

Ecological Impact Assessment (EclA) for the Proposed Development of a Sports Campus at St. Thomas House, Tibbradden Road, Dublin 16.



11th July 2024

Prepared by: Bryan Deegan (MCIEEM) of Altemar Ltd.
On behalf of: Dún Laoghaire Rathdown County Council.

Document Control Sheet

Project	Appropriate Assessment Screening for a proposed development of a sports campus at St. Thomas House, Tibbradden Road, Dublin 16.		
Report	Ecological Impact Assessment (EclA)		
Date	11 th July 2024		
Version	Author	Reviewed	Date
Draft 01	Jeff Boyle	Emma Peters	12 th March 2024
Planning	Bryan Deegan		11 th July 2024

Contents

Introduction.....	1
Background.....	1
Study Objectives.....	1
Altamar Ltd.	1
Project Description.....	2
Landscape.....	2
Lighting.....	9
Drainage.....	11
Ecological Assessment Methodology.....	21
Desk Study.....	21
Field Survey.....	21
Consultation.....	21
Spatial Scope and Zone of Influence.....	21
Ecological Evaluation Criteria.....	22
Results.....	24
Proximity to Designated Conservation Sites.....	24
Dún Laoghaire-Rathdown County Development Plan 2022-2028.....	25
Other objectives of note within the development plan.....	25
The DLR County Biodiversity Action Plan 2021 -2025.....	27
Habitats and Species.....	37
Potential Impacts.....	44
Potential Construction Impacts.....	44
Potential Operational Impacts.....	45
Mitigation Measures & Monitoring.....	46
Cumulative Impacts.....	46
Residual Impacts and Conclusion.....	52
References.....	52
Appendix I Tufa Habitat Hydrogeological Assessment.....	54

Introduction

Background

Ecological Impact Assessment (EclA) has been defined as *‘the process of identifying, quantifying and evaluating the potential impacts of defined actions on ecosystems or their components’* (Treweek, 1999). *“The purpose of EclA is to provide decision-makers with clear and concise information about the likely ecological effects associated with a project and their significance both directly and in a wider context. Protecting and enhancing biodiversity and landscapes and maintaining natural processes depends upon input from ecologists and other specialists at all stages in the decision-making and planning process; from the early design of a project through implementation to its decommissioning”* (IEEM, 2010).

The following EclA has been prepared by Altemar Ltd. at the request of Dún Laoghaire Rathdown County Council, who intend to apply for Part 8 permission for a sports campus at St. Thomas House, Tibbradden Road, Dublin 16.

Study Objectives

The objectives of this EclA are to:

1. Outline the project and any alternatives assessed;
2. Undertake a baseline ecological feature, resource and function assessment of the site and zone of influence;
3. Assess and define significance of the direct, indirect and cumulative ecological impacts of the project during its construction, lifetime and decommissioning stages;
4. Refine, where necessary, the project and propose mitigation measures to remove or reduce impacts through sustainable design and ecological planning; and
5. Suggest monitoring measures to follow up the implementation and success of mitigation measures and ecological outcomes.

The following guidelines have been used in preparation of this EclA:

- Guidelines on the information to be contained in Environmental Impact Statements (EPA, 2002);
- Guidelines on the information to be contained in EIARs (EPA,2022);
- Guidelines for Ecological Impact Assessment (EclA) (IEEM, 2019);
- Advice Notes on current practice in the preparation of EIS’s (EPA, 2003);
- Institute of Ecology and Environmental Management Guidelines for EIA (IEEM, 2005).

Altemar Ltd.

Since its inception in 2001, Altemar has been delivering ecological and environmental services to a broad range of clients. Operational areas include: residential; infrastructural; renewable; oil & gas; private industry; Local Authorities; EC projects; and, State/semi-State Departments. Bryan Deegan, the managing director of Altemar, is an Environmental Scientist and Marine Biologist with 28 years’ experience working in Irish terrestrial and aquatic environments, providing services to the State, Semi-State and industry. He is currently contracted to Inland Fisheries Ireland as the sole “External Expert” to environmentally assess internal and external projects. He is also chair of an internal IFI working group on environmental assessment. Bryan Deegan (MCIEEM) holds a MSc in Environmental Science, BSc (Hons.) in Applied Marine Biology, NCEA National Diploma in Applied Aquatic Science and a NCEA National Certificate in Science (Aquaculture). Bryan Deegan carried out all elements of this Ecological Impact Assessment (EclA).

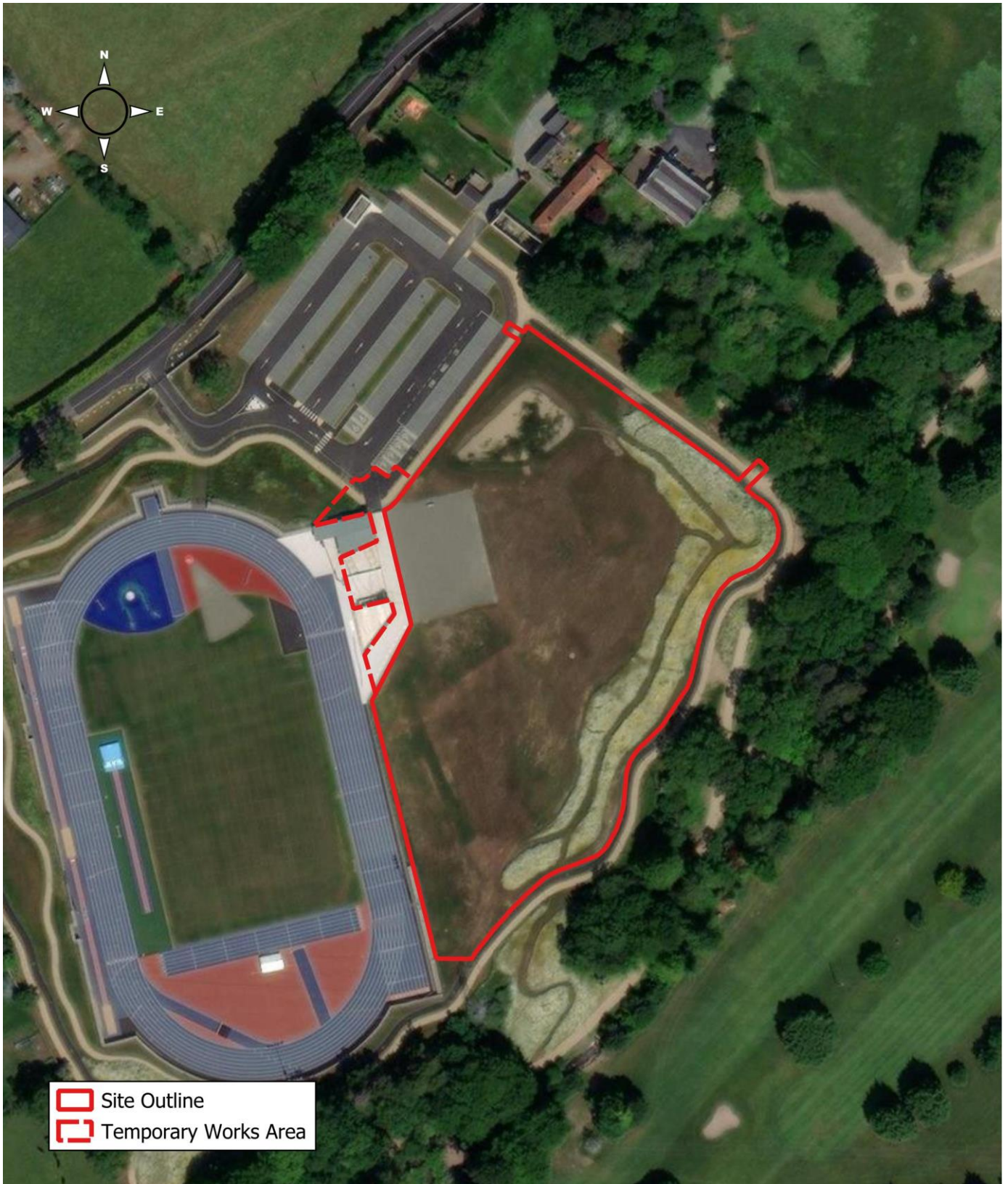
Project Description



Dun Laoghaire Rathdown County Council (DLR) in collaboration with Dundrum South Dublin Athletics (DSD) is proposing to develop a Sports Campus in the grounds of St Thomas House, Tibbradden Road, Co. Dublin as a satellite amenity to Marlay Park. The proposed development comprises Phase Two of a development plan, Phase One having been completed early in 2023. The site for the proposed development is located off Tibbradden Road, Rathfarnham, Dublin 16. The phase 2 developed design comprises (1) a single storey activities and administration building of c.1,574m² with 4.5m floor to ceiling clearance generally, (2) a single storey sprint track enclosure of c.841m² with 3.5m rising to 5.0m floor to ceiling clearance and (3) site landscaping to settle the building into its immediate context and to tie in with existing facilities delivered in phase 1. The site outlined in red on the site location map is approximately 1.3 hectares. In the Marlay Park Master Plan adopted in January 2019 the area known as the Sports Paddocks and the North West Field will be developed to provide enhanced sports facilities for public use. As both of these areas are at the western end of Marlay Park, the location of the multi-sport campus at St Thomas Fields, a half kilometre westward, may be considered an extension to and enhancement of these public sports facilities. With a recently upgraded footpath and cycleway connection and good road access, these three areas: the North West Field, the Sports Paddocks, and the St Thomas Fields multi-sport campus may be seen as one comprehensive sporting facility for the benefit of the public.

The site outline and site location plan are shown in Figures 1-3.

Landscape

The landscape strategy for the proposed project has been prepared by Dún Laoghaire Rathdown County Council. The ecological enhancement plan, site layout and landscape plan are demonstrated in Figures 4-6. Biodiversity enhancement features were put in place in discussion with Altamar within the landscape strategy. These include native woodland planting, planting of night scented plants, an enhanced sedium roof, a long grass policy (one cut per year) in areas of the site.



 Site Outline
 Temporary Works Area

0 50 100 150 m



Project: St. Thomas Sports Campus
 Location: Tibbradden Rd, Kilmashogue,
 Dublin 16
 Date: 15th February 2024
 Drawn By: Bryan Deegan (Altemar)

ALTEMAR
 Marine & Environmental Consultancy

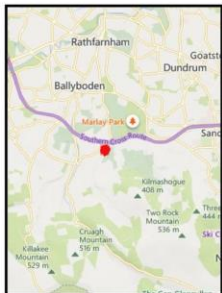


Figure 1. Site Outline



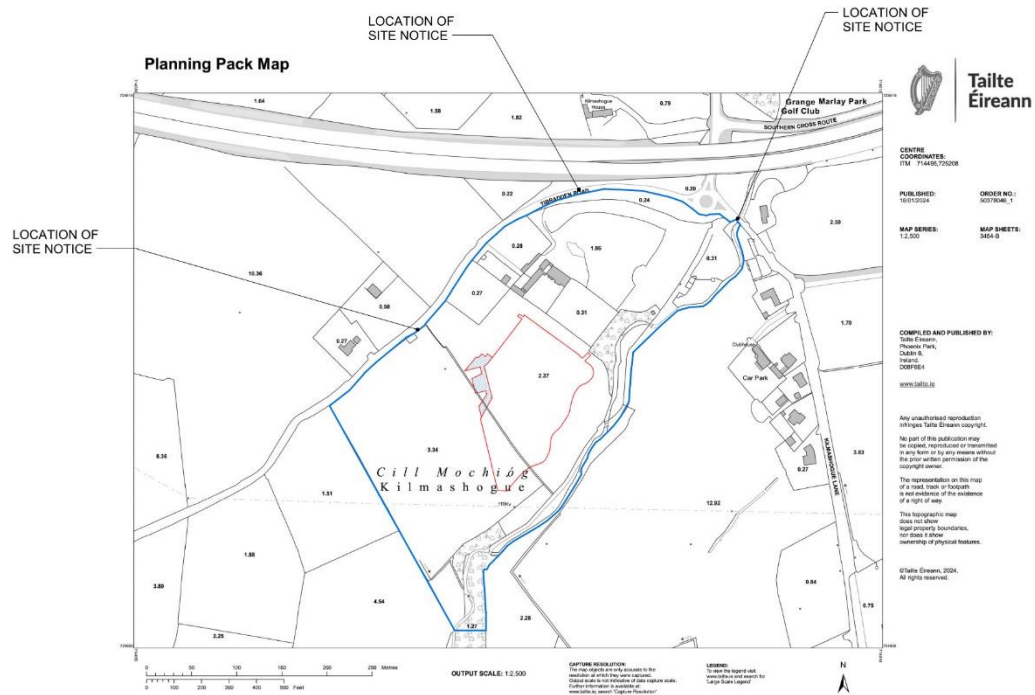
0 0.5 1 1.5 2 km

Project: St. Thomas Sports Campus
 Location: Tibbradden Rd, Kilmashogue,
 Dublin 16
 Date: 15th February 2024
 Drawn By: Bryan Deegan (Altamar)

ALTEMAR
 Marine & Environmental Consultancy



Figure 2. Site location



SITE AERIAL IMAGE

OS Map - 1:2500
1:2500

LEGEND

- BOUNDARY OF PROPOSED WORKS AREA
- LANDS WITHIN OWNERSHIP OF DSD ATHLETICS CLUB
- TEMPORARY WORKS AREA FOR TYING IN PURPOSES

Tailte Éireann

CENTRE COORDINATES:
ITM 714487.720208

PUBLISHED: 18/03/2024

ORDER NO.: S0278046_1

MAP SERIES: 1:2,500

MAP SHEETS: 28413

COMPILED AND PUBLISHED BY:
Tailte Éireann,
Phoenix Park,
Dublin 8,
Ireland.
©2024

www.tailte.ie

Any unauthorised reproduction infringes Tailte Éireann copyright.
No part of this publication may be copied, reproduced or transmitted in any form or by any means without the prior written permission of the copyright owner.
The representation on this map of a road, track or boundary is not evidence of the existence of a right of way.
This topographic map does not show:
- legal boundaries, easements;
- nor does it show:
- ownership of physical features.

©Tailte Éireann, 2024.
All rights reserved.

Do not scale. Use figured dimensions only. All dimensions to be checked on site.
Any discrepancies between mill and figure dimensions to be brought immediately to the architect's attention. Digital copies cannot be guaranteed.
Only dimension in hard copy can be relied upon for conformity and accuracy.
© This drawing is copyright.

GENERAL NOTE
Any deviation from the proposed specifications to be brought immediately to the architect's attention. All project submissions to meet the project performance requirements and the minimum requirements of the Building Regulations, etc. are to be included in strict accordance with the manufacturer's specification. Any discrepancies between the area figures to be brought immediately to the architect's attention. Subcontractors to confirm site dimensions with the main contractor prior to manufacture. Subcontractors to supply appropriate drawings to the architect for approval or comment prior to manufacture.
All fabrications, structural elements and reinforced concrete to structural engineer's design, detail and specification. Structural precast concrete elements to specialist subcontractor. Any inconsistencies between structural and architectural drawings to be brought immediately to the architect's attention.

1	09/07/24	70	PART 8 SUBMISSION
Client:	Dair Langhairs Rathdown County Council		
Project:	St Thomas Fields		
Drawing title:	OS Map		
Job no:	23008		
Drawing no:	10001		
Scale:	1:2500@A1	Status:	PLANNING
Drawn:	PD	Checked:	TR
Date created:	09/11/2023	Revision:	1
Drawing Ref:	23008-DMO-Z-DR-A-ZZ-SITE-10001		

Part 8 Submission



Suite 501, The Capel Building, 007 W003, T +353 1 737 2841, info@dmmod.com, www.dmod.ie

Figure 3. Site location OS Map



Figure 4. Ecological enhancement measures



Figure 5. Site layout plan



 Comhairle Contae County Council PARKS Senior Parks Superintendent : Ruairi O'Dulaing	PROJECT: 2434 Multi-Use Campus at St. Thomas Estate Phase 2 St. Thomas fields	Status:	Drawing Number:	Revision:	Scale:	Date:	Drawn:	Checked:
	Drawing Title: Landscape - Landscape Plan	Planning - PART 8	DRP 2434- 03	B	1/250 @ A1	July 2024	SB	EOB

Figure 6. Landscape plan

Lighting

The lighting strategy for the proposed development has been prepared by Axiseng Consulting Engineers. It outlines the following in relation to lighting for the proposed development:

‘Lighting Design

To meet the required lighting design for the lighting levels and in keeping with the local authority’s standards, the following shall be incorporated:

- *LED luminaires with a 3000K colour temperature.*
- *The lighting control, to ensure local ecology is not affected, shall be via timeclock/photocell with an “Default” to OFF rather than ON. This shall be achieved via a Hand/OFF/Auto switch and shall be controlled & maintained by building staff.*
- *Luminaires shall provide a light output ratio in excess of 90% with an upward light output ratio of no more than 0.5%*
- *The luminaire shall be fully compatible for dimming, allowing for diagnostic and dimming functions. All LED drivers and dimming modules shall be contained within the lantern housing.*

Other elements included within this design:

- *The final exit points shall be lit via battery backed fittings in the case of an emergency.*
- *The maintenance pathway around the building has not been included within this report, only the final exits, as this path shall not be used in hours of darkness. Access shall be controlled by the building management. The standard from the National Standards Authority of Ireland (NSAI) that deals with the issues of Emergency Lighting are the (I.S. 3217). The emergency lighting system has three major purposes: “To illuminate exit routes, to keep communal areas lit and to provide sufficient light for proper shutdown during high-risk processes. Every building owner has an ethical and legal obligation to make sure that the emergency lighting system installed in the building is built, designed and installed according to IS 3217: 2013 standard.”*

- *There shall be a controlled evacuation in the event of an emergency, supervised by the building staff.*

The following has not been included within the calculations and report;

- *Tree lines, proposed and existing, have not been included within the calculations*
- *Existing running track & carpark lighting has not been included within these calculations. This lighting will add to the levels around the Entrance to both buildings.*

Proposed Lighting Design

The lighting design for the development has been assumed to be a P3 classification taken from the I.S. EN 13201- 2:2015 (CEN/CENELEC, 2016) – Road Lighting Part 2: Performance Requirements. EN 13201-2 defines the P/S Class as “For pedestrian traffic and cyclists for use on footways and cycleways, and drivers of motorised vehicles at low speed on residential roads, shoulder or parking lanes, and other road areas lying separately or along a carriageway of a traffic route or a residential road, etc.” this has been applied to pathways in this report.

To meet this classification, the requirement is to achieve an average of 7.5lux on the pathways.

Proposed Luminaires

Private Development Lighting

There are 3No luminaire types proposed for this development. These shall be installed as per drawing RSC-AXE-XX-XX-DR-E-60101.

The proposed luminaires are:

- *Type A iGuzzini iPro – building mounted at: o 3.6m above final exits on the main building
o 2.2m above final exits on the sprint track building*
- *Type C iGuzzini Platea Pro – 4m column mounted, located on entrance approach*
- *Type B iGuzzini iWay round – 900mm bollard, located on paths surrounding the sprint track*

Conclusion

Private Development Lighting

The results from the ‘Dialux Evo’ calculation demonstrates that the minimum average lux levels proposed are exceeded. The average requirement is to achieve 7.5lux on the paths.

The average lux levels achieved are all above 7.5lux across the development.’ See Figure 7 for lighting plan.

