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Jacobs Island Strategic Housing Development

Natura Impact Statement

Hibernia Star Ltd.

20-06-2022

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Document history

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Client signoff

Client	Hibernia Star Ltd.
Project	Jacobs Island Strategic Housing Development
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Client signature / date	

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1. Introduction

1.1. Background

Atkins Ireland have been commissioned by Hibernia Star Ltd. to prepare a Screening for Appropriate Assessment report and Natura Impact Statement for a proposed mixed-use development at Jacobs Island, Cork City.

1.2. Project Location

The Jacob's Island site to the south of the N40 South Ring Road currently has several phases of completed residential development, as well as planning permission for 413 apartments in 6 blocks, ranging in height from 6 to 25 storeys, under the An Bord Pleanála Reference No. SHD ABP-301991-18. The proposed development area outlined in red in Figure 1.1 is the subject of this report for the undeveloped lands on Jacobs Island. The proposed development will tie in with the existing built and permitted developments. This report focuses on the SHD application within the proposed masterplan.

Figure 1.1 SHD Application Boundary and building footprints.

Note:

1. Block 16 (hotel), Block 17 (offices) and their ancillary public realm are not part of this SHD, and are subject to a separate planning application ref:22/40809 through the local authority process.
2. Block 10 and its associated streetscape is permitted, and not part of this SHD application.
3. Blocks 11, 13, 14, 15 (residential and crèche), Block 12 (offices), the park and adjacent roads and public realm are part of this SHD application.

The site context is described and illustrated in detail in the Design Statement prepared by O'Mahony Pike Architects which accompanies this application (OMP, 2022).

1.3. Project Background

The following description is largely taken from the Engineering Report which accompanies this application (MMOS, 2022a). The proposed development is described and illustrated in detail in the Design Statement prepared by O'Mahony Pike Architects which accompanies this application (OMP, 2022). The planning application is also accompanied by a full pack of Design Drawings, a Planning Statement (HWP, 2022); as well as an Engineering & Infrastructure Report (MMOS, 2022a) and Construction and Engineering Management Plan (MMOS, 2022b). The Design Statement summarised the type, location and scale of different elements of the Masterplan, as well as details of what is currently built, permitted (yet to be built); this application and a proposed current SHD application. While a number of representative Drawings are included below (see in particular Figure 1.4), the full set of Drawings and accompanying reports have informed this assessment and should be reviewed in conjunction with this document.

The following summary is extracted from the Design Statement prepared by O'Mahony Pike Architects (OMP, 2022). This includes detailed representations of the proposed development, it's character, landscaping etc.

Jacobs Island has a long planning history, which has its genesis in 1997 when the development of Jacobs Island was subject to a competitive tender. At the time Jacobs Island was in the ownership of Cork City Council, who identified it as a strategic development opportunity. 23 tenders were submitted from development teams and the scheme proposed by McCarthy Developments Limited & O'Callaghan Properties was selected as the winning tender. This design team were led by Skidmore, Owings and Merrill and the original design concept as outlined in the Design Statement was for mixed use development on Jacobs Island.

Both McCarthy Development and O'Callaghan Properties lodged applications for the mixed use development of Jacobs Island in accordance with the Masterplan and to date approximately 330 residential homes have been constructed on Jacobs Island.

The subject lands were originally in the ownership of O'Callaghan Properties and were recently purchased by the applicants. Two planning permissions have been granted on the site for mixed use development. In December 2000, Cork City Council granted permission for a development that included a 9290 m² Trade Centre and 150 room hotel, with associated bar, restaurants, fitness facilities, 841 parking spaces and associated roads, T.P. 24611/00 refers. The T.P. 24611/00 permission was not implemented and in 2007 Riga Development Limited applied for permission for a mixed use development including 325 no. apartments, a 184 no. bedroom hotel, convenience store, café, medical unit, dentist, crèche building, in 7 no. blocks ranging in height from 2 to 21 storeys, T.P. 07/32686 refers. Cork City Council decided to grant permission for the proposed development and this decision was appealed to the Board by first and third parties, PL28.232275 refers. In 2008 An Bord Pleanála decided to grant permission for the proposed mixed use development.

The applicants wish to deliver a mixed-use development originally envisaged for the lands as far back as 2000 and which has been permitted twice in the intervening period. This in conjunction with the recently permitted Strategic Housing Development of 413 residential units on the adjacent lands to the east will see the realisation of the Masterplan first developed for Jacobs Island over 20 years ago.

A new Masterplan has been developed for the lands which is consistent with the original ambitions to deliver a mixed use and sustainable community on the lands and is throughout this document. This Masterplan has been updated to have full regard to the significant evolution in planning policy in the intervening period and the existing infrastructural benefits Jacobs Island has to offer in terms of connectivity and public amenities. The Masterplan envisages the delivery of residential, hotel, crèche and office uses, which have been permitted twice previously on the lands. Due to restrictions placed on An Bord Pleanála by Section 9(6)(b) of the Planning and Development (Housing) and Residential Tenancies Act 2016, the delivery of the Masterplan requires a dual approach to the achievement of planning permission on the lands. A Strategic Housing Development application is being made to An Bord Pleanála for the 498 residential units and office building and a conventional planning application for a hotel and larger office building will be lodged to Cork City Council.

Figure 1.2 Original Masterplan for Jacobs Island (1999).

1.4. Project Description

The proposed development for this current planning application consists of: -

- The construction of a Strategic Housing Development of 489 no. apartments, creche and offices in 5 no. buildings ranging in height from part-1 to part-8 no. storeys over lower ground and basement levels. The development will contain 1 no. studio, 161 no. 1 bedroom apartments and 327 no. 2 bedroom apartments.
- Blocks 12 and 13 will contain ancillary commercial areas including a creche (381m^2) and offices (4,112m^2). The development will also contain supporting internal resident amenity spaces (588m^2) and external communal amenity spaces.
- Block 11 is part-5 to part-8 no. storeys over basement and will contain 101 no. apartments.
- Block 12 is part-1 to part-5 no. storeys over basement and lower ground level office building (4,112m^2) comprising 2,934m^2 of office floor area.
- Block 13 ranges in height from part-2 to part-8 no. storeys and will contain a creche over 2 no. levels (381m^2) and 39 no. apartments.
- Block 14 is part-4 to part-7 no. storeys over lower ground level and contains 130 no. apartments.
- Block 15 ranges in height from part-5 to part-7 no. storeys over lower ground levels and contains 219 no. apartments and ancillary resident amenity spaces (588m^2).
- The proposed development also provides for hard and soft landscaping, boundary treatments, public realm works, car parking, bicycle parking, bin stores, signage, lighting, PV panels, sprinkler and water tank, substations, plant rooms and all ancillary site development works above and below ground.

The accompanying planning pack should be referred to for full scale copies of the following Drawings.

The red line boundary is illustrated in Figure 1.1 and 1.2; while the proposed site layout is shown in Figure 1.3. Representative floor plans for Blocks 11, 12, 13, 14 and 15 are illustrated in Figures 1.4 to 1.9.

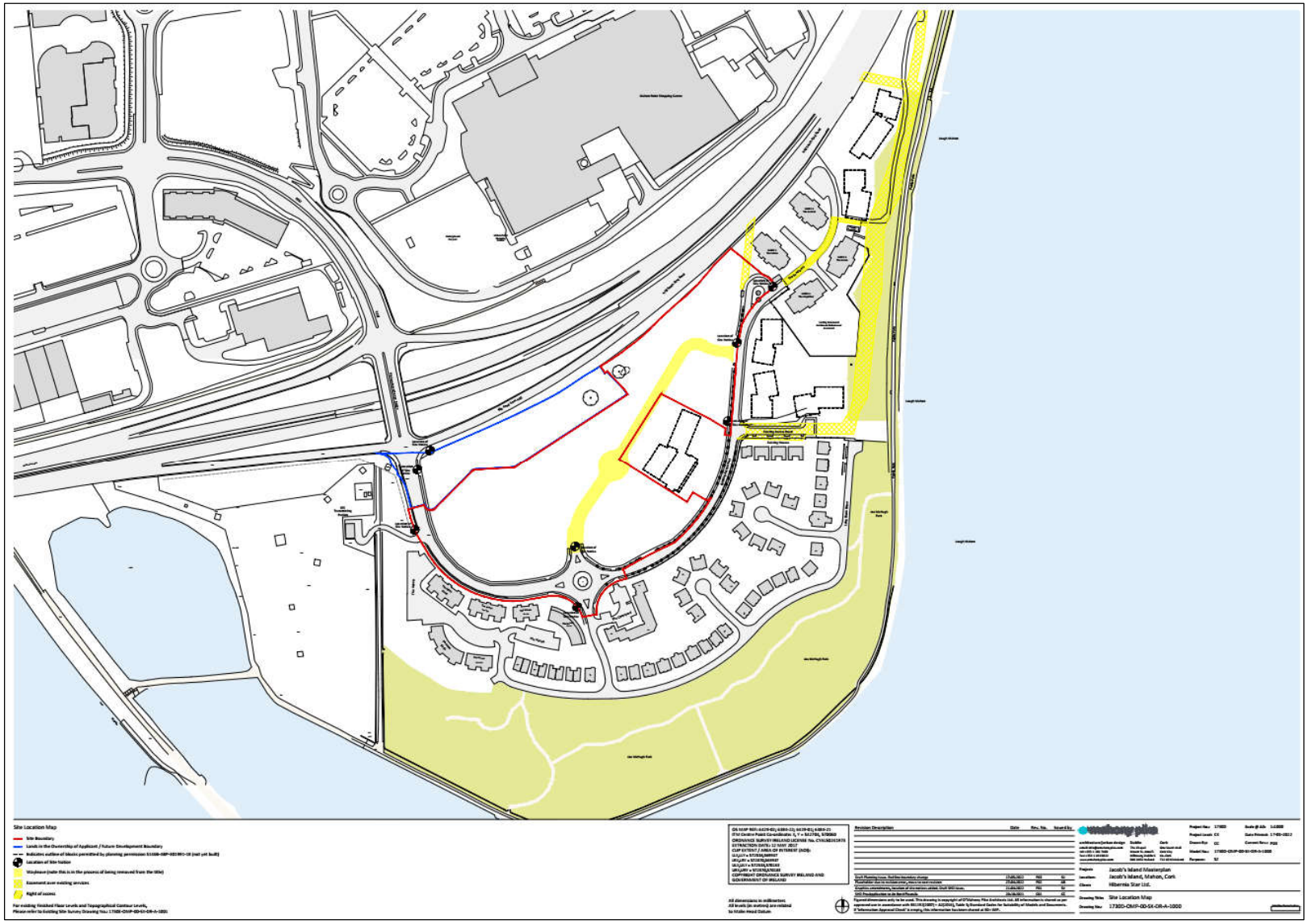


Figure 1.3 Red line boundary.

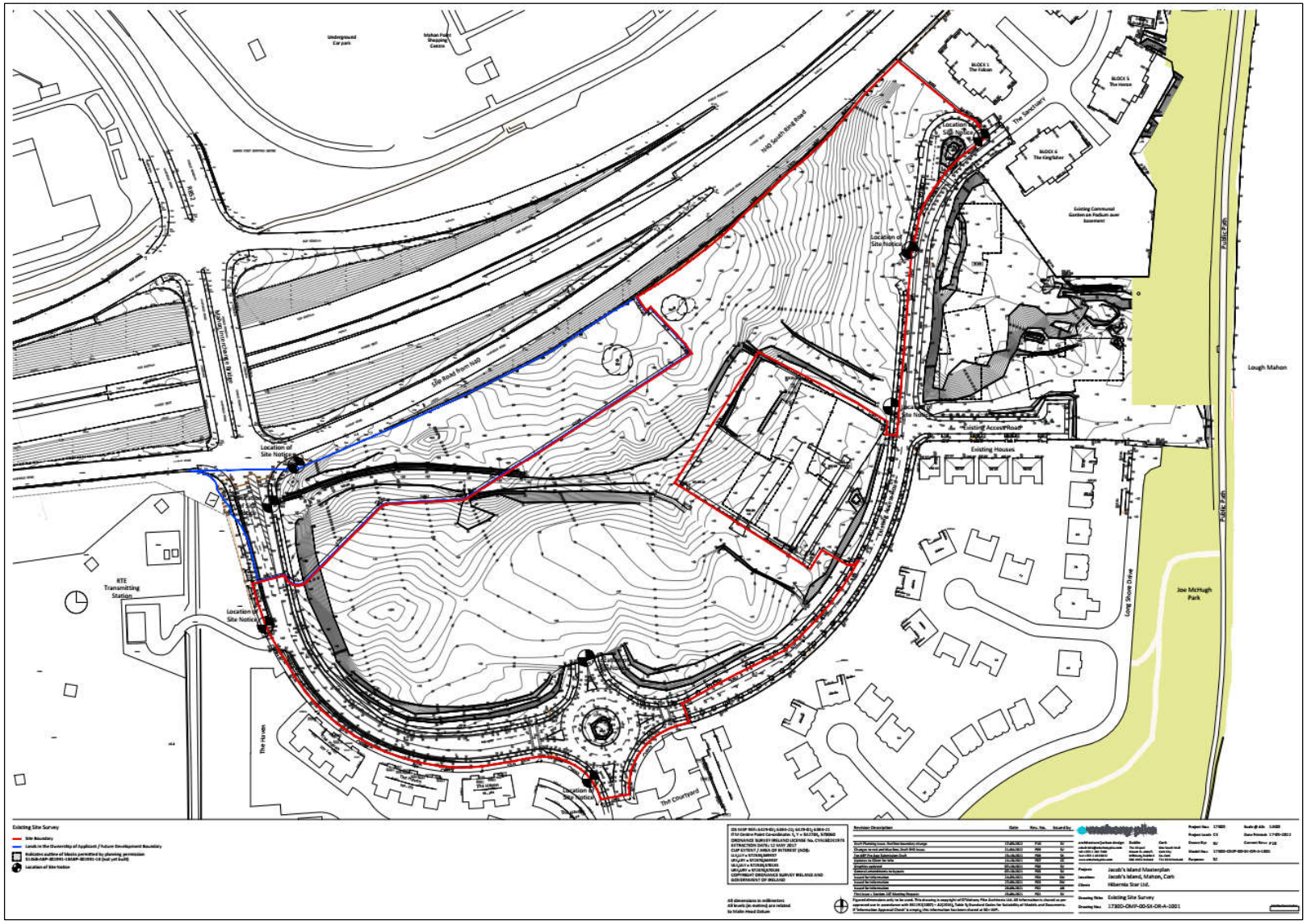


Figure 1.4 Red line boundary, including site contours.

Figure 1.5 Proposed site layout.

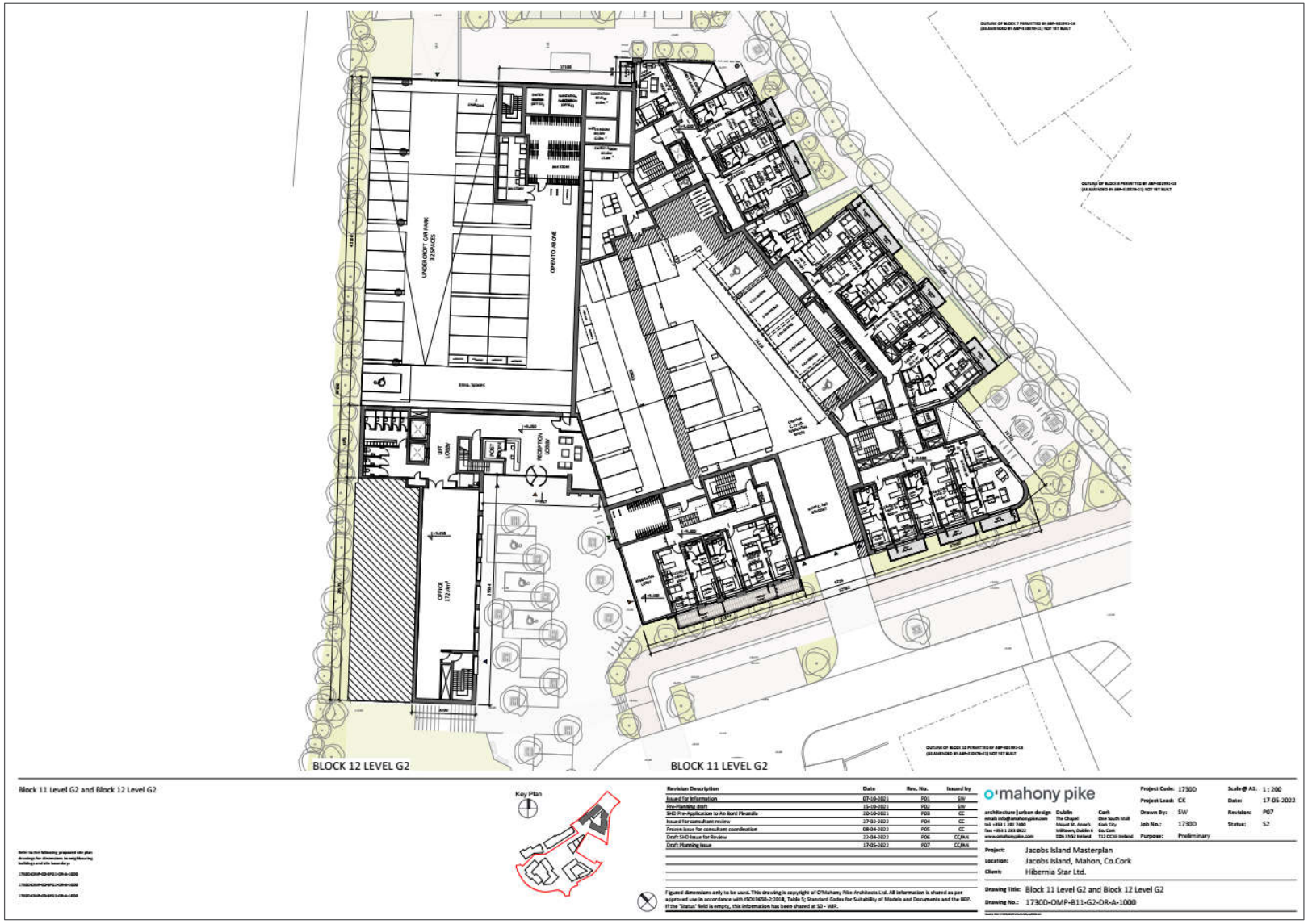


Figure 1.6 Block 11 and 12. Ground floor (level G02).

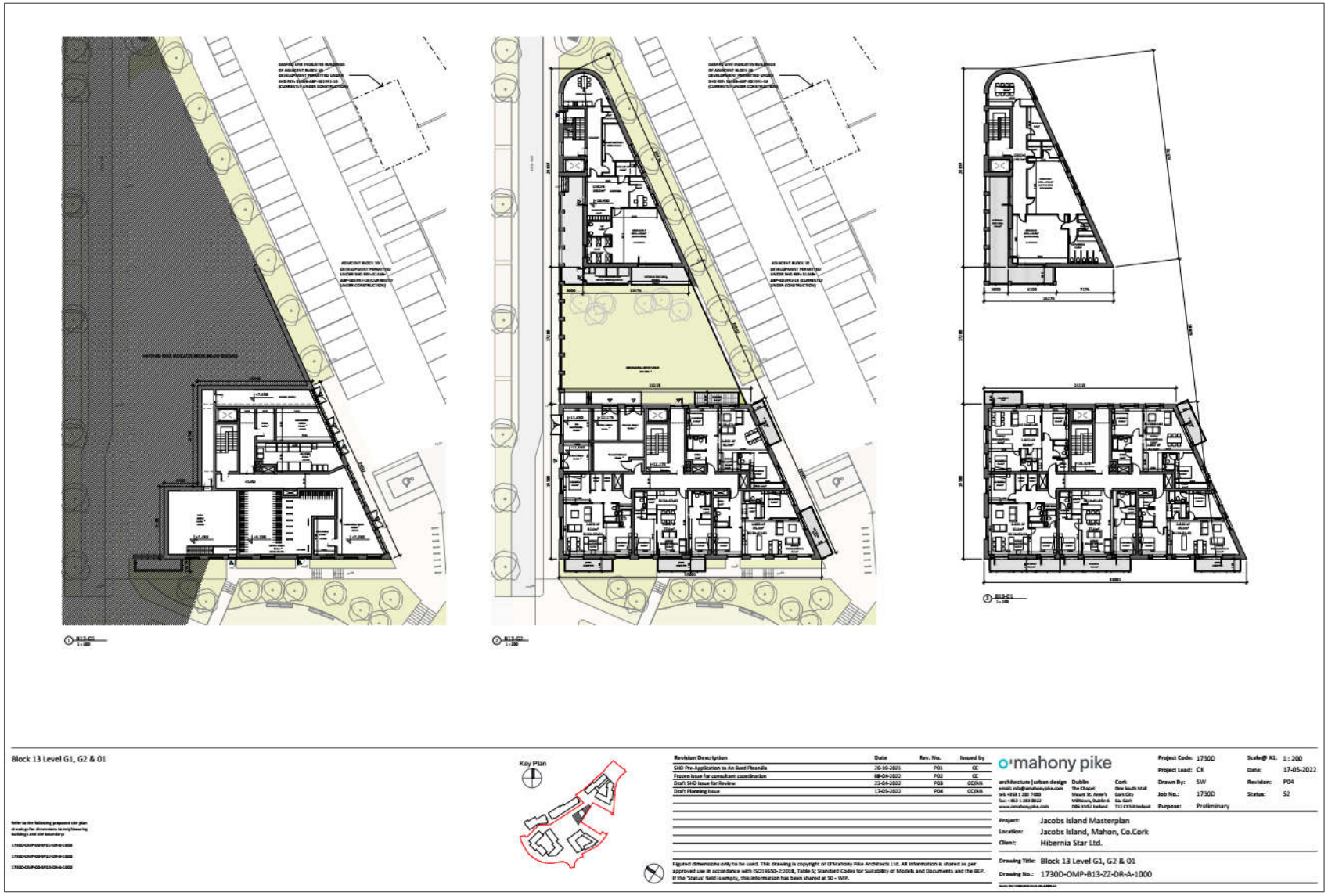


Figure 1.7 Block 13.

Figure 1.8 Block 14. Ground Floor.

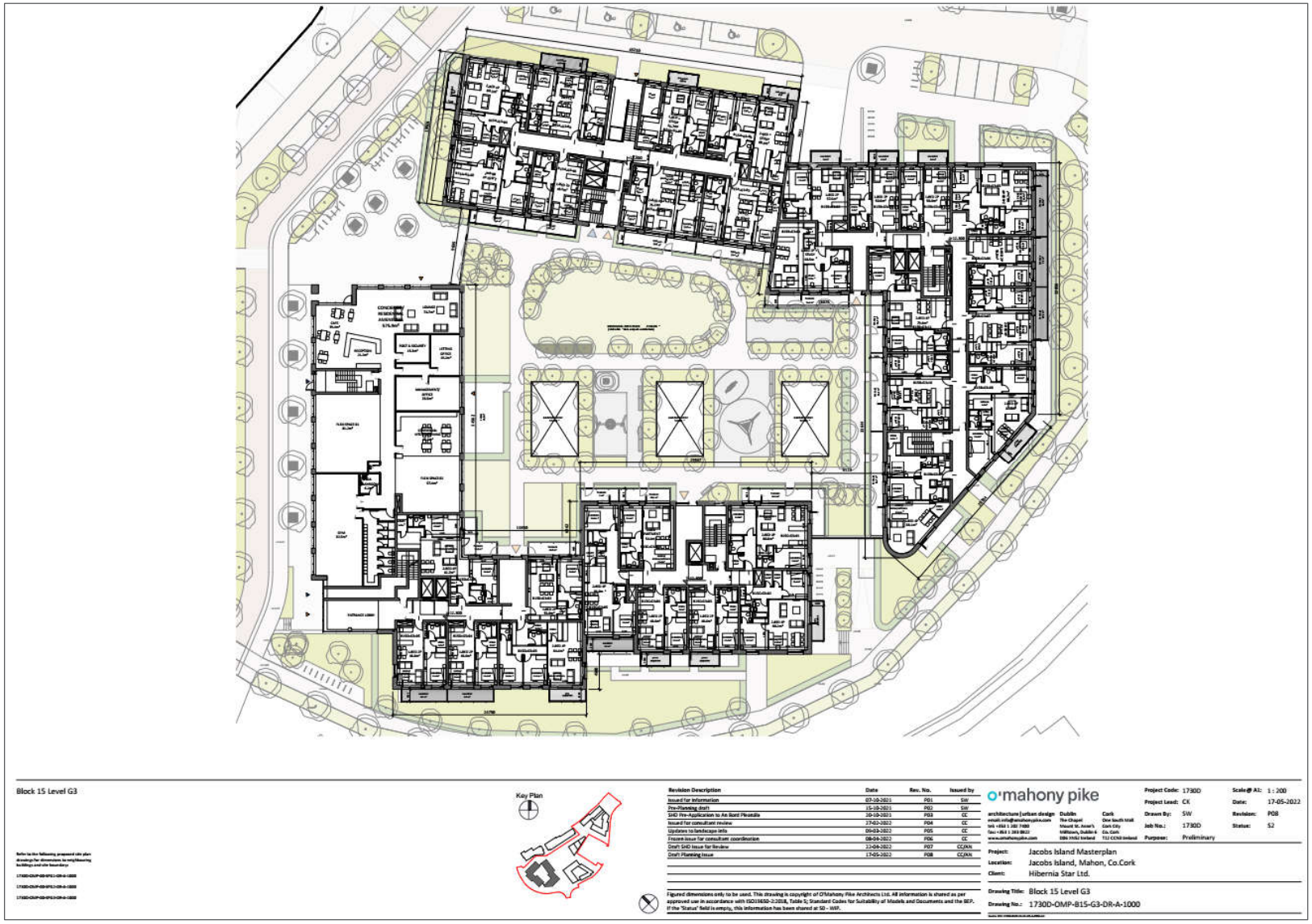


Figure 1.9 Block 15 (Ground floor; G3).

