



Figure 6.11. Fossitt Habitats on site (See habitat descriptions for the explanation to the Fossitt codes)

Bats

- 6.44 As outlined in Appendix 6.1 “*There is no evidence of a current or past bat roost in the structures on site, therefore no significant negative impacts on the roosting of these animals are expected to result from the proposed development. Foraging activity was not present.*”

Evaluation of Habitats

- 6.45 The proposed development site is on built land. No habitats of conservation significance were noted within the site outline.

Plant Species

- 6.46 The plant species encountered at the various locations on site are detailed above. No rare or plant species of conservation value were noted during the field assessment. Records of rare and threatened species from NBDC and NPWS were examined. No rare or threatened plant species were recorded in the vicinity of the proposed site.

Invasive Plant species

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

Fauna

Amphibians/Reptiles

- 6.48 The common frog (*Rana temporaria*) was not observed on site. The common lizard (*Zootoca vivipara*) or smooth newt (*Lissotriton vulgaris*) were not recorded on site. There are no features within the site boundary that could be important to Amphibians/Reptiles.

Terrestrial Mammals

- 6.49 The proposed development site is on built land. No badgers or badger activity was noted on site. No hedgehogs were seen during the site visit. No rare or threatened faunal species were recorded within the proposed development site based on NBDC records.

Birds

- 6.50 No rare or bird species of conservation value were noted during the field assessment. The following bird species were noted on site:

Table 6.4: Bird Species noted in the vicinity of the proposed development.

Common Name	Scientific Name
herring gull (Amber listed)	<i>Larus argentatus</i> (flying not roosting)

- 6.51 The site is not seen as an important wintering bird site due it consisting entirely of built land. AAs outlined in Appendix 6.2 “*11 bird species were recorded from observations made at the City Quay site. Results from the surveys suggest that the site is not an ex-*

situ foraging or roosting site for species of qualifying interest from nearby Special protection areas (SPA's). Results also suggest that the site is not a regular flightline path for such species like Brent Geese or other species of significant interest, from the observers experience of regular commuting through this part of the city center these species are not frequently encountered passing through this area. The birds move primarily from roost sites (in the case of Brent Geese for example - the North Bull) on the coast and travel west and northwest further north and east from Dublin city center. A nearby site being surveyed in Fairview concurrently in the same period that these surveys were conducted found Brent Geese were following the Tolka river from the coast as a route to negotiate towards feeding grounds inland. This would appear to be the closest flight path to the city center identified and some distance from this site.'

6.6 POTENTIAL EFFECTS OF THE PROPOSED DEVELOPMENT

6.52 The proposed development will involve the removal of the existing terrestrial habitats on site and considerable re-profiling and excavations, in addition to the construction of a 24-storey building. It should be noted that a Construction Environmental Management Plan (CEMP) and an AA Screening/NIS accompany this EIAR. The quality, magnitude and duration of potential effects of the proposed development are defined as per EPA Guidance (EPA, 2022) seen in Table 1.2 of Chapter 1.

6.6.1 Demolition/Construction Phase

6.53 In the absence of mitigation measures the overall development of the site is likely to have direct negative impacts upon the existing habitats, fauna and flora within the site. Direct negative effects will be manifested in terms of the removal of the site's internal and perimeter habitats. The removal of these habitats will result in a loss of species of low biodiversity importance. The area is not deemed to be an important foraging area for terrestrial mammals or birds. The potential impacts of the proposed demolition/construction of the development are outlined below:

Designated Conservation sites within 15km

6.54 The proposed development is not within a designated conservation site. It should be noted that the proposed development site is located 15m from the River Liffey and the nearest Natura 2000 site is South Dublin Bay and Tolka Estuary SPA, located 1.9 km downstream of the proposed demolition and construction site. The nearest pNHA is Royal Canal pNHA (located 0.7 km from the subject site) and the nearest Ramsar site is Sandymount Strand/Tolka Estuary (located 2.9 km downstream).

6.55 Given the nature of the demolition and construction works and the subject site's proximity to the River Liffey (15m), due to the risk of surface water and dust entering the River Liffey directly, out of an abundance of caution it is considered that there is a direct hydrological pathway to designated conservation sites located within Dublin Bay, downstream of the River Liffey, namely, South Dublin Bay (SAC & pNHA), South Dublin Bay and River Tolka Estuary SPA, is Sandymount Strand/Tolka Estuary Ramsar site, North Dublin Bay (SAC & pNHA), and North Bull Island SPA.

6.56 In the absence of mitigation measures surface water runoff and dust during site demolition and clearance works could potentially impact on the River Liffey and downstream conservation sites, with water quality or downstream/upstream impacts, due to the tidal nature of the River Liffey proximate to the site. Ensuring water quality and compliance with Inland Fisheries Ireland "Guidelines on the Protection of Fisheries

*during construction works in and adjacent to waters*³ and the Water Pollution Acts would be seen as the primary method of ensuring no significant impact on designated conservation sites. There will be no discharge to the River Liffey or drainage networks. Standard construction phase mitigation in relation to onsite, works, will be in place and no impact is foreseen in relation to designated conservation sites. As outlined in the CEMP 'Surface water management will be imperative during construction works, especially the initial development stages. All site runoff associated with the construction will be directed to onsite sumps or percolate to ground during each of the initial demolition and construction phases. This shall be crucial during the basement excavation and construction. Groundwater shall be controlled during the excavation stage by installation of the perimeter pile wall which shall act as a cut off wall to limit groundwater flows. Any groundwater encountered within the basement excavation shall be directed to sumps within the excavation and passed through settlement tanks. A temporary discharge licence shall be agreed with DCC for discharge of water during the basement excavation and the follow-on construction stages once infiltration to ground is no longer available.'

- 6.57 Effects: Low adverse / International / Negative Impact / Not significant / short term. Mitigation is needed to limit the potential impact from contaminated surface water and dust.

Biodiversity

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

6.59 **Terrestrial mammalian species**

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

- 6.60 Effects: Slight effects / site / reversible effects/ negative effect / not significant / short term/likely.

Flora

- 6.61 No protected flora was noted on site. Site clearance will remove the flora species on site.

- 6.62 Effects: Slight effects / site / reversible effects/ negative effect / not significant / short term/likely.

6.63 **Bat Fauna**

No bats were noted roosting on site. No bats were noted emerging from buildings on site. No significant impacts on bats are foreseen.

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<https://www.fisheriesireland.ie/sites/default/files/migrated/docman/2016/Guidelines%20Report%202016.pdf>

- 6.64 Effects: Slight effects / site / reversible effects/ Negative effect / Not significant / short term/likely. Mitigation is needed in the form of a pre-construction survey.

Aquatic Biodiversity

- 6.65 In the absence of any mitigation on site, due to the proximity of the estuarine element of the River Liffey and the potential for dust during demolition, surface water runoff during the removal of material off site into road drainage and pumping of unmitigated surface/ground water from excavations to the watercourse, there is potential for downstream/upstream impacts on biodiversity from contaminated runoff, silt, dust and petrochemicals.
- 6.66 Effects: Moderate adverse / national / Negative Impact / reversible/ short term/likely/not significant. Mitigation is needed in the form of control of silt and petrochemical and dust during construction.

Bird Fauna

- 6.67 No birds of conservation importance were nesting on site. Herring gull were not nesting on site but there is potential that herring gull could potentially nest on site.
- 6.68 Effects: Slight effects / site / reversible effects/ Negative effect / Not significant / short term/likely. Mitigation is needed in the form of a pre-construction survey in relation to nesting birds if constructed during nesting season.