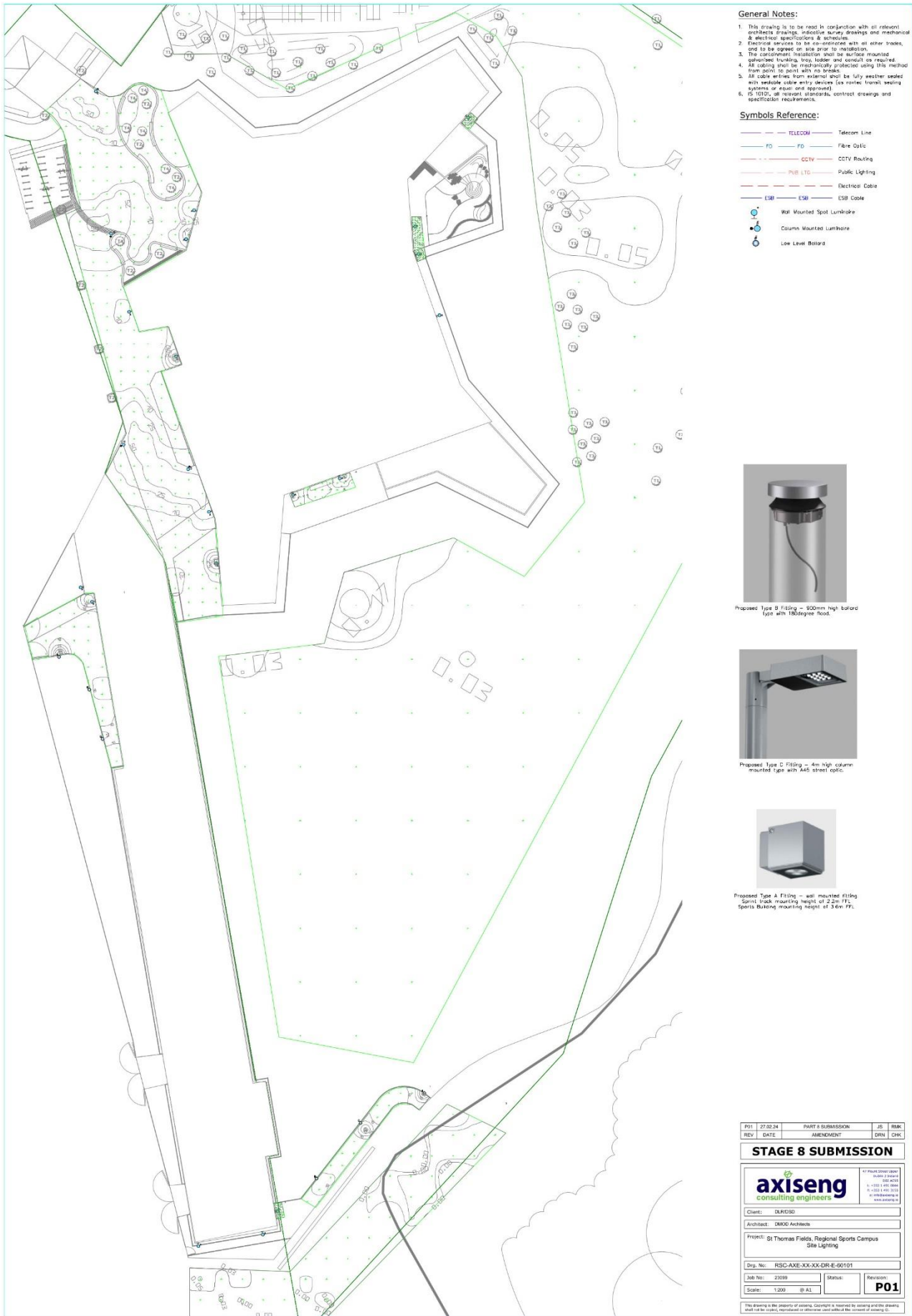


Figure 7. External lighting plan

Drainage

An Engineering Services Report has been prepared by O'Connor Sutton Cronin to accompany this planning application. It outlines the following drainage strategy for the proposed development:

'EXISTING SURFACE WATER DRAINAGE

EXISTING SURFACE WATER INFRASTRUCTURE

We are aware that there is existing surface water infrastructure on the site which was intended to be designed to cover the site master plan however, from our discussions with our colleagues in DLRDCC we understand that the volume of attenuation provided as part of the Phase 1 works is not sufficient to deal with the volume of surface water expected nor does it satisfy their requirements. We also understand that in line with this there are compliance issues to be closed out as part of the Phase 1 works. These will need to be closed out by the Phase 1 team which OCSC nor the current Phase 2 Design team were party to.

PROPOSED SURFACE WATER DESIGN STRATEGY

OVERVIEW

In light of the above issue that there is not sufficient attenuation provided in Phase 1 for the Phase 1 site excluding the Phase 2 proposals we are proposing to DLRDCC that we, as part of the Phase 2 works, cater for all our own surface water within Phase 2 alone. Thereby taking no benefit from the works already built on the site and treating our Phase 2 site as completely separate. This means that we are proposing to cater for the surface water attenuation in two distinct ways as part of the Phase 2 works. It is our proposal to cater for the surface water attenuation on the Phase 2 site via utilising a blue roof system under our extensive green roof system on the roof of the Facility Building and also to cater for surface water at ground level create an additional detention pond within the Phase 2 site for attenuation at ground level. By utilising both of these systems we can cater for all surface water generated within Phase 2 in Phase 2 alone and neglect any benefit from the Phase 1 constructed works.

CLIMATE CHANGE ALLOWANCE

The proposed surface water network according to the current DLRDCC Development plan requires all surface water design to cater for a 20% increase in intensity. We can confirm that we have catered for this allowance within the Phase 2 attenuation calculation. A copy of the results of the calculations are included in the Appendices.

SURFACE WATER MANAGEMENT PLAN

The proposed surface water management plan has been delivered for this site as part of the phase one works. However as noted previously we are now proposing an entirely new surface water system to cater for the Phase 2 works alone.

PROPOSED PIPE NETWORK DESIGN

All external, in-ground pipe infrastructure has been designed in accordance with BS EN 752 and all new infrastructure is to be compliant with the requirements of the GSDSDS and the GDRCOP for Drainage Works, with minimum full-bore velocities of 1.0 m/s achieved throughout.

All external main surface water carrier pipes have been sized to ensure no surcharging of the proposed drainage network for rainfall events up to, and including, the 1 in 5-year ARI event.

3.4.2 SURFACE WATER OUTFALL LOCATION

The surface water outfall location for this development has been constructed as part of the Phase 1 works and discharges to the local stream. We are planning to reuse this connection as part of the Phase 2 works.

3.4.3 ATTENUATION STORAGE

A total volume of (256 +106m3) = 362m3 of attenuation of attenuation has been provided as part of the Phase 2 works to cater for the sports facility and associated hard standings constructed as part of Phase 2. We have designed the blue roof attenuation system on the proposed facility building as its own region with site are taken as roof area and attenuation volume calculated on that basis alone which is the worst case for the blue roof system. We have shown this connecting into the main surface line on the site which is then further

attenuated, we have two options here either we adjust the outflow from this hydrobreak or we connect the roof storage to the final surface water line after the flow control device manhole. We can discuss this in more detail should there be an issue with either of these approaches.

3.4.4 MAINTENANCE

The SuDS across the site are to be regularly inspected and maintained by the to-be-appointed development maintenance contractor, with appropriate management plan in place. We do recommend that the new proposed detention basin is fenced off due to the depth of proposed water.

WASTEWATER DRAINAGE INFRASTRUCTURE

4.1 CONSULTATION

A Pre-Connection Enquiry form has been submitted to Irish Water for the proposed development by the team undertaking the design for Phase 1. The response to this connection offer consisted only of watermains connection which will be discussed later in this document as there is no public wastewater infrastructure in the vicinity.

4.2 DESIGN GUIDELINES

The wastewater network that is to serve the proposed development has been designed in accordance with Irish Water's Code of Practice for Wastewater Infrastructure and the Building Regulations, Part H.

4.3 SITE CHARACTERISTIC REPORT – WASTEWATER DRAINAGE

As part of the phase 1 works Specialist Consultants licensed by the EPA, Trinity Green, specifically Dr Eugene Bolton undertook a design and assessment of the site at Tibbradden Road. The testing and assessment of the site undertaken by Trinity Green for foul drainage was based on a development for a recreation facility that will accommodate up to **200 participants**. Trinity Green advised that based on EPA guidelines outlined in the EPA wastewater Manual for Small Systems Communities, Business, Leisure Centres and Hotels treating the development as a football club. The Hydraulic Loading equates to a hydraulic population equivalent of 40 and the organic loading equates to an organic population equivalent of 67. Thus, the treatment system needs to be sized for a population equivalent of 67.

Based on the calculations within the Trinity Green report from the site testing the soakage on the site was deemed to be acceptable. Based on the results from the Trinity Greens calculations it was recommended to install a package Aeration system and to polish the effluent through a sand filter and a discharge to ground. The area of the sand filter was advised to be 175m². The proposed area of the infiltration pad was advised to be 600m².

Finally it was noted to construct the infiltration pad and sand filter the area is stripped of vegetation removing not more than 200mm of topsoil and the gravel based in put in place to a depth of 300mm. The 175m² sand filter is then constructed directly on top of the gravel base. The polished effluent percolates by gravity from the sand filter into the gravel.

Following our discussions with Dr Eugene Bolton we believe the proposed design undertaken in 2019 is compliant with the revised EPA requirements for Design of systems such as this. We have also followed his advice as illustrated on our packages in relation to required offsets from Dwellings and Streams for placing the proposed Wastewater treatment system. A copy of the site characteristic assessment undertaken by Trinity Green is available in the attached Appendices.

The proposed OCSC design can be seen attached in the Appendices- this design incorporates the proposed wastewater treatment system advised by the client and Phase 1 team and undertaken by Dr Eugene Bolton of Trinity Green who are licensed by the EPA and whose design package was issued to the Phase 2 Team as part of the Phase 2 briefing.'

The foul and surface water drainage plans are shown in Figures 8 -15. It should be noted that the final surface water drainage has taken into account the recommendations from the Tufa Habitat Hydrogeological Assessment (Appendix I) following the site visit from Dr Joanne Denyer (Appendix II. Site visit by Dr Joanne Denyer in relation to petrifying springs.) which identified Tufa on the southern site of the watercourse within the valley. As a result, the paving to the front of the building is to be porous to allow water infiltrate if possible, further to this the project will use a terram or other water permeable geotextile in the event there is some infiltration on site. The detention pond will remain unlined to allow for infiltration.



- THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DESIGN TEAM DRAWINGS AND SPECIFICATIONS.
- FOR SETTING OUT REFER TO ARCHITECT'S DRAWINGS. DO NOT SCALE THIS DRAWING. USE FIGURED DIMENSIONS ONLY.
- NO PART OF THIS DOCUMENT MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM OR STORED IN ANY RETRIEVAL SYSTEM OF ANY NATURE WITHOUT THE WRITTEN PERMISSION OF O'CONNOR SUTTON CRONIN AS COPYRIGHT HOLDER EXCEPT AS AGREED FOR USE ON THE PROJECT FOR WHICH THE DOCUMENT WAS ORIGINALLY ISSUED.

Rev No.	Date	Revision Note	Drn by	Chkd by
P01	26/02/24	SUITABLE FOR INFORMATION	MC	SD
P02	08/07/2024	SUITABLE FOR INFORMATION	MC	SD

Rev No.	Date	Revision Note	Drn by	Chkd by



OCSC
 O'CONNOR SUTTON CRONIN
 MULTI-DISCIPLINARY CONSULTING ENGINEERS
 Civil | Structural | Environmental | Mechanical | Electrical | Sustainability
 Dublin Office: 9 Parnass Street, Dublin 7, D07 KT57
 Tel: +353 (0)1 8662000 Web: www.ocscl.ie
 Dublin | London | Belfast | Galway | Cork | Birmingham

Client:	DSD ATHLETICS AND DLRDCC								
Project:	MULTI PURPOSE LEISURE FACILITY AT ST THOMAS FIELDS								
Title:	PROPOSED SURFACE WATER LAYOUT SHEET 1 OF 4								
Code	Originator	Zone	Level	Type	Role	Number	Status	Revision	
D823	OCSC	XX	XX	DR	C	0500	S2	P02	
Date:	FEB '24		Scale:	@ A1:1:500		Drn by:	MC	Chkd by:	SD

