nickel #	-	45.0	38.4								<0.7	mg/kg	TM30/PM15
Selenium #	-	2	<1								<1	mg/kg	TM30/PM15
Zinc #	-	99	79								<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	-	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Acenaphthylene	-	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Acenaphthene #	-	<0.05	<0.05								<0.05	mg/kg	TM4/PM8
Fluorene #	-	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Phenanthrene #	-	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Anthracene #	-	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Fluoranthene #	-	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Pyrene #	-	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	-	<0.06	<0.06								<0.06	mg/kg	TM4/PM8
Chrysene #	-	<0.02	<0.02								<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	-	<0.07	<0.07								<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	-	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene	-	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	-	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	-	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Coronene	-	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
PAH 6 Total #	-	<0.22	<0.22								<0.22	mg/kg	TM4/PM8
PAH 17 Total	-	<0.64	<0.64								<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	-	<0.05	<0.05								<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	-	<0.02	<0.02								<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	-	<1	<1								<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	-	99	97								<0	%	TM4/PM8
Mineral Oil (C10-C40)	-	<30	<30								<30	mg/kg	TM5/PM8/PM16

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : Solid

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

EMT Sample No.	61-63	64-66	67-69									
Sample ID	TR10	TR11	TR11									
Depth	2.00-3.00	0.00-1.00	1.00-2.00							Please see attached notes for all abbreviations and acronyms		
COC No / misc												
Containers	V J T	V J T	V J T									
Sample Date	13/02/2020	13/02/2020	13/02/2020									
Sample Type	Soil	Soil	Soil									
Batch Number	1	1	1									
Date of Receipt	17/02/2020	17/02/2020	17/02/2020							LOD/LOR	Units	Method No.
TPH CWG												
Aliphatics												
>C5-C6 #	-	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>C6-C8 #	-	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>C8-C10	-	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>C10-C12 #	-	<0.2	<0.2							<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	-	<4	<4							<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	-	<7	<7							<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	-	<7	<7							<7	mg/kg	TM5/PM8/PM16
>C35-C40	-	<7	<7							<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40	-	<26	<26							<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10	-	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>C10-C25	-	<10	<10							<10	mg/kg	TM5/PM8/PM16
>C25-C35	-	<10	<10							<10	mg/kg	TM5/PM8/PM16
Aromatics												
>C5-EC7 #	-	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	-	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	-	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	-	<0.2	<0.2							<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 #	-	<4	<4							<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	-	<7	<7							<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	-	<7	<7							<7	mg/kg	TM5/PM8/PM16
>EC35-EC40	-	<7	<7							<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40	-	<26	<26							<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40)	-	<52	<52							<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10 #	-	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>EC10-EC25	-	<10	<10							<10	mg/kg	TM5/PM8/PM16
>EC25-EC35	-	<10	<10							<10	mg/kg	TM5/PM8/PM16
MTBE #	-	<5	<5							<5	ug/kg	TM36/PM12
Benzene #	-	<5	<5							<5	ug/kg	TM36/PM12
Toluene #	-	<5	<5							<5	ug/kg	TM36/PM12
Ethylbenzene #	-	<5	<5							<5	ug/kg	TM36/PM12
m/p-Xylene #	-	<5	<5							<5	ug/kg	TM36/PM12
o-Xylene #	-	<5	<5							<5	ug/kg	TM36/PM12
PCB 28 #	-	<5	<5							<5	ug/kg	TM17/PM8
PCB 52 #	-	<5	<5							<5	ug/kg	TM17/PM8
PCB 101 #	-	<5	<5							<5	ug/kg	TM17/PM8
PCB 118 #	-	<5	<5							<5	ug/kg	TM17/PM8
PCB 138 #	-	<5	<5							<5	ug/kg	TM17/PM8
PCB 153 #	-	<5	<5							<5	ug/kg	TM17/PM8
PCB 180 #	-	<5	<5							<5	ug/kg	TM17/PM8
Total 7 PCBs #	-	<35	<35							<35	ug/kg	TM17/PM8

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : Solid

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

EMT Sample No.	61-63	64-66	67-69									
Sample ID	TR10	TR11	TR11									
Depth	2.00-3.00	0.00-1.00	1.00-2.00									
COC No / misc												
Containers	V J T	V J T	V J T									
Sample Date	13/02/2020	13/02/2020	13/02/2020									
Sample Type	Soil	Soil	Soil									
Batch Number	1	1	1									
Date of Receipt	17/02/2020	17/02/2020	17/02/2020									

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
Natural Moisture Content	-	15.3	13.8								<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	-	13.2	12.1								<0.1	%	PM4/PM0
Hexavalent Chromium #	-	<0.3	<0.3								<0.3	mg/kg	TM38/PM2
Sulphate as SO4 (2:1 Ext) #	0.0127	-	0.0107								<0.0015	g/l	TM38/PM20
Chromium III	-	20.8	18.2								<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	-	0.60	0.36								<0.02	%	TM21/PM24
pH #	-	8.38	8.42								<0.01	pH units	TM73/PM11
Mass of raw test portion	-	0.1109	0.1018									kg	NONE/PM17
Mass of dried test portion	-	0.09	0.09									kg	NONE/PM17

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : CEN 10:1 1 Batch

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

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	TR1	TR1	TR2	TR2	TR3	TR3	TR4	TR4	TR5	TR5			
Depth	0.00-1.00	1.00-2.40	0.00-1.00	1.00-2.40	0.00-1.00	1.00-2.40	0.00-2.00	2.00-3.00	0.00-1.10	1.10-3.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020			
Dissolved Antimony #	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.0066	<0.0025	<0.0025	<0.0025	<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.066	<0.025	<0.025	<0.025	<0.025	mg/kg	TM30/PM17
Dissolved Barium #	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	0.010	0.007	0.017	0.004	0.008	0.006	0.003	0.002	0.009	0.008	<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.10	0.07	0.17	0.04	0.08	0.06	0.03	0.02	0.09	0.08	<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	0.003	<0.003	0.004	<0.003	<0.003	<0.003	0.003	0.004	<0.003	0.003	<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	<0.03	<0.03	0.04	<0.03	<0.03	<0.03	<0.03	0.04	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM26/PM0
Fluoride	0.3	<0.3	0.5	0.4	0.5	<0.3	0.6	<0.3	0.4	<0.3	<0.3	mg/l	TM173/PM0
Fluoride	<3	<3	5	4	5	<3	6	<3	4	<3	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	<0.5	<0.5	<0.5	2.4	<0.5	2.5	<0.5	0.7	<0.5	<0.5	<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	<5	<5	<5	24	<5	25	<5	7	<5	<5	<5	mg/kg	TM38/PM0
Chloride #	<0.3	<0.3	<0.3	1.4	<0.3	0.8	<0.3	<0.3	<0.3	<0.3	<0.3	mg/l	TM38/PM0
Chloride #	<3	<3	<3	14	<3	8	<3	<3	<3	<3	<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	<2	<2	2	<2	<2	<2	2	<2	2	<2	<2	mg/l	TM60/PM0
Dissolved Organic Carbon	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	mg/kg	TM60/PM0
pH	8.51	8.50	8.23	8.29	8.34	8.31	8.31	8.30	8.32	8.00	<0.01	pH units	TM73/PM0
Total Dissolved Solids #	45	<35	74	69	52	45	75	53	88	38	<35	mg/l	TM20/PM0
Total Dissolved Solids #	450	<350	740	690	520	450	750	530	880	380	<350	mg/kg	TM20/PM0

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : CEN 10:1 1 Batch

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

EMT Sample No.	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54	55-57	58-60	LOD/LOR	Units	Method No.
Sample ID	TR6	TR6	TR7	TR7	TR8	TR8	TR9	TR9	TR10	TR10			
Depth	0.00-1.10	1.10-3.00	0.00-1.00	1.10-3.00	0.00-0.70	0.70-3.00	0.00-0.55	0.55-3.00	0.00-0.60	0.60-2.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020			
Dissolved Antimony #	0.005	<0.002	<0.002	<0.002	<0.002	0.005	0.005	0.002	0.004	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	0.05	<0.02	<0.02	<0.02	<0.02	0.05	0.05	<0.02	0.04	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	<0.0025	<0.0025	<0.0025	0.0029	0.0184	<0.0025	0.0120	<0.0025	0.0090	<0.0025	<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	<0.025	<0.025	<0.025	0.029	0.184	<0.025	0.120	<0.025	0.090	<0.025	<0.025	mg/kg	TM30/PM17
Dissolved Barium #	0.055	<0.003	<0.003	<0.003	0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	0.55	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	0.023	0.007	0.002	0.007	0.004	0.006	0.010	0.010	0.005	0.006	<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.23	0.07	<0.02	0.07	0.04	0.06	0.10	0.10	0.05	0.06	<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	0.005	<0.003	<0.003	<0.003	0.005	<0.003	0.004	<0.003	0.007	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	0.05	<0.03	<0.03	<0.03	0.05	<0.03	0.04	<0.03	0.07	<0.03	<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	<0.00001	<0.00001	<0.00001	0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM26/PM0
Fluoride	0.3	0.3	0.5	<0.3	0.4	<0.3	0.4	0.3	<0.3	0.4	<0.3	mg/l	TM173/PM0
Fluoride	<3	3	5	<3	4	<3	4	<3	<3	4	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	74.9	2.0	<0.5	0.6	0.7	<0.5	0.9	<0.5	0.5	<0.5	<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	749	20	<5	6	7	<5	9	<5	5	<5	<5	mg/kg	TM38/PM0
Chloride #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/l	TM38/PM0
Chloride #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	<2	<2	2	2	7	2	13	4	6	2	<2	mg/l	TM60/PM0
Dissolved Organic Carbon	<20	<20	<20	<20	70	<20	130	40	60	20	<20	mg/kg	TM60/PM0
pH	8.13	6.78	7.64	3.37	4.56	7.72	6.14	8.05	6.96	7.98	<0.01	pH units	TM73/PM0
Total Dissolved Solids #	237	90	104	77	79	53	138	88	112	91	<35	mg/l	TM20/PM0
Total Dissolved Solids #	2370	901	1040	770	790	530	1379	880	1120	910	<350	mg/kg	TM20/PM0

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : CEN 10:1 1 Batch

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

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	64-66	67-69	LOD/LOR	Units	Method No.
Sample ID	TR11	TR11			
Depth	0.00-1.00	1.00-2.00			
COC No / misc					
Containers	V J T	V J T			
Sample Date	13/02/2020	13/02/2020			
Sample Type	Soil	Soil			
Batch Number	1	1			
Date of Receipt	17/02/2020	17/02/2020			
Dissolved Antimony #	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	<0.0025	<0.0025	<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	<0.025	<0.025	<0.025	mg/kg	TM30/PM17
Dissolved Barium #	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005	<0.0005	<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	<0.0015	<0.0015	<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	<0.015	<0.015	<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007	<0.007	<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07	<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	<0.005	<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	0.003	0.005	<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.03	0.05	<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	<0.00001	<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001	<0.0001	<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01	<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1	<0.1	mg/kg	TM26/PM0
Fluoride	0.4	<0.3	<0.3	mg/l	TM173/PM0
Fluoride	4	<3	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	<0.5	<0.5	<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	<5	<5	<5	mg/kg	TM38/PM0
Chloride #	<0.3	<0.3	<0.3	mg/l	TM38/PM0
Chloride #	<3	<3	<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	<2	<2	<2	mg/l	TM60/PM0
Dissolved Organic Carbon	<20	<20	<20	mg/kg	TM60/PM0
pH	8.00	8.14	<0.01	pH units	TM73/PM0
Total Dissolved Solids #	96	89	<35	mg/l	TM20/PM0
Total Dissolved Solids #	960	890	<350	mg/kg	TM20/PM0

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : EN12457_2

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

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Sample ID	TR1	TR1	TR2	TR2	TR3	TR3	TR4	TR4	TR5	TR5						
Depth	0.00-1.00	1.00-2.40	0.00-1.00	1.00-2.40	0.00-1.00	1.00-2.40	0.00-2.00	2.00-3.00	0.00-1.10	1.10-3.00						
COC No / misc																
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T						
Sample Date	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1	1	1	1						
Date of Receipt	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020						
Solid Waste Analysis																
Total Organic Carbon #	0.36	0.52	1.66	0.43	1.03	0.32	2.42	0.48	1.19	0.40	3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025 [SV]	<0.025	<0.025	<0.025	6	-	-	<0.025	mg/kg	TM36/PM12
Sum of 7 PCBs #	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035 [SV]	1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6 #	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	0.59	<0.22	0.41	<0.22	-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	1.08	<0.64	0.73	<0.64	100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Arsenic #	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.066	<0.025	<0.025	<0.025	0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	2	50	100	<0.07	mg/kg	TM30/PM17
Mercury #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	0.2	2	<0.0001	mg/kg	TM61/PM0
Molybdenum #	0.10	0.07	0.17	0.04	0.08	0.06	0.03	0.02	0.09	0.08	0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc #	<0.03	<0.03	0.04	<0.03	<0.03	<0.03	<0.03	0.04	<0.03	<0.03	4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids #	450	<350	740	690	520	450	750	530	880	380	4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	500	800	1000	<20	mg/kg	TM60/PM0
Mass of raw test portion	0.1015	0.1021	0.1103	0.129	0.111	0.1018	0.1183	0.1134	0.1105	0.1026	-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	88.6	88.1	81.5	69.8	80.7	88.2	75.9	79.5	81.5	87.8	-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.888	0.888	0.879	0.861	0.878	0.888	0.871	0.877	0.879	0.887	-	-	-		l	NONE/PM17
Eluate Volume	0.8	0.6	0.8	0.831	0.8	0.8	0.8	0.779	0.669	0.8	-	-	-		l	NONE/PM17
pH #	8.90	8.62	8.24	8.55	8.55	8.48	8.14	8.21	8.44	8.66	-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	-	-	<0.1	mg/kg	TM26/PM0
Fluoride	<3	<3	5	4	5	<3	6	<3	4	<3	-	-	-	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	<5	<5	<5	24	<5	25	<5	7	<5	<5	1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride #	<3	<3	<3	14	<3	8	<3	<3	<3	<3	800	15000	25000	<3	mg/kg	TM38/PM0

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : EN12457_2

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

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54	55-57	58-60	Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Sample ID	TR6	TR6	TR7	TR7	TR8	TR8	TR9	TR9	TR10	TR10						
Depth	0.00-1.10	1.10-3.00	0.00-1.00	1.10-3.00	0.00-0.70	0.70-3.00	0.00-0.55	0.55-3.00	0.00-0.60	0.60-2.00						
COC No / misc																
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T						
Sample Date	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1	1	1	1						
Date of Receipt	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020						
Solid Waste Analysis																
Total Organic Carbon #	3.60	0.30	0.72	0.35	3.34	0.45	6.98	0.56	5.58	0.42	3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025 [SV]	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	6	-	-	<0.025	mg/kg	TM36/PM12
Sum of 7 PCBs #	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6 #	1.29	<0.22	<0.22	<0.22	<0.22	<0.22	1.30	<0.22	1.17	<0.22	-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	2.46	<0.64	<0.64	<0.64	<0.64	<0.64	2.32	<0.64	2.18	<0.64	100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Arsenic #	<0.025	<0.025	<0.025	0.029	0.184	<0.025	0.120	<0.025	0.090	<0.025	0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium #	0.55	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	2	50	100	<0.07	mg/kg	TM30/PM17
Mercury #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	0.2	2	<0.0001	mg/kg	TM61/PM0
Molybdenum #	0.23	0.07	<0.02	0.07	0.04	0.06	0.10	0.10	0.05	0.06	0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony #	0.05	<0.02	<0.02	<0.02	<0.02	0.05	0.05	<0.02	0.04	<0.02	0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc #	0.05	<0.03	<0.03	<0.03	0.05	<0.03	0.04	<0.03	0.07	<0.03	4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids #	2370	901	1040	770	790	530	1379	880	1120	910	4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	<20	<20	<20	<20	70	<20	130	40	60	20	500	800	1000	<20	mg/kg	TM60/PM0
Mass of raw test portion	0.1124	0.1035	0.1061	0.1	0.1154	0.1056	0.1132	0.1093	0.1137	0.1046	-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	80.4	86.9	85.2	90.0	77.8	85.1	79.3	82.1	79.4	86.4	-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.878	0.887	0.884	0.89	0.874	0.884	0.876	0.88	0.877	0.886	-	-	-		l	NONE/PM17
Eluate Volume	0.8	0.74	0.8	0.8	0.8	0.8	0.84	0.75	0.8	0.6	-	-	-		l	NONE/PM17
pH #	8.05	8.23	8.41	8.53	8.18	8.63	7.96	8.38	8.16	8.51	-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	-	-	<0.1	mg/kg	TM26/PM0
Fluoride	<3	3	5	<3	4	<3	4	<3	<3	4	-	-	-	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	749	20	<5	6	7	<5	9	<5	5	<5	1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	800	15000	25000	<3	mg/kg	TM38/PM0

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : EN12457_2

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

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	64-66	67-69									Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Sample ID	TR11	TR11														
Depth	0.00-1.00	1.00-2.00														
COC No / misc																
Containers	V J T	V J T														
Sample Date	13/02/2020	13/02/2020														
Sample Type	Soil	Soil														
Batch Number	1	1														
Date of Receipt	17/02/2020	17/02/2020														
Solid Waste Analysis																
Total Organic Carbon #	0.60	0.36									3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025	<0.025									6	-	-	<0.025	mg/kg	TM36/PM12
Sum of 7 PCBs #	<0.035	<0.035									1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	<30	<30									500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6 #	<0.22	<0.22									-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	<0.64	<0.64									100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Arsenic #	<0.025	<0.025									0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium #	<0.03	<0.03									20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium #	<0.005	<0.005									0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium #	<0.015	<0.015									0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper #	<0.07	<0.07									2	50	100	<0.07	mg/kg	TM30/PM17
Mercury #	<0.0001	<0.0001									0.01	0.2	2	<0.0001	mg/kg	TM61/PM0
Molybdenum #	0.03	0.05									0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel #	<0.02	<0.02									0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead #	<0.05	<0.05									0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony #	<0.02	<0.02									0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium #	<0.03	<0.03									0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc #	<0.03	<0.03									4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids #	960	890									4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	<20	<20									500	800	1000	<20	mg/kg	TM60/PM0
Mass of raw test portion	0.1109	0.1018									-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	80.8	88.2									-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.879	0.888									-	-	-		l	NONE/PM17
Eluate Volume	0.75	0.79									-	-	-		l	NONE/PM17
pH #	8.38	8.42									-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1	<0.1									1	-	-	<0.1	mg/kg	TM26/PM0
Fluoride	4	<3									-	-	-	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	<5	<5									1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride #	<3	<3									800	15000	25000	<3	mg/kg	TM38/PM0

Client Name: Ground Investigations Ireland

Reference: Project Cavalry

Location: Project Calvary

Contact: Stephen Kealy

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	EPH Interpretation
20/2403	1	TR1	0.00-1.00	1-3	No interpretation possible
20/2403	1	TR1	1.00-2.40	4-6	No interpretation possible
20/2403	1	TR2	0.00-1.00	7-9	No interpretation possible
20/2403	1	TR2	1.00-2.40	10-12	No interpretation possible
20/2403	1	TR3	0.00-1.00	13-15	No interpretation possible
20/2403	1	TR3	1.00-2.40	16-18	No interpretation possible
20/2403	1	TR4	0.00-2.00	19-21	Possible PAH's
20/2403	1	TR4	2.00-3.00	22-24	No interpretation possible
20/2403	1	TR5	0.00-1.10	25-27	No interpretation possible
20/2403	1	TR5	1.10-3.00	28-30	No interpretation possible
20/2403	1	TR6	0.00-1.10	31-33	No interpretation possible
20/2403	1	TR6	1.10-3.00	34-36	No interpretation possible
20/2403	1	TR7	0.00-1.00	37-39	No interpretation possible
20/2403	1	TR7	1.10-3.00	40-42	No interpretation possible
20/2403	1	TR8	0.00-0.70	43-45	No interpretation possible
20/2403	1	TR8	0.70-3.00	46-48	No interpretation possible
20/2403	1	TR9	0.00-0.55	49-51	PAH's
20/2403	1	TR9	0.55-3.00	52-54	No interpretation possible
20/2403	1	TR10	0.00-0.60	55-57	No interpretation possible
20/2403	1	TR10	0.60-2.00	58-60	No interpretation possible
20/2403	1	TR11	0.00-1.00	64-66	No interpretation possible
20/2403	1	TR11	1.00-2.00	67-69	No interpretation possible

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

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

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

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
20/2403	1	TR1	0.00-1.00	2	18/02/2020	**General Description (Bulk Analysis)**	Soil/Stones
					18/02/2020	**Asbestos Fibres**	NAD
					18/02/2020	**Asbestos ACM**	NAD
					18/02/2020	**Asbestos Type**	NAD
					18/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR1	1.00-2.40	5	18/02/2020	**General Description (Bulk Analysis)**	Soil
					18/02/2020	**Asbestos Fibres**	NAD
					18/02/2020	**Asbestos ACM**	NAD
					18/02/2020	**Asbestos Type**	NAD
					18/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR2	0.00-1.00	8	18/02/2020	**General Description (Bulk Analysis)**	soil-stones
					18/02/2020	**Asbestos Fibres**	NAD
					18/02/2020	**Asbestos ACM**	NAD
					18/02/2020	**Asbestos Type**	NAD
					18/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR2	1.00-2.40	11	18/02/2020	**General Description (Bulk Analysis)**	soil-stones
					18/02/2020	**Asbestos Fibres**	NAD
					18/02/2020	**Asbestos ACM**	NAD
					18/02/2020	**Asbestos Type**	NAD
					18/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR3	0.00-1.00	14	18/02/2020	**General Description (Bulk Analysis)**	soil.stones
					18/02/2020	**Asbestos Fibres**	NAD
					18/02/2020	**Asbestos ACM**	NAD
					18/02/2020	**Asbestos Type**	NAD
					18/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR3	1.00-2.40	17	18/02/2020	**General Description (Bulk Analysis)**	Soil
					18/02/2020	**Asbestos Fibres**	NAD
					18/02/2020	**Asbestos ACM**	NAD
					18/02/2020	**Asbestos Type**	NAD
					18/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR4	0.00-2.00	20	18/02/2020	**General Description (Bulk Analysis)**	soil-stones
					18/02/2020	**Asbestos Fibres**	NAD
					18/02/2020	**Asbestos ACM**	NAD

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
20/2403	1	TR4	0.00-2.00	20	18/02/2020	**Asbestos Type**	NAD
					18/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR4	2.00-3.00	23	19/02/2020	**General Description (Bulk Analysis)**	Soil/Stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR5	0.00-1.10	26	19/02/2020	**General Description (Bulk Analysis)**	Soil/Stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR5	1.10-3.00	29	19/02/2020	**General Description (Bulk Analysis)**	Soil/Stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR6	0.00-1.10	32	19/02/2020	**General Description (Bulk Analysis)**	Soil/Stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR6	1.10-3.00	35	19/02/2020	**General Description (Bulk Analysis)**	Soil/Stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR7	0.00-1.00	38	19/02/2020	**General Description (Bulk Analysis)**	soil-stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR7	1.10-3.00	41	19/02/2020	**General Description (Bulk Analysis)**	soil-stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR8	0.00-0.70	44	19/02/2020	**General Description (Bulk Analysis)**	soil-stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR8	0.70-3.00	47	19/02/2020	**General Description (Bulk Analysis)**	soil-stones
					19/02/2020	**Asbestos Fibres**	NAD

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
20/2403	1	TR8	0.70-3.00	47	19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR9	0.00-0.55	50	19/02/2020	**General Description (Bulk Analysis)**	soil-stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR9	0.55-3.00	53	19/02/2020	**General Description (Bulk Analysis)**	Soil/Stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR10	0.00-0.60	56	19/02/2020	**General Description (Bulk Analysis)**	Soil/Stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR10	0.60-2.00	59	19/02/2020	**General Description (Bulk Analysis)**	Soil/Stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR11	0.00-1.00	65	19/02/2020	**General Description (Bulk Analysis)**	Soil/Stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR11	1.00-2.00	68	19/02/2020	**General Description (Bulk Analysis)**	soil-stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
20/2403	1	TR1	0.00-1.00	1-3	Sulphate	Sample holding time exceeded
20/2403	1	TR2	0.00-1.00	7-9	Sulphate	Sample holding time exceeded
20/2403	1	TR3	0.00-1.00	13-15	Sulphate	Sample holding time exceeded
20/2403	1	TR4	0.00-2.00	19-21	Sulphate	Sample holding time exceeded
20/2403	1	TR5	0.00-1.10	25-27	Sulphate	Sample holding time exceeded
20/2403	1	TR6	0.00-1.10	31-33	Sulphate	Sample holding time exceeded
20/2403	1	TR7	0.00-1.00	37-39	Sulphate	Sample holding time exceeded
20/2403	1	TR8	0.00-0.70	43-45	Sulphate	Sample holding time exceeded
20/2403	1	TR9	0.00-0.55	49-51	Sulphate	Sample holding time exceeded
20/2403	1	TR10	0.00-0.60	55-57	Sulphate	Sample holding time exceeded
20/2403	1	TR10	2.00-3.00	61-63	Sulphate	Sample holding time exceeded
20/2403	1	TR11	1.00-2.00	67-69	Sulphate	Sample holding time exceeded

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

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 20/2403

SOILS

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

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

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

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

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

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

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

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

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

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

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

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

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

WATERS

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

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

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

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

DEVIATING SAMPLES

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

SURROGATES

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

DILUTIONS

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

BLANKS

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

NOTE

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

REPORTS FROM THE SOUTH AFRICA LABORATORY

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

Measurement Uncertainty

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

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher, this result is not accredited.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 20/2403

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3: 1990/USEPA 160.3 Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes

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EMT Job No: 20/2403

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060, APHA Standard Methods for Examination of Water and Wastewater 5310B, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes

EMT Job No: 20/2403

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM61	Modified US EPA methods 245.7 and 200.7. Determination of Mercury by Cold Vapour Atomic Fluorescence.	PM0	No preparation is required.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	Yes
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.			AR	
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.			AR	

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element

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

P: +44 (0) 1244 833780
F: +44 (0) 1244 833781
W: www.element.com

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

Attention :	Stephen Kealy
Date :	19th March, 2020
Your reference :	9363-01-20
Our reference :	Test Report 20/2573 Batch 1
Location :	Project Calvary
Date samples received :	19th February, 2020
Status :	Final report
Issue :	3

Twelve samples were received for analysis on 19th February, 2020 of which twelve were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Phil Sommerton BSc
Senior Project Manager

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Client Name: Ground Investigations Ireland
Reference: 9363-01-20
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2573

Report : Solid

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

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	SL1	SL2	SL3	SL4	SL5	SL6	SL7	SL8	SL9	SL10			
Depth	0.20-1.10	0.15-1.40	0.07-0.30	0.13-1.50	0.12-1.20	0.15-1.40	0.20-1.30	0.15-1.60	0.15-1.50	0.20-1.30			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	13/02/2020	13/02/2020	12/02/2020	14/02/2020	13/02/2020	13/02/2020	12/02/2020	13/02/2020	13/02/2020	14/02/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020			
Antimony	3	3	-	5	4	5	3	3	3	2	<1	mg/kg	TM30/PM15
Arsenic #	14.0	12.2	-	7.6	15.8	16.5	12.1	22.1	14.4	9.1	<0.5	mg/kg	TM30/PM15
Barium #	110	92	-	113	114	113	75	131	90	161	<1	mg/kg	TM30/PM15
Cadmium #	2.3	2.7	-	3.4	5.2	3.6	2.4	1.9	2.7	1.7	<0.1	mg/kg	TM30/PM15
Chromium #	40.5	36.1	-	53.0	74.9	52.1	39.3	51.6	55.7	52.8	<0.5	mg/kg	TM30/PM15
Copper #	124	44	-	39	60	55	44	74	69	25	<1	mg/kg	TM30/PM15
Lead #	193	20	-	27	40	64	40	161	35	40	<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	0.5	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Molybdenum #	4.5	5.4	-	7.0	7.9	9.0	4.5	6.0	5.3	3.8	<0.1	mg/kg	TM30/PM15
Nickel #	46.2	47.9	-	56.5	92.0	63.1	46.3	59.1	81.2	40.4	<0.7	mg/kg	TM30/PM15
Selenium #	2	2	-	3	3	2	2	2	2	<1	<1	mg/kg	TM30/PM15
Zinc #	128	105	-	130	282	141	114	183	132	70	<5	mg/kg	TM30/PM15
Antimony	-	-	<1	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Arsenic	-	-	4.1	-	-	-	-	-	-	-	<0.5	mg/kg	TM30/PM62
Barium	-	-	61	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Cadmium	-	-	0.4	-	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Chromium	-	-	32.5	-	-	-	-	-	-	-	<0.5	mg/kg	TM30/PM62
Copper	-	-	44	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Lead	-	-	41	-	-	-	-	-	-	-	<5	mg/kg	TM30/PM62
Mercury	-	-	<0.1	-	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Molybdenum	-	-	0.4	-	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Nickel	-	-	28.3	-	-	-	-	-	-	-	<0.7	mg/kg	TM30/PM62
Selenium	-	-	<1	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Zinc	-	-	112	-	-	-	-	-	-	-	<5	mg/kg	TM30/PM62

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 9363-01-20
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2573

Report : Solid

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

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	SL1	SL2	SL3	SL4	SL5	SL6	SL7	SL8	SL9	SL10			
Depth	0.20-1.10	0.15-1.40	0.07-0.30	0.13-1.50	0.12-1.20	0.15-1.40	0.20-1.30	0.15-1.60	0.15-1.50	0.20-1.30			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	13/02/2020	13/02/2020	12/02/2020	14/02/2020	13/02/2020	13/02/2020	12/02/2020	13/02/2020	13/02/2020	14/02/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020			
PAH MS													
Naphthalene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.04	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.06	<0.03	0.09	0.11	<0.03	<0.03	<0.03	0.05	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene #	0.05	<0.03	0.16	0.11	<0.03	<0.03	<0.03	0.04	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	0.06	0.10	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene #	0.05	<0.02	0.17	0.10	<0.02	<0.02	<0.02	0.04	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	<0.07	0.14	0.26	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	0.09	0.13	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene	<0.04	<0.04	0.04	0.12	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	0.13	0.10	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 6 Total #	<0.22	<0.22	0.49	0.72	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	mg/kg	TM4/PM8
PAH 17 Total	<0.64	<0.64	0.88	1.03	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	0.10	0.19	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	0.04	0.07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	92	87	84	86	90	90	89	84	90	92	<0	%	TM4/PM8
Mineral Oil (C10-C40)	<30	343	303 AA	<30	<30	<30	<30	<30	<30	<30	<30	mg/kg	TM5/PM8/PM16
TPH CWG													
Aliphatics													
>C5-C6 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	<0.2	<0.6 AA	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	<4	<4	<12 AA	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	<7	<7	<21 AA	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	<7	326	222 AA	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C35-C40	<7	17	81 AA	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40	<26	343	303 AA	<26	<26	<26	<26	<26	<26	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C25	<10	50	<30 AA	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
>C25-C35	<10	276	211 AA	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16

Please see attached notes for all abbreviations and acronyms

Please include all sections of this report if it is reproduced

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

Client Name: Ground Investigations Ireland
Reference: 9363-01-20
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2573

Report : Solid

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

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	SL1	SL2	SL3	SL4	SL5	SL6	SL7	SL8	SL9	SL10			
Depth	0.20-1.10	0.15-1.40	0.07-0.30	0.13-1.50	0.12-1.20	0.15-1.40	0.20-1.30	0.15-1.60	0.15-1.50	0.20-1.30			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	13/02/2020	13/02/2020	12/02/2020	14/02/2020	13/02/2020	13/02/2020	12/02/2020	13/02/2020	13/02/2020	14/02/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020			
TPH CWG													
Aromatics													
>C5-EC7 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	<0.2	<0.6 AA	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 #	<4	<4	<12 AA	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	<7	<7	<21 AA	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	<7	70	388 AA	63	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC35-EC40	<7	8	197 AA	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40	<26	78	585 AA	63	<26	<26	<26	<26	<26	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40)	<52	421	888 AA	63	<52	<52	<52	<52	<52	<52	<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC25	<10	11	<30 AA	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
>EC25-EC35	<10	59	380 AA	56	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
MTBE #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Benzene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Toluene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Ethylbenzene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
m/p-Xylene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
o-Xylene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
PCB 28 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 52 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 101 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 118 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 138 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 153 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 180 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	ug/kg	TM17/PM8
Natural Moisture Content	18.0	11.7	6.7	21.7	16.7	19.7	20.7	25.2	27.8	19.3	<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	15.3	10.5	6.2	17.9	14.3	16.4	17.1	20.1	21.7	16.1	<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Chromium III	40.5	36.1	-	53.0	74.9	52.1	39.3	51.6	55.7	52.8	<0.5	mg/kg	NONE/NONE
Chromium III	-	-	32.5	-	-	-	-	-	-	-	<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	0.89	0.43	NDP	0.60	0.71	1.14	0.84	4.68	0.64	0.37	<0.02	%	TM21/PM24
pH #	9.66	8.72	8.88	8.40	8.07	8.35	9.76	8.38	8.65	8.33	<0.01	pH units	TM73/PM11
Mass of raw test portion	0.1043	0.1052	0.0997	0.1129	0.1137	0.1122	0.1082	0.115	0.1158	0.1143		kg	NONE/PM17

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 9363-01-20
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2573

Report : Solid

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

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	SL1	SL2	SL3	SL4	SL5	SL6	SL7	SL8	SL9	SL10			
Depth	0.20-1.10	0.15-1.40	0.07-0.30	0.13-1.50	0.12-1.20	0.15-1.40	0.20-1.30	0.15-1.60	0.15-1.50	0.20-1.30			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	13/02/2020	13/02/2020	12/02/2020	14/02/2020	13/02/2020	13/02/2020	12/02/2020	13/02/2020	13/02/2020	14/02/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020			
Mass of dried test portion	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		kg	NONE/PM17

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 9363-01-20
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2573

Report : Solid

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

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	31-33	34-36									LOD/LOR	Units	Method No.
Sample ID	IF2	IF3											
Depth	0.00-1.50	0.00-1.50											
COC No / misc													
Containers	V J T	V J T											
Sample Date	12/02/2020	11/02/2020											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	19/02/2020	19/02/2020											
Antimony	4	3									<1	mg/kg	TM30/PM15
Arsenic #	15.9	12.3									<0.5	mg/kg	TM30/PM15
Barium #	193	104									<1	mg/kg	TM30/PM15
Cadmium #	0.5	2.2									<0.1	mg/kg	TM30/PM15
Chromium #	57.8	38.5									<0.5	mg/kg	TM30/PM15
Copper #	42	301 AB									<1	mg/kg	TM30/PM15
Lead #	460	133									<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1									<0.1	mg/kg	TM30/PM15
Molybdenum #	3.3	4.3									<0.1	mg/kg	TM30/PM15
Nickel #	33.2	43.6									<0.7	mg/kg	TM30/PM15
Selenium #	<1	1									<1	mg/kg	TM30/PM15
Zinc #	142	149									<5	mg/kg	TM30/PM15
Antimony	-	-									<1	mg/kg	TM30/PM62
Arsenic	-	-									<0.5	mg/kg	TM30/PM62
Barium	-	-									<1	mg/kg	TM30/PM62
Cadmium	-	-									<0.1	mg/kg	TM30/PM62
Chromium	-	-									<0.5	mg/kg	TM30/PM62
Copper	-	-									<1	mg/kg	TM30/PM62
Lead	-	-									<5	mg/kg	TM30/PM62
Mercury	-	-									<0.1	mg/kg	TM30/PM62
Molybdenum	-	-									<0.1	mg/kg	TM30/PM62
Nickel	-	-									<0.7	mg/kg	TM30/PM62
Selenium	-	-									<1	mg/kg	TM30/PM62
Zinc	-	-									<5	mg/kg	TM30/PM62

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 9363-01-20
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2573

Report : Solid

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

EMT Sample No.	31-33	34-36									LOD/LOR	Units	Method No.
Sample ID	IF2	IF3											
Depth	0.00-1.50	0.00-1.50											
COC No / misc													
Containers	V J T	V J T											
Sample Date	12/02/2020	11/02/2020											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	19/02/2020	19/02/2020											
PAH MS													
Naphthalene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03									<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05									<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Phenanthrene #	0.07	<0.03									<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.11	0.07									<0.03	mg/kg	TM4/PM8
Pyrene #	0.10	0.06									<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06									<0.06	mg/kg	TM4/PM8
Chrysene #	0.07	0.06									<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.10	0.10									<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.05	0.05									<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
PAH 6 Total #	0.26	0.22									<0.22	mg/kg	TM4/PM8
PAH 17 Total	<0.64	<0.64									<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.07	0.07									<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.03	0.03									<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1									<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	88	90									<0	%	TM4/PM8
Mineral Oil (C10-C40)	37	<30									<30	mg/kg	TM5/PM8/PM16
TPH CWG													
Aliphatics													
>C5-C6 #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	<0.2									<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	<4	<4									<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	<7	<7									<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	37	<7									<7	mg/kg	TM5/PM8/PM16
>C35-C40	<7	<7									<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40	37	<26									<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C10-C25	<10	<10									<10	mg/kg	TM5/PM8/PM16
>C25-C35	33	<10									<10	mg/kg	TM5/PM8/PM16

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 9363-01-20
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2573

Report : Solid

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

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	31-33	34-36									LOD/LOR	Units	Method No.
Sample ID	IF2	IF3											
Depth	0.00-1.50	0.00-1.50											
COC No / misc													
Containers	V J T	V J T											
Sample Date	12/02/2020	11/02/2020											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	19/02/2020	19/02/2020											
TPH CWG													
Aromatics													
>C5-EC7 #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	<0.2									<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 #	<4	<4									<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	<7	<7									<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	<7	<7									<7	mg/kg	TM5/PM8/PM16
>EC35-EC40	<7	<7									<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40	<26	<26									<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40)	<52	<52									<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10 #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC10-EC25	<10	<10									<10	mg/kg	TM5/PM8/PM16
>EC25-EC35	<10	<10									<10	mg/kg	TM5/PM8/PM16
MTBE #	<5	<5									<5	ug/kg	TM31/PM12
Benzene #	<5	<5									<5	ug/kg	TM31/PM12
Toluene #	<5	<5									<5	ug/kg	TM31/PM12
Ethylbenzene #	<5	<5									<5	ug/kg	TM31/PM12
m/p-Xylene #	<5	<5									<5	ug/kg	TM31/PM12
o-Xylene #	<5	<5									<5	ug/kg	TM31/PM12
PCB 28 #	<5	<5									<5	ug/kg	TM17/PM8
PCB 52 #	<5	<5									<5	ug/kg	TM17/PM8
PCB 101 #	<5	<5									<5	ug/kg	TM17/PM8
PCB 118 #	<5	<5									<5	ug/kg	TM17/PM8
PCB 138 #	<5	<5									<5	ug/kg	TM17/PM8
PCB 153 #	<5	<5									<5	ug/kg	TM17/PM8
PCB 180 #	<5	<5									<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	<35									<35	ug/kg	TM17/PM8
Natural Moisture Content	22.5	20.0									<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	18.4	16.6									<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3									<0.3	mg/kg	TM38/PM20
Chromium III	57.8	38.5									<0.5	mg/kg	NONE/NONE
Chromium III	-	-									<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	1.03	0.85									<0.02	%	TM21/PM24
pH #	8.78	10.76									<0.01	pH units	TM73/PM11
Mass of raw test portion	0.109	0.1058										kg	NONE/PM17