6.6.2 Operational Phase

- 6.69 Once constructed, the site would be seen as a stable ecological environment. However, in the absence of mitigation, appropriate measures should be taken to prevent surface water run-off into adjacent habitats and in particular the River Liffey.

Designated Conservation sites within 15km

- 6.70 There is potential for silt laden surface water to exit the site and enter surface water networks and the River Liffey.
- 6.71 Effects: Slight effects / site / reversible effects/ Negative effect / Not significant / long term/likely. Standard mitigation is required in relation to discharges off site.

Biodiversity

Terrestrial mammalian species

- 6.72 No protected terrestrial mammals were noted on site. The site will be cleared during the construction phase.
- 6.73 Effects: Neutral / site / Not significant / long term/likely.

Flora

- 6.74 No protected flora was noted on site. The site will be cleared during the construction phase.
- 6.75 Effects: Neutral / site / Not significant / long term/likely.

Bat Fauna

- 6.76 The proposed development will change the local environment as new structures are to be erected and some of the existing vegetation will be removed. No bat roosts will be lost due to this development. As the site will have been cleared no potential roosting habitats will be on site.
- 6.77 Effects: Neutral / site / Not significant / long term/likely.

Aquatic Biodiversity

- 6.78 Due to the proximity to the estuarine element of the River Liffey and the hydrological pathway to designated sites, there is potential for downstream impacts on biodiversity from silt.
- 6.79 Effects: Slight effects / site / reversible effects/ Negative effect / Not significant / long term/likely. Standard mitigation is required in relation to discharges off site.

Bird Fauna

- 6.80 Results of the flightline assessment (Appendix 6.2) suggest that the site is not a regular flightline path for such species like Brent Geese or other species of significant interest, and that these species are not frequently encountered passing through this area. However, as outlined in section 14 of the Architectural Design Statement '*The integration of bird friendly design has been taken into account in the form of an applied etching and/or printed interlayer on the glazed elements as birds often perceive glazing as openings. Visual cues will help identify solid surface, whilst visible up close, they are difficult to read from any kind of a distance. These etchings have the added bonus of providing a form of solar control.*'
- 6.81 Impacts: Low adverse / site / Negative Impact / Not significant / long term.

6.7 REMEDIAL AND MITIGATION MEASURES

6.7.1 Demolition/Construction Phase

- 6.82 A project ecologist will be appointed and consulted in relation to all onsite drainage during works. Consultation with the project ecologist will not involve the formulation of new mitigation measures for the purposes of protecting any European Site, and relate only to the implementation of those mitigation measures already stated in the submission or the formulation of mitigation for other purposes.
- 6.83 All demolition and site clearance works methodologies will have prior approval of a project ecologist.
- 6.84 Staging of project will be carried out to reduce risks of onsite drainage to the River Liffey and subject to the approval of a project ecologist.
- 6.85 Upon lifting of the concrete slab/hard standing and removal the building on site, the soils will be assessed for contamination prior to any site discharge.
- 6.86 Local drainage connections, gullies and watercourses will be protected from dust, silt and surface water throughout the works.

- 6.87 All onsite drainage network connections will be blanked off and sealed at the first phase of the demolition works.
- 6.88 There will be no entry of solids or petrochemicals to the drainage network during the works
- 6.89 The Site Manager will be responsible for the pollution prevention programme and will ensure that at least daily checks are carried out to ensure compliance. A record of these checks will be maintained.
- 6.90 Spill containment equipment shall be available for use in the event of an emergency. The spill containment equipment shall be replenished if used and shall be checked on a scheduled basis.
- 6.91 Demolition works should be carried outside of bird nesting season (March 1st-31st August). Should this not be possible, a pre-works check by a qualified ecologist should be undertaken to ensure nesting birds are absent. This would include nesting gulls on buildings if present.
- 6.92 Pre Construction survey for bats. If bats are found roosting on site a derogation licence will be required from the NPWS prior to demolition.

6.7.2 Operational Phase

- 6.93 Standard operational mitigation measures as outlined in the engineering report will be in place to protect surface water networks from pollution.

6.8 RESIDUAL IMPACTS OF THE PROPOSED DEVELOPMENT

6.8.1 Demolition/Construction Phase

- 6.94 Based on the successful implementation of the construction phase controls and the works to be carried out in accordance with this EIAR and the accompanying AA Screening/NIS, it is likely that there will be no significant ecological impact arising from demolition or construction works proposed for the proposed project. Designated conservation sites will not be impacted by the proposed development during construction.
- 6.95 A robust series of standard construction phase control measures have been outlined to ensure that the proposed project does not impact on species or habitats of conservation importance, conservation areas or watercourses during construction. It is essential that these measures are complied with to ensure that the proposed works do not have downstream environmental impacts. These measures are to protect the River Liffey, which is potentially the primary vector of impacts from the site, is not impacted during demolition and operational phases of the proposed development.
- 6.96 No significant environmental impacts are likely in relation to the construction of the proposed development.
- 6.97 Effects: Slight effects / site / Negative effect / Not significant /short term/likely. Standard mitigation will be in place on site.

6.8.2 Operational Phase

- 6.98 Based on the successful implementation of the operational phase controls and the works to be carried out in accordance with this EIAR and the accompanying AA Screening/NIS, it is likely that there will be no significant ecological impact arising from operation of the proposed project. Designated conservation sites will not be impacted by the proposed development.
- 6.99 Standard operational phase control measures have been outlined to ensure that the proposed project does not impact on species or habitats of conservation importance, conservation areas or watercourses. It is essential that these measures are complied with, to ensure that the proposed works do not have downstream environmental impacts. These measures are to protect the River Liffey, which is potentially the primary vector of impacts from the site, is not impacted during operational phases of the proposed development.
- 6.100 No significant environmental impacts are likely in relation to the operation of the proposed development.
- 6.101 Effects: Slight effects / site / Negative effect / Not significant / long term/likely. Standard mitigation will be in place on site.

6.9 MONITORING OR REINSTATEMENT

6.9.1 Demolition/Construction Phase

- 6.102 A project ecologist will be appointed to oversee demolition and construction works on site.

6.9.2 Operational Phase

- 6.103 No operational monitoring/reinstatement is required.

6.10 CUMULATIVE IMPACTS OF THE PROPOSED DEVELOPMENT

- 6.104 A full description of relevant cumulative developments is included in Chapter 2. No terrestrial habitats, fauna or flora of significant conservation importance were found on site. However, the site is located 15m from the River Liffey, which has the potential to carry silt and pollutants downstream to designated conservation sites.
- 6.105 There are several proposed developments located in the area immediately surrounding the subject site. The following is a list of planning applications in close proximity to the subject site as identified on the Department of Housing, Local Government and Heritage's 'National Planning Application Database' portal⁴,:

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<https://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=9cf2a09799d74d8e9316a3d3a4d3a8de>

Table 6.5. In combination effects evaluated.