Figure 8. Proposed surface water layout sheet 1

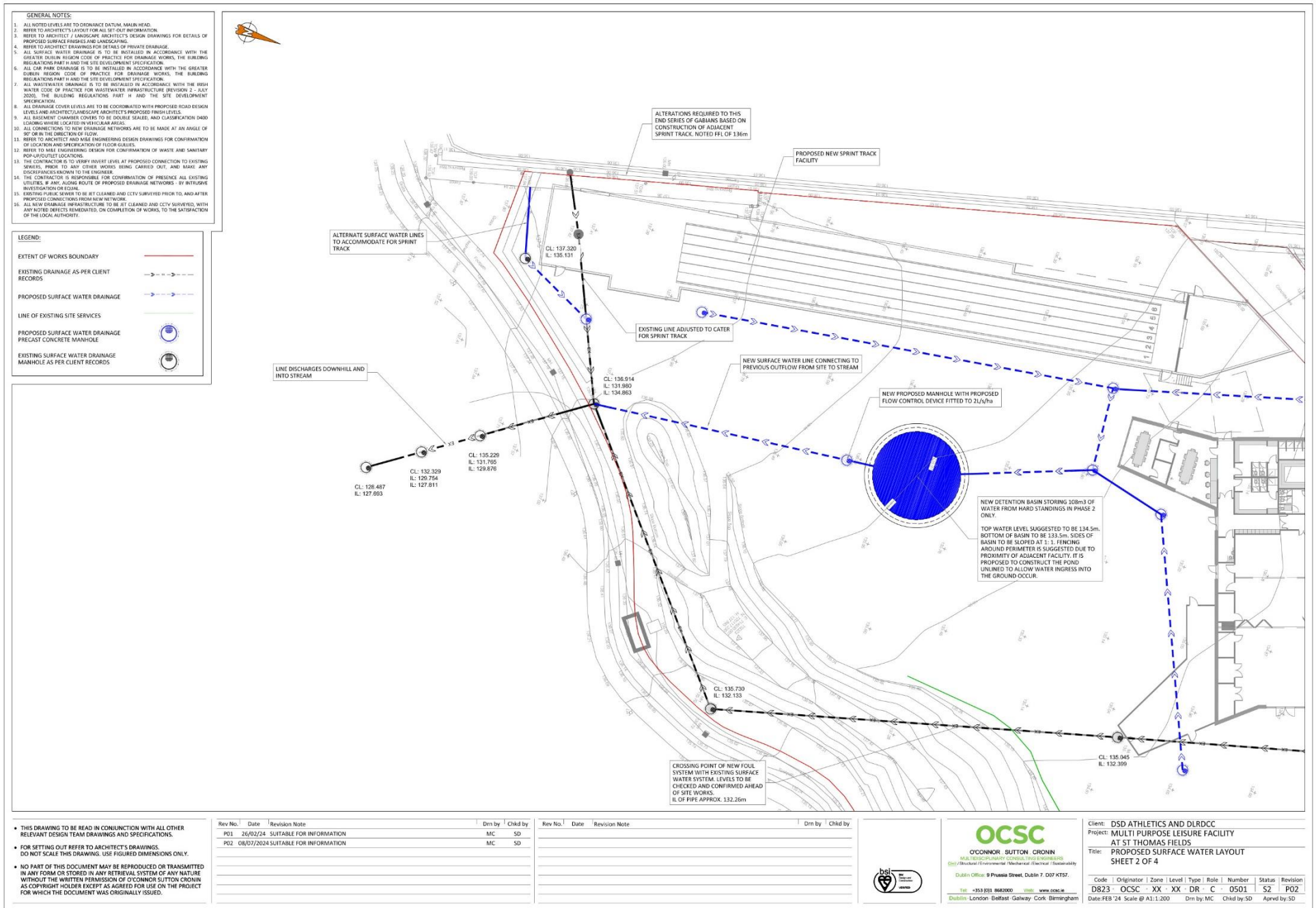


Figure 9. Proposed surface water layout sheet 2

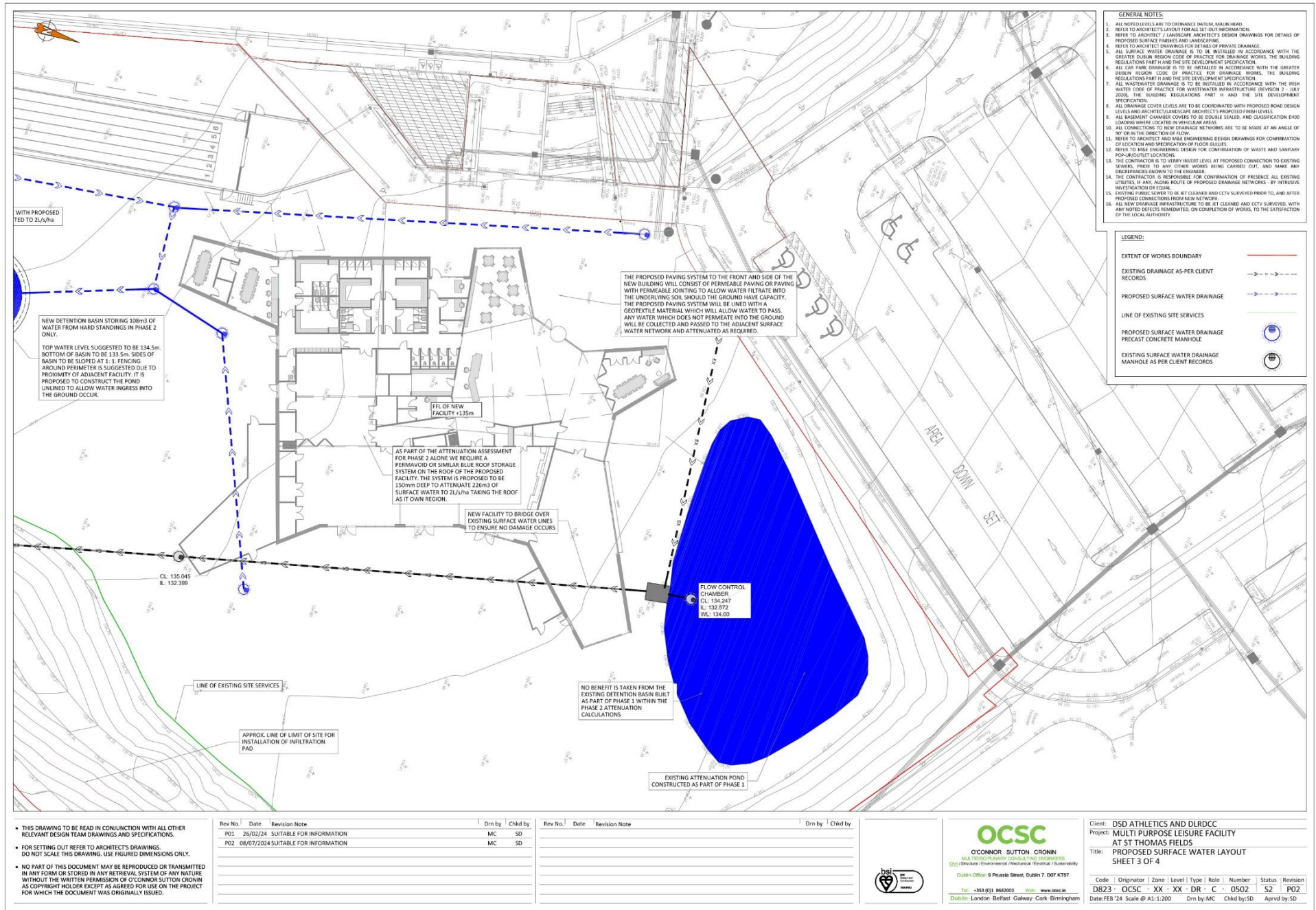


Figure 10. Proposed surface water layout sheet 3

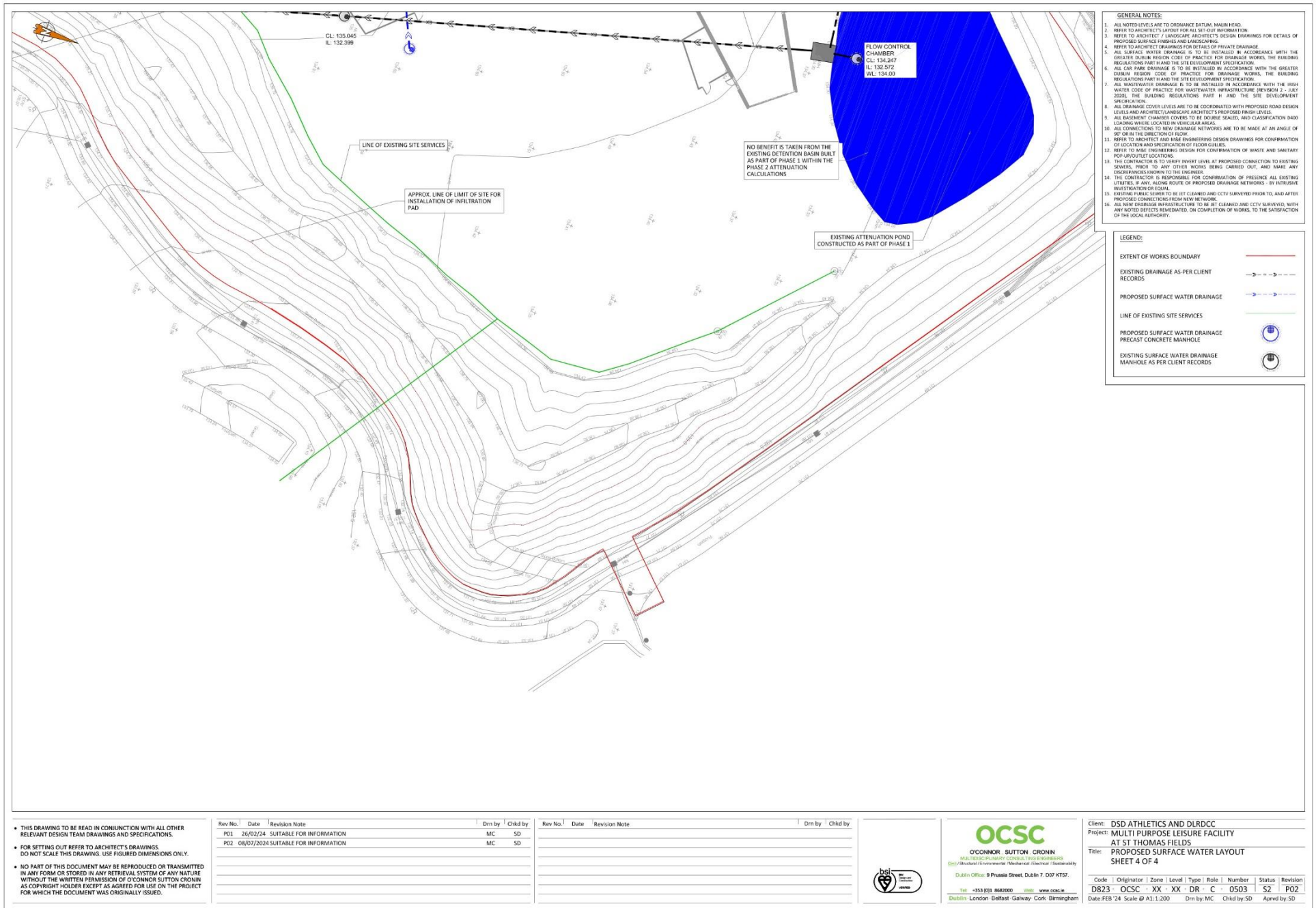
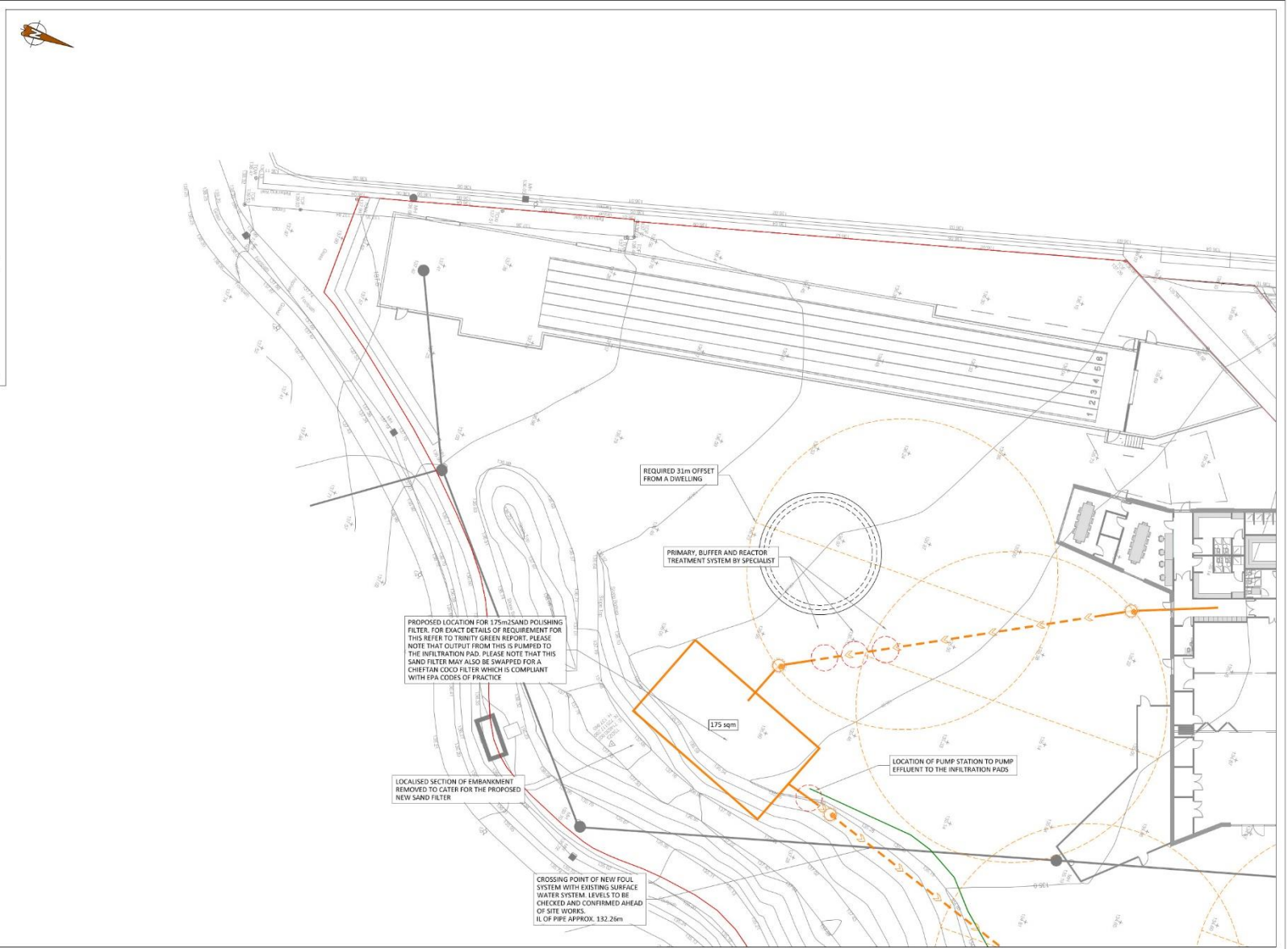
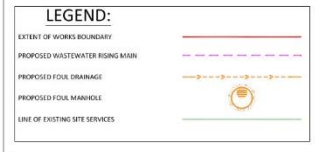


Figure 11. Proposed surface water layout sheet 4



Figure 12. Proposed foul water layout sheet 1

- GENERAL NOTES:**
1. ALL NOTED LEVELS ARE TO ODRAINAGE DATUM, MAIN HEAD.
 2. REFER TO ARCHITECT'S LAYOUT FOR ALL SET-OUT INFORMATION.
 3. REFER TO ARCHITECT / LANDSCAPE ARCHITECT'S DESIGN DRAWINGS FOR DETAILS OF PROPOSED/EXISTING FINE/PAVING/LANDSCAPING.
 4. REFER TO ARCHITECT DRAWINGS FOR DETAILS OF PRIVATE DRAINAGE.
 5. ALL SURFACE WATER DRAINAGE IS TO BE INSTALLED IN ACCORDANCE WITH THE GREATER DUBLIN REGION CODE OF PRACTICE FOR DRAINAGE WORKS, THE BUILDING REGULATIONS PART H AND THE SITE DEVELOPMENT SPECIFICATION.
 6. ALL CAR PARK DRAINAGE IS TO BE INSTALLED IN ACCORDANCE WITH THE GREATER DUBLIN REGION CODE OF PRACTICE FOR DRAINAGE WORKS, THE BUILDING REGULATIONS PART H AND THE SITE DEVELOPMENT SPECIFICATION.
 7. ALL WASTEWATER DRAINAGE IS TO BE INSTALLED IN ACCORDANCE WITH THE IREISH WATER CODE OF PRACTICE FOR WASTEWATER INFRASTRUCTURE DIVISION 2 - JULY 2020, THE BUILDING REGULATIONS PART H AND THE SITE DEVELOPMENT SPECIFICATION.
 8. ALL DRAINING COVER LEVELS ARE TO BE COORDINATED WITH PROPOSED ROAD DESIGN LEVELS AND ARCHITECT/LANDSCAPE ARCHITECT'S PROPOSED FINISH LEVELS.
 9. ALL INLET/CHAMBER COVERS TO BE ROUND, SLOTTED, 600mm DIAMETER (UNLESS OTHERWISE NOTED) AND TO BE LOCATED IN REGULAR AREAS.
 10. ALL CONNECTIONS TO NEW DRAINAGE NETWORKS ARE TO BE MADE AT AN ANGLE OF 90° OR IN THE DIRECTION OF FLOW.
 11. REFER TO ARCHITECT AND M&E ENGINEERING DESIGN DRAWINGS FOR CONFIRMATION OF LOCATION AND SPECIFICATION OF FLOOR OULLES.
 12. REFER TO M&E ENGINEERING DESIGN FOR CONFIRMATION OF WASTE AND SANITARY FOR UP/DOWNLET LEGATIONS.
 13. THE CONTRACTOR IS TO VERIFY INVERT LEVEL AT PROPOSED CONNECTION TO EXISTING SEWERS, PRIOR TO ANY OTHER WORKS BEING CARRIED OUT, AND MAKE ANY DISCREPANCIES KNOWN TO THE ENGINEER.
 14. THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMATION OF PRESENCE ALL EXISTING UTILITIES, IF ANY, ALONG ROUTE OF PROPOSED DRAINAGE NETWORKS, BY INTRINSIC INVESTIGATION OR EQUAL.
 15. EXISTING PUBLIC SEWERS TO BE RT CLEANED AND CCTV SURVEYED PRIOR TO, AND AFTER PROPOSED CONNECTIONS FROM NEW NETWORKS.
 16. ALL NEW DRAINAGE INFRASTRUCTURE TO BE RT CLEANED AND CCTV SURVEYED WITH ANY NOTED DEFECTS REMEDIATED, ON COMPLETION OF WORKS, TO THE SATISFACTION OF THE LOCAL AUTHORITY.



- THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DESIGN TEAM DRAWINGS AND SPECIFICATIONS.
- FOR SETTING OUT REFER TO ARCHITECT'S DRAWINGS. DO NOT SCALE THIS DRAWING. USE FIGURED DIMENSIONS ONLY.
- NO PART OF THIS DOCUMENT MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM OR STORED IN ANY RETRIEVAL SYSTEM OF ANY NATURE, WITHOUT THE WRITTEN PERMISSION OF O'CONNOR SUTTON CROWIN AS COPYRIGHT HOLDER EXCEPT AS AGREED FOR USE ON THE PROJECT FOR WHICH THE DOCUMENT WAS ORIGINALLY ISSUED.

Rev No.	Date	Revision Note	Drawn by	Checked by
PD1	26/02/24	SUITABLE FOR INFORMATION	MC	SD
PD2	28/02/24	SUITABLE FOR INFORMATION	MC	SD

Rev No.	Date	Revision Note	Drawn by	Checked by



OCSC
O'CONNOR SUTTON CROWIN
 MULTI-DISCIPLINARY CONSULTING ENGINEERS
 Civil / Structural / Environmental / Mechanical / Electrical / Sustainability

Dublin Office: 9 Phinias Street, Dublin 7, D07 X197
 Tel: +353 (0)1 8881000 | Web: www.ocscl.ie
 Dublin | London | Belfast | Galway | Cork | Birmingham

Client:	DSD ATHLETICS AND DLRCDC
Project:	MULTI PURPOSE LEISURE FACILITY AT ST THOMAS FIELDS
Title:	PROPOSED FOUL WATER LAYOUT SHEET 2 OF 4
Code:	[Originator Zone Level Type Role Number Status Revision]
D823 - OCSC - XX - XX - DR - C - 0506	S2 PO2
Date:	FEB 24 Scale: 1:200
Drawn by:	MC
Checked by:	SD
Approved by:	SD

Figure 13. Proposed foul water layout sheet 2

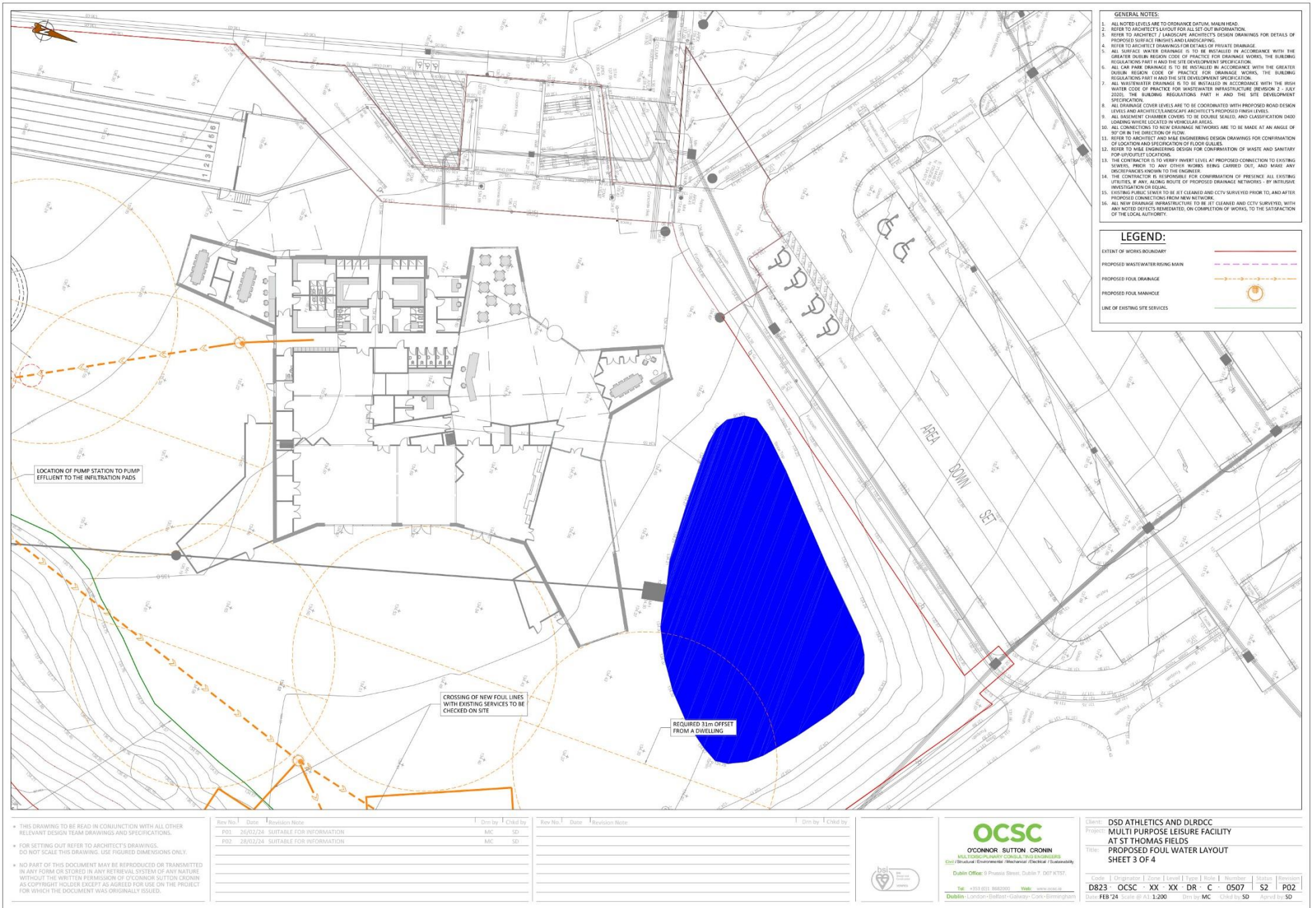


Figure 14. Proposed foul water layout sheet 3

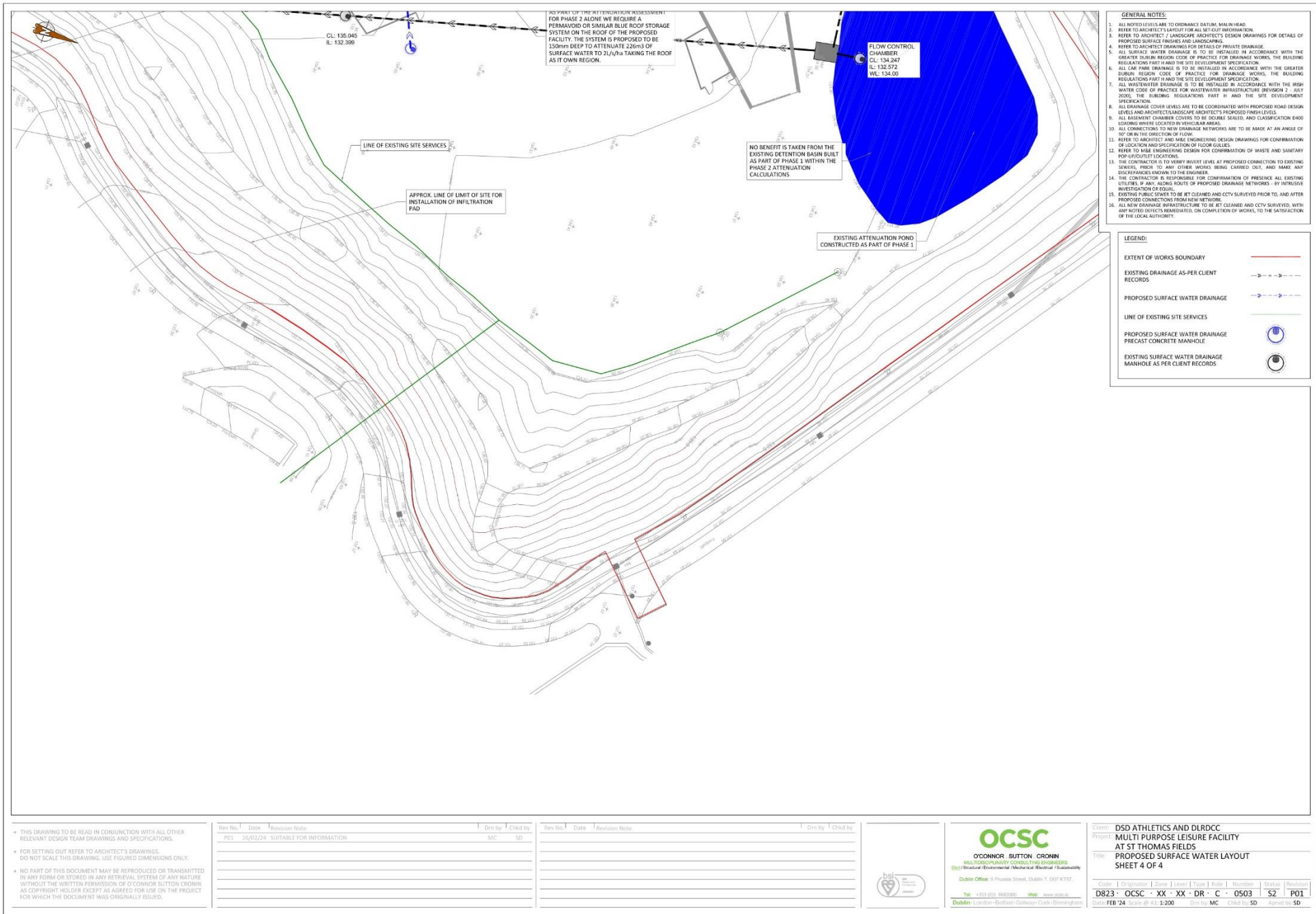


Figure 15. Proposed foul water layout sheet 4

Ecological Assessment Methodology

Desk Study

A desk study was undertaken to gather and assess ecological data prior to undertaking fieldwork elements. Sources of datasets and information included:

- The National Parks and Wildlife Service
- National Biological Data Centre
- Satellite, aerial and 6" map imagery
- Bing Maps (ArcGIS)

A provisional desk-based assessment of the potential species and habitats of conservation importance was carried out in August 2023 with the site assessment (5th September 2023).

Field Survey

The primary site visit was carried out by Bryan Deegan (MCIEEM) on the 5th September 2023 and included a bat survey. The surveys were carried out in mild dry conditions and covered all the lands within the site outline and the land immediately outside the site. The purpose of the field survey was to identify habitat types according to the Fossitt (2000) habitat classification and map their extent. Additional site visits were carried out on the 29th February 2024, 6th March 2024 and 8th March 2024. Altamar assessed the project, the proposed construction methodology and the operation of the proposed development, in addition to the potential for cumulative impacts.

Survey Limitations

The field survey was carried out on 5th September 2023. This is within the period for full species assessments of the floral cover in addition to bat surveys. Weather conditions were mild and dry and allowed a bat detector surveys to take place. The survey is outside the period for mammal surveys. However, additional site visits were carried out within the optimal mammal survey season. Given that the site is primarily recently landscaped and all areas were accessible no limitations are foreseen in relation to the surveys. It should be noted that the entire proposed development site has undergone recent works and landscaping. However, the previous works (Phase 1) also extended into the riparian corridor and included the felling of trees, inclusion of paths and additional lighting and instream works. It is likely that the Phase 1 works have reduced the biodiversity value of the wider site possibly reducing bat and mammal activity in the wider area.

Consultation

A request for data in relation to species of conservation interest was submitted to the National Parks and Wildlife Service (NPWS). The National Biological Data Centre records were consulted for species of conservation significance. Consultation was carried out with DLR in relation to the proposed landscape strategy including the creation of bar foraging corridors within the landscaping and the inclusion of a green roof on the building. NPWS and DLR have been consulted in relation to mitigation measures to limit cumulative impacts.

Spatial Scope and Zone of Influence

As outlined in CIEEM (2018) *'The 'zone of influence' for a project is the area over which ecological features may be affected by biophysical changes as a result of the proposed project and associated activities. This is likely to extend beyond the project site, for example where there are ecological or hydrological links beyond the site boundaries.'* In line with best practice guidance an initial zone of influence be set at a radius of 2km for non-linear projects (IEA, 1995).

The ZOI of the proposed project would be seen to be restricted to the site outline and nearby sensitive receptors including the Whitechurch Stream and riparian woodland, with potential for minor localised noise and lighting impacts during construction which do not extend significantly beyond the site outline. After attenuation on-site, surface water drainage from the proposed development will be directed via an existing connection (Phase 1) to an the nearby Whitechurch Stream which flows 4km north where it joins the River Dodder and ultimately outfalls to the marine environment at Dublin Bay. In this case, the potential ZOI extends beyond the site, with the potential for downstream impacts to extend beyond the proposed development area via the surface water networks. During operation increased human activity would be expected within the riparian woodland.

Ecological Evaluation Criteria

This section of the EclA examines the potential causes of impact that could result in likely significant effects to the species and habitats that occur within the ZOI of the proposed development. These impacts could arise during either the construction or operational phases of the proposed development. The following terms are derived from EPA EIA Guidance (2022) (Tables 1A -F) and are used in the assessment to describe the predicted and potential residual impacts on the ecology by the construction and operation of the proposed development.

Table 1A: Impact description terminology (EPA,2022)

Magnitude of effect (change)		Typical description
High	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality.
Medium	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Low	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial effect on attribute or a reduced risk of negative effect occurring
Negligible	Adverse	Very minor loss or alteration to one or more characteristics, features or elements.
	Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements.