Figure 1.10 Neighbouring Context (Source: OMP, 2022. Design Statement).

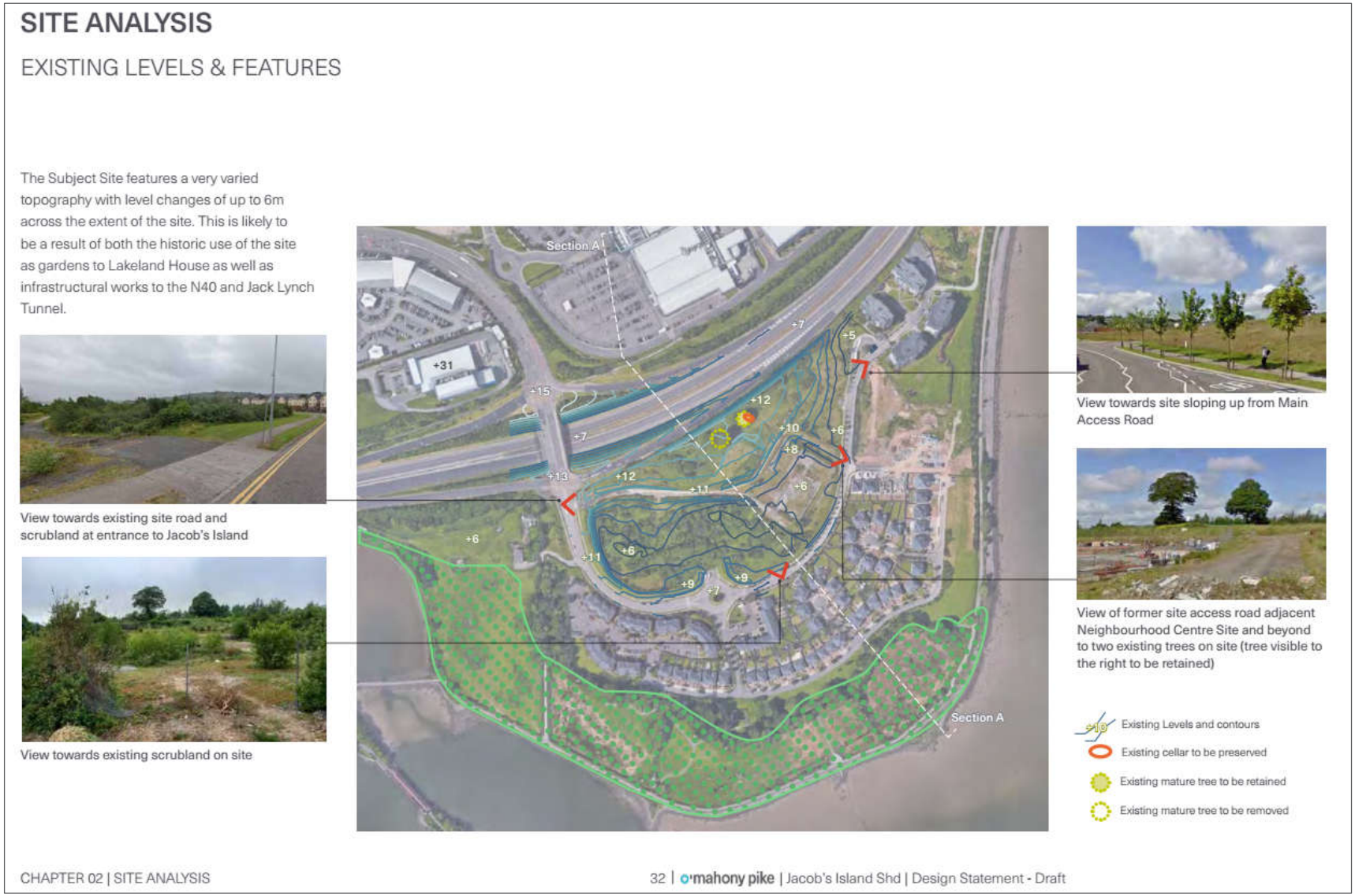


Figure 1.11 Existing Levels and Features (Source: OMP, 2022. Design Statement).

Figure 1.12 Site Strategy. Massing & Height (Source: OMP, 2022. Design Statement). (This application – Block 12 & 15).

Figure 1.13 Site Sections.

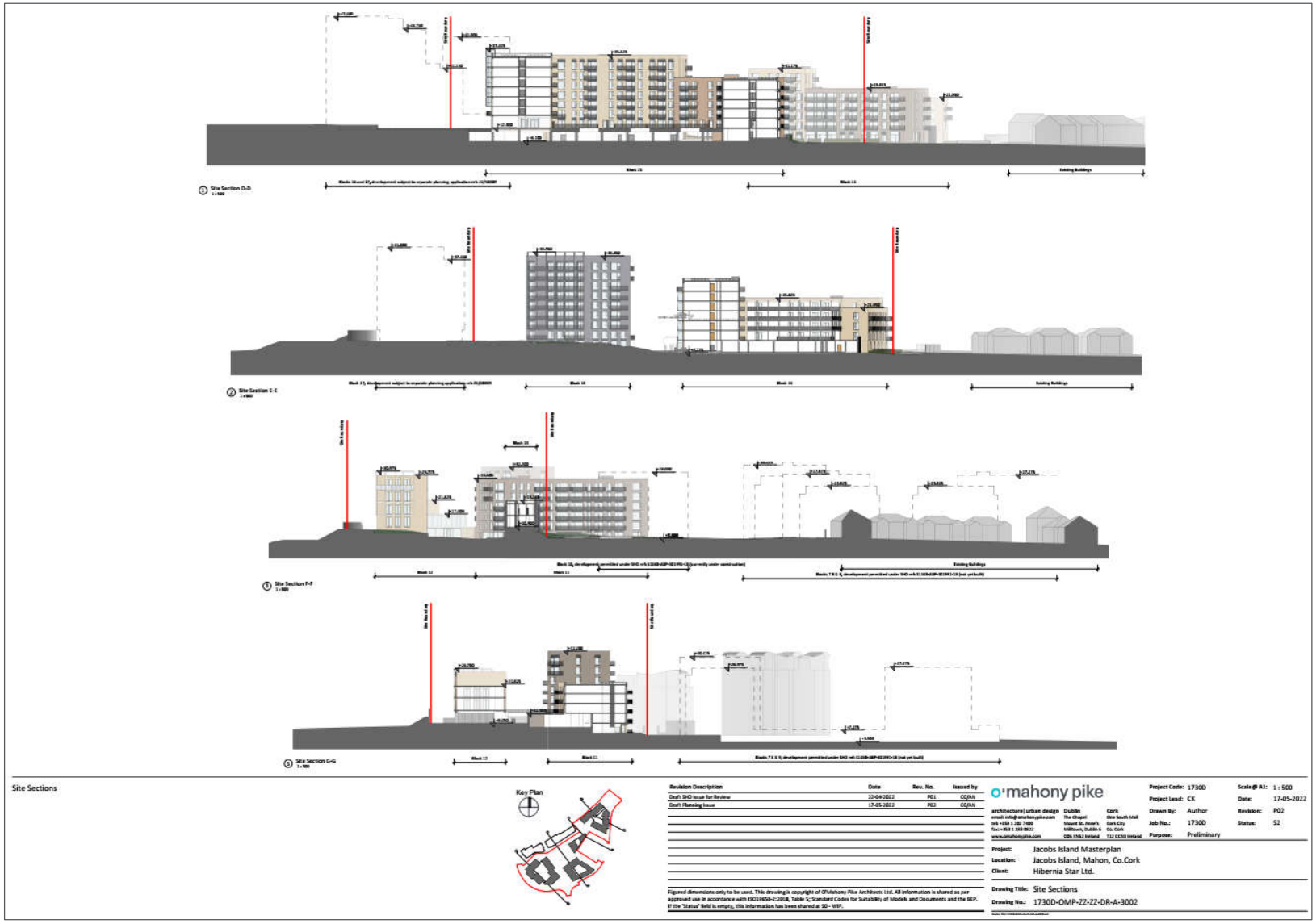


Figure 1.14 Site Sections.

Figure 1.15 **Landscape Plan** (Source: Doyle O'Troithigh).

1.4.1. Existing Services

The surface water network for the entire Jacobs Island development was completed as part of the original works under planning reference 00/24609. This infrastructure was designed for all future development (i.e. all development envisaged under the 00/24609 planning application).

The installed surface water drainage network included a large 600 mm diameter and 900 diameter surface water sewers adjacent to the fore shore to an outfall located to the north of the site. The surface water sewer outfalls directly into the Lough Mahon Estuary via a non- return valve.

As is similar with the surface water network, the wastewater sewer network for the entire Jacobs Island development was completed as part of the original works and this infrastructure will cater for the development works that are proposed under this application. This wastewater sewer network is completely separate to the surface water network throughout the site.

In 2013 a taking in charge process was undertaken in conjunction with Cork City Council and during this process the constructed sewage network was signed off by Cork City Council following the process of CCTV surveys and visual inspections. In addition, a report that reviewed the design and future capacity of the existing sewers was undertaken and provided to Cork City Council by MMOS. A copy of this report is enclosed in Appendix C of the Engineering Report (MMOS, 2022a).

The proposed connection points for the development can be seen below in Figure 1.9.

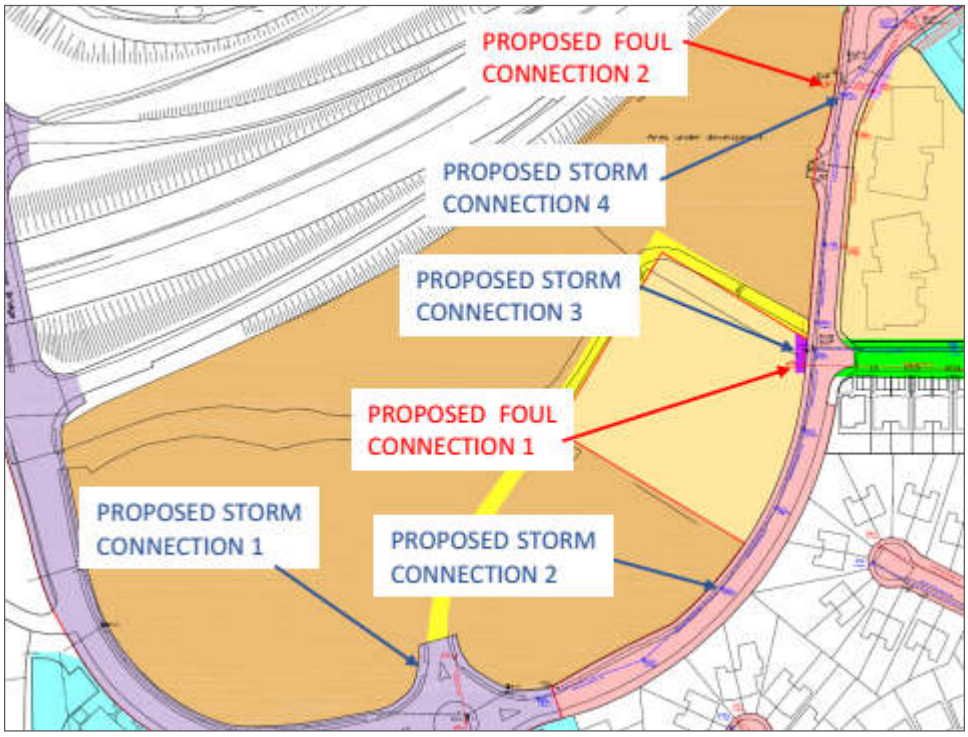


Figure 1.16 Existing drainage records.

Jacobs Island is provided with water services at the southwestern and northern end of the site. Both connections are 200 mm diameter water connections. A full network of water supply services has been completed throughout the Jacobs Island development and has been taken in charge by the local authority.

1.4.2. Flood Risk

A flood risk assessment was carried out in accordance with the OPW Publication "The Planning System and Flood Risk Assessment Guidelines for Planning Authorities" and concluded the following (refer to MMOS, 2022a for full Report): -

- The site-specific flood risk assessment for the proposed development was undertaken in accordance with the requirements of the "Planning System and Flood Risk Management Guidelines for Planning Authorities", and other relevant documents and publications listed within this chapter.
- The proposed type of development for this site is to be primarily commercial. This is categorized by the guidelines as less vulnerable development and 'Appropriate' to be located within Flood Zone C
- A justification test is not required.
- The development's drainage design includes for a 10% climate change allowance.
- There is no risk of flooding affecting the site from tidal or fluvial sources.
- The proposed development will not increase the stormwater runoff rate when compared to the existing site and satisfies the requirement of the SFRA to reduce flooding and improve water quality.
- Any flood events do not cause flooding of the proposed development, and the proposed development does not affect the flood storage volume or increase flood risk elsewhere.
- Thus, the residual risks of flooding can be managed by incorporation of good building practice in design and construction of ground floor level and associated drainage systems, and by maintenance and management of the property.

As outlined above, the proposed development has been demonstrated to be in compliance with the core objectives of the Planning System and Flood Risk Management Guidelines (refer to MMOS, 2022a for full Report).

1.4.3. Surface Water Drainage Proposals

The proposed surface water drainage will be gathered in a dedicated system and will collect runoff from all impermeable areas, such as roofs, terraces, and hardstanding areas within the land boundary.

The surface water drainage will be designed in accordance with the following criteria: -

- BS EN752:2008 – Drain and Sewer Systems outside Buildings
- BS 8515:2009 – Rainwater Harvesting Systems, Code of Practice (where applicable)
- Minimum pipe diameter will be 225mm on the main network.
- All pipe runs shall be designed to achieve a minimum self-cleansing velocity of 1 m/s.
- A roughness value (k) of 0.6mm is used in the network design.

The Greater Dublin Strategic Drainage Study (GDSDS) Vol. 2 Section E2.1 requires provision of interception and/or treatment volume for River Water Quality Protection.

It is noted that the point of outfall of the sewer is directly into the Lough Mahon and as recognised in the Greater Dublin Strategic Drainage Study (GDSDS) attenuation is not required in such circumstance where the point of outfall is into an estuary, as specifically advised in section 6.3.3.4., as follows: -

"Where there is little downstream to be concerned about with respect to flooding (discharging to the estuary or sea), criteria on flow rates and volumes of discharge are of little relevance. Water quality is the only issue needing to be addressed (primarily sedimentation)"

Attenuation is not therefore proposed for the current application; however, hydrocarbon interceptors will be provided for all discharge generated off the newly added carparking area and traffic routes.

As per SUDs proposals, the following measures will be considered.

- Green roof and podium landscaping which will provide interception storage for between 5-10mm of rainfall and provide treatment by filtration through the planter soils. These planted areas will also provide a medium for removal of pollutants and will improve the quality of surface run-off discharging into the surface water drainage system.

- Hydrocarbon interceptors and non-return valves will be provided prior to the connection to the existing drainage network.

- In addition, tree pits, swales, soakaways, and another SUDs measure will be considered following an onsite infiltration test. Details of the proposed surface water drainage layout are shown indicatively on proposed services drawing presented in Appendix D of the Engineering Report. It should be noted that all storm drainage works will be undertaken in accordance with the local authority requirements and Irish Water standard details as required.

1.4.4. Foul Drainage Proposals

The foul drainage for the proposed development has been designed as a completely separate system to the storm. All foul drainage for the above ground units will be drained and gathered in stacks below basement floor level and directed to the proposed new foul network onsite, which is proposed to discharge to the existing manhole as previously shown in Figure 1.16.

The proposed development is to comprise 489 residential units plus 4,493m^2 of non-residential areas that comprise an office building and a creche. However, the drainage scheme for this phase of the development will take in consideration the incoming flow from future works related to the masterplan, that involves an additional area of 10,632m^2 of office building and a 165-bed hotel.

A pre connection enquiry has been submitted to Irish Water with regards to the proposed foul discharge for the development on 20th July 2021 (REF: CDS21005115) and we have received back the confirmation of feasibility. Both documents are attached in Appendix G of the Engineering Report. We note that the site layout has changed since the pre connection enquiry and the number of units in the scheme was reduced, so the confirmation of feasibility from Irish Water is provided for a number of units bigger than the present development.

Details of the proposed foul drainage layout are shown indicatively on proposed services drawing presented in Appendix D of the Engineering Report. It should be noted that all foul drainage works will be undertaken in accordance with Irish Water standard details and codes of practice for wastewater as required.

1.4.5. Water Supplies

The proposals for the water supply will involve taking a feed from the existing watermain located outside the site running along the residential access roads. Sluice valves will be provided at appropriate locations to facilitate isolation and purging of the system. Details of the proposed watermain layout are shown on services drawing included in Appendix E the Engineering Report.

The proposed water demand for the development has been estimated as 5.736 l/s in the average hours, and 28.68 l/s in the peak hours.

As per Irish Water requirements, the proposed development will have an onsite water storage tank to satisfy the 24-hour water demand storage requirement to cater for possible shut-downs in the system.

A pre connection enquiry has been submitted to Irish Water with regards to the proposed foul discharge for the development on 20.07.2021 (REF: CDS21005115) and we have received back the confirmation of feasibility. Both documents are attached in Appendix G of the Engineering Report. We note that the site layout has changed since the pre connection enquiry and the number of units in the scheme was reduced, so the confirmation of feasibility from Irish Water is provided for a number of units bigger than the present development.

Irish water has noted that, for the development, onsite water booster pumps may be

All new water services infrastructure will be constructed in accordance with Irish Water requirements for supply infrastructure as per the following documents.

- Water infrastructure Standard Details (Document IW-CDS-5020-01)
- Code of Practice for water Infrastructure (Document IW-CDS-5020-03)

1.4.6. Lighting

A Lighting Plan was prepared by ED Mechanical & Electrical Consulting Engineers (EDC, 2022). And accompanies this planning application. This details public lighting plans within the proposed development.

1.4.7. Landscaping

A landscape planting scheme has been developed by Doyle & O'Troithigh Landscape Architecture. The proposed planting mix is as set out below. A full set of landscape drawings accompanying this planning application, namely: -

- Landscape Site Plan LP-01-PP to LP-06-PP
- Overall Planting Plan PP-01-PP
- PP-02-PP Planting Plan 1 of 2
- PP-03-PP Planting Plan 2 of 2

In tandem with the other construction activities being carried out on the buildings, elements of the site's landscaping plan will be progressed. The formation of landscape features will take place in parallel to the early works, utilising material excavated during the cut and fill exercise. As the site build progresses the landscape works will begin to focus on the soft landscaping aspects such as establishment of green zones and walkways, as well as planting of trees and shrubs in designated areas.

Peripheral planting will be installed during the first planting season to ensure boundary interfaces are as robust as possible upon occupation.

No herbicides will be used in the landscape preparation of the public open spaces, to minimise impact on natural drainage systems.

Landscape planting proposals for the site are as follows: -

Tree planting to include the following, but not limited to: -

- 13 Norway maple *Acer platanoides* ‘Columnare’, r/b, 20-25cm girth
- 10 Norway maple *Acer platanoides* ‘Drumondii’, r/b, 20-25cm girth
- 22 European hornbeam *Carpinus betulus* 'Frans Fontaine', r/b, 18-20cm, clear stem to 2.0m
- 30 Beech *Fagus sylvatica* ‘Dawyck’s Gold’, r/b, 3.5-4.0m tall (feathered)
- 4 American sweetgum *Liquidambar styraciflua* 'Slender Silhouette', r/b, 18-20cm girth
- 3 Callery pear *Pyrus calleryana* 'Chanticleer', r/b, 18-20cm girth
- 4 Flowering cherry *Prunus* 'Sunset Boulevard', r/b, 18-20cm girth

Open space trees

- 12 Red maple *Acer rubrum* 'Red Sunset', r/b 18-20cm
- 35 Snowy mespil *Amelanchier lamarkii*, r/b, multistem, 3.0-3.5m tall
- 10 Erman's birch *Betula ermanii*, r/b, 18-20cm girth
- 42 Himalayan birch *Betula utilis* 'Jacquemontii', r/b, multistem 4.0-4.5m tall
- 36 Eastern redbud *Cercis canadensis* 'Forest Pansy', r/b, 16-18cm girth, 4.0-4.5m tall
- 6 American witch-hazel *Hamamelis virginiana*, r/b 1.75-2.0m
- 16 Beech *Fagus sylvatica* ‘Dawyk’s Purple’, r/b, 18-20cm girth, clear stem to 2.0m
- 3 Beech *Fagus sylvatica* ‘Dawyck’s Gold’, r/b, 3.5-4.0m tall (feathered)
- 32 American sweetgum *Liquidambar styraciflua* 'Slender Silhouette', r/b, 18-20cm girth
- 30 American sweetgum *Liquidambar styraciflua* 'Worplesdon', r/b, 18-20cm girth
- 11 Tulip tree *Liriodendron tulipifera*, r/b 18-20cm girth
- 9 Scot’s pine *Pinus sylvestris*, r/b 2.0-2.5m
- 2 Bird cherry *Prunus padus*, r/b, 18-20cm girth
- 7 Callery pear *Pyrus* 'Chanticleer', r/b, 18-20cm girth
- 8 large-leaved linden *Tilia platyphyllos*, r/b 30-35cm girth

Courtyard trees

- 40 Snowy mespil *Amelanchier lamarkii*, r/b, multistem, 2.0-2.5m tall
- 11 Strawberry tree *Arbutus unedo*, r/b 1.75-2.0m
- 40 Himalayan birch *Betula utilis* 'Jacquemontii', r/b, multistem 2.0-2.5m tall

- 30 Eastern redbud *Cercis canadensis* 'Forest Pansy', r/b, 16-18cm girth, 4.0-4.5m tall
- 15 Witch-hazel *Hamamelis virginiana*, r/b 1.75-2.0m
- 6 Japanese white pine *Pinus parviflora* 'Glauca', 2.0-2.5m
- 1 *Viburnum bodnantense* 'Pink Dawn', r/b 1.75-2.0m

Woodland screen planting (420m^2)

- 14 Alder *Alnus glutinosa* rootball 12-14cm girth
- 13 Downy birch *Betula pubescens* rootball 12-14cm girth
- 13 Beech *Fagus sylvatica* rootball 12-14cm girth
- 13 Scot's pine *Pinus sylvestris* rootball 1.5-2.0m tall
- 13 European Larch *Larix decidua* rootball 1.5-2.0m tall

Including, Understorey:

- Field Maple *Acer campestre* bare root 60-90cm planted at 1.0m c/cs
- Hawthorn *Crataegus monogyna* bare root 60-90cm planted at 1.0m c/cs
- Hazel *Corylus avellana* bare root 120-150cm planted at 1.5m c/cs
- Spindle *Euonymus europaeus* bare root 40-60cm planted at 1.0m c/cs
- Blackthorn *Prunus spinosa* bare root 60-90cm planted at 1.0m c/cs
- Guelder rose *Viburnum opulus* bare root 40-60cm planted at 1.0m c/cs

Edged with:

- Pendulous sedge (*Carex pendula*)

Hedging to include:

- European hornbeam *Carpinus betulus* –double staggered row; 5/linear metr
- Portuguese laurel cherry *Prunus lusitanica* 'Angustifolia', r/b, 800-1000mm tall. (3 per linear m)

Shrubs / Perennials, container grown 2L, planted at 5no per m^2, to include:

- *Anemone 'Honorine Jobert'*
- *Ceanothus thyrsiflorus repens*
- *Crocosmia 'Lucifer'*
- *Helleborus orientalis*
- *Hydrangea 'Lime light'*
- *Hypericum Hidcote*

- *Miscanthus sinensis 'Fern Osten'*
- *Pachysandra terminalis*
- *Perovskia 'Blue Spire'*
- *Prunus 'Otto Luyken'*
- *Rudbeckia fulgida 'Goldsturm'*
- *Sarcococca confuse*
- *Stipa gigantea*
- *Verbena bonariensis*

Bulbs, planted at 15no per m^2:

- *Allium hollandicum 'Purple Sensation'*
- *Camassia leichtlinii*
- *Leucojum aestivum*
- *Tulipa 'Triumphator'*

Meadow grass seeding:

Grass mix with 25% *Vicia sativa* (Common vetch), 25% *Leucanthemum vulgare* (Ox-eye daisy), 25% *Succisa pratensis* (devil's-bit scabious), 25% *Centaurea nigra* (Common knapweed). Application rate: 1.5g / m2/.