Ref. No.	Address	Proposal
2976/21	44-53 Townsend Street, 33-39 Moss Street, 31-33 Gloucester Street South, and including Bracken's Lane, Dublin 2.	<p>RETENTION: Retention permission to amend a mixed use development permitted under ABP Ref. PL 29S.249415; DCC Reg. Ref. 2711/17 (as amended by DCC Reg. Refs. 3265/20 and 3995/20) located on a site of c. 0.4 hectares.</p> <p>The development to be retained consists of: an increase in basement floor area of 86 sqm; minor increases to internal floor areas at upper levels totalling 41.5 sqm; reconfiguration of internal layouts; amendments to external elevations including revised glazing and façade treatments and arrangements, a reduction in parapet height levels, revisions to the roof level including revised access, vent and plant arrangement, and all ancillary site development works above and below ground.</p>
3194/20	Church Of The Immaculate Heart of Mary, 10-12 City Quay, Dublin 2.	<p>PROTECTED STRUCTURE: Permission for development at the The Church of The Immaculate Heart of Mary, a protected structure, RPS No. 1864 at City Quay, Dublin 2.</p> <p>The development will consist of the following:</p> <ol style="list-style-type: none"> 1. External works to the existing church building to include pointing and stone repair to the south elevation and campanile; -new lead capping to the external buttress wall at the south east corner; -insertion of 6 no. slate vents into the east and west church roof; 2. Works to main entrance area to include a new short access ramp, adjustment to existing door for accessibility purposes, new matwell and tiled floor finish; relocation of 2 no. holy water fonts; relocation Shrine to Our Lady, demolition of existing timber lobby screen and doors and replacement with new glazed screen and doors, additional light and wiring to new routes; 3. Works to the western annex to include the removal of 1 no. existing confessional boxes, installation of an accessible WC and installation of new fire escape doors in eastern elevation. 4. Works to the main body of the church to include redecoration, renewal of flooring and selected joinery, relocation of 4 no. shorter pews from the rear to the front of the main aisle to allow for new wheelchair spaces, new Olea Sacra to the western nave, new floor finish, repair work to stained glass window in the north facade, repair works to the window above the altar as well as various repairs to the windows on east and west facades, replacement of cover plates to the donation boxes; Insertion of a new Olea Sacra cabinet on the narthex adjacent to the existing baptismal font; 5. Works to the altar area to include commissioning of a new altar and steps to the pulpit; 6. Refurbishment of stained glass windows including repair work to stained glass window in North facade, repair work to the window above the altar, as well as various repairs to the windows in the east and west facades; 7. Works to the sacristy area; 8. New brass guardrail to choir area;

Ref. No.	Address	Proposal
		9. Upgrading of mechanical and electrical services throughout the building including the addition of new lighting and wiring routes, installation of new destratification fans suspended from the roof.
3088/20	Lands (c.0.064ha) including 1 and 3, Prince's Court at the junction of Gloucester Street South and Prince's Street South, Dublin 2.	<p>Planning Permission for amendments to previously permitted hotel development (Reg. Ref. 4805/19) on lands (c. 0.064ha) including No. 1 and No. 3 Prince's Court, at the junction of Gloucester Street South and Prince's Street, South, Dublin 2. The proposed amendments comprise of the following:</p> <ul style="list-style-type: none"> - Provision of 5 no. additional hotel rooms, increasing the number of rooms from 108 no. permitted to 113 no. - Infill of permitted set back on the 6th floor level to the west elevation with set back now occurring at 8th floor and part 7th floor level. - Infill of permitted set back at 6th floor level on the south elevation with the set back now occurring on the 7th floor level. - Infill of permitted set back at 7th floor on the south east elevation with the set back now occurring at 8th floor level. - Minor modifications to the permitted entrance door detail. - Internal reconfiguration of the permitted 6th and 7th floor hotel layout. <p>The overall development will result in a minor increase the total floor area from GFA of c. 4,655.2 sq.m previously permitted under Reg. Ref. 4805/19 to c. 4,795.7 sq.m GFA.</p>
4805/19	Lands (c.0.064ha) including 1 and 3, Prince's Court at the junction of Gloucester Street South and Prince's Street South, Dublin 2.	<p>Planning permission for demolition of existing 2 no. storey building and the construction of a 10 no. storey hotel development on lands (c.0.064ha) including no 1 and no 3 Prince's Court at the junction of Gloucester Street South and Prince's Street South. The proposed development comprises of the following:</p> <ul style="list-style-type: none"> • Demolition of existing 2 no. storey building (c.803.6sqm) • Construction of a 10 no. storey (c.31.9 metres) hotel development of GFA of c. 4,661.9 sqm in total, comprising of 108 no. bedrooms at 1st floor level to 9th floor level inclusive and public bar/restaurant/reception area (c.199.2 sqm) with related back of house/service areas at ground floor level, over part basement level (c. 304.5 sqm). • A number of set backs will be provided including: at 9th floor level on south elevation; at 6th floor level on the south and west elevations; at 7th floor level on the rear portion of the south

Ref. No.	Address	Proposal
		<p>elevation; at 1st floor level from the boundary of the south eastern corner of the site.</p> <ul style="list-style-type: none"> • Provision of ancillary hotel services including public bar, seating area, restaurant, reception area and back of house areas at ground floor level; • The proposed development also includes the provision of; part basement level to accommodate ancillary back of house services, plant, attenuation and 12 no. bicycle spaces; provision of a new entrance at the corner of Gloucester Street South and Prince's Street South; a secondary entrance/exit to Gloucester Street South; a secondary entrance/exit to Prince's Street South accessing ground floor level back of house areas including refuse store and linen store; provision of ESB substation and associated switchroom at ground floor level fronting Gloucester Street South, provision of green roof, provision of plant, PV panels and AOV at roof level, and all other ancillary and enabling works necessary to facilitate the proposed development.
2711/17	44-53 Townsend Street, 33-39 Moss Street, 31-33 Gloucester Street South, and including Bracken's Lane, Dublin 2.	<p>Site of c.0.4 ha. The proposed development will consist of the demolition of all building and structures on site (c.4,065sqm gross floor area (GFA) and the development of an 8 storey (with partial 7th floor level setback for balconies) hotel of c. 10,688 sqm GFA (comprising 393 no. bedrooms and related hotel facilities including reception area, lounge, kitchen, bin store, switch room and ESB substation) over basement plant level (157sqm); an 8 storey (with partial 7th floor level setback for balconies) aparthotel of c. 5,412 sqm GFA (comprising 136 no. studios/suites and related aparthotel facilities including reception area, bin store, switch room and ESB substation) over basement plant level (63 sqm); an 8 storey (with 7th floor level setback for balconies) aparthotel of c. 2875 sqm GFA (comprising 66 No. studios/suites and lobby area) over ground floor restaurant unit (482 sqm) and basement plant level (136 sqm); an 8 storey apartment block of c. 2,068 sqm GFA comprising 21 no. apartment units in a mix of 14 no. 1 bed and 7 no. 2 bed units (with associated enclosed bicycle parking, bin store at ground floor) and ground floor retail unit (110sqm); plant room and screened plant at roof level. The development will also include: vehicular and pedestrian access via Moss Street (onto Bracken's Lane) and Gloucester Street South and pedestrian access via Townsend Street; cycle parking, associated lighting; associated signage; associated site servicing (foul and surface water drainage and water supply); solar panels; the provision of SuDS measures (including attenuation tank below ground and sedum roofs). The scheme also includes: all hard and soft landscaping; boundary treatments; changes in level; and all other associated site</p>

Ref. No.	Address	Proposal
		excavation and site development works above and below ground.

- 6.106 In relation to the Planning Ref. **2711/17**, A Screening Report for Appropriate Assessment was prepared by OPENFIELD Ecological Services to accompany this planning application. This report concludes with the following:

'This project has been screened for AA under the appropriate methodology. No mitigation measures are proposed to avoid or reduce an effect to any Natura 2000 area. It has found that significant effects are not likely to arise, either alone or in combination with other plans or projects to the Natura 2000 network.'