Table 1B: Criteria for Establishing Receptor Sensitivity/Importance

Importance	Ecological Valuation
International	Sites, habitats or species protected under international legislation e.g. Habitats and Species Directive. These include, amongst others: SACs, SPAs, Ramsar sites, Biosphere Reserves, including sites proposed for designation, plus undesignated sites that support populations of internationally important species.
National	Sites, habitats or species protected under national legislation e.g. Wildlife Act 1976 and amendments. Sites include designated and proposed NHAs, Statutory Nature Reserves, National Parks, plus areas supporting resident or regularly occurring populations of species of national importance (e.g. 1% national population) protected under the Wildlife Acts, and rare (Red Data List) species.
Regional	Sites, habitats or species which may have regional importance, but which are not protected under legislation (although Local Plans may specifically identify them) e.g. viable areas or populations of Regional Biodiversity Action Plan habitats or species.
Local/County	Areas supporting resident or regularly occurring populations of protected and red data listed-species of county importance (e.g. 1% of county population), Areas containing Annex I habitats not of international/national importance, County important populations of species or habitats identified in county plans, Areas of special amenity or subject to tree protection constraints.
Local	Areas supporting resident or regularly occurring populations of protected and red data listed-species of local importance (e.g. 1% of local population), Undesignated sites or features which enhance or enrich the local area, sites containing viable area or populations of local Biodiversity Plan habitats or species, local Red Data List species etc.
Site	Very low importance and rarity. Ecological feature of no significant value beyond the site boundary

Table 1C: Quality of effects

Quality of Effects	Effect Description
Negative /Adverse Effect	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Neutral Effect	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Positive Effect	A change which improves the quality of the environment (for example, by increasing species diversity, or improving the reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).

Table 1D: Significance of Effects

Significance of Effect	Description of Potential Effect
Imperceptible	An effect capable of measurement but without significant consequences.
Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics.

Table 1E: Duration and frequency of effects

Duration and Frequency of Effect	Description
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day
Temporary	Effects lasting less than a year
Short-term	Effects lasting one to seven years.
Medium-term	Effects lasting seven to fifteen years.
Long-term	Effects lasting fifteen to sixty years.
Permanent	Effects lasting over sixty years
Reversible	Effects that can be undone, for example through remediation or restoration

Table 1F: Describing probability of effects

Describing the Probability of Effects	Description
Likely Effects	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely Effects	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.

Results

Proximity to Designated Conservation Sites

Designated sites are presented in Figure 16 (SAC within 15km), Figure 17 (SPA within 15km), Figure 18 (pNHA within 15km), Figure 19 (Ramsar sites within 15km), Figure 20 (Watercourses proximate), Figure 21 (Watercourses and SACs), Figure 15 (Watercourses and SPAs), Figure 16 (Watercourses & pNHAs within 15km) and Figure 22 (Watercourses and Ramsar sites within 15km). It should be noted that the site of the proposed project is not within a designated conservation site. The nearest Natura 2000 sites with a hydrological pathway to the subject site are South Dublin Bay SAC (7.7km), North Dublin Bay SAC (12.5km), South Dublin Bay and River Tolka Estuary SPA (7.6km), North Bull Island SPA (12.5km) and North-West Irish Sea SPA (12.6km). There are no National Heritage Areas (NHA) within 15km of the subject site. The nearest Proposed NHA (pNHA) is Fitzsimon's Wood (3.1km) and the nearest Ramsar site is Sandymount Strand/Tolka Estuary (7.8km).

The distance and details of the conservation sites within 15km of the proposed Project are presented in Table 2 & 3.

Table 1. Natura 2000 sites within 15km of the proposed development site

Natura 2000 Site	Code	Distance	Direct Hydrological / Biodiversity Connection
Special Areas of Conservation			
Wicklow Mountains SAC	IE002122	2.8 km	No
Glenasmole Valley SAC	IE001209	5.6 km	No
Knocksink Wood SAC	IE000725	7.4 km	No
South Dublin Bay SAC	IE000210	7.7 km	No
Ballyman Glen SAC	IE000713	9.9 km	No
North Dublin Bay SAC	IE000206	12.5 km	No
Rockabill to Dalkey Island SAC	IE003000	12.8 km	No
Bray Head SAC	IE000714	15 km	No
Special Protection Areas			
Wicklow Mountains SPA	IE004040	3.1 km	No
South Dublin Bay and River Tolka Estuary SPA	IE004024	7.6 km	No
North Bull Island SPA	IE004006	12.5 km	No
North-West Irish Sea SPA	IE004236	12.6 km	No
Dalkey Islands SPA	IE004172	12.8 km	No

Table 2. Proposed NHAs and Ramsar sites within 15km of the proposed development site

Status	Site Name	Distance
Proposed NHA	Fitzsimon's Wood	3.1km
Proposed NHA	Dodder Valley	4.4 km
Proposed NHA	Glenasmole Valley	5.6 km
Proposed NHA	Ballybetagh Bog	6.7 km
Proposed NHA	Dingle Glen	7.2km
Proposed NHA	Grand Canal	7.2 km
Proposed NHA	Knocksink Wood	7.4 km
Proposed NHA	Boosterstown Marsh	7.6 km
Proposed NHA	South Dublin Bay	7.7 km
Proposed NHA	Glencree Valley	8.4 km
Proposed NHA	Royal Canal	9.6 km
Proposed NHA	Ballyman Glen	9.9 km
Proposed NHA	Powerscourt Woodland	9.9 km
Proposed NHA	Loughlinstown Woods	10 km
Proposed NHA	Dolphins, Dublin Docks	10.5 km
Proposed NHA	Dalkey Coastal Zone and Killiney Hill	10.6 km
Proposed NHA	Liffey Valley	10.9 km

Status	Site Name	Distance
Proposed NHA	Slade of Saggart and Crooksling Glen	10.9 km
Proposed NHA	North Dublin Bay	11 km
Proposed NHA	Dargle River Valley	12.1 km
Proposed NHA	Great Sugar Loaf	12.8 km
Proposed NHA	Kilmacanoge Marsh	14.7 km
Proposed NHA	Bray Head	14.9 km
Proposed NHA	Santry Demense	14.9 km
Ramsar	Sandymount Strand/Tolka Estuary	7.8 km
Ramsar	North Bull Island	12.6 km

Dún Laoghaire-Rathdown County Development Plan 2022-2028

The Dún Laoghaire-Rathdown County Development Plan sets out the policies and objectives for the development of the County over the Plan period. The County Development Plan 2022-2028 has now been adopted by the elected members. The adopted Plan came into effect on the 21st April 2022. These elements are important to note particularly in relation to the Phase I, works and the potential for cumulative effects.

Policy Objective OSR7: Trees, Woodland and Forestry

'Policy Objective OSR7: Trees, Woodland and Forestry It is a Policy Objective to implement the objectives and policies of the Tree Policy and the forthcoming Tree Strategy for the County, to ensure that the tree cover in the County is managed, and developed to optimise the environmental, climatic and educational benefits, which derive from an 'urban forest', and include a holistic 'urban forestry' approach.'

Policy Objective GIB22: Non-Designated Areas of Biodiversity Importance

'It is a Policy Objective to protect and promote the conservation of biodiversity in areas of natural heritage importance outside Designated Areas and to ensure that notable sites, habitats and features of biodiversity importance - including species protected under the Wildlife Acts 1976 and 2000, the Birds Directive 1979, the Habitats Directive 1992, Birds and Habitats Regulations 2011, Flora (Protection) Order, 2015, Annex I habitats, local important areas, wildlife corridors and rare species - are adequately protected. Ecological assessments will be carried out for all developments in areas that support, or have potential to support, features of biodiversity importance or rare and protected species and appropriate mitigation/ avoidance measures will be implemented. In implementing this policy, regard shall be had to the Ecological Network, including the forthcoming DLR Wildlife Corridor Plan, and the recommendations and objectives of the Green City Guidelines (2008) and 'Ecological Guidance Notes for Local Authorities and Developers' (Dún Laoghaire-Rathdown Version 2014).'

Other objectives of note within the development plan.

Policy Objective GIB18: Protection of Natural Heritage and the Environment

'It is a Policy Objective to protect and conserve the environment including, in particular, the natural heritage of the County and to conserve and manage Nationally and Internationally important and EU designated sites - such as Special Protection Areas (SPAs), Special Areas of Conservations (SACs), proposed Natural Heritage Areas (pNHAs) and Ramsar sites (wetlands) - as well as non-designated areas of high nature conservation value known as locally important areas which also serve as 'Stepping Stones' for the purposes of Article 10 of the Habitats Directive.'

Policy Objective GIB19: Habitats Directive

'It is a Policy Objective to ensure the protection of natural heritage and biodiversity, including European Sites that form part of the Natura 2000 network, in accordance with relevant EU Environmental Directives and applicable National Legislation, Policies, Plans and Guidelines.'

Policy Objective GIB20: Biodiversity Plan

'It is a Policy Objective to support the provisions of the forthcoming DLR County Biodiversity Action Plan, 2021-2025.'

Policy Objective GIB21: Designated Sites

'It is a Policy Objective to protect and preserve areas designated as proposed Natural Heritage Areas, Special Areas of Conservation, and Special Protection Areas. It is Council policy to promote the maintenance and as appropriate, delivery of 'favourable' conservation status of habitats and species within these areas.'

Policy Objective GIB23: County- Wide Ecological Network

'It is a Policy Objective to protect the Ecological Network which will be integrated into the updated Green Infrastructure Strategy and will align with the DLR County Biodiversity Action Plan. Creating this network throughout the County will also improve the ecological coherence of the Natura 2000 network in accordance with Article 10 of the Habitats Directive. The network will also include nondesignated sites.'

Policy Objective GIB24: Rivers and Waterways

'It is a Policy Objective to maintain and protect the natural character and ecological value of the river and stream corridors in the County and where possible to enhance existing channels and to encourage diversity of habitat and nature-based solutions that incorporate biodiversity features. It is also policy (subject to the sensitivity of the riverside habitat), to provide public access to riparian corridors, to promote improved passive recreational activities.'

Policy Objective GIB25: Hedgerows

'It is a Policy Objective to retain and protect hedgerows in the County from development, which would impact adversely upon them. In addition, the Council will promote the protection of existing site boundary hedgerows and where feasible require the retention of these when considering a grant of planning permission for all developments. The Council will promote the County's hedgerows by increasing coverage, where possible, using locally native species and to develop an appropriate code of practice for road hedgerow maintenance. The Council will promote the protection of existing hedgerows when considering a grant of planning permission for all developments.'

Policy Objective GIB27: Green

'Belts It is a Policy Objective to retain the individual physical character of towns and development areas by the designation of green belt areas, where appropriate.'

Policy Objective GIB28: Invasive Species

'It is a Policy Objective to prepare an 'Invasive Alien Species Action Plan' for the County which will include actions in relation to Invasive Alien Species (IAS) surveys, management and treatment and to also ensure that proposals for development do not lead to the spread or introduction of invasive species. If developments are proposed on sites where invasive species are or were previously present, the applicants will be required to submit a control and management program for the particular invasive species as part of the planning process and to comply with the provisions of the European Communities Birds and Habitats Regulations 2011 (S.I. 477/2011).'

Policy Objective GIB29: Nature Based Solutions

'It is a Policy Objective to increase the use of Nature Based Solutions (NBS) within the County, and to promote and apply adaption and mitigation actions that favour NBS, which can have multiple benefits to the environment and communities. NBS has a role not only to meet certain infrastructure related needs (e.g. flooding management), and development needs, but also to maintain or benefit the quality of ecosystems, habitats, and species.'

The DLR County Biodiversity Action Plan 2021-2025

The DLR Biodiversity Action Plan 2021-2025, the second Plan for the County, builds on the aims of the first Plan and continues to move us towards our overall EU and National Vision for Biodiversity. It is Government policy for the Local Authorities to take the lead role in the production of Local Biodiversity Action Plans. The adoption of this plan has been included in the Development Plan above. Specifically in relation to the proposed project and the potential for cumulative effects the following elements of the DLR County Biodiversity Action Plan 2021-2025 should be noted:

Wildlife Corridors

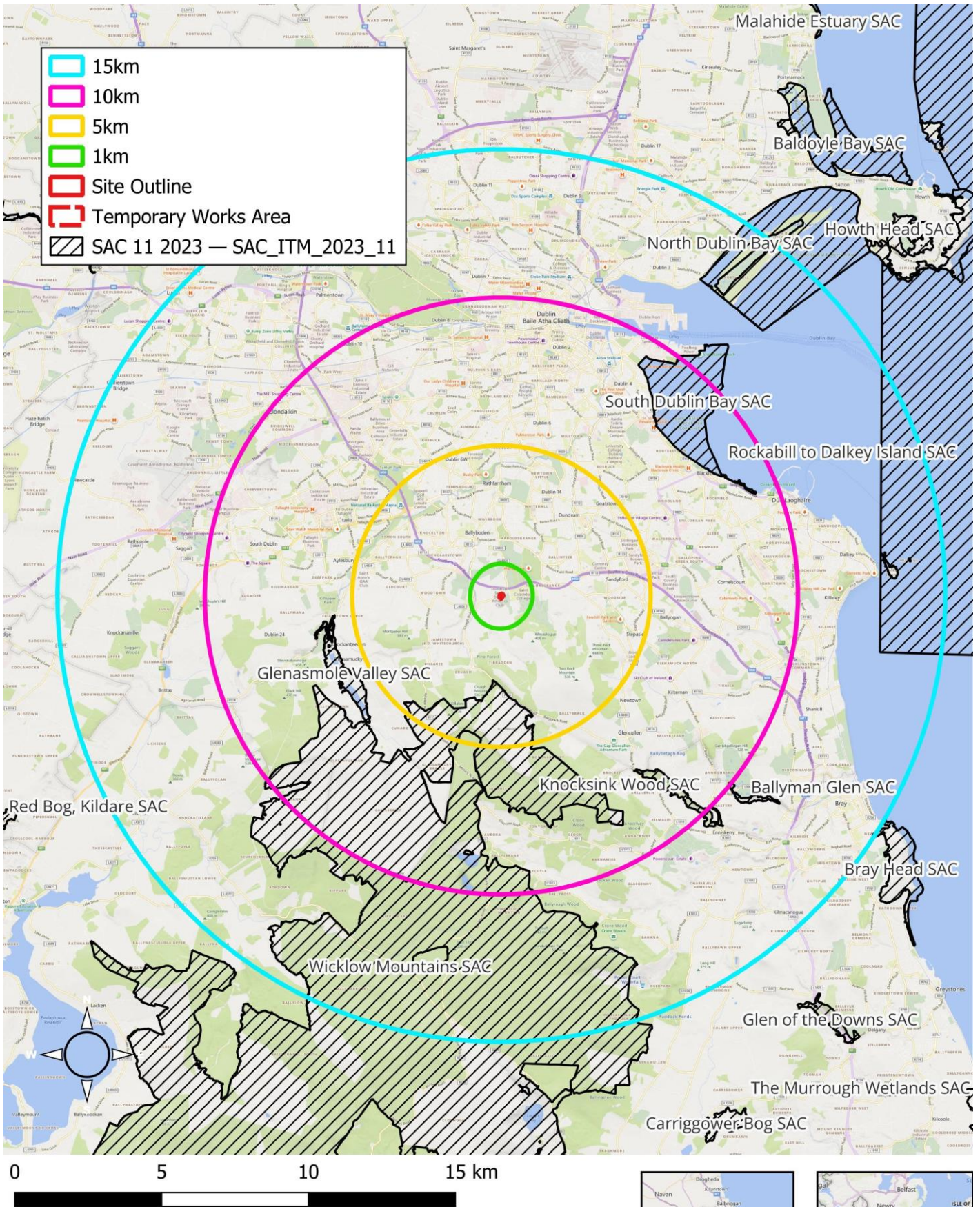
'In an increasingly urbanised county, wildlife corridors are vital for the survival of countless species, such as badgers, hedgehogs, bats and birds. They bridge the gap between habitats, which otherwise would be small and isolated, and join them together. Linking core wildlife habitats helps to restore and preserve biodiversity, allowing movement between important habitats to maintain genetic diversity in wildlife populations. Without this, local extinctions can occur. They provide refuge and foraging areas; they store carbon and regulate our water flows and water quality; clean our air; and provide resilience to climate change. Our wildlife corridors include our watercourses, riparian habitats, hedgerows, treelines and other associated habitats, such as wet grassland, scrub and woodland.'

Locally important biodiversity sites

'Locally Important Biodiversity Sites (LIBSs) are areas that are outside of protected areas, but which form an integral part of the ecological network across a county and are considered important at a local level, and provide a range of ecosystem services to communities. They have no formal designation but are sites worth of protection and enhancement. These sites also provide additional benefits to, and support, protected areas. They do not include/ overlap with protected sites, but may be adjacent to them. These include areas in our parks, along our wildlife corridors, areas of wetlands, grasslands, heath, fen and other habitats, and habitats that contain rare or important flora and fauna species.'

Open Spaces

'A lot of our open spaces contain areas that are important for biodiversity and this is reflected in the fact that some of our parks are included in our Locally Important Biodiversity Sites. Parks across the county contain meadows, hedgerows, native tree planting and wetlands, while fauna, such as badgers, bats, otter, hedgehogs, birds, amongst other species, live or forage in some of our parks and residential green spaces. Our wildlife corridors that provide connectivity and allow species to move and forage throughout the county often pass through our green spaces in the form of a river, a stream, a treeline or a hedgerow, all forming an important element of the wider ecological network.'

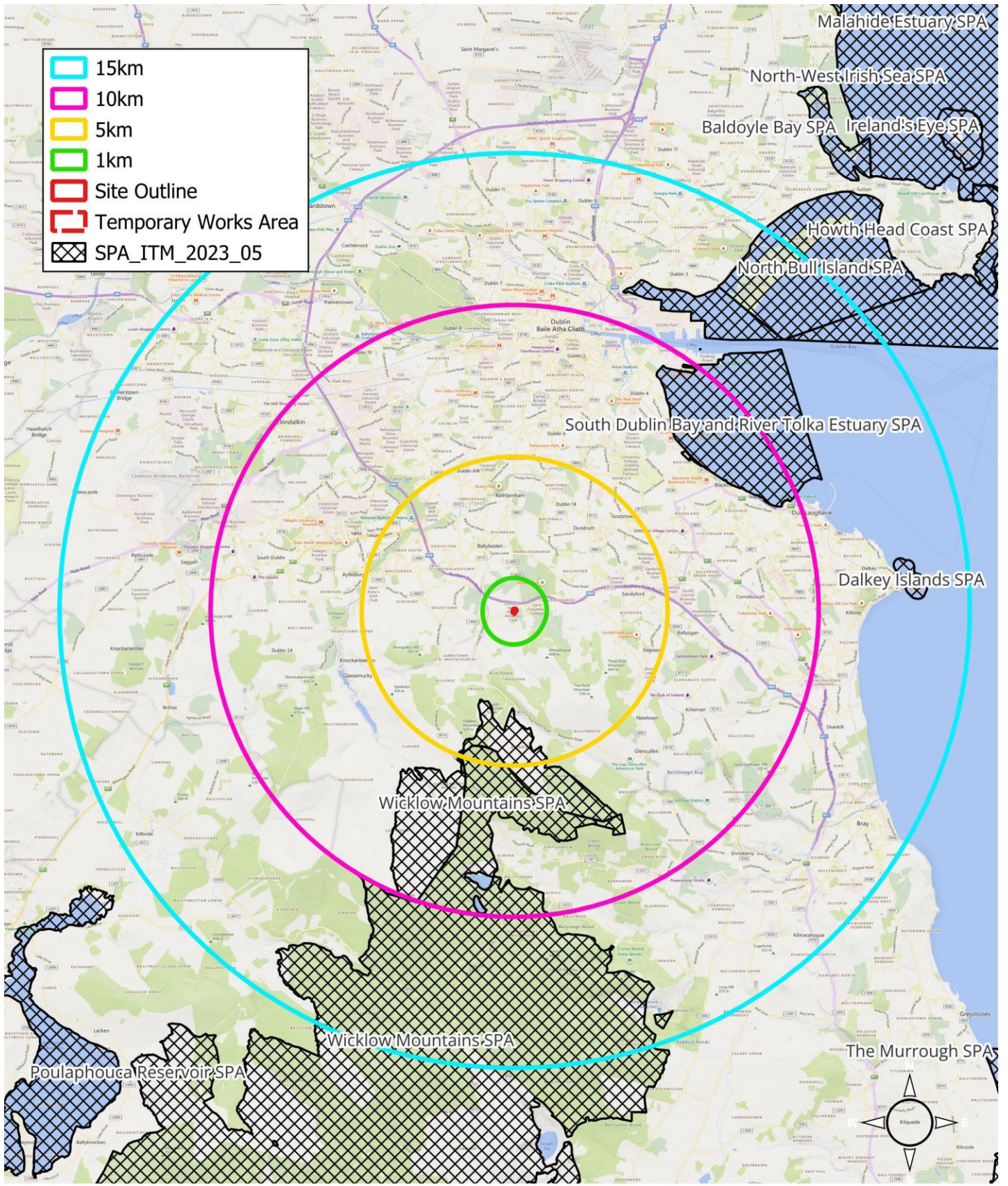


Project: St. Thomas Sports Campus
 Location: Tibbradden Rd, Kilmashogue, Dublin 16
 Date: 15th February 2024
 Drawn By: Bryan Deegan (Altamar)