Manage by cutting once a year in September.

Leave cuttings on the ground for a couple of days to facilitate seeds dropping and then remove.

Grass seeding:

Grass mix (45% Amenity Ryegrass, 40% Slender Creeping Red Fescue, 10% Chewings Fescue, 5% Highland Brown top Bent); Application rate: 35g / m^2.

1.5. Construction Phase

The following description is largely taken from the Construction and Environmental Management Plan which accompanies this application (MMOS, 2022b).

1.5.1. Construction Phasing and Programme

The construction plan is organized in one phase following enabling works.

1.5.2. Construction Sequence

The proposed works will be constructed in the following sequence.

- Site clearance and reduced levels. It is envisaged that the works will require the excavation to formation level resulting in approximately 18,000m^3 of excavated material, which is proposed to be kept onsite to be reutilized during ground works and landscaping in this development.
- Piled foundations and perimeter retaining walls.
- Construction basement slab and associated water proofing.
- Erection of concrete stairs and lift cores to roof level.
- Construction of concrete columns and intermediate upper basement and ground floor concrete slabs.
- Erection of structural frame super structure and floor slabs.
- Construction of glazing and solid facades in accordance with the architect's drawings.
- Roof completions.
- Internal completions and fitout works.
- External works.

1.5.3. Details

1.5.3.1. Hours of Work

Hours of work will be 7:30 am to 6 pm Monday to Friday, 7.30 am to 4 pm on Saturdays, or as directed by Cork City Council. It is proposed that hours of work outside of these times will be by agreement with the local authority.

1.5.3.2. Site Compound

It is anticipated that the location of the site compound will be located to the middle portion of the site, located in the proposed green open space within the development. Please refer to drawing 21168-MMS-ZZ-ST-DR-C-10009 in the Appendix of the accompanying CEMP (MMOS, 2022b).

1.5.3.3. Tower Cranes

The construction works will require the erection of at least 4 no. tower cranes within the development site. The tower crane will be required for the erection of the building frame and super structure. It is noted that the location and operation of the tower cranes will be co- ordinated by the main contractor but are likely to be located centrally in each site phase.

1.5.3.4. Piling

All buildings structures will be supported on piled foundations, subject to further detailed design. Formation levels across the site will vary and they are anticipated to the various areas as 5.65m OD (Block 11), 7.0m OD (Block 12), 6.85m OD (Block 13), 6.8m OD (Block 14), 7.5m OD (Block 15).

It is proposed that the piling methodology will be continuous flight auger type piles (CFA Piles) so as to limit noise and vibration to the adjoining residential area.

During the piling installation works an independent specialist will be employed to monitor the noise levels at the site perimeter and vibration levels at specified locations.

1.5.3.5. Site Storage

Materials for inclusion as part of the works will be stored generally within the allocated site compound. No products will be placed outside of this area. Materials will be brought to site periodically to suit the programme for the works.

Earthworks arising will be stored within the identified space and will be sampled, processed and placed within the works or removed off site in accordance with Waste Management as set out in Chapter 9.0 of the accompanying CEMP (MMOS, 2022b).

1.5.3.6. Removal of excavated material from Site

The construction works will involve the excavation of approximately 30,000m^3 of soil from the development site.

Given the landscaping through site and the lower levels at the southern part, approximately 20,00 m^3 of the excavated material is proposed to be kept onsite to be reutilized on the next phase of the development. The remaining of the excavated material is proposed to be removed from the site and sent to an appropriately licenced facility. All material to be transported off the site will be subject to appropriate licencing. Appropriate environmental measures will be employed to ensure that the material does not become a source of pollution.

The appointed contractor will be responsible for the final classification and removal of all material from the site but will be obliged to comply with the requirements as set out in this report. Any material that is found to be above the Inert limit will not be accepted at and Inert Landfill and will need to be segregated on site before being transported to a speciality designated landfill. The resident engineer from MMOS will monitor and ensure compliance with the main contractor.

Final certification for all materials removed off site will require to be provided by the main contractor on completion of the excavation works.

1.5.3.7. Equipment

Equipment to be used on site is as shown in Table 1.2.

Table 1.2 List of typical plant required for this Project.

Plant Item	Purpose
Hydraulic excavators – various	Excavation, substructures, drainage
Mobile cranes - various	Erection of buildings, movement of large materials and plant
Dumpers	Excavations, drainage, landscaping, movement of materials
Concrete saw cutting	Used for cutting concrete slabs in yard areas, building substructure and superstructures
Ready-mix concrete trucks	Delivery of concrete to site for new structures, slabs etc.

Plant Item	Purpose
Pump unit for ready-mix concrete	For placement of concrete
Vibrating rollers	Used for compacting stone in roads, yard areas, substructures etc.
HGV – 20 foot trailers	Delivery of materials, steel, cladding and concrete blocks.
HGV – 40 foot trailers	Delivery of structural steel, cladding, large elements of new plant and equipment
Telescopic site handlers	Handling and moving materials on site
Road sweeping equipment	Management of dust and excavation residues on site and off site on road approaches.
Welding gear	Demolitions, erection of structural steel and in mechanical installations
Elevation platforms	For use by employees erecting steel, cladding and general construction at height.
Small tools – grinders, saws, drills, kango hammers, power floats, temporary lights, water pumps, concrete vibrators.	For use during all stages of construction.

1.5.3.8. Other Elements

Further areas dealt with within the CEMP include dust management plan (Section 7.0 of the CEMP, which will all help to mitigate environmental impacts on the wider environment), Noise (Section 8.0 of the CEMP) and Construction Waste Management (Chapter 9.0 of the CEMP).

1.6. Construction Works

1.6.1. Basement Construction

Block 15 is proposed to have a basement car parking area and as outlined above, the foundations for the building will likely consist of piled foundations. All basement drainage will be located beneath this slab and will be tanked to prevent future water ingress. The drainage will then connect to the main network in the public road by gravity.

The suspended podium slab will be formed in a concrete frame. This structure will also provide horizontal restraint to the perimeter retaining sheet piled walls and will facilitate the sequenced removal of any temporary propping as required.

The basement structure will require large concrete pour volumes, which will likely require works outside of normal construction hours to be agreed with Cork City Council in advance and will require particular traffic management.

1.6.2. Superstructure Construction

The buildings will likely be constructed as a concrete framed flat slab type structure with columns in rectangular shapes to suit the party wall layouts and required sound resistance.

The stair core walls will be reinforced concrete or precast concrete.

1.6.3. Facades

The building façades will vary depending on the building use. Where possibly an emphasis will be placed on off-site construction including modular unitised facades and precast panels. This will facilitate a swift form of construction and will also reduce site waste.

1.6.4. Fit Out

The internal fitout out of each building will be on a phased basis and will be subject to final tenant requirements. The fitout works will include mechanical and electrical works, partitions, and finishes. The emphasis will be on lean construction to ensure minimal construction waste.

1.6.5. Landscaping Works

Landscaping works will commence on the completion of the building facades. Landscaping works will be undertaken within the site perimeter, particularly to the north that is bounded by N40 South Ring Road.

1.6.6. Construction Access

During the project site delivery traffic will access the site via the Jacobs Island Spine Road.

1.6.7. Construction Traffic Volumes

Heavy goods vehicle truck movements into and out of the site are expected to peak during the basement excavation works and large concrete pours. Note that the excavated material will be relocated internal within the site and will not necessitate external vehicular movements. Large concrete pours will be concentrated to within an individual 24-hour period.

People movement (in and out) and associated car trips during each construction stage will be circa 20no. during basement excavation stage and rising to circa 50 during construction with an increase to 60no. as the frame is being progressed. The numbers on site will maintain at this level during the façade construction but will increase to between 60-70 during internal M&E installation.

Typically, the trips to and from the site will be by private car and vans accommodating 1-2 workers. Some sub-contractors will use minibus transport when in larger crews, such as concrete contractors, M&E, and facades. Public transportation will also be availed of by individual workers. Typically, construction workers will remain on site from between morning start to evening time.

1.6.8. Signage

Signage will be erected in advance to warn other pedestrian and road users of a construction site ahead. These signs will be checked and cleaned regularly so that they are maintained in a good condition.

2. Scope of Natura Impact Statement

This document contains information required for the competent authority (in this instance An Bord Pleanála) to undertake both a Stage One Screening for Appropriate Assessment (AA) and Stage Two AA. The developer has provided information on, and assesses the potential for, the proposed development to impact on the Natura 2000 network (hereafter referred to as European sites)[1].

Screening for Appropriate Assessment is required pursuant to Article 6(3) of Directive 92/43/EEC (the Habitats Directive) and Part XAB of the Planning and Development Act 2000, as amended ("the 2000 Act"). Where it cannot be excluded that a project or plan, either alone or in combination with other projects or plans, would have a significant effect on a European Site then same shall be subject to an appropriate assessment of its implications for the site in view of the site's conservation objectives. The Jacobs Island project is not directly connected with, or necessary for, the management of any European Site and, consequently, the project is subject to the Appropriate Assessment Screening process.

A Stage Two Appropriate Assessment is required if likely significant effects on European sites arising from a proposed development cannot be ruled out at the screening stage, either alone or in combination with other plans or projects. It is the responsibility of the competent authority to decide as to whether or not the proposed development is likely to have significant effects on European sites, either individually or in combination with other plans or projects.

An NIS, where required, should present the data, information and analysis necessary to reach a definitive determination as to (1) the implications of the plan or project, alone or in combination with other plans and projects, for a European site in view of its conservation objectives, and (2) whether there will be adverse effects on the integrity of a European site. The NIS should be underpinned by best scientific knowledge, objective information and by the precautionary principle.

Accordingly, this NIS provides: -

- Description of all elements of the proposed Jacobs Island hotel and office development;
- Baseline environment, with respect to the relevant QI/SCI of the European Sites;
- Information in relation to the Article 6(3) Appropriate Assessment screening exercise (which clearly identifies the European sites that have the potential to be significantly affected by the proposed development and the pathways by which they might be affected);
- Having conducted the screening exercise, assessment of the potential for adverse effects to occur on the identified European Sites and prescribes mitigation to robustly prevent or have prevented impacts;
- Assessment of residual effects taking into consideration the proposed mitigation;
- Appraisal of potential cumulative effects of the proposed development on European Sites to occur, when considered in combination with other plans and projects are considered; and

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

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

- Concluding statement.

2.1. Legislative Context

This Natura Impact Statement is submitted pursuant to subsection 8(2) of the Planning and Development (Housing) and Residential Tenancies Act 2016, to enable the Board to conduct an Appropriate Assessment in accordance with the provisions of Article 6(3) of the Habitats Directive and sections 177U (Stage One Screening) and 177V (Stage Two AA) of the Planning and Development Act 2000.

Article 6(3) of the Habitats Directive provide as follows:

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

This Natura Impact Statement has been prepared in accordance with Section 177T of the Planning and Development Act 2000 and in accordance with the European Commission's Assessment of Plans and Projects Significantly affecting Natura 2000 Sites: Methodological Guidance on the provisions of Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC (EC, 2001), European Communities (2018) Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2018) and the Department of the Environment's Appropriate Assessment of Plans and Projects in Ireland (- Guidance for Planning Authorities (DoEHLG, 2010).

In addition to the documents referenced above, the following relevant documents were also considered in the preparation of this report: -

1. Council of the European Commission (1992) Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. Official Journal of the European Communities. Series L 20, pp. 7-49.

2. EC (2013) Interpretation Manual of European Union Habitats. Version EUR 28. European Commission.

2.2. Appropriate Assessment (AA) Process

Guidance on the AA process was produced by the European Commission (EC, 2001; 2018), which was subsequently used to develop guidance for Ireland by the Department of Environment, Heritage and Local Government in 2009 (DEHLG, 2009) and also by the National Parks and Wildlife Service in 2018[2] (NPWS 2018). These guidance documents set out a staged approach to complete the AA process and outline the issues and tests at each stage.

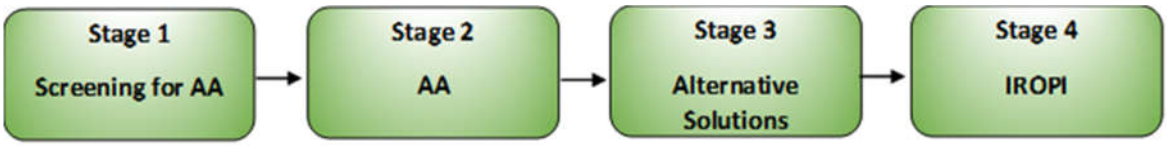


Figure 2.1 Appropriate Assessment Process (Source: DEHLG, 2009).

Only Stage 1 Screening for AA, and Stage 2 AA, are engaged in relation to the proposed Jacobs Island project. As such Stage 3 (Alternative Solutions) and Stage 4 (IROPI) are not discussed further.

[2] https://www.npws.ie/development-consultations

3. Methodology

This Natura Impact Statement report was prepared with reference and due consideration to the following documentation: -

- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna (Habitats Directive);
- European Commission (2018). Managing Natura 2000 sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC;
- European Commission (2021). Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Articles 6(3) and (4) of the Habitats Directive 92/43/EEC;
- European Commission (2007). Guidance document on Article 6(4) of the 'Habitats Directive' 92/49/EEC; clarification of the concepts of: Alternative solutions, Imperative reasons of overriding public interest, Compensatory Measures, Overall Coherence, Opinion of the Commission;
- Department of the Environment, Heritage and Local Government (2009). Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities; and,
- Office of Planning Regulation (2021). Appropriate Assessment Screening for Development Management. OPR Practice Note PN01;
- Planning and Development Act 2000 (as amended) and Planning and Development Regulations 2001 (as amended); and,
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine CIEEM (2018);
- Scott Wilson and Levett-Therivel, (2006). Appropriate Assessment of Plans. Scott Wilson, Levett-Therivel Sustainability Consultants, Treweek Environmental Consultants and Land Use Consultants;
- Inland Fisheries Ireland (2020). Planning for Watercourses in the Urban Environment. A Guide to the Protection of Watercourses through the use of Buffer Zones, Sustainable Drainage Systems, Instream Rehabilitation, Climate / Flood Risk and Recreational Planning. A Guideline Developed by Inland Fisheries Ireland.

3.1. Desk Study

A desk study was carried out to collate information available on European sites in the vicinity of the proposed project. These areas were viewed using Google Earth, Google maps[3] and Bing maps[4]. The National Parks and Wildlife Service (NPWS) online databases were reviewed concerning European sites and their features of interest in the vicinity of the proposed project. The Environmental Protection Agency (EPA) mapping[5] system was used to identify any hydrological connection between the proposed project and European sites, this information was supported by ecological walkover surveys.

Locations and boundaries of all European sites within the potential zone of influence of the proposed project were identified and reviewed using the NPWS online map viewer. Boundary shapefiles were also downloaded from this site to facilitate the preparation of project graphics.

[3] https://www.google.ie/maps
[4] http://www.bing.com/maps/
[5] https://gis.epa.ie/EPAMaps/

Desktop information on relevant European sites was reviewed on the NPWS website, including the site synopsis for each SAC/SPA, the conservation objectives, the site boundaries as shown on the NPWS online map viewer, the standard Natura 2000 Data Form for the SAC/SPA which details conditions and threats of the sites, and published information and unpublished reports on the relevant European sites.

Relevant planning information for the surrounding area was reviewed using the planning enquiry systems of Cork City Council. Search criteria were implemented to determine whether such projects or plans would be relevant to this study and this information was used to determine potential cumulative impacts from other plans / projects with the proposed project.

A full desktop review is also being undertaken as part of the assessment of Biodiversity.

3.2. Site Visit

A preliminary walkover of parts of the site was undertaken on the 25th August 2021. This helped to inform the scope of ecology survey work to be undertaken as part of the Biodiversity assessment. A Phase 1 habitat survey of the site was undertaken John Deasy (Broc Ecology) on behalf of Atkins on the 21st September 2021. This survey was undertaken in accordance with *A Guide to Habitats in Ireland* (Fossitt, 2000); and *Best Practice Guidance for Habitat Survey and Mapping* (Smith *et al*., 2011). During the course of the survey any invasive species observed were also recorded. An arboricultural assessment of the site was also undertaken.

Consideration was also given during both desktop and field surveys to the potential occurrence of rare or protected flora and fauna; i.e. after *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes* (NRA, 2009; see also CIEEM, 2021). During the course of the habitat survey any signs of fauna, such as birds, terrestrial mammals and insects, were also recorded. A bat survey of the site was undertaken by Dr. Caroline Shiel on behalf of Atkins in September 2021. The site will be subject to further site visits to consider terrestrial mammals (such as Badger, *Meles meles*). The alignment of the River Lee/Lough Mahon Waterfront Greenway adjoining Jacobs Island was walked on a number of occasions, including on the 9th January 2022.

3.3. Statement of Authority

The Screening for Appropriate Assessment report was prepared by Paul O' Donoghue and Emma Nickelsen.

Paul O'Donoghue has a BSc (Zoology), MSc (Behavioural Ecology) and a PhD in avian ecology and genetics. His is a chartered member of the Society for the Environment (CEnv) and a full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM). Paul has over 20 years' experience in ecology; including extensive experience in the preparation of Habitat Directive Assessments / Natura Impact Statements (i.e. Appropriate Assessment under Article 6(3) of the EU Habitats Directive).

Emma Nickelsen has a BSc (Hons) in Environmental Biology and an MSc in Marine Biology. Emma has worked in ecological and environmental consultancy since 2017, working on a wide range of projects including bridge works, road construction, local amenity development and renewable energy. A focus of Emma's work to date has been on conducting Appropriate Assessment screenings, ecological appraisals and supporting the preparation of Natura Impact Statements and Ecological Impact Statements.

Caroline Sheil (BSc, PhD) has 30 years' experience in the field of bat research and in conducting bat surveys. My B.Sc. thesis was an investigation of the diet of four species of Irish bat. She has extensive experience in carrying out bat surveys for building, road construction (M11 Gorey bypass, M11 Arklow bypass, M11 Enniscorthy bypass, M18 Gort bypass, N6 Galway City Transport Project and Tobercurry bypass) and windfarm construction work on behalf of many private companiesI companies.

John Deasy (BSc, MSc Applied Marine Science, MSc Ecological Assessment) is a freelance ecologist with over 7 years' experience working as an ecological consultant. John has extensive experience in Phase 1 habitat surveying, as well as surveying birds, mammals etc.

4. Existing Environment

4.1. Desktop Review

As noted, the proposed site is located at Jacobs Island in Mahon, Cork City. The overall site area is approximately 4.03 hectares. The site for the proposed development has immediate frontage to the N40 South Link Road, the South Link Bridge at the entrance to Jacobs Island and internal residential access roads within. The proposed site is accessed south of the N40 via the R852 flyover. The site comprises areas of scrub and spoil ground surrounded by residential developments and the N40. To the south of the site, separated by a housing development, is the confluence between the Douglas River Estuary and Cork Harbour, which is encompassed by Cork Harbour Special Protection Area (Site Code 004030).

The site at Jacobs Island does not lie within a Natural Heritage Area. Natural Heritage Areas (NHAs) are nationally designated sites, which are considered important for the habitat, species or geological heritage. NHAs are legally protected under the Wildlife Amendment Act 2000. However, ca. 150-200m to the south the shoreline adjoins Douglas Estuary pNHA (001046); the pNHA is notable for wintering waterbirds as well as areas of saltmarsh habitat.

There are no other non-statutory designated sites of ecological value in the vicinity of the proposed site. While the NPWS site synopsis for Douglas Estuary lists the estuary as a Wildfowl Sanctuary, it is not listed as such on the NPWS webpage (see - https://www.npws.ie/protected-sites/wildfowl-sanctuaries). This is to be clarified with NPWS.

There are no freshwater features within the proposed site. The River Douglas enters the Douglas River Estuary to the west of the proposed site, and Cork Harbour south of the proposed site. Thus, the proposed site is surrounded to the west, south and east by transitional waters. This area known as Lough Mahon is classed as being eutrophic by the EPA and being of Moderate status under the Water Framework Directive. A small are of marshland is located to the southeast – between the existing residential development and the adjoining River Lee/Lough Mahon Waterfront Greenway.

The NBDC mapviewer does not record any invasive plant species listed on the 3rd Schedule of the Natural Habitats Regulations, 2011.

As noted Jacobs Island adjoins Lough Mahon (Cork Harbour). Lough Mahon has a surface area of approximately 12.23km^2 stretching from Mahon to Passage West (CRFB, 2008), with its volume changing over the tidal cycle. The harbour is classified as transitional waters (Inner Harbour) and coastal waters (Outer Harbour).

ERU (1989) found that "*many of the environmental parameters measured in the harbour show a gradient extending from the upper harbour and estuarine areas, through the lower Harbour to the Harbour mouth. Thus, going in this direction, BOD loadings, phosphate, nitrate, and ammonia levels, bacteria levels, and levels of contaminants in the water, sediments and biota all show a general decrease in values as the Harbour mouth is reached. Dissolved oxygen levels, on the other hand, show an increase along the same gradient*" (from T.J. O'Connor & Associates (2009). This pattern of water quality change has also been found in more recent studies (see e.g. Hartnett and Nash, 2015; see also McGovern *et al*. (2020) which provides a detailed summary of background water quality within different sections of Cork Harbour; much of it derived from Costello *et al*., 2001, prior to the commissioning of Carrigrennan WWTP).

Currently, the harbour's Water Framework Directive ecological status is defined as Moderate, with its chemical status categorised as Good (2013-2018; source: EPA Maps). Between 2008 and 2018, dissolved inorganic nitrogen (as N); orthophosphate (P) and chlorophyll trends were all downwards, indicating gradual improvements to water quality (source: EPA Maps). This may to some extent reflect the developments being undertaken under the Cork Main Drainage Project which was largely completed in 2004 and achieved the cessation of the discharges of untreated sewage into the Lee Estuary and Lough Mahon (as was predicted in modelling by O'Kane and Barry, 2007 as quoted in Mott McDonald (2008). However, recent EPA data (source: EPA Maps) categorise water quality in much of the harbour and lower River Lee as being of Intermediate status (2018-2020); in contrast areas such as Lough Mahon and Douglas Estuary are categorised as Eutrophic. Recent work on the Lower Harbour, however, should fuel further improvements to water quality in the Lower Harbour in

coming years. The proposed development seeks to intercept and control surface waters during both construction and operation at site; detailed measures for same are included in Section 6.2 Mitigation Measures.