- 6.107 In relation to the Planning Ref. **4805/19**, A Screening Report for Appropriate Assessment was prepared by OPENFIELD Ecological Services to accompany this planning application. This report concludes with the following:

'This project has been screened for AA under the appropriate methodology. It has found that significant effects are not likely to arise, either alone or in combination with other plans or projects that will result in significant effects to any Natura 2000 area.'

A full Appropriate Assessment of this project is therefore not required.'

- 6.108 As part of the assessment of the impact of the proposed development, account has also been taken of cumulative projects, i.e. developments that are currently permitted or under construction within the surrounding area, but whose environmental impact are not yet fully realised within the existing environmental baseline. Following a review of projects located in proximity to the proposed development it was determined that no significant projects are proposed or currently under construction that could potentially cause in combination effects on designated conservation sites.

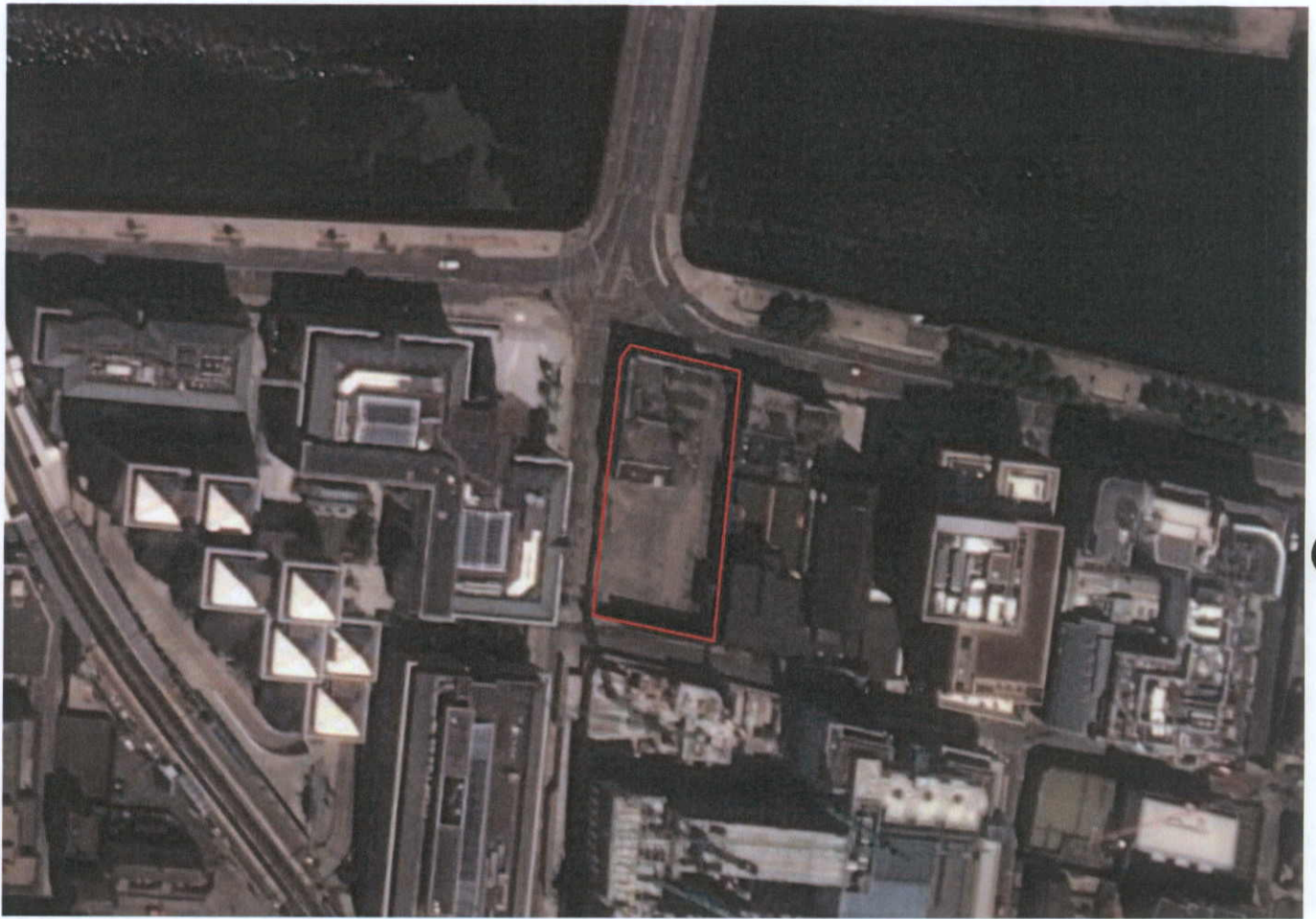
- 6.109 Given this, it is considered that in combination effects with other existing and proposed developments in proximity to the application area would be unlikely, neutral, not significant and localised. It is concluded that no significant effects on designated conservation sites will be seen as a result of the proposed development alone or in combination with other projects.

- 6.110 An AA screening/NIS was also carried out for this development. It concluded that *'No projects in the vicinity of the proposed development would be seen to have a significant in combination effect on Natura 2000 sites.'*

- 6.111 No significant effects are likely from in combination effects

APPENDIX 6.1

BAT FAUNA ASSESSMENT FOR PROPOSED DEMOLITION AND CLEARANCE WORKS AT 1-6 CITY QUAY, DUBLIN 2.



27th June 2022

Prepared by: Bryan Deegan (MCIEEM) of Altemar Ltd.
On behalf of: City Art and City Quay Partnership.

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Document Control Sheet			
Client	City Arts and City Quay Partnership		
Project	Bat Fauna Assessment for proposed demolition and site clearance works at 1-6 City Quay, Dublin 2.		
Report	Bat Fauna Assessment		
Date	27 th June 2022		
Version	Author	Reviewed	Date
Planning	Bryan Deegan	Jack Doyle	27 th June 2022

SUMMARY

Structure: Existing derelict building on site.

Location: 1-6 City Quay, Dublin 2.

Bat species present: None Roosting. No foraging or bats observed emerging from buildings

Proposed work: Demolition of existing buildings and clearance of site.

Impact on bats: No impacts on roosting bats. No impacts on foraging areas. A derogation licence for the removal of roosting bats is not required.

Survey by: Bryan Deegan MCIEEM

Survey date: 9th and 21st September 2021. 10th August 2022.

SITE LOCATION

The proposed works site is located at 1-6 City Quay, Dublin 2. The proposed site outline and location is demonstrated in Figure 1.

PROPOSED DEVELOPMENT

Ventaway Limited intend to apply for planning permission for development at a site bound by City Quay to the north, Moss Street to the west and Gloucester Street South to the south, Dublin 2. The site includes 1-4 City Quay (D02 KT32), 5 City Quay (D02 PC03), and 23-25 Moss Street (D02 F854).

The proposed development comprises:

- Demolition of the existing buildings and structures;
- Construction of a building up to 24 storeys in height over a double basement including arts centre, offices, gym and ancillary uses;
- The arts centre is contained at basement -1, ground and first floor level
- The gym is proposed at ground level onto Moss Street;
- The offices are proposed from ground to 23rd floor (24th storey) with terraces to all elevations;
- The double basement provides for 11 car parking spaces and 424 bicycle spaces
- The overall gross floor area of the development comprises 35,910 sq.m. including 1,404 sq.m. arts centre, 22,587 sq.m. offices and 244 sq.m. gym
- All ancillary and associated works and development including plant, temporary construction works, public realm, landscaping, utilities connections and infrastructure.