ALTEMAR
 Marine & Environmental Consultancy



Figure 16. SACs within 15km of the subject site



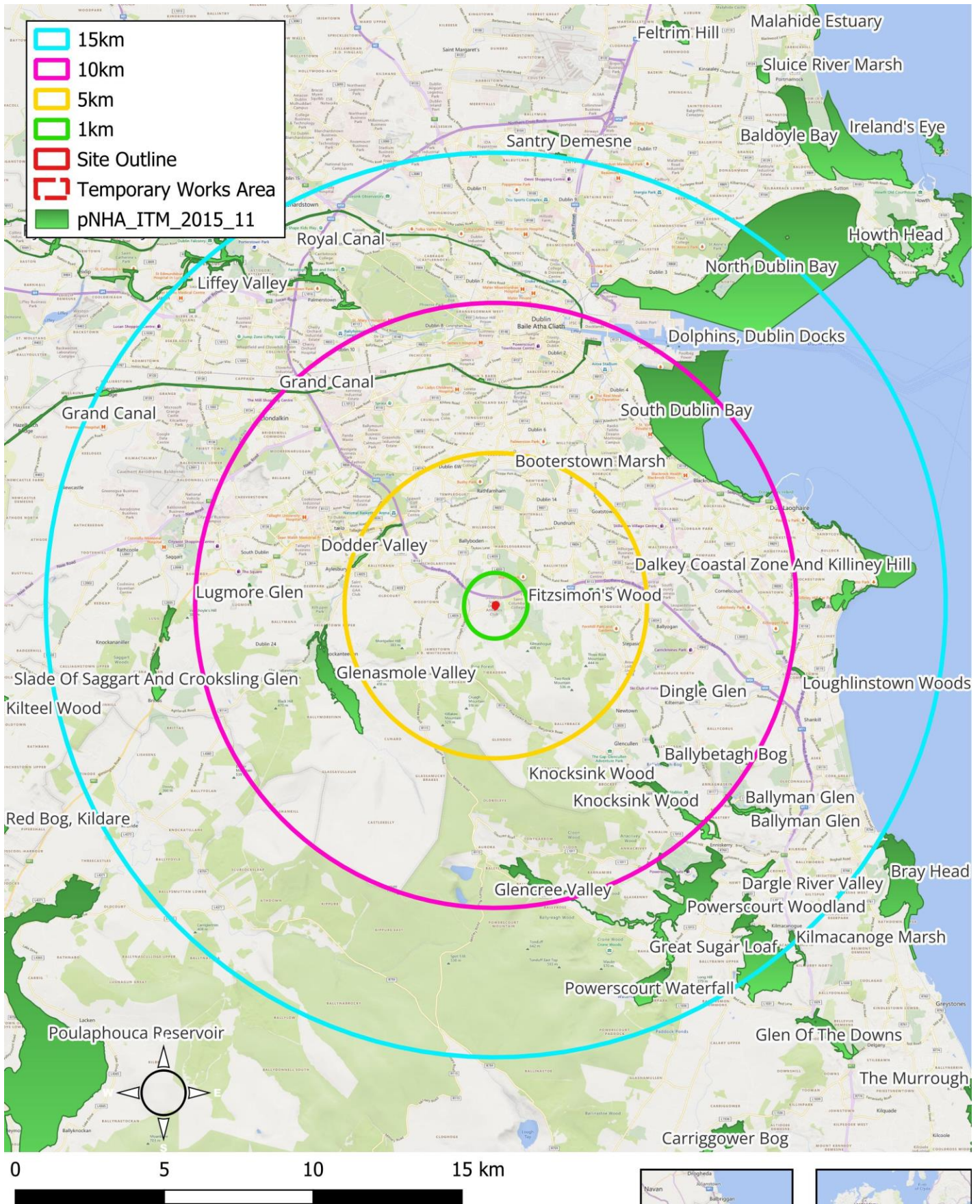
0 5 10 15 km

Project: St. Thomas Sports Campus
 Location: Tibbradden Rd, Kilmashogue,
 Dublin 16
 Date: 15th February 2024
 Drawn By: Bryan Deegan (Altemar)

ALTEMAR
 Marine & Environmental Consultancy



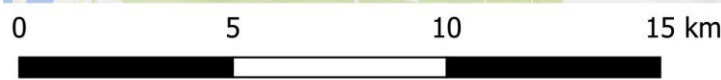
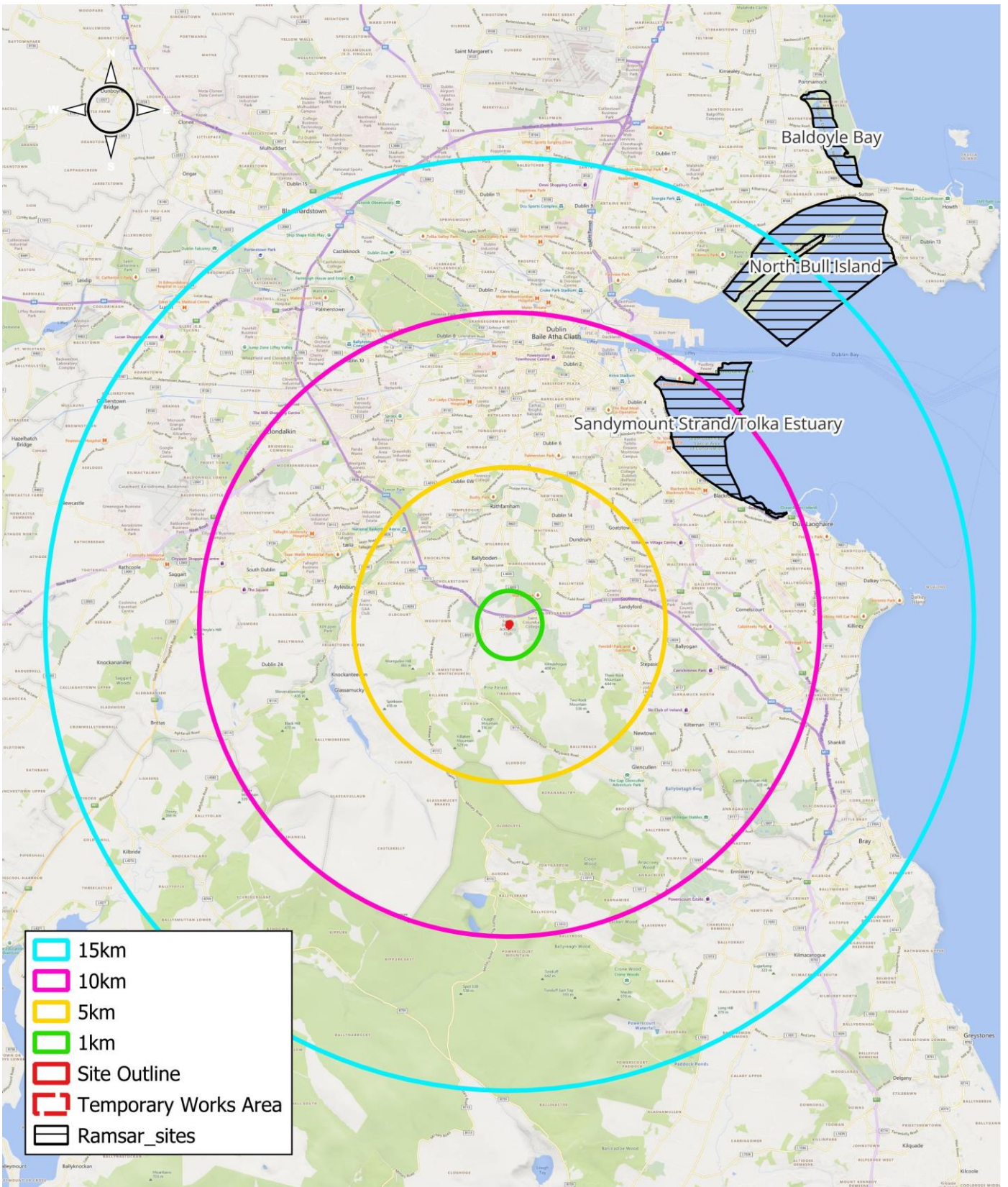
Figure 17. SPAs within 15km of the subject site



Project: St. Thomas Sports Campus
 Location: Tibbradden Rd, Kilmashogue, Dublin 16
 Date: 15th February 2024
 Drawn By: Bryan Deegan (Altamar)



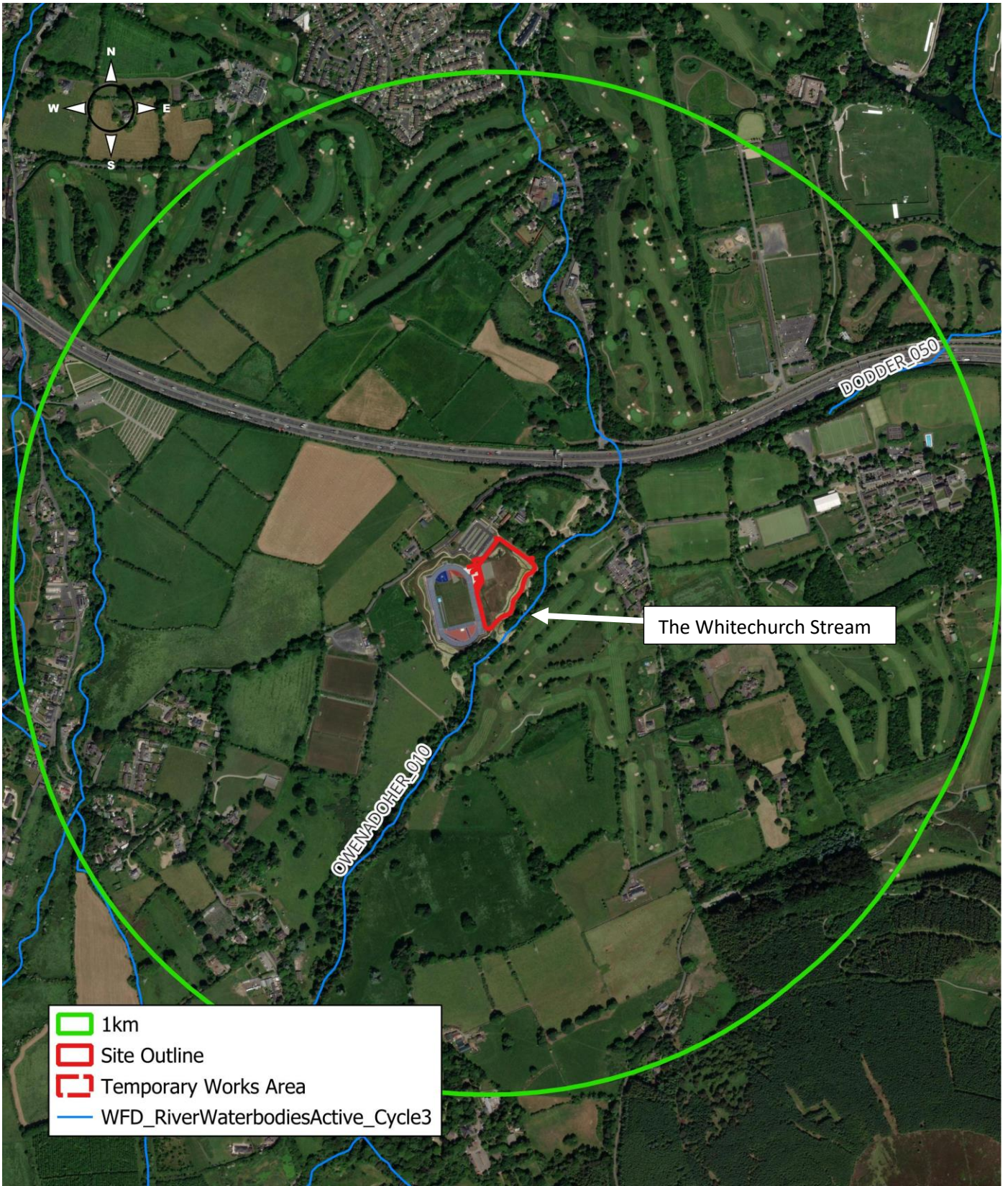
Figure 18. pNHAs within 15km of the subject site



Project: St. Thomas Sports Campus
 Location: Tibbradden Rd, Kilmashogue, Dublin 16
 Date: 15th February 2024
 Drawn By: Bryan Deegan (Altemar)



Figure 19. Ramsar sites within 15km of the subject site



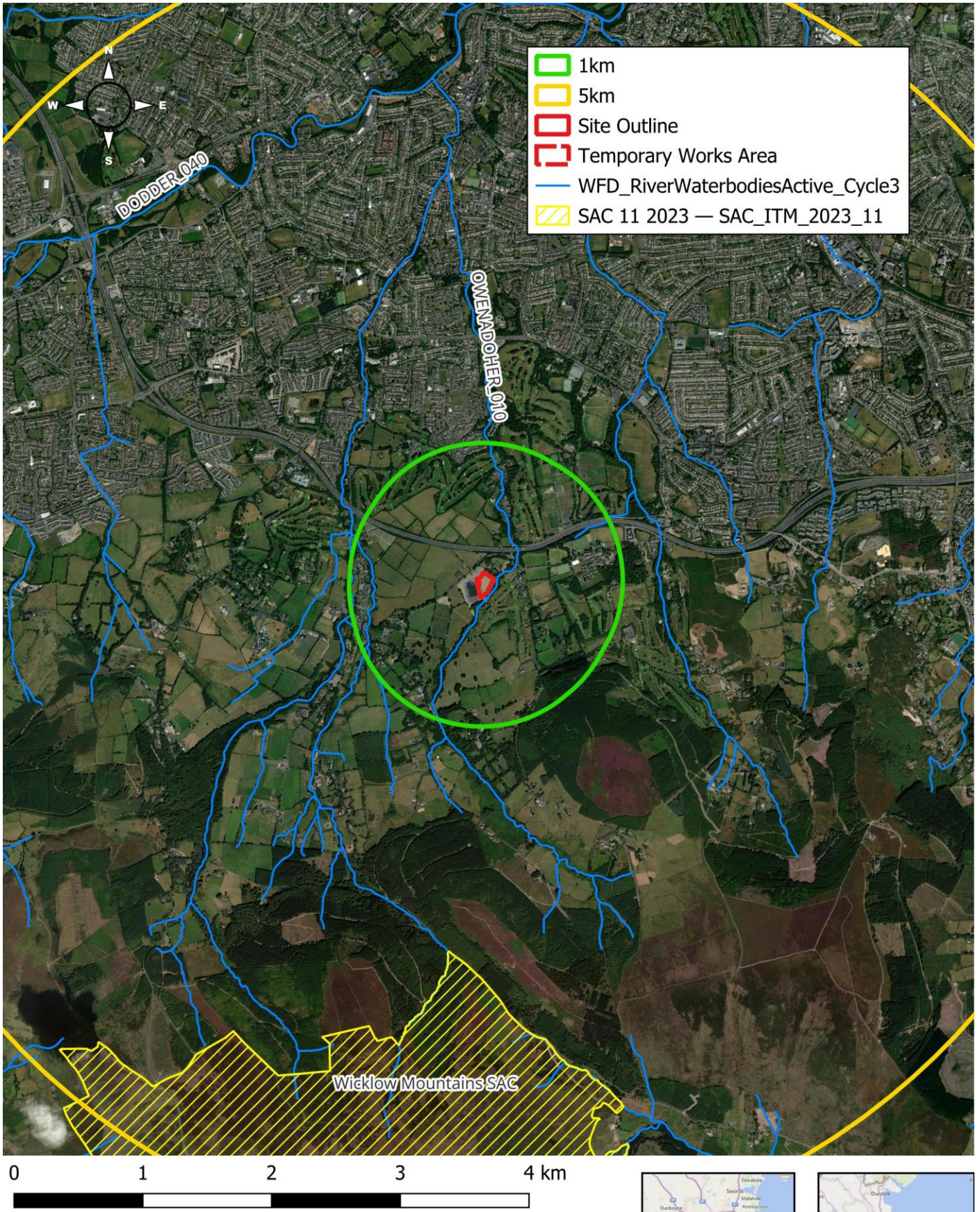
- 1km
- Site Outline
- Temporary Works Area
- WFD_RiverWaterbodiesActive_Cycle3

0 0.5 1 km

Project: St. Thomas Sports Campus
 Location: Tibbradden Rd, Kilmashogue,
 Dublin 16
 Date: 15th February 2024
 Drawn By: Bryan Deegan (Altamar)



Figure 20. Watercourses within 1km of the subject site



Project: St. Thomas Sports Campus
 Location: Tibradden Rd, Kilmashogue,
 Dublin 16
 Date: 15th February 2024
 Drawn By: Bryan Deegan (Altamar)

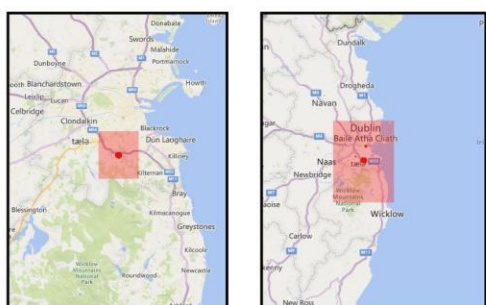
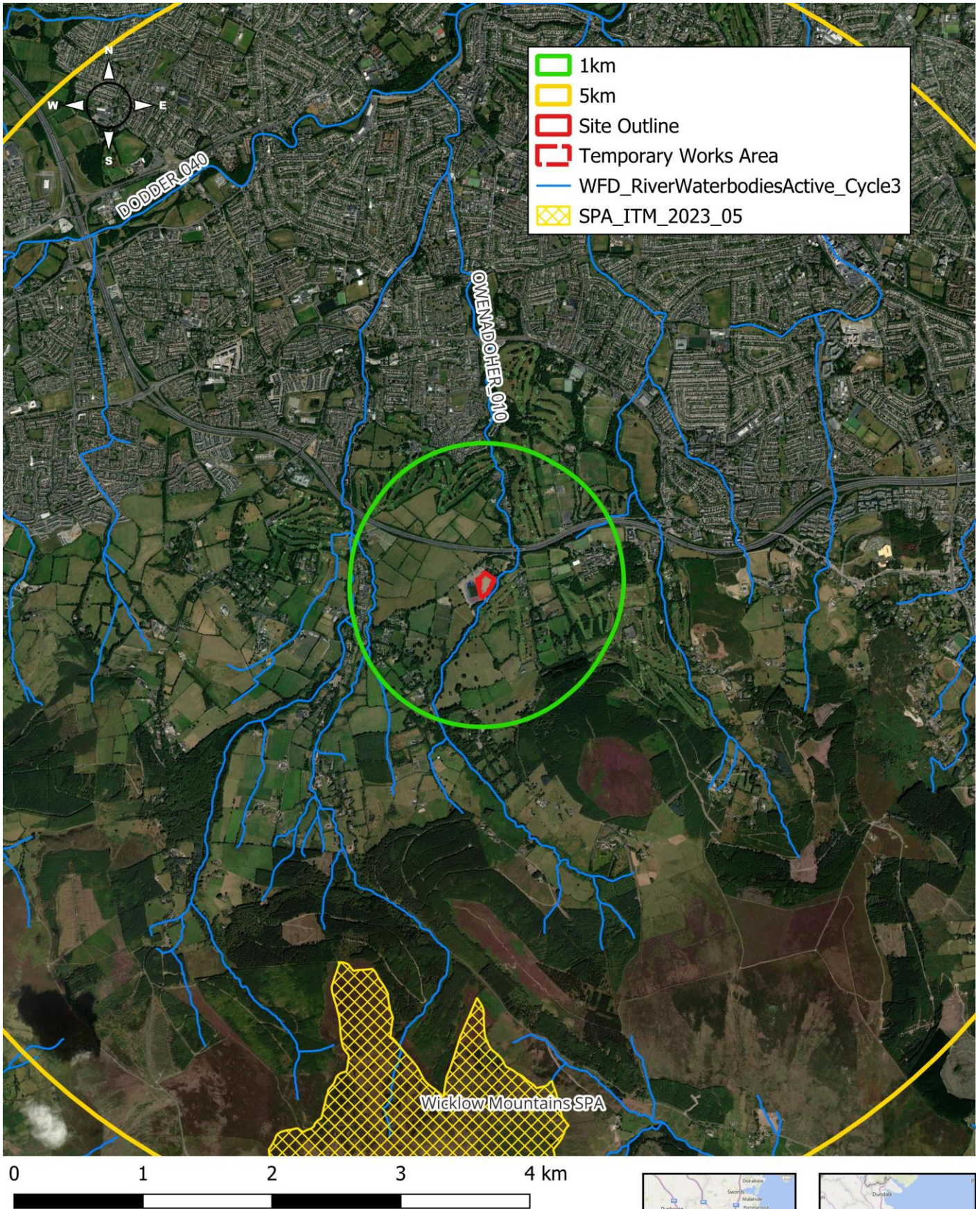