The proposed site at Jacobs Island is not located within any European sites. The proposed site is hydrologically connected via surface water outfalls to Lough Mahon within Cork Harbour, within which is located Cork Harbour SPA (004030) and Great Island Channel SAC (001058). Cork Harbour SPA, the closer of the two sites, is located 17.65km downstream of the proposed site.

A data request was also submitted to NPWS for information on rare and protected plant and animal species within the 10km grid square within which the site is located (W76 & W77); a response was received in November 2021. The NBDC database was also searched for records of any species noted form these grid squares by NPWS. There are no notable records noted from Jacobs Island.

There are no records on the NBDC database for invasive plant species such as Japanese knotweed (*Fallopia japonica*) from within Jacobs Island. The nearest record of Japanese knotweed is from the R852 at top of exit to join the N40 South Link Road (eastwards) from Mahon, Cork (W726702; 2014). There were no records of Himalayan balsam (*Impatiens glandulifera*) or Giant Hogweed (*Heracleum mantegazzianum*) within the site, or in the vicinity of the site; or of other forms of knotweed.

4.1.1. Previous Site Surveys

The site has been subject to a number of ecology surveys. It was surveyed on 2000 by Roger Goodwillie as part of the proposal to develop housing on Jacobs Island (Goodwillie, 2000 in McCarthy Developments (2000). Surveys undertaken at the time included the area where housing has now been built as well as lands between the housing and the estuary. The site was surveyed in November 1998 and May 2000. However, apart from the creation of a small park and retention of areas of brackish lagoon south of the houses, the areas discussed in this report have been largely developed.

This site used to host a large badger sett in the south-eastern corner overlooking the brackish marsh.

The site was again surveyed in 2007 by Scott Cawley. Scott Cawley's 2007 survey identified two species of interest - White Melilot (*Melilotus albus*) and Ribbed Melilot (*Melilotus officinalis*). White Melilot flowers from June – August; while White Melilot flowers from June to September. The site should be visited soon to check again for these species.

However, the 2007 survey undertaken by Scott Cawley noted the presence of Japanese knotweed within the site. Surveys for knotweed should be completed before the end of September.

As would be expected for a site of this character other invasive / garden species were noted: - winter heliotrope (*Petasites pyrenaicus*), butterfly-bush (*Buddleja davidii*), traveller's-joy (*Clematis vitalba*) and Himalayan honeysuckle (*Leycesteria formosa*). Scott Cawley also noted the presence of Evening primrose (*Oenothera biennis*), a garden escape which has naturalised on many sites such as this in Cork.

4.2. Site Visit

4.2.1. Habitats

Figure 4.1 displays the distribution of habitats within the overall Masterplan site within which the proposed development site is located. Ecology surveys within this wider site are ongoing.

4.2.1.1. Scrub (WS1)

This habitat was widely recorded across the study site and the species composition varied at different locations.

Along the northern end of the site, adjacent to the boundary with the N22 South Ring Road boundary, Bramble was frequently recorded along with occasional Grey willow, Gorse and Dogwood (*Cornus* sp.). A range of immature and sapling trees were recorded occasionally including Oak, Alder, Ash, Sycamore, Aspen, Poplar,

Italian alder and Birch. Small patches of open ground between and around the edges of scrub held frequent Creeping thistle, Common ragwort, willowherb sp., Bilboa fleabane, Nettle, Ribwort plantain and Spear thistle.

To the western side of the study site, the scrub habitat consisted of frequent Butterfly bush, Grey willow, Gorse, Sycamore, Dogwood and Bramble. Hazel and Guelder rose were rarely recorded. Immature trees in the scrub habitat included Sycamore, Ash and Grey alder.

The scrub habitat grew from 3-5 m high and was dense and impenetrable in places.

Given the built up environment in which the proposed site is located, this habitat provides a potentially important corridor for mammal and bird species.

Plate 4.1 Scrub (WS1) located within the proposed site.

4.2.1.2. Neutral grassland / Scrub / Recolonising bare ground (GS1N/WS1/ED3) mosaic

This habitat was recorded in the open areas in the eastern side of the study site and consisted of a mosaic of formerly disturbed ground that has being recolonised to form a grassland habitat which is undergoing succession to scrub. The open areas consisted of frequent Ribwort plantain, Selfheal, Bilbao fleabane, Bramble, Sweet vernal grass, Lesser trefoil, Creeping cinquefoil, Springy turf-moss (*Rhytidiadelphus squarrosus*) and Pointed Spear-moss (*C*alliergonella cuspidata). Creeping thistle, Lesser hawkbit, Common centaury, Common ragwort, Common bent, Yorkshire fog, willowherb sp. and Silverweed were recorded occasionally. Tutsan, White meliot, Yarrow, Spear thistle, Red bartsia, Trailing St. Johns-wort, Mouse-ear hawkweed, Common knapweed, Red clover and Birds foot trefoil were rarely recorded.

The encroaching scrub species included Gorse, Willow, Larch (*Larix* sp.), Common alder, Grey alder, Sycamore and Butterfly bush. There was evidence of intensive grazing by rabbits at some locations and the sward was c. 2-5 cm long. Given the built up environment in which the proposed site is located, this habitat provides a potentially important corridor for invertebrate, mammal and bird species.

Plate 4.2 Neutral grassland/Scrub/Recolonising bare ground (GS1N/WS1/ED3) mosaic located within the proposed site.

4.2.1.3. Spoil and Bare ground / Recolonising bare ground (ED2/ED3)

This habitat was recorded along existing informal paths that are being utilised by pedestrians through the study area. The habitat consisted of a well-worn path c. 1 m wide with a margin of c. 1 m on both sides where traffic is not as intense and some ruderal species have recolonised. Species recorded in the exposed gravel substrate included Selfheal, Bilboa fleabane, Lesser hawkbit, Pointed Spear-moss, Springy turf-moss, Ribwort plantain, Dandelion, Daisy, Broadleaf plantain, Marsh cudweed, Pendulous sedge, Creeping buttercup, Teasel, Evening primrose (*Oenothera sp.*), willowherb sp., Soft rush, Hard rush and Great mullein. This habitat may provide some habitat for invertebrate species.

Plate 4.3 Spoil and Bare ground/Recolonising bare ground (ED2/ED3) located within the proposed site.

4.2.1.4. Recolonising bare ground (ED3)

This habitat was recorded in two main locations; at the northwest corner of the site where recent disturbance and dumped aggregates have been recolonised and a larger area in the centre of the study area which evidence suggests may have been used as a storage or construction compound in the past due to the presence of a boundary chain link fence and a number of areas of concrete foundation pads /tarmac areas amongst the gravel hardstand.

The species at the northwest corner of the site included frequent Winter heliotrope and Ribwort plantain along with occasional Cocksfoot, Common centaury, Bramble, Butterfly bush, Bilboa fleabane, Dogwood, Ash, Yorkshire fog and Mouse ear hawkweed. Pendulous sedge, Red bartsia, Silverweed, Autumn hawkbit and Eyebright (*Euphrasia sp.*) were rarely recorded.

The larger area of recolonising bare ground contained frequent Bilbao fleabane, Ribwort plantain, Lesser hawkbit, Pointed Spear-moss and Butterfly bush. Scarlet pimpernel and Bramble were occasionally recorded. Selfheal, Common centaury, Autumn hawkbit and common mouse-ear were rarely recorded. This habitat may provide some habitat for invertebrate species.

Plate 4.4 Recolonising bare ground (ED3) located within the proposed site.

4.2.1.5. Mixed Broadleaved Woodland (WD1)

A small area of mixed broadleaved woodland was recorded on the northern side of the scrub habitat on the western side of the study area. The stand of semi-mature trees consisted of Grey alder, Poplar sp., White willow and Sycamore. Elder and immature Sycamore were recorded occasionally growing beneath as well as Willow and Bramble which grew in from the adjacent scrub habitat. Given the built up environment in which the proposed site is located, this habitat provides a potentially important corridor for invertebrate, mammal and bird species.

Plate 4.5 Mixed Broadleaved Woodland (WD1) located within the proposed site.

4.2.1.6. Treeline (WL2)

This habitat was recorded along the margin of the existing access roadway along the southern boundary of the study area. The treeline consisted ornamental semi-mature Maple (*Acer* sp.) and Cherry (*Prunus* sp.) trees growing along a grassy strip next to the footpath. The trees were c. 6-8 m.

Given the built up environment in which the proposed site is located, this habitat provides a potentially important corridor for invertebrate, mammal and bird species.

Plate 4.6 Treeline (WL2) located within the proposed site.

4.2.1.7. Amenity grassland (GA2)

This habitat was recorded along the margin of the existing access roadway along the southern boundary of the study area. The habitat consisted of a c. 3 m wide grassy margin which is managed by regular mowing resulting in a sward height of c. 4-5 cm. The species present included frequent Creeping buttercup, White clover, Dandelion, Daisy, Yorkshire fog, Sweet vernal grass, Common bent and Springy turf-moss. Red clover, Annual meadow grass, Selfheal, Cat's ear, Ribwort plantain and Sweet vernal-grass were recorded occasionally. This habitat may provide some habitat for invertebrate species.

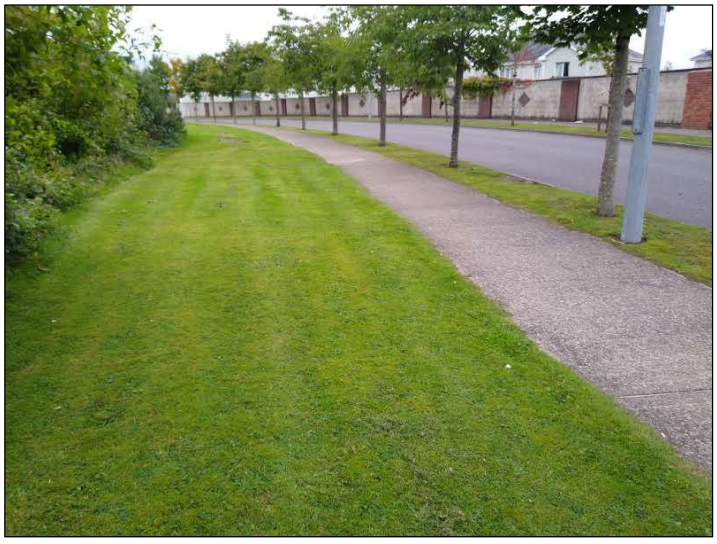


Plate 4.7 Amenity grassland (GA2) located within the proposed site.

4.2.1.8. Dry meadows and grassy verges (GS2)

This habitat on a sloped bank along the southern boundary of the study area and consisted of a less intensively mown area of grassland which contained frequent Red clover, Cat's ear, Ribwort plantain, Common bent and Sweet vernal-grass. Common ragwort, Dandelion, Red fescue and Common centaury were occasionally recorded. Common mouse-ear, Meadow vetchling, Tufted vetch, Bird's-foot trefoil, Smooth hawk's-beard, Yorkshire fog and Perennial rye-grass were rarely recorded. This bank had been strimmed relatively recently but mowing was not as intensive or regular as the adjacent amenity grassland strip. The sward height was c. 5-10 cm. Gorse was occasionally recorded indicating scrub encroachment from the adjacent scrub habitat. This habitat may provide some habitat for invertebrate species.

Plate 4.8 Dry meadows and grassy verges (GS2) located within the proposed site.

4.2.1.9. Scrub/Semi-natural grassland mosaic habitat (WS1/GS)

This habitat on a sloped bank along the southern boundary of the study area adjacent to the amenity grassland and dry meadows and grassy verges. However, in this area no management (mowing) has been undertaken for an extended period allowing scrub species to be firmly established. Bramble was frequently recorded along with occasional Gorse. The grassy areas consisted of frequent Common bent, Sweet vernal-grass along with Ribwort plantain and Red clover which were occasionally recorded. Creeping thistle, Cock's-foot, Cat's ear, Bird's-foot trefoil, Common ragwort, Meadow vetchling, Creeping buttercup and Common mouse-ear were rarely recorded. The grassy areas were c. 40-50 cm high, rank and lodged in places. Given the built up environment in which the proposed site is located, this habitat provides a potentially important corridor for invertebrate and bird species.

Plate 4.9 Scrub/Semi-natural grassland mosaic habitat (WS1/GS) located within the proposed site.

4.2.2. Invasive Plants

No species listed on the 3rd Schedule Part 1 of the EC (Birds and Natural Habitats) Regulations 2011 (S.I. 477/2011). are located within the boundaries of the current site (as illustrated on Figure 1.1).

Japanese knotweed (*Fallopia japonica*) and Bohemian knotweed *(Fallopia bohemica*) have been recorded on adjoining lands which are within the broader Masterplan site (boundary as illustrated on Figure 1.4). It should be noted that John O'Donovan, of O'Donovan Agri Environmental, has been employed to carry out treatment of Japanese knotweed and Bohemian knotweed on the Masterplan site.

Additional non 3rd Schedule potentially invasive species noted within the wider site include Butterfly Bush (*Buddleia davidii*), Himalayan honeysuckle (*Leycesteria formosa*), Old-man's beard / Traveller's-joy (*Clematis vitalba*), Winter heliotrope (*Petasites pyrenaicus*) and contoneaster.

4.2.3. Other Ecology

All Irish bat species are listed on Annex IV of the Habitats Directive, with only Lesser horseshoe bat (*Rhinolophus hipposideros*) listed on Annex II. The site was surveyed for bats on 15th September 2021. A walkover survey was conducted in daylight hours to investigate the site for roosting potential for bats. Overnight bat activity was assessed by placing two remote Songmeter 4 bat detectors on site, set to record bat calls from dusk until dawn. A bat detector survey was also conducted by walking transects on the site from sunset until approximately 2 hours after sunset (Shiel, 2021).

The level of bat activity recorded on site at Jacobs Island is very low. During walking transects only one individual Common pipistrelle (*Pipistrellus pipistrellus*) and one individual Soprano pipistrelle (*Pipistrellus pygmaeus*) were recorded and observed on site. Lesser horseshoe bat was not recorded on site. The weather conditions on the night of the survey were ideal for foraging bats – yet very low levels of activity were recorded. Jacobs Island is an exposed site sited directly on the coast. Foraging conditions for bats would be negatively affected by winds on site. Recommendations with respect to mitigation for bats is included in the Bat report (Shiel, 2021). As noted, terrestrial mammal survey work is ongoing.

There are only two mature trees (a sycamore and a beech) at the northern boundary of the site close to the N40, which may provide roosting opportunities for bats. Both trees are heavily overgrown with ivy, which made it very difficult to identify potential roost features such as cavities and broken branches. The arborist has recommended one of these trees should be removed. It is recommended that four Schwegler 1FF bat boxes are to be mounted mature trees at a number of locations on the northern boundary of the site. Locations will be confirmed with the bat specialist as the proposed design evolves.

Calls of the non-native Speckled bush cricket (*Leptophyes punctatissima*) were recorded from vegetation throughout the site.

No evidence of badger (*Meles meles*) has been recorded on site. There are extensive signs of rabbit (Oryctolagus cuniculus) within the site. During the habitat survey work the following were also recorded: - Red Admiral (*Vanessa atalanta*), Speckled Wood (*Pararge aegeria*), Small tortoiseshell (*Aglais urticae*); Green shieldbug (*Palomena prasina*), Common carder bee (Bombus (*Thoracombus) pascuorum*); Straw dot (*Rivula sericealis*), Silver Y (*Autographa gamma*) and Green carpet (*Colostygia pectinataria*).

Bird species noted within the Masterplan site are listed on Table 4.1. Conservation status is based on Gilbert et al. 2021; *Birds of Conservation Concern in Ireland. 4. 2020-2026*.

Table 4.1 List of birds noted within the site (21/09/21).

Species	Scientific name	Conservation Status
Black headed gull (fly over)	*Chroicocephalus ridibundus*	Amber
Blackbird	*Turdus merula*	Green
Blue tit	*Cyanistes caeruleus*	Green
Chaffinch	*Fringilla coelebs*	Green
Chiffchaff	*Phylloscopus collybita*	Green
Dunnock	*Prunella modularis*	Green
Great tit	*Parus major*	Green
Goldfinch	*Carduelis carduelis*	Green
Hooded crow	*Corvus (corone) cornix*	Green
House martin	*Delichon urbicum*	Amber
House sparrow	*Passer domesticus*	Amber
Magpie	*Pica pica*	Green
Pied wagtail	*Motacilla alba yarelli*	Green
Robin	*Erithacus rubecula*	Green
Rook	*Corvus frugilegus*	Green
Starling	*Sturnus vulgaris*	Amber
Wood pigeon	*Columba palumbus*	Green
Wren	*Troglodytes troglodytes*	Green

5. Stage 1 Screening for Appropriate Assessment

This section of the NIS has been included to provide the information necessary to allow the competent authority to conduct an Article 6(3) Stage One Screening for Appropriate Assessment in respect of a proposed strategic housing development (SHD). Screening for Appropriate Assessment is required pursuant to Article 6(3) of Directive 92/43/EEC (the Habitats Directive) and Part XAB of the Planning and Development Act 2000, as amended ("the 2000 Act"). Where it cannot be excluded that a project or plan, either alone or in combination with other projects or plans, would have a significant effect on a European Site then same shall be subject to an appropriate assessment of its implications for the site in view of the site's conservation objectives. The proposed development is not directly connected with, or necessary for, the management of any European site and, consequently, the project is subject to the Appropriate Assessment Screening process.

The purpose of a (Stage One) screening exercise for Appropriate Assessment is to determine whether it is necessary to carry out a Stage Two Appropriate Assessment of the implications for a European site of a project. The trigger for the requirement for an Appropriate Assessment is that the project, either individually or in combination with other plans or projects, is "likely to have a significant effect" on the European site.

It is clear that the trigger for an Appropriate Assessment is a very light one, and that the mere probability or a risk that a project might have a significant effect is sufficient to require an Appropriate Assessment to be undertaken. Under Part XAB of the 2000 Act, screening for Appropriate Assessment must be carried out by the competent authority. As per section 177U of the Planning and Development Act, 2000, as amended, '*A screening for appropriate assessment shall be carried out by the competent authority to assess, in view of best scientific knowledge, if… a proposed development, individually or in combination with another plan or project is likely to have a significant effect on the European site*'. The competent authority shall determine that an Appropriate Assessment of a proposed development is required if it cannot be excluded, on the basis of objective information, that the proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site. The competent authority's determination as to whether an Appropriate Assessment is required must be made on the basis of objective information and must be recorded.

Whereupon the carrying out of a Stage One screening, it is concluded that a Stage Two Appropriate Assessment is required, an applicant for permission must prepare and submit a Natura Impact Statement to the competent authority.

This Article 6(3) Appropriate Assessment Screening Report has been prepared in compliance with the provisions of section 177U of the 2000 Planning & Development Act 2010 as amended.

5.1. Connectivity of Works Area to European Sites

The '*zone of influence*' (ZoI) for a project is the area over which ecological features may be subject to significant effects 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. The zone of influence will vary for different ecological features depending on their sensitivity to an environmental change (CIEEM, 2018).

A distance of 15km was previously recommended in the case of plans, as a potential zone of influence and this distance is derived from UK guidance (Scott Wilson *et al.*, 2006). However, for projects the distance could be much less. National Parks and Wildlife Service guidance[6] as well as guidance recently published by the Office of Planning Regulation (OPR, 2021) advises that this must be evaluated on a case-by-case basis with reference to the nature, size and location of the project, the sensitivities of the ecological receptors, and the potential for in-combination effects. Thus, given the nature, scale and extent of the proposed project, the potential zone of influence (ZoI) will consider European sites with regard to the Cause-Pathway-Effect model – giving consideration to their qualifying interests, the life history characteristics of these habitats and species, potential mobility of species from a given European site as well as potential connections (e.g. hydrological). In this way

[6] DoEHLG (2009*). Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities*. Department of Environment, Heritage and Local Government, Dublin, Ireland.

consideration is given the potential interaction of proposed works with European sites across factors other than just distance (i.e. the Cause-Pathway-Effect model).

Thus, given the nature, scale and extent of the proposed project, the potential zone of influence will consider European sites with regard to the location of a European site, the QIs of the site and their potential mobility outside that European site, the Cause-Pathway-Effect model and potential environment effects of the proposed project.

It follows that given the nature of the proposed project the potential zone of influence will be limited to the closest European sites or to those hydrologically connected to the proposed project.

The following methodology was used to establish which European Sites are within the Likely Zone of Impact of the proposed development: -

1. Initially, the most up to date GIS spatial datasets for European designated sites and water catchments were downloaded from the NPWS website (www.npws.ie) and the EPA website (www.epa.ie). The datasets were utilized to identify European Sites which could potentially be affected by the proposed development.

2. All European Sites within a distance of 15km surrounding the development site were identified and are shown on Figure 3.1. (Note, however, that in reviewed sites those at >15km were also considered and discounted based on the methods outlined above).

3. There is no potential connectivity between the proposed development site and European site located at a distance of greater than 15km. Potential pathways for connection which were considered include included hydrological (surface water and groundwater); air quality (i.e. dust and other air emissions) and disturbance.

4. The catchment mapping was used to establish or discount potential hydrological connectivity between the site of the proposed development and any European Sites.

5. In relation to Special Protection Areas, in the absence of any specific European or Irish guidance in relation to such sites, the Scottish Natural Heritage (SNH) Guidance, 'Assessing Connectivity with Special Protection Areas (SPA)' (SNH, 2016) was consulted. This document provides guidance in relation to the identification of connectivity between proposed development and Special Protection Areas. The guidance takes into consideration the distances species may travel beyond the boundary of their SPAs and provides information on dispersal and foraging ranges of bird species which are frequently encountered when considering plans and projects.

6. Table 5.1, provides details of all relevant European Sites as identified in the preceding steps which are within the likely Zone of Impact. The assessment considers any potential for any direct or indirect impacts of the proposed development, both alone and in combination with other plans and projects, on European Sites by virtue of the following criteria: size and scale, land-take, distance from the European Site or key features of the site, resource requirements, emissions, excavation requirements, transportation requirements and duration of construction, operation and decommissioning were considered in this screening assessment

7. The site synopses and conservation objectives of these sites, as per the NPWS website (www.npws.ie), were consulted and reviewed at the time of finalising this report in January 2022.

8. Figure 5.1 shows the location of the proposed development in relation to all European sites within Cork Harbour.

9. Where potential for any pathways for Significant Effects are identified, the site is included within the Likely Zone of Impact and is further considered as part of the Stage One screening assessment.

10. There is absolutely no reliance placed in this Screening on (a) measures intended to avoid/reduce harmful effects on the European sites, (b) construction management/best practice measures, or (c)

any other measures (such as SUDS) which are proposed with no relation to the intention of avoiding or reducing any potentially harmful effect of the development on any European site.

5.2. Special Area of Conservation

The Great Island Channel SAC is located 3.8km east of the proposed project. Part of the Great Island Channel SAC is within Lough Mahon and the area of the SAC within the Lough is located to the east of the site at Jacobs Island. Thus, the Great Island Channel SAC is within the zone of influence of the project and is discussed in greater detail below.

Table 5.1 below details qualifying interests of Great Island Channel SAC.

The only other Special Areas of Conservation in the wider landscape are as follows. The River Blackwater (Cork/Waterford) SAC (002170) is located just under 17km from the site at Jacobs Island. The proposed site at Jacobs Island is not, however, within the catchment of the River Blackwater.

To the west the Gearagh SAC (000108) is located upstream of Cork City on the River Lee to the southwest of Macroom (>25km from the site). The proposed site at Jacobs Island is downstream of this site and will not affect the Gearagh SAC (ca. 40km straight line distance).

Along the coast Ballymacoda (Clonpriest and Pillmore) SAC (000077) is located at the mouth of the Womanagh River approximately 31km to the east of Jacobs Island. Like the Blackwater River, the estuary at Ballymacoda is not within the same catchment as the proposed development at Jacobs Island. In a similar way Courtmacsherry Estuary SAC (001230) is located ca. 30km to the southwest, again outside the catchment within which Jacobs Island is located.

These SACs are not deemed to be within the zone of influence of the Cloghroe site and are not discussed further (see Table 5.1 for qualifying interests of these sites).

Table 5.1 SACs within 15km of the proposed project.