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 9363-01-20
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2573

Report : Solid

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

EMT Sample No.	31-33	34-36									LOD/LOR	Units	Method No.
Sample ID	IF2	IF3											
Depth	0.00-1.50	0.00-1.50											
COC No / misc													
Containers	V J T	V J T											
Sample Date	12/02/2020	11/02/2020											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	19/02/2020	19/02/2020											
Mass of dried test portion	0.09	0.09										kg	NONE/PM17

Please see attached notes for all abbreviations and acronyms

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 9363-01-20
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2573

Report : CEN 10:1 1 Batch

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

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	SL1	SL2	SL3	SL4	SL5	SL6	SL7	SL8	SL9	SL10			
Depth	0.20-1.10	0.15-1.40	0.07-0.30	0.13-1.50	0.12-1.20	0.15-1.40	0.20-1.30	0.15-1.60	0.15-1.50	0.20-1.30			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	13/02/2020	13/02/2020	12/02/2020	14/02/2020	13/02/2020	13/02/2020	12/02/2020	13/02/2020	13/02/2020	14/02/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020			
Dissolved Antimony #	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	0.003	0.004	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	0.03	0.04	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.0042	0.0084	<0.0025	<0.0025	<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.042	0.084	<0.025	<0.025	<0.025	mg/kg	TM30/PM17
Dissolved Barium #	<0.003	<0.003	0.006	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.004	<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	<0.03	<0.03	0.06	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.04	<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	0.0026	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	0.0030	<0.0015	<0.0015	0.0016	<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	0.026	<0.015	<0.015	<0.015	<0.015	<0.015	0.030	<0.015	<0.015	0.016	<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	0.005	0.013	<0.002	0.018	0.005	0.011	0.014	0.007	0.008	0.010	<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.05	0.13	<0.02	0.18	0.05	0.11	0.14	0.07	0.08	0.10	<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.00001	<0.00001	<0.00001	<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM26/PM0
Fluoride	<0.3	0.5	<0.3	0.3	<0.3	0.4	<0.3	0.4	0.3	0.7	<0.3	mg/l	TM173/PM0
Fluoride	<3	5	<3	3	<3	4	<3	4	<3	7	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	1.5	1.5	7.5	1.2	0.7	0.6	4.6	2.0	2.8	3.8	<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	15	15	75	12	7	6	46	20	28	38	<5	mg/kg	TM38/PM0
Chloride #	0.4	<0.3	<0.3	<0.3	<0.3	<0.3	0.4	<0.3	0.4	<0.3	<0.3	mg/l	TM38/PM0
Chloride #	4	<3	<3	<3	<3	<3	4	<3	4	<3	<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	3	4	4	2	2	4	3	5	3	2	<2	mg/l	TM60/PM0
Dissolved Organic Carbon	30	40	40	20	20	40	30	50	30	20	<20	mg/kg	TM60/PM0
pH	8.55	8.11	9.37	8.17	8.12	8.02	9.03	7.97	8.11	8.28	<0.01	pH units	TM73/PM0
Total Dissolved Solids #	<35	51	78	90	57	64	84	58	60	91	<35	mg/l	TM20/PM0
Total Dissolved Solids #	<350	510	780	901	570	640	840	580	600	910	<350	mg/kg	TM20/PM0

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 9363-01-20
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2573

Report : CEN 10:1 1 Batch

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

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	31-33	34-36									LOD/LOR	Units	Method No.
Sample ID	IF2	IF3											
Depth	0.00-1.50	0.00-1.50											
COC No / misc													
Containers	V J T	V J T											
Sample Date	12/02/2020	11/02/2020											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	19/02/2020	19/02/2020											
Dissolved Antimony #	0.007	<0.002									<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	0.07	<0.02									<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	0.0040	0.0159									<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	0.040	0.159									<0.025	mg/kg	TM30/PM17
Dissolved Barium #	0.015	0.005									<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	0.15	0.05									<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005	<0.0005									<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005									<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	0.0096	0.0092									<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	0.096	0.092									<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007	0.064									<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07	0.64									<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	<0.005									<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05									<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	<0.002	0.011									<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	<0.02	0.11									<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	<0.002	<0.002									<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02	<0.02									<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003	<0.003									<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03	<0.03									<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	<0.003	<0.003									<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	<0.03	<0.03									<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	0.00003									<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001	0.0003									<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01									<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1									<0.1	mg/kg	TM26/PM0
Fluoride	<0.3	<0.3									<0.3	mg/l	TM173/PM0
Fluoride	<3	<3									<3	mg/kg	TM173/PM0
Sulphate as SO4 #	4.6	6.1									<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	46	61									<5	mg/kg	TM38/PM0
Chloride #	<0.3	0.4									<0.3	mg/l	TM38/PM0
Chloride #	<3	4									<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	2	4									<2	mg/l	TM60/PM0
Dissolved Organic Carbon	<20	40									<20	mg/kg	TM60/PM0
pH	8.45	2.91									<0.01	pH units	TM73/PM0
Total Dissolved Solids #	45	131									<35	mg/l	TM20/PM0
Total Dissolved Solids #	450	1310									<350	mg/kg	TM20/PM0

Client Name: Ground Investigations Ireland
Reference: 9363-01-20
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2573

Report : EN12457_2

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

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Sample ID	SL1	SL2	SL3	SL4	SL5	SL6	SL7	SL8	SL9	SL10						
Depth	0.20-1.10	0.15-1.40	0.07-0.30	0.13-1.50	0.12-1.20	0.15-1.40	0.20-1.30	0.15-1.60	0.15-1.50	0.20-1.30						
COC No / misc																
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T						
Sample Date	13/02/2020	13/02/2020	12/02/2020	14/02/2020	13/02/2020	13/02/2020	12/02/2020	13/02/2020	13/02/2020	14/02/2020						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1	1	1	1						
Date of Receipt	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020						
Solid Waste Analysis																
Total Organic Carbon #	0.89	0.43	NDP	0.60	0.71	1.14	0.84	4.68	0.64	0.37	3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	6	-	-	<0.025	mg/kg	TM31/PM12
Sum of 7 PCBs #	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	<30	343	303_{BA}	<30	<30	<30	<30	<30	<30	<30	500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6 #	<0.22	<0.22	0.49	0.72	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	<0.64	<0.64	0.88	1.03	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Arsenic #	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.042	0.084	<0.025	<0.025	0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium #	<0.03	<0.03	0.06	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.04	20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium #	0.026	<0.015	<0.015	<0.015	<0.015	<0.015	0.030	<0.015	<0.015	0.016	0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	2	50	100	<0.07	mg/kg	TM30/PM17
Mercury #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	0.2	2	<0.0001	mg/kg	TM61/PM0
Molybdenum #	0.05	0.13	<0.02	0.18	0.05	0.11	0.14	0.07	0.08	0.10	0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony #	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	0.03	0.04	<0.02	<0.02	0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids #	<350	510	780	901	570	640	840	580	600	910	4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	30	40	40	20	20	40	30	50	30	20	500	800	1000	<20	mg/kg	TM60/PM0
Mass of raw test portion	0.1043	0.1052	0.0997	0.1129	0.1137	0.1122	0.1082	0.115	0.1158	0.1143	-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	86.6	85.7	90.4	80.0	79.4	80.3	83.6	78.5	77.8	78.7	-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.886	0.885	0.89	0.878	0.877	0.878	0.882	0.875	0.874	0.876	-	-	-		l	NONE/PM17
Eluate Volume	0.87	0.87	0.87	0.67	0.82	0.85	0.87	0.87	0.88	0.78	-	-	-		l	NONE/PM17
pH #	9.66	8.72	8.88	8.40	8.07	8.35	9.76	8.38	8.65	8.33	-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	-	-	<0.1	mg/kg	TM26/PM0
Fluoride	<3	5	<3	3	<3	4	<3	4	<3	7	-	-	-	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	15	15	75	12	7	6	46	20	28	38	1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride #	4	<3	<3	<3	<3	<3	4	<3	4	<3	800	15000	25000	<3	mg/kg	TM38/PM0

Client Name: Ground Investigations Ireland
Reference: 9363-01-20
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2573

Report : EN12457_2

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

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	31-33	34-36									Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Sample ID	IF2	IF3														
Depth	0.00-1.50	0.00-1.50														
COC No / misc																
Containers	V J T	V J T														
Sample Date	12/02/2020	11/02/2020														
Sample Type	Soil	Soil														
Batch Number	1	1														
Date of Receipt	19/02/2020	19/02/2020														
Solid Waste Analysis																
Total Organic Carbon #	1.03	0.85									3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025	<0.025									6	-	-	<0.025	mg/kg	TM31/PM12
Sum of 7 PCBs #	<0.035	<0.035									1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	37	<30									500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6 #	0.26	0.22									-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	<0.64	<0.64									100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Arsenic #	0.040	0.159									0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium #	0.15	0.05									20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium #	<0.005	<0.005									0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium #	0.096	0.092									0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper #	<0.07	0.64									2	50	100	<0.07	mg/kg	TM30/PM17
Mercury #	<0.0001	0.0003									0.01	0.2	2	<0.0001	mg/kg	TM61/PM0
Molybdenum #	<0.02	0.11									0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel #	<0.02	<0.02									0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead #	<0.05	<0.05									0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony #	0.07	<0.02									0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium #	<0.03	<0.03									0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc #	<0.03	<0.03									4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids #	450	1310									4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	<20	40									500	800	1000	<20	mg/kg	TM60/PM0
Mass of raw test portion	0.109	0.1058									-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	82.8	85.5									-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.881	0.885									-	-	-		l	NONE/PM17
Eluate Volume	0.87	0.7									-	-	-		l	NONE/PM17
pH #	8.78	10.76									-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1	<0.1									1	-	-	<0.1	mg/kg	TM26/PM0
Fluoride	<3	<3									-	-	-	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	46	61									1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride #	<3	4									800	15000	25000	<3	mg/kg	TM38/PM0

Client Name: Ground Investigations Ireland

Reference: 9363-01-20

Location: Project Calvary

Contact: Stephen Kealy

Matrix : Soli

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	EPH Interpretation
20/2573	1	SL1	0.20-1.10	1-3	No interpretation possible
20/2573	1	SL2	0.15-1.40	4-6	Lubricating oil
20/2573	1	SL3	0.07-0.30	7-9	Lubricating oil & Possible taramc/bitumen
20/2573	1	SL4	0.13-1.50	10-12	No interpretation possible
20/2573	1	SL5	0.12-1.20	13-15	No interpretation possible
20/2573	1	SL6	0.15-1.40	16-18	No interpretation possible
20/2573	1	SL7	0.20-1.30	19-21	No interpretation possible
20/2573	1	SL8	0.15-1.60	22-24	No interpretation possible
20/2573	1	SL9	0.15-1.50	25-27	No interpretation possible
20/2573	1	SL10	0.20-1.30	28-30	No interpretation possible
20/2573	1	IF2	0.00-1.50	31-33	Possible Lubricating oil
20/2573	1	IF3	0.00-1.50	34-36	No interpretation possible

Client Name: Ground Investigations Ireland
Reference: 20/01/9363
Location: Project Calvary
Contact: Stephen Kealy

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

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

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

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
20/2573	1	SL1	0.20-1.10	2	21/02/2020	**General Description (Bulk Analysis)**	soil-stones
					21/02/2020	**Asbestos Fibres**	NAD
					21/02/2020	**Asbestos ACM**	NAD
					21/02/2020	**Asbestos Type**	NAD
					21/02/2020	**Asbestos Level Screen**	NAD
20/2573	1	SL2	0.15-1.40	5	21/02/2020	**General Description (Bulk Analysis)**	soil-stones
					21/02/2020	**Asbestos Fibres**	NAD
					21/02/2020	**Asbestos ACM**	NAD
					21/02/2020	**Asbestos Type**	NAD
					21/02/2020	**Asbestos Level Screen**	NAD
20/2573	1	SL3	0.07-0.30	8	21/02/2020	**General Description (Bulk Analysis)**	soil-stones
					21/02/2020	**Asbestos Fibres**	Fibre Bundles
					21/02/2020	**Asbestos ACM**	NAD
					21/02/2020	**Asbestos Type**	Chrysotile
					21/02/2020	**Asbestos Level Screen**	less than 0.1%
					03/03/2020	**Total ACM Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					03/03/2020	**Total Detailed Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					03/03/2020	**Total Gravimetric Quantification (ACM + Detailed) (% Asb)**	<0.001 (mass %)
20/2573	1	SL4	0.13-1.50	11	21/02/2020	**General Description (Bulk Analysis)**	soil-stones
					21/02/2020	**Asbestos Fibres**	NAD
					21/02/2020	**Asbestos ACM**	NAD
					21/02/2020	**Asbestos Type**	NAD
					21/02/2020	**Asbestos Level Screen**	NAD
20/2573	1	SL5	0.12-1.20	14	21/02/2020	**General Description (Bulk Analysis)**	soil-stones
					21/02/2020	**Asbestos Fibres**	NAD
					21/02/2020	**Asbestos ACM**	NAD
					21/02/2020	**Asbestos Type**	NAD
					21/02/2020	**Asbestos Level Screen**	NAD
20/2573	1	SL6	0.15-1.40	17	21/02/2020	**General Description (Bulk Analysis)**	soil-stones
					21/02/2020	**Asbestos Fibres**	NAD
					21/02/2020	**Asbestos ACM**	NAD
					21/02/2020	**Asbestos Type**	NAD
					21/02/2020	**Asbestos Level Screen**	NAD

Client Name: Ground Investigations Ireland
Reference: 20/01/9363
Location: Project Calvary
Contact: Stephen Kealy

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
20/2573	1	SL7	0.20-1.30	20	21/02/2020	**General Description (Bulk Analysis)**	soil-stones
					21/02/2020	**Asbestos Fibres**	NAD
					21/02/2020	**Asbestos ACM**	NAD
					21/02/2020	**Asbestos Type**	NAD
					21/02/2020	**Asbestos Level Screen**	NAD
20/2573	1	SL8	0.15-1.60	23	21/02/2020	**General Description (Bulk Analysis)**	soil-stones
					21/02/2020	**Asbestos Fibres**	NAD
					21/02/2020	**Asbestos ACM**	NAD
					21/02/2020	**Asbestos Type**	NAD
					21/02/2020	**Asbestos Level Screen**	NAD
20/2573	1	SL9	0.15-1.50	26	21/02/2020	**General Description (Bulk Analysis)**	soil-stones
					21/02/2020	**Asbestos Fibres**	NAD
					21/02/2020	**Asbestos ACM**	NAD
					21/02/2020	**Asbestos Type**	NAD
					21/02/2020	**Asbestos Level Screen**	NAD
20/2573	1	SL10	0.20-1.30	29	21/02/2020	**General Description (Bulk Analysis)**	soil-stones
					21/02/2020	**Asbestos Fibres**	NAD
					21/02/2020	**Asbestos ACM**	NAD
					21/02/2020	**Asbestos Type**	NAD
					21/02/2020	**Asbestos Level Screen**	NAD
20/2573	1	IF2	0.00-1.50	32	21/02/2020	**General Description (Bulk Analysis)**	Soil
					21/02/2020	**Asbestos Fibres**	NAD
					21/02/2020	**Asbestos ACM**	NAD
					21/02/2020	**Asbestos Type**	NAD
					21/02/2020	**Asbestos Level Screen**	NAD
20/2573	1	IF3	0.00-1.50	35	21/02/2020	**General Description (Bulk Analysis)**	soil-stones
					21/02/2020	**Asbestos Fibres**	NAD
					21/02/2020	**Asbestos ACM**	NAD
					21/02/2020	**Asbestos Type**	NAD
					21/02/2020	**Asbestos Level Screen**	NAD

Client Name: Ground Investigations Ireland
Reference: 9363-01-20
Location: Project Calvary
Contact: Stephen Kealy

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Method No.	NDP Reason
20/2573	1	SL3	0.07-0.30	7-9	TM21/PM24	Asbestos detected in sample

Please include all sections of this report if it is reproduced

Client Name: Ground Investigations Ireland
Reference: 9363-01-20
Location: Project Calvary
Contact: Stephen Kealy

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 20/2573						

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

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 20/2573

SOILS

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

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

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

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

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

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

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

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

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

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

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

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

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

WATERS

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

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

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

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

DEVIATING SAMPLES

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

SURROGATES

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

DILUTIONS

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

BLANKS

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

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

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

Measurement Uncertainty

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

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher, this result is not accredited.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x3 Dilution

AB	x5 Dilution
BA	x3 Dilution

EMT Job No: 20/2573

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3: 1990/USEPA 160.3 Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes

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EMT Job No: 20/2573

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM62	Acid digestion of as received solid samples using Aqua Regia refluxed at 112.5 °C.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM0	No preparation is required.	Yes		AR	Yes

EMT Job No: 20/2573

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060, APHA Standard Methods for Examination of Water and Wastewater 5310B, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM61	Modified US EPA methods 245.7 and 200.7. Determination of Mercury by Cold Vapour Atomic Fluorescence.	PM0	No preparation is required.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	Yes
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM131	Quantification of Asbestos Fibres and ACM, based on HSG248 and SCA method.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	Yes
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes
NONE	No Method Code	NONE	No Method Code			AR	Yes

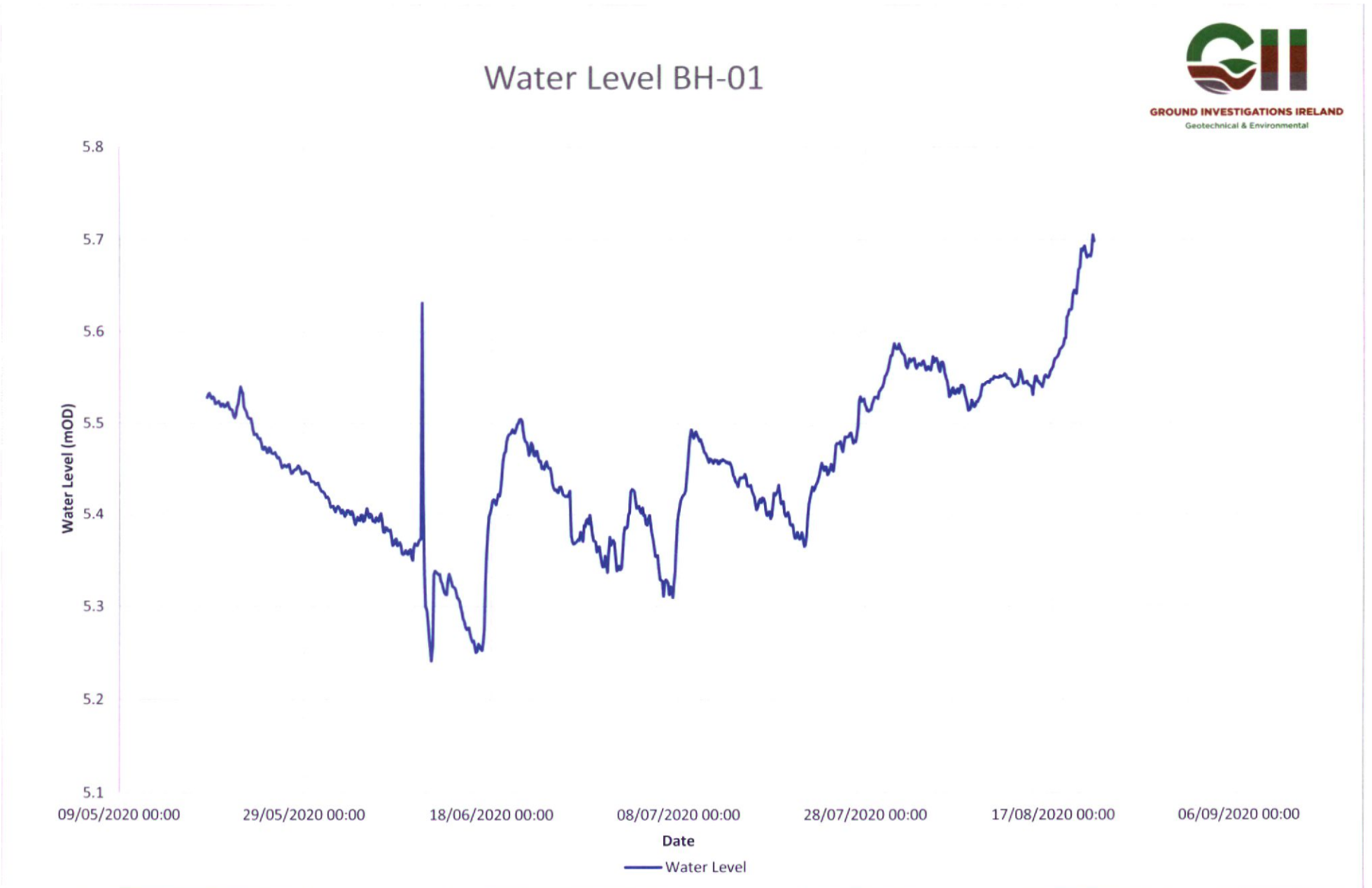
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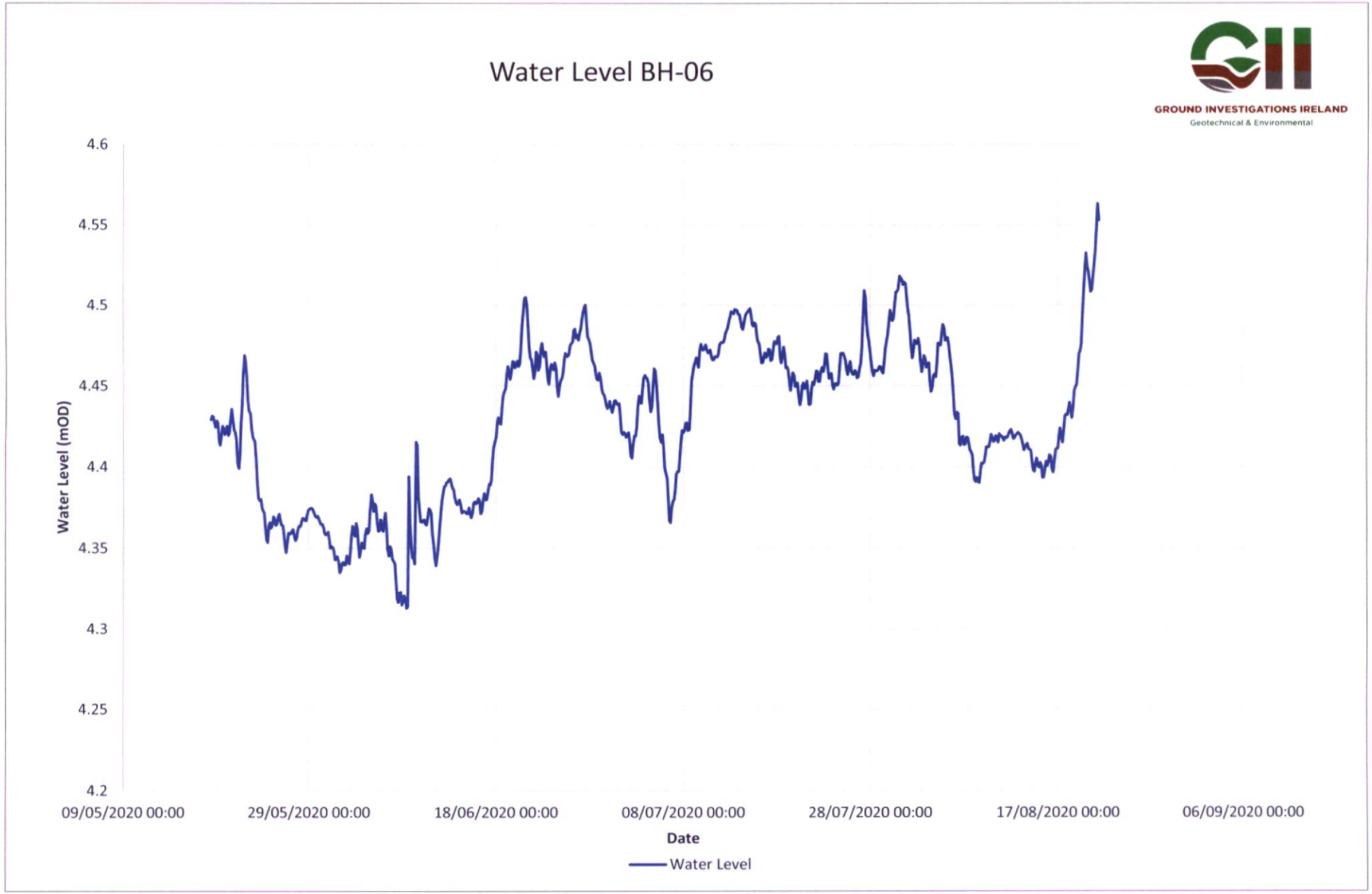
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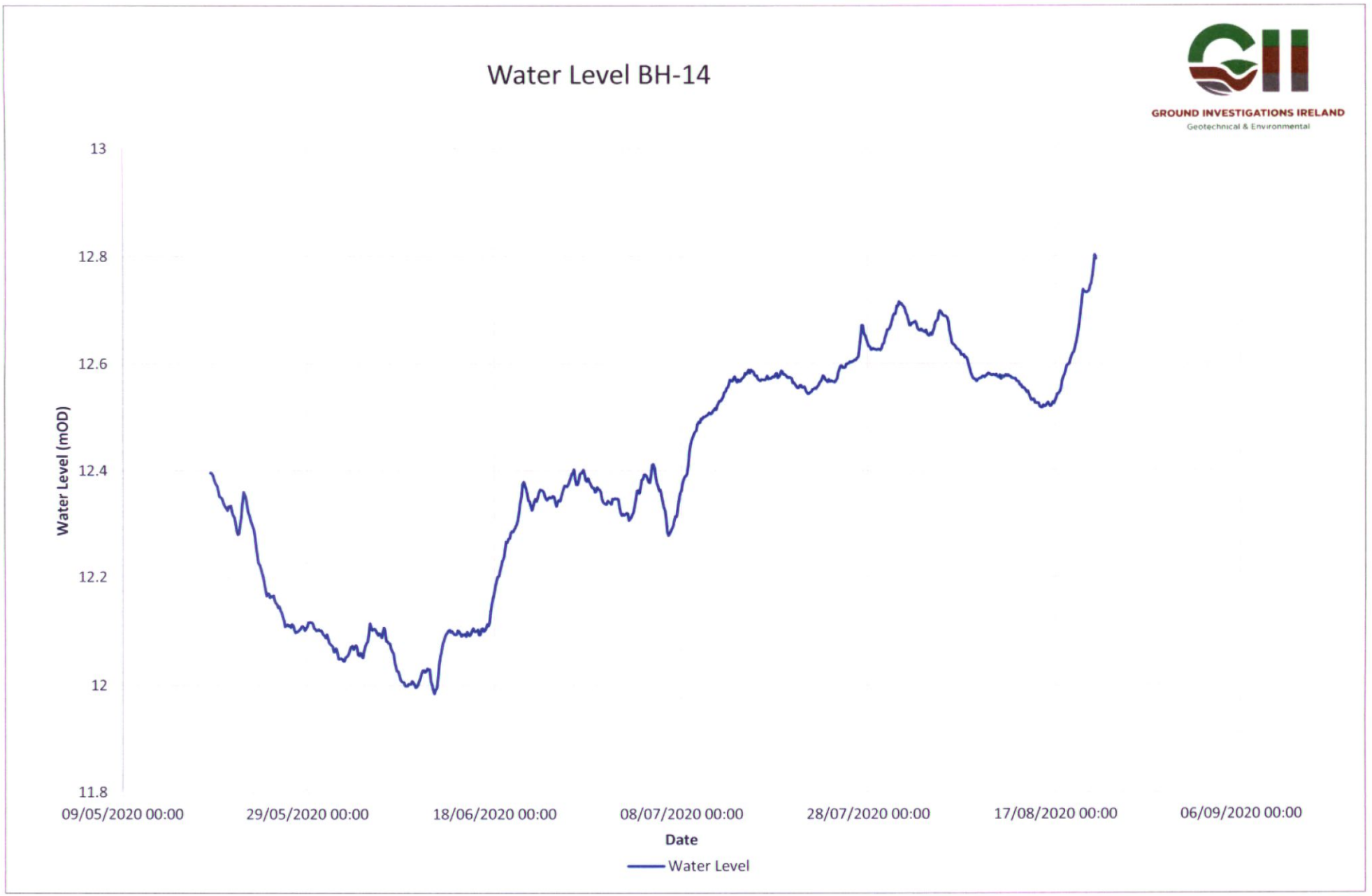
Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in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

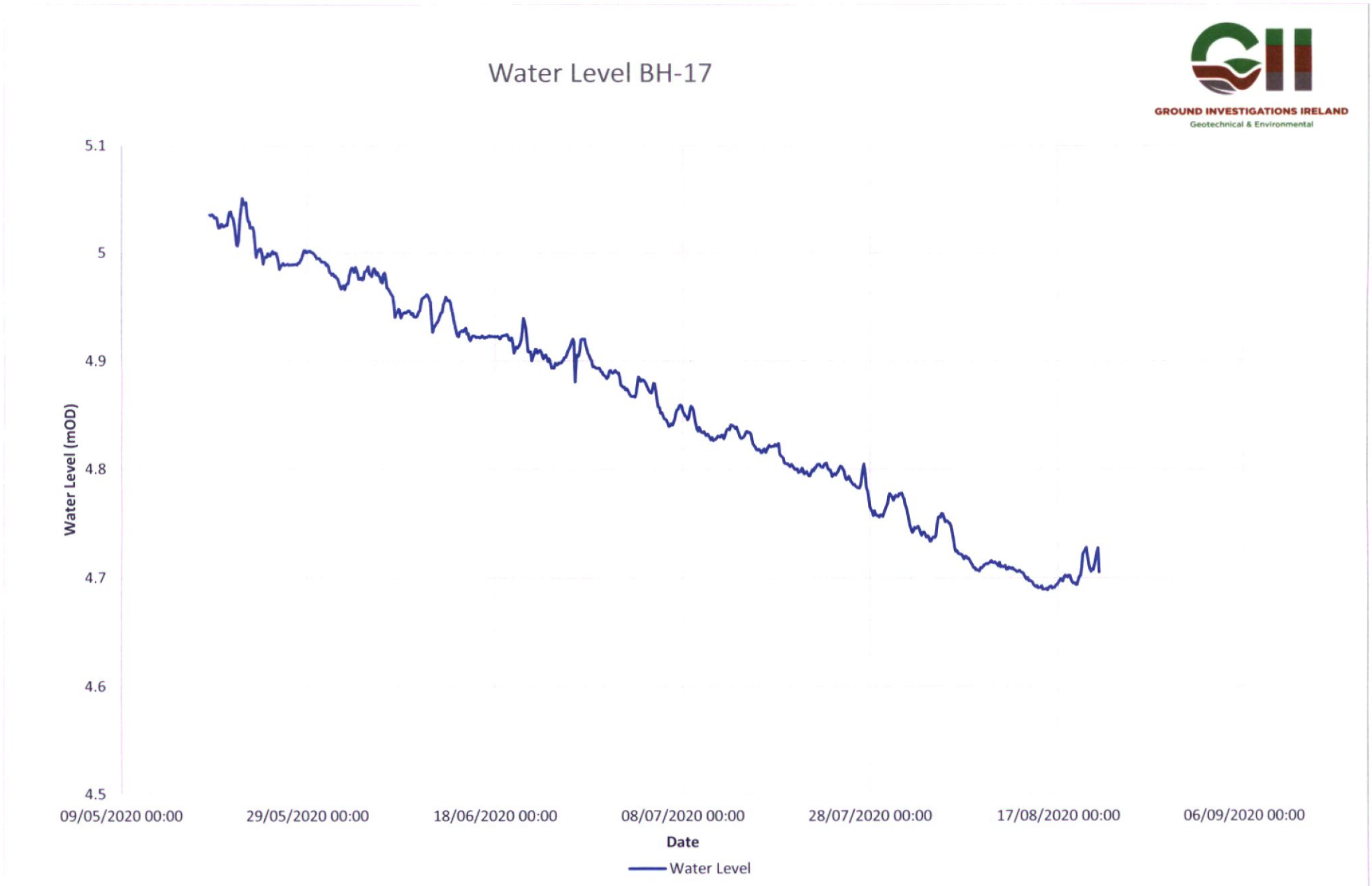
APPENDIX 8 – Groundwater Monitoring

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental




Water Level BH-06
GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Water Level (mOD)
4.6
4.55
4.5
4.45
4.4
4.35
4.3
4.25
4.2
09/05/2020 00:00
29/05/2020 00:00
18/06/2020 00:00
08/07/2020 00:00
28/07/2020 00:00
17/08/2020 00:00
06/09/2020 00:00
Date
Water Level


Water Level BH-14
GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
13
12.8
12.6
12.4
12.2
12
11.8
Water Level (mOD)
09/05/2020 00:00
29/05/2020 00:00
18/06/2020 00:00
08/07/2020 00:00
28/07/2020 00:00
17/08/2020 00:00
06/09/2020 00:00
Date
Water Level


Water Level BH-17
GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Water Level (mOD)
5.1
5
4.9
4.8
4.7
4.6
4.5
09/05/2020 00:00
29/05/2020 00:00
18/06/2020 00:00
08/07/2020 00:00
28/07/2020 00:00
17/08/2020 00:00
06/09/2020 00:00
Date
Water Level

Appendix 10.1 NRA/TII Criteria for Rating the Magnitude and Significance of Impacts

Box 4.1: CRITERIA FOR RATING SITE ATTRIBUTES - Estimation of Importance of Soil and Geology Attributes

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

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

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

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

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

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

Box 4.4: CRITERIA FOR RATING IMPACT SIGNIFICANCE AT ROUTE SELECTION STAGE - Rating of Significant Environmental Impacts at Route Selection Stage

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

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

Appendix 16.1: Geophysical Survey Report

Brady Shipman Martin
HIN003-0005 #9538036v1

GEOPHYSICAL SURVEY

REPORT

Holy Cross College,

Clonliff West, Drumcondra,

Dublin 3

Date:
31/03/2020

Licence: 20R0046

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

J. M. Leigh Surveys Ltd.
124 Oaklawn West,
Leixlip, Co. Kildare
Tel: 01 615 4647
Mobile: 0879062729
www.jmlsurveys.com

GEOPHYSICAL SURVEY SUMMARY SHEET
HOLY CROSS COLLEGE, DRUMCONDRA, CLONLIFF WEST, DUBLIN 3

Site Name	Holy Cross College	**Ref No.**	20006
Townland	Clonliff West	**Licence No.**	20-R-0046
County	Dublin 3	**Licence Holder**	Joanna Leigh
ITM (centre)	E716367, N736331	**Purpose**	Pre-planning Investigation
Client	IAC Ltd.	**Reference No.**	N/A

Ground Conditions Survey was conducted within four predefined areas within the grounds of Holy Cross College. Ground conditions were good and comprised short grass.

Survey Type Detailed gradiometer survey totalling c. 3.25 hectares.

Summary of Results

The dataset is largely dominated by modern ferrous responses and disturbance from multiple buildings, landscaping and modern services. This may obscure any response from potential archaeological remains in these areas. Several possible former field divisions have been identified, some of which correlate with field boundaries depicted on historic mapping. Faint linear trends are suggestive of former agricultural activity, possibly associated with the extant field boundaries.

Field Staff Joanna Leigh, Susan Curran, Rhonda McGovern

Report Date 31/03/2020 **Report Author** Susan Curran

Contents

1. Introduction 1

2. Survey ground conditions and further information 1

3. Survey Methodology 2

4. Data Display 2

5. Survey Results 3

6. Conclusion 4

Geophysical Survey Report
Holy Cross College, Clonliff West, Drumcondra, Dublin 3

1 Introduction

1.1 A geophysical survey has been conducted by J. M. Leigh Surveys at a site in the townland of Clonliff West, Drumcondra, Dublin 3. The survey was requested by IAC Ltd. on behalf of Hines Real Estate. The survey forms part of a pre-planning investigation.

1.2 Four areas (A-D) were highlighted for investigation and subject to a detailed gradiometer survey. Areas A-C are located within the grounds of Holy Cross College, to the east of the main college building. Area D is located to the north of the college, adjacent to a playing field. Figure 1 presents the site and survey locations at a scale of 1:2,000.

1.3 There are no recorded monuments within the application area. A recorded 'House - 18th/19th century' (DU018-019001) lies just outside the eastern limits of the application area and a 'Water mil - unclassified' (DU018-030) is located c. 365m to the north east.

1.4 The main aim of the survey was to identify any responses which may represent previously unknown archaeological remains within the application area. It is the objective of the survey to identify the location, nature and extent of any responses of potential archaeological interest.

1.5 The detailed gradiometer survey was conducted under licence 20R0046 issued by the Department of Culture, Heritage and the Gaeltacht.

2 Survey ground conditions and further information

2.1 Detailed gradiometer survey was conducted where possible in Areas A-D. The application area has been subject to modern activity with roadways running through Areas B and C. In addition, modern landscaping, trees, and infrastructure such as lighting, signage and modern services are found throughout the area.

2.2 Area A comprised a discrete field, separated from Areas B and C by a field boundary consisting of a low stone wall and thick vegetation. A high stone wall along its eastern and southern sides separates Area A from a large apartment complex.

2.3 Area B comprised a small lawn area close to an entrance to the site. This was bounded on the west by metal fencing and to the east by the roadway.

2.4 Area C comprised a lawn area immediately to the east of the main Holy Cross College buildings. The area is bounded by carparks to the west and roadways to the north, south and east. A roadway also bisects the area. Trees, signage and other modern infrastructure are particularly evident here.

2.5 Area D is located to the north of the main buildings and comprised short grass. It is divided by the partial remains of a north-south field boundary.

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 All data was collected in 'zigzag' traverses. Grid orientation was positioned to best facilitate site work and ground conditions in each area.

3.5 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.

3.6 The survey methodology, data presentation and report content adheres to the European Archaeological Council (EAC) (2016) 'Guidelines for the use of Geophysics in Archaeology'.

4 Data display

4.1 A summary greyscale image and accompanying interpretation diagram are presented in Figures 2 and 3, at a scale of 1:1,500.

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 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 and A1.02. The raw data is displayed as a greyscale image and xy-trace plot, both at a scale of 1:750. 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

Areas A-C

5.1 The data is largely dominated by modern ferrous responses and disturbance from multiple buildings, landscaping, signage and modern services within the application area.