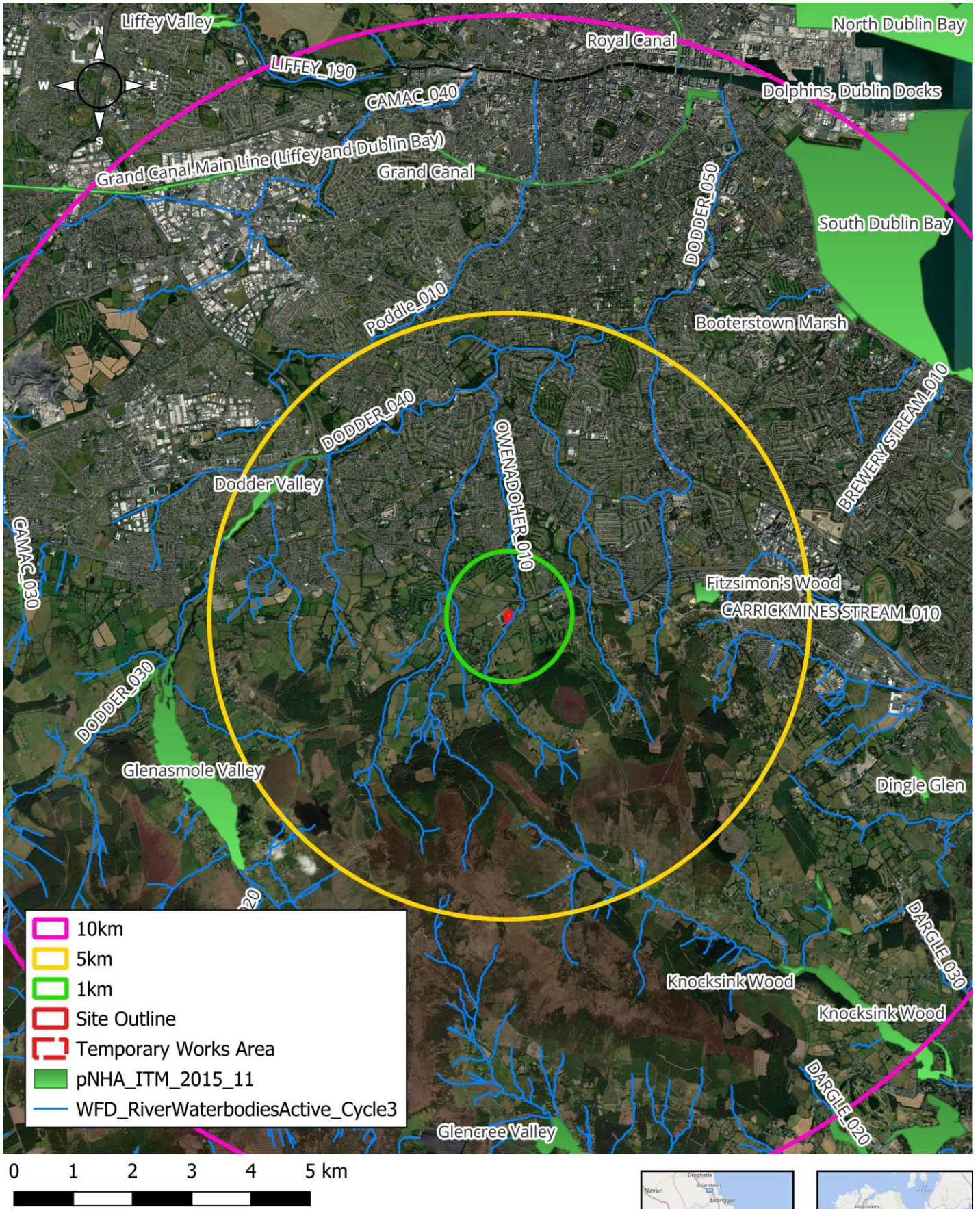
Figure 21. Watercourses and SACs near the subject site



Project: St. Thomas Sports Campus
 Location: Tibbradden Rd, Kilmashogue,
 Dublin 16
 Date: 15th February 2024
 Drawn By: Bryan Deegan (Altamar)



Figure 22. Watercourses and SPAs near the subject site

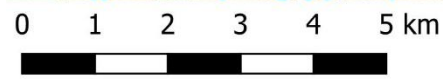
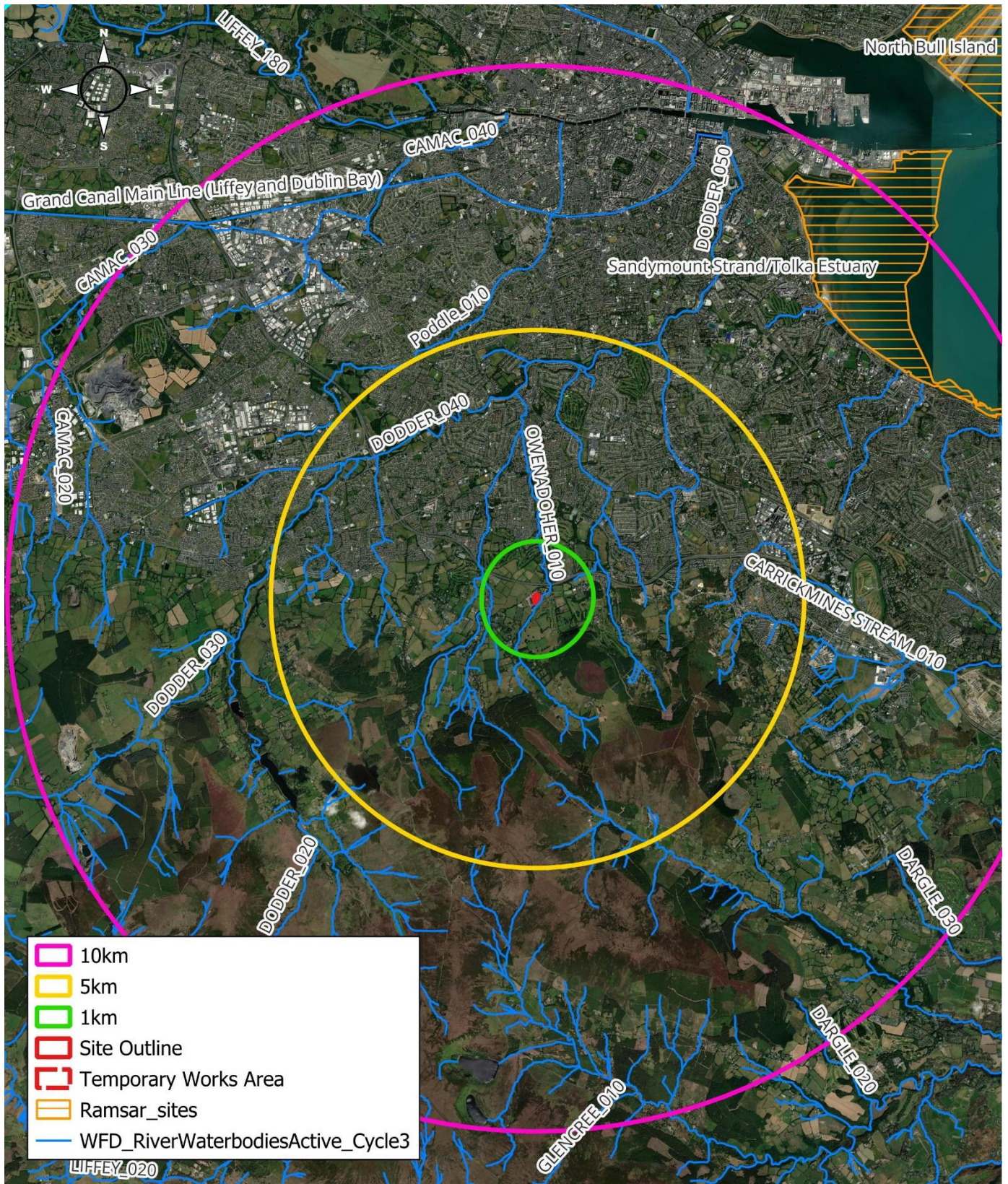


Project: St. Thomas Sports Campus
 Location: Tibbradden Rd, Kilmashogue,
 Dublin 16
 Date: 15th February 2024
 Drawn By: Bryan Deegan (Altamar)

ALTEMAR
 Marine & Environmental Consultancy



Figure 23. Watercourses and pNHAs near the subject site



Project: St. Thomas Sports Campus
 Location: Tibbradden Rd, Kilmashogue, Dublin 16
 Date: 15th February 2024
 Drawn By: Bryan Deegan (Altamar)



Figure 24. Watercourses and Ramsar sites near the subject site

Habitats and Species

A site assessment was carried out on the 5th September 2023. Habitats within the proposed site were classified according to Fossitt (2000) (Figure 25). It is important to note that the site has undergone significant disturbance and landscaping in the past two years where the entire redline has been previously cleared and relandscaped (Figure 26).

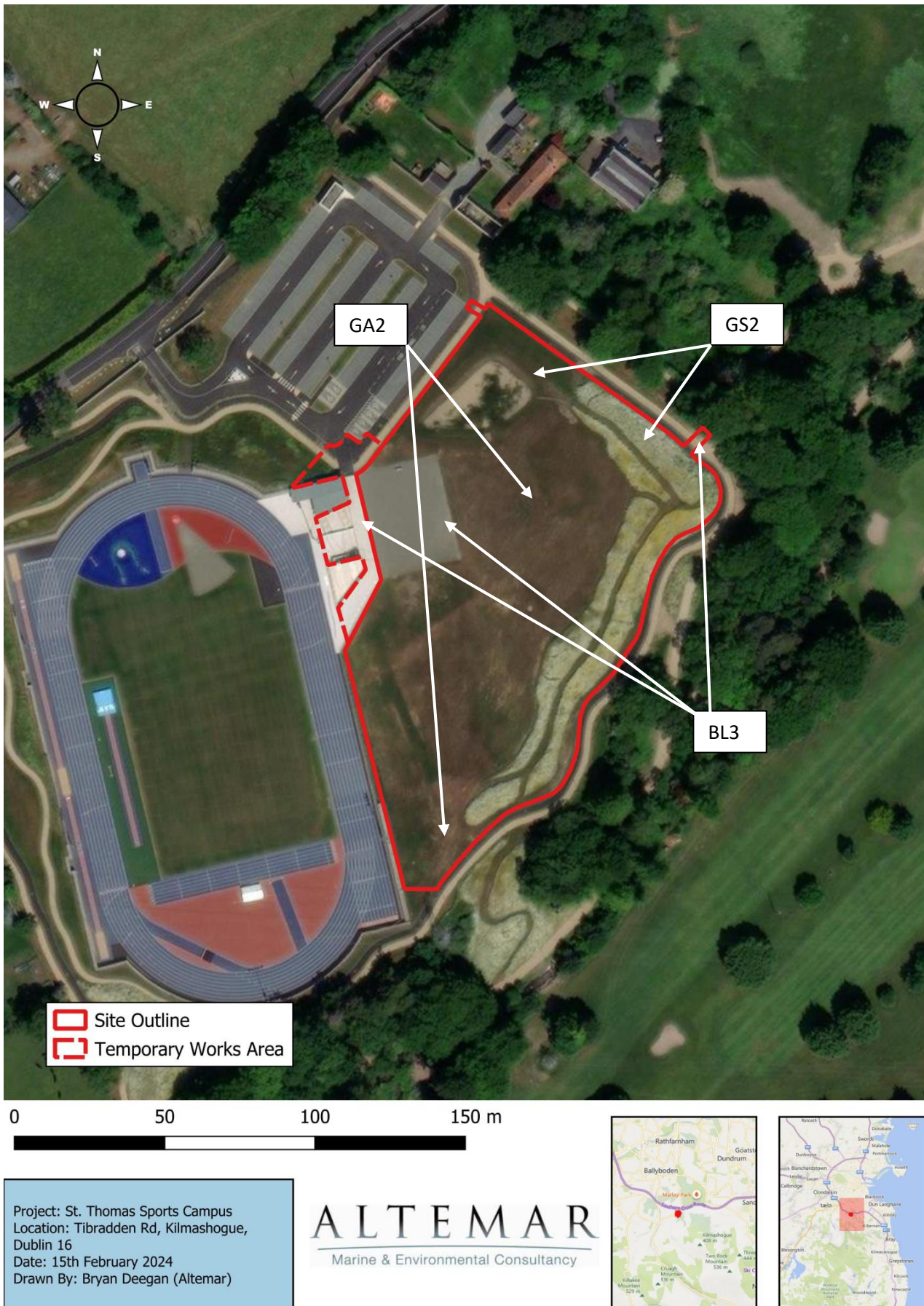


Figure 25. Fossitt Habitat map



Figure 26. Satellite imagery from August 2022 (Google Earth Pro).

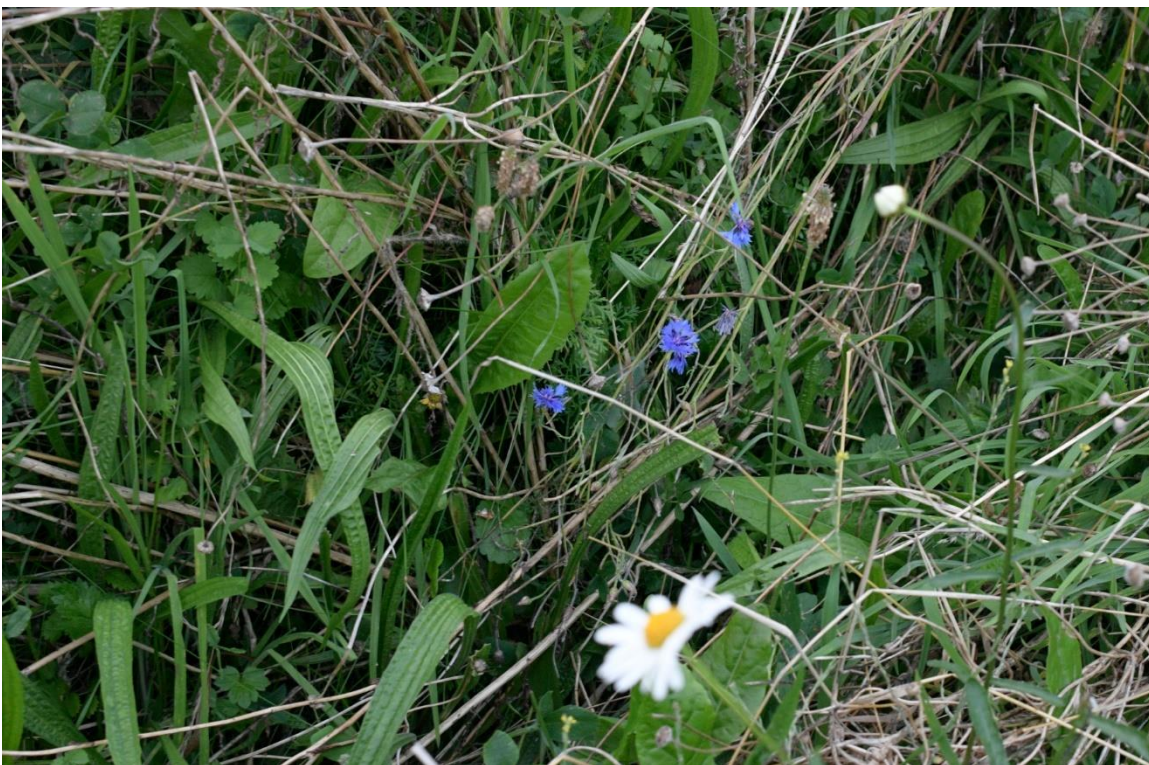


Plate 1. GS2 Dry meadows and grassy verges.

GS2 Dry meadows and grassy verges.

A recently constructed earth slope has been prepared on site as part of a cross country running track. On either side of this track wildflowers had been planted as part of a Dry meadows and grassy verges habitat. This included species such as ox-eye daisy (*Leucanthemum vulgare*), ribbed melilot (*Melilotus officinalis*), marsh ragwort (*Jacobaea aquatica*), chicory (*Cichorium intybus*), devil's bit scabious (*Succisa prantensis*) and marigold (*Glebionis spp.*). This habitat also had ribwort plantain (*Plantago lanceolata*), white clover (*Trifolium repens*), red clover (*Trifolium pratense*), cleavers (*Galium aparine*), creeping cinquefoil (*Potentilla reptans*), fool's parsley (*Aethusa cynapium*) and meadow buttercup (*Ranunculus acris*). A depression, which appears to be a swale, was located to the north of the site. This had also been planted with similar species but with limited success due to the semi-aquatic nature of the habitat. This was predominantly comprised of grass species with bare patches, some of which comprised of standing water.



Plate 2. GA2 Amenity Grassland.

GA2 Amenity Grassland

The majority of the proposed development area consists of amenity grassland. Species included buttercup (*Ranunculus repens*), white clover (*Trifolium repens*), red clover (*Trifolium pratense*), daisy (*Bellis perennis*), plantains (*Plantago spp.*), thistles (*Cirsium sp.*), docks (*Rumex spp.*) and dandelion (*Taraxacum spp.*).

Evaluation of Habitats

No rare or protected habitats were noted. The site has recently undergone disturbance and relandscaping.

Plant Species

The plant species encountered at the various locations on site are detailed above. No rare or plant species of conservation value were noted during the field assessment. No rare or threatened plant species were recorded in the vicinity of the proposed redevelopment site. No invasive species e.g. Japanese knotweed, giant rhubarb, Himalayan balsam or giant hogweed were noted on site.

Mammals

No signs of terrestrial mammals of conservation importance including footprints, burrows (setts or holts) etc. were noted on site or, in the scrub/woodland within 50m of the proposed development. A badger sett was previously noted within the riparian woodland more than 100m from the proposed works, but was within the ZoI of the Phase I works.

Amphibians

The common frog (*Rana temporaria*) was not observed on site. However, it is likely that this species is present in the vicinity given the proximity of the watercourse. The swale on site may form a habitat for frogs but no frogs were observed within the swale.

Bats

A bat survey was carried out. No evidence of bat roosts were seen on site. No bats were noted emerging from the trees or buildings adjacent to the proposed development site. Bat foraging was noted on and proximate to the site by a common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*) and Leisler (*Nyctalus leisleri*) bats.

Birds

No rare or bird species of conservation value were noted on site during the field assessment. The site is primarily grassland. No birds were noted nesting in the vicinity of the buildings on site. The following birds were noted within and proximate to the site, the majority of which were noted within the riparian woodland:

Table 3: Bird Species noted in the vicinity of the proposed development.

Common Name	Scientific Name	BoCCI
Great tit	<i>Parus major</i>	Green
Woodpigeon	<i>Columba palumbus</i>	Green
Goldfinch	<i>Carduelis carduelis</i>	Green
Herring Gull	<i>Larus argentatus (flying)</i>	Amber
Hooded crow	<i>Corvus cornix</i>	Green
Wren	<i>Troglodytes troglodytes</i>	Green
Blackbird	<i>Turdus merula</i>	Green
Goldfinch	<i>Carduelis carduelis (on site)</i>	Green
Robin	<i>Erithacus rubecula</i>	Green
Chaffinch	<i>Fingilla coelebs</i>	Green
Dunnock	<i>Prunella modularis</i>	Green
Jay	<i>Garrulus glandarius</i>	Green
Treecreeper	<i>Certhia familiaris</i>	Green

Historic Records of Biodiversity

The National Biodiversity Data Centre's online viewer was consulted to determine the extent of biodiversity and/or species of interest in the area. First, an assessment of the site-specific area was carried out and it recorded no species of interest in the site area. Following this a 2km² grid (O12M) that encompasses the subject site were assessed. Table 3 provides a list of all species recorded in both grid areas that possess a specific designation, such as Invasive Species or Protected Species.