Site Name	Approximate distance	Features of Interest	Within ZoI
Great Island Chanel SAC (001058)	3.8km east	• Mudflats and sandflats not covered by seawater at low tide [1140] • Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]	Yes
River Blackwater (Cork/Waterford) SAC (002170)	ca. 17km	• Estuaries [1130] • Mudflats and sandflats not covered by seawater at low tide [1140] • Perennial vegetation of stony banks [1220] • Salicornia and other annuals colonising mud and sand [1310] • Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] • Mediterranean salt meadows (Juncetalia maritimi) [1410] • Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260] • Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]	No

Site Name	Approximate distance	Features of Interest	Within ZoI
		• Alluvial forests with *Alnus glutinosa* and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0] • *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] • *Austropotamobius pallipes* (White-clawed Crayfish) [1092] • *Petromyzon marinus* (Sea Lamprey) [1095] • *Lampetra planeri* (Brook Lamprey) [1096] • *Lampetra fluviatilis* (River Lamprey) [1099] • *Alosa fallax fallax* (Twaite Shad) [1103] • *Salmo salar* (Salmon) [1106] • *Lutra lutra* (Otter) [1355] • *Trichomanes speciosum* (Killarney Fern) [1421]	
Ballymacoda (Clonpriest and Pillmore) SAC (000077)	ca. 31km	• Estuaries [1130] • Mudflats and sandflats not covered by seawater at low tide [1140] • Salicornia and other annuals colonising mud and sand [1310] • Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] • Mediterranean salt meadows (Juncetalia maritimi) [1410]	No
Courtmacsherry Estuary SAC (001230)	ca. 30km	• Estuaries [1130] • Mudflats and sandflats not covered by seawater at low tide [1140] • Annual vegetation of drift lines [1210] • Perennial vegetation of stony banks [1220] • Salicornia and other annuals colonising mud and sand [1310] • Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] • Mediterranean salt meadows (Juncetalia maritimi) [1410] • Embryonic shifting dunes [2110] • Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] • Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	No

5.2.1. Description of Great Island Channel SAC

Great Island Channel SAC is described as follows in the NPWS site synopsis (NPWS, 2013a): -

> *"The Great Island Channel stretches from Little Island to Midleton, with its southern boundary being formed by Great Island. It is an integral part of Cork Harbour which contains several other sites of conservation interest. Geologically, Cork Harbour consists of two large areas of open water in a limestone basin, separated from each other and the open sea by ridges of Old Red Sandstone. Within this system, Great Island Channel forms the eastern stretch of the river basin and, compared to the rest of Cork Harbour, is relatively undisturbed. Within the site is the estuary of the Owenacurra and Dungourney Rivers. These rivers, which flow through Midleton, provide the main source of freshwater to the North Channel.*
>
> *The main habitats of conservation interest in Great Island Channel SAC are the sheltered tidal sand and mudflats and the Atlantic salt meadows. Owing to the sheltered conditions, the intertidal flats are composed mainly of soft muds. These muds support a range of macro-invertebrates, notably* Macoma balthica*,* Scrobicularia plana*,* Hydrobia ulvae*,* Nepthys hombergi*,* Nereis diversicolor *and* Corophium volutator*. Green algal species occur on the flats, especially* Ulva lactuca *and* Enteromorpha *spp. Cordgrass (*Spartina *spp.) has colonised the intertidal flats in places, especially at Rossleague and Belvelly. The saltmarshes are scattered through the site and are all of the estuarine type on mud substrate. Species present include Sea Purslane (*Halimione portulacoides*), Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Common Saltmarsh-grass (*Puccinellia maritima*), Sea Plantain (*Plantago maritima*), Greater Sea-spurrey (*Spergularia media*), Lax-flowered Sea-lavender (*Limonium humile*), Sea Arrowgrass (*Triglochin maritimum*), Sea Mayweed (*Matricaria maritima*) and Red Fescue (*Festuca rubra*)."*

5.2.2. Conservation Objectives

The Habitats Directive defines when the conservation status of the listed habitats and species is considered as favourable. The definitions it uses for this are specific to the Directive. In summary, they require that the range and areas of the listed habitats, and the range and population of the listed species, should be at least maintained at their status at the time of designation. Site-specific conservation objectives aim to define favourable conservation conditions for a particular habitat or species at that site.

Article (1) of the Habitats Directive (92/43/EEC) describes favourable conservation status for habitats and species as follows.

Favourable conservation status of a habitat is achieved when:

- Its natural range, and area it covers within that range, are stable or increasing;
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and
- The conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats;
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

The conservation objectives for Great Island Channel SAC, to maintain or restore the favourable conservation condition for each of the qualifying interests of the site, were published by NPWS (2014a) and are as follows: -

- To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in Great Island Channel SAC;

- To restore the favourable conservation condition of Atlantic salt meadows in Great Island Channel SAC.

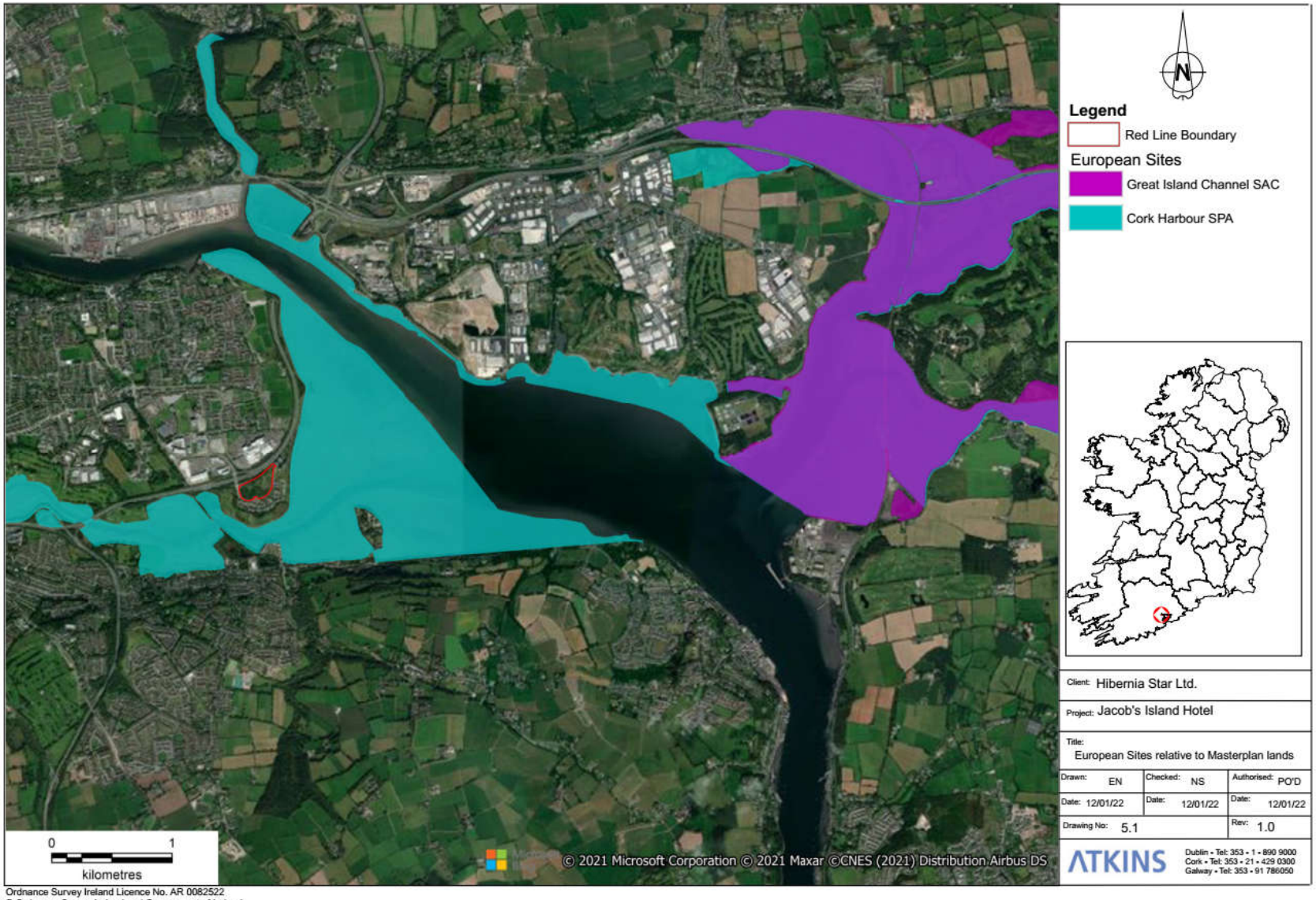
5.2.3. Potential Threats

The site synopsis for the Great Island Channel SAC describes the land use and threats to the SAC as follows; *'While the main land use within the site is aquaculture (oyster farming), the greatest threats to its conservation significance come from road works, infilling, sewage outflows and possible marina developments.'*

The threats, pressures and activities with impacts on the SAC (NPWS, 2019) are itemised in Table 5.2.

Table 5.2 Threats, pressures and activities with impacts on the SAC.

Rank	Threats and pressures (code)	Threats and pressure (type)	Inside/outside/both (i/o/b)
M	A08	Fertilisation	o
H	F01	Marine and freshwater aquaculture	i
H	J02.01.02	Suppression of natural fires	i
H	D01.02	Roads and motorways	i
H	E01	Urbanised areas and human habitation	o
M	I01	Invasive non-native species	i
M	A04	Grazing	i
M	K02.03	Eutrophication (natural)	i



5.3. Special Protection Areas

There is 1 no. SPA located within 15km of the proposed site; Cork Harbour SPA (004030). The site is designated for waterbirds that are dependent on the wetlands within the harbour for feeding and roosting. As the proposed site hydrologically connected to the SPA, Cork Harbour SPA is within the zone of influence of the proposed works.

The details of the SPA, including qualifying interests, are detailed in Table 5.3, while Figure 5.1 displays the distribution of Cork Harbour SPA in relation to the proposed site at Jacobs Island.

Other SPAs in the wider environment include: -

- The Gearagh SPA (004109) – ca. 40km to the west;
- Blackwater Callows SPA (004094) – ca. 30km to the northeast;
- Ballycotton Bay SPA (004022) – ca. 25km to the east;
- Ballymacoda Bay SPA (004023) – ca. 32km to the east;
- Blackwater Estuary SPA (004028) -ca. 36km to the east.
- Sovereign Islands SPA (004124) – ca. 23km to the southwest

In summary, these SPAs are between 25km and 40km from the site at Jacobs Island and are designated for a range of wetland birds. These SPAs are not deemed to be within the zone of influence of the Jacobs Island site and are not discussed further. Qualifying interests for all sites are set out in Table 5.3.

Table 5.3 SPAs within 15km of the proposed project.

Site Name	Approximate distance	Features of Interest	Within ZoI
Cork Harbour SPA (004030)	ca. 150-200m	• Little Grebe (*Tachybaptus ruficollis*) [A004] • Great Crested Grebe (*Podiceps cristatus*) [A005] • Cormorant (*Phalacrocorax carbo*) [A017] • Grey Heron (*Ardea cinerea*) [A028] • Shelduck *(Tadorna tadorna*) [A048] • Wigeon (*Anas penelope*) [A050] • Teal *(Anas crecca*) [A052] • Pintail (*Anas acuta*) [A054] • Shoveler (*Anas clypeata*) [A056] • Red-breasted Merganser (*Mergus serrator*) [A069] • Oystercatcher (*Haematopus ostralegus*) [A130] • Golden Plover (*Pluvialis apricaria*) [A140] • Grey Plover (*Pluvialis squatarola*) [A141] • Lapwing (*Vanellus vanellus*) [A142] • Dunlin *(Calidris alpina*) [A149]	Yes

Site Name	Approximate distance	Features of Interest	Within ZoI
		• Black-tailed Godwit (*Limosa limosa*) [A156] • Bar-tailed Godwit (*Limosa lapponica*) [A157] • Curlew (*Numenius arquata*) [A160] • Redshank (*Tringa totanus*) [A162] • Black-headed Gull (*Chroicocephalus ridibundus*) [A179] • Common Gull (*Larus canus*) [A182] • Lesser Black-backed Gull (*Larus fuscus*) [A183] • Common Tern (*Sterna hirundo*) [A193] • Wetland and Waterbirds [A999]	
The Gearagh SPA (004109)	ca. 40km to west	• Wigeon (*Anas penelope*) [A050] • Teal (*Anas crecca*) [A052] • Mallard (*Anas platyrhynchos*) [A053] • Coot (*Fulica atra*) [A125] • Wetland and Waterbirds [A999]	No
Blackwater Callows SPA (004094)	ca. 30km to the northeast	• Whooper Swan (*Cygnus cygnus*) [A038] • Wigeon (*Anas penelope*) [A050] • Teal (*Anas crecca*) [A052] • Black-tailed Godwit (*Limosa limosa*) [A156] • Wetland and Waterbirds [A999]	No
Ballycotton Bay SPA (004022)	ca. 25km to the east	• Teal (*Anas crecca*) [A052] • Ringed Plover (*Charadrius hiaticula*) [A137] • Golden Plover (*Pluvialis apricaria*) [A140] • Grey Plover (*Pluvialis squatarola*) [A141] • Lapwing (*Vanellus vanellus*) [A142] • Black-tailed Godwit (*Limosa limosa*) [A156] • Bar-tailed Godwit (*Limosa lapponica*) [A157] • Curlew (*Numenius arquata*) [A160] • Turnstone (*Arenaria interpres*) [A169] • Common Gull (*Larus canus*) [A182] • Lesser Black-backed Gull (*Larus fuscus*) [A183] • Wetland and Waterbirds [A999]	No
Ballymacoda Bay SPA (004023)	ca.32km to the east	• Wigeon (*Anas penelope*) [A050] • Teal (*Anas crecca*) [A052] • Ringed Plover (*Charadrius hiaticula*) [A137] • Golden Plover (*Pluvialis apricaria*) [A140] • Grey Plover (*Pluvialis squatarola*) [A141] • Lapwing (*Vanellus vanellus*) [A142]	No

Site Name	Approximate distance	Features of Interest	Within ZoI
		• Sanderling (*Calidris alba*) [A144] • Dunlin (*Calidris alpina*) [A149] • Black-tailed Godwit (*Limosa limosa*) [A156] • Bar-tailed Godwit (*Limosa lapponica*) [A157] • Curlew (*Numenius arquata*) [A160] • Redshank (*Tringa totanus*) [A162] • Turnstone (*Arenaria interpres*) [A169] • Black-headed Gull (*Chroicocephalus ridibundus*) [A179] • Common Gull (*Larus canus*) [A182] • Lesser Black-backed Gull (*Larus fuscus*) [A183] • Wetland and Waterbirds [A999]	
Blackwater Estuary SPA (004028)	ca. 36km east	• Wigeon (*Anas penelope*) [A050] • Golden Plover (*Pluvialis apricaria*) [A140] • Lapwing (*Vanellus vanellus*) [A142] • Dunlin (*Calidris alpina*) [A149] • Black-tailed Godwit (*Limosa limosa*) [A156] • Bar-tailed Godwit (*Limosa lapponica*) [A157] • Curlew (*Numenius arquata*) [A160] • Redshank (*Tringa totanus*) [A162] • Wetland and Waterbirds [A999]	No
Sovereign Islands SPA (004124)	ca. 23km to southwest	• Cormorant (*Phalacrocorax carbo*) [A017]	No

5.3.1. Description of Cork Harbour SPA [004030]

Cork Harbour SPA is described as follows in the NPWS site synopsis (NPWS, 2015): -

> "*Cork Harbour is a large, sheltered bay system, with several river estuaries - principally those of the Rivers Lee, Douglas, Owenboy and Owennacurra. The SPA site comprises most of the main intertidal areas of Cork Harbour, including all of the North Channel, the Douglas River Estuary, inner Lough Mahon, Monkstown Creek, Lough Beg, the Owenboy River Estuary, Whitegate Bay, Ringabella Creek and the Rostellan and Poulnabibe inlets.*
>
> *Owing to the sheltered conditions, the intertidal flats are often muddy in character. These muds support a range of macro-invertebrates, notably* Macoma balthica, Scrobicularia plana, Hydrobia ulvae, Nepthys hombergi, Nereis diversicolor *and* Corophium volutator. *Green algae species occur on the flats, especially* Ulva *spp. Cordgrass (*Spartina *spp.) has colonised the intertidal flats in places, especially where good shelter exists, such as at Rossleague and Belvelly in the North Channel. Salt marshes are scattered through the site and these provide high tide roosts for the birds. Some shallow bay water is included in the site. Rostellan Lake is a small brackish lake that is used by swans throughout the winter. The site also includes some marginal wet grassland areas used by feeding and roosting birds.*
>
> *The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Little Grebe, Great Crested Grebe, Cormorant, Grey Heron, Shelduck, Wigeon, Teal, Mallard, Pintail, Shoveler, Red-breasted Merganser, Oystercatcher, Golden Plover, Grey Plover, Lapwing, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank, Greenshank, Black-headed Gull, Common Gull, Lesser Black-backed Gull and Common Tern. The site is also of special conservation interest for holding an assemblage of over 20,000 wintering waterbirds. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.*
>
> *Cork Harbour is an internationally important wetland site, regularly supporting in excess of 20,000 wintering waterfowl. Of particular note is that the site supports internationally important populations of Black-tailed Godwit (1,896) and Redshank (2,149) - all figures given are five year mean peaks for the period 1995/96 to 1999/2000. Nationally important populations of the following 19 species occur: Little Grebe (57), Great Crested Grebe (253), Cormorant (521), Grey Heron (80), Shelduck (2,009), Wigeon (1,791), Teal (1,065), Mallard (513), Pintail (57), Shoveler (103), Red-breasted Merganser (121), Oystercatcher (1,809), Golden Plover (3,342), Grey Plover (95), Lapwing (7,569), Dunlin (9,621), Bar-tailed Godwit (233), Curlew (2,237) and Greenshank (46). The Shelduck population is the largest in the country (over 10% of national total). Other species using the site include Mute Swan (38), Whooper Swan (5), Pochard (72), Gadwall (6), Tufted Duck (64), Goldeneye (21), Coot (53), Ringed Plover (73), Knot (26) and Turnstone (113). Cork Harbour is an important site for gulls in winter and autumn, especially Black-headed Gull (3,640), Common Gull (1,562) and Lesser Black-backed Gull (783), all of which occur in numbers of national importance. Little Egret and Mediterranean Gull, two species which have recently colonised Ireland, also occur at this site.*
>
> *A range of passage waders occurs regularly in autumn, including such species as Ruff (5-10), Spotted Redshank (1-5) and Green Sandpiper (1-5). Numbers vary between years and usually a few of each of these species over-winter.*
>
> *Cork Harbour has a nationally important breeding colony of Common Tern (102 pairs in 1995). The birds have nested in Cork Harbour since about 1970, and since 1983 on various artificial structures, notably derelict steel barges and the roof of a Martello Tower. The birds are monitored annually and the chicks are ringed.*
>
> *Cork Harbour is of major ornithological significance, being of international importance both for the total numbers of wintering birds (i.e. > 20,000) and also for its populations of Black-tailed Godwit and Redshank. In addition, it supports nationally important wintering populations of 22 species, as well as a nationally important breeding colony of Common Tern. Several of the species which*

occur regularly are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Little Egret, Golden Plover, Bar-tailed Godwit, Ruff, Mediterranean Gull and Common Tern. The site provides both feeding and roosting sites for the various bird species that use it. Cork Harbour is also a Ramsar Convention site and part of Cork Harbour SPA is a Wildfowl Sanctuary."

5.3.2. Conservation Objectives

The Conservation Objectives for Cork Harbour SPA (NPWS, 2014b; 2014c) are to maintain the favourable conservation condition of the bird species as Special Conservation Interests for this SPA.

The favourable conservation status of a species is achieved when: -

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- The natural range of the species is neither being reduced not is likely to be reduced for the foreseeable future, and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

The conservation objective for of Cork Harbour SPA are summarised below.

Objective 1: To maintain the favourable conservation condition of the waterbird Special Conservation Interest species listed for Cork Harbour SPA, which is defined by the following list of attributes and targets: -

Parameter	Attribute	Measure	Target
Population	Population Trend	Percentage change as per population trend assessment using waterbird count data collected through the Irish Wetland Bird Survey and other surveys	The long term population trend should be stable or increasing.
Range	Distribution	Range, timing or intensity of use of areas used by waterbirds, as determined by regular low tide and other waterbird surveys	There should be no significant decrease in the range, timing or intensity of use of areas by the waterbird species of Special Conservation Interest other than that occurring from natural patterns of variation.

Objective 2: To maintain the favourable conservation condition of the wetland habitat at Wexford Harbour and Slobs SPA as a resource for the regularly-occurring migratory waterbirds that utilise it, which is defined by the following list of attributes and targets: -

Parameter	Attribute	Measure	Target
Area	Wetland habitat	Area (Ha)	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 2,587ha, other than that occurring from natural patterns of variation.

5.3.3. Birds - Lough Mahon

Cork Harbour is routinely counted as part of BirdWatch Ireland's Irish Wetland Bird Survey (IWeBS). Wintering waders and wildfowl are counted by a team of volunteer counters as close to high tide as is practical during the winter months, ideally from September to March. The most recent published summary of the site can be downloaded from the BirdWatch Ireland IWeBS webpage[7]. These data are included in Table 5.1 and present counts for all of Cork Harbour from 2007/2008 to 2017/2018. The areas counted can also be viewed on BirdWatch Ireland IWeBS webpage[8].

The harbour has also been counted as part of the National Parks and Wildlife Services series of Low Tide Counts in 2010 (Cummins and Crowe, 2011), which were undertaken following the methodology set out in Lewis and Tierney (2014). These illustrate the spatial distribution of birds during low tide when they may be foraging; rather than at high tide roosts as generally recorded by IWeBS. Recent data for Cork Harbour is presented in Table 5.1. Both these sources of data were extensively used in *the Cork Harbour SPA. Conservation Objective Supporting Document* (NPWS, 2014b) to summarise the numbers and trends of wintering birds for which Cork Harbour SPA has been designated.

Jacobs Island lies at the western side of Lough Mahon in the Upper Harbour. A large triangle of intertidal mudflats is present at the western side of Lough Mahon between the subtidal channels of the River Lee and Douglas River Estuary. This extends from the Jack Lynch tunnel – south past Ringmahon Point – as far as Jacobs Island / Black Bridge. This is at its widest south and east of Ringmahon Point (known as Lakeland Strand on OSi Discovery Series mapping). Close to Jacobs Island the mudflats narrow along the northern side of the Douglas River Channel as you move upstream towards the Black Bridge. To the west of Jacobs Island, a small coastal lagoon is impounded by the River Lee/Lough Mahon Waterfront Greenway as it crosses the estuary to join the public walkway linking The Marina / Atlantic Pond with Rochestown.

These areas of mudflat overlap in part with the eastern part of IWeBS count sector OL488 Douglas Estuary (i.e. east of Black Bridge). There is a further narrow band of intertidal mudflats running between Blackrock Castle and the Jack Lynch tunnel which lies within IWeBS count sector OL486 Dunkettle to the north. Recent counts for these sectors are presented in Table 5.2 and 5.3. The shoreline from north of Mahon Point to Jack Lynch tunnel lies between count sectors OL488 and OL486 and is not counted as part of IWeBS. This entire area is within Cork Harbour SPA.

On the southern shore of Lough Mahon there is another large area of intertidal mudflat both west (within IWeBS site OL488 Douglas Estuary) and east of Hop Island (not counted as part of IWeBS). These areas adjoin the River Lee/Lough Mahon Waterfront Greenway running along the southern side of Lough Mahon which is currently being examined as part of the Lee to Sea Greenway project (https://lee2sea.com/). It is our understanding that this areas has been the subject of recent winter bird survey work, the results of which should be published when this project goes to planning.

With respect to high tide roosts a number of small high tide roosts occur along the shoreline of the small lagoon west of Jacobs Island (ca. 170m west of the access road). There are no important high tide roosts along the shoreline from Jacobs Island north to the tunnel. (Source: Cork Harbour Roosts database; IWeBS). At low tide very large numbers of gulls (predominantly Lesser black-backed gull) roost along the shore east of Blackrock Castle (e.g. 350 on 9/11/20) or at Dunkettle (e.g. 2,750 on 18/9/2018).[9] However, these are ca. 1.8km north of the site at Jacobs Island.