5.2 Area A comprises several linear responses (1 & 2) which may correspond to former field divisions. (1) is located in the southern half of Area A and is made up of largely positive magnetic responses. (2) runs approximately north-south close to the eastern boundary of Area A and is more ferrous in nature, suggesting it is recent in origin. This may equally represent a buried service pipe, although this is unclear.

5.3 Area B is dominated by modern ferrous disturbance. This is largely due to the metal fencing which defines its western edge and the roadway which bounds it to the east.

5.4 Area C is also dominated by modern ferrous disturbance. This is the result of modern landscaping and services, in addition to the roadways which surround it.

Area D

5.5 A strong linear ferrous response (3) runs east-west across the most southerly part of Area D. This likely corresponds to modern services.

5.6 A positive magnetic linear trend (4) lies just to the north of (3). This appears to continue the trajectory of the existing east-west field boundary and may be indicative of a section of this boundary which has been removed.

5.7 A strong linear response (5) to the north of (4) runs north-west to south-east from the extant north-south field boundary. This most likely represents the location of a former field division.

5.8 In the northern part of Area D, a strong linear response (6) runs north-west to south-east towards the present field boundary. This response is similar in strength and

signature to (5) and has a comparable orientation. It most likely represents a former field division, possibly associated with that indicated by (5).

5.9 To the south of (6), a strong ferrous linear response (7) runs east-west from an existing field boundary before joining up with the extant north-south field boundary. This response sits within a visibly raised and slightly disturbed area and also corresponds with the location of a former field boundary depicted on the 6inch historic mapping. This most likely represents the remains of a partially removed field boundary.

5.10 Several positive and negative linear trends (8) are evident in the western half of Area D. These are quite faint and appear to run parallel to the present field boundaries. They are suggestive of former agricultural activity.

5.11 Two short parallel linear trends (9) have been identified just west of the present-north-south field boundary. These are quite faint and given their proximity to the modern field boundary, an archaeological interpretation is highly tentative. They most likely represent former agricultural activity.

6 Conclusion

6.1 Several possible former field divisions have been identified (Areas A and D), some of which correlate with field boundaries depicted on historic mapping.

6.2 Faint linear trends are suggestive of former agricultural activity (Area D), possibly associated with the extant field boundaries.

6.3 Modern ferrous disturbance dominates the datasets (particularly Areas B and C), and may obscure any response from potential archaeological remains in these areas.

6.4 Consultation with a licensed archaeologist and with the Department of Culture, Heritage and the Gaeltacht is recommended to establish if any additional archaeological works are required.

Technical Information Section

Instrumentation & Methodology

Detailed Gradiometer Survey



This is conducted to clearly define any responses detected during scanning, or can be applied as a stand-alone methodology. Detailed survey is often applied with a sample interval of 0.25m and a traverse interval of 1m. This allows detection of potential archaeological responses. Data is collected in grids 40m x 40m, and data is displayed accordingly. A more detailed survey methodology may be applied where archaeological remains are thought likely. A survey with a grid size of 10m x 10m 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.

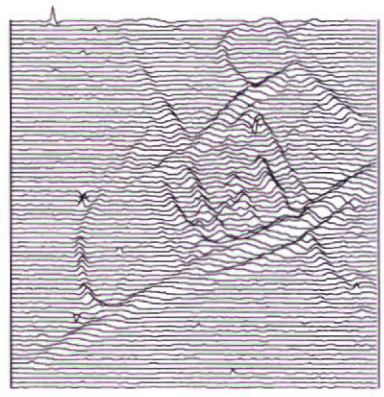


Frequent realignment of the instruments and zero drift correction; ensure a constant high quality of data. Extremely sensitive, these instruments can detect variations in soil magnetism to 0.1nT, affording diverse application throughout a variety of archaeological, soil morphological and geological conditions.

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.



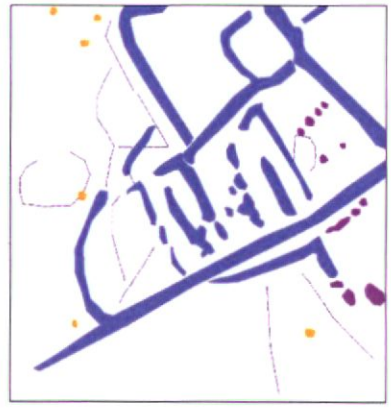
*Greyscale**

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 allows 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.*

Glossary of Interpretation Terms

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, storage 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.

? Industrial

Such anomalies generally possess a strong magnetic response and may equate with archaeological features such as kilns, furnaces, concentrations of fired debris and associated industrial material.

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.

Bibliography

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English Heritage (2008) '*Geophysical guidelines: Geophysical Survey in Archaeological Field Evaluation.*' Second Edition.

Gaffney, C. Gater, J. & Ovenden, S. (2006) '*The use of Geophysical Techniques in Archaeological Evaluations.*' IFA Paper No. 6.

Gaffney, C & Gater, J (2003). '*Revealing the buried past: Geophysics for Archaeologists.*' Tempus Publishing Limited.

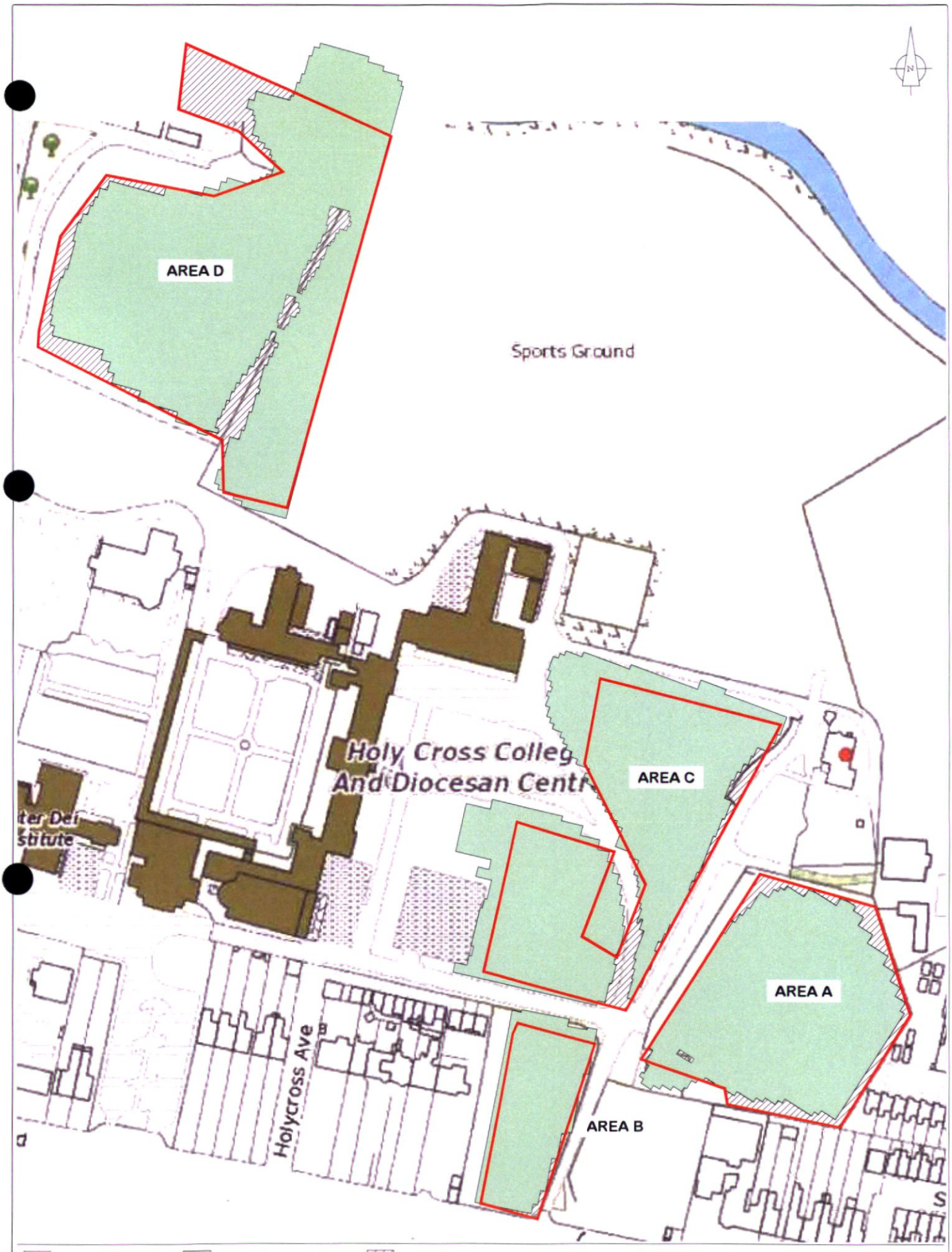
National Soil Survey of Ireland (1980) *General soil map second edition (1:575,000)*. An Foras Taluntais.

List of Figures

Figure	Description	Paper Size	Scale
Figure 1	Site & survey location diagram	A4	1:2,000
Figure 2	Summary greyscale image	A3	1:1,500
Figure 3	Summary interpretation diagram	A3	1:1,500

Archive Data Supplied as a PDF Upon Request

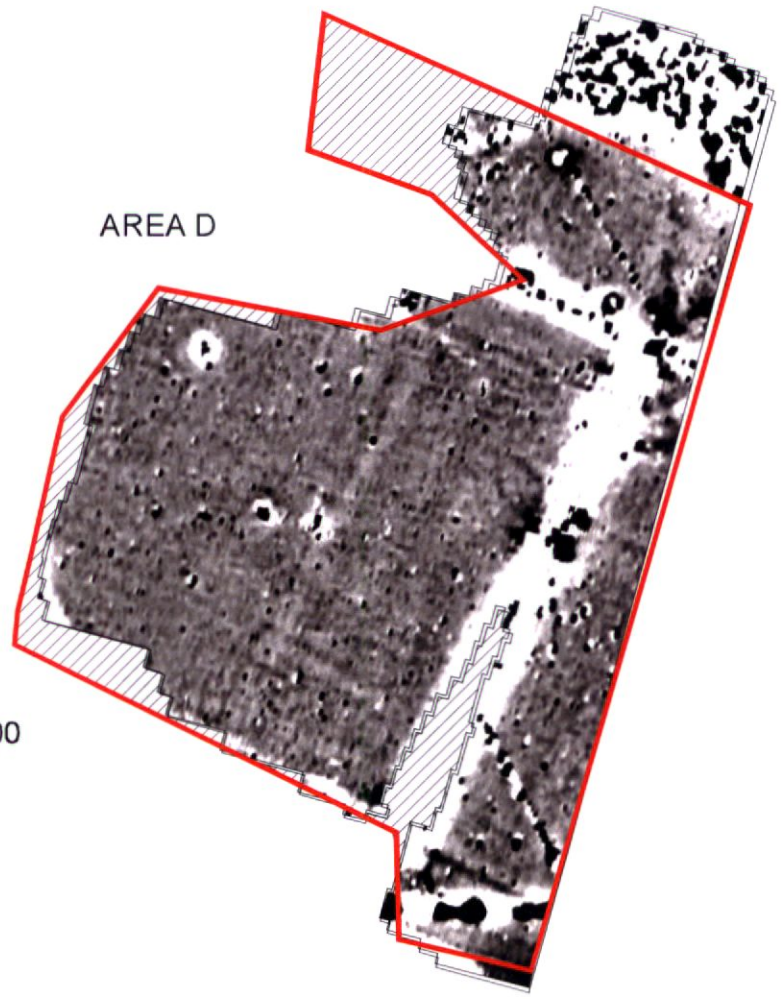
A1.01	Raw data XY-Trace plot	A0	1:750
A1.02	Raw data greyscale image	A0	1:750



Application Area | Gradiometer Survey | Survey not possible

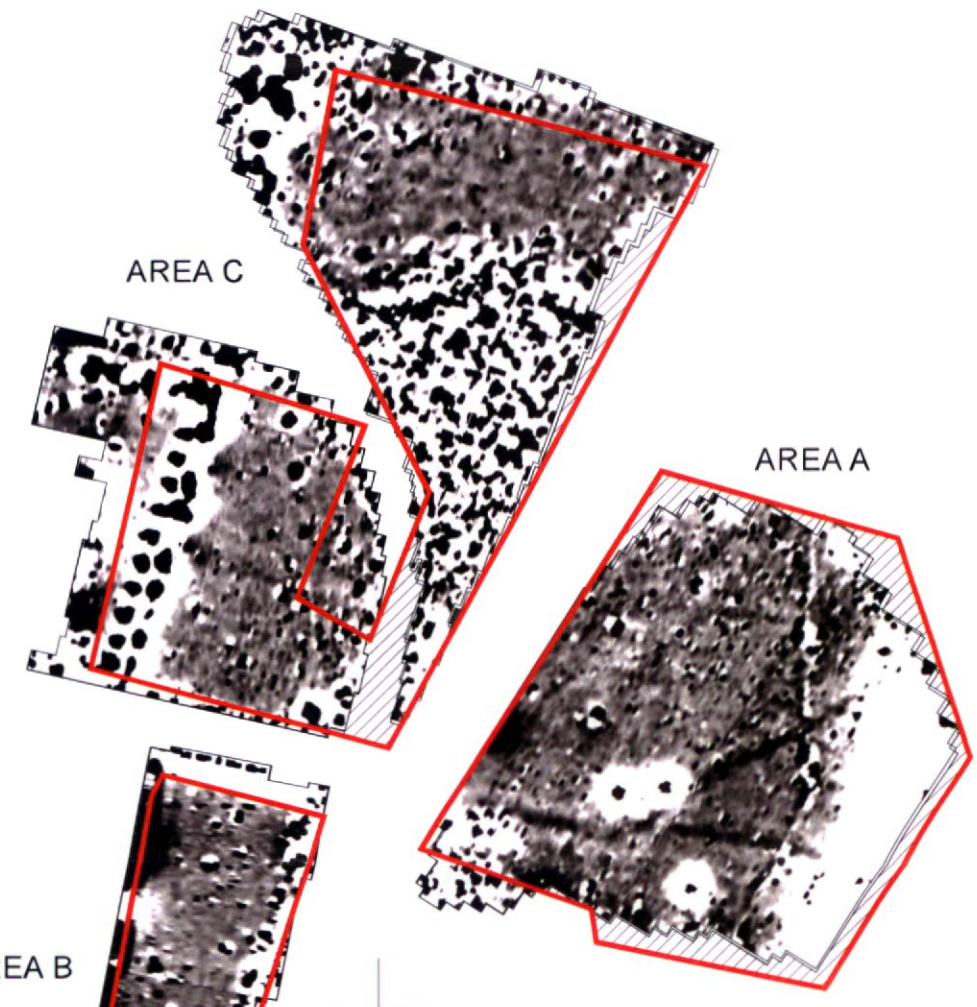
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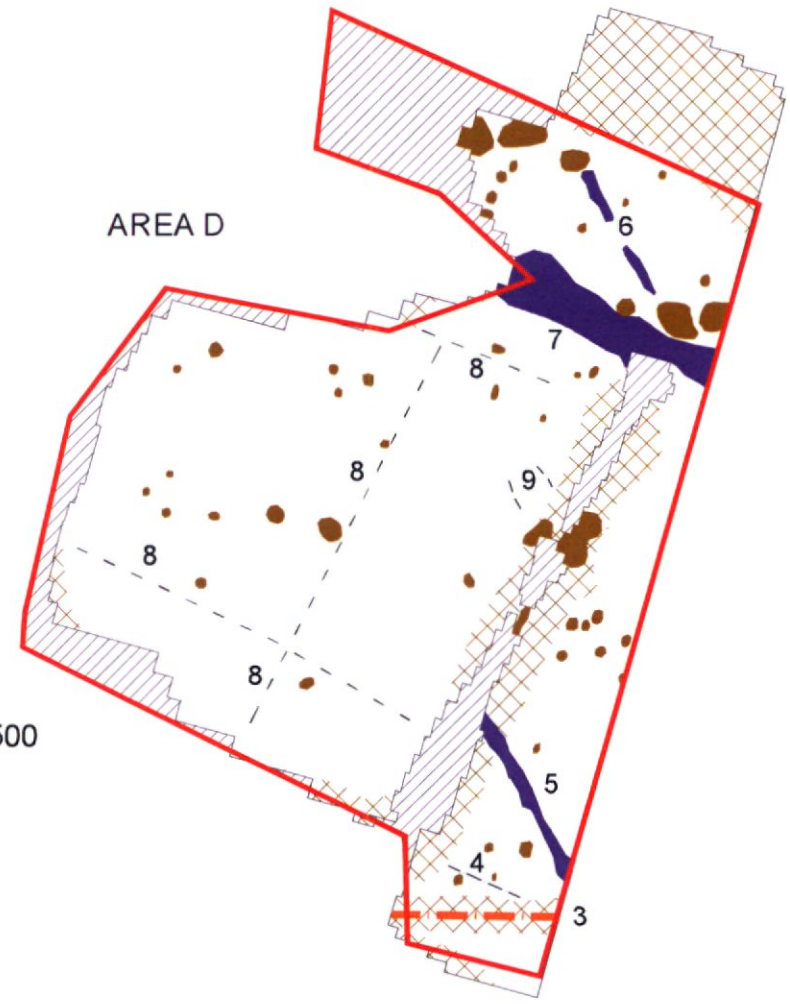
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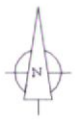
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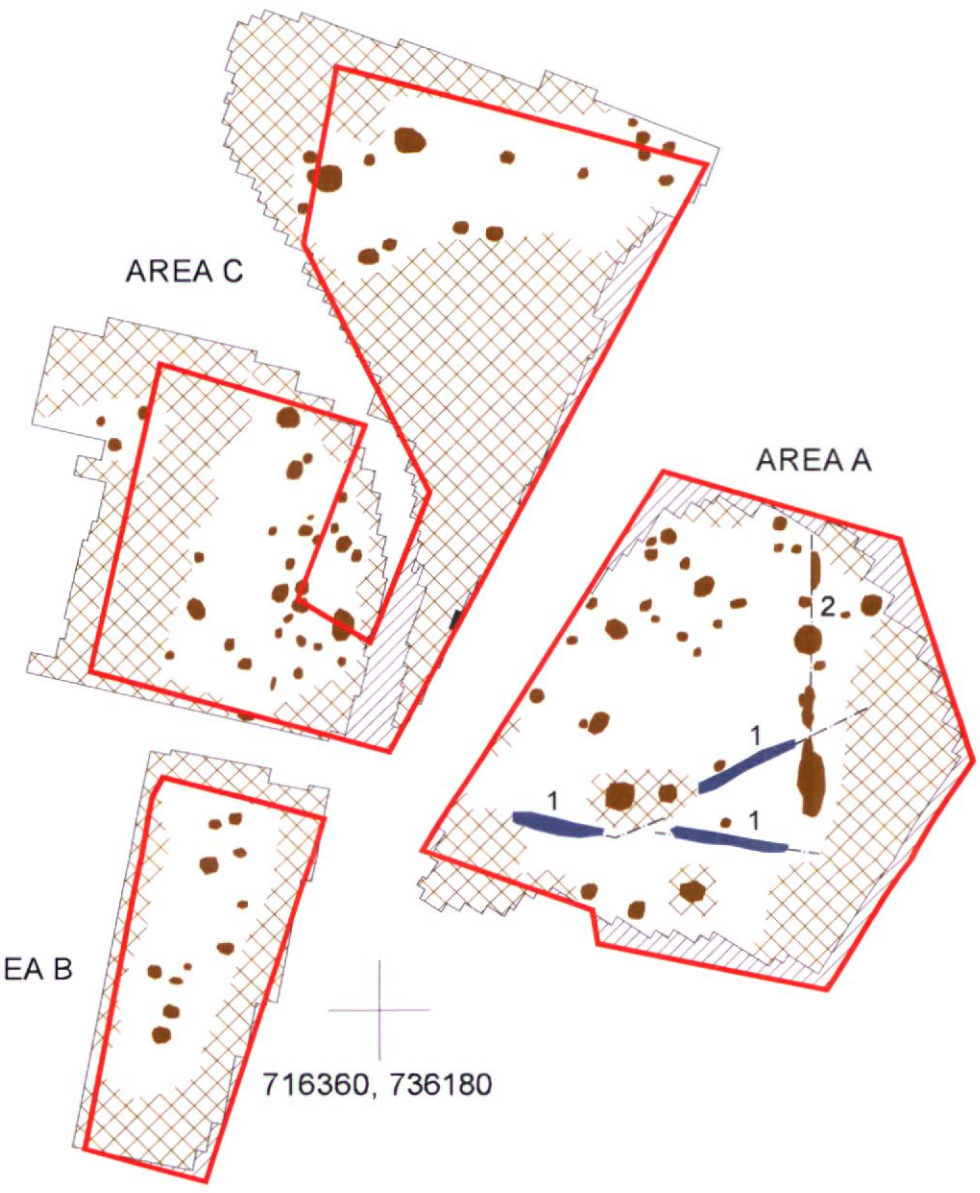
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Figure:	2
Licence No.:	20R0046
Issue Date:	31.03.2020





716300, 736500



?Archaeology

?Former Field Boundary

Trend

Agricultural Trend

Disturbance

Ferrous

Modern Ferrous Pipe

0 metres 60

Client: IAC Ltd.	Project: Geophysical Survey Holy Cross College, Clonliff West, Dublin 3	Title: Summary Interpretation	J.M.Leigh surveys www.jmlsurveys.com	Scale @ A3: 1:1,500 Figure: 3 Licence No.: 20R0046 Issue Date: 31.03.2020

Appendix 16.2: Archaeological Testing Report

IAC Archaeology

ARCHAEOLOGICAL IMPACT ASSESSMENT AT AT LANDS AT HOLY CROSS COLLEGE, CLONLIFFE ROAD, DUBLIN 3 AND DRUMCONDRA LOWER, DRUMCONDRA, DUBLIN 9

LICENCE: 20E0286

ON BEHALF OF: CWTC MULTI FAMILY ICAV ACTING ON BEHALF OF ITS SUB-FUND DBTR DR1 FUND

I.T.M.: 716277/736343

LICENCEE: NEIL O'FLANAGAN
AUTHORS: NEIL O'FLANAGAN & GRACE CORBETT

REPORT STATUS: FINAL
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IRISH ARCHAEOLOGICAL CONSULTANCY LTD
ARCHAEOLOGY & CONSERVATION CONSULTANTS

T: (01) 201 8380 E: archaeology@iac.ie
Dublin I Belfast IAC.ie

DOCUMENT CONTROL SHEET

DATE	DOCUMENT TITLE	REV.	PREPARED BY	REVIEWED BY	APPROVED BY
16.11.20	Archaeological Impact Assessment at Lands at Holy Cross College, Clonliffe Road, Dublin 3 and Drumcondra Lower, Drumcondra, Dublin 9	1	N. O' Flanagan	G Corbett	F Bailey

ABSTRACT

IAC Archaeology has prepared this report on behalf of CWTC Multi Family ICAV acting on behalf of its sub-fund DBTR DR1 Fund, to study the impact, if any, on the archaeological and historical resource of a proposed development, which is located at Clonliffe Road, Drumcondra, Dublin 9 (ITM 716277/736343; OS Sheet 18). The assessment was carried out by Neil O'Flanagan under licence 20E0286. It follows a previous geophysical report carried out by JM Surveys under licence 20R0046 in March 2020.

Archaeological testing was carried out over the course of three days from 6 July 2020 using a mechanical excavator fitted with a flat grading bucket. The trenches targeted geophysical anomalies and open green space to fully investigate the archaeological potential of the site. Testing did not reveal areas of archaeological significance. Much of the lands appeared to have been reworked for the purposes of laying out a flat lawn and playing fields associated with Holy Cross College.

Whilst no sites or areas of archaeological potential were noted during the course of the investigations, it remains possible that small or isolated features survive beneath the current ground level and outside of the footprint of the excavated test trenches. Ground disturbances associated with the development have the potential to adversely impact on same. It is recommended that all topsoil stripping during construction of the proposed development be monitored by a suitably qualified archaeologist. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation in-situ or by record. Any further mitigation will require approval from the National Monuments Service of the DoCHG and Dublin City Council Archaeologist.

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1 INTRODUCTION

1.1 GENERAL

The following report details the results of a programme of archaeological testing undertaken at Clonliffe Road, Drumcondra, Dublin 9, prior to proposed development. This assessment has been carried out to ascertain the potential impact of the proposed development on the archaeological resource that may exist within the proposed development area.

The assessment was undertaken by Neil O'Flanagan of IAC Archaeology (IAC), on behalf of CWTC Multi Family ICAV acting on behalf of its sub-fund DBTR DR1 Fund and under Licence 20E0286, as issued by the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht (DoCHG). This report follows on from a draft archaeological desk top assessment carried out by IAC Archaeology in February 2020 (Corbett and Anderson 2020) and a geophysical survey carried out by JM Surveys under licence 20R0046 in March 2020 (Leigh 2020).

Test trenching commenced at the site on 6 July 2020 and continued for 3 days. Work was carried out using a 13 tonne 360 degree tracked excavator, with a flat, toothless bucket, under strict archaeological supervision. A total of 24 trenches were mechanically investigated across the test area which measured 808 linear metres in total. No definitive archaeological features were identified during the course of the works.

1.2 THE PROPOSED DEVELOPMENT

The proposed development (Figure 2) will consist of the construction of a 'Build To Rent' residential development set out in 12 no. blocks, ranging in height from 3 to 17 storeys, to accommodate 1635 no. apartments (comprising 561 studios, 605 no. 1 bed units, 426 no. 2 bed units and 43 no. 3 bed units) including a retail unit, a café unit, a crèche, and residential tenant amenity. The development will include a single level basement under Blocks B2, B3 & C1, a single level basement under Block D2 and a podium level basement and single level basement under Block A1 to accommodate car parking spaces, bicycle parking, storage, services and plant areas. To facilitate the proposed development the scheme will involve the demolition of a number of existing structures on the site.

The proposed development sits as part of a wider Site Masterplan for the entire Holy Cross College lands which includes a proposed hotel development (currently under appeal to An Bord Pleanala and future proposed GAA pitches and clubhouse.

The site contains a number of Protected Structures including The Seminary Building, Holy Cross Chapel, South Link Building, The Assembly Hall and The Ambulatory while the wider Holy Cross College lands also includes Protected Structures including The Red House and the Archbishop's House. The application proposes the renovation and extension of the Seminary Building and South Link Building to accommodate residential

units and the renovation of the existing Holy Cross Chapel and Assembly Hall buildings for use as residential tenant amenity use.

The residential buildings are arranged around a number of proposed public open spaces and routes throughout the site with extensive landscaping and tree planting proposed. Communal amenity spaces will be located adjacent to residential buildings and at roof level throughout the scheme. To facilitate the proposed development the scheme will involve the removal of some existing trees on the site.

The site is proposed to be accessed by vehicles, cyclists and pedestrians from a widened entrance on Clonliffe Road, at the junction with Jones's Road and through the opening up of an unused access point on Drumcondra Road Lower at the junction with Hollybank Rd. An additional cyclist and pedestrian access is proposed through an existing access point on Holy Cross Avenue. Access from the Clonliffe Road entrance will also facilitate vehicular access to future proposed GAA pitches and clubhouse to the north of the site and to a proposed hotel on Clonliffe Road (currently under appeal).

The proposed application includes all site landscaping works, green roofs, boundary treatments, lighting, servicing and utilities, signage, and associated and ancillary works, including site development works above and below ground.

2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

2.1 SUMMARY OF DESKTOP ASSESSMENT (CORBETT AND ANDERSON 2020)

The proposed development area is located to the north of Clonliffe Road, east of Drumcondra Road and to the south of the River Tolka. The site is currently occupied by the buildings of Holy Cross College and Diocesan Centre and associated landscaping. There are six recorded monuments within 500m of the proposed development area, in addition to one site listed in the SMR, a 18th/19th century house (DU018-019001), c. 34m east of the site (Figure 1). The closest recorded monument comprises an unclassified watermill (DU018-030) 133m to the east.

2.1.1 Prehistoric Period

Mesolithic Period (c. 7000–4000BC)

Although recent discoveries have suggested the possibility of a human presence in the southwest of Ireland as early as the Upper Palaeolithic (Dowd and Carden 2016), the Mesolithic period is the earliest time for which there is widespread evidence of human occupation of the island. During this period, small mobile groups hunted, fished and forged as a way of life. These small groups migrated seasonally in order to exploit seasonal resources and natural resources, such as the coast and river valleys were of key importance for their survival. While there is no recorded evidence of Mesolithic activity in the immediate surrounding of the proposed development area, the vicinity of the River Tolka, which lies c. 29m north of the proposed development area, would have been an attractive location for Mesolithic communities.

Neolithic Period (c. 4000–2500BC)

The Neolithic period saw the introduction and adoption of agriculture to Ireland. This represented a seismic shift in lifestyle with settlements becoming more permanent, while forests were cleared, and field boundaries constructed to facilitate farming. A new concern for claiming land on which to farm contributed to the emergence of the megalithic tomb tradition, which was characteristic of the Neolithic period. There are four main types of megalithic tombs, court cairns, portal tombs, passage tombs and the wedge tombs of the early Bronze Age. However, there are no recorded Neolithic sites in the vicinity of the proposed development area.

Bronze Age Period (c. 2500–800BC)

The Bronze Age was marked by the widespread use of metal for the first time in Ireland. As with the transition from Mesolithic to Neolithic, the transition into the early Bronze Age was accompanied by changes in society. The construction of megalithic tombs went into decline by the end of the early Bronze Age and the burial of the individual became typical. Cremated or inhumed bodies were often placed in a cist, which is a stone-lined grave, usually built of slabs set upright to form a box-like construction and capped by a large slab or several smaller lintels (Buckley and Sweetman 1991). Barrows and pit burials are also funerary monuments associated with this period. A possible ring-ditch was identified during field work c. 500m north of the site in 2009 (Licence Ref.: 09E437, Moriarty 2009; Bennett 2009:306).

Another site type thought to reveal of glimpse of domestic life at this time is the burnt mound and fulacht fia. A common site within the archaeological record, they are normally interpreted as temporary cooking sites but may have been used for other industrial or even recreational functions. They survive as low mounds of charcoal-enriched soil mixed with an abundance of heat-shattered stones. They are usually horseshoe shaped and located in low-lying areas near a water source and are often found in clusters. Even when levelled by an activity such as ploughing, they are identifiable as burnt spreads in the landscape (Brindley and Lanting 1990).

Iron Age Period (c. 800BC – AD400)
Until recently, the dearth of evidence representing the Irish Iron Age lead to the it being among the most enigmatic and least understood period in Irish prehistory. However, large scale commercial excavations carried out over the past two decades have produced large quantities of new data relating to Iron Age settlement and industry across the country.

As in Europe, two phases of the Iron Age have been proposed in Ireland; the Hallstatt and the La Tène (Raftery 1994). The Hallstatt period generally dates from 700 BC onwards and spread rapidly from Austria, across Europe, and then into Ireland. The later Iron Age or La Tène culture also originated in Europe during the middle of the 5th century BC. While evidence of the Hallstatt period was traditionally viewed as rare in Ireland, La Tène influences are clear in the Irish metalwork of the period.

There is as yet no firmly dated evidence for Iron Age activity within the immediate vicinity of the proposed development area.

2.1.2 Early Medieval Period (AD400–1100)

Settlements expanded and advanced during the early medieval period when the area now known as County Dublin straddled the ancient kingdoms of Brega (north of the River Tolka) and Laigin (south of the Tolka). A pre-Viking settlement was located at *Ath Cliath* in the 7th and 8th centuries. The Vikings set up a longphort or ship camp on the southern banks of the River Liffey in the mid-9th century which was intermittently occupied until the late 12th century.

The most common indicator of settlement during the early medieval period is the ringfort. Ringforts, (also known as rath, lios, caiseal, cathair and dún) are a type of defended homestead comprising of a central site enclosed by a number of circular banks and ditches. Ringforts are commonly located at sites with commanding views of the surrounding environs which provided an element of security. While raths, for the most part, avoid the extreme low and uplands, they also show a preference for the most productive soils (Stout 1997, 107). There were hundreds of early medieval enclosures or raths within County Dublin although none are recorded within the immediate vicinity of the proposed development area. It is possible that sites of this type were removed during suburban development in the 1970s and 1980s.

A holy well (DU018-011), dedicated St. Catherine, is recorded c. 500m northwest of the proposed development area. The veneration of wells is a very widespread and ancient tradition in Ireland. Many holy wells can be found associated with early ecclesiastical sites. Well veneration and its antecedent well worship is not confined to Ireland or even to Europe, and at least some holy wells in Ireland were important venues of pre-Christian ritual activity. Most wells are springs but occasionally other water sources, or hollowed stones which collect water, are treated as holy wells.

During the 10th century the concept of a central authority began to take root in Ireland due to the emergence of rulers sufficiently powerful to declare themselves high kings of Ireland over all lesser kings and chieftains. One of the more prominent of these was Brian Boruma (Boru) who established himself in 976 as leader of the Dalcassians from his stronghold in Kincora and went on to declare himself King of Ireland in 1002. The Vikings had largely retained the kingship of Dublin throughout the century, despite many defeats. On Good Friday 1014, a battle was fought between Mealmordha, king of Leinster, and Brian Borumha, later known as the Battle of Clontarf, in which the Vikings supported Maelmordha. It seems unlikely that the Battle of Clontarf took place in the modern district of Clontarf. The Annals of the Four Masters say it was fought 'from Tulcainn to *Ath Cliath*' and suggests isolated encounters of small groups occurred during the day over a wide area. This description is the simplest and the most accurate definition of the battlefield. *Tulcainn* was the River Tolka and *Ath Cliath* was probably located at the *Droichet Dubhgaill*, the bridge that crossed the Liffey at this time (possibly close to Augustine Street). The main action of the battle is believed to have taken place in the area bounded by O'Connell Street, Dorset Street, Drumcondra Road, the River Tolka, Ballybough Road and the North Strand (De Courcy 1996). This would place the proposed development area within the region affected by the battle.

2.1.3 Medieval Period (AD1100–1600)

The beginning of the medieval period is characterised by political unrest that originated from the death of Brian Borumha in 1014. Diarmait MacMurchadha, deposed King of Leinster, sought the support of mercenaries from England, Wales and Flanders to assist him in his challenge for kingship. Norman involvement in Ireland began in 1169, when Richard de Clare and his followers landed in Wexford to support MacMurchadha. Two years later de Clare (Strongbow) inherited the Kingdom of Leinster and by the end of the 12th century the Normans had succeeded in conquering much of the country.

Under Anglo-Norman occupation, Clonliffe was confirmed to the Abbey of St. Mary's. The grange of Clonliffe was the birthplace of an Abbot of St. Mary's Abbey, Stephen Lawless, who ruled the abbey from 1429–1437. After the dissolution of the religious houses in 1537 by King Henry VIII, the Grange of Clonliffe was granted in common with other possessions of the Abbey to Walter Peppard (Ball 1920). The property was estimated to contain 150 cares with a messuage. In 1611 the Grange was granted to the Crown and is believed to contain over 200 acres, as well as a messuage, three cottages and a mill (Ball 1920). In the Commonwealth Civil Survey conducted in 1654–1656, the Grange of Clonliffe is recorded as including 250 acres and was in the possession of Viscount Moore. In the early 18th century the Grange became the residence of Tristram Fortick.

Two castles are recorded within 500m of the proposed development area. A castle (DU018-017, 377m northeast) was recorded on maps during the early 19th century; however, no surface remains of the castle exist today. Drumcondra Castle (DU018-015001, 490m north) was built in the 16th century on the present site of St. Joseph's Asylum for the Blind. Part of the 16th castle walls are located at ground floor level in the current building, it is intact at semi-basement/ground level where it currently forms part of the kitchen.

2.1.4 Post-medieval Period (AD1600-1900)

Post-medieval settlement and activity in the wider area can be seen to the northwest of the proposed development area. Belvedere House (DU018-012001, 490m north northwest) dates to the 17th century and is incorporated into St. Patrick's Training College. This house was originally the seat of the Coghill family before being leased to Henry Singleton in 1725, who carried out a number of renovations and additions to the building.

A post-medieval graveyard is located 470m north of the potential development site (DU018-013002) and is associated with the Church of St. John the Baptist (DU018-013001) directly to the north. It is believed the Church may be built on the site of a medieval foundation associated with the Priory of All Saints. A watermill (DU018-030) is recorded c. 133m east of the proposed development area. It is depicted on historic mapping as early as Taylors map of 1816 (Figure 3) and had fallen out of use by the OS map of 1906–9 (Figure 4).

The 18th and early 19th centuries saw a dramatic rise in the establishment of large residential houses around the country. The large country house was only a small part of the overall estate of a wealthy landowner and provided a base to manage an estate that could be spread nationwide. During the 17th century, lands associated with the large houses were generally formal gardens, which were much the style of continental Europe. Gradually the formal avenues and geometric garden designs were replaced during the mid-18th century by the adoption of parkland landscapes – to be able to view a large house within a natural setting. Although the creation of a parkland landscape involved working with nature, rather than against it, considerable constructional effort went into their creation. Earth was moved, field boundaries disappeared, streams were diverted to form lakes and quite often roads were completely diverted to avoid travelling anywhere near the main house or across the demesne. The proposed development area is shown in the first edition OS map of 1843, as forming part of the demesne lands associated with Clonliffe House (Figure 4).

2.2 SUMMARY OF PREVIOUS ARCHAEOLOGICAL FIELDWORK

A review of the Excavations Bulletin (1970–2019) and available excavation reports has revealed that six archaeological investigations have taken place within the surrounding landscape, three of which revealed archaeological remains.

Monitoring carried out during the River Tolka Flood Alleviation Scheme in 2003 (Licence Ref.: 03E0079, McCulllogh 2003, Bennett 2003:490) revealed evidence relating to

Distillery Weir and its associated Clonliffe Mill complex to the north of the site, on the south bank of the Tolka River. The house foundations of Tolka Park Cottages were also uncovered.

Testing at 185–189 Richmond Road, 360m northwest of the site (Licence Ref.: 03E0615, Lynch 2003) revealed archaeological features below the level of 19th century cellars, however it was not clear how extensive these were, or what period they dated from.

Geophysical survey and testing carried out at Drumcondra castle and demesne, c. 500m north of the site in 2009 (Licence Ref.: 09E437, Moriarty 2009; Bennett 2009:306) revealed evidence for prehistoric activity, including a ring-ditch. Possible medieval activity associated with the castle (DU018-015001), as well as post-medieval agricultural activity was also revealed.

The following archaeological investigations did not reveal anything of archaeological significance.