Table 3. NBDC list of species (O12M)

Date of last record	Species name	Designation
31/12/0005	<i>Arthurdendyus triangulatus</i>	Invasive Species: Invasive Species Invasive Species: Invasive Species >> High Impact Invasive Species
31/12/2012	Eastern Grey Squirrel (<i>Sciurus carolinensis</i>)	Invasive Species: Invasive Species Invasive Species: Invasive Species >> High Impact Invasive Species Invasive Species: Invasive Species >> EU Regulation No. 1143/2014 Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
25/05/2015	Japanese Knotweed (<i>Fallopia japonica</i>)	Invasive Species: Invasive Species Invasive Species: Invasive Species >> High Impact Invasive Species Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
05/06/2014	Butterfly-bush (<i>Buddleja davidii</i>)	Invasive Species: Invasive Species Invasive Species: Invasive Species >> Medium Impact Invasive Species
05/06/2014	Sycamore (<i>Acer pseudoplatanus</i>)	Invasive Species: Invasive Species Invasive Species: Invasive Species >> Medium Impact Invasive Species
14/08/2013	European Rabbit (<i>Oryctolagus cuniculus</i>)	Invasive Species: Invasive Species Invasive Species: Invasive Species >> Medium Impact Invasive Species
18/04/2020	Three-cornered Garlic (<i>Allium triquetrum</i>)	Invasive Species: Invasive Species Invasive Species: Invasive Species >> Medium Impact Invasive Species Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
06/05/1980	European Otter (<i>Lutra lutra</i>)	Protected Species: EU Habitats Directive Protected Species: EU Habitats Directive >> Annex II Protected Species: EU Habitats Directive >> Annex IV Protected Species: Wildlife Acts
02/09/2009	Brown Long-eared Bat (<i>Plecotus auritus</i>)	Protected Species: EU Habitats Directive Protected Species: EU Habitats Directive >> Annex IV Protected Species: Wildlife Acts
02/09/2009	Lesser Noctule (<i>Nyctalus leisleri</i>)	Protected Species: EU Habitats Directive Protected Species: EU Habitats Directive >> Annex IV Protected Species: Wildlife Acts
02/09/2009	Natterer's Bat (<i>Myotis nattereri</i>)	Protected Species: EU Habitats Directive Protected Species: EU Habitats Directive >> Annex IV Protected Species: Wildlife Acts
02/09/2009	Pipistrelle (<i>Pipistrellus pipistrellus sensu lato</i>)	Protected Species: EU Habitats Directive Protected Species: EU Habitats Directive >> Annex IV Protected Species: Wildlife Acts
02/09/2009	Soprano Pipistrelle (<i>Pipistrellus pygmaeus</i>)	Protected Species: EU Habitats Directive Protected Species: EU Habitats Directive >> Annex IV Protected Species: Wildlife Acts
13/08/2020	Common Frog (<i>Rana temporaria</i>)	Protected Species: EU Habitats Directive Protected Species: EU Habitats Directive >> Annex V Protected Species: Wildlife Acts
31/12/2012	Pine Marten (<i>Martes martes</i>)	Protected Species: EU Habitats Directive Protected Species: EU Habitats Directive >> Annex V Protected Species: Wildlife Acts

Date of last record	Species name	Designation
01/09/1972	Common Lizard (<i>Zootoca vivipara</i>)	Protected Species: Wildlife Acts
31/12/2007	Eurasian Badger (<i>Meles meles</i>)	Protected Species: Wildlife Acts
17/08/2015	Eurasian Pygmy Shrew (<i>Sorex minutus</i>)	Protected Species: Wildlife Acts
17/04/2016	Eurasian Red Squirrel (<i>Sciurus vulgaris</i>)	Protected Species: Wildlife Acts
20/05/2021	West European Hedgehog (<i>Erinaceus europaeus</i>)	Protected Species: Wildlife Acts
31/12/2011	Common Pheasant (<i>Phasianus colchicus</i>)	Protected Species: Wildlife Acts Protected Species: EU Birds Directive Protected Species: EU Birds Directive >> Annex II, Section I Bird Species Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
28/09/2018	Common Wood Pigeon (<i>Columba palumbus</i>)	Protected Species: Wildlife Acts Protected Species: EU Birds Directive Protected Species: EU Birds Directive >> Annex II, Section I Bird Species Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
28/09/2018	Mallard (<i>Anas platyrhynchos</i>)	Protected Species: Wildlife Acts Protected Species: EU Birds Directive Protected Species: EU Birds Directive >> Annex II, Section I Bird Species Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
25/05/2013	Red Grouse (<i>Lagopus lagopus</i>)	Protected Species: Wildlife Acts Protected Species: EU Birds Directive Protected Species: EU Birds Directive >> Annex II, Section I Bird Species Protected Species: EU Birds Directive >> Annex III, Section I Bird Species Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
28/09/2018	Common Coot (<i>Fulica atra</i>)	Protected Species: Wildlife Acts Protected Species: EU Birds Directive Protected Species: EU Birds Directive >> Annex II, Section I Bird Species Protected Species: EU Birds Directive >> Annex III, Section II Bird Species Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
31/12/2011	Barn Swallow (<i>Hirundo rustica</i>)	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
28/09/2018	Little Grebe (<i>Tachybaptus ruficollis</i>)	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
28/09/2018	Black-headed Gull (<i>Larus ridibundus</i>)	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
25/05/2013	Cow-horn Bog-moss (<i>Sphagnum denticulatum</i>)	Threatened Species: Least concern
25/05/2013	Feathery Bog-moss (<i>Sphagnum cuspidatum</i>)	Threatened Species: Least concern

Date of last record	Species name	Designation
25/05/2013	Glittering Wood-moss (<i>Hylocomium splendens</i>)	Threatened Species: Least concern
25/05/2013	Heath Star Moss (<i>Campylopus introflexus</i>)	Threatened Species: Least concern
25/05/2013	Papillose Bog-moss (<i>Sphagnum papillosum</i>)	Threatened Species: Least concern
25/05/2013	Pointed Spear-moss (<i>Calliergonella cuspidata</i>)	Threatened Species: Least concern
25/05/2013	Red-stemmed Feather-moss (<i>Pleurozium schreberi</i>)	Threatened Species: Least concern
25/05/2013	Soft Bog-moss (<i>Sphagnum tenellum</i>)	Threatened Species: Least concern
25/05/2013	Woolly Fringe-moss (<i>Racomitrium lanuginosum</i>)	Threatened Species: Least concern
01/01/1970	<i>Glebionis segetum</i>	Threatened Species: Near threatened
31/12/1900	<i>Oreodytes davisii</i>	Threatened Species: Near threatened
10/08/2023	<i>Andrena (Cnemidandrena) denticulata</i>	Threatened Species: Vulnerable

An assessment of files received from the NPWS (Code No. 2022_120) which contain records of rare and protected species and grid references for sightings of these species was carried out as part of this EclA. No species of conservation importance were noted within the site boundaries. The following table provides a summary of the species identified, the year of identification, survey name and Grid Reference.

Table 4. NPWS records of recorded species near the proposed development site

Sample ID	Species	Survey Name	Sample Year
1105	Common Frog (<i>Rana temporaria</i>)	AFF Mammals, Reptiles & Amphibians Distribution Atlas 1978	1972
1514	West European Hedgehog (<i>Erinaceus europaeus</i>)	Animal Survey IBRC – Location Species List	1960
1515	Irish Stoat (<i>Mustela erminea subsp. Hibernica</i>)	Animal Survey IBRC – Location Species List	1960
1517	Eurasian Red Squirrel (<i>Sciurus vulgaris</i>)	Animal Survey IBRC – Location Species List	1960
1518	Eurasian Badger (<i>Meles meles</i>)	Animal Survey IBRC – Location Species List	1960
1519	Brown Hare (<i>Lepus europaeus</i>)	Animal Survey IBRC – Location Species List	1960
2000	Red Hemp-nettle (<i>Galeopsis angustifolia</i>)	Galeopsis angustifolia	1967
18418	Sika Deer (<i>Cervus nippon</i>)	Deer data Coilte	2004
5163	Common Lizard (<i>Lacerta vivipara</i>)	Lizards IBRC data	1972
1516	Irish Hare (<i>Lepus timidus subsp. Hibernicus</i>)	Animal Survey IBRC – Location Species List	1960

Potential Impacts

This report has been prepared to outline the construction and operational phase measures in addition to detailing the potential impacts on sensitive receptors within the Zone of Influence (ZOI).

Potential Construction Impacts

The overall development of the site is likely to have direct negative impacts upon the existing habitats, fauna and flora. Direct negative effects will be manifested in terms of the removal of a portion of the site's internal habitats. The removal of these habitats will result in a loss of species of low biodiversity importance.

Designated Conservation sites within 15km

The proposed development is not within a designated conservation site. The nearest Natura 2000 sites to the proposed development site are the Wicklow Mountains SAC (2.8km) and the Wicklow Mountains SPA (3.1km). There is no hydrological connection to either of these sites from the proposed development site. There is an indirect hydrological pathway between the subject site and European sites at Dublin Bay via surface water drainage to the Whitechurch stream. These sites are the South Dublin Bay SAC (7.7km), North Dublin Bay SAC (12.5km), South Dublin Bay and River Tolka Estuary SPA (7.6km), North Bull Island SPA (12.5km), North-West Irish Sea SPA (12.6km), South Dublin Bay pNHA (7.7km), North Dublin Bay pNHA (11km), Sandymount Strand/Tolka Estuary Ramsar site (7.8km) and North Bull Island Ramsar site (12.6km).

Impacts: Low adverse / International/ Negative Impact / Not significant / short term. Mitigation is not needed to protect designated sites.

Biodiversity

The impact of the development during construction phase will be a loss of existing habitats and species on site. It would be expected that the flora and fauna associated with these habitats would also be displaced.

Terrestrial mammalian species

No protected terrestrial mammals were noted on site. Loss of habitat and habitat fragmentation may affect some common mammalian species.

Potential Impacts in the absence of mitigation: Low adverse / site / Negative Impact / Not significant / short term.

Flora

No protected flora was noted on site. Site clearance will remove the flora species on site. A small stand of Japanese knotweed was noted proximate to the watercourse in the riparian woodland. No works are proposed in this area.

Potential Impacts in the absence of mitigation: Low adverse / site / Negative Impact / Not Significant / Short term.

Bat Fauna

There are no trees of bat roosting potential located onsite. No bats were noted emerging from the buildings or trees on site. Foraging was noted on site. Lighting during construction could potentially impact on foraging on site.

Impacts: Low adverse / site / Negative Impact / Not significant / short term. Mitigation is required in the form of the control of lighting during construction.

Bird Fauna

No bird species of conservation importance have been noted on site. There are no trees on site.

Impacts: Low adverse / Local / Negative Impact / Not significant / short term. Mitigation is needed in the form of site clearance outside bird nesting season.

Potential Operational Impacts

Designated Conservation sites within 15km

The development must comply with County Council drainage requirements and the Water Pollution Acts. Measures will be in place to prevent downstream impacts. No significant impacts on designated sites are likely during operation.

Impacts: Negligible / International / Neutral Impact / Not significant / Long-term. Standard mitigation will be required.

Terrestrial mammalian species

No protected terrestrial mammals were noted in the vicinity of proposed works.

Potential Impacts in the absence of mitigation: Low adverse / local/ Negative Impact / Not significant / long term. Mitigation is required in the form of a pre construction inspection.

Flora

No protected flora was noted on site. Landscaping will increase flora diversity.

Potential Impacts in the absence of mitigation: Neutral / site / Not significant / long-term

Bat Fauna

The proposed development will change the local environment as new structures are to be erected and some of the existing vegetation will be removed. Existing building and lighting is located on site. The proposed development would not significantly impact on bats greater than the baseline. No bat roosts or potential bat roosts will be lost due to this development and the species expected to occur onsite should persist. The proposed development has included a sensitive lighting strategy and the planting of trees to form a bat foraging corridor. No significant impacts are foreseen. Lighting during construction could impact on foraging activity

Effects: Low adverse / International / Negative Impact / Not significant / long term.

Aquatic Biodiversity

Standard measures will be in place in relation to surface water discharges. It important to note that petrochemical interception is required on site due to potential effects on the Whitechurch Stream.

Potential Impacts in the absence of mitigation: Low adverse / local / Negative Impact / Not significant / long term. Petrochemical interception is required on site due to potential effects on the Whitechurch Stream.

Bird Fauna

The proposed development will change the local environment as new structures are to be erected. The buildings are comprised of solid materials consisting of a solid material on the exterior which includes sections of concrete and glass. These buildings would be clearly visible to bird species and would not pose a significant collision risk. However, given the proximity of the woodland and tall glass windows mitigation measures in relation to bird collision are required. As the landscaping elements improve with maturity it would be expected that the biodiversity value of the site to birds would increase.

Impacts: Low adverse / site / Negative Impact / Not significant / long term. Mitigation measures in relation to bird strikes on glazing are required on windows facing the woodland.

Cumulative Impacts

Phase I of the proposed project was recently completed on site. This involved works within the proposed development site and works in the vicinity of the proposed development site. The proposed development site has recently undergone extensive site works and is now primarily planted with Amenity Grassland in addition to Dry Meadows and Grassy Verges (Fossitt, 2000).

The phase I works have resulted in effects on local biodiversity. Mitigation measures are required in relation to cumulative effects from Phase 1 works. Discussions have taken place on site between NPWS, DLR and Altamar in relation to the cumulative effect of the proposed works and protection of species such as bats, otter and badger and riparian corridors.

There are no other recent development proposals (last five years) located in the vicinity of the subject site as identified on the Department of Housing, Local Government and Heritage's 'National Planning Application Database' portal.

Mitigation measure will be put in place to minimise the potential for cumulative impacts in discussion with NPWS and the DLR Biodiversity officer.

Mitigation Measures & Monitoring

Standard construction and operational controls will be incorporated into the proposed development project to minimise the potential negative impacts on the ecology within the Zone of Influence (Zoi). These are outlined in Table 5.

Table 5. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
<p>The Whitechurch Stream</p> <p>The River Dodder</p>	<ul style="list-style-type: none"> • Habitat degradation • Dust deposition • Pollution • Silt ingress from site runoff • Downstream impacts • Negative impacts on aquatic and bird fauna. • Disturbance. 	<p>Prior to works commencing on site an ecologist will be appointed to oversee and monitor the mitigation measures on site.</p> <p>The following mitigation will be implemented:</p> <p>Construction</p> <p><u>Contamination of watercourses</u></p> <ul style="list-style-type: none"> • Appointment of an ecologist to oversee enabling works and the implementation of mitigation measures outlined. • Staging of project to reduce risks to watercourses from contamination • Earthwork operations will be carried out such that surfaces, as they are being raised, shall be designed with adequate drainage, falls and profile to control run-off and prevent ponding and flowing. • Any discharges to the watercourse during construction must be discussed with the ecologist, undergo desilting and petrochemical interception and have twice daily turbidity monitoring. • Local watercourses and drains will be protected from dust, silt and contaminated surface water throughout the works. • Local silt traps established throughout site as discussed with the ecologist. • Mitigation measures on site include dust control, stockpiling away from watercourse and drains • Stockpiling of loose materials will be kept to a minimum of 20m from watercourses and drains. • Stockpiles and runoff areas following clearance will have suitable barriers to prevent runoff of fines into the drainage system and watercourses. • Fuel, oil and chemical storage will be sited within a bunded area. The bund will be at least 50m away from drains, ditches or the watercourse, excavations and other locations where it may cause pollution. • Bunds will be kept clean and spills within the bund area will be cleaned immediately to prevent groundwater contamination. Any water-filled excavations, including the attenuation tank during construction, that require pumping will not directly discharge to the stream. Prior to discharge of water from excavations adequate filtration will be provided to ensure no deterioration of water quality. • Stockpiles and runoff areas following clearance will have suitable barriers to prevent runoff of fines into the drainage system and watercourses. • Bunds will be kept clean and spills within the bund area will be cleaned immediately to prevent groundwater contamination. • During the construction works silt traps will be put in place in the vicinity of all runoff channels the stream to prevent sediment entering the watercourse. • Planting in the vicinity of the stream crossings should be put in place as soon as possible to allow biodiversity corridors to establish.

Table 5. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		<ul style="list-style-type: none"> • On-site inspections will be carried out by project ecologist during enabling works and until drainage connection is complete. • Maintenance of any drainage structures (e.g. de-silting operations) must not result in the release of contaminated water to the surface water network. • No entry of solids or concrete to the associated drainage network during the connection of pipework • The program for the felling of trees will be carried out in consultation with the project ecologist and arborist. The ecologist will be present for the felling of trees within 10m of drainage ditch. <p><u>Air & Dust</u></p> <ul style="list-style-type: none"> • The pro-active control of fugitive dust will ensure prevention of significant emissions arising, rather than a less effective attempt to control them once they have been released. • Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic. • Any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and / or windy conditions. • Vehicles exiting the Site shall make use of a wheel wash facility where appropriate, prior to entering onto public roads. • Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced site road, this will be 20kph, and on hard surfaced roads as site management dictates. • Public roads outside the Site will be regularly inspected for cleanliness and cleaned as necessary. • Material handling systems and Site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods. • During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions. • Dust may enter the drainage ditch via air or surface water with potential downstream impacts. Mitigation measures will be carried out reduce dust emissions to a level that avoids the possibility of adverse effects on the onsite watercourse. The main activities that may give rise to dust emissions during construction include the following: <ul style="list-style-type: none"> • Excavation of material; • Materials handling and storage; • Movement of vehicles (particularly HGV's) and mobile plant. • Contaminated surface runoff • Trucks leaving the site with excavated material will be covered so as to avoid dust emissions along the haulage routes.

Table 5. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		<ul style="list-style-type: none"> • Speed limits on site (15kmh) to reduce dust generation and mobilisation. • The stream is to be protected from dust on site. This may require additional measures in the vicinity of the bridge (east of the site) if this road is used for machinery e.g. placing of terram/protective material over the stream. • Regular inspections of the site and boundary should be carried out to monitor dust, records and notes on these inspections should be logged. • Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. • Make the complaints log available to the local authority when asked. • Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book. • Road sweeping will be in place in adjacent roads when required or requested by the project ecologist. <p><u>Monitoring</u></p> <ul style="list-style-type: none"> • Undertake daily on-site and off-site inspection, where receptors are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces within 100 m of site boundary, integrity of the silt control measures, with cleaning and / or repair to be provided if necessary. • Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. • Fully enclose specific operations where there is a high potential for dust production and the site is active for an extensive period. • Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below. • Cover, seed or fence stockpiles to prevent wind whipping. • Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic. • Any road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions. • Maintain a vegetated strip and vehicle exclusion zone between the works and the onsite watercourse in consultation with the project ecologist. • Regular inspection of surface water run-off and any sediment control measures e.g. silt traps will be carried out during the Construction Phase. Regular auditing of construction / mitigation measures will be undertaken e.g. concrete pouring, refuelling in designated areas etc.

Table 5. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		<ul style="list-style-type: none"> • Weather conditions will be considered when planning construction activities to minimise the risk of run-off from the Site and the suitable distance of topsoil piles from surface water drains will be maintained. <p><u>Measures Specific to Earthworks</u></p> <ul style="list-style-type: none"> • Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. • Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable. • Only remove the cover in small areas during work and not all at once. • During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil and thus suppress dust. • Due to the proximity of the onsite watercourse an ecologist will oversee works in particular the excavation of material from the perimeter of the site. • The Contractor will be required to consult with an ecologist prior to the beginning of works to identify any additional measures that may be appropriate and/or required. <p><u>Storage/Use of Materials, Plant & Equipment</u></p> <ul style="list-style-type: none"> • Materials, plant and equipment shall be stored in the proposed site compound location; • Plant and equipment will not be parked within 50m of the onsite watercourse at the end of the working day; • Hazardous liquid materials or materials with potential to generate run-off shall not be stored within 50m of the nearby watercourse. • All oils, fuels and other hazardous liquid materials shall be clearly labelled and stored in an upright position in an enclosed bunded area within the proposed development site compound. The capacity of the bunded area shall conform with EPA Guidelines – hold 110% of the contents or 110% of the largest container whichever is greater; • Fuel may be stored in the designated bunded area or in fuel bowsers located in the proposed compound location. Fuel bowsers shall be double skinned and equipped with certificates of conformity or integrity tested, in good condition and have no signs of leaks or spillages; • Waters collected in drip trays must be assessed prior to discharge. If classified as contaminated, they shall be disposed by a permitted waste contractor in accordance with current waste management legal and regulatory requirements; <p>All persons working will receive work specific induction in relation to material storage arrangements and actions to be taken in the event of an accidental spillage. Daily environmental toolbox talks / briefing sessions will be conducted for all persons working to outline the relevant environmental control measures and to identify any environment risk areas/works.</p>

Table 5. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		<p>Operation During the Operational Phase of the proposed Project there is limited potential for Site activities to impact on the geological and hydrogeological environment of the area. However, standard hydrocarbon interception will be put in place.</p> <p>Cumulative Impacts DLR and NPWS will work with the club to develop a restoration plan for the stream. The timing and scope of the plan will be subject to discussion with NPWS and DLR Biodiversity Officer.</p>
Birds (National Protection)	<ul style="list-style-type: none"> • Destruction and/or disturbance to nests. 	<ul style="list-style-type: none"> • “Relevant guidelines and legislation (Section 40 of the Wildlife Acts, 1976 to 2012) Should this not be possible, a pre-works check by a qualified ecologist should be undertaken to ensure nesting birds are absent. • 10 bird boxes will be placed on site as an enhancement measure. • Planting will provide suitable cover for nesting birds and encourage insect diversity that would sustain birds.
Bats (international Protection)	<ul style="list-style-type: none"> • Removal roosting/foraging habitat. • Lighting Impacts 	<ul style="list-style-type: none"> • Lighting at all construction stages will be done sensitively on site with no direct lighting of treelines. • A pre construction bat roosting inspection will be carried out on all buildings and trees on site, prior to the commencement of works. A derogation license will be applied for from NPWS if bats are found during the future inspection. All works will be carried out in compliance with NPWS conditions if bats or bat roosts are found during pre-commencement inspections.
Invasive Species	<ul style="list-style-type: none"> • Spread of invasive species distribution 	<ul style="list-style-type: none"> • An invasive species specialist will be employed to remove/control invasive species on site.
Mammals	<ul style="list-style-type: none"> • Injury/death • Destruction of resting/breeding places. 	<ul style="list-style-type: none"> • A pre-construction survey will be carried out for terrestrial mammals of conservation importance. If terrestrial mammals of conservation importance are noted on site NPWS will be consulted in relation to removal and the appropriate permissions obtained.

Residual Impacts and Conclusion

The construction and operational mitigation proposed for the development satisfactorily addresses the mitigation of potential effects on the terrestrial, mammalian, avian and aquatic sensitive receptors through the application the standard construction and operational phase controls. No significant effects on biodiversity are likely. Residual effects on biodiversity are considered to be: Low adverse / site / Negative Impact / Not significant / long term following the implementation of mitigation measures in relation to cumulative impacts.