Lough Mahon also plays host to a number of important night-time roosts. This includes a large night-time gull roost as well as a night-time roost of Great crested grebe; both are located offshore in the western part of Lough Mahon.

Amenity grassland / playing pitches on the western side of the N40 (from Mahon Point north to Blackrock Castle) are known to support large numbers of field feeding Oystercatcher and Black-headed Gull; on occasion these are accompanied by Curlew or Black-tailed Godwit. These areas are between 600m and 1600m north of Jacobs

[7] https://birdwatchireland.ie/our-work/surveys-research/research-surveys/irish-wetland-bird-survey/
[8] https://bwi.maps.arcgis.com/apps/View/index.html?appid=1043ba01fcb74c78bc75e306eda48d3a
[9] Source: http://www.irishbirding.com/birds/web

Island on the far side of the N40. There are no suitable field within the site at Jacobs Island which could be used by field feeding waders; the site at Jacobs Island is dominated by scrub (see Figure 4.1).

The proposed hotel and office project site is screened to the north by the N40. To the east and south it is screened from the estuary by an existing residential development, a public park and a small wetland. The residential development is further screened from the River Lee/Lough Mahon Waterfront Greenway by ca. 3m high landscape planting (see Plate 5.1 – 5.3).

In addition to wintering birds, Cork Harbour SPA is designated for its breeding population of Common Tern (*Sterna hirundo*). Historically Common Tern nested primarily on old barges anchored near Marino Point (Wilson *et al*., 2000); following their deterioration terns nested at a number of locations in Cork Harbour, such as the Deep Water Berth, Ringaskiddy; on the roof of the Martello Tower adjoining the Cork to Cobh railway line (south of Fota Island) and on a small island in the lagoon at Pfizer's Golf Course, Shanbally (on the southern shore of Raffeen Creek). In recent years a nesting platform / raft has been anchored on the eastern side of Little Island, close to the eastern side of Lough Mahon, over 4km from Jacobs Island.

5.3.3.1. Spatial Distribution

As noted birds close to Jacobs Island are counted as either Douglas Estuary or Dunkettle. Douglas Estuary is known to support internationally important numbers of Black-tailed godwit; as well as nationally important numbers of Shelduck, Golden Plover, Bar-tailed godwit, Dunlin and Redshank. In the past Lapwing and Shelduck also occurred in nationally important numbers.

Dunkettle is known to support nationally important numbers of Black-tailed godwit and on occasion Dunlin; as well as significant numbers of gulls.

As noted, Cork Harbour is designated for a range of waders and wildfowl; however, not all species occur in all parts of the harbour. The mudflats east of Jacobs Island can support notable numbers of species such as Dunlin, Black-tailed godwit and Oystercatcher; with Redshank and Curlew also recorded. For example, on the 9th February 2022, ca. 1000 Dunlin were feeding on mudflats east of Jacobs Island. Wigeon often also occur along the tideline; though within Douglas Estuary the main areas used by this species is around Bloomfield House in inner Douglas Estuary. Both Black-headed gull and Lesser black-backed gull also occur in notable numbers; the main area used by Lesser black-backed gull at low tide is east of Blackrock Castle / Dunkettle where large numbers can be seen roosting a during the day; as noted these move offshore into Lough Mahon for night-time roosting. Lough Mahon also supports important numbers of Great crested grebe in deeper subtidal waters of Lough Mahon. Unlike many of the other species which feed on intertidal and shallow subtidal habitat, Great crested grebe are pursuit diving species which capture their prey under water. Cormorant also feed in the deeper tidal channel and offshore subtidal waters. Both Grey heron and Little egret can also along the shoreline. Turnstone frequently feed close to the path on the gravelly / seaweed covered parts of the upper shore.

5.3.3.2. River Lee/Lough Mahon Waterfront Greenway

Along the eastern side of Jacobs Island, the River Lee/Lough Mahon Waterfront Greenway separated from the shore by a strip of amenity grassland and rock armour; a narrow strip of fucoid seaweeds generally lines the upper shore (see Plate 5.4). Apart from a point at the south-eastern corner of Jacobs Island, access to the shoreline is therefore limited largely due the rock armouring. Along a short stretch east of Jacobs Island the River Lee/Lough Mahon Waterfront Greenway is separated from the shore by a ca. 1.5m stone wall. While the shoreline along southern side is more open as shown in Plate 5.5; the River Lee/Lough Mahon Waterfront Greenway is still set back from area of intertidal habitat.

Plate 5.1 **Residential development between the proposed works and the estuary.**

Plate 5.2 **Wetland, treeline & housing between the proposed works and the estuary.**

Plate 5.3 **Mature landscaping screening the eastern side of Jacobs Island from the Greenway.**

Plate 5.4 **Amenity grassland and rock armour adjoining Greenway. Dunlin visible feeding.**

Plate 5.5 **View from the southern side of Jacobs Island towards Harty's Quay.**

Table 5.4 Recent IWeBS data for Cork Harbour.

Species	National threshold[a]	Intern'l threshold[a]	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	Mean
Shelduck	100	2,500	1303*	952*	1369*	1021	1281	1241	1073	955	792	953	1003
Wigeon	560	15,000	1368*	1236*	1388*	1508	1056	1503	1578	1245	1605	1848	1556
Teal	360	5000	1077*	753*	1216*	1015	1251	1240	1221	1399	1343	1343	1309
Pintail	20	600	22*	27*	12*	8*	8	15	21	26	36	1	20
Shoveler	20	650	37*	25*	17*	33	19	24	23	9	23	29	22
Red-breasted Merganser	25	860	53*	63*	61*	71	50	55	86	70	70	77	72
Little Grebe	20	4,700	60*	56*	65*	85	62	71	93	57	104	101	85
Great Crested Grebe	30	6,300	81*	183*	140*	154	117	82	94	87	159	174	119
Cormorant	110	1,200	168*	170*	283*	317	363	263	330	401	466	300	352
Grey Heron	25	5,000	87*	59*	75*	70	49	78	99	110	122	115	105
Oystercatcher	610	8,200	1241*	1190*	1560*	1939	1294	1452	2334	1274	1397	1478	1587
Golden Plover	920	9,300	248*	4500*	3357*	5211	6900	2602	3650	1970	600	1450	2054
Grey Plover	30	2,000	20*	10*	53*	35	36	19	47	8	7	10	18
Lapwing	850	72,300	3219*	1974*	2715*	2217	1934	1750	1942	1740	982	1658	1614
Dunlin	460	13,300	5189*	2632*	5037*	4939	6789	3117	3801	2934	1006	3286	2829
Black-tailed Godwit	200	1,100	1490*	1339*	2415*	2955	2770	2681	3299	3048	2210	4203	3088
Bar-tailed Godwit	170	1,500	281*	396*	301*	312	351	300	290	249	172	241	250
Curlew	350	7,600	943*	992*	1397*	1662	1266	1163	1987	1524	1082	1306	1412
Redshank	240	2,400[1] / 760[2]	1471*	1365*	1673*	1352	1739	1436	1906	1542	1521	1777	1636
Black-headed Gull	n.a.	31,000	814*	466*	1703*	3790	2067	3275	4289	3878	3722	3139	3661
Common Gull	n.a.	16,400	93*	193*	271*	131	200	444	295	460	422	224	369

Species	National threshold[a]	Intern'l threshold[a]	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	Mean
Lesser Black-backed Gull	n.a.	5,500[3] / 6,300[4]	192*	60*	169*	72	167	120	142	162	153	264	168
Common Tern	n.a.						1	1	26				5

Notes: -

The mean is based only on the most recent 5-season period, i.e. for the period 2013/14- 2017/18.

Blank columns indicate seasons when no counts were carried out, while blank cells show that a species was absent.

Counts that are poor quality are represented by an asterisk.

[a] After Lewis *et al*., 2021. [1] Redshank – *robusta*, Iceland, Faeroe Islands (br); [2] *totanus*, Britain & Ireland (br).

[3] Lesser black-backed gull – *graellsii*, W. Europe (br); *intermedius* S. Scandinavia (br).

Table 5.5 Recent IWeBS data for Douglas Estuary (OL488) 2014/2015 and 2016/17 to 2019/20.

Species	2014/15	2016/17	2017/18	2018/19	2019/20	Mean annual peak	% Cork Harbour
Shelduck	53	43	124	94	98	82	9%
Wigeon	335	231	272	209	265	262	18%
Teal	150	157	58	110	44	104	7%
Shoveler	0	0	0	0	1	0	1%
Red-breasted merganser	5	6	2	7	1	4	6%
Cormorant	19	6	19	26	32	20	6%
Grey Heron	8	5	13	17	14	11	10%
Little Grebe	7	7	9	4	9	7	7%
Great crested grebe	5	2	3	2	6	4	2%
Oystercatcher	160	36	287	310	210	201	13%
Golden Plover	3650	600	1450	2650	27	1675	81%
Lapwing	895	62	315	285	230	357	27%
Curlew	481	112	166	240	330	266	20%
Black-tailed Godwit	940	155	915	370	1150	706	22%
Bar-tailed Godwit	280	169	238	430	490	321	99%
Dunlin	2615	540	1943	2620	3400	2224	68%
Redshank	430	268	180	230	490	320	19%
Black-headed Gull	370	448	530	652	1350	670	18%
Common Gull	24	12	43	23	23	25	8%
Lesser black-backed Gull	60	110	56	38	32	59	33%

Note: Cork Harbour % shows the 2014/15 and 2016/17-2019/20 mean annual peak for the Douglas Estuary subsite as a percentage of the overall 2014/15 and 2016/17-2019/20 mean annual peak for Cork Harbour. [Source: the Irish Wetland Bird Survey (I-WeBS), a joint scheme of BirdWatch Ireland and the National Parks and Wildlife Service of the Department of Arts, Heritage & the Gaeltacht].

National and International Thresholds are presented in Table 5.4.

Table 5.6 Recent IWeBS data for Dunkettle (OL486) 2015/16 to 2019/20.

Species	2015/16	2016/17	2017/18	2018/19	2019/20	Mean annual peak	% Cork Harbour
Shelduck	0	2	2	2	4	2	0%
Wigeon	24	27	3	18	6	16	1%
Teal	0	4	3	0	0	1	0%
Red-breasted merganser	4	3	15	11	7	8	12%
Cormorant	23	15	17	14	19	18	5%
Grey Heron	18	14	2	14	10	12	10%
Little Grebe	0	4	3	2	1	2	2%
Oystercatcher	7	153	28	144	60	78	6%
Lapwing	6	49	50	16	30	30	2%
Curlew	210	61	80	209	66	125	10%
Black-tailed Godwit	570	521	177	179	10	297	9%
Bar-tailed Godwit	10	33	20	2	12	15	4%
Dunlin	30	60	450	340	400	256	7%
Redshank	40	91	95	134	77	87	5%
Black-headed Gull	103	245	460	309	120	247	7%
Common Gull	2	2	2	7	0	3	1%
Lesser black-backed Gull	120	70	150	173	59	114	61%

Note: Cork Harbour % shows the 2015/16-2019/20 mean annual peak for the Dunkettle subsite as a percentage of the overall 2015/16-2019/20 mean annual peak for Cork Harbour. [Source: the Irish Wetland Bird Survey (I-WeBS), a joint scheme of BirdWatch Ireland and the National Parks and Wildlife Service of the Department of Arts, Heritage & the Gaeltacht].

National and International Thresholds are presented in Table 5.4.

5.4. Likelihood of Significant Effects on European Sites

The available information on European sites was reviewed to establish whether or not the proposed development is likely to have a significant effect on the conservation objectives of the designated sites. The likelihood of impacts on the qualifying interests of the European sites identified in this report is based on information collated from the desk study, site plans and other available existing information.

The likelihood of impacts occurring are established in light of the type and scale of the proposed works, the location of the proposed works with respect to European sites and the features of interest and conservation objectives of the European sites.

This report is prepared following the Cause – Pathway – Effect model. The potential impacts are summarised into the following categories for screening purposes.

- Direct impacts refer to habitat loss or fragmentation arising from land-take requirements for development or agricultural purposes. Direct impacts can be as a result of a change in land use or management, such as the removal of agricultural practices that prevent scrub encroachment. There are no direct impacts associated with the proposed investigative works.

- Indirect and secondary impacts do not have a straight-line route between cause and effect. It is potentially more challenging to ensure that all the possible indirect impacts of the project – in combination with other plans and projects - have been established. These can arise, for example, when a development alters the hydrology of a catchment area, which in turn affects the movement of groundwater to a site and the qualifying interests that rely on the maintenance of water levels. Deterioration in water quality can occur as an indirect consequence of development, which in turn changes the aquatic environment and reduces its capacity to support certain plants and animals. The introduction of invasive species can also be defined as an indirect impact. Disturbance to fauna can arise directly through the loss of habitat (e.g. displacement of qualifying interest species) or indirectly through noise, vibration and increased activity associated with construction and operation.

The proposed development does not lie within any European sites. However, the proposed project is hydrologically connected to the Cork Harbour SPA and to Great Island Channel SAC. Adopting a precautionary approach, in the absence of any mitigation measures, best practice/construction measures or any other measures which have no relation to avoiding impacts on European sites, a potential hydrological pathway for indirect effect was identified in relation to QIs associated with Cork Harbour SPA and Great Island Channel SAC.

Following an extremely precautionary approach, these sites are considered to be within the Likely Zone of Impact of the proposed development and further assessment regarding potential for significant impacts thereon is required.

Where potential pathways for effects have been identified, then the potential for cumulative effects resulting from the proposed development when considered in combination with other plans and projects, cannot be discounted at the screening stage and the potential cumulative impacts arising as between the proposed development and other plans and projects are required to be considered as part of a Stage Two Appropriate Assessment.

5.5. Concluding Statement

It cannot be excluded beyond reasonable scientific doubt, in view of best scientific knowledge, on the basis of objective information and in light of the conservation objectives of the relevant European sites, that the proposed development, individually or in combination with other plans and projects, would be likely to have a significant effect on the Great Island Channel SAC and the Cork Harbour SPA.

As a result, a Stage Two Appropriate Assessment is required, and this Natura Impact Statement has been prepared in respect of the Great Island Channel SAC and the Cork Harbour SPA and submitted with the application for permission in respect of the proposed project at Jacobs Island.

6. Appropriate Assessment

This section of the report assesses the two relevant European sites in more detail and examines whether likely significant effects may arise. Where effects are identified that may affect the integrity of the European sites, avoidance and mitigation measures are proposed to offset these effects.

6.1. Identification of potential impacts on the Great Island Channel SAC

6.1.1. Potential Direct Impacts

The proposed development does not occur within or directly adjacent to the Great Island Channel SAC and there will be no direct impacts, such as habitat loss or habitat modification, as a result of the proposed development at Jacobs Island.

6.1.2. Potential Indirect Impacts

6.1.2.1. Indirect impacts via surface water run-off during construction and operational phase

As outlined above surface waters from the site at Jacobs Island discharge to Lough Mahon adjoining the site. There is, accordingly, a hydrological link between the development site and European sites in Cork Harbour.

When considering the potential for impacts on annexed habitats consideration was given to each of the Attributes for Habitat 1140 (Table 6.1) and 1330 (Table 1330) as set out in the Conservation Objective Supporting documentation (NPWS, 2014a).

Table 6.1 Attributes of 1140 Mudflats and sandflats not covered by seawater at low tide (from NPWS, 2014a).

1140	Mudflats and sandflats not covered by seawater at low tide		
To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in Great Island Channel SAC, which is defined by the following list of attributes and targets:			
Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See Map 3 of NPWS, 2014a.	Habitat area was estimated using as 723ha using OSi data
Community distribution	Hectares	Conserve the following community type in a natural condition: Mixed sediment to sandy mud with polychaetes and oligochaetes community complex. See Map 4 of NPWS, 2014a.	Based on intertidal and subtidal surveys undertaken in 2006 (Aquafact, 2007) and 2011 (EcoServe, 2012; MERC, 2012). See marine supporting document for further information.

Table 6.2 Attributes of 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (from NPWS, 2014a).

1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)		
To restore the favourable conservation condition of Atlantic salt meadows (GlaucoPuccinellietalia maritimae) in Great Island Channel SAC, which is defined by the following list of attributes and targets:			
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Bawnard - 0.29ha; Carrigatohil - 1.01ha. See Map 5 of NPWS, 2014a.	Based on data from Saltmarsh Monitoring Project (SMP) (McCorry and Ryle, 2009). Two sub-sites that supported Atlantic salt meadow were mapped (1.30ha) and additional areas of potential saltmarsh (17.60ha) were identified from an examination of aerial photographs, giving a total estimated area of 18.90ha. Saltmarsh habitat has also been recorded at two other sub-sites within the SAC (Curtis and Sheehy Skeffington, 1998). NB further unsurveyed areas maybe present within the SAC. See coastal habitats supporting document for further details.
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See Map 5 of NPWS, 2014a.	Based on data from McCorry and Ryle (2009). Within the sites surveyed by the SMP, estuary type saltmarsh over a mud substrate is most common and ASM is the dominant saltmarsh habitat. NB further unsurveyed areas maybe present within the SAC. See coastal habitats supporting document for further details.
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain/restore natural circulation of sediments and organic matter, without any physical obstructions	Based on data from McCorry and Ryle (2009). At Bawnard there is a seawall that was constructed in the 18th-19th centuries. At Carrigatohil the northern and eastern shorelines have been significantly modified by road construction. Part of the saltmarsh has also been infilled. See coastal habitats supporting document for further details
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession	Based on data from McCorry and Ryle (2009). The ASM at Carrigatohil is poorly developed, though some of the larger sections contain salt pans. The smaller sections, however, tend to be quite uniform in topography. The saltmarsh topography at Bawnard is poorly developed with few typical saltmarsh features. See coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	Based on data from McCorry and Ryle (2009). At Bawnard, the entire bay empties at low tide to expose soft intertidal mudflats. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from McCorry and Ryle (2009). Zonations to Salicornia flats and intertidal mudflats occurs at Carrigatohil. At Bawnard, there is succession from saltmarsh to brackish saltmarsh and wet grassland as well as zonation to intertidal mudflats at the lower saltmarsh boundary. See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on data from McCorry and Ryle (2009). At Carrigatohil, the sward height is quite tall due to lack of grazing. At Bawnard only part of the site is grazed. See coastal habitats supporting document for further details

Continued.

1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)		
To restore the favourable conservation condition of Atlantic salt meadows (GlaucoPuccinellietalia maritimae) in Great Island Channel SAC, which is defined by the following list of attributes and targets:			
Vegetation structure: vegetation cover	Percentage cover at a representative number of monitoring stops	Maintain more than 90% area outside creeks vegetated	Based on data from McCorry and Ryle (2009). Some poaching was noted in places at Bawnard. See coastal habitats supporting document for further details
Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops	Maintain range of subcommunities with typical species listed in SMP (McCorry and Ryle, 2009)	See coastal habitats supporting document for further details
Vegetation structure: negative indicator species - *Spartina anglica*	Hectares	No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1% where it is known to occur	Based on data from McCorry and Ryle (2009). Spartina occurs at both sub-sites in this SAC. See coastal habitats supporting document for further details

During the construction phase of the project, and as set out above, a construction compound will be established which will not be located in proximity to any drains or surface water features through which sediment or pollutants such as hydrocarbons could be discharged to Cork Harbour.

Furthermore, given the distance between the site and the outfall point from Jacobs Island (ca. 3.8km), it is not likely that any pollution event at the site could result in significant impacts to Great Island Channel SAC. When considering 1140 - Mudflats and sandflats not covered by seawater at low tide – the proposed development at Jacobs Island would not affect either of the listed Attributes for this habitat – i.e. either *Habitat Area* or *Distribution* of this habitat within the SAC.; nor would they affect any of the Attributes listed for 1330 Atlantic salt meadows.

Notwithstanding the fact that such indirect impacts are unlikely to arise, as set out below, a number of measures have been designed and will be implemented in order to ensure that there are no adverse effects arising from the proposed development at Jacobs Island on Great Island Channel SAC.

Once built, surface waters will discharge to the network which ultimately outfalls to Lough Mahon at the location shown in Figure 1.5. The Greater Dublin Strategic Drainage Study (GDSDS) Vol. 2 Section E2.1 requires provision of interception and/or treatment volume for River Water Quality Protection. It is noted that the point of outfall of the sewer is directly into the Lough Mahon and as recognised in the Greater Dublin Strategic Drainage Study (GDSDS) attenuation is not required in such circumstance where the point of outfall is into an estuary, as specifically advised in section 6.3.3.4., as follows.

> *"Where there is little downstream to be concerned about with respect to flooding (discharging to the estuary or sea), criteria on flow rates and volumes of discharge are of little relevance. Water quality is the only issue needing to be addressed (primarily sedimentation)"*

Attenuation is not therefore proposed for the current application; however, hydrocarbon interceptors will be provided for all discharge generated off the newly added carparking area and traffic routes.

As per SUDs proposals, the following measures will be considered.

- Green roof and podium landscaping which will provide interception storage for between 5-10mm of rainfall and provide treatment by filtration through the planter soils. These planted areas will also

provide a medium for removal of pollutants and will improve the quality of surface run-off discharging into the surface water drainage system.

- Hydrocarbon interceptors and non-return valves will be provided prior to the connection to the existing drainage network.

- In addition, tree pits, swales, soakaways, and another SUDs measure will be considered following an onsite infiltration test. Details of the proposed surface water drainage layout are shown indicatively on proposed services drawing presented in Appendix D of the Engineering Report. It should be noted that all storm drainage works will be undertaken in accordance with the local authority requirements and Irish Water standard details as required.

Thus, based on proposed surface water attenuation measures, indirect impact through surface waters to either 1140 (Mudflats and sandflats not covered by seawater at low tide) or 1330 (Atlantic salt meadows) will not occur.

6.1.2.2. Potential Indirect Impacts during construction and operational phase via groundwater (hydrogeological pathway)

Excavation works on site can interact with groundwater and has the potential to expose groundwater to contamination by concrete, hydrocarbons and other chemicals used in construction. However, due to the site topography, the existing levels are both above/below the final floor levels (FFLs) (note that much of the site is also characterised by made ground). Site excavation will be to formation level 500mm below final floor levels (FFLs). However, previous Site Investigation work has found that boreholes largely indicated shallow groundwater, with groundwater frequently being encountered at >5m beyond ground level. Works are therefore not anticipated to have a significant effect on ground water. Details of previous ground investigation and cut and fill balance calculations, etc. are set out in the accompanying CEMP(MMOS, 2022b).

Any localised / temporary alteration of ground water levels on-site is therefore expected to be minor and will not have a significant impact on the Lough Mahon Transitional Water Body ground waterbody feeding Cork Harbour to the east. In landscaped areas of the site surface water will naturally infiltrate to soils and ultimately groundwater; all other waters will be intercepted by the surface water management system as discussed above.

It is therefore considered that the proposed development will not negatively impact on water quality within Great Island Channel SAC; nor will it impact, directly or indirectly, any of the habitats or species listed as features of interest for Great Island Channel SAC. However, as is good practice, a series of environmental protection measures are proposed during both construction and operation, which are detailed in full in the accompanying Construction and Environmental Management Plan (CEMP) (MMOS, 2022b) – with the principal measures included in this NIS under the heading “Mitigation” below.

6.1.2.3. Potential Indirect impact / damage through discharge of treated foul effluent.

A pre connection enquiry has been submitted to Irish Water with regards to the proposed foul discharge for the development on 20th July 2021 (REF: CDS21005115) and Irish Water has issued the confirmation of feasibility that specifies that the wastewater connection is feasible subject to upgrades. Both documents are attached in Appendix G of the accompanying Engineering Report (MMOS, 2022a). It is noted that the site layout has changed since the pre connection enquiry and the number of units in the scheme was reduced, so the confirmation of feasibility from Irish Water is provided for a calculated flow greater than the present proposed development.

Details of the proposed foul drainage layout are shown indicatively on proposed services drawing presented in Appendix D Engineering Report (MMOS, 2022a). It should be noted that all foul drainage works will be undertaken in accordance with Irish Water standard details and codes of practice for wastewater as required.