TABLE 1: Archaeological investigations

LICENCE NO.	LOCATION	REFERENCE
03E1067	Distillery Road, 80m east	Phelan 2003, Bennett 2003:521
06E0729	Waterfall Avenue, 290m northeast	Walsh 2006, Bennett 2006:597
98E0604	St. Patrick's College, 500m north-northwest	Byrne 1998

2.3 CARTOGRAPHIC ANALYSIS

John Rocque's Map of the City and County of Dublin, 1760 (Figure 6)
This map shows the proposed development area in some detail, with the area occupied by agricultural fields to the east of Drumcondra Road. Clonliffe Road is named 'Fortick Lane' on this map and leads from Drumcondra Road towards a structure, most likely DU018-019001. The area surrounding the structure is named 'Fortick's Grove', with an orchard and formal gardens also illustrated. A mill race can be seen extending from the River Tolka, to the northeast of the structure, however there is no evidence for a mill on this map. A small number of structures are also located fronting on to Drumcondra Road.

John Taylor's Map of the Environs of Dublin 1816 (Figure 6)
By 1816 Clonliffe Road appears to have been formalized, though it is not labelled as such. House (DU018-019001) is now called 'Clonliffe House', the mill at Clonliffe is now named (DU018-030), as is a weir along the Tolka. A number of structures have also been built off Clonliffe Road and Drumcondra Road.

First Edition Ordnance Survey Map, 1843, scale 1:10,560 (Figure 7)
The proposed development area is located across the demesne of Clonliffe House, which includes an orchard located across the central area of the site. The house itself is located outside of the development area, to the immediate east, while further

buildings are located to the south, fronting on to Clonliffe Road, as per the previous mapping. To the south of Clonliffe House, within the development area, is an area of planting, less formal than the orchard to the west.

The mill (DU018-030) to the east of the proposed development area is clearly labelled, as is the associated mill pond and mill race.

Ordnance Survey Map, 1888, scale 1:1,056
By the publication of the 1888 OS map, Holy Cross College had been constructed at the center of the site, across the area once occupied by the orchard. A Roman Catholic chapel has also been constructed at the southern end of the college. Gardens and pathways can be seen to the east and west of the college buildings.

Some of the structures associated with Clonliffe House, as shown on the 1843 map, have been demolished, while Clonliffe corn mill (DU018-030) is now recorded as a paper mill.

Ordnance Survey Map, 1906–9, scale 1:2,500 (Figure 7)
No significant changes are noted across the proposed development area on this map. Clonliffe paper mill is now recorded as a Colour Printing Works.

2.4 SUMMARY OF GEOPHYSICAL RESULTS

A geophysical survey was carried out by JM Surveys under licence 20R0046 in March 2020 (Figure 3; Leigh 2020). The dataset was largely dominated by modern ferrous responses and disturbance from multiple buildings, landscaping, and modern services. This may obscure any response from potential archaeological remains in these areas. Several possible former field divisions were identified, some of which correlate with field boundaries depicted on historic mapping. Faint linear trends are suggestive of former agricultural activity, possibly associated with the extant field boundaries.

2.5 AERIAL PHOTOGRAPHIC ANALYSIS

Inspection of the aerial photographic coverage of the potential development areas held by the Ordnance Survey (1995-2013), Google Earth (2002–2019), and Bing Maps (2020) failed to identify any additional or previously unknown archaeological features.

Aerial photographic analysis has shown that the central potential development area is largely occupied by standing buildings of Holy Cross College and Diocesan Centre, while the remainder of the areas are occupied by green field and small pockets of planting and woodland.

2.6 TOPOGRAPHICAL FILES

Information on artefact finds from the study area in County Dublin has been recorded by the National Museum of Ireland since the late 18th century. Location information relating to these finds is important in establishing prehistoric and historic activity in the study area.

There are no recorded stray finds from the vicinity of the proposed development area.

2.7 CITY DEVELOPMENT PLAN

The Dublin City Development Plan 2016–2022 recognises the statutory protection afforded to all RMP sites under the National Monuments Legislation (1930–2014). The plans list a number of aims and objectives in relation to archaeological heritage (Appendix 3). It is the objective of the council to protect and preserve (in-situ, or at a minimum, preservation by record) all known sites and features of historical and archaeological interest and all sites and features of historical interest discovered subsequent to the publication of the Record of Monuments and Places.

There are six recorded monuments within 500m of the proposed development area, in addition to one site listed in the SMR (Table 2). Further information on these sites can be found in Appendix 2.

TABLE 2: Archaeological Sites

RMP/SMR NO.	LOCATION	CLASSIFICATION	DISTANCE FROM DEVELOPMENT	RMP STATUS
DU018-019001	Holy Cross College	House – 18th/19th century	34m east	No
DU018-030	Distillery Road	Watermill – unclassified	133m east	Yes
DU018-017	Richmond Road	Castle - unclassified	377m northeast	Yes
DU018-013002	Church Avenue	Graveyard	470m north	Yes
DU018-012001	Drumcondra Road Upper	House – 16th/17th century	490m north-northwest	Yes
DU018-015001	Grace Park Road	Castle – unclassified	490m north	Yes
DU018-011	Griffith Park	Ritual site – holy well	500m northwest	Yes

3 ARCHAEOLOGICAL TESTING

3.1 GENERAL

Test trenching took place between 6-8 July 2020, using a 13 tonne 360 degree tracked excavator equipped with a flat, toothless bucket under strict archaeological supervision. Any investigated deposits were preserved by record. This was by means of written, drawn and photographic records.

A total of 24 trenches were excavated across the site measuring 808 linear metres (Figure 4). The findings of each trench are outlined in Appendix 1, and a brief list of contexts is included in Appendix 2.

The test trenches were excavated to determine, as far as reasonably possible, the location, extent, date, character, condition, significance and quality of any surviving archaeological remains threatened by the proposed development. Test trenching was also carried out to clarify the nature and extent of existing disturbance and intrusions and to assess the degree of archaeological survival in order to formulate further mitigation strategies. These are designed to reduce or offset the impact of the proposed development scheme.

3.2 TESTING RESULTS

Much of the lands (Trenches 1-16) were characterised by well-kept lawns with topsoil ranging in depth from 0.10-0.15m. The same trenches were also characterised by a light brown sandy soil with modern pottery of various depths, possibly indicating an infill, under the topsoil. The exposed natural clay comprised a sterile light brown soil over a limestone boulder clay. Trenches 12 and 13 included recent fills of rubble / debris deposited for the purposes of providing a level surface for the lawn areas.

Trenches 17-24 in the northern portion of the site comprised shallow deposits of the light sandy clay overlying limestone boulder clay. In some instances, the latter clays were much denuded, and the natural limestone rose close to the surface.

Archaeological Features

No discernible archaeological features were identified on the site.

Non-Archaeological Features

The main body of trenches yielded some isolated drains and field boundaries, while some indications of furrows and agricultural activity were seen in the northern field. Few remains of animal bone were recovered, suggesting that the lands were set aside for pasture rather than tillage. In general, the site yielded few remains of modern activity. Trench 6 yielded what was probably the remains of a natural water course. Trench 12 included the base of a large structure likely from the 19th or 20th century (Figure 5).

3.3 CONCLUSIONS

The proposed development area is located to the north of Clonliffe Road, east of Drumcondra Road and to the south of the River Tolka. The site is currently occupied by the buildings of Holy Cross College and Diocesan Centre and associated landscaping. There are six recorded monuments within 500m of the proposed development area, in addition to a site listed in the SMR, a 18th/19th century house (DU018-019001), c. 34m east of the site. The close proximity of the River Tolka lends archaeological potential to the proposed development area, particularly with regards to prehistoric archaeology.

Medieval activity was also noted at this site. The grange at Clonliffe is recorded during the medieval period and Clonliffe House (DU018-019001), located to the east of the site, may be the location of the original medieval messuage. A medieval castle (DU018-015001), dating to the 16th century is also located to the north, at Drumcondra.

Evidence for post-medieval activity is more prevalent across the landscape. While the landscape was located outside of the city boundary during the mid-19th century, expansion during the second half of that century led to the establishment of the area as a suburb of the city by the early 20th century.

A geophysical survey carried out at the site revealed a dataset largely dominated by modern ferrous responses and disturbance from multiple buildings, landscaping, and modern services. Several possible former field divisions were identified, some of which correlate with field boundaries depicted on historic mapping. Faint linear trends are suggestive of former agricultural activity, possibly associated with the extant field boundaries.

The cumulative evidence of the geophysical survey, historical analysis, and the archaeological testing suggest that the lands were largely devoid of human settlement and were utilised for pasture rather than tillage in the early modern period. Field boundaries can be discerned in the historic maps of the site, and some of them were reflected in the findings of the archaeological test excavations.

The northern trenches demonstrated the shallow accumulation of topsoils, suggesting the lands were probably prone to flooding from the nearby Tolka River.

4 IMPACT ASSESSMENT AND MITIGATION STRATEGY

Impacts can be identified from detailed information about a project, the nature of the area affected and the range of archaeological resources potentially affected. Archaeological sites can be affected adversely in a number of ways: disturbance by excavation, topsoil stripping; disturbance by vehicles working in unsuitable conditions; and burial of sites, limiting access for future archaeological investigation.

4.1 IMPACT ASSESSMENT

- Although no archaeological features were recovered, there remains the possibility that more isolated archaeological features and artefacts could exist given the strategic position of the site, its proximity to Dublin, the Tolka, and the purported site of the battle of Clontarf.

- There may therefore be an adverse impact on previously unrecorded archaeological feature or deposits that have the potential to survive beneath the current ground level. This will be caused by ground disturbances associated with the proposed development.

4.2 MITIGATION

We recommend the following actions in mitigation of the impacts above.

- It is recommended that all ground disturbances associated with the proposed development be monitored by a suitably qualified archaeologist. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation *in-situ* or by record. Any further mitigation will require approval from the National Monuments Service of the DoCHG and Dublin City Council Archaeologist.

It is the developer's responsibility to ensure full provision is made available for the resolution of any archaeological remains, both on site and during the post excavation process, should that be deemed the appropriate manner in which to proceed.

Please note that all recommendations are subject to approval by the National Monuments Service of the Heritage and Planning Division, Department of Culture, Heritage and the Gaeltacht.

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ELECTRONIC SOURCES

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www.osiemaps.ie – Ordnance Survey aerial photographs dating to 1995, 2000 & 2005; and 6-inch/25-inch maps.

www.heritagemaps.ie – The Heritage Council web-based spatial data viewer which focuses on the built, cultural and natural heritage around Ireland and off shore.

www.googleearth.com – Satellite coverage of the proposed development area

www.bingmaps.com – Satellite coverage of the proposed development area

www.archaeology.ie – DoCHG website listing all SMR sites.

www.logainm.ie – Placenames Database of Ireland launched by *Fiontar agus Scoil na Gaelige* and the DoCHG.

APPENDICES

APPENDIX 1 TRENCH RESULTS

TRENCH	LENGTH (m)	WIDTH (m)	DEPTH (m)	ORIENTATION	DETAILS
1	30	2	0.45	North-south	No Archaeology found.
2	30	2	0.3	North-south	No Archaeology found. No geophysical anomalies targeted.
3	30	2	0.50	West-east	No archaeology found. Sub-circular pit of burnt clay and iron slag with mortar and modern pottery.
4	15	2	0.5	North-south	No Archaeology found. Field boundary identified
5	15	2	0.8	Southeast-north west	No Archaeology found. The targeted geophysical anomaly proved to be a narrow wall base of red-brick and concrete.
6	60	2	0.95	Southwest-north east	No Archaeology found. Modern ceramic drain uncovered in south portion. An elongated gully with irregular sides 0.80m wide, 0.25m deep field boundary filled with sterile grey brown clay.
7	30	2	0.7	Southwest – north east	No Archaeology found. A stone drain with large granite flags was uncovered running the length of the trench. Shallow ditch with dark brown clay. No geophysical anomalies targeted.
8	30	2	0.6	East-west	No archaeology found.
9	30	2	053	North–south	Shallow concave gully 0.30m wide 0.08m depth filled with loose friable dark brown clay.
10	19.25	2	0.80	North-south	Includes two shallow gullies 0.30m wide 0.25m depth filled with sterile sticky light brown clay, possible water courses.
11	24	2	0.65	East -west	Small drain feature with sterile brown soil fill with clay pipe fragment.
12	28.5	2	1.15	North-south	Cut in two portions. South portion – no archaeology found North portion – Construction cut filled with mortar, coal and red brick below a deep deposit of construction rubble laid to level the grassed area. Cut was revealed for 3.30m east-west, and a test excavation 0.20 cut by hand revealed a depth of 0.30m. Cut was recovered 1.70m below the grassed surface. Non archaeological.
13		2	1.50-2.00	East-west	Cut in 2 portions: Both portions substantially filled with rubble. No archaeology found.
14	30	2	0.80	East -west	No archaeology found
15		2	1.45	East-west	No archaeology found
16		2	1.35	East-west	No archaeology found

TRENCH	LENGTH (m)	WIDTH (m)	DEPTH (m)	ORIENTATION	DETAILS
17	14.80	2	0.85	Northwest-southeast	Numerous furrows cut into the natural boulder clay 0.15m wide, less than 0.05m depth filled with animal bone shell, likely to be modern. Non archaeological.
18		2	0.35	North-south	No archaeology found.
19		2	0.55	North south	Numerous parallel shallow gullies. Non archaeological.
20		2	0.55	North-south	Numerous parallel gullies. Non archaeological.
21		2	0.40	North-south	No archaeology found
22		2	0.40	Northwest-southeast	No archaeology found
23		2	0.30	Northwest – Southeast	Shallow trench fill with gravel. Non-Archaeological
24		2	0.70	North-south	No archaeology found.

APPENDIX 2 CONTEXTS

CONTEXT NO.	TRENCH NO.	DESCRIPTION
1	1-24	Brown sandy friable loose soil - Topsoil
2	1-24	Light brown sandy natural clay
3	3	Sub circular pit
4	3	Fill pf C3 Pit with iron slag and modern pottery
5	4	Shallow ditch
6	4	Fill of C5 ditch
7	5	Modern wall base
8	6	Ceramic drain
9	6	Filled water course?
10	12	Large construction cut with mortar fill

APPENDIX 3 RMP SITES WITHIN THE SURROUNDING AREA

SMR NO.:	DU018-019001
RMP STATUS:	Scheduled for inclusion in the next revision of the RMP
TOWNLAND:	Clonliffe West
PARISH:	North William Street
BARONY:	Dublin
I.T.M.:	716452
CLASSIFICATION:	House - 18th/19th century
DIST. TO SITE:	34m east
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. Date uncertain.
REFERENCE:	www.archaeology.ie/ SMR file

SMR NO.:	DU018-030
RMP STATUS:	Scheduled for inclusion in the next revision of the RMP
TOWNLAND:	N/A
PARISH:	North William St
BARONY:	Dublin
I.T.M.:	716594
CLASSIFICATION:	Water mill - unclassified
DIST. TO SITE:	133m east
DESCRIPTION:	No information available
REFERENCE:	www.archaeology.ie/ SMR file

SMR NO.:	DU018-017
RMP STATUS:	Scheduled for inclusion in the next revision of the RMP
TOWNLAND:	Fairview
PARISH:	Marino
BARONY:	Dublin
I.T.M.:	716796
CLASSIFICATION:	Castle - unclassified
DIST. TO SITE:	377m northeast
DESCRIPTION:	Duncan's 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.:	DU018-013002
RMP STATUS:	Scheduled for inclusion in the next revision of the RMP
TOWNLAND:	Drumcondra
PARISH:	Marino
BARONY:	Dublin

I.T.M.:	716425
CLASSIFICATION:	Graveyard
DIST. TO SITE:	470m north
DESCRIPTION:	Attached to the Church of St. John the Baptist (1734) on the grounds of All Hallows College. The Church of St. John the Baptist was built on the site of a medieval foundation associated with the Priory of All Saints (DU018-013001-). After the Dissolution of the priory a small church dedicated to St. Margaret was erected (Ball 1920, 6 182-183). The antiquarian Francis Grosse and James Gandon, the architect are buried in the graveyard.
REFERENCE:	www.archaeology.ie/ SMR file

SMR NO.:	DU018-012001
RMP STATUS:	Scheduled for inclusion in the next revision of the RMP
TOWNLAND:	Drishoge
PARISH:	Drumcondra
BARONY:	Dublin
I.T.M.:	716096
CLASSIFICATION:	House - 16th/17th century
DIST. TO SITE:	490m north-northwest
DESCRIPTION:	St. Patrick's Training College incorporates Belevedere House, a 17th century house with 18-19th century additions. The Civil survey (1654-6) describes the former as a 'faire brick house, slated on the lands of James Bath of Drumconragh, at Drishoge' (Simington 1945, 180). This was the seat of the Coghill family, Sir John Coghill, Master in Chancery, resided here in the late 17th century (Joyce 1912, 256-257). In 1725 Belvedere house was leased to Henry Singleton, a Drogheda lawyer who undertook a programme of building and renovation including the addition of a drawingroom at the rear of the building (Ó'Ceallaigh 1975, 14). The present building is two storey, 7 bay, over sunken basement with a break front, and 2 bay thick in back. Built of an inner and outer wall of brick with a rubble core (T. 0.60m). Brickwork is 17th century to first floor level when it changes indicating that the first floor was re-built or is probably a later addition. The mountain granite quions are also more widely spaced at first floor level to incorporate the larger brick. Belvedere House is lit by flush sash windows with moulded sills that are pre- 1730 (flush sash windows were made illegal in the 1720's and were out of fashion by 1730 because they resulted in wood decay). The front balustrade was added at the turn of the 18th century probably to replace a pediment. Hall and chambers in the front retain a number of original 17th century features, including bolection panelling dating to c. 1660's, tall doorways, relatively thin doors and pannelling over windows with window seats. A drop beam running across the ground floor ceiling maybe the original roof joist. The rear of the house was modified in the 18th century to incorporate a staircase and circular roof light. The upper floor contains two suites of rooms with plain and decorated cornices of early 18th century date. Belvedere House compares favourably with the 17th century phase of Eyrecourt Castle, Co. Galway (O'Connell & Loeber 1988, 40-48).
REFERENCE:	www.archaeology.ie/ SMR file

SMR NO.:	DU018-015001
RMP STATUS:	Scheduled for inclusion in the next revision of the RMP
TOWNLAND:	Richmond
PARISH:	Fairview

BARONY:	Dublin
I.T.M.:	716629
CLASSIFICATION:	Castle - unclassified
DIST. TO SITE:	490m north
DESCRIPTION:	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 cane 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 cabbins. 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).
REFERENCE:	www.archaeology.ie/ SMR file

SMR NO.:	DU018-011
RMP STATUS:	Scheduled for inclusion in the next revision of the RMP
TOWNLAND:	Drishoge
PARISH:	Drumcondra
BARONY:	Dublin
I.T.M.:	715746
CLASSIFICATION:	Ritual site - holy well
DIST. TO SITE:	500m northwest
DESCRIPTION:	Located on the main walk through Griffith Park, c. 70m N of the footbridge across the Tolka. This well was formerly within an enclosed yard of a house at Millbourne Avenue. It was a natural spring under the kitchen floor and led by a short culvert to the outside where it was accessible under a pointed arched superstructure. The water was used to cure sore eyes and toothache (Anon 1928, 159-161; Ó Danachair 1958, 233). This house was demolished and the well is preserved in an ornamental shrubbery.
REFERENCE:	www.archaeology.ie/ SMR file

APPENDIX 4 LEGISLATION PROTECTING THE ARCHAEOLOGICAL RESOURCE

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 Culture, Heritage and the Gaeltacht) 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 Development Plan 2016–2022

It is the Policy of Dublin City Council:

CHC9: To protect and preserve National Monuments.

1. To protect archaeological material in situ by ensuring that only minimal impact on archaeological layers is allowed, by way of the re-use of buildings, light buildings, foundation design or the omission of basements in the Zones of Archaeological Interest.

2. That where preservation in situ is not feasible, sites of archaeological interest shall be subject to 'preservation by record' according to best practice in advance of redevelopment.

3. That sites within Zones of Archaeological Interest will be subject to consultation with the City Archaeologist and archaeological assessment prior to a planning application being lodged.

4. That the National Monuments Service will be consulted in assessing proposals for development which relate to Monuments and Zones of Archaeological Interest.

5. To preserve known burial grounds and disused historic graveyards, where appropriate, to ensure that human remains are re-interred, except where otherwise agreed with the National Museum of Ireland.

6. That in evaluating proposals for development in the vicinity of the surviving sections of the city wall that due recognition be given to their national significance and their special character.

7. To have regard to the Shipwreck inventory maintained by the DAHG. Proposed developments that may have potential to impact on riverine, inter-tidal and sub-tidal environments shall be subject to an underwater archaeological assessment in advance of works.

8. To have regard to DAHG policy documents and guidelines relating to archaeology.

It is an Objective of Dublin City Council:

CHCO10:

1. To implement the archaeological actions of the Dublin City Heritage Plan 2002-6 in light of the Dublin City Heritage Plan Review 2012.

2. To prepare and implement conservation plans for National Monuments and Monuments in DCC care (City Walls, St Luke's Church, St James's Graveyard, St. Thomas's Abbey, St Canice's Graveyard etc).

3. To maintain, develop and promote the Dublin City Archaeological Archive (DCAA) at Pearse Street Library and Archives.

4. To ensure the public dissemination of the findings of licensed archaeological activity in Dublin through the Dublin County Archaeology GIS.

5. To develop a long-term management plan to promote the conservation, management and interpretation of archaeological sites and monuments and to identify areas for strategic research.

6. To have regard to the city's industrial heritage and Dublin City Industrial Heritage Record (DCIHR) in the preparation of Local Area Plans (LAPs) and the assessment of planning applications and to publish the DCIHR online. To review the DCIHR in accordance with Ministerial recommendations arising from the national Inventory of Architectural Heritage (NIAH) survey of Dublin City and in accordance with the Strategic Approach set out in Section 11.1.4 of this Chapter

7. To promote awareness of, and access to, the city's archaeological inheritance and foster high-quality public archaeology.

8. To promote archaeological best practice in Dublin city.

9. To promote the awareness of the international significance of Viking Dublin and to support post-excavation research into the Wood Quay excavations 1962-81.

10. To develop a strategy for the former Civic Museum collection and for other collections of civic interest and importance.

11. To investigate the potential for the erection of Columbarium Walls.

12. To support the implementation of the Kilmainham Mill Conservation Plan.

13. Dublin City Council will seek to work with Diageo to undertake a more comprehensive industrial heritage survey of the constituent historic buildings within the Guinness Brewery complex at Saint James's Gate.

14. To implement and promote The Dublin Principles (ICOMOS, 2011) as guiding principles to assist in the documentation, protection, conservation and appreciation of industrial heritage as part of the heritage of Dublin and Ireland.

15. To continue to implement actions of the Saint Luke's Conservation Plan on the basis of funds available to conserve the monument, recover the graveyard, provide visitor access, improve visual amenity and secure an appropriate new use.

APPENDIX 5 IMPACT ASSESSMENT & THE CULTURAL HERITAGE RESOURCE

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 2003: 31). 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 6 MITIGATION MEASURES & THE CULTURAL HERITAGE RESOURCE

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

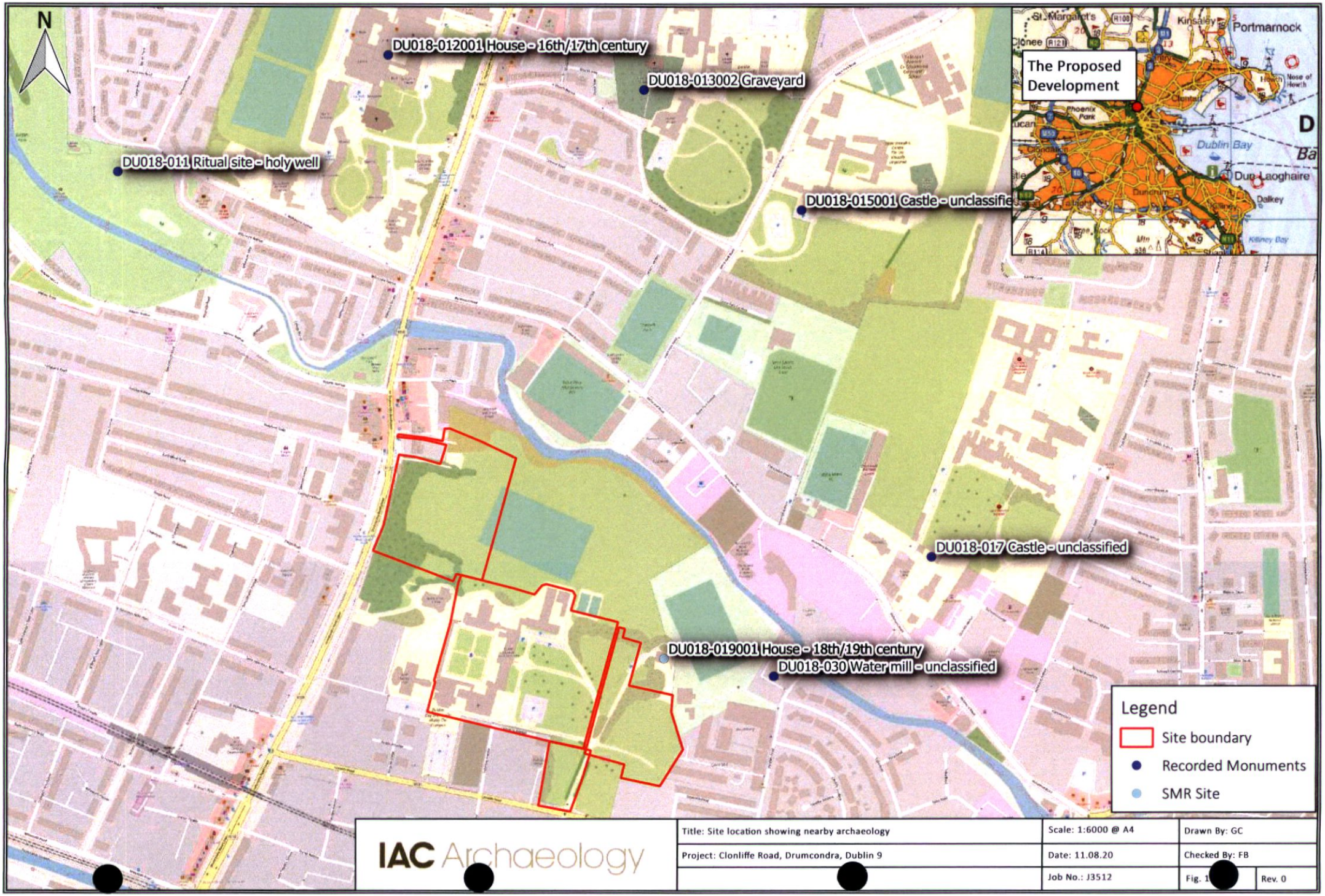
ARCHAEOLOGICAL RESOURCE

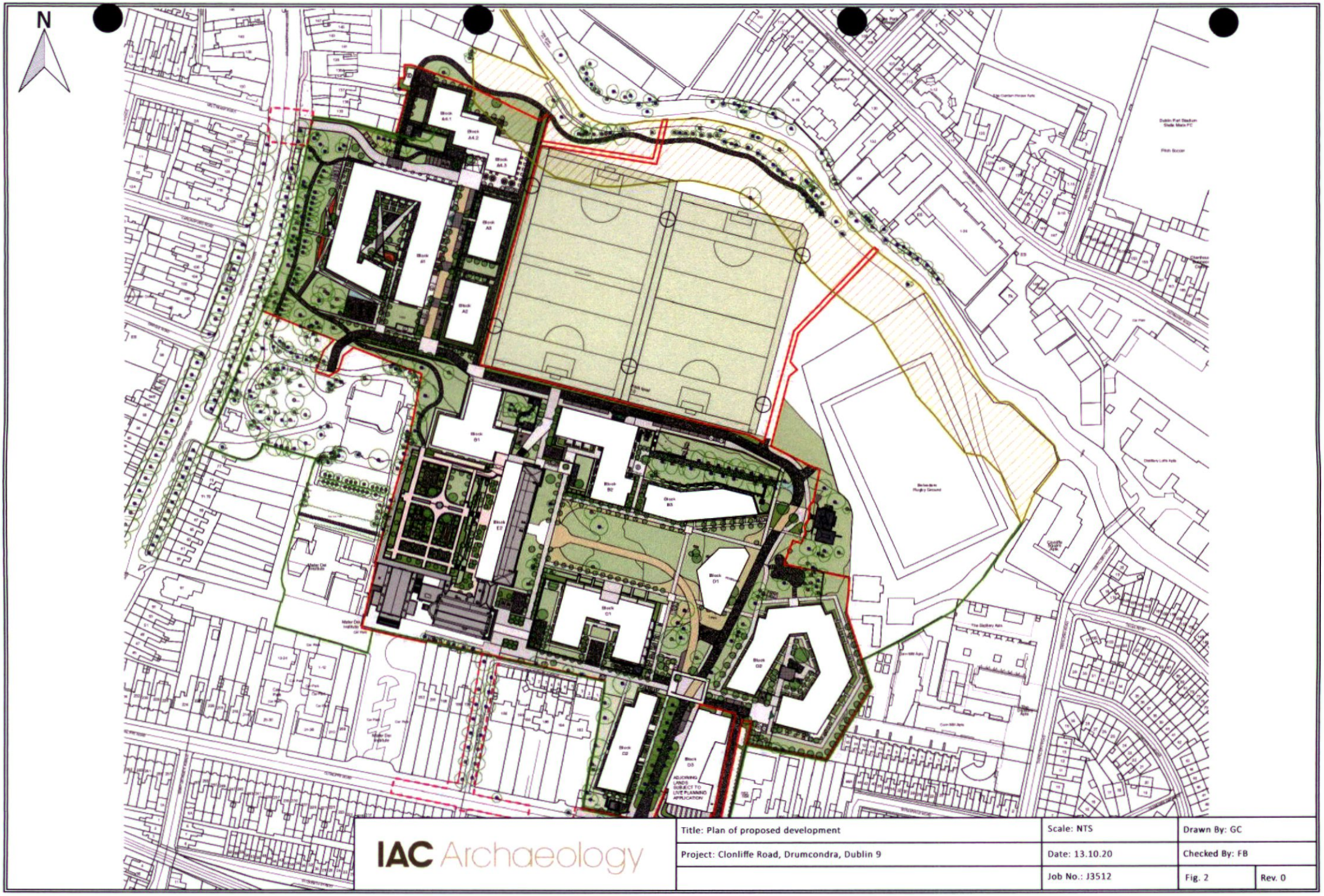
The ideal mitigation for all archaeological sites is preservation *in situ*. This is not always a practical solution, however. Therefore, a series of recommendations are offered to provide ameliorative measures where avoidance and preservation *in situ* are not possible.

Full Archaeological Excavation involves the scientific removal and recording of all archaeological features, deposits, and objects to the level of geological strata or the base level of any given development. Full archaeological excavation is recommended where initial investigation has uncovered evidence of archaeologically significant material or structures and where avoidance of the site is not possible. (CIfA 2014b)

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 or underwater. If such archaeological remains are present test trenching defines their character and extent and relative quality.' (CIfA 2014a)

Archaeological Monitoring can be defined as a 'formal programme of observation and investigation conducted during any operation carried out for non-archaeological reasons within a specified area or site on land or underwater, where there is possibility that archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report and ordered archive.' (CIfA 2014c)


N
DU018-012001 House - 16th/17th century
DU018-013002 Graveyard
DU018-011 Ritual site - holy well
DU018-015001 Castle - unclassifie
DU018-017 Castle - unclassified
DU018-019001 House - 18th/19th century
DU018-030 Water mill - unclassified
The Proposed Development
Portmarnock
Dublin Bay
Dun Laoghaire
Dalkey
Legend
Site boundary
Recorded Monuments
SMR Site
IAC Archaeology
Title: Site location showing nearby archaeology
Project: Clonliffe Road, Drumcondra, Dublin 9
Scale: 1:6000 @ A4
Date: 11.08.20
Job No.: J3512
Drawn By: GC
Checked By: FB
Fig. 1
Rev. 0

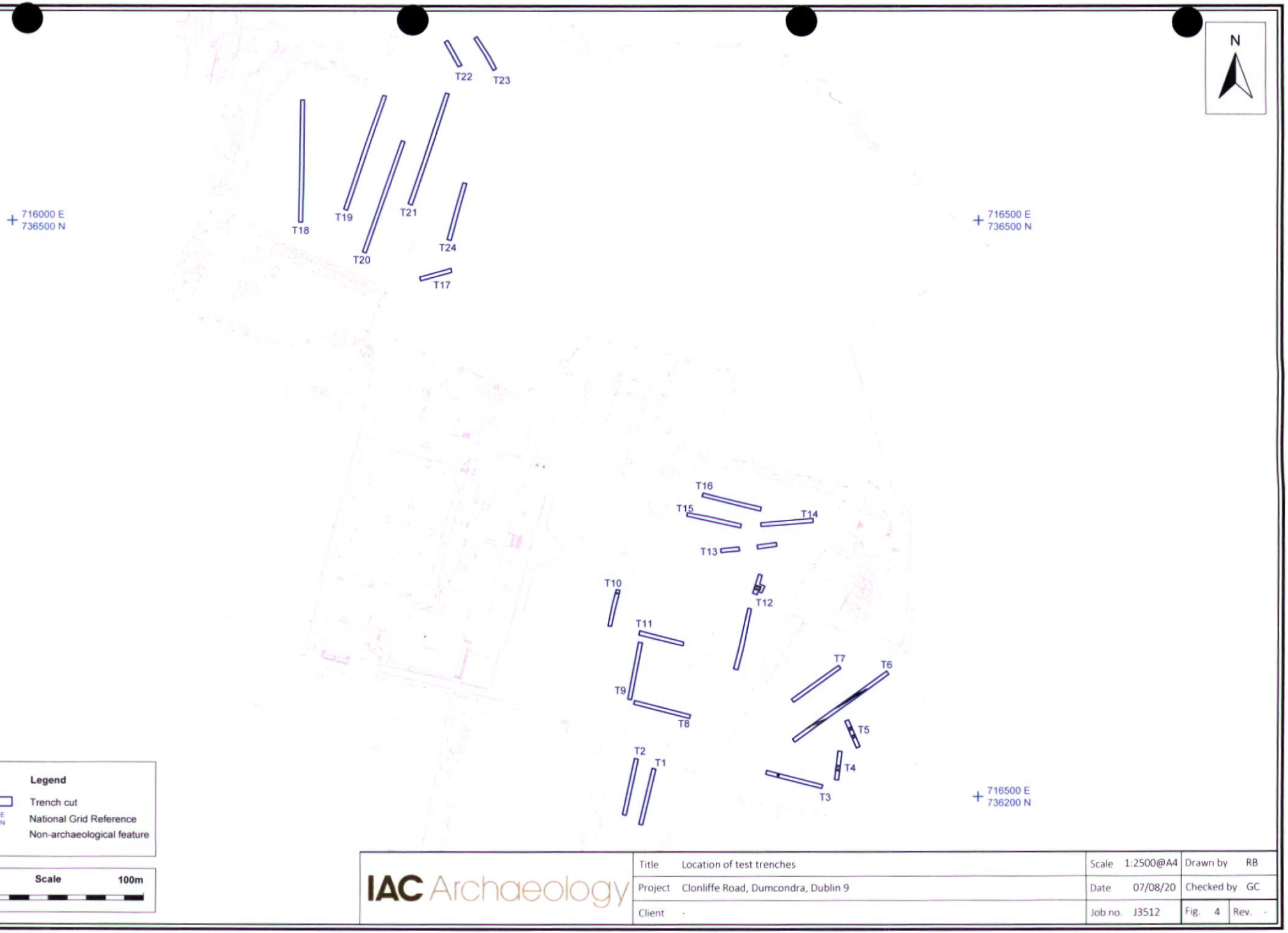


IAC Archaeology

Title: Plan of proposed development	Scale: NTS	Drawn By: GC	
Project: Clonliffe Road, Drumcondra, Dublin 9	Date: 13.10.20	Checked By: FB	
	Job No.: J3512	Fig. 2	Rev. 0

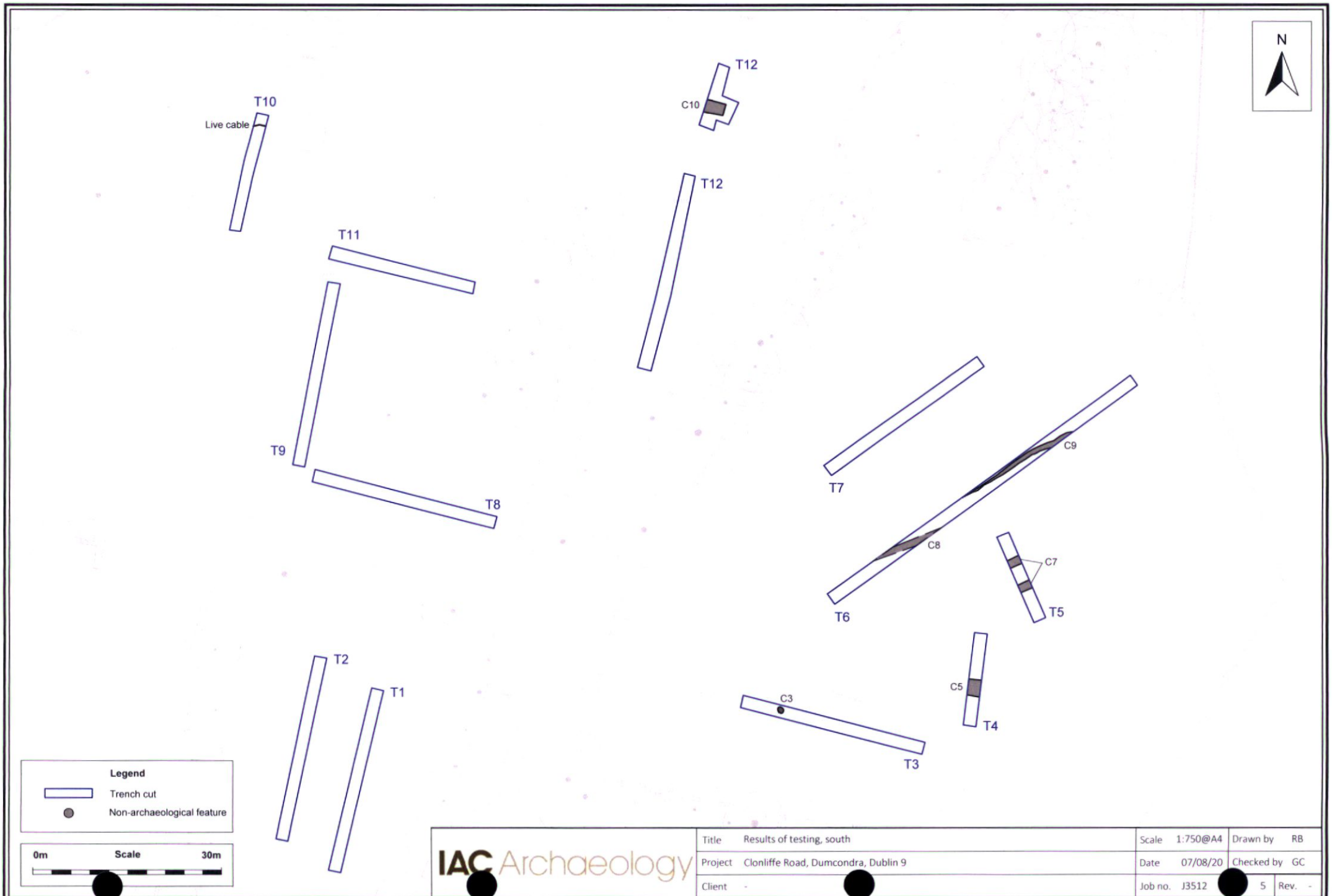


IAC Archaeology	Title: Results of geophysical survey showing location of excavated trenches	Scale: 1:2000 @ A4	Drawn By: GC
	Project: Clonliffe Rd, Drumcondra, Dublin 9	Date: 28.04.2020	Checked By: FB
		Job No.: J3512	Fig. 3 / Rev. 0