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

BAT SURVEY

This report presents the results of site visit by Bryan Deegan (MCIEEM) on the 9th and 21st September 2021 and 10th August 2022, during which all buildings were inspected for signs of bat use or presence. A bat emergent/detector was carried out on the 9th September 2021. A bat emergent/detector and building inspection survey was carried out on the 21st September 2021 and 10th August 2022.

COMPETENCY OF ASSESSOR

This report has been prepared by Bryan Deegan MSc, BSc (MCIEEM). Bryan has over 26 years of experience providing ecological consultancy services in Ireland. He has extensive experience in carrying out a wide range of bat surveys including dusk emergence, dawn re-entry and static detector surveys. He also has extensive experience reducing the potential impact of projects that involve external lighting on Bats. Bryan trained with Conor Kelleher author of the Bat Mitigation Guidelines for Ireland (Kelleher and Marnell (2022)) and Bryan is currently providing bat ecology (impact assessment and enhancement) services to Dun Laoghaire Rathdown County Council primarily on the Shanganagh Park Masterplan. The desk and field surveys were carried out having regard to the guidance: Bat Surveys for Professional Ecologists – Good Practice Guidelines 3rd Edition (Collins, J. (Ed.) 2016) and Marnell, Kelleher and Mullen (2022), Bat Mitigation Guidelines for Ireland V2 (which update and replace the Bat Mitigation Guidelines for Ireland published in 2006).

SURVEY METHODOLOGY

As outlined in Marnell et al. 2022 *'The presence of a large maternity roost can normally be determined on a single visit at any time of year, provided that the entire structure is accessible and that any signs of bats have not been removed by others. However, most roosts are less obvious. A visit during the summer or autumn has the advantage that bats may be seen or heard. Buildings (which for this definition exclude cellars and other underground structures) are rarely used for hibernation alone, so droppings deposited by active bats provide the best clues. Roosts of species which habitually enter roof voids are probably the easiest to detect as the droppings will normally be readily visible. Roosts of crevice-dwelling species may require careful searching and, in some situations, the opening up of otherwise inaccessible areas. If this is not possible, best judgement might have to be used and a precautionary approach adopted. Roosts used by a small number of bats, as opposed to large maternity sites, can be particularly difficult to detect and may require extensive searching backed up by bat detector surveys (including static detectors) or emergence counts.'* In relation to the factors

influencing survey results the guidelines outlines the following 'During the winter, bats will move around to find sites that present the optimum environmental conditions for their age, sex and bodyweight and some species will only be found in underground sites when the weather is particularly cold. During the summer, bats may be reluctant to leave their roost during heavy rain or when the temperature is unseasonably low, so exit counts should record the conditions under which they were made. Similarly, there may be times when females with young do not emerge at all or emerge only briefly and return while other bats are still emerging thus confusing the count. Within roosts, bats will move around according to the temperature and may or may not be visible on any particular visit. Bats also react to disturbance, so a survey the day after a disturbance event, may give a misleading picture of roost usage.'

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

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

The presence of bats is assessed with reference to their signs; principally staining, droppings, feeding signs such as invertebrate prey remains and the presence of bat fly *Nycteribiidae* pupae, although direct observations are also occasionally made. The nature and type of habitats present onsite are also indicative of the species likely to be present. The exterior and interior of the buildings were inspected for bat presence/access and a emergent survey carried out.

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

SURVEY CONSTRAINTS

The detector survey was undertaken towards the end of the active bat season in late September. Weather conditions were good with mild temperatures of 15°C after sunset. Winds were light and there was no rainfall. Insects were observed in flight. This is not seen as a constraint as conditions were optimal. Additional surveys were carried out on the 10th August 2022.

REVIEW OF LOCAL BAT RECORDS

The review of existing bat records (sourced from *Bat Conservation Ireland’s* National Bat Records Database) within a 2km² grid (Reference grid O13S) encompassing the study area reveals that four of the nine known Irish species have been observed locally (Table 1). The National Biodiversity Data Centre’s online viewer was consulted in order to determine whether there have been recorded bat sightings in the wider area. This is visually represented in Figures 2 - 5. The following species were noted in the wider area: Brown Long-eared Bat (*Plecotus auritus*), Soprano Pipistrelle (*Pipistrellus pygmaeus*), Whiskered Bat (*Myotis nattereri*), Daubenton’s Bat (*Myotis daubentonii*), Natterer’s Bat (*Myotis nattereri*), Nathusius’s Pipistrelle (*Pipistrellus nathusii*), and Pipistrelle (*Pipistrellus pipistrellus sensu lato*) (Figures 2 - 5).

Table 1: Status of bat species within 2km² grid encompassing the subject site (Reference no. O13S)

Species name	Record count	Date of last record	Note
Lesser Noctule (<i>Nyctalus leisleri</i>)	3	15/09/2010	National Bat Database of Ireland
Nathusius’s Pipistrelle (<i>Pipistrellus nathusii</i>)	1	15/09/2010	National Bat Database of Ireland
Pipistrelle (<i>Pipistrellus pipistrellus sensu lato</i>)	2	15/09/2010	National Bat Database of Ireland
Soprano Pipistrelle (<i>Pipistrellus pygmaeus</i>)	1	18/05/2006	National Bat Database of Ireland

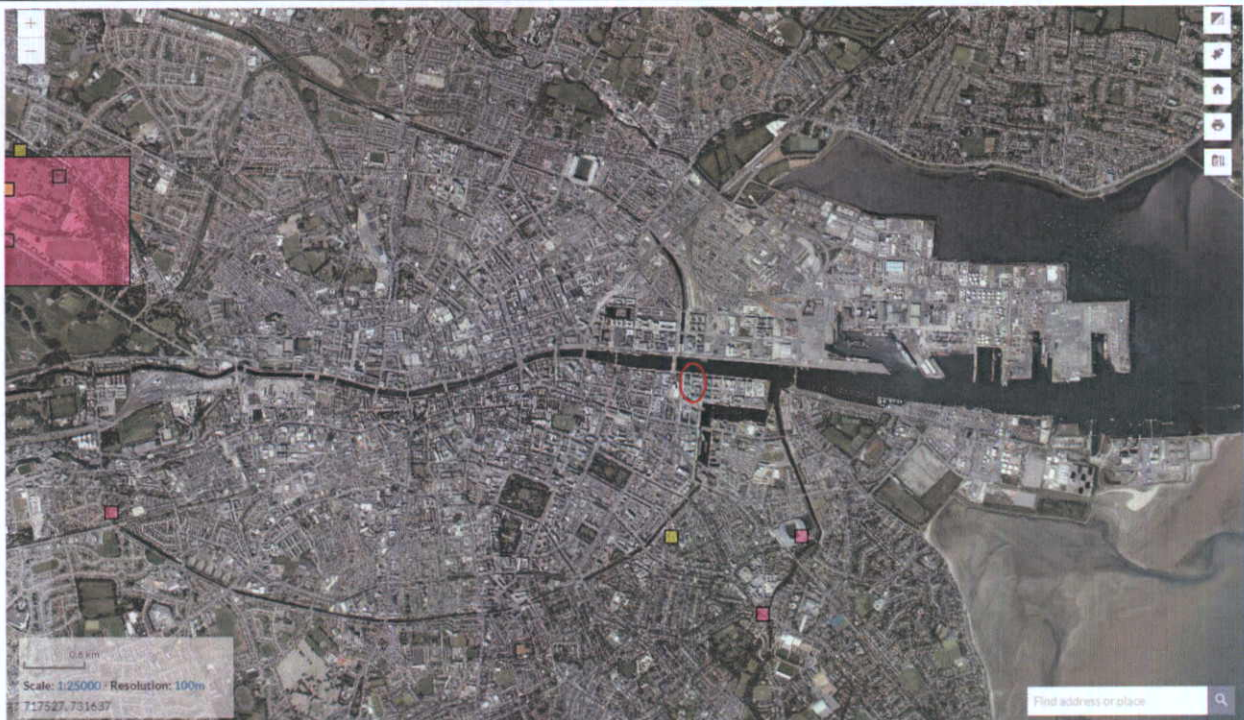


Figure 2. Brown Long-eared Bat (*Plecotus auritus*) (yellow), Daubenton’s Bat (*Myotis daubentonii*) (purple), and both Brown Long-eared Bat and Daubenton’s Bat (orange) (Source NBDC) (Site – red circle)