References

1. **Bat Conservation Ireland 2004** on-going, *National Bat Record Database*. Virginia, Co. Cavan
2. **Boyd, I. and Stebbings, R.E. 1989** Population changes in brown long-eared bats (*Plecotus auritus*) in Bat Boxes at Thetford Forest. *Journal of Applied Ecology* **26**: 101 - 112
3. **Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) 1982**
4. **Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) 1979**
5. **Cutts, N., Hemmingway, K. and Spencer, J. (2013)**. *Waterbird Disturbance Mitigation Toolbox Informing Estuarine Planning & Construction Projects*. Institute of Estuarine & Coastal Studies (IECS) University of Hull.
6. **EC Directive on The Conservation of Natural habitats and of Wild Fauna and Flora (Habitats Directive) 1992**
7. **Jefferies, D.J. 1972** Organochlorine insecticide residues in British bats and their significance. *Journal of Zoology*, London **166**: 245 - 263
8. **Kelleher, C. 2004**, Thirty years, six counties, one species – an update on the lesser horseshoe bat *Rhinolophus hipposideros* (Bechstein) in Ireland – *Irish Naturalists' Journal* **27**, No. 10, 387 – 392
9. **Kelleher, C. 2015** *Proposed Residential Development, Church Road, Killiney, Dublin: Bat Fauna Study*. Report prepared for Altemar Marine and Environmental Consultants
10. **Marnell, F., Kingston, N. and Looney, D. 2009** *Ireland Red List No. 3: Terrestrial Mammals*. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin
11. **Racey, P.A. and Swift, S.M. 1986** The residual effects of remedial timber treatments on bats. *Biological Conservation* **35**: 205 – 214
12. **Smal, C.M. 1995** *The Badger & Habitat Survey of Ireland*. The Stationery Office, Dublin
13. **Wildlife Act 1976 and Wildlife [Amendment] Act 2000**. Government of Ireland.
14. NPWS (2013) Conservation Objectives: South Dublin Bay SAC 000210. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.
15. NPWS (2013) Conservation Objectives: North Dublin Bay SAC 000206. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.
16. NPWS (2017) Conservation Objectives: Wicklow Mountains SAC 002122. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.
17. NPWS (2021) Conservation objectives for Glenasmole Valley SAC [001209]. Generic Version 8.0. Department of Housing, Local Government and Heritage.
18. NPWS (2021) Conservation Objectives: Knocksink Wood SAC 000725. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.
19. NPWS (2019) Conservation Objectives: Ballyman Glen SAC 000713. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.
20. NPWS (2013) Conservation Objectives: Rockabill to Dalkey Island SAC 003000. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.
21. NPWS (2017) Conservation Objectives: Bray Head SAC 000714. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.
22. NPWS (2015) Conservation Objectives: South Dublin Bay and River Tolka Estuary SPA 004024. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.
23. NPWS (2015) Conservation Objectives: North Bull Island SPA 004006. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

24. NPWS (2023) Conservation Objectives: North-west Irish Sea SPA 004236. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.
25. NPWS (2021) Conservation objectives for Dalkey Islands SPA [004172]. Generic Version 8.0. Department of Housing, Local Government and Heritage.
26. NPWS (2021) Conservation objectives for Wicklow Mountains SPA [004040]. Generic Version 8.0. Department of Housing, Local Government and Heritage.



**TUFA HABITAT –
HYDROGEOLOGICAL
ASSESSMENT (PREMININARY)**

for

**PROPOSED SPORT CAMPUS –
ST THOMAS HOUSE**

The Tecpro Building,
Clonsillaugh Business & Technology Park,
Dublin 17, Ireland.

T: + 353 1 847 4220
F: + 353 1 847 4257
E: info@awnconsulting.com
W: www.awnconsulting.com

Technical Report Prepared By

Teri Hayes Director
BSc MSc PGeo, Director

Our Reference

237501.0617/WR01

Date of Issue

4 July 2024



Cork Office

Unit 5, ATS Building,
Carrigaline Industrial Estate,
Carrigaline, Co. Cork.
T: +353 21 438 7400
F: +353 21 483 4606

AWN Consulting Limited
Registered in Ireland No. 319812
Directors: F. Callaghan, C. Dilworth,
T. Donnelly, T. Hayes, D. Kelly, E. Porter

Document History

Document Reference		Original Issue Date	
237501.0617/WR01		4 July 2024	
Revision Level	Revision Date	Description	Sections Affected

Table of Contents

1.0 INTRODUCTION.....	4
1.1 Objective of Study.....	4
1.2 Methodology.....	4
1.3 Site Location & Hydrological Setting.....	4
2.0 GEOLOGY & HYDROLOGY.....	6
2.1 Regional Data.....	6
2.2 Site Specific Data.....	7
3.0 RECOMMENDATIONS.....	9
4.0 ASSESSMENT OF POTENTIAL IMPACTS.....	9
5.0 CONCLUSIONS.....	9

1.0 INTRODUCTION

1.1 Objective of Study

AWN have been requested to undertake an initial assessment of the likely impacts of the proposed development of Phase 2 of a sport campus on the water requirements for tufa habitats identified along the adjoining Owenadoher (Whitechurch) stream.

Petrifying springs are groundwater dependent ecosystems which are protected under the Habitats Directive (Priority Habitat). In addition there is protection under the Water Framework Directive, to maintain and improve the groundwater status for groundwater dependent ecosystems.

Protection of these habitats requires understanding of the groundwater receiving environment.

1.2 Methodology

Understanding the likely groundwater catchment (Zone of Contribution (ZOC)) for tufa habitats is necessary to determine any likely source - pathway - receptor linkage.

A preliminary assessment was proposed based on a walkover and desktop assessment of the site and the proposed development. Where this initial assessment identifies a potential source pathway linkage, field studies (geophysics and site investigation and water quality sampling) may be proposed to confirm the ZOC as outlined in the Guidelines for the Assessment of Annex I Priority Petrifying Springs in Ireland. Irish Wildlife Manuals 142, 2023.

The sources of information used in the study are outlined below.

Site specific topography, soil and geological and tufa spring location information:

- GSI and EPA on-line mapping.
- Geohive maps (<http://map.geohive.ie/mapviewer.html>).
- Murphy Topographic Survey 2024
- Proposed Layout DLR 2024

Biodiversity information and drainage design:

- Ecological Impact Assessment (EclA) for the Proposed Development of a Sports Campus at St Thomas House Tibbradden Road, Dublin 16. AlteMar Ltd, March 2024,
- St Thomas GAA Ground, petrifying Spring Survey- Technical Note. Denyer Ecology April 2024
- Site assessment by Dr. Joanne Denyer (Tufa specialist)

1.3 Proposed Development

The development comprises Phase Two of a development plan for a sports campus in the grounds of St Thomas House, Tibbradden road, Co Dublin. Phase one was completed in early 2023. Phase 2 comprises an administration building of c.1,574m² with 4.5m floor to ceiling clearance generally, (2) a single storey sprint track enclosure of c.841m² with 3.5m rising to 5.0m floor to ceiling clearance and (3) site landscaping.



Figure 1.1 Site Location showing area for proposed development (red line) Source Altemar ECIA

The existing development (Phase 1 development) drainage outfalls following attenuation to the downgradient Owenadoher (Whitechurch) stream and south west of the existing running track. The outfall location is upgradient of the seepages.

Figure 1.2 presents the proposed layout. The following is noted:

- There is minimal disturbance to the current overburden levels apart from shallow foundations, an additional attenuation pond and associated drainage lines.
- The increase in hardstand area will be addressed by a new attenuation pond (c. 363m³) and a blue roof system.
- There is no additional outfall proposed.
- There is no proposed impact to the natural slope to the stream.



Figure 1.2 Proposed layout (with drainage) Source DLR

2.0 BASELINE GEOLOGY, HYDROGEOLOGY & HYDROLOGY

2.1 Regional Data

Bedrock

The GSI classifies the bedrock beneath the site and the surrounding area as dominated by Granite (Type 3 Muscovite Porphyritic and Type 2e Equigranular).

The GSI also classifies the principal aquifer types in Ireland as:

- Lk - Locally Important Aquifer - Karstified
- LI - Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
- Lm - Locally Important Aquifer - Bedrock which is Generally Moderately Productive
- PI - Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones
- Pu - Poor Aquifer - Bedrock which is Generally Unproductive
- Rkd - Regionally Important Aquifer (karstified diffuse)

Presently, from the GSI (2023) National Bedrock Aquifer Map, the GSI classifies the bedrock aquifer beneath the subject site as a *Poor Aquifer (PI)*, i.e. *Bedrock which is Generally Unproductive except for Local Zones*. The potential for vertical or horizontal migration within this type of aquifer is poor as fractures will be disconnected. As such the aquifer has low storage is not a significant pathway for groundwater flow apart from along a weathered surface.

The proposed development is within the 'Kilcullen' groundwater body (GWB) and is classified as 'Poorly productive bedrock'. Presently, the groundwater body in the region of the site is classified under the WFD Status 2016-2021 (EPA, 2023) as Good. The WFD Risk Score is "At Risk".

Overburden

Aquifer vulnerability is a term used to represent the intrinsic geological and hydrological characteristics that determine the ease with which groundwater may be contaminated generally by human activities. The GSI guidance presently classifies the bedrock aquifer in the region of the subject site as having 'Moderate' vulnerability which indicates a general overburden depth potential of 5-10m, indicating a moderate protection of the aquifer by low permeability tills. The aquifer vulnerability class in the region of the site is presented as Figure 2.1 below.



Figure 2.1 Aquifer Vulnerability (source: GSI, 2024)

The GSI/ Teagasc mapping database of the quaternary sediments in the area of the subject site indicates the principal subsoil type to the east of the stream TGr, i.e. Till derived from granites) with well drained Made ground to the west, i.e golf course development.

Hydrology

The Owenadoher (Whitechurch) stream WFD Status (2013-2018) is Good and the waterbody risk score (3rd cycle) is "At Risk". The ecological status is Moderate (2016-2021).

2.2 Site Specific Data

Dr Joanne Denyer has completed a comprehensive assessment on March 15th 2024 and identified Annex I priority habitat 'Petrifying springs with tufa formation' [*7220] at two locations on the east bank of the stream and a number of seepages.

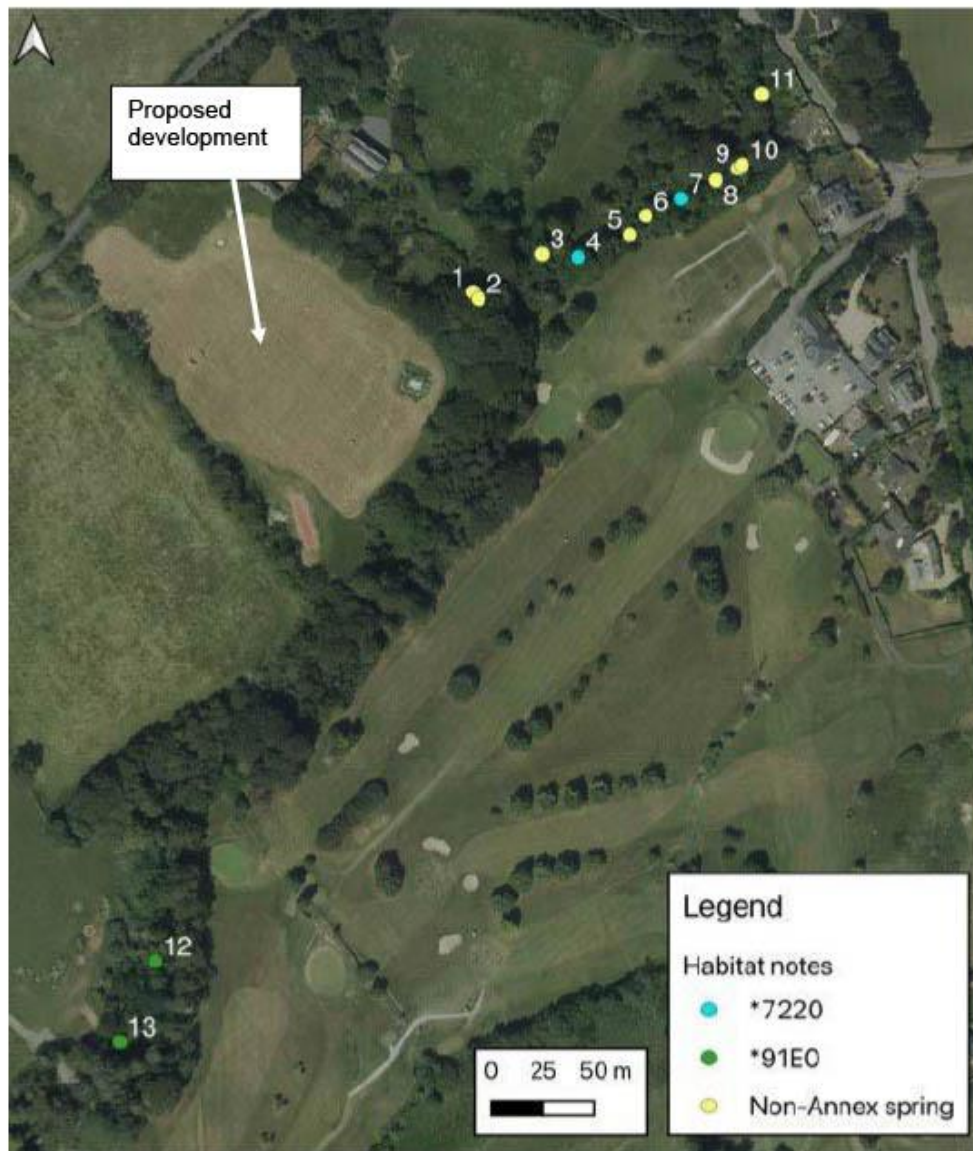


Figure 2.2 Map of Annex 1 habitat (source: Denyer Ecology, 2024)



Photograph 1. Iron stained petrifying spring (mapped point 4) (source: Denyer Ecology)

Photograph 2. Iron stained petrifying spring (mapped point 7). (source: Denyer Ecology.)

The hydrogeological walkover noted the following:

- the topography falls steeply at the river channel with seepages occurring at a number of break in slopes though not always present at a distinct horizon, and present at bedrock interface in one location.
- granite bedrock was encountered within the base of the channel in a couple of locations
- a number of minor seepages identified at presumed bedrock interface and some higher within the overburden slope
- no evidence of distinct granular zones within the overburden along river slope where seepages noted.
- pH within stream varied for 7.2-9.5. No distinctive alkalinity adjacent to petrifying spring location 4, however measurement taken after heavy rains.

3.0 CONCLUSIONS & RECOMMENDATIONS

The site walkover and review of available desktop information has not identified any obvious geological reason for the location of the identified petrifying springs as compared to the other seepage zones noted by the ecologist.

- The bedrock in this area is acidic in nature (granite) rather than calcareous. As such based on the location (on a steep slope) and the nature of the geology, the seepages are not sourced from bedrock. As it is poorly productive, recharge water is largely stored in the overburden material and along any weathered horizons.
- The GSI data indicates granite derived soil on the proposed development site and manmade (golf course reworked soil) on the east of the stream. No soil/seepage testing was undertaken but as seen in other similar sites there is likely to be adequate carbonate within the overburden sediment to provide a source for the tufa and its deposition is largely controlled by the nature of the steep slope break along the stream.

-
- It is noted that the petrified seepages (Annex 1 habitat) are on the east slope (golfcourse side), as such there is no potential for the proposed development to impact on groundwater discharging to these habitats. There is no likely source pathway linkage.
 - However, as there is no obvious difference in terms of hydrogeology between the seepage zones on both sides of the stream, there is the potential that tufa deposition could occur and allow development of suitable Annex 1 habitat in the future.
 - It is recommended that no further works area planned within the stream (e.g any new discharge pipes) or disturbance to the river bed or bank sides within the area of the noted seepages or a minimum of c. 100 m upgradient of the seepages.
 - To understand the potential for the proposed development to impact on the groundwater flow path to the seepage zones and determine the likely ZOC, site investigation (geophysics and boreholes/trial pits) would be required. This would aid in identifying any preferential pathways within the overburden.
 - In the absence of any site investigation data it should be conservatively assumed that the ZOC could be as outlined on Figure 3.1 based on site topography (Murphy survey). However, this should be used cautiously as does not rely on any site investigation data.
 - It is noted that the proposed building and associated hardstand is largely outside of the preliminary ZOC and that the remaining development (landscaping etc) will require minimal soil disturbance. This minimises the likely potential for any change in recharge pattern to the seepages.
 - It is recommended that the SuDs design aims to mirror the natural recharge pattern on the site. This should include discharge to ground where feasible and it is suggested that the proposed new attenuation pond should allow for discharge to ground as well as overflow to the existing discharge pipe from the site.
 - It is recommended that the hardstand areas (including bluroof) discharge to infiltration trenches/ percolation areas.



Figure 3.1 Preliminary ZOC based on site topography (no site investigations undertaken to confirm).

A summary of the risk assessment based on the preliminary site assessment is provided below.

Potential Impact	Possible Mechanism	Assessment of Risk of Impact
Alteration of Recharge Characteristics	<p>Reducing the permeability of the ground with hardstand and thereby reducing recharge to ground within the catchment.</p> <p>Installation of drainage systems which change the spring catchment or lead to reduced recharge within the catchment of the springs</p>	<p>The risk of impact on recharge to the seepages is considered to be low as:</p> <p>There is no source pathway linkage to the petrifying springs (Annex 1 habitats).</p> <p>Recharge pattern within the preliminary ZOC to all seepages/springs will be largely unchanged as SuDs design to mirror natural recharge pattern with recharge to ground where feasible.</p>
Alteration to Physical Flow Paths	<p>Physical barriers to groundwater flow (secant piled walls, deep foundations for undercroft parking, basement structures) installed below the water table could impede flow paths.</p>	<p>No subsurface structures proposed in the design.</p> <p>No change to bank slope proposed or further impact on river bed and flow.</p>

Impact on water quality	<p>Potential for impact on nature of soil/rock from which the tufa derives its chemistry.</p> <p>Potential for discharge to ground of chemicals which could impact water quality.</p>	<p>No risk of an impact due to low chemical loading and minimal disturbance of soil., Also natural attenuation within the soil (estimated 5-10m m near buildings) for any minor impacts.</p>
-------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Table 3.1 Assessment of Potential Impacts on Identified Tufa Springs and seepages. Note: based on preliminary site assessment without site investigation data.

Appendix II. Site visit by Dr Joanne Denyer in relation to petrifying springs.



To: Anne Murray, Dún Laoghaire-Rathdown County Council

From: Dr Joanne Denyer (Denyer Ecology)

Date: 09/04/24

Subject: St Thomas GAA Grounds, Petrifying spring survey March 2024

The site was visited on 15 March 2024 and a section of the stream was surveyed for the presence of the Annex I priority habitat '*Petrifying springs with tufa formation*' [*7220]. The results are shown in Figure 1. Two examples of petrifying springs were recorded on the eastern bank, and 9 additional non-Annex springs were mapped (Figure 1). There was a small area of the Annex I priority habitat '*Alluvial woodland*' [*91E0] at the southern end of the survey area (Figure 1). Summary details for all mapped points are included in Table 1. Photographs of the two areas of Annex I petrifying spring habitat are shown in Photographs 1 and 2 and the Annex I wet woodland in Photograph 3.

Figure 1. Map of Annex I habitat recorded within survey area.



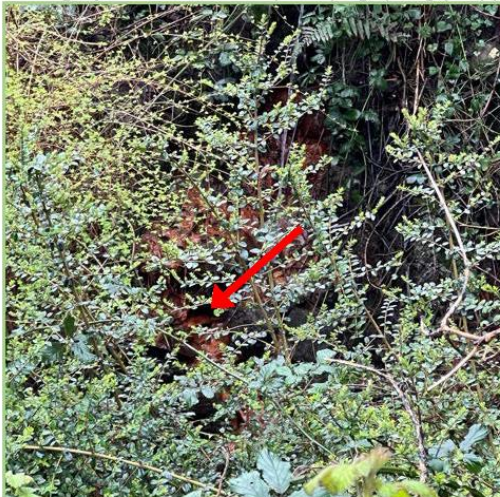
Table 1. Summary details of mapped points

Note_ID	Annex	Spring	Note
1	NULL	Tufa only	Small spring on western bank in leaf litter with moderate flow
2	NULL	Tufa only	Some tufa on rocks at water line where spring discharges
3	NULL	Tufa & 1 indicator	Seepage from wall with cascade tufa and <i>Pellia endiviifolia</i>
4	*7220	*7220	Spring below bridge with strong iron staining
5	NULL	Tufa only	Spring on western bank
6	NULL	Tufa only	Small spring under dumped parts of a car on the eastern bank
7	*7220	*7220	Large iron stained spring on eastern bank. Not accessible due to scrub and woody debris in stream.
8	NULL	Tufa only	Spring on eastern bank
9	NULL	Tufa & 1 indicator	Small spring with <i>Pellia endiviifolia</i>
10	NULL	Tufa & 2 indicators	Spring from top of bank with <i>Chrysosplenium oppositifolium</i> and <i>Pellia endiviifolia</i> Bordeline *7220.
11	NULL	Spring no tufa	Spring on western bank
12	*91E0	NULL	Area of wet woodland on eastern side of river
13	*91E0	NULL	Spring origin in wet woodland

Photograph 1. Iron stained petrifying spring on eastern bank (mapped point 4)



Photograph 2. Iron stained petrifying spring (mapped point 7). Not accessible due debris in channel.



Photograph 3. Wet woodland at southern boundary of survey area.