IAC Archaeology

Title	Location of test trenches	Scale 1:2500@A4	Drawn by RB
Project	Clonliffe Road, Dumcondra, Dublin 9	Date 07/08/20	Checked by GC
Client	-	Job no. J3512	Fig. 4 Rev. -



IAC Archaeology

Title	Results of testing, south	Scale	1:750@A4	Drawn by	RB
Project	Clonliffe Road, Dumcondra, Dublin 9	Date	07/08/20	Checked by	GC
Client	-	Job no.	J3512	5	Rev. -

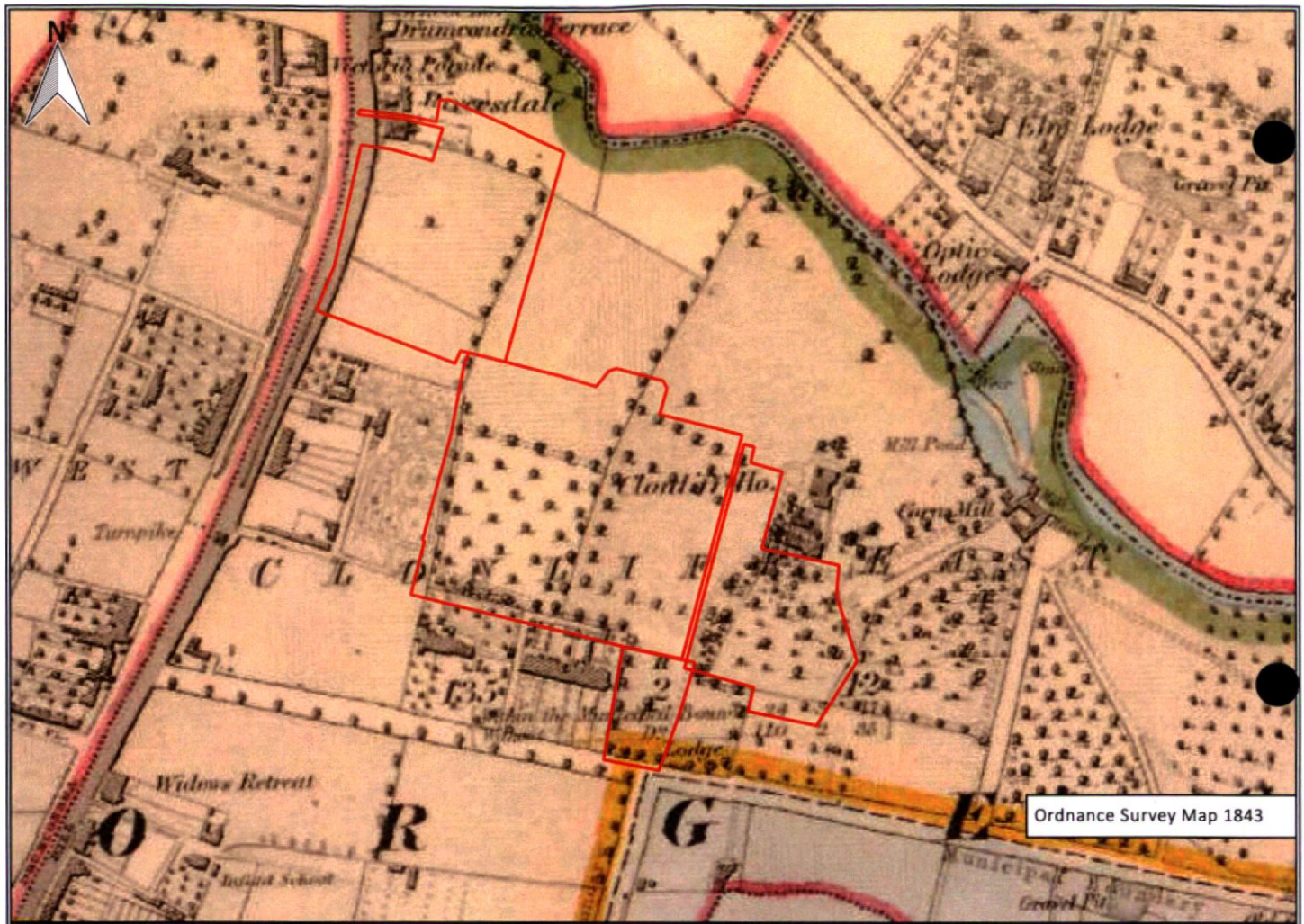


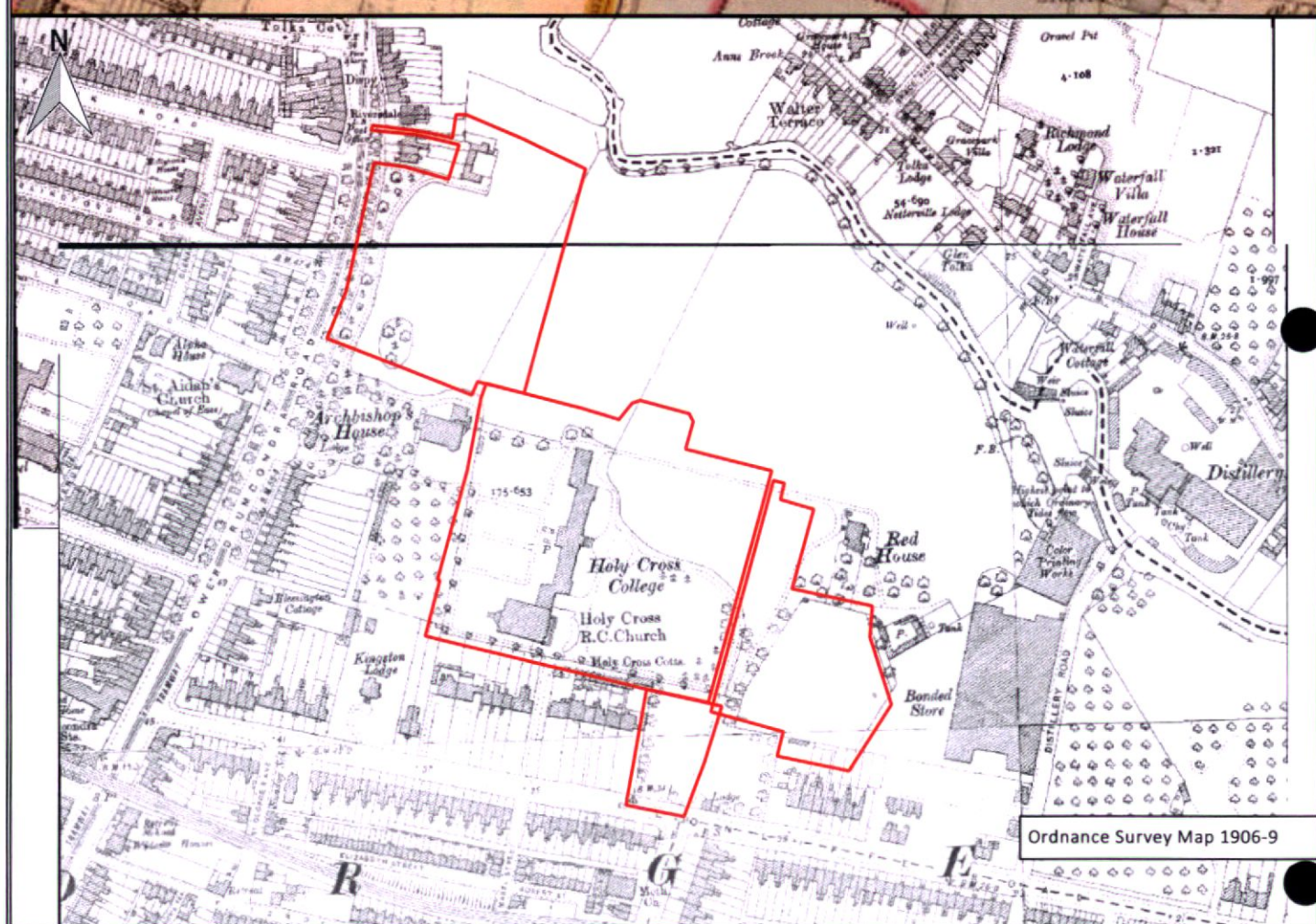
Extract of John Rocque's Survey of Dublin 1757



Taylor's Map of Dublin, 1816

IAC Archaeology	Title: Extract of John Rocque's Survey of Dublin 1757 & Taylors Map of Dublin 1816	Scale: NTS	Drawn By: GC
	Project: Clonliffe Road, Drumcondra, Dublin 9	Date: 11.08.2020	Checked By: FB
		Job No.: J3512	Fig. 6 / Rev. 0





IAC Archaeology	Title: Extracts from the first edition OS map (1843) 25-inch OS map (1905-09) showing the proposed development	Scale: NTS	Drawn By: GC
	Project: Clonliffe Road, Drumcondra, Dublin 9	Date: 11.08.2020	Checked By: FB
		Job No.: J3512	Fig. 7 / Rev. 0



Plate 1 Southern end of site, facing north west



Plate 2 Eastern side of site, facing north east



Plate 3 Drain in Trench 7, facing north



Plate 4 Trench 12, construction cut and mortar fill of modern structure



Plate 5 Trench 19, facing north



Plate 6 Trench 22, facing south

Appendix 16.3: SMR/RMP within the study area

Appendix 16.3: SMR/RMP within the study area

SMR No.	DU018-019001
Townland	Clonliffe West
Parish	North William Street
Barony	Dublin
I.T.M	716452 736336
Classification	House - 17th/18th century
Dist. From Development	To the immediate east
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

SMR No.	DU018-030
Townland	N/A
Parish	North William St
Barony	Dublin
I.T.M	716594 736313
Classification	Water mill - unclassified
Dist. From Development	133m east
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.	DU018-017
Townland	Fairview
Parish	Marino
Barony	Dublin
I.T.M	716796
Classification	Castle - unclassified
Dist. From Development	377m northeast
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.	DU018-013002
Townland	Drishoge
Parish	Drumcondra

SMR No.	DU018-013002
Barony	Dublin
I.T.M	716425 737075
Classification	Graveyard
Dist. From Development	470m north
Description	Attached to the Church of St. John the Baptist (1734) on the grounds of All Hallows College. The Church of St. John the Baptist was built on the site of a medieval foundation associated with the Priory of All Saints (DU018-013001-). After the Dissolution of the priory a small church dedicated to St. Margaret was erected (Ball 1920, 6 182-183). The antiquarian Francis Grosse and James Gandon, the architect are buried in the graveyard.
Reference	www.archaeology.ie/ SMR file

SMR No.	DU018-012001
Townland	Drishoge
Parish	Drumcondra
Barony	Dublin
I.T.M	716096 737120
Classification	House - 16th/17th century
Dist. From Development	490m north-northwest
Description	St. Patrick's Training College incorporates Belevedere House, a 17th century house with 18-19th century additions. The Civil survey (1654-6) describes the former as a 'faire brick house, slated on the lands of James Bath of Drumconragh, at Drishoge' (Simington 1945, 180). This was the seat of the Coghill family, Sir John Coghill, Master in Chancery, resided here in the late 17th century (Joyce 1912, 256-257). In 1725 Belvedere house was leased to Henry Singleton, a Drogheda lawyer who undertook a programme of building and renovation including the addition of a drawingroom at the rear of the building (Ó'Ceallaigh 1975, 14). The present building is two storey, 7 bay, over sunken basement with a break front, and 2 bay thick in back. Built of an inner and outer wall of brick with a rubble core (T. 0.60m). Brickwork is 17th century to first floor level when it changes indicating that the first floor was re-built or is probably a later addition. The mountain granite quions are also more widely spaced at first floor level to incorporate the larger brick. Belvedere House is lit by flush sash windows with moulded sills that are pre- 1730 (flush sash windows were made illegal in the 1720's and were out of fashion by 1730 because they resulted in wood decay). The front balustrade was added at the turn of the 18th century probably to replace a pediment. Hall and chambers in the front retain a number of original 17th century features, including bolection panelling dating to c. 1660's, tall doorways, relatively thin doors and pannelling over windows with window seats. A drop beam running across the ground floor ceiling maybe the original roof joist. The rear of the house was modified in the 18th century to incorporate a staircase and circular roof light. The upper floor contains two suites of rooms with plain and decorated cornices of early 18th century date. Belvedere House compares favourably with the 17th century phase of Eyrecourt Castle, Co. Galway (O'Connell & Loeber 1988, 40-48).
Reference	www.archaeology.ie/ SMR file

SMR No.	DU018-015001
Townland	Richmond
Parish	Fairview
Barony	Dublin
I.T.M	716629 736917
Classification	Castle - unclassified
Dist. From Development	490m north
Description	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 cane 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 cabbins. 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).
Reference	www.archaeology.ie/ SMR file

SMR No.	DU018-011
Townland	Drishoge
Parish	Drumcondra
Barony	Dublin
I.T.M	715747 736966
Classification	Ritual site- holy well
Dist. From Development	500m northwest
Description	Covered site of St. Catherine's Well located on the main walk through Griffith Park, c. 70m N of the footbridge across the Tolka. This well was formerly within an enclosed yard of a house at Millbourne Avenue. It was a natural spring under the kitchen floor and led by a short culvert to the outside where it was accessible under a pointed arched superstructure. The water was used to cure sore eyes and toothache (Anon. 1928, 159-161; Ó Danachair 1958, 233). This house was demolished and the well is preserved in an ornamental shrubbery. St. Catherine's Well was described in 1928 as follows; 'in parish of Clonturk, townland of Drishogue, lies on the north bank of the river Tolka. Until recently it was enclosed in Millbourne Avenue, being supplied from a spring that rose under the kitchen floor of the house and was led by a sort of culvert to the outside, where it was accessible under a rude pointed arch. The house has now been demolished, but the municipal authorities have been careful to preserve the well with its covering in an ornamental shrubbery. It has been in traditional repute for the cure of sore eyes, toothache and

SMR No.	DU018-011
	chincough; but has had no annual celebration or pattern day within living memory' (anon. 1928, 159-60).
Reference	www.archaeology.ie/ SMR file

Appendix 16.4 Legislation protecting the Archaeological Resource

Appendix 16.4 Legislation protecting the Archaeological Resource

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.

The National Monuments Act 1930, as amended by various acts including but not limited to, the National Monuments (Amendment) Act 1954, the National Monuments (Amendment) Act 1987, the National Monuments (Amendment) Act 1994 and the National Monuments (Amendment) Act 2004 (together the National Monuments Acts) make provision for the protection and preservation of national monuments, archaeological monuments and archaeological objects in Ireland.

The Historic and Archaeological Heritage and Miscellaneous Provisions Act 2023 (the 2023 Act) was enacted by the Oireachtas in late 2023 and aims to address a range of structural issues, simplify terminology, as well as provide a single accessible piece of legislation. At the date of writing many sections of the 2023 Act have yet to commence. It is not anticipated that this will result in statutory protection being extended to any potential receptors apart from those already considered in this chapter and the chapter already identifies as mitigation the various archaeological investigations and licencing requirements that will come into force when the 2023 Act is commenced. Accordingly, the EIAR conclusions are likely to be unchanged should the 2023 Act commence fully while the application is moving through the planning process.

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 as amended 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 Development Plan 2022–2028

It is the Policy of Dublin City Council

BHA26- Archaeological Heritage

1. To protect and preserve Monuments and Places listed on the statutory Record of Monuments and Places (RMP) as established under Section 12 of the National Monuments (Amendment) Act 1994 which have been identified in the Record of Monuments and Places and the Historic Environment Viewer (www.archaeology.ie) and all wrecks over 100 years old including those in the Shipwreck Inventory of Ireland.

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 Monuments and Places listed on the statutory Record of Monuments and Places (RMP) as established under Section 12 of the National Monuments (Amendment) Act 1994.

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; all wrecks and associated objects over 100 years old 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 the Record of Monuments and Places (RMP) as established under Section 12 of the National Monuments (Amendment) Act 1994, notification of sites over 0.5 hectares size with potential underwater impacts 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 Housing, Local Government and Heritage and be subject to an appropriate level of archaeological assessment.

8. 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.

Section 15.15, pg. 629, Chapter 15 (Development Standards):

- All applications for proposed new developments at sites marked as Sites and/or Zones of Archaeological Interest identified on the development plan zoning maps shall be subject to pre application discussion/consultation with the Archaeology Office.
- Where a site is located within a Zone of Archaeological Interest, an Archaeological Assessment as defined in National policy and guidelines shall be prepared in consultation with the City Archaeologist and provided as part of the planning application. The assessment will evaluate the archaeological potential of the site for and the impact of the proposed development on them.
- New basement development in the medieval core and known medieval sites shall be avoided. Approved basements may be rescinded where undue damage to in situ archaeological deposits will occur as a result.
- The impact and merits/demerits of foundation type and soil hydrology shall be archaeologically assessed to determine appropriate mitigation (including avoidance, redesign, etc.).
- Buildings on the first edition OS that are not protected structures shall be recorded as part of the archaeological assessment that accompanies the planning application. Appropriate specifications for the recording of historic buildings will be determined in consultation with the City Archaeologist. Records of historic buildings will inform decisions relating to the approval or implementation of a scheme of development as part of the planning process or to document buildings, or parts of buildings, which will be lost as a result of demolition or alteration.

Appendix 16.5: Impact Assessment and Cultural Heritage Resource

Appendix 16.5: Impact Assessment and Cultural Heritage Resource

POTENTIAL IMPACTS ON ARCHAEOLOGICAL AND HISTORICAL REMAINS

Impacts are defined as 'A change resulting from the implementation of a project' (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 16.6: Mitigation Measures and the Cultural Heritage Resource

Appendix 16.6: Mitigation Measures and the Cultural Heritage Resource

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' (CIfA 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' (CIfA 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 (CIfA 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 20.1 Resource & Waste Management Plan

REPORT



Trinity Consultants

awnconsulting

Resource & Waste Management Plan

Project Title: Holy Cross College LRD – Appendix 20.1

CLIENT

CWTC Multi Family ICAV acting solely in respect of its sub fund the DBTR DR1 Fund

DOCUMENT REFERENCE

257501.0579WMR01

DATE

26/06/2025

AWN Consulting Ltd, The Tecpro Building, IDA Business & Technology Park, Clonshaugh, Dublin 17, D17 XD90

DOCUMENT CONTROL SHEET

Document Control Sheet	
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Revision	Revision Date	Description

Details	Written by	Approved by
Signature		
Name	Chonaill Bradley	Fergal Callaghan
Title	Associate (Environmental)	Director
Date	26/06/2025	26/06/2025

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This report considers the specific instructions and requirements of our client. It is not intended for third-party use or reliance, and no responsibility is accepted for any third party. The provisions in this report apply solely to this project and should not be assumed applicable to other developments without review and modification.

ENVIRONMENT
I.S. EN ISO 14001:2015
NSAI Certified

HEALTH & SAFETY
I.S. ISO 45001:2018
NSAI Certified

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1. INTRODUCTION

AWN Consulting, a Trinity Consultants Team, has prepared this Construction and Demolition (C&D) Resource & Waste Management Plan (RWMP) on behalf of CWTC Multi Family ICAV acting solely in respect of its sub fund the DBTR DR1 Fund. The development will consist of the construction of a residential development set out in blocks ranging in height from 3 to 13 storeys, to accommodate 1131 no. apartments including retail and crèche units, residential tenant amenity spaces, community/cultural spaces, mobility hubs and public open space.

This plan provides information necessary to ensure that the management of C&D waste at the site is undertaken in accordance with the 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 *National Waste Management Plan for a Circular Economy 2024 - 2030 (NWMPCE) (2024)* [4]. In particular, this plan aims to ensure maximum recycling, reuse and recovery of waste with diversion from landfill, wherever possible. It also provides appropriate measures in relation to the 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 prescribes measures for the management of different waste streams. The RWMP should be viewed as a live document and will be regularly revisited throughout the project's lifecycle so that opportunities to maximise waste reduction / efficiencies are exploited throughout, and that data is collected on an ongoing basis so that it is as accurate as possible.

2. OVERVIEW OF WASTE MANAGEMENT IN IRELAND

2.1 National level

The Irish Government issued a policy statement in September 1998, *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. 2018).

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 out 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. This 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 work 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 [11]. 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 Waste 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 bespoke 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, which require a simplified RWMP:

- 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 1,250m^2.
- Retrofit of commercial, industrial, infrastructural, institutional, educational, health and other developments with an aggregate floor area less than 2,000m^2; and
- Demolition projects generating in total less than 100m^3 in volume of C&D waste.

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

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

- Demolition projects generating in total less than 100m^3 in volume of C&D waste.
- New residential development of less than 10 dwellings.

The Department of Housing, Local Government and Heritage authored *Sustainable Residential Development and Compact Settlements - Guidelines for Planning Authorities (2024)* [12], suggests the below thresholds at which the need for supplemental information such as the RWMP should be considered.

- 30 or more residential units,
- 1,000 sq. metres of mixed-use development

Other guidelines followed in the preparation of this report include *'Construction and Demolition Waste Management – a handbook for Contractors and Site Managers'* [13], 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 minimised and maximum levels of waste recycling are achieved.

2.2 Regional Level

The proposed development is located in the Local Authority area of Dublin City Council (DCC).

The Eastern Midlands Region (EMR) Waste Management Plan 2015 – 2021, which previously governed waste management policy in the DCC area, has been superseded as of March 2024 by the NWMPCE 2024 – 2030, the national waste management plan for Ireland.

The NWMPCE does not dissolve the three regional waste areas. The NWMPCE sets the ambition of the plan to have a 0% total waste growth per person over the life of the Plan with an emphasis on non-household waste, including waste from commercial activities and the construction and demolition sector. This plan seeks to influence sustainable consumption and prevent the generation of waste, improve the capture of materials to optimise circularity and enable compliance with policy and legislation.

The national plan sets out the following strategic targets for waste management in the country that are relevant to the development:

National Targets

1B. (Construction Materials) 12% Reduction in Construction & Demolition Waste Generated by 2030.

3B. (Reuse Facilities) Provide for reuse at 10 Civic Amenity Sites, minimum

Municipal landfill charges in Ireland are based on the weight of waste disposed. In the Leinster Region, charges are approximately €140 - €160 per tonne of waste which includes an €85 per tonne landfill levy introduced under the *Waste Management (Landfill Levy) (Amendment) Regulations 2015 (as amended)* [14]. *The Circular Economy (Waste Recovery Levy) Regulations 2024* [15] will also incur a levy of €10 per tonne to waste accepted for recovery. This will include backfilling at authorised recovery sites and at municipal waste landfills.

The *Dublin City Development Plan 2022 – 2028* [16] 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 change 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 development plan.

Policies:

- CA8 (f): (New development should generally demonstrate/ provide for:) minimising the generation of site and construction waste and maximising reuse or recycling.
- CA8 (G): (New development should generally demonstrate/ provide for:) the use of construction materials that have low to zero embodied energy and CO2 emissions
- CA23: 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.
- CA24: 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.
- SI28: To prevent and minimise waste generation and disposal, and to prioritise prevention, recycling, preparation for reuse and recovery in order to develop Dublin as a circular city and safeguard against environmental pollution.
- 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 2020 (or and any future updated versions of these guidelines produced during the lifetime of this plan).

Objectives:

- SIO14 Local Recycling/Reuse 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.

15.7.1 Re-use of Existing Buildings

- Where development proposal comprises of existing buildings on the site, applicants are encouraged to reuse and repurpose the buildings for integration within the scheme, where possible in accordance with Policy CA6, CA7 and CA8. Where demolition is proposed, the applicant must submit a demolition justification report to set out the rational for the demolition having regard to the 'embodied carbon' of existing structures as well as the additional use of resources and energy arising from new construction relative to the reuse of existing structures.

- Existing building materials should be incorporated and utilised in the new design proposals where feasible and a clear strategy for the reuse and disposal of the materials should be included where demolition is proposed.

2.3 Legislative Requirements

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

- *Waste Management Act 1996, as amended;*
- *Environmental Protection Agency Act 1992, as amended;*
- *Litter Pollution Act 1997, as amended;*
- *Planning and Development Act 2000, as amended* [17];
- *Circular Economy and Miscellaneous Provisions Act 2022, as amended.*

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 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, as amended* or a Waste 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. 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.

As noted in the EPA guidelines, the approaches presented are based on international principles of optimizing resources and reducing waste on demolition and 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 will 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 which are being investigated as part of the planning stage 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 as outlined in section 3.1, structures should be designed with the intent of designing out waste. 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. DESCRIPTION OF THE DEVELOPMENT

4.1 Location, Size and Scale of the Development

The site of the proposed development is located at Holy Cross College, Clonliffe Road, Dublin 3 and Drumcondra Road Lower, Drumcondra, Dublin 9. The overall area of the site is c. 8.7 ha, with a developable site area of c. 8.2 ha. The site is located c. 1.7 km north of Dublin City Centre. It is bound by Drumcondra Road Lower, Archbishop's House (a Protected Structure), Mater Dei College and Crosscare Family Hub to the west; Clonliffe Road to the south; Cornmill Apartments and Belvedere College Rugby Grounds to the east; and by the River Tolka and future GAA sports ground to the north.

The site is situated in the administrative area of Dublin City Council, in the townlands of Clonliffe East and Clonliffe West.

The proposed development will consist of:

1. Demolition of a number of former office/college buildings on site, including the New Wing and Library Wing Buildings which are non-original/late 20th century addition, (total demolition of c. 6,327 sq.m) and the construction of a residential development with a gross floor area (GFA) of c. 106,181 sq.m (including existing buildings and excluding basement and podium areas) set out in 12 no. new residential blocks, ranging in height from 3 to 13 storeys, and re-use of 1 no. existing building, to accommodate 1,131 no. apartments, with associated residential tenant amenity, 1 no. retail unit, 1 no. crèche and re-use of existing buildings for community/cultural use. The site will accommodate a total of 382 no. car parking spaces and 2,619 no. bicycle parking spaces in separate basement/podium areas and at surface level. Landscaping will include extensive new public open spaces and communal courtyards, podiums and roof terraces.

2. The 1,131 no. residential buildings range in height from 2-storeys to 13-storeys, accommodating 1,131 no. apartments comprising 268 no. studios, 282 no. 1-bed units, 392 no. 2-bed units (2 no. 2-bed (3P) & 390 no. 2-bed (4P)), 132 no. 3-bed units and 57 no. 4-bed units. The breakdown of residential accommodation is as follows:

    - Block A1 is a 4 to 8 storey building, including setbacks and balconies, accommodating 234 no. units (47 no. studios, 98 no. 1-bed units, 56 no. 2-bed (4P), 25 no. 3-bed units and 8 no. 4-bed units);
    - Block A2 is a 7 to 9 storey building, including setbacks and balconies, accommodating 68 no. units; (23 no. studios, 8 no. 1-bed units, 37 no. 2-bed (4P));
    - Block A3 is an 8 to 10 storey building, including setbacks and balconies, accommodating 79 no. units; (26 no. studios, 9 no. 1-bed units, 44 no. 2-bed (4P));
    - Block A4 is a 6 to 13 storey building, including setbacks, balconies and terraces, accommodating 97 no. units; (29 no. studios, 38 no. 2-bed (4P), 18 no. 3-bed units, 12 no. 4-bed units);
    - Block B1 is a 5 to 7 storey building, including setbacks and balconies, accommodating 69 no. units; (5 no. studios, 15 no. 1-bed units, 26 no. 2-bed (4P), 10 no. 3-bed units, 13 no. 4-bed units);
    - Block B2 is a 6 to 8 storey building, including setbacks and balconies, accommodating 37 no. units; (2 no. studios, 5 no. 1-bed units, 16 no. 2-bed (4P), 13 no. 3-bed units, 1 no. 4-bed units);
    - Block B3 is a 6 to 10 storey building, including setbacks and balconies, accommodating 92 no. units; (16 no. studios, 25 no. 1-bed units, 45 no. 2-bed (4P), 6 no. 3-bed units);
    - Block B4 is a 4 to 6 storey building, including setbacks and balconies, accommodating 53 no. units; (10 no. studios, 17 no. 1-bed units, 10 no. 2-bed (4P), 6 no. 3-bed units, 10 no. 4-bed units);
    - Block C1A is a 5 to 6 storey building, including setbacks and balconies, accommodating 47 no. units; (18 no. studios, 7 no. 1-bed units, 10no. 2-bed (4P), 12 no. 3-bed units);
    - Block C1B is a 6 to 8 storey building, including setbacks and balconies, accommodating 66 no. units; (15 no. studios, 8 no. 1-bed units, 35 no. 2-bed (4P), 8 no. 3-bed units);

- Block C2 is a 5 to 7 storey building, including setbacks and balconies, accommodating 88 no. units; (43 no. studios, 8 no. 1-bed units, 2 no. 2-bed (3P), 18 no. 2-bed (4P), 7 no. 3-bed units, 10 no. 4-bed units);
- Block D2 is a 3 to 7 storey building, including setbacks and balconies, accommodating 145 no. units; (14 no. studios, 48 no. 1-bed units, 53 no. 2-bed (4P), 27 no. 3-bed units, 3 no. 4-bed units);
- The Seminary Building and South Link Building (Block E2) are existing Protected Structures of 2 to 4 storeys, with a proposed conversion of both buildings to accommodate 56 no. residential units (20 no. studios, 34 no. 1-bed units, 2 no. 2-bed (4P)); and
- Residential Tenant Amenity Space is provided throughout the scheme in Blocks A4, B1 and D2, totalling c. 1,989 sq.m and Communal Open Space is provided adjacent each block and at roof level on Blocks A1, A2, A3 & A4, totalling c. 10,323 sq.m.

3. The site contains a number of Protected Structures including The Seminary Building, Holy Cross Chapel, South Link Building, The Assembly Hall and The Ambulatory (RPS Ref. 1901). The application proposes the renovation of the Seminary Building and South Link Building to accommodate residential units and the renovation of the existing Holy Cross Chapel and Assembly Hall buildings for use as community/cultural uses. The wider Holy Cross College lands also include The Red House (RPS Ref. 1902) and the Archbishop's House (RPS Ref. 2361) - these are not included in the application boundary and no works are proposed to these Protected Structures, with the exception of adjacent landscaping and the proposed works to the Drumcondra Road boundary wall, which is inscribed under the Protected Structure of the Archbishop's House as noted below. The works to the Protected Structures within the application site include:

   - The Seminary Building (RPS Ref. 1901): The works include of the careful refurbishment and alteration of the existing 4-storey Seminary Building to provide residential accommodation. It is proposed that an existing adjacent element of the structure, the Library Wing on the northern elevation of the Seminary and the connecting corridors to the Seminary, will be demolished; new infill concrete walls are located to fill the gap where elements are removed. Materials that can be salvaged from this wing will be surveyed, their location noted, and re-used in the conservation and restoration works in The Seminary Building, where possible. The projecting WC blocks (modern addition to overall structure) to the rear (west) elevation of The Seminary Building are also proposed to be demolished. The external envelope of The Seminary Building, with existing chimneys, stone and render finishes, windows and doors is maintained and re-used; The scheme proposes 56 no. apartments installed within the existing shell on the East side of a corridor running along the rear of the plan;
   - The South Link Building (RPS Ref. 1901): The South Link Building consists of a 2-storey stone and render block, with slate roof and bellcote between Holy Cross Chapel and The Seminary Building; this building will be conserved and restored. Alterations to the South Link Building include the insertion of a new doorway within the existing front (Eastern) façade to link the front of the building to the cloister garden, and the insertion of 2 no. apartments in the ground and first floor space. The existing organ at first floor level will be moved to a new location within the Holy Cross Chapel;
   - Holy Cross Chapel (RPS Ref. 1901): Holy Cross Chapel is retained and restored as a community/cultural space. External alterations include a new metal door and interior alterations are limited to services and decoration; a section of the existing tiled floor will be lifted to allow for service connections to furniture installations.
   - The Assembly Hall (RPS Ref. 1901): The Assembly Hall comprises a 2-storey hall with its front façade, steps and projecting porch orientated towards Clonliffe Road. The building is conserved and restored as a community/cultural space as a part of the proposal; Existing doors and windows are retained and repaired. The existing Oratory located in the New Wing Building, will be relocated to within the Assembly Hall;
   - The Ambulatory (RPS Ref. 1901): All of the above referenced buildings are linked by a cloister colonnade (i.e. the Ambulatory) around two sides of a central garden; there is a part section of the colonnade on the North side and an indented (enclosed) section directly outside Holy Cross

Chapel; the fourth (east) side is completed by the rear elevation of The Seminary Building. The Ambulatory will be retained as part of the proposed development. The Cloister Garden will be restored and conserved as a part of the project for circulation, amenity and community/cultural use. The courtyard garden will be re-designed and re-planted as a part of the scheme; and

- Drumcondra Road Boundary Wall Entrance (Inscribed under Archbishop's House, RPS Ref. 2361): The existing entrance gates and the adjoining walls are part of the Archbishop's House Protected Structure. It is proposed to salvage and reuse, the existing stone gate pier to the south and reconstruct this pier in a new location further to the south, widening the gate opening in this location. This will involve the taking down of a small portion of the stone boundary wall.

4. Extensive areas of public open space of c. 23,842 sq.m or c. 29.89% of the site is provided for, including woodland walk, central seminary lawn, games area, and playground. The proposed landscaping scheme provides for the removal of some existing trees on the site as well as extensive new planting.

5. Non-residential uses include a crèche of c. 587 sq.m in Block A4 (with an external play area of 160 sq.m) and 1 no. retail unit of c. 306 sq.m in Block A1. The scheme includes for the renovation and reuse of the former Holy Cross Chapel and Assembly Hall buildings (c. 2,048 sq.m) and part of the Ambulatory and Cloister Garden (c. 1,952 sq.m) for use as community/cultural uses.

6. The site will accommodate a total of 382 no. car parking spaces (345 no. for residents and 41 no. for visitors/accessible use/car club) and 2,619 no. bicycle parking spaces including cargo bikes, EV charging and shared bikes (1,981 no. for residents and 638 no. for visitor/staff) in separate basement/podium areas and at surface level. It includes for a single level basement under Blocks B2, B3 & C1, containing 50 no. car spaces, cycle parking, plant, storage areas, waste storage areas and other associated facilities, a single level basement and podium parking under Block D2 containing 136 no. car spaces, cycle parking, plant, storage areas, waste storage areas and other associated facilities and a part podium level basement, part single level basement/part podium under Block A1, containing 155 no. car spaces, cycle parking spaces, plant, storage areas, waste storage areas and other associated facilities. A total of 1,646 no. resident's bicycle stores are provided at basement/podium/ground level within the blocks, and the remaining 240 no. spaces are located proximate to residential buildings in external bike stores. In addition, 41 no. car parking spaces are located at surface level to include visitor, accessible, EV, car club and 4 no. Block D resident spaces, as well as 638 no. short stay bicycle parking spaces. The scheme also includes for 2 no. mobility hubs located at the ground floor of Block A1 and D2.

7. The site is accessed by vehicles, cyclists and pedestrians from a widened existing entrance on Clonliffe Road, at the junction with Jones's Road (which is already permitted as part of the under construction hotel - DCC Reg. Ref. 2935/20 and ABP Reg. Ref. 308193), and through the widening and reopening of an existing access point on Drumcondra Road Lower at the junction with Hollybank Road to act as a left in/left out access. There is no vehicular access through the site for the public or occupants of the sites, other than for maintenance and operations. An additional cyclist and pedestrian access is proposed through an existing access point on Holy Cross Avenue. A relocated entrance to the Archbishop's House through the site is provided on the northern boundary of the Archbishop's House.

8. The proposed application includes all site landscaping works, green roofs, boundary treatments, lighting, servicing, signage, ESB Substations, solar PV panels at roof level on all residential blocks (excluding The Seminary Building (E2)), and all associated and ancillary works, including site development works above and below ground including site drainage and infrastructure.