Therefore, it is not anticipated that operational discharge of foul to the existing network would result in any adverse effects on the Great Island SAC.

6.1.2.4. Proposed Indirect habitat/species loss/damage via spread of invasive species (if present at the study site).

The introduction and spread of invasive species can also result in negative impacts within a designated site. As noted, no species listed on the 3rd Schedule of the EC (Bird and Natural Habitats) Regulations, 2011 (S.I. 477/ 2011), have been recorded on site. No 3rd Schedule species were recorded within the site boundaries as illustrated on Figure 1.1.

Japanese knotweed (*Fallopia japonica*) and Bohemian knotweed *(Fallopia bohemica*) have been recorded on adjoining lands which are within the broader Masterplan site (boundary as illustrated on Figure 1.4).

O'Donovan Agri Environmental has been employed to carry out treatment of these invasive plants on site. Treatment works commenced on site on 2021. In order to gain access to the growths of knotweed to commence foliar applications and to identify all areas of infestation it was necessary to conduct vegetation clearance. This included clearance of areas of buddleia, gorse and willow in September 2021, after the bird nesting season (refer to Appendix 9.2). Control included a combination of foliar application of herbicides and direct stem injection. Treatment methods are explained in full in the Invasive Species Management Plan prepared by O'Donovan Agri Environmental (Appendix 9.2). Once stems had died back it was possible to cut and remove this dead material without spreading viable plant tissue which could easily lead to spread of knotweed; cut stems were retained within the infested area. Stems were cut just above the first stem node. One is then left with short projecting stems from the plant crowns to 25cms over ground. These are a direct corridor for infusion of additional herbicide into these stems and the herbicide can gradually absorb downwards to the rhizomes. Stem filling is a process developed by O Donovan Agri group in house a number of years ago along with the dedicated equipment for infusing and hydraulically loading the underground rhizomes. This work was undertaken in January and February 2022. The second year of the herbicide treatment program is being targeted to commence late August – mid September 2022. In combination with treatment, which can take up to 3-5 years, the option of on-site encapsulation of plant material is currently being explored.

As a result, no adverse effects shall occur on the Great Island Channel SAC as a result of the potential spread of invasive species. However, as is good practice strict biosecurity measures will be implemented on site as outlined under Mitigation, below.

6.2. Identification of potential impacts on the Cork Harbour SPA

6.2.1. Environmental Management Plan

A Construction and Environmental Plan (CEMP) has been prepared by Murphy Matson O'Sullivan (MMOS, 2022b).

The control measures for the construction stage of the proposed development will follow the following current best practice guidelines (MMOS, 2022b): -

- Masters-Williams *et al*. (2001) Control of water pollution from construction sites. Guidance for consultants and contractors (C532). CIRIA;
- IFI (2016). Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters. Inland Fisheries Ireland, Dublin;
- Murnane *et al*. (2002). Control of Water Pollution from Construction Sites - Guide to Good Practice. SP156; and
- Murphy, D. (2004). Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites. Eastern Regional Fisheries Board, Dublin.

6.2.2. Potential Direct Impacts

The proposed development does not occur within Cork Harbour SPA and as such there will be no direct impact such as habitat loss or habitat modification as a result of the proposed development at Jacobs Island. Furthermore, the site is screened by existing residential development, landscaping and River Lee/Lough Mahon Waterfront Greenway from Cork Harbour. Thus, there will be no direct impact to wetland habitats (Wetland and Waterbirds [A999]) for which the SPA has been designated.

Field feeding birds such as Oystercatcher (*Haematopus ostralegus*), Black-tailed Godwit (*Limosa limosa*) or Curlew (*Numenius arquata*), which are qualifying interests of Cork Harbour SPA, are known to feed on grassland adjoining the SPA and Lough Mahon. In particular Oystercatcher are known to feed on playing fields in Mahon in large numbers; along with Curlew and Black-headed gulls and on occasion Lesser black-blacked gulls. Small numbers of Oystercatcher, often accompanied by Black-tailed godwit also often feed on amenity grassland adjoining the main parking area at Mahon Point (usually <10).

Unlike in Dublin there are no Light-bellied brent geese (*Branta bernicla hrota*) feeding in this part of Cork Harbour. Light-bellied brent geese only occur in small numbers in Cork Harbour – particularly around Cuskinny, Great Island and the eastern harbour around Saleen-Aghada-Whitegate; with small numbers sometimes occurring further west (e.g. Luc Strand, Ringaskiddy).

As can be seen in the Habitat Map presented in Figure 1.4 Jacobs Island does not support habitat suitable for use by field feeding species which is largely dominated by scrub. This ex-situ impacts on field feeding birds which are qualifying interests of the adjoining Cork Harbour SPA are not anticipated.

6.2.3. Potential Indirect Impacts

6.2.3.1. Potential Indirect impacts via surface water run-off during construction and operational phase

During the construction phase of the project, and as set out above, a construction compound will be established which will not be located in proximity to any drains or surface water features through which sediment or pollutants such as hydrocarbons could be discharged to Cork Harbour.

Furthermore, given the distance between the site and the outfall point from Jacobs Island (ca. 3.8km), it is not likely that any pollution event at the site could result in significant impacts to Great Island Channel SAC. When considering 1140 - Mudflats and sandflats not covered by seawater at low tide – the proposed development at Jacobs Island would not affect either of the listed Attributes for this habitat – i.e. either *Habitat Area* or *Distribution* of this habitat within the SAC.; nor would they affect any of the Attributes listed for 1330 Atlantic salt meadows.

Notwithstanding the fact that such indirect impacts are unlikely to arise, as set out below, a number of measures have been designed and will be implemented in order to ensure that there are no adverse effects arising from the proposed development at Jacobs Island on Great Island Channel SAC.

Once built, surface waters will discharge to the network which ultimately outfalls to Lough Mahon at the location shown in Figure 1.5. The Greater Dublin Strategic Drainage Study (GDSDS) Vol. 2 Section E2.1 requires provision of interception and/or treatment volume for River Water Quality Protection. It is noted that the point of outfall of the sewer is directly into the Lough Mahon and as recognised in the Greater Dublin Strategic Drainage Study (GDSDS) attenuation is not required in such circumstance where the point of outfall is into an estuary, as specifically advised in section 6.3.3.4., as follows.

> *"Where there is little downstream to be concerned about with respect to flooding (discharging to the estuary or sea), criteria on flow rates and volumes of discharge are of little relevance. Water quality is the only issue needing to be addressed (primarily sedimentation)"*

Attenuation is not therefore proposed for the current application; however, hydrocarbon interceptors will be provided for all discharge generated off the newly added carparking area and traffic routes.

As per SUDs proposals, the following measures will be considered.

- Green roof and podium landscaping which will provide interception storage for between 5-10mm of rainfall and provide treatment by filtration through the planter soils. These planted areas will also provide a medium for removal of pollutants and will improve the quality of surface run-off discharging into the surface water drainage system.

- Hydrocarbon interceptors and non-return valves will be provided prior to the connection to the existing drainage network.

- In addition, tree pits, swales, soakaways, and another SUDs measure will be considered following an onsite infiltration test. Details of the proposed surface water drainage layout are shown indicatively on proposed services drawing presented in Appendix D of the Engineering Report. It should be noted that all storm drainage works will be undertaken in accordance with the local authority requirements and Irish Water standard details as required.

Thus, based on proposed surface water attenuation measures, indirect impact through surface waters to either 1140 (Mudflats and sandflats not covered by seawater at low tide) or 1330 (Atlantic salt meadows) will not occur.

6.2.3.2. Potential Indirect Impacts during construction and operational phase via groundwater (hydrogeological pathway)

Excavation works on site can interact with groundwater and has the potential to expose groundwater to contamination by concrete, hydrocarbons and other chemicals used in construction. However, due to the site topography, the existing levels are both above/below the final floor levels (FFLs) (note that much of the site is also characterised by made ground). Site excavation will be to formation level 500mm below final floor levels (FFLs). However, previous Site Investigation work has found that boreholes largely indicated shallow groundwater, with groundwater frequently being encountered at >5m beyond ground level. Works are therefore not anticipated to have a significant effect on ground water. Details of previous ground investigation and cut and fill balance calculations, etc. are set out in the accompanying CEMP(MMOS, 2022b).

Any localised / temporary alteration of ground water levels on-site is therefore expected to be minor and will not have a significant impact on the Lough Mahon Transitional Water Body ground waterbody feeding Cork Harbour to the east. In landscaped areas of the site surface water will naturally infiltrate to soils and ultimately groundwater; all other waters will be intercepted by the surface water management system as discussed above.

It is therefore considered that the proposed development will not negatively impact on water quality within Great Island Channel SAC; nor will it impact, directly or indirectly, any of the habitats or species listed as features of interest for Great Island Channel SAC. However, as is good practice, a series of environmental protection measures are proposed during both construction and operation, which are detailed in full in the accompanying Construction and Environmental Management Plan (CEMP) (MMOS, 2022b) – with the principal measures included in this NIS under the heading “Mitigation” below.

6.2.3.3. Potential Indirect impact / damage through discharge of treated foul effluent.

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Details of the proposed foul drainage layout are shown indicatively on proposed services drawing presented in Appendix D Engineering Report (MMOS, 2022a). It should be noted that all foul drainage works will be undertaken in accordance with Irish Water standard details and codes of practice for wastewater as required.

Therefore, it is not anticipated that operational discharge of foul to the existing network would result in any adverse effects on the Great Island SAC.

6.2.3.4. Proposed Indirect habitat/species loss/damage via spread of invasive species (if present at the study site).

The introduction and spread of invasive species can also result in negative impacts within a designated site. As noted, no species listed on the 3rd Schedule of the EC (Bird and Natural Habitats) Regulations, 2011 (S.I. 477/ 2011), have been recorded on site. No 3rd Schedule species were recorded within the site boundaries as illustrated on Figure 1.1.

Japanese knotweed (*Fallopia japonica*) and Bohemian knotweed *(Fallopia bohemica*) have been recorded on adjoining lands which are within the broader Masterplan site (boundary as illustrated on Figure 1.4).

O'Donovan Agri Environmental has been employed to carry out treatment of these invasive plants on site. Treatment works commenced on site on 2021. In order to gain access to the growths of knotweed to commence foliar applications and to identify all areas of infestation it was necessary to conduct vegetation clearance. This included clearance of areas of buddleia, gorse and willow in September 2021, after the bird nesting season (refer to Appendix 9.2). Control included a combination of foliar application of herbicides and direct stem injection. Treatment methods are explained in full in the Invasive Species Management Plan prepared by O'Donovan Agri Environmental (Appendix 9.2). Once stems had died back it was possible to cut and remove this dead material without spreading viable plant tissue which could easily lead to spread of knotweed; cut stems were retained within the infested area. Stems were cut just above the first stem node. One is then left with short projecting stems from the plant crowns to 25cms over ground. These are a direct corridor for infusion of additional herbicide into these stems and the herbicide can gradually absorb downwards to the rhizomes. Stem filling is a process developed by O Donovan Agri group in house a number of years ago along with the dedicated equipment for infusing and hydraulically loading the underground rhizomes. This work was undertaken in January and February 2022. The second year of the herbicide treatment program is being targeted to commence late August – mid September 2022. In combination with treatment, which can take up to 3-5 years, the option of on-site encapsulation of plant material is currently being explored.

As a result, no adverse effects shall occur on the Great Island Channel SAC as a result of the potential spread of invasive species. However, as is good practice strict biosecurity measures will be implemented on site as outlined under Mitigation, below.

6.2.3.5. Potential disturbance of birds using the estuary

As noted the proposed development site does not adjoin the estuary. There is no direct overlap with Cork Harbour SPA and habitats within it; there is no direct overlap with either the intertidal habitats adjoining Jacobs Island or the coastal lagoon within the SPA which is located to the west of the Jacobs Island access road. None of the recorded roost sites (such as in the lagoon) are adjoined by the proposed works.

The nearest nesting site for Common Tern is >4km from Jacobs Island on the eastern side of Little Island; thus, eastern Lough Mahon. Works at Jacobs Island are too far from the nesting raft to cause disturbance to nesting birds and Common Tern frequently feed in subtidal waters adjoining urbanised environments (e.g. at Ringaskiddy close to nest platforms in this area). Gulls, crows and even Grey Heron, rather than humans, tend to be the greatest disturbance factors for nesting Common Tern.

As noted (and as shown in the Plates in Section 5.0), the proposed development site adjoins the N40 side of Jacobs Island. It is screened from the estuary by residential properties, treelines and mature landscaping (see Plates 5.1 – 5.3). Thus, birds using the estuary will be visually screened from the bulk of the works; with only works to the upper floors potentially becoming visible. However, these works are well back from intertidal habitats within the estuary and are not predicted to disturb birds using the estuary.

Construction works are likely to also result in a localised and temporary increase in noise levels. However, the site adjoins a busy national road (N40); residential development and a neighbouring complex of commercial facilities. As such the area is already exposed to ongoing daily noise. As indicated by the proposed working hours, works during night-time hours are not proposed. Measures to avoid disturbance of neighbouring residential properties will also help to prevent disturbance to birds within the estuary. Disturbance of birds using the estuary by construction related noise is not therefore predicted. It should be noted, however, that some species, such as Oystercatcher, Curlew and Black-tailed Godwit routinely feed on playing pitches west of the N40 (adjoining Ringmahon Road and its adjoining residential estates) and as such can adapt to using areas of

suitable habitat within urban conurbations; especially where patterns of human activity (disturbance) are predictable.

Goss-Custard *et al*., (2020) noted that "*it should not be assumed that an estuary's close proximity to conurbations, and the presence of large numbers of people in the vicinity of the SPA, necessarily implies a significant disturbance risk to waders*". This is very much the case at Jacobs Island where birds are using the estuary adjoining a long established pathway. As noted, an existing public path (River Lee/Lough Mahon Waterfront Greenway) runs from Blackrock Castle to Douglas Estuary alongside the estuary. Birds using the mudflats tend to congregate along the tideline and areas of mudflat recently exposed (and thus wet). Thus, for much of the tidal cycle birds east of Jacobs Island are remote from the pathway. In this area the mudflats can be as much as 500m-1000m from the shoreline. As the tide fills birds will come progressively closer to the pathway, though often birds will also relocate to other parts of inner Douglas Estuary (Lakeland Strand is viewed as an integral element of habitats in the wider Douglas Estuary). While the width of available mudflat is significantly narrower along the southwest corner of Jacobs Island (moving upstream to Douglas Estuary) birds such as Black-tailed Godwit do feed along this area (*pers obs*), Oystercatcher also forage around the base of the Black Bridge at low tide on exposed mussel (*Mytilis edulis*) beds.

As it parallels the eastern side of Jacobs Island long it is separated from the estuary by an strip of amenity grassland and rock armouring (see Plate 5.4). The path is very popular and is used by walkers, joggers, cyclists, dog-walkers and skaters. Incidental observations along the walkway indicated that birds did not react to walkers or joggers (*pers obs*) but did react to dogs going onto the foreshore. During a site visit on the 9th February 2022 the behaviour of a flock of Dunlin was observed (observations were on a Sunday afternoon when the path very busy). As the tide filled birds came progressively closer to the pathway (see Plate 5.4). Walkers and joggers were ignored. It was only when a dog walked out on the rock armouring that a small flock of Dunlin were disturbed; these flew ca. 100m before settling back onto the mud to resume feeding (this was a rare occurrence with all other dogs staying along the path / amenity grassland on the day). These birds formed part of a much large group of Dunlin (ca. 1,000) feeding along the length of Lakeland Strand. However, as noted much of the eastern side of Jacobs Island is screened by a ca. 3m strip of rock armour making it difficult for dogs to access the shoreline. Given the time the path has been in place waders appear to have acclimated to its presence, most likely due in a large part to patterns of human activity (disturbance) along the pathway being predictable, with people or dogs rarely leaving the path to go onto the shore. The proposed office and hotel development is not predicted to increase the number of dogs being walked along the shoreline and therefore is not anticipated to result in an increased level of potential disturbance from dogs.

6.2.3.6. Lighting

One further area of potential disturbance is lighting. A lighting plan was prepared by EDC (2022) for this scheme. It is not proposed to have any lighting directed onto the foreshore. The potential for an increase in ambient lighting levels in the environs of the site is low given that the site is screened by existing residential properties; adjoins the N40 which has public lighting and adjoins Ringmahon etc. where there is existing public light in areas of residential and commercial development. However, recent published work has shown that far from being a negative influence, artificial lighting can allow intertidal waders access to foraging areas at night-time. Many waders are visual feeders and they will often use such habitats on full moon to feed – especially during mid-winter when the time available to feed is less due to shorter day-lengths and temperatures are often colder (having an impact on the food a bird must consume to meet their daily energy requirements). These restrictions can put significant pressure on some bird species, such as e.g. Redshank. An increase in ambient lighting can allow such birds to increase their time foraging to offset such risk (e.g. Dwyer *et al*. 2012). Thus, any increase in illumination is likely to be localised, it is anticipated that a small and localised increase in ambient light levels would not negatively impact upon species for which the SPA has been designated.

6.2.3.7. Collision Risk

Rates at which bird collisions with buildings can occur are influenced by a diverse range of factors. At the site level they will be influenced by the character of the proposed building (including features such as size, scale, height, proportion of glass and lighting) as well as its setting within the wider landscape. In the latter case the position of the building relative to foraging areas and day / night roosts are of most relevance for wintering waders and wildfowl that use Cork Harbour SPA; as well as Common Tern which nest with the SPA. The relative risk to migrating birds versus day-to-day movements is also a consideration, as is the potential negative impact that inclement weather may have which can disorient birds and result in collisions with large structures. While

migrants such as Whimbrel can often be heard flying across they City, this is at high altitude. What is of relevance to Jacobs Island is the lower altitude day-to-day flights.

In addition to features of the environment, different groups of birds may be more vulnerable to collision than others. Large bodied species such as swans, or soaring birds, such as bird of prey can be more vulnerable. However, in the case of Jacobs Island, the proposed development site does not support notable aggregations of either group. Also, behavioural factors such as flocking as seen in species such as Golden plover, Lapwing and Dunlin may also present a risk; as is the tendency of birds to leave the estuary to feed inland at night (e.g. Golden plover).

Plate 6.1 shows an image taken by Pedersen Focus of the existing shoreline as viewed from the Greenway on the eastern side of Jacobs Island. Plate 6.2 shows the photomontage of the same area with the proposed development added. Plate 6.3 and 6.4 shows the same set of images taken from the northern tip of Hop Island, on the southern side of Lough Mahon; while Plate 6.5 and 6.6 show the same set of images, this time taken from the southern shore of Lough Mahon immediately east of the apartment complex at Harty's Island. The full set of photomontages is submitted as part of the Planning Pack and should be referred to. These also provide a series of photomontages which also include visualisations of already permitted developments. This includes a tower building at the north-eastern end of the Masterplan lands.

As can be seen the proposed SHD buildings are of a similar scale to the existing apartment blocks on the eastern end of the Site at Jacobs Island. Furthermore, the proposed SHD development is focused closer to the N40 side of Jacobs Island. It is separated from the estuary by landscape screening, public park and existing 2/3 storey residential properties. It should also be noted that further inland, on the northern side of the N40, landuse is dominated by large scale commercial and retail properties (including e.g. Mahon Point Shopping Centre, the glass fronted WebPrint building, Mahon Commercial Park, north to Mater Private Hospital etc.). Thus, the proposed SHD development is an area which already includes a high density of tall and large scale buildings separating Jacobs Island from lands to the north and west.

A key consideration is how birds will fly through the wider landscape. In the case of wetland birds for which Cork Harbour SPA has been designated the bulk of movements would be expected to be along the shoreline or along estuaries / watercourses. While overland movements cannot be discounted, the link between potential foraging areas, roosts or in the case of Common tern nesting sites, can be considered when determining risk.

With respect to the environs of Jacobs Island, it adjoins the eastern side of Cork City between the River Lee and Douglas Estuary. This includes the suburban areas of Ballinlough, Ballintemple, Blackrock and Ballinure. The only adjacent foraging opportunities for wintering birds is for field feeding birds using areas of amenity grassland within suburban areas. As noted, field feeding birds such as Oystercatcher, Black-tailed Godwit or Curlew, which are qualifying interests of Cork Harbour SPA, are known to feed on grassland adjoining the SPA and Lough Mahon. In particular Oystercatcher are known to feed on playing fields in Mahon in large numbers; along with Curlew and Black-headed gulls and on occasion Lesser black-blacked gulls. Small numbers of Oystercatcher, often accompanied by Black-tailed godwit also often feed on amenity grassland adjoining the main parking area at Mahon Point (usually <10). Birds, especially Oystercatcher, can often be seen flying over the N40 from the estuary to feed on these playing pitches. Such birds do not need to overfly Jacobs Island to reach these feeding areas. To the west movement of birds from Douglas Estuary to feed on Mahon Golf Course also do not need to overfly Jacobs Island.

The River Lee and Douglas Estuary waterways represent important flight lines for birds moving to Lough Mahon and the wider harbour. For example, large numbers of gulls can be seen flying downstream each evening along the River Lee to roost in the Lough Mahon. Wading birds are also frequently seen flying between mudflats running from Dunkettle, along Lough Mahon and on into Douglas Estuary. Invariably these birds are seen following the shoreline rather than cutting across land. The nearest Cormorant roost to Jacobs Island is located at Glanmire to the north of the site; Cormorant can regularly be seeing flying up/down river on the River Lee, as well as up Douglas Estuary and across Lough Mahon. With respect to Common Tern, they are often seen feeding in Douglas Estuary. The nearest breeding sites, however, are to the east (nesting rafts near Marino Point) and southeast (Ringaskiddy / Monkstown). While Common tern will frequently take the more direct route over land, this would take birds away from Jacobs Island and not over the proposed development at Jacobs Island.

With respect to movements in/out of Douglas Estuaries bird movements can be easily seen from Black Bridge. As the tide changes birds such as Redshank, Dunlin and Black-tailed godwit can be seen flying over Black Bridge to enter or leave Douglas Estuary. To the east these birds follow the shoreline to the eastern side of Jacobs Island or the southern side of Lough Mahon.

In summary, based on the location, positioning and scale of the proposed development; as well as it position relative to the River Lee (including mudflats at Dunkettle/Blackrock), Douglas Estuary and Lough Mahon, the risk of collision with the proposed building is predicted to be low and is unlikely to negatively impact upon bird species for which Cork Harbour SPA has been designated.

Plate 6.1 Extract from Photomontage View 3 – on the eastern side of Jacobs Island - Existing (Pedersen Focus, 2022). (Canon 5DS-R/28mmTS, 573045.182, 570067.364; 4.49m).

Plate 6.2 Extract from Photomontage View 3 – on the eastern side of Jacobs Island – Proposed (Pedersen Focus, 2022). (Canon 5DS-R/28mmTS, 573045.182, 570067.364; 4.49m).

Plate 6.3 Extract from Photomontage View 4 – from the northern tip of Hop Island - Existing (Pedersen Focus, 2022). (Canon 5DS-R/28mm, 15/07/21; 573581.888, 570011.670; 3.23m).

Plate 6.4 Extract from Photomontage View 4 – from the northern tip of Hop Island - Proposed (Pedersen Focus, 2022). (Canon 5DS-R/28mm, 15/07/21; 573581.888, 570011.670; 3.23m).

Plate 6.5 Extract from Photomontage View 5 – on the southern shore of Lough Mahon - Existing (Pedersen Focus, 2022). (Canon 5DS-R/28mm, 15/07/21; 573100.749, 569538.941, 5.81m).

Plate 6.6 Extract from Photomontage View 5 – on the southern shore of Lough Mahon - Existing (Pedersen Focus, 2022). (Canon 5DS-R/28mm, 15/07/21; 573100.749, 569538.941, 5.81m).

6.3. Mitigation Measures

6.3.1. Management of Surface Waters

Potential pollution from the site will be managed in accordance with the principals as set out in CIRIA guide C532 *Control of Water Pollution from Construction Sites – Guidance for consultants and contractors*.

The site is in close proximity to the Lough Mahon Estuary and construction works will require to be controlled, in particular, controlled surface water runoff procedures implemented. This will include best practice standards and environmental guideline to safeguard qualifying interests.

Specific details will be provided by the Contractor on development of the detailed Construction Management Plan at construction stage to be agreed in full with the Council's Environmental Department where necessary.