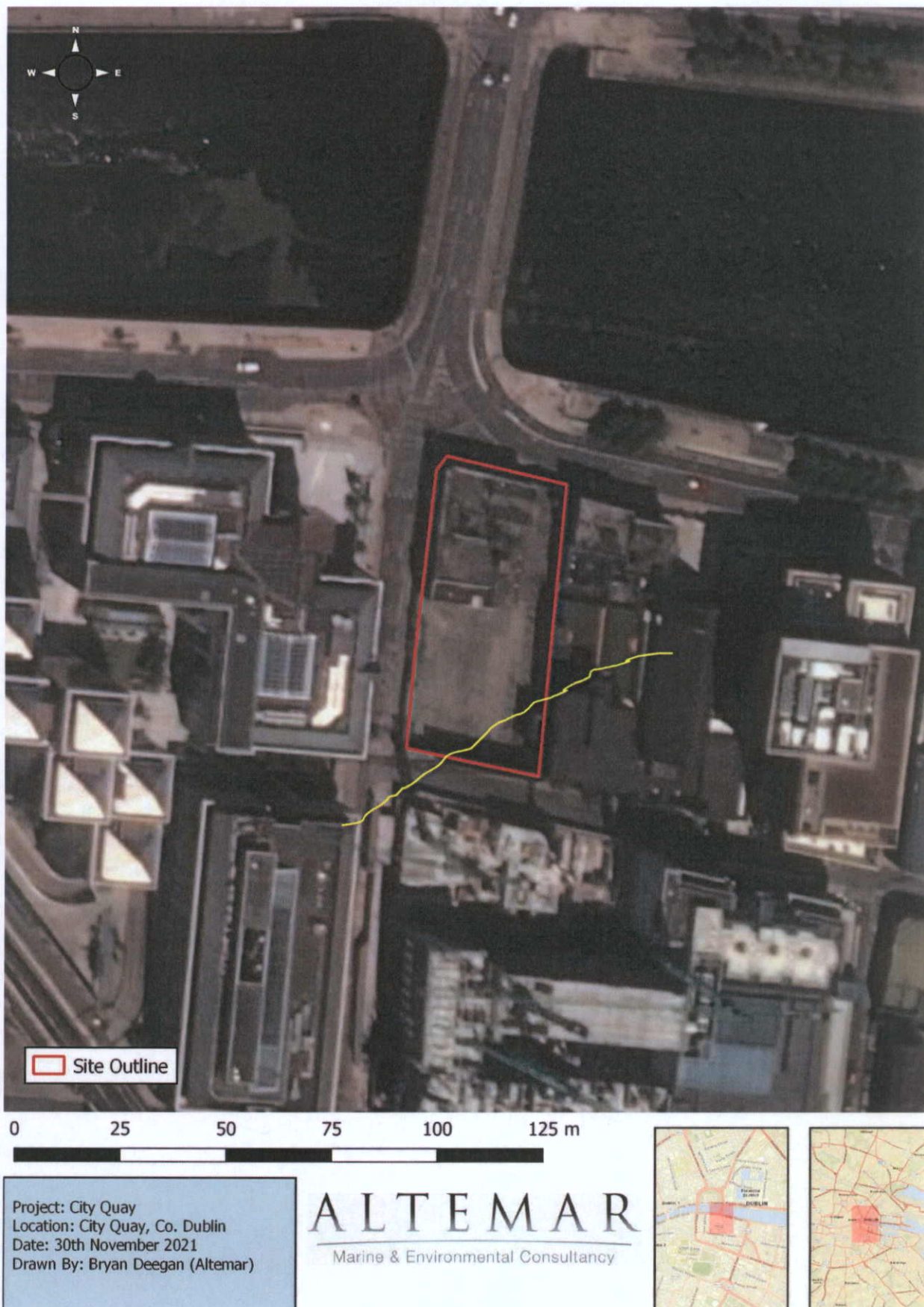


Figure 1. Proposed site outline and location. Soprano pipistrelle transiting site (yellow (2021))

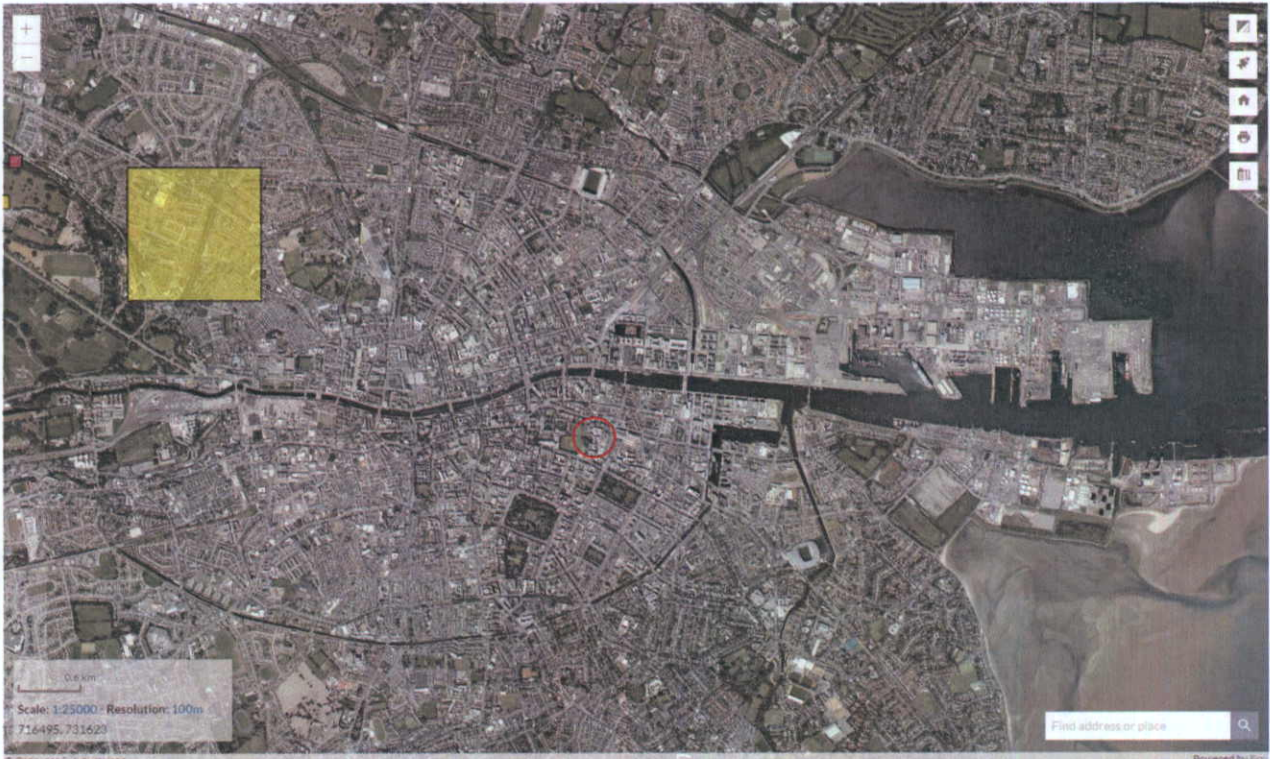


Figure 3. Natterer's Bat (*Myotis natterer*) (purple), Whiskered Bat (*Myotis mystacinus*) (yellow), and both Natterer's Bat and Whiskered Bat (orange) (Source NBDC) (Site – red circle)