Figure 4.1 Proposed Site Location and Redline Boundary (Source: O'Mahony Pike, 2025)

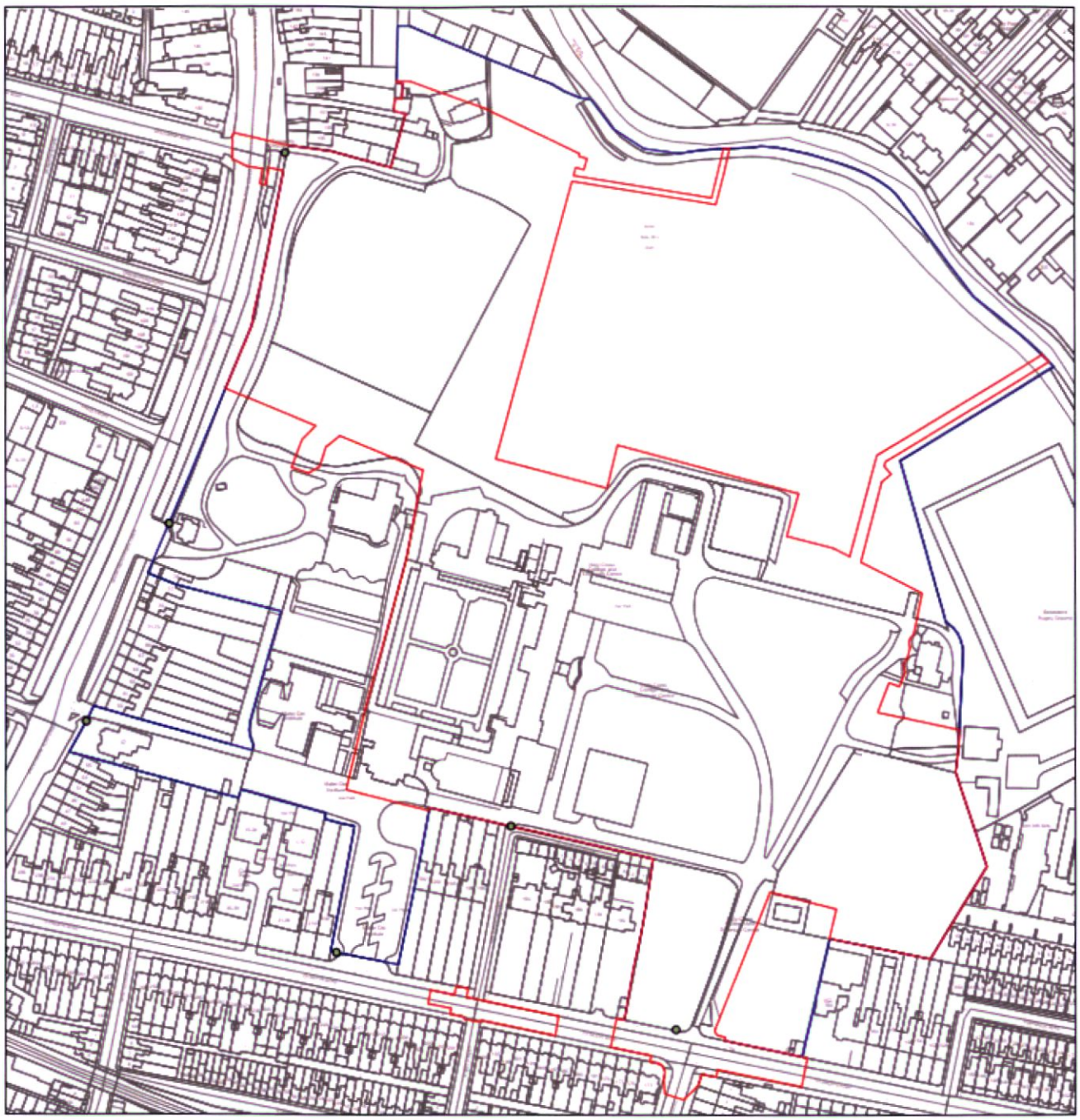
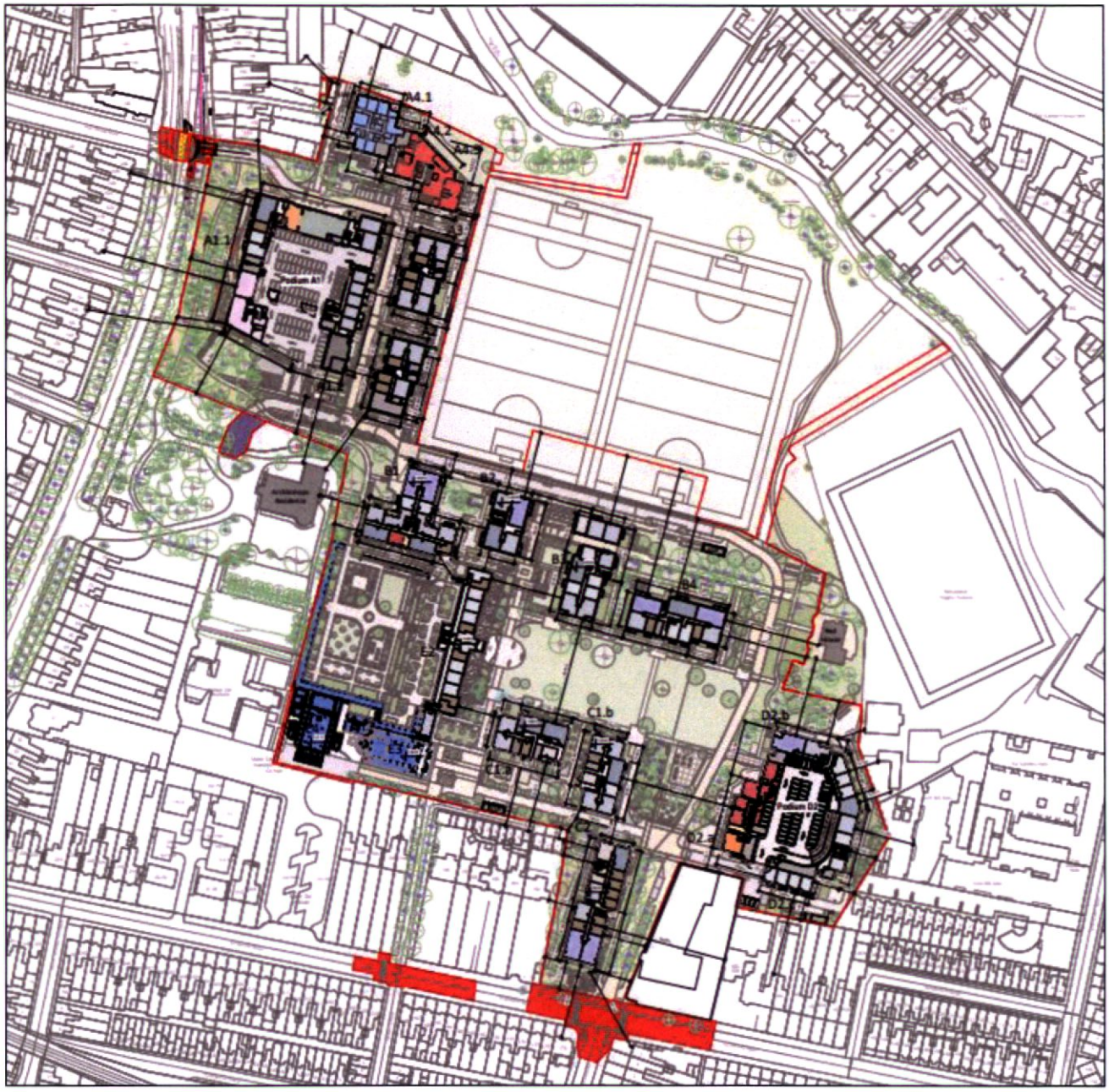


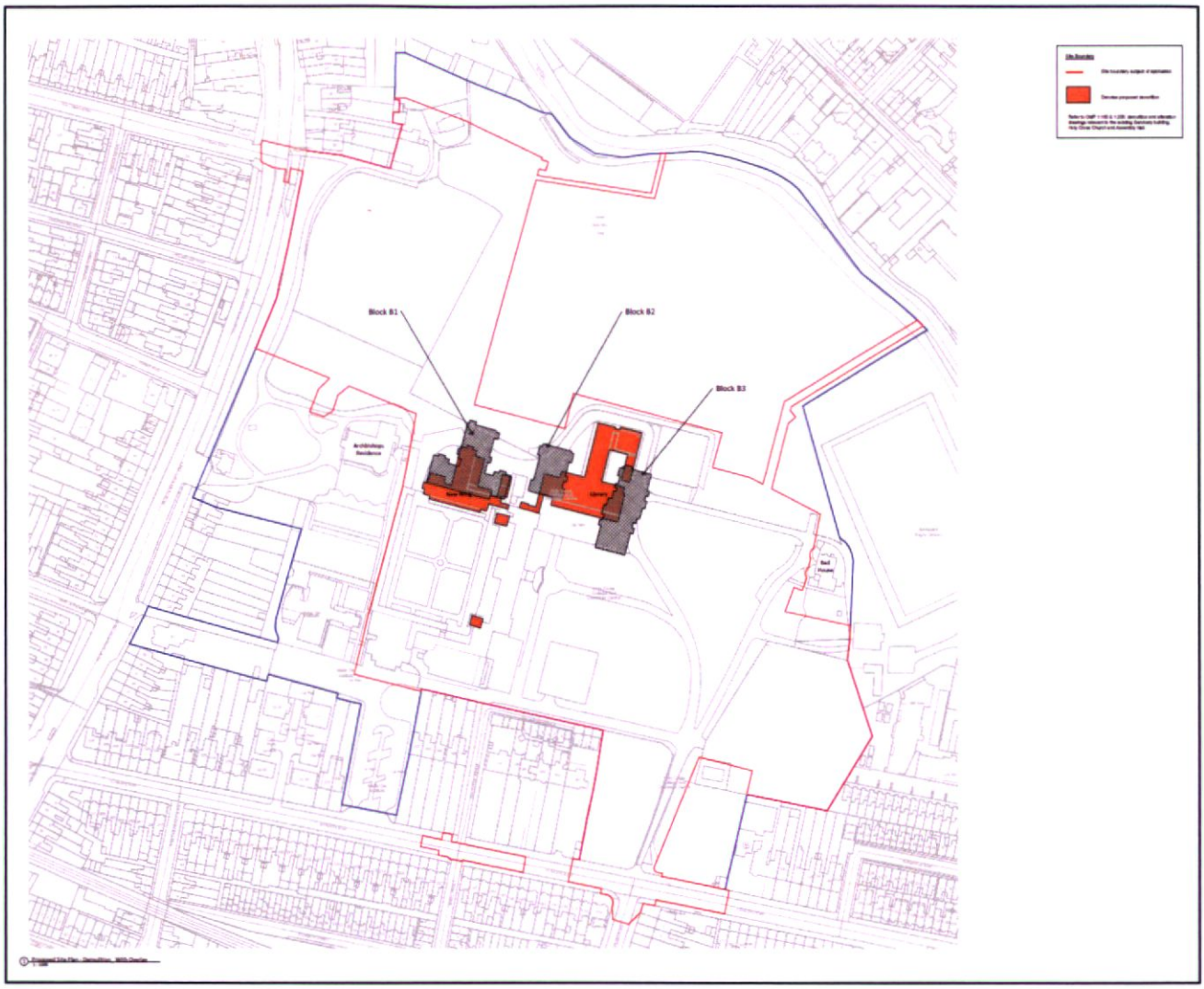
Figure 4.2 Proposed Site Layout and Redline Boundary (Source: O'Mahony Pike, 2025)



4.2 Details of the Non-Hazardous Wastes to be Produced

There will be waste materials generated from the demolition of some of the existing buildings, renovations and updating to other existing structures and removal of some hardstanding areas on site, as well as from the excavation of the building foundations. The proposed demolition will consist of a number of former office/college buildings on site, including the New Wing (c. 2476.4 m^2), Library Wing Buildings (c. 3601.6m^2), later additions to the seminary building (c. 249m^2), resulting in a total demolition area of c. 6,327m^2. The volume of waste generated from demolition will be more difficult to segregate than waste generated from the construction phase, as many of the building materials will be bonded together or integrated i.e. plasterboard on timber ceiling joists, steel embedded in concrete, etc.

Figure 4.3 Proposed Demolition Locations



There will be soil, stones, clay and made ground excavated to facilitate construction of new foundations, underground services, and the installation of the proposed basements. The project quantity surveyors have estimated that 30,000m^3 of material will need to be excavated to do so. It is currently envisaged that 10,000m^3 will be able to be retained and reused onsite for landscaping and fill, the remaining material (20,000m^3), will need to be removed offsite due to the limited opportunities for reuse on site. This will be taken for appropriate offsite 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 demolition and 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 between February and March 2020, along with a further survey in June 2020 by Ground Investigations Ireland (GII).

Samples were selected from the exploratory holes for a range of geotechnical and environmental testing to assist in the classification of soils and to provide information for the proposed design. Environmental and Chemical testing including the Rilta Suite, pH and sulphate testing was carried out by Element Materials Technology Laboratory in the UK. The Rilta suite testing includes both Solid Waste and Leachate Waste Acceptance Criteria.

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

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'* [18] 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* [19], which establishes the criteria for the acceptance of waste at landfills.

In the event that Asbestos Containing Materials (ACMs) are found within the excavated material, the removal will only be carried out by a suitably permitted waste contractor, in accordance with *the Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010* [20] *and the Best Practice Guidance for Handling Asbestos (2023)* [21]. 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 demolition and 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 refueling techniques, it is not expected that there will be any fuel / oil waste generated at the site.

4.3.3 Invasive Plant Species

A site invasive species surveys were undertaken by Invas Biosecurity in 2021 and follow up survey was undertaken in June 2025. This included a site walkover survey of the entire site, and around part of the outside perimeter to search for any invasive species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended.

Evidence of an extensive Japanese Knotweed (*Fallopia japonica*) stand was recorded at the north-west perimeter of the Site, adjacent to Cian Park Industrial Units; and a second stand was located to the

perimeter bordering the Archbishop's Palace grounds. There was evidence that these have previously been treated by the Church's grounds maintenance contractor over the past number of years.

The Contractor will be required to adhere to any mitigation measures / conditions prescribed in relation to invasive plant species. For further information on this topic, please refer to Chapter 8 of the EIAR for the proposed development (Biodiversity).

4.3.4 Asbestos

Multiple asbestos refurbishment / demolition surveys were undertaken by Phoenix Environmental Safety Ltd in May 2020. As is normal at this stage of the project the scope of the surveys was confined to all accessible areas of the existing buildings which are due for demolition and / or refurbishment in the future.

Asbestos Containing Materials (ACM) were detected in several locations within some of the buildings, including in floor tiling, insulating boards, downpipes, bitumen and stair nosings.

If located onsite removal of asbestos or ACMs will be carried out by a suitably qualified contractor and ACMs will only be removed from site by a suitably permitted / licenced waste contractor, in accordance with the *Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010 and the Best Practice Guidance for Handling Asbestos (2023).* All material 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 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.

5. ROLES AND RESPONSIBILITIES

The *Best Practice Guidelines on the Preparation of Resource Waste Management Plans for Construction and Demolition Projects* promotes that a suitably qualified Resource Manager (RM) with expertise in waste and resource management to implement the RWMP should be appointed. The RM may be performed by a 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 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 is the body establishing the aims and the performance targets for the proposed development.

- The Client has commissioned the preparation and submission of this 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 demolition and construction tendering process;
- The Client will ensure that the RWMP is agreed on and submitted to the local authority and their agreement obtained prior to commencement of works on site;
- The Client will 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 will 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 demolition and/or 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 selected, 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 the EPA 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 demolition/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) will be maintained for the duration of the project; and
- Preparing a RWMP Implementation Review Report at project handover.

6. 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 will 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 will 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 estimated to be generated at this site by the demolition and construction activities are shown in Table 6.1. The List of Waste (LoW) code (2018) 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 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

6.3 Demolition Waste Generation

The proposed development will include demolition of a number of former office/college buildings on site, including the New Wing (c. 2476.4 m^2), Library Wing Buildings (c. 3601.6m^2), later additions to the seminary building (c. 249m^2), resulting in a total demolition area of c. 6,327m^2. The demolition areas are identified in the planning drawings provided with this application under separate cover. There will be c. 7508.3 m^3 of demolition material generated as a result of the proposed development, however to be in line with EPA requirements for C&D waste the below table (6.2) has been converted into tonnage. The demolition areas are identified in the planning drawings provided with this application and in figure 4.3. The anticipated demolition waste and rates of reuse, recycling / recovery and disposal are shown in Table 6.2, below.

Table 6.2 Estimated off-site reuse, recycle and disposal rates for demolition waste

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	341.7	0	0.0	85	290.4	15	51.2
Concrete, Bricks, Tiles, Ceramics	1936.1	85	1645.7	5	96.8	10	193.6
Plasterboard	151.8	30	45.6	60	91.1	10	15.2
Asphalts	38.0	25	9.5	70	26.6	5	1.9
Metals	569.4	5	28.5	80	455.5	15	85.4
Slate	303.7	0	0.0	85	258.1	15	45.6
Timber	455.5	10	45.6	60	273.3	30	136.7
Asbestos	5.0	0	0.0	0	0.0	100	5.0
Total	**3801.2**		**1774.7**		**1491.9**		**534.6**

A demolition justification & adaptive re-use report setting out the rational for the demolition having regard to the 'embodied carbon' of existing structures as well as the additional use of resources and energy arising from new construction relative to the reuse of existing structure has been provided under a separate cover as part of this application.

6.4 Construction Waste Generation

Table 6.3 shows the breakdown of C&D waste types produced on a typical site based on data from the EPA *National Waste Reports* [22] and the joint *EPA & GMIT study* [23].

Table 6.3 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

Table 6.4, below, shows the estimated construction waste generation for the proposed Project 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 amounts for the main waste types (with the exception of soils, stones and clay) are based on an average large-scale development waste generation

rate per m^2, using the waste breakdown rates shown in Table 6.3. These have been calculated from the schedule of development areas provided by the architect.

Table 6.4 Predicted on and off-site reuse, recycle and disposal rates for construction waste

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	1962.1	10	196.2	80	1569.7	10	196.2
Timber	1664.8	40	665.9	55	915.7	5	83.2
Plasterboard	594.6	30	178.4	60	356.8	10	59.5
Metals	475.7	5	23.8	90	428.1	5	23.8
Concrete	178.4	30	53.5	65	115.9	5	8.9
Other	891.9	20	178.4	60	535.1	20	178.4
Total	**5767.5**		**1296.2**		**3921.3**		**550.0**

In addition to the information in Table 6.4, there will be 30,000m^3 of soil, stones, clay and made ground excavated to facilitate construction of new foundations, the installations of underground services and the installation of the proposed basement. Any suitable excavated material will be temporarily stockpiled for reuse as fill. It is currently envisaged that all excavated material with the exception of 10,000m^3 will be required to be removed for appropriate reuse, recovery 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.

6.5 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 the 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 arisings will be handled by an approved waste contractor holding a current waste collection permit. All waste arisings requiring disposal off-site will be reused, recycled, recovered or disposed of at a facility holding the appropriate registration, permit or licence, as required. A non-exhaustive list of licensed waste facilities within the DCC region has been included in Appendix A of this RWMP. The ultimate selection of waste contractors and waste facilities would be subject to appropriate selection criteria proximity, competency, capacity and serviceability.

National End-of-Waste Decision EoW-N001/2023 (Regulation 28) published by the EPA in September 2023, establishes criteria determining when recycled aggregate resulting from a recovery operation ceases to be waste. Material from this proposed development will be investigated to see if it can cease to be a waste under the requirements of the National End of Waste Criteria for Aggregates.

During demolition and 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 (per 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 off-site in their work vehicles (which are not designed 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 / 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, if required.

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

Soil, Stone, Clay & Made Ground

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 of the European Communities (Waste Directive) Regulations 2011, as amended, 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 Framework Directive (Directive 2008/98/EC), 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 off-site for appropriate reuse, recovery and / or disposal. If bedrock is to be crushed on-site, the appropriate mobile waste facility permit will be obtained from DCC.

Silt & Sludge

During the demolition and construction phase, silt and petrochemical interception will be carried out on run-off and pumped water from site works, where required. Sludge and silt will then be collected by a suitably licensed contractor and removed off-site.

Concrete Blocks, Bricks, Tiles & Ceramics

The majority of concrete blocks, bricks, tiles and ceramics generated as part of the demolition and construction works are expected to be clean, inert material and will be recycled, where possible. If concrete is to be crushed on-site, 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 demolition and construction phases will be stored in a separate skip, pending collection for recycling. The Site Manager will ensure that supply of new plasterboard is carefully monitored to avoid oversupply and minimise waste.

Glass

Glass materials will be segregated for recycling, where possible.

Waste Electrical & 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 9.0) 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 on-site 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 the *Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010 and the Best Practice Guidance for Handling Asbestos (2023).*

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 waste will be recovered, wherever possible, and failing this, disposed of appropriately.

On-Site Crushing

It is currently not envisaged that the crushing of waste materials will occur on-site. However, if the crushing of material is to be undertaken, a mobile waste facility permit will first be obtained from DCC. Information regarding the location of the accepting waste facility, or if an application under regulation 28 will be made using National End-of-Waste Decision EoW-N001/2023, will be supplied to the DCC waste unit.

It should be noted that until demolition and construction contractors are appointed it is not possible to provide information on the specific destinations of each construction waste stream. Prior to commencement of construction and removal of any waste offsite, details of the proposed destination of each waste stream will be provided to DCC by the project team.

6.6 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 a 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 9.0).

All movement of waste and the use of waste contractors will be undertaken in accordance with the Waste Framework Directive (Directive 2008/98/EC), the *Waste Management Act 1996* as amended, *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 9.0) 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 Licence for that site will be provided to the nominated project Resource Waste Manager (RM) (see Section 9.0). 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.

7. 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.

7.1 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 at a reduced fee for such purposes, reducing final waste disposal costs.

7.2 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.

7.3 Disposal

Municipal landfill charges in Ireland are based on the weight of waste disposed. In the Leinster Region, charges are approximately €140 - €160 per tonne of waste which includes an €85 per tonne landfill levy introduced under the Waste Management (Landfill Levy) (Amendment) Regulations 2023. The Circular Economy (Waste Recovery Levy) will also incur a levy of €10 per tonne for waste accepted for recovery. This will include backfilling at authorised recovery sites and at municipal waste landfills.

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.

8. DEMOLITION PROCEDURES

The demolition stage will involve the demolition of a number of former office/college buildings on site, including the New Wing, Library Wing Buildings, later additions to the seminary building. The demolition plans are identified in the planning drawings submitted as part of this application. A formal plan including safety procedures will be prepared by the demolition contractor. However, in general, the following sequence of works should be followed during the demolition stage:

Waste Reduction Assessment

- Preparation of a pre-demolition audit detailing resource recovery best practice, i.e. deconstruction and disassembly where feasible and practicable. The demolition audit will be informed by the *EU Guidelines for the waste audits before demolition and renovation works of buildings* (May 2018) [24].
- Investigate the reduction and recycling potential of deconstructed components, elements and materials within the new build if it will be in compliance with functionality, regulatory and performance requirements. The reuse and recycling of deconstructed components, elements and materials will be carried out in compliance with relevant requirements relating to by-product, end-of-waste and waste data reporting.
- Reuse and recycle deconstructed components, elements and materials from other projects off-site if in compliance with functionality, regulatory and performance requirements. The reuse and recycling of deconstructed components, elements and materials must be carried out in compliance with relevant requirements relating to by-product, end-of-waste and waste data reporting.
- A specific audit for potentially hazardous material (asbestos, polychlorinated biphenyls (PCBs), persistent organic pollutants (POPs), etc.) and document procedures for removal of same prior to main demolition works will be undertaken.

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.

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.

9. TRAINING PROVISIONS

A member of the demolition and construction team will be appointed as the RM to ensure commitment, operational efficiency and accountability in relation to waste management during the C&D phases of development.

9.1 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.

9.2 Site Crew Training

Training of site crew in relation to waste is the responsibility of the RM and, as such, a waste training program will 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.

10. TRACKING AND TRACING / RECORD KEEPING

Records will 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 arisings on site.

A waste tracking log will be used to track each waste movement from the site. On exit from the site, the waste collection vehicle driver will stop at the site office and sign out as a visitor and provide the security personnel or RM with a waste docket (or Waste Transfer Form (WTF) for hazardous waste) for the waste load collected. At this time, the security personnel will 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
- LoW
- Weight/Quantity

The waste vehicle will be checked by security personel 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, will 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.

11. OUTLINE WASTE AUDIT PROCEDURE

11.1 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 proposed Project. 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.

11.2 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 will be undertaken mid-way through the demolition and construction phase of the proposed Project.

If waste movements are not accounted for, the reasons for this will be established in order to see 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.

11.3 Pest Management

A pest control operator will be appointed as required to manage pest onsite during the demolition and construction phases 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.

12. CONSULTATION WITH RELEVANT BODIES

12.1 Local Authority

Once demolition and construction contractors have been appointed and have appointed waste contractors, and prior to removal of any C&D waste materials off-site, 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.

12.2 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. This will be done throught the life of the project inline with the requirements of the EPA's *"Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects"*

13. SUMMARY AND CONCLUSION

Adherence to this plan will also ensure that waste management during the demolition and construction phase at the proposed development is carried out in accordance with the requirements in the EPA's Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects and the DCC Waste Bye-Laws and the NWMPCE.

14. REFERENCES

1. Waste Management Act 1996 as amended,
2. Environmental Protection Agency Act 1992 as amended.
3. Litter Pollution Act 1997 (S.I. No. 12 of 1997) as amended
4. Regional Waste Management Planning Offices, *The National Waste Management Plan for a Circular Economy 2024 – 2030 (2024).*
5. Department of Environment and Local Government (DoELG) *Waste Management – Changing Our Ways, A Policy Statement* (1998).
6. Forum for the Construction Industry – *Recycling of Construction and Demolition Waste.*
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8. DCCAE, *Whole of Government Circular Economy Strategy 2022-2023 'Living More, Using Less'* (2021)
9. Circular Economy and Miscellaneous Provisions Act 2022, as amended.
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13. FÁS and the Construction Industry Federation (CIF), *Construction and Demolition Waste Management – a handbook for Contractors and* site *Managers* (2002).
14. Waste Management (Landfill Levy) Regulations 2015 (as amended)
15. Circular Economy (Waste Recovery Levy) Regulations 2024
16. Dublin City Council (DCC), Dublin City Council Development Plan 2022-2028 (2022)
17. Planning and Development Act 2000 (S.I. No. 30 of 2000) as amended
18. EPA, *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* (2018)
19. Council Decision 2003/33/EC, establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC.
20. The *Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010*
21. Local Government Ireland, *Best practice guidance for handling asbestos (2023).*
22. Environmental Protection Agency (EPA), National Waste Database Reports 1998 – 2020 and the Circular Economy and National Waste Database Report 2021 – 2022
23. EPA and Galway-Mayo Institute of Technology (GMIT), *EPA Research Report 146 – A Review of Design and Construction Waste Management Practices in Selected Case Studies – Lessons Learned* (2015).
24. European Commission, *Guidelines for the waste audits before demolition and renovation works of buildings* (May 2018).

APPENDIX A. WASTE FACILITIES IN THE DUBLIN AREA

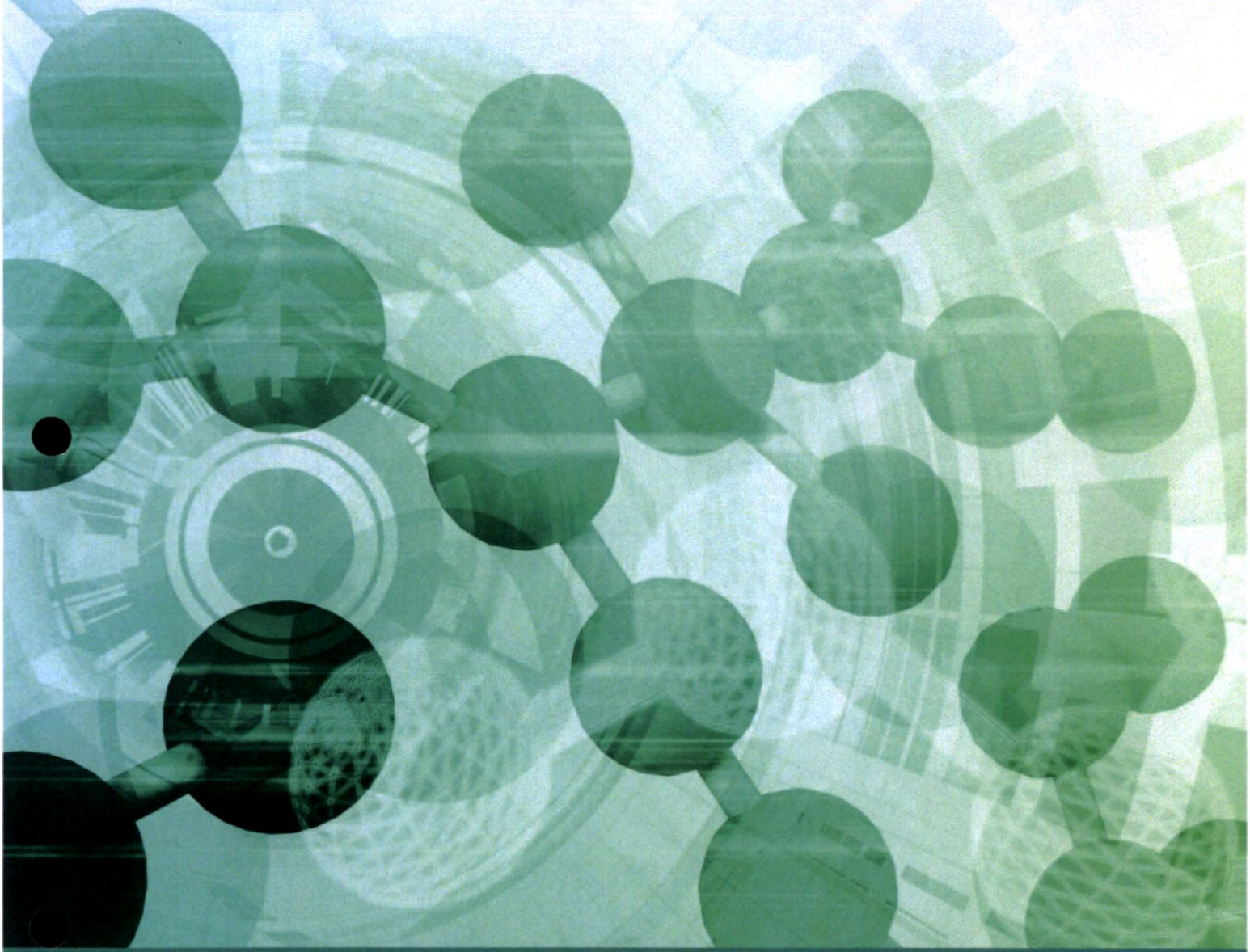
A full list of currently licensed waste facilities that can potentially be used for this development can be found on the National Waste Collection Permit Office Website - https://facilityregister.nwcpo.ie/.

Authorisation Reference	Name	Trading As	Address
WFP-DC-20-0054-01	Shanowen Plant Hire Ltd - Mobile Plant		Various Sites Various Sites Various Sites
WFP-DC-20-0053-01	Loftus Demolition & Recycling Ltd - Mobile PLant		Various Sites Various Sites Various Sites Various Sites
WFP-DC-20-0055-01	Padraig Thornton Waste Disposal Ltd	Thornton's Recycling	Unit S3A Henry Road Park West Business Park Dublin 12
WFP-DC-09-0015-03	Chevron Environmental Ltd	Electronic Recycling	Unit 20 Jamestown Business Park Jamestown Road Finglas D11 X2HN
WFP-DC-11-0023-03	Padraig Thornton Waste Disposal Ltd (PTWDL)	Thornton's Recycling	Unit 6 S3B Henry Road Park West Business Park D12 KT91
COR-DC-21-0010-01	Fridge Spares Wholesale Ltd		Unit 15, Blackwater Road Dublin Industrial Estate Glasnevin Dublin 11 D11 YK26
WFP-DC-11-0022-03	Dawnlane Limited	Mullen Scrap	31 & 32 Upper Clanbrassil Street Dublin 8 D08 XY92
WFP-DC-11-0025-03	Rehab Enterprises Limited	Rehab Recycle	The Rehab Building Kylemore Road Ballyfermot Dublin 10 D10 Y443
WFP-DC-11-0027-03	Tom Murphy Recovery & Towing Services Ltd		Block 4, Unit 24 Port Tunnel Business Park Clonshaugh Industrial Estate Dublin 17
WFP-DC-22-0059-01	Derek Beahan Limited	Derek Beahan Recovery	Unit 7 Concorde Industrial Estate Naas Road Dublin 12 D12 YD30
COR-DC-22-0011-01	Soaktech Limited		Unit 16, Butterly Business Park Kilmore Road Artane Dublin 5, D05 X079
WFP-DC-22-0060-01	Edward O'Reilly	E.O'Reilly Recycling	92E Fairview Strand Ballybough Dublin 3
WFP-DC-10-0021-04	Padraig Thornton Waste Disposal Ltd	Thornton's Recycling	Unit 51 Henry Road Park West Business Park Dublin 12 D12 FH68
WFP-DC-11-0028-03	Mitchell Taylor (Exports) Limited	MT oils	The Old Brewery Newmarket Dublin 8 D08 FPF6
WFP-DC-18-0045-02	J. Ryan Haulage Limited - Mobile Plant		Former Bailey Gibson Site 326-328 South Circular Road Dublin 8 D08 N8X6

Authorisation Reference	Name	Trading As	Address
WFP-DC-10-0018-03	Summerhill Spares Limited		Unit 3 Newtown Industrial Estate Malahide Road Coolock Dublin 17 D17 VY80
WFP-DC-10-0020-03	Everyday Waste & Skiphire	All Away Recycling	84E Pigeon House Road Ringsend Dublin 4 D04 R7N0
WFP-DC-23-0061-01	Wills Bros Limited		Terminal 4 North Lands, Dublin Port (bounded by Bond Road, Tolka Quay Road & Promenade Road) Dublin 1
WFP-DC-24-0062-01	Tinnelly Group	John Tinnelly & Sons Ireland Limited	Unit 5B, Unit 5H Fingal Bay Business Park Co. Dublin K32 NY57
WFP-DC-24-0063-01	Micks Recycling Limited	Micks Skips	Unit 3a Ballyboggan Business Centre Glasnevin Dublin 11
WFP-DC-19-0048-02	Sunflower Recycling Company (Limited by Guarantee)		Shamrock Terrace Five Lamps, North Strand Dublin 1 D01 DX67
WFP-DC-08-0002-04	G & T McGoverns Ltd		2-4, 9 & 12 Prices Lane Rear 31 Ranelagh Road Ranelagh Dublin 6
WFP-DC-22-0056-01 (T)	Dembachel Ltd.		Kylemore Business Park 2 Kylemore Way Inchicore Dublin 8
WFP-DC-25-0064-01	Martin Services (Industrial) Ltd		Unit 10/11 Bluebell Business Park Bluebell, Old Naas Road Dublin 12 D12 W995

Appendix 20.2 Operational Waste Management Plan

REPORT



Trinity Consultants

awnconsulting

Operational Waste Management Plan

Project Title: Holy Cross College LRD – Appendix 20.2

CLIENT

CWTC Multi Family ICAV acting solely in respect of its sub fund the DBTR DR1 Fund

DOCUMENT REFERENCE

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DATE

26/06/2025

AWN Consulting Ltd, The Tecpro Building, IDA Business & Technology Park, Clonshaugh, Dublin 17, D17 XD90

DOCUMENT CONTROL SHEET

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Details	Written by	Approved by
Signature		
Name	Chonaill Bradley	Fergal Callaghan
Title	Associate (Environmental)	Director
Date	26/06/2025	26/06/2025

Disclaimer
This report considers the specific instructions and requirements of our client. It is not intended for third-party use or reliance, and no responsibility is accepted for any third party. The provisions in this report apply solely to this project and should not be assumed applicable to other developments without review and modification.

ENVIRONMENT
I.S. EN ISO 14001:2015
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HEALTH & SAFETY
I.S. ISO 45001:2018
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QUALITY
I.S. EN ISO 9001:2015
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1. INTRODUCTION

AWN Consulting, a Trinity Consultants Team, has prepared this Operational Waste Management Plan (OWMP) on behalf of CWTC Multi Family ICAV acting on behalf of its sub-fund DBTR DR DR1 Fund. The development will consist of the construction of a residential development set out in blocks ranging in height from 3 to 13 storeys, to accommodate 1131 no. apartments including retail and crèche units, residential tenant amenity spaces, community/cultural spaces, mobility hubs and public open space.

This OWMP has been prepared to ensure that the management of waste during the operational phase of the proposed development is undertaken in accordance with the 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 National Waste Management Plan for a Circular Economy 2024 - 2030 (NWMPCE) (2024) [4] and Dublin City Council (DCC) 'Dublin City Council (Storage, Presentation and Segregation of Household and Commercial Waste) Bye-Laws' 2018 [5]. In particular, this OWMP aims to provide a robust strategy for the storage, handling, collection and transport of the wastes generated at Site.

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 national 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. OVERVIEW OF WASTE MANAGEMENT IN IRELAND

2.1 National level

The Irish Government issued a policy statement in September 1998 entitled 'Changing Our Ways' [6], 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 [7]. 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' [8]. This document also stressed the need to decouple 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*' [9]. 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'* [10] (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) [11] to set a course for Ireland to transition across all sectors and at all levels of Government toward circularity. This was issued in December 2021. The Strategy states "*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 [12] 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 Department of Housing, Local Government and Heritage authored Sustainable Residential Development and Compact Settlements - Guidelines for Planning Authorities (2024) [13], suggests the below thresholds at which the need for the supplemental information such as the OWMP should be considered.

- 30 or more residential units,
- 1,000 sq. metres of mixed-use development

Since 1998, the Environmental Protection Agency (EPA) has produced periodic 'National Waste (Database) Reports' which, as of 2023, have been renamed Circular Economy and Waste Statistics Highlight Reports [14] 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 2024 National Circular Economy and Waste Statistics web resource, which is the most recent study published, along with the national waste statistics web resource (2024) reported the following key statistics for 2022:

- Generated – Ireland produced 3,190,000 t of municipal waste in 2022. This is a slight increase since 2021. Of this, 55% came from households and 45% came from commercial and public service sources.
- Managed –In 2022, a total of 1.76 million Household waste collected and treated by the waste industry.
- Unmanaged – An estimated 36,970 tonnes of household waste was unmanaged waste i.e., not disposed of in the correct manner in 2022.
- Recovered – A rounded 1.3 million tonnes of Ireland's municipal waste went for incineration with energy recovery in 2022. This tonnage is 43% of municipal waste managed and a marginal increase on the 42% achieved in 2021.
- Recycled –Some 1.3 million tonnes of municipal waste generated in Ireland was recycled in 2022, resulting in a recycling rate of 41% . This indicates that we face significant challenges to meet the upcoming EU recycling targets for 2025 to 2035
- Of the municipal waste recycled in 2022, over 825,000 tonnes went for material recycling (approximately the same as 2021) and over 480,000 tonnes were treated by composting/anaerobic digestion (approximately the same as 2021 but up 37% on 2020). The large increase of composted/anaerobically digested biowaste from 2020 is mainly due to a change in our way of estimating home composting.
- Disposed – Ireland's landfill rate for municipal waste managed was 15% in 2022. This is a 1% decrease from 2021's rate of 16%.
- Reuse – 54,800 tonnes of second-hand products were estimated by the EPA to have been reused in Ireland in 2021. The average annual Reuse rate per person in Ireland is 10.6 kg per person.

2.2 Regional Level

The proposed development is located in the Local Authority administrative area of Dublin City Council (DCC). The EMR Waste Management Plan 2015 – 2021 has been superseded as of March 2024 by the NWMPCE 2024 - 2030.

The NWMPCE does not dissolve the three regional waste areas. The NWCPCE sets the ambition of the plan to have a 0% total waste growth per person over the life of the Plan with an emphasis on non-household wastes including waste from commercial activities and the construction and demolition sector.

This Plan seeks to influence sustainable consumption and prevent the generation of waste, improve the capture of materials to optimise circularity and enable compliance with policy and legislation.
The national plan sets out the following strategic targets for waste management in the country that are relevant to the development:

This Plan seeks to influence sustainable consumption and prevent the generation of waste, improve the capture of materials to optimise circularity and enable compliance with policy and legislation.

The national plan sets out the following strategic targets for waste management in the country that are relevant to the development:

National Targets

1A. (Residual Municipal Waste) 6% Reduction in Residual Municipal Waste per person by 2030

2A. (Contamination of Materials) 90% of Material in Compliance in the Dry Recycling Bin

2B. (Material Compliance Residual) 10% per annum increase in Material Compliance in the residual bin. (90% by the end of 2030)

3A. (Reuse of Materials) 20kg Per person / year – Reuse of materials like cloths or furniture to prevent waste.

Municipal landfill charges in Ireland are based on the weight of waste disposed. In the Leinster Region, charges are approximately €140-160 per tonne of waste, which includes a €85 per tonne landfill levy introduced under the Waste Management (Landfill Levy) (Amendment) Regulations 2015 [15]. *The Circular Economy (Waste Recovery Levy) Regulations 2024 [16]will also add a levy of €10 per tonne to waste accepted for recovery.*

The *Dublin City Development Plan 2022 – 2028* [17] 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 development plan.