6.3.1.1. Sources of Water on the Construction Site

The following are the sources of water that are likely or that may be encountered during the construction works.

- **Rainwater:** The primary source of water to the site is rainwater. The anticipated average annual rainfall at the site is anticipated to be in the region of between 800 and 1200 mm annually. The rainfall amounts vary by the season and can be as much as 50 mm over a 24-hour duration. Heavy rainfall can have a significant effect on the site and can cause flooding and the overwhelming of site drainage systems. Flooding can have an effect on stored site materials that would not normally pose a risk. The contractor will be required to ensure that materials are therefore properly stored on site and to plan site activities to ensure that works such as heavy excavation, drainage and foundation works are postponed during adverse weather conditions.

- **Surface Water:** Surface waters tend to include watercourses and waterbodies. In the case of the proposed development site, the large waterbody adjacent to the site is the adjacent Lough Mahon Estuary. Whilst the construction works do not require any works within the Lough Mahon estuary the works will be taking place in close proximity to the estuary and the contractor will need to have regard for this during the construction works.

- **Groundwater:** Construction works will include the construction of a basement under blocks 15-16. The basement floor level of 8 1 m OD is set above known ground water levels and therefore should not have a significant effect on ground water. The contractor will be required, in advance of and during site establishment, to undertake a series of trial holes to establish the ground water levels.

- **Mains Potable Water:** Jacobs Island is served by a large truck public water main from 2 locations, at the entrance bridge and also at a point directly opposite the Mahon Shopping Centre, as identified on MMOS services drawings. The main infrastructure is complete, and each site is served by a branch of this public water main. The contractor will be required to specifically identify each of these mains and ensure that they are protected during the works.

6.3.1.2. Potential Sources of Water Pollution

The following are a list of potential water pollutions that could arise on the construction site.

- **Suspended Solids:** The contractor is to employ measures to ensure that water pollution does not arise as a result of suspended solid pollution. Sources of suspended solid pollution include, excavation, earth stockpiles, plant and wheel washing, build-up of mud on site roads. Good practice construction measures are proposed in the following sections that the contractor will be required to employ to ensure that suspended sediments from the above potential sources do not enter the watercourse.

- **Oils and Hydrocarbons:** Oils are a potential source of pollutants on a construction site. Diesel, lubricating oil, fuel, petrol, and hydraulic fluids are used quite readily on construction sites for various types of machinery and refuelling and maintenance are required regularly on sites. The contractor will

need to employ good practice measures to prevent these potential pollutants entering the water course. These measures will include bunded areas for the storage of fuels, regular maintenance of machinery to ensure that no leakages occur, measures to protect the site from vandalism and the provision of a designated refuelling area on site or refuelling off site.

- **Concrete and Cement Products:** It is important the cement products are carefully stored to withstand various weather conditions such as heavy rainfall and high winds to prevent run off and dust pollution. Concrete products can cause contamination during wash down of the trucks which can cause a large volume of uncontrolled runoff. Good practice measures can be employed on site to prevent such uncontrolled runoff by the use of a special impermeable bunded slab with a collection point and siltation for such operations.

6.3.1.3. Surface Water Management Techniques

The contractor will be required to submit proposed methods for managing surface water runoff from the site during the construction operations. The following operations will require particular attention.

A designated fuel transfer area should be provided on site, and this is typically a good practice on well managed construction sites. The contractor will be required to install an impermeable paved and bunded area that is capable of handling and intercepting a fuel spillage. All tanks should be fully bunded and placed on a firm and secure foundation as per the following sketch from CIRIA C532.

Concrete should always be placed in a controlled method to prevent spillages as is good construction practice. Where possible concrete should be placed using a concrete pump. As noted above it is important that the machinery is well maintained.

At the delivery and wash down point it is important that measures are employed to prevent spillages from concrete delivery trucks contaminating the ground.

6.3.2. Biosecurity protocols

In addition to on site control measures for knotweed being implemented by O'Donovan Agri Environmental, Biosecurity protocols will be implemented during the construction phase of the proposed project to prevent the introduction of invasive species listed on the third schedule of the EC (Birds and Natural Habitats) Regulations 2011, as amended, to site.

All equipment intended to be used at the site shall be dry, clean and free from debris prior to being brought to site.

If drying out of equipment is not feasible, equipment should be either: -

i. power steam washed at a suitably high temperature or at least 65 degrees, or

ii. disinfected with an approved disinfectant, e.g. Virkon or an iodine-based product. It is important that the manufacturer's instructions are followed and if required, the correct contact times are allowed for during the disinfection process. Items that are difficult to soak should be sprayed or wiped down with disinfectant.

During the duration of the proposed project, if equipment is removed off-site to be used elsewhere, the said equipment shall be cleaned and disinfected prior to being brought back to the works area of the proposed project.

Appropriate facilities shall be used for the containment, collection and disposal of material and/or water resulting from washing facilities of vehicles, equipment and personnel.

Importation of materials shall comply with Regulation 49 of the EC (Birds and Natural Habitats) Regulations 2011. In relation to 3rd Schedule species, but notably Japanese knotweed and Himalayan balsam, the following general biosecurity and containment measures shall be undertaken during the construction phase of the project:

- Identify and mark out areas of infestation;
- Fence off areas of infestation in advance of and during construction works;
- Erect signage identifying restricted areas;
- Avoid, where possible, using plant and machinery in areas of invasive species infestation;
- Plant and equipment used within areas if invasive species infestation should be inspected post works and washed down in a contained area;
- Site staff should be aware that root zones / control zones for knotweed species extend a minimum of 7m from the extent of the invasive species' surface vegetation.

It should be noted that John O'Donovan, of O'Donovan Agri Environmental, has been employed to carry out treatment of Japanese knotweed and Bohemian knotweed on site.

Further invasive species survey will be undertaken prior to the commencement of construction. In the event that further invasive species are identified an Invasive Species Management Plan shall be prepared and implemented by the Contractor. This shall include plant specific control measures for any invasive species identified.

Non 3rd Schedule species such as Butterfly Bush (*Buddleia davidii*) shall be grubbed and either chipped or removed from site. The site will be monitored for re-growth and any saplings will be pulled and disposed of appropriately or treated by an application of a suitable herbicide following completion of an appropriate herbicide use risk assessment due to the proximity to Cork Harbour SPA.

6.3.3. General Measures

6.3.3.1. Fuel & Oil Management Procedure

Refuelling will take place in the proposed site compound (as set out in the accompanying CEMP).

Refuelling

- Refuelling will be carried out using 110% capacity double bunded mobile bowsers. The refuelling bowser will be operated by trained personnel. The bowser will have spill containment equipment which the operators will be fully trained in using.
- Plant nappies or absorbent mats shall be placed under refuelling point during all refuelling to absorb drips.
- Mobile bowsers, tanks and drums shall be stored in secure, impermeable storage area, away from drains and open water.
- To reduce the potential for oil leaks, only vehicles and machinery will be allowed onto the site that are mechanically sound. An up to date service record will be required.
- Potential leaks from delivery vehicles will be reduced by visually inspecting all vehicles for major leaks.
- In the unlikely event of an oil leak or spill, the leak or spill will be contained immediately using oil spill kits; the nearby dirty water drain outlet will be blocked with an oil absorbent boom until the fuel/oil spill has been cleaned up and all oil and any contaminated material removed from the area. This contaminated material will be properly disposed of in a licensed facility.
- The Environmental Manager will be immediately informed of the oil leak/spill and will assess the cause and the management of the clean-up of the leak or spill. The Environmental Manager will inspect nearby drains for the presence of oil and initiate the clean-up if necessary.
- Immediate action will be facilitated by easy access to oil spill kits. An oil spill kit that includes absorbing pads and socks will be kept at the site compound, and also in site vehicles and machinery.
- Correct action in the event of a leak or spill will be facilitated by training all vehicle/machinery operators in the use of the spill kits and the correct containment and cleaning up of oil spills or leaks. This training will be provided by the Environmental Manager at site induction.
- In the extremely unlikely event of a major oil spill, a company who provide a rapid response emergency service for major fuel spills will be immediately called for assistance, their contact details will be kept in the site office and in the spill kits kept in site vehicles and machinery.

Oil storage

Oil storage will take place in the proposed site compound as follows: -

- Fuel containers must be stored within a secondary containment system e.g. bund for static tanks or a drip tray for mobile stores.
- Collision with oil stores will be prevented by locating oils within a steel container in a designated area of the site compound away from vehicle movements.
- Leakages of oil from oil stores will be prevented by storing these oils in bunded tanks which have a capacity of 110% of the total volume of the stored oil. Ancillary equipment such as hoses and pipes will be contained within the bunded storage container. Taps, nozzles or valves will be fitted with a lock system.

- The volume of leakages will be prevented through monitoring oil storage tanks/drums for leaks and signs of damage. This will be carried out daily by the Environmental Manager.

- Long term storage of waste oils will not be allowed on site. These waste oils will be collected in leak-proof containers and removed from the site for disposal or re- cycling by an approved service provider.

Environmental Controls

Environmental control measures will be stored in the proposed site compound as follows: -

- Mobile bowsers, tanks and drums will be stored in secure, impermeable storage area, away from drains and open water.

- Fuel containers must be stored within a Secondary Containment System, e.g. bund for static tanks or a drip tray for mobile stores.

- Ancillary equipment such as hoses, pipes must be contained within the bund.

- Taps, nozzles or valves must be fitted with a Lock System.

- Fuel and Oil Stores including tanks and drums must be regularly inspected for leaks and signs of damage.

- Only designated Trained Operators w authorized to refuel plant on site and emergency spill kits will be present at equipment for all refuelling events.

- Procedures and contingency plans will be set up to deal with emergency accidents or spills.

- Suitable spill response materials and emergency instruction shall be available on site and staff shall have been adequately trained.

Other measures such as Waste, Noise and Dust management are also presented in the CEMP.

6.3.3.2. Site Environmental Training & Awareness

- Environmental awareness and training shall be achieved by: -
    - Site induction, including relevant environmental issues.
    - Environmental posters and site notices.
    - Method statement and risk assessment briefings.
    - Toolbox talks, including instruction on incident response procedures.
    - Key project specific environmental issues briefings.

- All managers and supervisors will be briefed on the content and effective implementation of the measures identified in the CEMP.

- Method Statements will be prepared for specific activities prior to the works commencing and will include all environmental protection and mitigation measures identified in the planning application documentation and emergency preparedness appropriate to the activity covered. The Construction Environmental Manager will review key Method Statements prior to their issue.

- Method Statement briefings will be given before personnel carry out key activities for the first time.

- Environmental Training Records are to be retained in the Site Office.

Environmental Controls: Site staff shall be competent to perform tasks that have the potential to cause a significant environmental impact. Competence is defined in terms of appropriate education, training and experience.

The appointed Contractor will also be required to develop an Environmental Emergency Response Plan; a Monitoring and Auditing Procedure; an Environmental Accidents, Incidents & Corrective Action Procedures and a clear Environmental Complaints Procedure.

6.4. Overall Assessment of Residual Effects

In view of best scientific knowledge, and on the basis of objective information, in circumstances where the measures which have been identified will be implemented to avoid potential water pollution events, the proposed development at Jacobs Island will not adversely affect surface or ground water during either the construction or operational phase. There will be no adverse effects on any QIs/SCIs of the Great Island Channel SAC or Cork Harbour SPA and their associated targets and attributes, or on any European Site.

6.5. Potential In-Combination Impacts

The potential cumulative impact of the relevant plan for the area was assessed, which is considered to be the Draft Cork City Development Plan 2022 - 2028, which will come into effect in August 2022. The assessment of the potential impacts on the environment of the Draft Plan, was undertaken utilising the Strategic Housing Objectives (SEO), which are detailed in Table 5-1 of the supporting Strategic Environmental Assessment (SEA) Statement contained in Appendix 2(A) of the Draft Plan. The potential cumulative impacts of the Plan were assessed having regard to both these SEOs.

SEO BFF objectives as detailed in Table 5-1 and 7-1 of the Draft Plan are to: -

- To preserve, protect, maintain and, where appropriate, enhance the terrestrial, aquatic and soil biodiversity, particularly EU designated sites and protected species;
- Ensure no adverse effects on the integrity of any European site, with regard to its qualifying interests, associated conservation status, structure and function;
- Safeguard national, regional and local designated sites and supporting features which function as stepping stones for migration, dispersal and genetic exchange of wild species;
- Enhance biodiversity in line with the National Biodiversity Strategy and its targets; and
- To protect, maintain and conserve the City's natural capital.

A Strategic Environmental Assessment (SEA) and Natura Impact Report (NIR) was prepared for the draft Cork County Development Plan, which assessed the CDP and its potential to adversely affect the environment as a whole and the integrity of Natura 2000 sites[10].This sets out in full the approach to the Appropriate Assessment, how aspects of the Plan were considered and how the Plan will be implemented and delivered while protecting European sites; thus, ensuring that potential impacts were avoided, reduced or offset. Thus, the finding of the assessments was that the Plan will not adversely affect the general biodiversity and the integrity of Natura 2000 sites due to the incorporation of mitigation measures into the Plan as a result of the assessment processes. A summary of the Screening Assessment is presented in Table 5.2 of the NIR. Chapter 6.0 of the NIR further outlines the consideration of In-Combination Impacts. Of particular relevance here is Section 6.4 - Coastal and Marine Habitats and Species. Primary concerns of relevance here include e.g. - pressure on water quality in coastal and transitional waters. Table 6.1 sets out in full the Policy and Plans With Potential To Contribute to In-Combination Effects on EU Sites. Measures for strict protection of watercourses, waterbodies and water quality and expanded upon in Chapter 7.0 Appropriate Assessment; "Policies for zoned land adjoining EU sites have been reviewed to ensure that they provide appropriate caveats highlighting the sensitive location of the site and the likely or potential need for set-backs and screening to ensure the protection of habitats and the avoidance of disturbance to protected species". Great Island Channel SAC and Cork Harbour SPA are discussed specifically in Section 7.3.2 of the NIR.

Projects that have been granted planning permission in the vicinity of the proposed project within the last 5 years were reviewed through the Cork County Council Cork Planning Enquiry System and the National Planning Application Map Viewer (MyPlan.ie).

A full planning history of the site is presented in the accompanying Design Statement. And is shown in Figure 6.3. A summary of planning applications in the immediate environs of the site is presented in Table 6.3.

There are a range of significant infrastructural schemes within the catchment of Lough Mahon / Cork Harbour. These include significant developments within Cork City proper; plans for future development with the City, such as those for the Docklands; and a range of residential developments in the suburbs surrounding the City.

[10] https://www.corkcity.ie/en/proposed-cork-city-development-plan-2022-2028/draft-plan-documents/phase-2-draft-development-plan-2022-2028/natura-impact-report-for-appropriate-assessment/

There are also a number of significant road projects in the environs of Cork Harbour, such as the M8/M40 Dunkettle Interchange Upgrade[11] (where works are ongoing); as well as proposed schemes such as the M28 Ringaskiddy Road Scheme[12] (not yet on site). A number of Flood Relief Projects are also underway – such as Douglas FRS[13], Glashaboy FRS[14] and Midleton FRS[15]. All these schemes are linked to Cork Harbour; however, they have also all been subject to Appropriate Assessment and have conditions attached to their planning permission relating to sustainable development, such as siting of septic tanks, foul surface water and effluent drainage facilities, and clean surface water run-off drainage facilities. The Office of Public Work's Lower Lee (Cork City) Flood relief scheme[16] is currently in the design / preplanning stage.

There has been significant growth in the development of Greenways and Blueways in recent years. As mentioned there is an existing public walk along the western side of Lough Mahon which runs alongside Jacobs Island. In time this is to be part of the network of Greenways linking Lee to Sea – details of the Lee to Sea Greenway can be viewed at - https://lee2sea.com/.

Irish Water are engaged in an ongoing programme of work in Cork Harbour. For example, wastewater from Passage West, Glenbrook and Monkstown now no longer discharges untreated to Cork Harbour. The sewer network has been extended as part of the Cork Lower Harbour Main Drainage Project to connect these area to the Shanbally Wastewater Treatment Plant. In 2020, Irish Water completed the Cobh to Monkstown Estuary Crossing. This involved drilling under the Lee Estuary; these drilled bores allowed the installation of sewer pipelines at a depth of 60m under the Lee Estuary – creating a vital connection between Cobh and Monkstown. (Source: - https://www.water.ie/projects/local-projects/cork-lower-harbour/news-updates/). Such measures should result in progressive improvement in water quality within the harbour. As above, in each case these projects have been subject to stand alone Screening for Appropriate Assessment and / or prepared a Natura Impact Statement.

[11] https://www.dunkettle.ie/
[12] https://www.corkrdo.ie/major-schemes/m28-cork-to-ringaskiddy-project/
[13] https://www.floodinfo.ie/frs/en/douglas/home/
[14] https://www.floodinfo.ie/frs/en/glashaboy/home/
[15] https://www.floodinfo.ie/frs/en/midleton/home/
[16] https://www.floodinfo.ie/frs/en/lower-lee/home/

Table 6.3 Other relevant developments.

Application Reference	Applicant(s)	Description	Outcome/Current Status
ABP Ref.: TA28.313216	Estuary View Enterprises 2020 Limited	'The Meadows' Bessborrough	Due 25th July 2022
ABP Ref.: TA28.313206	Estuary View Enterprises 2020 Limited	'The Farm' Bessborrough	Due 25th July 2022
Cork City Council Ref.: 22/40809	Hibernia Star Limited	Construction of an office and hotel development at Jacob's Island, Ballinure, Mahon, Cork	Request for Further Information
ABP Ref.: TR28.310378	Montip Horizon Limited	Amendments to previously permitted strategic housing development reference ABP-301991-18 to increase the number of units from 413 no. units to 437 no. units and amendments to Blocks 4, 7, 8, 9 and 10 at Jacob's Island, Ballinure, Mahon, Cork	Granted (11th February 2022)
Cork City Council Ref.: 19/38875	O'Flynn Construction Co. Unlimited Company	Construction of 12,004 sq. m of office floorspace at Blackrock Business Park, Bessboro Road, Mahon, Cork	Granted (11th March 2020)
Cork City Council Ref.: 18/37820 and ABP Ref. PL. 302784	Bessboro Warehouse Holdings Limited	Demolition of the existing buildings and construction of 135 no. residential units at Bessboro Road, Mahon, Cork	Granted (28th February 2019)
ABP Ref.: TA.301991.	Montip Horizon Limited	Construction of 413 no. apartments, neighbourhood centre, creche, road improvement works including upgrades to the Mahon Link Road (R852) to the North of the N40 interchange to incorporate a dedicated bus lane and all site development works at Jacob's Island, Ballinure, Mahon, Cork	Granted (3rd October 2018)

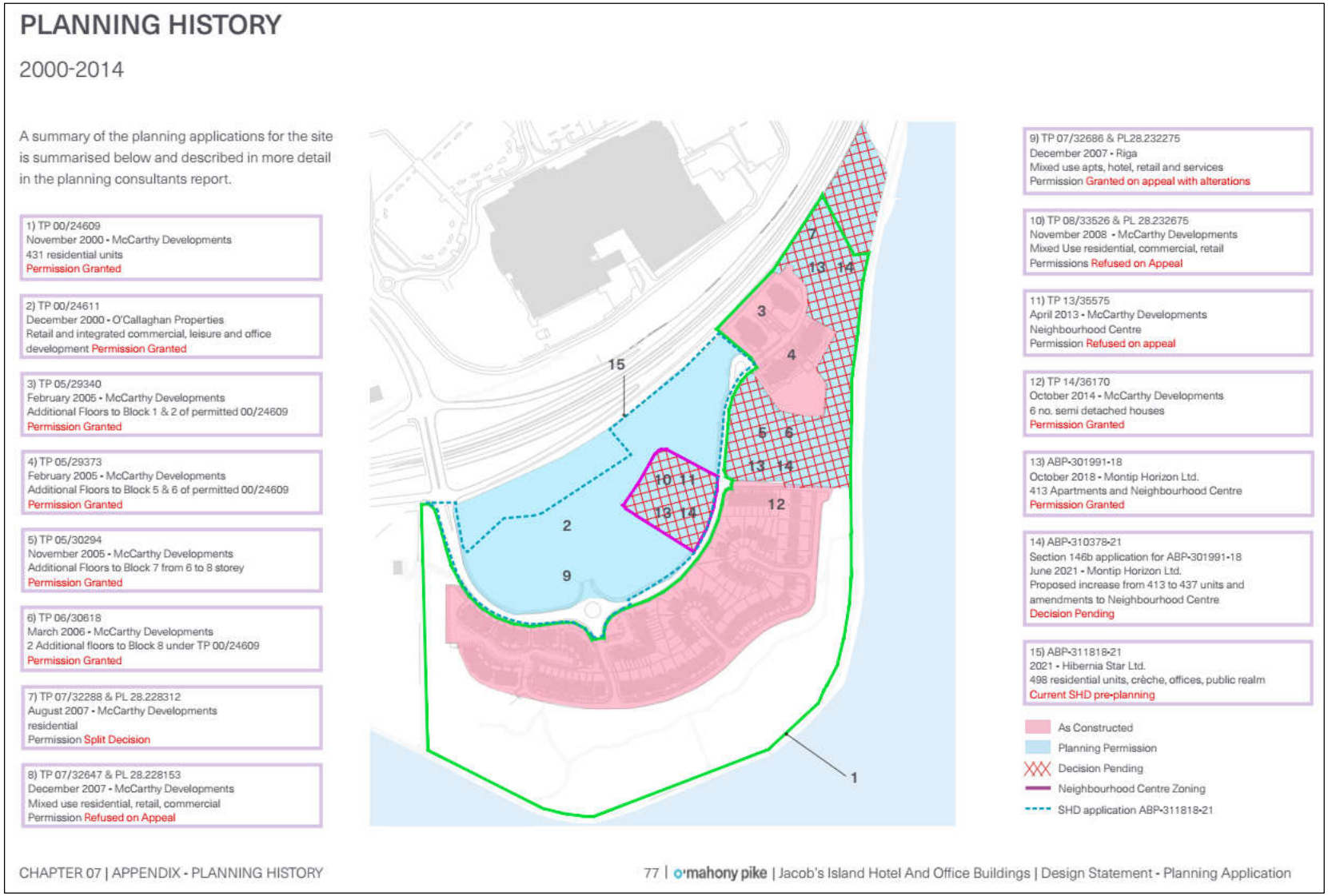

Figure 6.1 Summary of Planning History. (from OMP, 2022).

6.5.1. Conclusion of Cumulative Assessment

Following the detailed assessment provided in the preceding sections, it is concluded that, the proposed development at Jacobs Island will not result in any adverse effects on the integrity of any European site. There is, therefore, no potential for the proposed development to contribute to any potential cumulative adverse effects on any European site when considered in-combination with other plans and projects.

In the review of the projects and plans that was undertaken, no connection that could potentially result in additional or cumulative impacts was identified. Neither was any potential for different (new) impacts resulting from the combination of the various projects and plans in association with the proposed development.

Taking into consideration the reported residual impacts from other plans and projects in the area and the predicted impacts with the current proposal, there are no residual cumulative impacts with regard to any European Site.

7. Conclusions

This NIS has provided an assessment of all potential direct or indirect adverse effects which have the potential to cause likely significant impacts on European sites.

Where the potential for any likely significant effects on any European Site has been identified then, as is apposite when conducting a Stage Two Appropriate Assessment, consideration has been given to the mitigation measures which have been identified and which will be implemented in order to avoid potential water pollution events, in particular. The measures ensure that the construction and operation phases of the proposed development will not adversely affect the integrity of any European sites. In conclusion, in circumstances where the mitigation measures identified in this NIS are implemented, there is no reasonable scientific doubt remaining as to the absence of adverse effects on the constitutive characteristics of the Great Island Channel SAC and Cork Harbour SPA.

Therefore, it can be objectively concluded that the proposed development at Jacobs Island, whether individually or in combination with other plans or projects, will not adversely affect the integrity of any European site.

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Additional Information

Water status data available on http://www.epa.ie and http://www.wfdireland.ie.

[17] Scottish Natural Heritage (SNH) has changed its name to NatureScot as of August 2020.

Appendix A. Site Synopses

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