Figure 4. Nathusius's Pipistrelle (*Pipistrellus nathusii*) (purple), Pipistrelle (*Pipistrellus pipistrellus sensu lato*) (species aggregate) (yellow), and both Nathusius's Pipistrelle and Pipistrelle (orange) (Source NBDC) (Site – red circle)

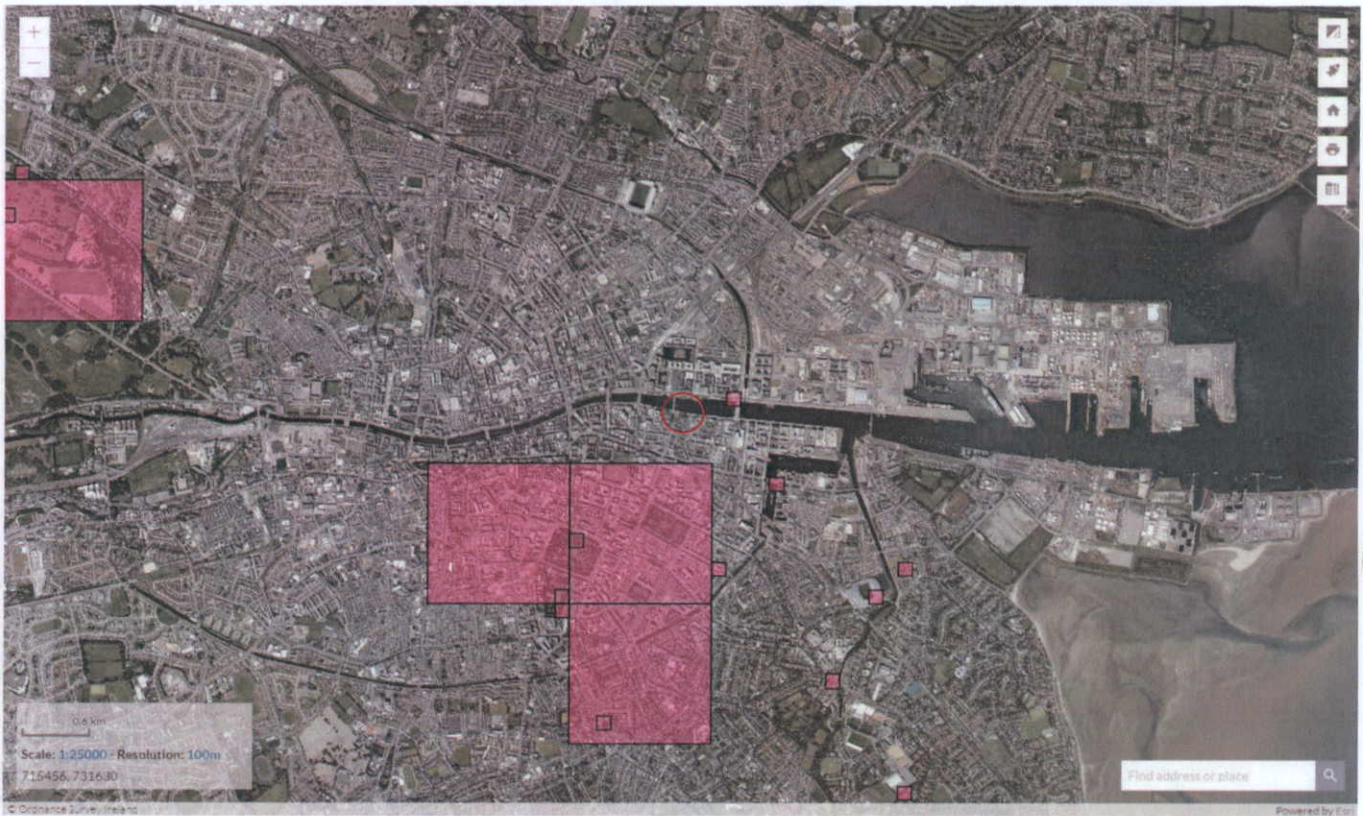


Figure 5. Soprano Pipistrelle (*Pipistrellus pygmaeus*) (purple) (Source NBDC) (Site – red circle)

POTENTIAL ROOST SURVEY

The site comprised of a main building and a small outbuilding and a car park. No trees of bat roosting potential were on site. At dusk a survey was carried out by the detector to assess if bats emerged from the buildings. An internal inspection of the buildings was carried out. No bats were observed emerging from on site buildings. No evidence of bat presence or activity was noted internally within the buildings on site.



Plate 1. Proposed development site (main building)



Plate 2. Outbuilding

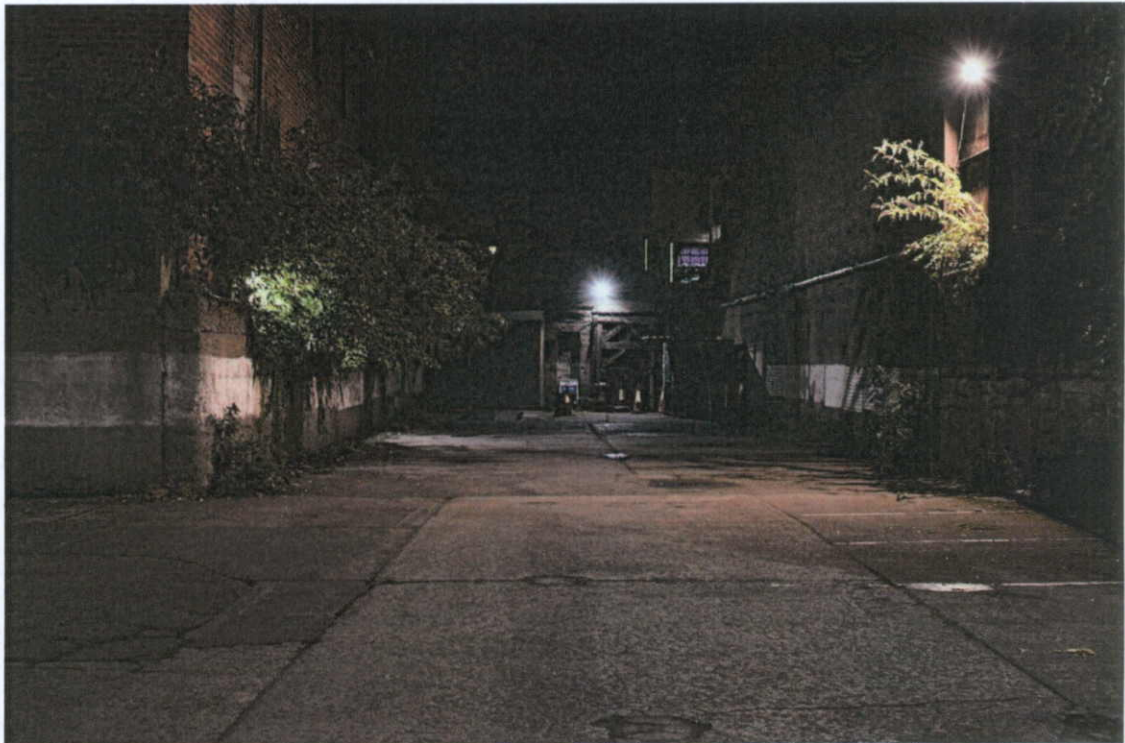


Plate 3. Existing lighting on site.