- *CA8 (f): minimising the generation of site and construction waste and maximising reuse or recycling.*
- *CA23: 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.*
- *CA24: 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 2020 (or and any future updated versions of these guidelines produced during the lifetime of this plan).

Objectives:

- *SIO14 Local Recycling/Reuse 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 proposed development are:

- *Waste Management Act 1996 as amended;*
- *Environmental Protection Agency Act 1992 as amended;*
- *Litter Pollution Act 1997 as amended;*
- *Planning and Development Act 2000 as amended* [18]*;*
- *Circular Economy and Miscellaneous Provisions Act 2022;*
- *Waste Management (Food Waste) (Amendment Regulations) 2015 (S.I. 190/2015);*
- *the European Union (Household Food Waste and Bio-waste) Regulations 2015 (S.I. 430/2015);*
- *the Waste Management (Food Waste) Regulations 2009 (S.I. 508/2009).*

These Acts and subordinate Regulations transpose the 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 and/or facilities management undertake on-site management of waste in accordance with all legal requirements and that the facilities management company 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 contactor 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 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.

2.4 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 bought 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 proposed 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.

2.5 Regional Waste Management Service Providers and Facilities

Various contractors offer waste collection services for the commercial and residential sector 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 all are 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 in Poolbeg in Dublin.

The DCC Civic Amenity / Recycling Centre at Shamrock Terrace, Upper North Strand, Dublin 2, Ireland is located c. 1.5 km southeast of the development site, can be utilised by the residents of the proposed development for other household waste streams. This centre can accept paper, soft plastic, food waste, garden (green) waste, glass, metals, Tetra Pak, batteries, electrical items, white goods, light bulbs, paints, varnish, gas cylinders, and books. There is also a bring bank located c. 600m southeast of the proposed development site at Croke Park, Drumcondra, Dublin, D03HN53, where glass and aluminium cans can be deposited.

A copy of all CORs and waste permits issued by the Local Authorities are available from the NWCPO website and all Waste Licenses issued are available from the EPA.

3. DESCRIPTION OF THE DEVELOPMENT

3.1 Location, Size and Scale of the Development

The site of the proposed development is located at Holy Cross College, Clonliffe Road, Dublin 3 and Drumcondra Road Lower, Drumcondra, Dublin 9. The overall area of the site is c. 8.7 ha, with a developable site area of c. 8.2 ha. The site is located c. 1.7 km north of Dublin City Centre. It is bound by Drumcondra Road Lower, Archbishop's House (a Protected Structure), Mater Dei College and Crosscare Family Hub to the west; Clonliffe Road to the south; Cornmill Apartments and Belvedere College Rugby Grounds to the east; and by the River Tolka and future GAA sports ground to the north.

The site is situated in the administrative area of Dublin City Council, in the townlands of Clonliffe East and Clonliffe West.

The proposed development will consist of:

1. Demolition of a number of former office/college buildings on site, including the New Wing and Library Wing Buildings which are non-original/late 20th century addition, (total demolition of c. 6,327 sq.m) and the construction of a residential development with a gross floor area (GFA) of c. 106,181 sq.m (including existing buildings and excluding basement and podium areas) set out in 12 no. new residential blocks, ranging in height from 3 to 13 storeys, and re-use of 1 no. existing building, to accommodate 1,131 no. apartments, with associated residential tenant amenity, 1 no. retail unit, 1 no. crèche and re-use of existing buildings for community/cultural use. The site will accommodate a total of 382 no. car parking spaces and 2,619 no. bicycle parking spaces in separate basement/podium areas and at surface level. Landscaping will include extensive new public open spaces and communal courtyards, podiums and roof terraces.

2. The 1,131 no. residential buildings range in height from 2-storeys to 13-storeys, accommodating 1,131 no. apartments comprising 268 no. studios, 282 no. 1-bed units, 392 no. 2-bed units (2 no. 2-bed (3P) & 390 no. 2-bed (4P)), 132 no. 3-bed units and 57 no. 4-bed units. The breakdown of residential accommodation is as follows:

    - Block A1 is a 4 to 8 storey building, including setbacks and balconies, accommodating 234 no. units (47 no. studios, 98 no. 1-bed units, 56 no. 2-bed (4P), 25 no. 3-bed units and 8 no. 4-bed units);
    - Block A2 is a 7 to 9 storey building, including setbacks and balconies, accommodating 68 no. units; (23 no. studios, 8 no. 1-bed units, 37 no. 2-bed (4P));
    - Block A3 is an 8 to 10 storey building, including setbacks and balconies, accommodating 79 no. units; (26 no. studios, 9 no. 1-bed units, 44 no. 2-bed (4P));
    - Block A4 is a 6 to 13 storey building, including setbacks, balconies and terraces, accommodating 97 no. units; (29 no. studios, 38 no. 2-bed (4P), 18 no. 3-bed units, 12 no. 4-bed units);
    - Block B1 is a 5 to 7 storey building, including setbacks and balconies, accommodating 69 no. units; (5 no. studios, 15 no. 1-bed units, 26 no. 2-bed (4P), 10 no. 3-bed units, 13 no. 4-bed units);
    - Block B2 is a 6 to 8 storey building, including setbacks and balconies, accommodating 37 no. units; (2 no. studios, 5 no. 1-bed units, 16 no. 2-bed (4P), 13 no. 3-bed units, 1 no. 4-bed units);
    - Block B3 is a 6 to 10 storey building, including setbacks and balconies, accommodating 92 no. units; (16 no. studios, 25 no. 1-bed units, 45 no. 2-bed (4P), 6 no. 3-bed units);
    - Block B4 is a 4 to 6 storey building, including setbacks and balconies, accommodating 53 no. units; (10 no. studios, 17 no. 1-bed units, 10 no. 2-bed (4P), 6 no. 3-bed units, 10 no. 4-bed units);
    - Block C1A is a 5 to 6 storey building, including setbacks and balconies, accommodating 47 no. units; (18 no. studios, 7 no. 1-bed units, 10no. 2-bed (4P), 12 no. 3-bed units);
    - Block C1B is a 6 to 8 storey building, including setbacks and balconies, accommodating 66 no. units; (15 no. studios, 8 no. 1-bed units, 35 no. 2-bed (4P), 8 no. 3-bed units);

- Block C2 is a 5 to 7 storey building, including setbacks and balconies, accommodating 88 no. units; (43 no. studios, 8 no. 1-bed units, 2 no. 2-bed (3P), 18 no. 2-bed (4P), 7 no. 3-bed units, 10 no. 4-bed units);
- Block D2 is a 3 to 7 storey building, including setbacks and balconies, accommodating 145 no. units; (14 no. studios, 48 no. 1-bed units, 53 no. 2-bed (4P), 27 no. 3-bed units, 3 no. 4-bed units);
- The Seminary Building and South Link Building (Block E2) are existing Protected Structures of 2 to 4 storeys, with a proposed conversion of both buildings to accommodate 56 no. residential units (20 no. studios, 34 no. 1-bed units, 2 no. 2-bed (4P)); and
- Residential Tenant Amenity Space is provided throughout the scheme in Blocks A4, B1 and D2, totalling c. 1,989 sq.m and Communal Open Space is provided adjacent each block and at roof level on Blocks A1, A2, A3 & A4, totalling c. 10,323 sq.m.

3. The site contains a number of Protected Structures including The Seminary Building, Holy Cross Chapel, South Link Building, The Assembly Hall and The Ambulatory (RPS Ref. 1901). The application proposes the renovation of the Seminary Building and South Link Building to accommodate residential units and the renovation of the existing Holy Cross Chapel and Assembly Hall buildings for use as community/cultural uses. The wider Holy Cross College lands also include The Red House (RPS Ref. 1902) and the Archbishop's House (RPS Ref. 2361) - these are not included in the application boundary and no works are proposed to these Protected Structures, with the exception of adjacent landscaping and the proposed works to the Drumcondra Road boundary wall, which is inscribed under the Protected Structure of the Archbishop's House as noted below. The works to the Protected Structures within the application site include:

   - The Seminary Building (RPS Ref. 1901): The works include of the careful refurbishment and alteration of the existing 4-storey Seminary Building to provide residential accommodation. It is proposed that an existing adjacent element of the structure, the Library Wing on the northern elevation of the Seminary and the connecting corridors to the Seminary, will be demolished; new infill concrete walls are located to fill the gap where elements are removed. Materials that can be salvaged from this wing will be surveyed, their location noted, and re-used in the conservation and restoration works in The Seminary Building, where possible. The projecting WC blocks (modern addition to overall structure) to the rear (west) elevation of The Seminary Building are also proposed to be demolished. The external envelope of The Seminary Building, with existing chimneys, stone and render finishes, windows and doors is maintained and re-used; The scheme proposes 56 no. apartments installed within the existing shell on the East side of a corridor running along the rear of the plan;
   - The South Link Building (RPS Ref. 1901): The South Link Building consists of a 2-storey stone and render block, with slate roof and bellcote between Holy Cross Chapel and The Seminary Building; this building will be conserved and restored. Alterations to the South Link Building include the insertion of a new doorway within the existing front (Eastern) façade to link the front of the building to the cloister garden, and the insertion of 2 no. apartments in the ground and first floor space. The existing organ at first floor level will be moved to a new location within the Holy Cross Chapel;
   - Holy Cross Chapel (RPS Ref. 1901): Holy Cross Chapel is retained and restored as a community/cultural space. External alterations include a new metal door and interior alterations are limited to services and decoration; a section of the existing tiled floor will be lifted to allow for service connections to furniture installations.
   - The Assembly Hall (RPS Ref. 1901): The Assembly Hall comprises a 2-storey hall with its front façade, steps and projecting porch orientated towards Clonliffe Road. The building is conserved and restored as a community/cultural space as a part of the proposal; Existing doors and windows are retained and repaired. The existing Oratory located in the New Wing Building, will be relocated to within the Assembly Hall;
   - The Ambulatory (RPS Ref. 1901): All of the above referenced buildings are linked by a cloister colonnade (i.e. the Ambulatory) around two sides of a central garden; there is a part section of the colonnade on the North side and an indented (enclosed) section directly outside Holy Cross

Chapel; the fourth (east) side is completed by the rear elevation of The Seminary Building. The Ambulatory will be retained as part of the proposed development. The Cloister Garden will be restored and conserved as a part of the project for circulation, amenity and community/cultural use. The courtyard garden will be re-designed and re-planted as a part of the scheme; and

- Drumcondra Road Boundary Wall Entrance (Inscribed under Archbishop's House, RPS Ref. 2361): The existing entrance gates and the adjoining walls are part of the Archbishop's House Protected Structure. It is proposed to salvage and reuse, the existing stone gate pier to the south and reconstruct this pier in a new location further to the south, widening the gate opening in this location. This will involve the taking down of a small portion of the stone boundary wall.

4. Extensive areas of public open space of c. 23,842 sq.m or c. 29.89% of the site is provided for, including woodland walk, central seminary lawn, games area, and playground. The proposed landscaping scheme provides for the removal of some existing trees on the site as well as extensive new planting.

5. Non-residential uses include a crèche of c. 587 sq.m in Block A4 (with an external play area of 160 sq.m) and 1 no. retail unit of c. 306 sq.m in Block A1. The scheme includes for the renovation and reuse of the former Holy Cross Chapel and Assembly Hall buildings (c. 2,048 sq.m) and part of the Ambulatory and Cloister Garden (c. 1,952 sq.m) for use as community/cultural uses.

6. The site will accommodate a total of 382 no. car parking spaces (345 no. for residents and 41 no. for visitors/accessible use/car club) and 2,619 no. bicycle parking spaces including cargo bikes, EV charging and shared bikes (1,981 no. for residents and 638 no. for visitor/staff) in separate basement/podium areas and at surface level. It includes for a single level basement under Blocks B2, B3 & C1, containing 50 no. car spaces, cycle parking, plant, storage areas, waste storage areas and other associated facilities, a single level basement and podium parking under Block D2 containing 136 no. car spaces, cycle parking, plant, storage areas, waste storage areas and other associated facilities and a part podium level basement, part single level basement/part podium under Block A1, containing 155 no. car spaces, cycle parking spaces, plant, storage areas, waste storage areas and other associated facilities. A total of 1,646 no. resident's bicycle stores are provided at basement/podium/ground level within the blocks, and the remaining 240 no. spaces are located proximate to residential buildings in external bike stores. In addition, 41 no. car parking spaces are located at surface level to include visitor, accessible, EV, car club and 4 no. Block D resident spaces, as well as 638 no. short stay bicycle parking spaces. The scheme also includes for 2 no. mobility hubs located at the ground floor of Block A1 and D2.

7. The site is accessed by vehicles, cyclists and pedestrians from a widened existing entrance on Clonliffe Road, at the junction with Jones's Road (which is already permitted as part of the under construction hotel - DCC Reg. Ref. 2935/20 and ABP Reg. Ref. 308193), and through the widening and reopening of an existing access point on Drumcondra Road Lower at the junction with Hollybank Road to act as a left in/left out access. There is no vehicular access through the site for the public or occupants of the sites, other than for maintenance and operations. An additional cyclist and pedestrian access is proposed through an existing access point on Holy Cross Avenue. A relocated entrance to the Archbishop's House through the site is provided on the northern boundary of the Archbishop's House.

8. The proposed application includes all site landscaping works, green roofs, boundary treatments, lighting, servicing, signage, ESB Substations, solar PV panels at roof level on all residential blocks (excluding The Seminary Building (E2)), and all associated and ancillary works, including site development works above and below ground including site drainage and infrastructure.

3.2 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), metal cans, plastic bottles, aluminium cans, tins and Tetra Pak cartons;
- Cardboard (bailed)
- Plastic packaging (bailed)
- 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 less frequently / in smaller quantities which will need to be managed separately including:

- Drink Cans and Bottles (Deposit Return Scheme)
- Green / garden waste may be generated from 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;
- Textiles;
- Waste cooking oil (if any generated by the tenants or residents);
- Furniture (and, from time to time, other bulky wastes); and
- Abandoned bicycles.

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 List of Waste Codes

In 1994, the *European Waste Catalogue* [19] and *Hazardous Waste List* [20] were published by the European Commission. In 2002, the EPA published a document titled the *European Waste Catalogue and Hazardous Waste List* [21], 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*'[22] 2018. 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 for typical waste materials expected to be generated during the operation of the proposed development are provided in Table 3-1 below.

Table 3.1 Typical Waste Types Generated and LoW Codes

Waste Material	LoW 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*

4. ESTIMATED WASTE ARISING

A waste generation model (WGM) developed by AWN has been used to predict waste types, weights and volumes expected to arise 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 residential amenities has been determined based on the predicted occupancy of the units. While the floor area usage (m^2) has been used to estimate the waste arising from the crèche, retail units and community/cultural units (commercial units).

The estimated waste generation for the proposed development for the main waste types is presented in Tables 4-1.

Table 4.1 Estimated Waste Generation for Proposed Development (Residential)

Waste Type	Waste Volume (m^3 / week)			
	Block A1.1 & A 1.2	Block A2	Block A3	Block A4
Organic Waste	3.33	1.00	1.15	1.65
DMR	23.60	7.08	8.17	11.70
Glass	0.64	0.19	0.22	0.32
MNR	12.41	3.72	4.29	6.15
Total	**39.99**	**12.00**	**13.84**	**19.82**

Table 4.2 Estimated Waste Generation for Proposed Development (Residential)

Waste Type	Waste Volume (m^3 / week)			
	Block B1	Block B2	Block B3	Block B4
Organic Waste	1.20	0.66	1.29	0.86
DMR	8.50	4.71	9.17	6.07
Glass	0.23	0.13	0.25	0.17
MNR	4.47	2.48	4.82	3.19
Total	**14.40**	**7.98**	**15.54**	**10.29**

Table 4.3 Estimated Waste Generation for Proposed Development (Residential)

Waste Type	Waste Volume (m^3 / week)			
	Block C1.a	Block C1.b	Block C2	Block D1
Organic Waste	0.71	1.01	1.36	0.34
DMR	5.01	7.17	9.61	2.41
Glass	0.14	0.20	0.26	0.07
MNR	2.64	3.77	5.06	1.27
Total	**8.50**	**12.15**	**16.29**	**4.09**

Table 4.4 Estimated Waste Generation for Proposed Development (Residential)

Waste Type	Waste Volume (m^3 / week)			
	Block D2.a	Block D2.b	Block D2.c	Block E2
Organic Waste	0.58	0.04	0.09	0.65
DMR	3.96	1.40	1.85	4.61
Glass	0.11	0.01	0.05	0.13

MNR	2.63	0.76	0.77	2.42
Total	**7.28**	**2.21**	**2.77**	**7.80**

Table 4.5 Estimated Waste Generation for Proposed Development (Commercial)

Waste Type	Waste Volume (m^3 / week)			
	Creche (A4)	Retail (A4)	Retail (D2a)	Community/ Cultural E3 & E4
Organic Waste	0.06	0.10	0.05	0.11
DMR	2.22	1.89	0.97	2.26
Glass	0.01	0.05	0.03	0.06
MNR	1.21	0.79	0.40	0.94
Total	**3.50**	**2.82**	**1.44**	**3.38**

BS5906:2005 Waste Management in Buildings – Code of Practice [23] has been considered in the calculations of waste estimates. AWN's modelling methodology is based on recently published data and data from numerous other similar developments in Ireland and, as it is based on AWN's experience, it provides a more representative estimate of the likely waste arisings from the proposed development.

5. WASTE STORAGE AND COLLECTION

This section provides information on how waste generated within the site will be stored and collected. 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,
- The NWMPCE (2024);
- Dublin City Council Development Plan 2022 – 2028 (Appendix 7);
- DCC Dublin City Council (Storage, Presentation and Segregation of Household and Commercial Waste) Bye-Laws (2018);
- DoHLGH, *Design Manual for Urban Roads and Streets* (2019) [24]; and
- DoHLGH, Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities (2023) [25].

Waste Storage Requirements

Using the estimated waste generation volumes in Tables 4.1 – 4.5, above, the waste receptacle requirements for MNR, DMR, organic waste and glass have been established for the Waste Storage Areas (WSA). It is envisaged that residential organic waste and glass will be collected on a weekly basis while MNR and DMR will be collected on a twice weekly basis.

Commercial waste will be collected on a weekly basis.

The locations of the WSAs can be viewed on the drawings submitted with the planning application under separate cover and in the appendices of this report.

Waste management facilities, servicing and parking have been sited and designed sensitively to minimise their visual impact and avoid any adverse impacts on users of highways in the surrounding neighbourhood

Using the estimated waste generation volumes in Tables 4-1 above, the waste receptacle requirements for MNR, DMR, organic waste and glass have been established for the WSAs and can be found in table 5-1.

Waste Storage Requirements

Estimated waste storage requirements for the operational phase of the proposed development are detailed in Table 5-1, below.

Table 5.1 Waste storage requirements for the proposed development

Area/Use	Bins Required			
	MNR[1]	DMR[2]	Glass	Organic
Block A1.1 & A1.2	6 no. 1100 L	11 no. 1100 L	3 no. 240 L	14 no. 240 L
Block A2	2 no. 1100 L	4 no. 1100 L	1 no. 240 L	5 no. 240 L
Block A3	2 no. 1100 L	4 no. 1100 L	1 no. 240 L	5 no. 240 L
Block A4.1-1.3	3 no. 1100 L	6 no. 1100 L	2 no. 240 L	7 no. 240 L

Area/Use	Bins Required			
	MNR[1]	DMR[2]	Glass	Organic
Block B1	2 no. 1100 L	4 no. 1100 L	1 no. 240 L	5 no. 240 L
Block B2	1 no. 1100 L	2 no. 1100 L	2 no. 240 L	3 no. 240 L
Block B3	2 no. 1100 L 1 no. 240L	4 no. 1100 L 1 no. 240L	1 no. 240 L	6 no. 240 L
Block B4	2 no. 1100 L	3 no. 1100 L	1 no. 240 L	4 no. 240 L
Block C1a	1 no. 1100 L 1 no. 240L	3 no. 1100 L	1 no. 240 L	3 no. 240 L
Block C1b	2 no. 1100 L	4 no. 1100 L	1 no. 240 L	5 no. 240 L
Block C2	3 no. 1100 L	5 no. 1100 L	1 no. 240 L	6 no. 120 L
Block D1	1 no. 1100 L	1 no. 1100 L 1 no. 240L	1 no. 240 L	2 no. 240 L
Block D2.a	2 no. 1100 L	3 no. 1100 L	1 no. 240 L	4 no. 240 L
Block D2.b	3 no. 1100 L	5 no. 1100 L	1 no. 240 L	6 no. 240 L
Block D2.c	1 no. 1100 L	1 no. 1100 L	1 no. 240 L	1 no. 240 L
Block E2	1 no. 1100 L 1 no. 240 L	2 no. 1100 L 1 no. 240 L	1 no. 240 L	3 no. 240 L
Creche Unit (A4)	1 no. 1100 L	2 no. 1100 L	1 no. 120 L	1 no. 120 L
Retail Unit (A4)	1 no. 1100 L	2 no. 1100 L	1 no. 120 L	1 no. 120 L
Retail Unit (D2.a)	2 no. 240 L	1 no. 1100 L	1 no. 120 L	1 no. 120 L
Block E3 & E4	1 no. 1100 L	2 no. 1100 L	1 no. 120 L	1 no. 120 L

Note: 1 = Mixed Non-Recyclables
2 = Dry Mixed Recyclables

The waste receptacle requirements have been established from distribution of the total weekly waste generation estimate into the holding capacity of each receptacle type, along with collection frequency.

Waste storage receptacles as per Table 5.1 above (or similar appropriate approved containers) will be provided by the waste contractor in the WSA.

As outlined in the current Dublin City Development Plan, it is preferable to use 1,100 L 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 L 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)



Receptacles for organic, mixed dry recyclable, glass and mixed non-recyclable waste will be provided in the WSAs prior to first occupation of the development.

Alternative options can be considered in future by the facilities management company, as technologies are developed. Solely for the purpose of ensuring the WSA is sufficiently sized to accommodate bins which take up more space.

A waste management plan will be provided to each resident and tenant from first occupation of the development. 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:

- Organic Waste;
- DMR;
- Glass; and
- MNR.

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



Residents will be required to take their segregated waste materials to their designated residential WSAs and deposit their segregated waste into the appropriate bins. The locations of the residential WSA is illustrated in the drawings submitted with the planning application under separate cover, and in appendices of this report.

Each bin / container in the residential 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 WSA will be restricted to authorised residents, facilities management of the development and waste contractors by means of a key or electronic fob access.

Other waste materials such as textiles, batteries, printer toner/cartridges, waste cooking oil 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 5.4.

5.2 Waste Storage – Commercial Units

The commercial tenants which includes the cultural/community use units will be required to segregate waste within their own unit into the following main waste types:

- Organic Waste;
- DMR;
- Glass; and
- MNR;

The commercial tenants will be required to take their segregated waste materials to their designated commercial WSAs and deposit their segregated waste into the appropriate waste receptacles. The location of the WSA is illustrated in the drawings submitted with the planning application under separate cover and in the appendices of this report.

Suppliers for the commercial tenants should be requested by the tenants to make deliveries in reusable containers, minimize packaging or remove any packaging after delivery, where possible, to reduce waste generated by the proposed development.

If any kitchens are allocated in unit area, 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 WSA.

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;
- Dish-wash and Glass-wash Area; and
- Bar 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 commercial bin stores.

All bins / containers in the commercial tenants' areas as well as in the WSA 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 textiles, batteries, lightbulbs, WEEE, cooking oil and printer toner / cartridges will be generated less frequently. Space has been allocated within the commercial WSAs for the storage of these items. Collections of these items will be arranged as required by the tenant or facilities management depending on the agreement. Further details on additional waste types can be found in Section 5.4.

5.3 Waste Collection

There are numerous private contractors that provide waste collection services in the Dublin City 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.

Bins from the development will be brought to collection points by the waste contractor or facilities management, immediately prior to collection. The basement level carparks are insufficient in height for a waste truck to access; therefore, all waste will be collected at grade. All locations for collection can be viewed on the drawings submitted with the planning application under separate cover and in Appendix B of this report.

The 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* (2019).

A trolley / tug or suitable vehicle may be required to convey the bins to and from the collection area. The facilities management or waste contractor will ensure that empty bins are promptly returned to the WSAs after collection / emptying.

Suitable access and egress has been provided to enable the bins to be moved easily from the temporary staging area to the waste collection vehicles on the appropriate days. Waste will be collected at agreed days and times by the nominated waste contractors.

All waste receptacles will be clearly identified as required by waste legislation and the requirements of the DCC *Waste Bye-Laws*. Waste will be presented for collection in a manner that will not endanger health, create a risk to traffic, harm the environment or create a nuisance through odours or litter.

It is recommended that bin collection times are staggered to reduce the number of bins required to be emptied at once and the time the waste vehicle is on-Site. This will be determined during the process of appointment of a waste contractor.

5.4 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.

Deposit Return Scheme
Most drinks containers can be recycled via the deposit return scheme, such as bottles, cans and tins made from plastic, aluminium or steel. These items can be returned once they are between 150ml and 3 litres in size and have the Re-turn logo on them.

At the shops you can either return the containers:

- Using a Reverse Vending Machine (RVM)
- Manually in the shop

If a shop does not have a RVM but they sell containers with the Re-turn logo, the shop may allow you to manually return containers in store, unless they have a take back exemption.

Locations of RVM machines can be found via the Re-turn website (www.re-turn.ie)

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 a 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 a 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 units, where appropriate. The commercial tenants will be required to store this waste within their units 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 will be 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 pending disposal 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 in the commercial units. It is anticipated that the 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.

Waste 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 their units 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 tenants. The collection of bulky waste will be arranged, as required by the tenant. If residents wish to dispose of furniture, this can be brought 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 may arrange collection by a licensed waste contractor.

5.5 Waste Storage Area Design

The commercial and residential 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 WSA;
- 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 management company, commercial tenants and residents will be required to maintain the resident bins and storage areas in good condition as required by the DCC Waste Bye-Laws.

5.6 Facility Management Responsibilities

It shall be the responsibility of the facilities manager to ensure that all waste generated is managed to ensure correct storage prior to collection by an appropriately permitted waste management company.

The facilities manager will provide the following items to all residents, commercial staff and any facilities management team appointed:

- Provision of a Waste Management Plan document, prepared by the facilities manager, to all residents, commercial tenants and facilities management staff. It 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, tenants and staff of their obligation to reduce waste, segregate waste and dispose of it in the correct bin;
- Preparation of an annual waste management report for all residents, commercial tenants and staff to view;
- Designation of access routes to common waste storage areas to ensure safe access from the unit 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;
- Frequent inspection of waste storage areas and signing of a monitoring check list, which shall be displayed within the area; and

- Maintenance of a register, detailing the quantities and breakdown of wastes collected from the development and provision of supporting documentation by the waste collector to allow tracking of waste recycling rates.

5.7 Pest Management

A pest control operator will be appointed as required to manage pests onsite during the operational phase of this development. All waste generated within the development will be stored in closed waste receptacles both within the office & commercial units and within the WSA. Any waste receptacles will be carefully managed to prevent leaks, odours and pest problems.

The WSA will have access for potential control of vermin, if required, be supplied with hot or cold water, drainage point and will be regularly inspected by facilities management to deter pests.

6. SUMMARY AND CONCLUSION

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 proposed 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 contributing to the targets set out in the *NWMPCE*.

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.*

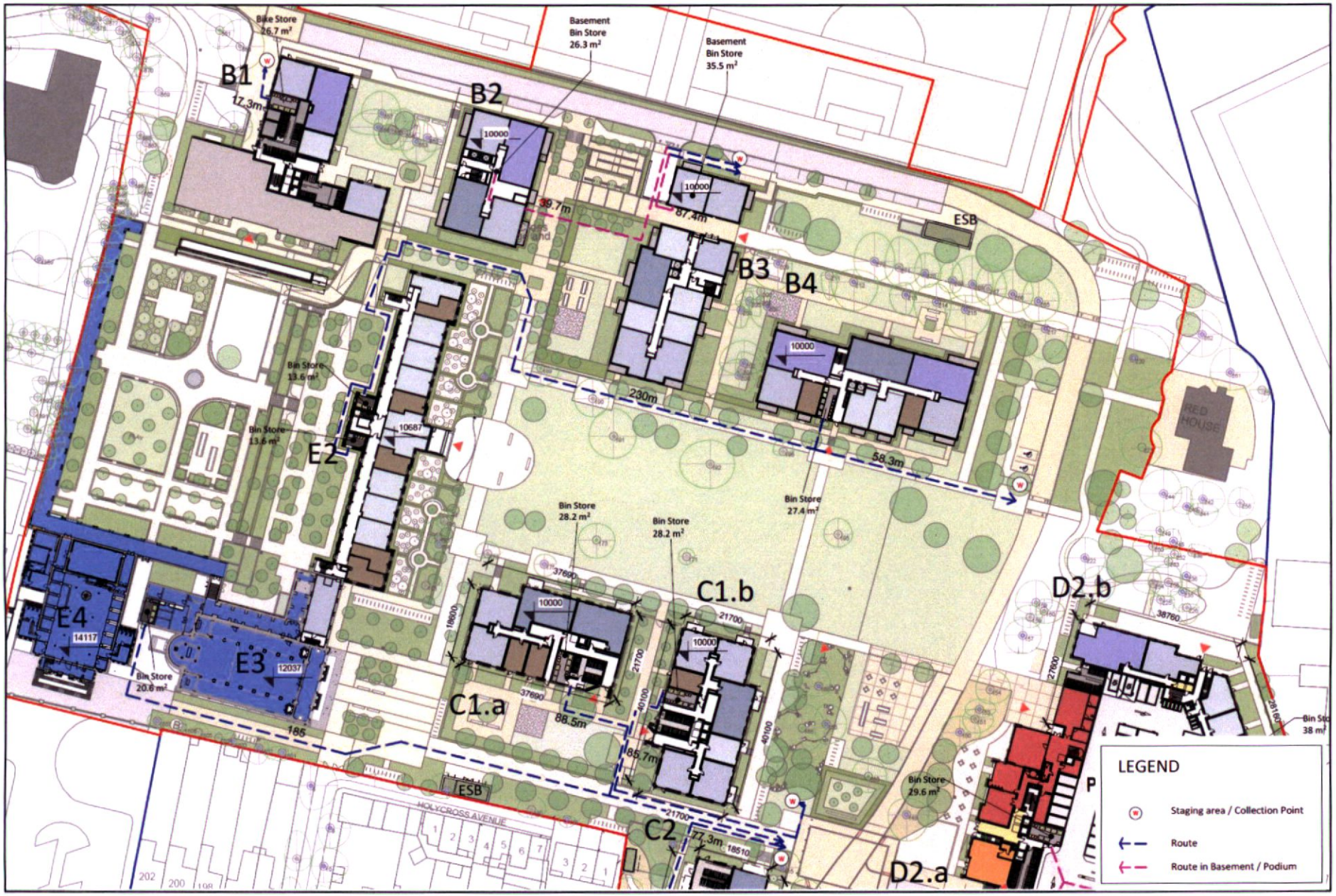
The waste strategy presented in this document will ensure sufficient storage capacity is provided for the estimated quantity of segregated waste. The designated areas for waste storage will provide sufficient room for the required receptacles in accordance with the details of this strategy.

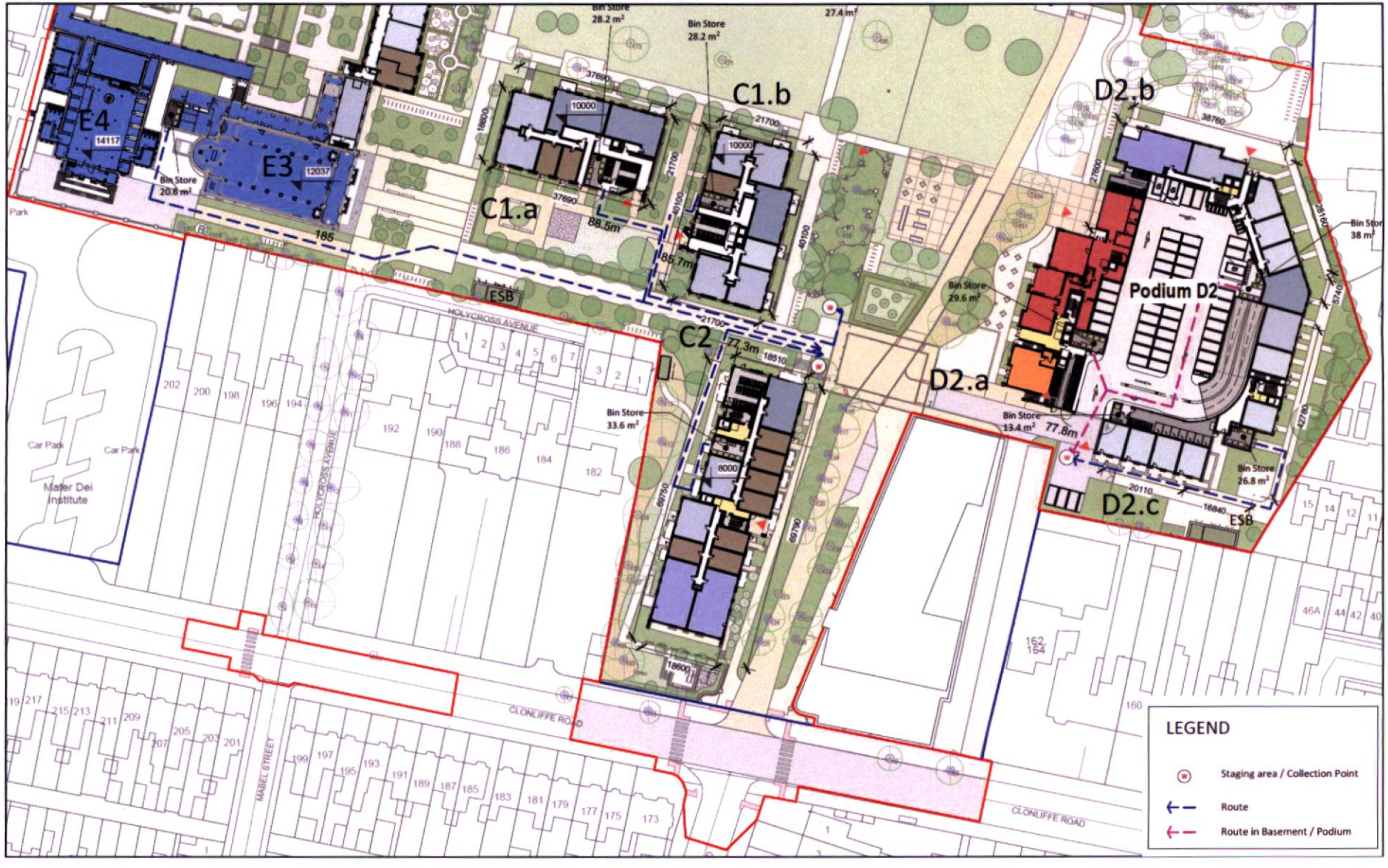
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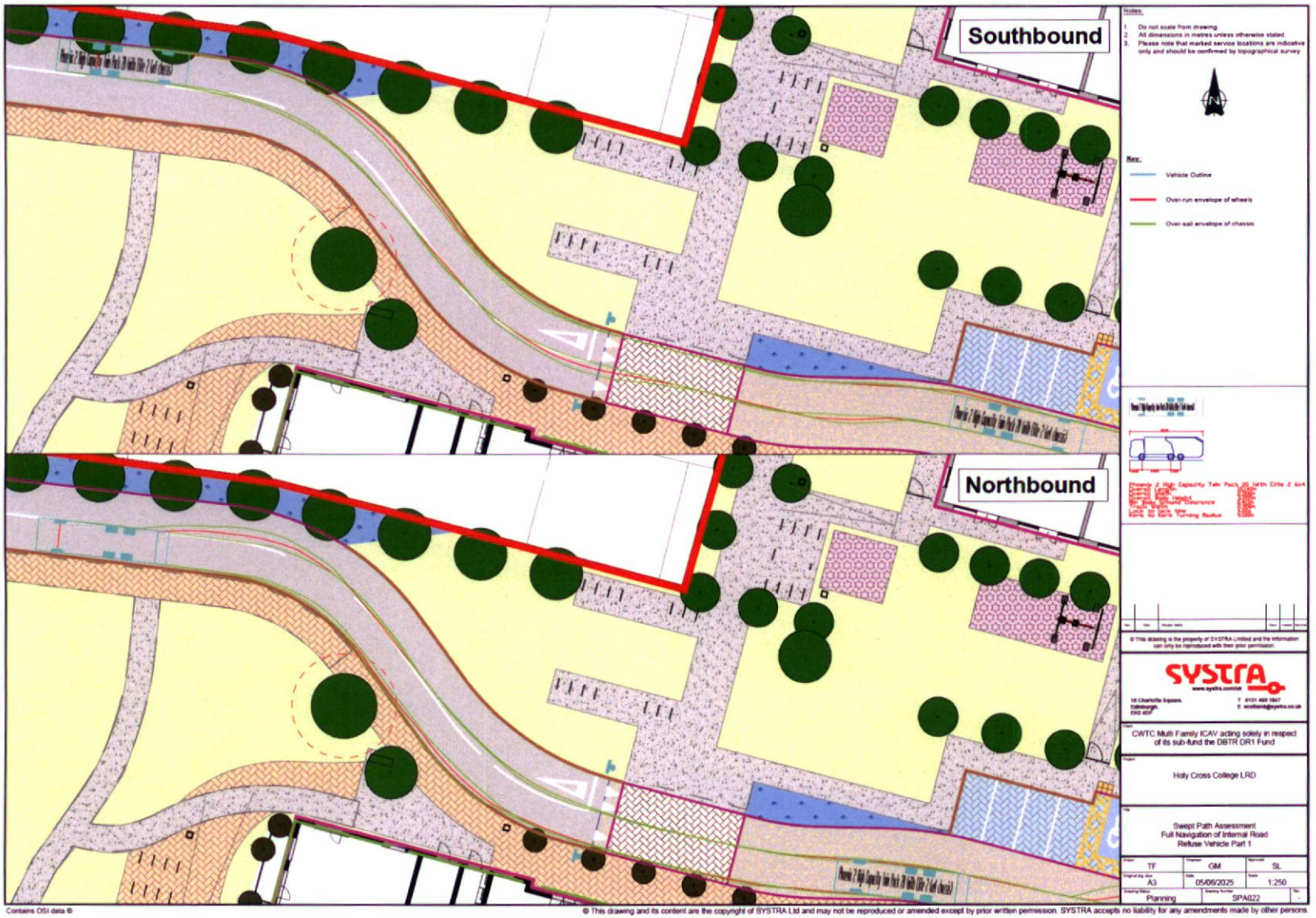
APPENDIX A. WASTE STORAGE AREAS

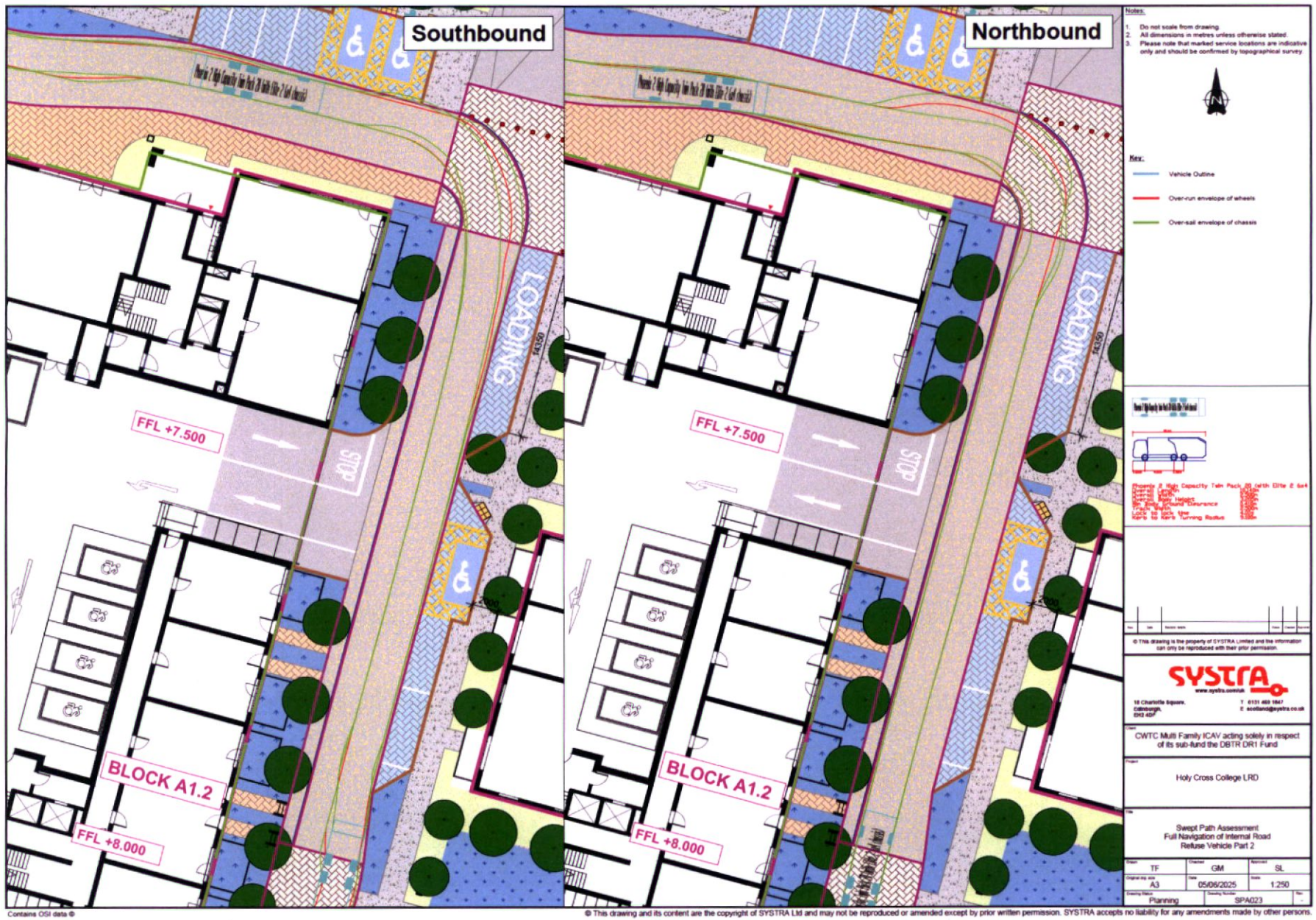


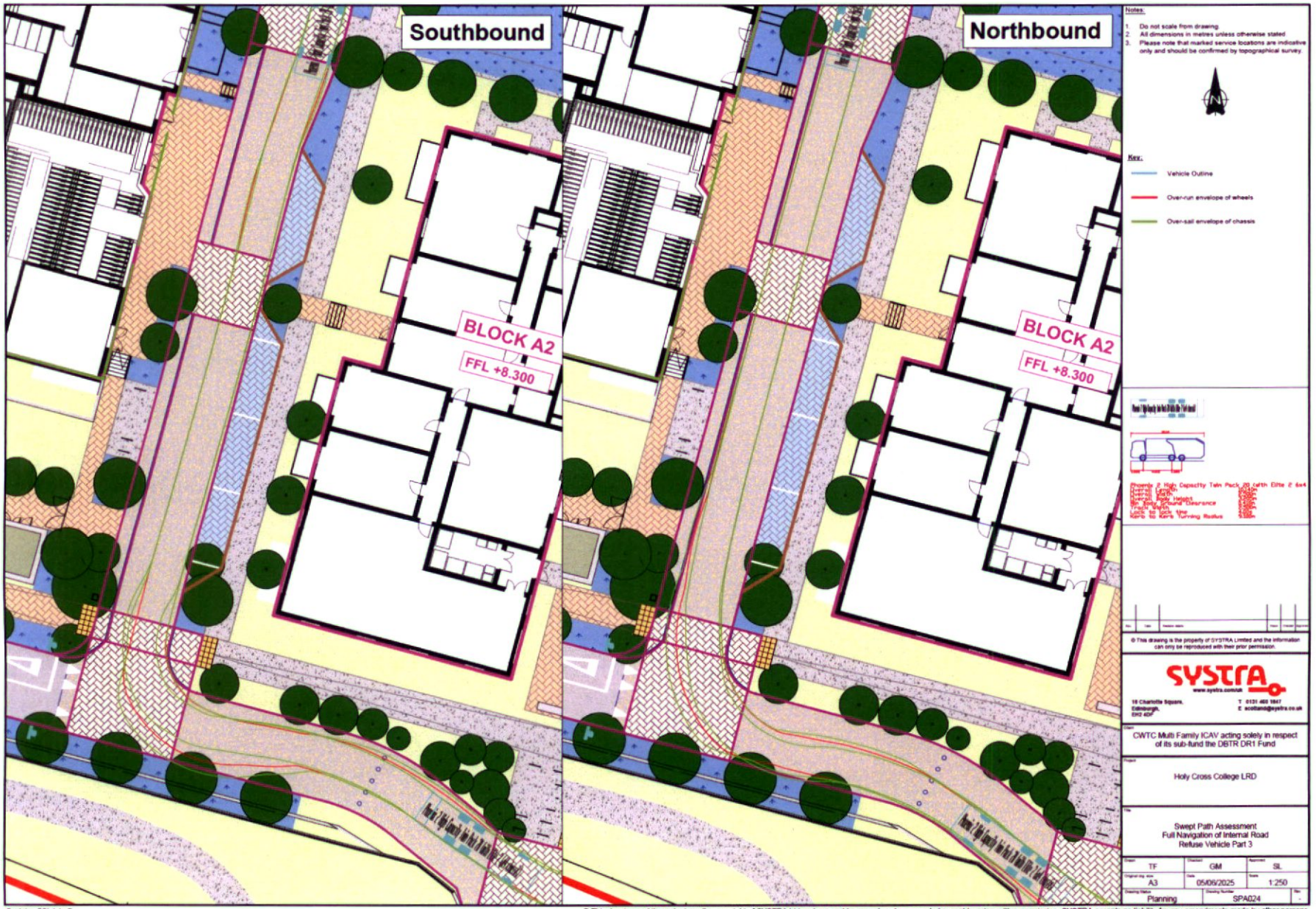

B1
B2
B3
B4
E2
E3
E4
C1.a
C1.b
C2
D2.a
D2.b
Bike Store 26.7 m²
Basement Bin Store 26.3 m²
Basement Bin Store 35.5 m²
ESB
Bin Store 13.6 m²
Bin Store 13.6 m²
Bin Store 28.2 m²
Bin Store 28.2 m²
Bin Store 27.4 m²
Bin Store 20.6 m²
Bin Store 29.6 m²
Bin Store 38 m²
ESB
HOLYCROSS AVENUE
LEGEND
Staging area / Collection Point
Route
Route in Basement / Podium

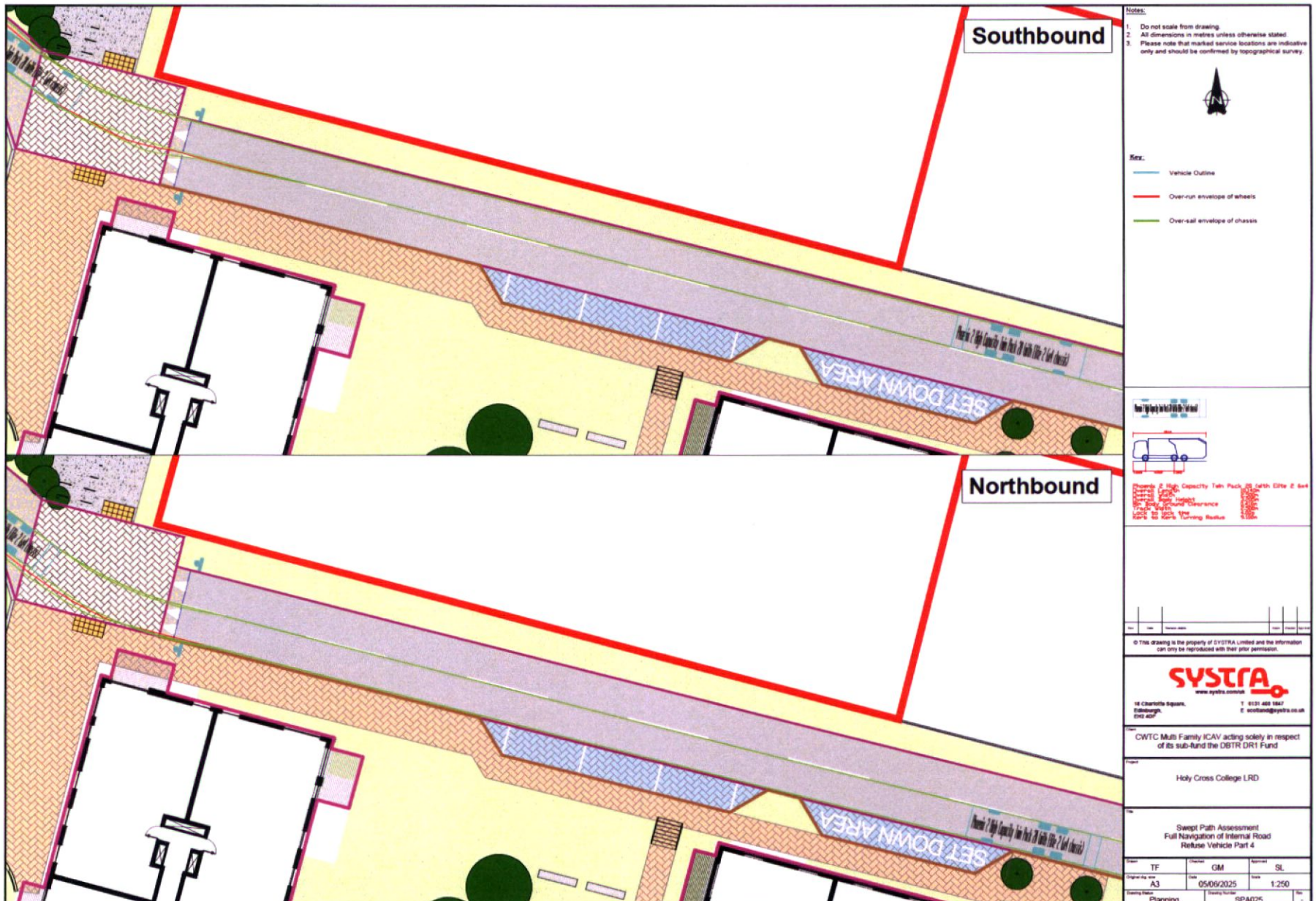

E4
14117
E3
12037
C1.a
C1.b
C2
D2.a
D2.b
D2.c
Podium D2
Bin Store 20.8 m²
Bin Store 28.2 m²
Bin Store 28.2 m²
Bin Store 29.6 m²
Bin Store 13.4 m²
Bin Store 26.8 m²
Bin Store 33.6 m²
Bin Store 38 m²
ESB
ESB
88.5m
86.7m
77.3m
77.8m
185
HOLYCROSS AVENUE
CLONLIFFE ROAD
CLONLIFFE ROAD
MABEL STREET
Mater Dei Institute
Car Park
Car Park
Park
LEGEND
Staging area / Collection Point
Route
Route in Basement / Podium

APPENDIX B. ROAD SWEEP ANALYSIS FOR REFUSE TRUCK

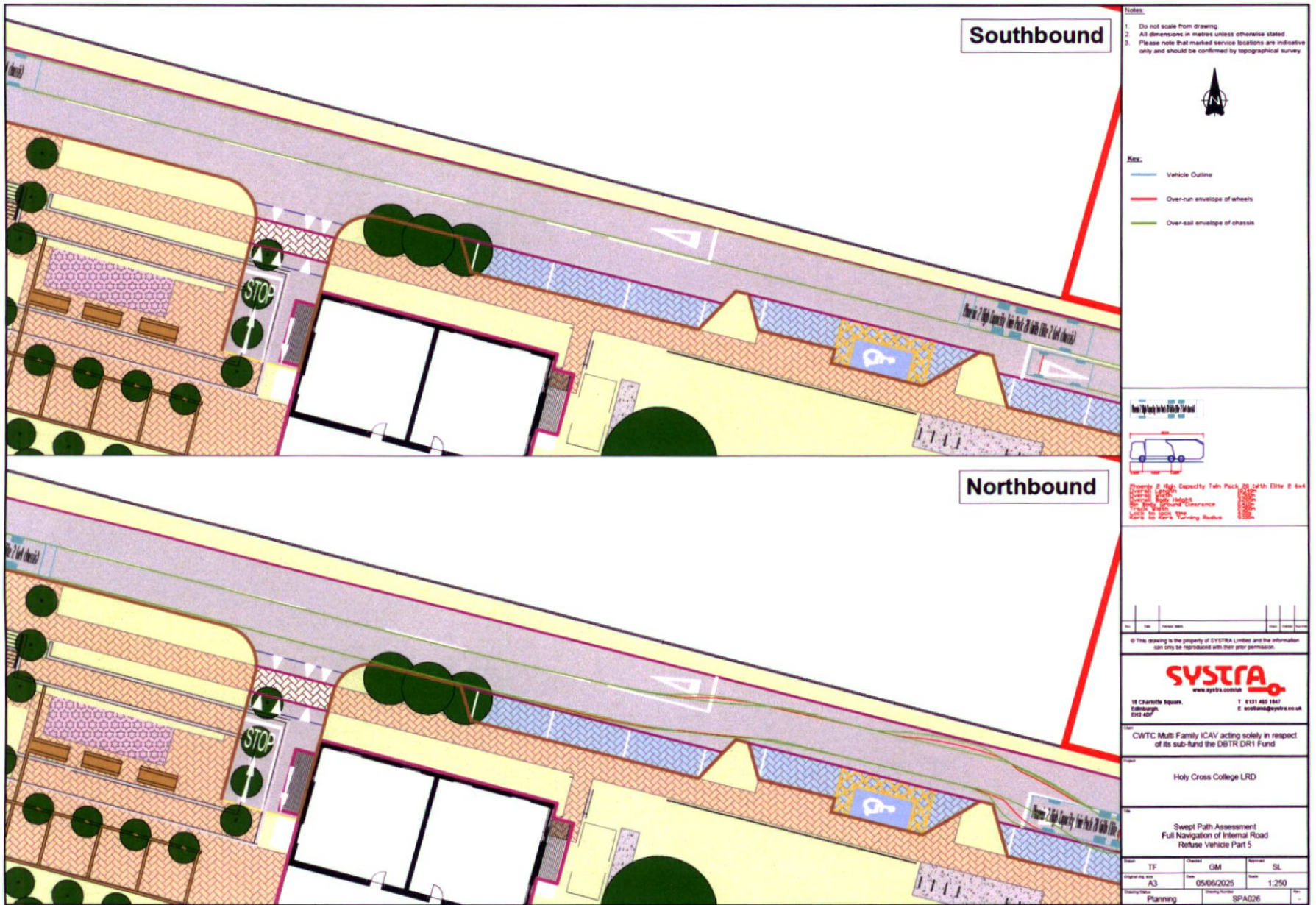


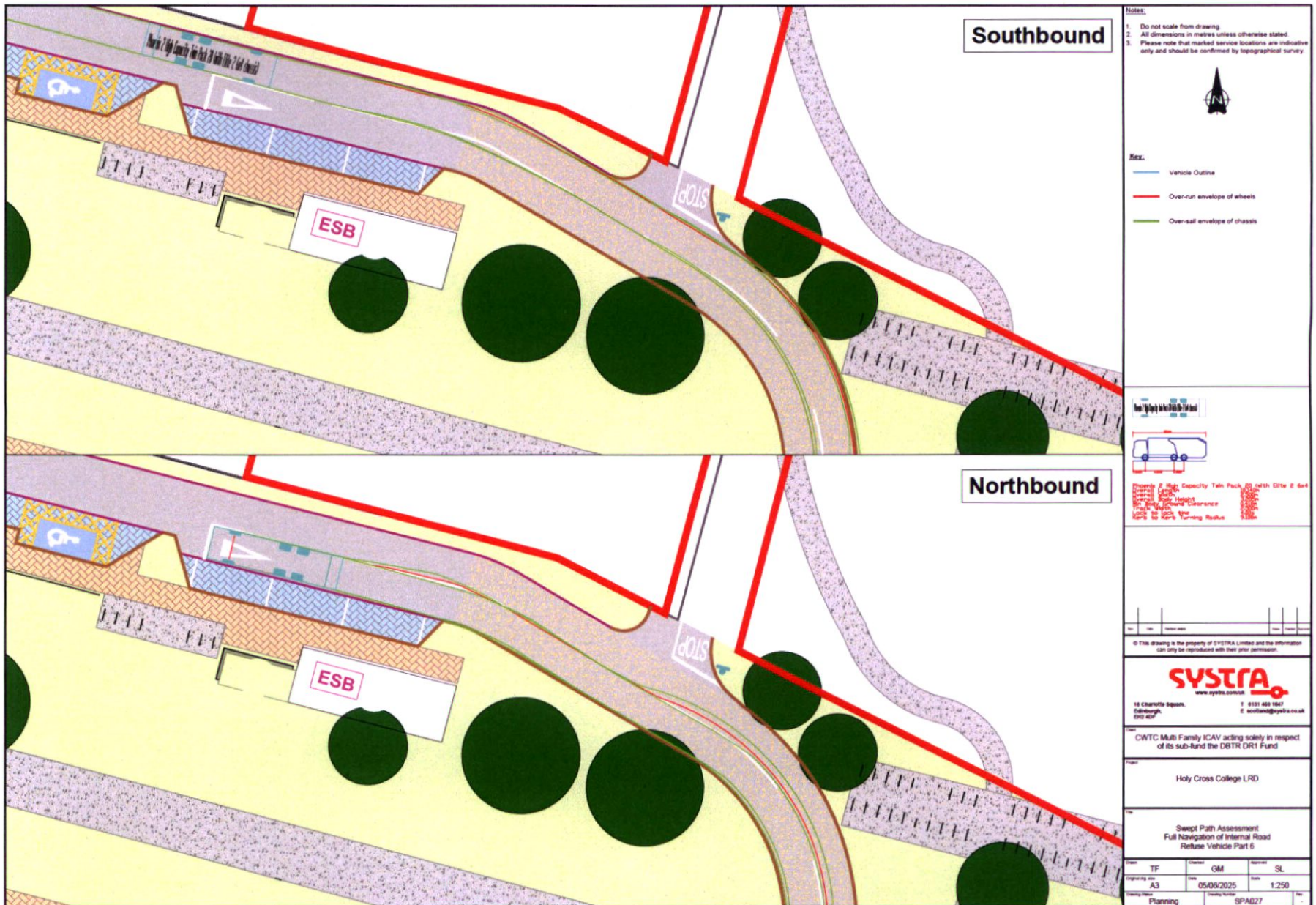

Southbound
Northbound
LOADING
STOP
FFL +7.500
BLOCK A1.2
FFL +8.000
Notes:
1. Do not scale from drawing.
2. All dimensions in metres unless otherwise stated.
3. Please note that marked service locations are indicative only and should be confirmed by topographical survey.
Key:
Vehicle Outline
Over-run envelope of wheels
Over-sail envelope of chassis
SYSTRA
CWTC Multi Family ICAV acting solely in respect of its sub-fund the DBTR DR1 Fund
Holy Cross College LRD
Swept Path Assessment
Full Navigation of Internal Road
Refuse Vehicle Part 2
TF
GM
SL
A3
05/06/2025
1:250
Planning
SPA023
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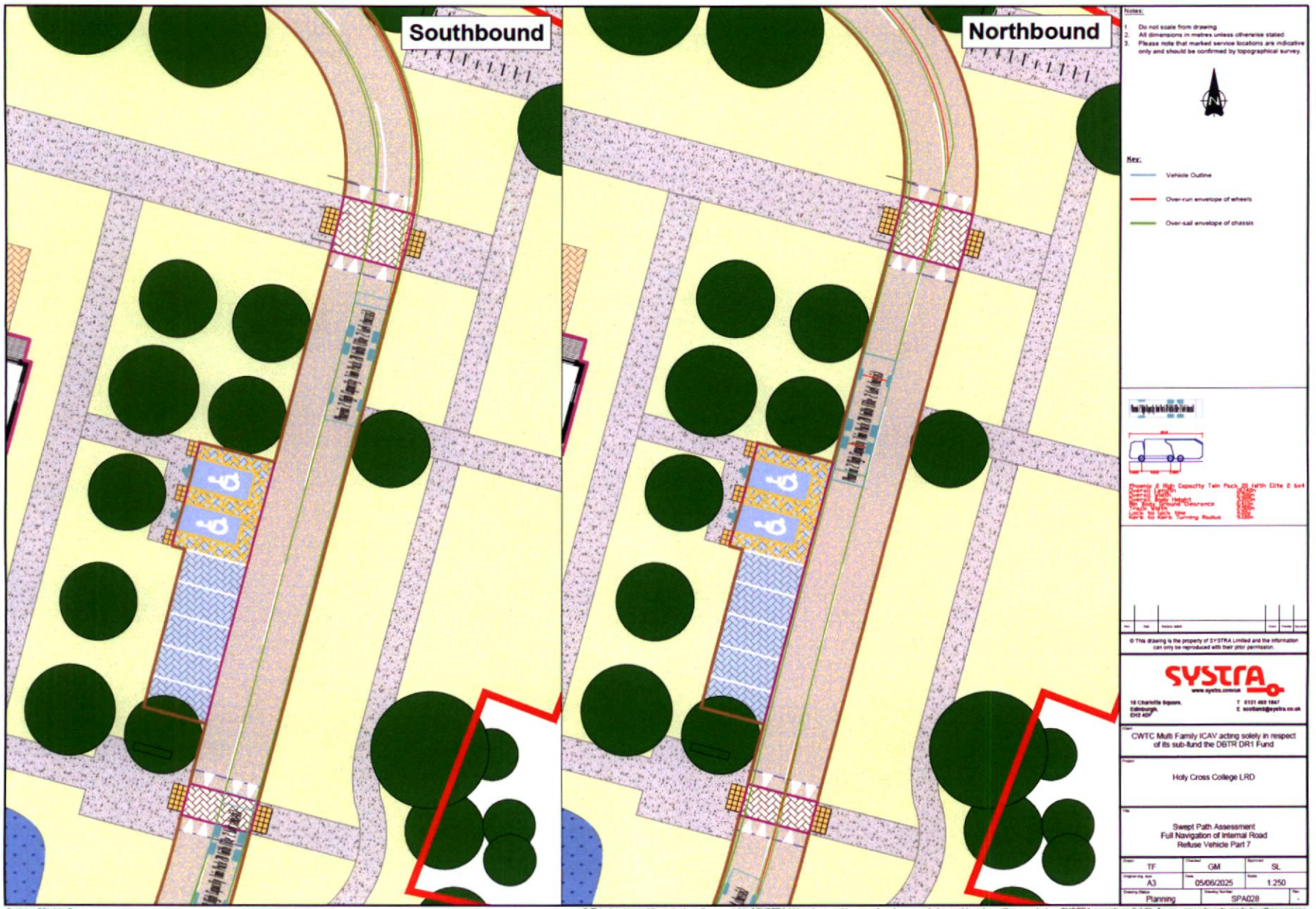

Southbound
Northbound
BLOCK A2
FFL +8.300
BLOCK A2
FFL +8.300
Notes:
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3. Please note that marked service locations are indicative only and should be confirmed by topographical survey.
Key:
Vehicle Outline
Over-run envelope of wheels
Over-sail envelope of chassis
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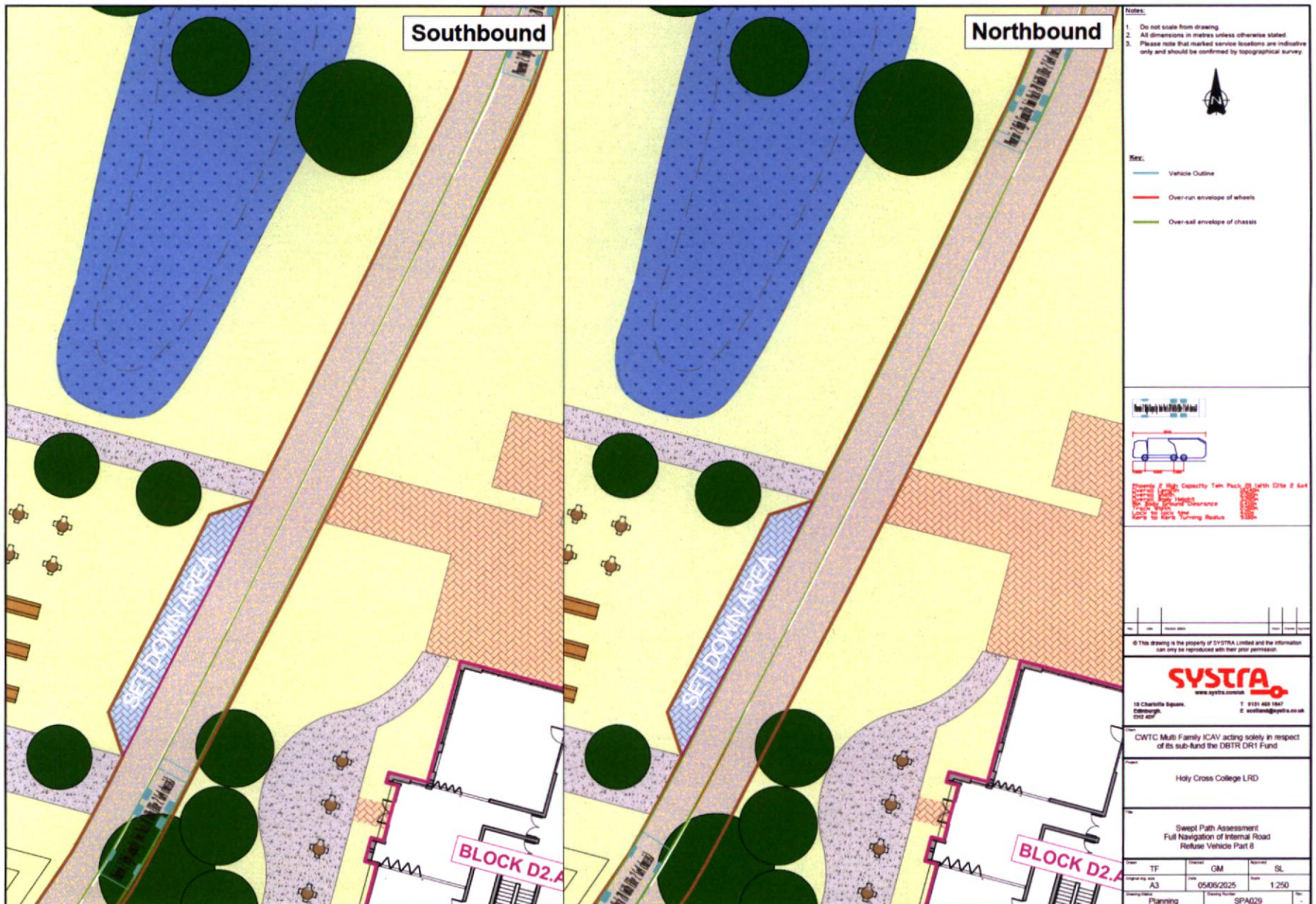


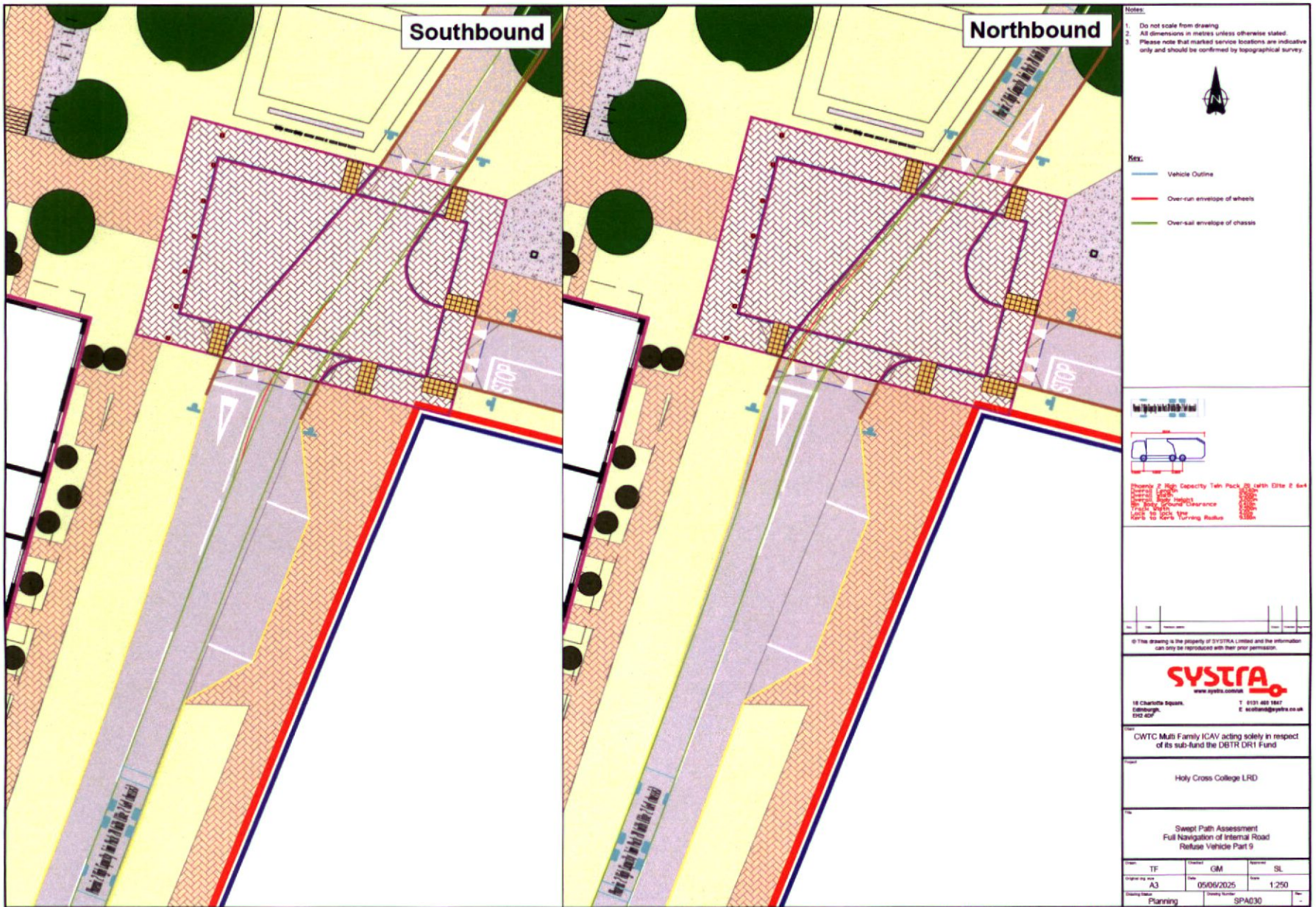
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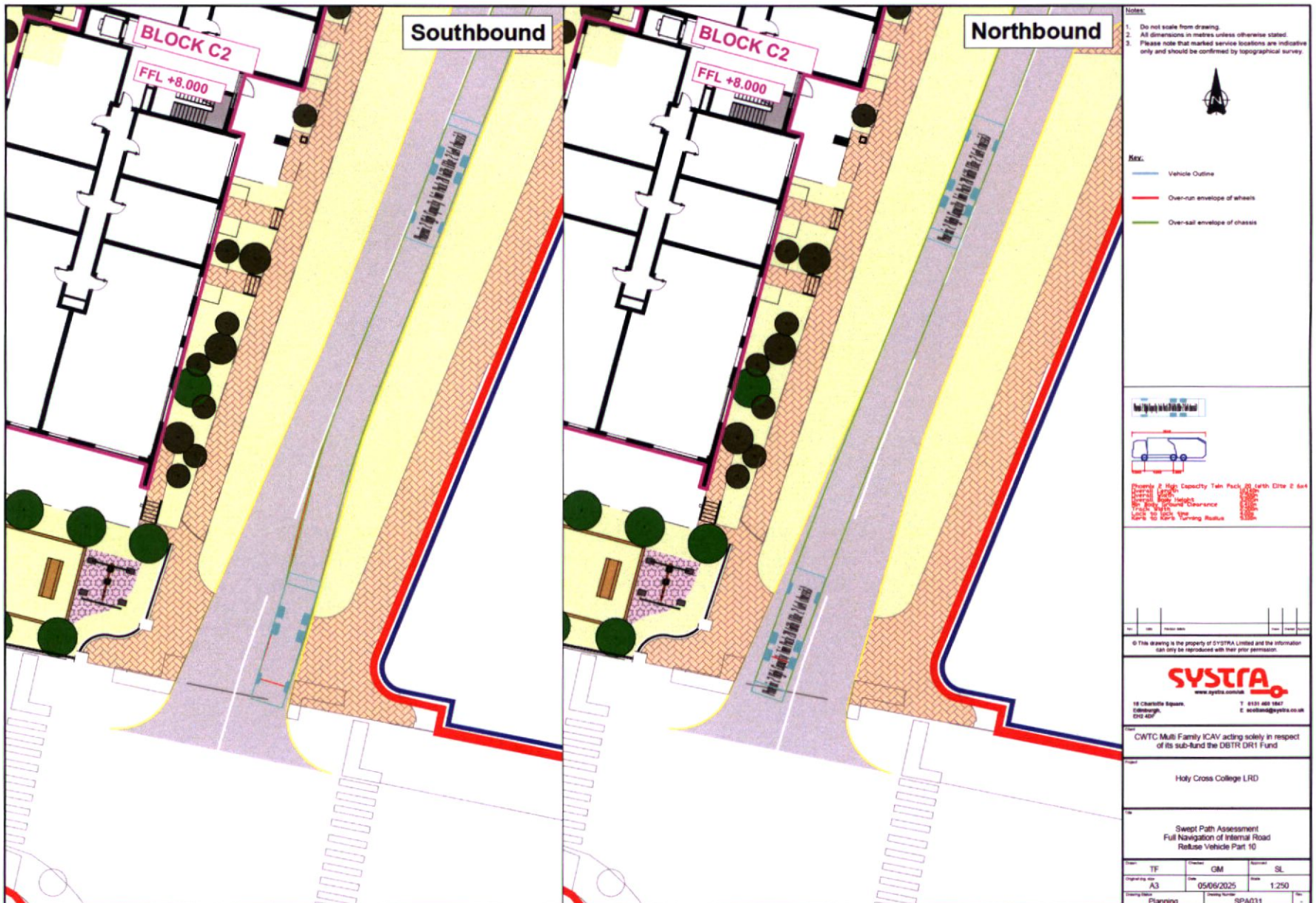

Southbound
Northbound
STOP
STOP
Notes:
1. Do not scale from drawing.
2. All dimensions in metres unless otherwise stated.
3. Please note that marked service locations are indicative only and should be confirmed by topographical survey.
Key:
Vehicle Outline
Over-run envelope of wheels
Over-sail envelope of chassis
SYSTRA
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EH2 4DF
T 0131 460 1947
E scotland@systra.co.uk
CWTC Multi Family ICAV acting solely in respect of its sub-fund the DBTR DR1 Fund
Holy Cross College LRD
Swept Path Assessment
Full Navigation of Internal Road
Refuse Vehicle Part 5
TF
GM
SL
A3
05/06/2025
1:250
Planning
SPA026
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Southbound
Northbound
ESB
ESB
STOP
STOP
Notes:
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3. Please note that marked service locations are indicative only and should be confirmed by topographical survey.
Key
Vehicle Outline
Over-run envelope of wheels
Over-sail envelope of chassis
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16 Charlotte Square, Edinburgh, EH2 4DF
T 0131 460 1847
E scotland@systra.co.uk
CWTC Multi Family ICAV acting solely in respect of its sub-fund the DBTR DR1 Fund
Holy Cross College LRD
Swept Path Assessment
Full Navigation of Internal Road
Refuse Vehicle Part 6
TF
GM
SL
A3
05/06/2025
1:250
Planning
SPA027
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Southbound
Northbound
Notes:
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Over-sail envelope of chassis
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CWTC Multi Family ICAV acting solely in respect of its sub-fund the DBTR DR1 Fund
Holy Cross College LRD
Swept Path Assessment
Full Navigation of Internal Road
Refuse Vehicle Part 7
TF
GM
SL
A3
05/06/2025
1:250
Planning
SPA028
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Southbound
Northbound
SET DOWN AREA
SET DOWN AREA
BLOCK D2.A
BLOCK D2.A
Notes:
1. Do not scale from drawing.
2. All dimensions in metres unless otherwise stated
3. Please note that marked service locations are indicative only and should be confirmed by topographical survey.
Key:
Vehicle Outline
Over-run envelope of wheels
Over-sail envelope of chassis
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SYSTRA
www.systra.com/uk
10 Charlotte Square, Edinburgh, EH2 4DR
T 0131 460 1847
E scotland@systra.co.uk
CWTC Multi Family ICAV acting solely in respect of its sub-fund the DBTR DR1 Fund
Holy Cross College LRD
Swept Path Assessment
Full Navigation of Internal Road
Refuse Vehicle Part 8
TF
GM
SL
A3
05/06/2025
1:250
Planning
SPA029
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Full Navigation of Internal Road
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Brady Shipman Martin

DUBLIN
Mountpleasant Business Centre
Mountpleasant Avenue Upper
Ranelagh
Dublin 6

CORK
Penrose Wharf Business Centre
Penrose Wharf
Cork

+353 1 208 1900
mail@bradyshipmanmartin.com
www.bradyshipmanmartin.com