Plate 4. Interior of building.

Detector survey

Bat emergent surveys were carried out in optimal conditions within the bat survey season. No bats were observed foraging on site. No bats were detected emerging from

any of the onsite buildings. A single soprano pipistrelle bat was noted transiting the site but did not emerge from buildings on site.

Potential impacts of proposed redevelopment on bats

No roosts or bats emerging onsite buildings were observed. The demolition of the buildings on site would not result in a loss of bat roosts or bat foraging.

Mitigation measures

As no evidence of a bat roost or roosting activity was noted onsite, no mitigation measures in regard to the roosting of these animals are needed during the proposed works. There is also no requirement for a *National Parks and Wildlife Service* derogation licence application to allow the planned works. However, as bats may inhabit a site between the original survey and the commencement of works on site, a pre construction inspection should be carried out prior to demolition commencing.

Predicted and residual impact of the proposal

There is no evidence of a current or past bat roost in the structures on site, therefore no significant negative impacts on the roosting of these animals are expected to result from the proposed development. Foraging activity was not present.

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APPENDIX 6.2

City Quay Winter Bird Surveys December 2021

APPENDIX 6.2 City Quay Winter Bird Surveys December 2021

Introduction

In December 2021 two winter bird surveys were conducted at City Quay, in Dublin City Centre, by Hugh Delaney, a freelance ecologist (Birds primarily) with an experienced background in bird surveying on numerous sites with ecological consultancies over 10+ years. Hugh, a lifelong birder, is local to the Dun Laoghaire-Rathdown area in Dublin and is especially familiar with the bird life and its ecology in the environs going back over 30 years.

Winter Bird Survey Methodology

The surveys at City Quay were conducted specifically to ascertain if the site was on the path of flightlines of species moving over the site as birds transition from one site to another, in a Dublin context the species concerned would be Brent Geese and wader species like Curlew, Oystercatcher and Black-tailed Godwit. Winter bird surveys are conducted from soon after sunrise until late in the afternoon before sunset, the site is monitored throughout the day and all bird species utilizing the site recorded, including species flying through overhead. Checks are also made on suitable habitat nearby or adjacent the site for comparative purposes and to monitor any interchange of birds between sites. Target species (species of more special interest) utilizing the site will be mapped and estimates of the time these species frequented the site recorded.

Site Location

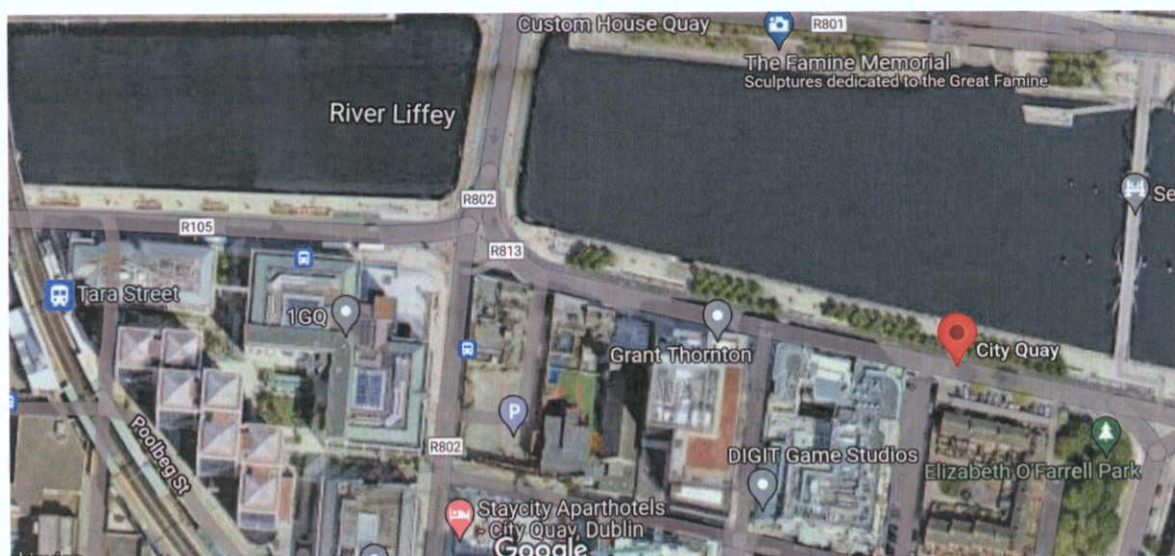


Figure 1. Site Location – Block situated south of Talbot Bridge (between ‘R813’ and ‘R802’ on map). Vantage point was from Talbot Bridge, which gave good elevation to view site and clear views west and east of Liffey.

Site Description

Urban site partly demolished in city center urban location to south of river Liffey.

Specific site survey methodology

Continual observations of site and surrounding area mainly from Talbot Bridge immediately to the north which afforded a good overview of the site, also observations made from City Quay and George's Quay.

Survey results

December 14th, 2021

Sunrise- 08.33hrs/Sunset 16.06hrs. Weather – Wind F2 Southwest, Cloud 3/8, Dry, 7c, Excellent visibility. On-site 08.20hrs – 15.30hrs.

Species recorded – Herring Gull, Black-headed Gull, Lesser black-backed Gull, Feral Pigeon, Pied Wagtail, Black Guillemot, Brent Geese, Mute Swan, House Sparrow.

Observations from 08.20hrs – 12.00hrs –

Herring Gull and Black-headed Gull dominating the avifauna recorded through the morning with peak counts of 58 Herring Gull at 11.30hrs and 45 Black-headed Gull at 10.40hrs, almost all on Liffey area. Single Herring and Black-headed Gull recorded passing over the site occasionally, with most being 4 Herring over site at 10.10hrs. Small numbers of Lesser black-backed Gull (<4) in Liffey area also during morning. Feral Pigeon and Pied Wagtail noted on site structure. No target species (Brent Geese, Wader species etc.) on-site or noted passing over site.

Observations from 12.00hrs – 15.30hrs –

Peak counts of Herring Gull were 62 at 14.35hrs and Black-headed Gull 40 at 13.15hrs. Occasional birds of both species passing over the site, maximum recorded together were 5 Herring Gull and 3 Black-headed Gull flying south over the site at 15.10hrs. A flock of 40 Brent Geese were observed distantly east of vantage point on Talbot Bridge (birds were estimated to be east of the Samuel Beckett Bridge) at 13.20hrs flying north to south. Two Mute Swan flew east over vantage point on Talbot Bridge at 14.05hrs. No target species recorded on-site or passing over the site.

December 27th, 2021

Sunrise- 08.40hrs/Sunset 16.12hrs. Weather – Wind F1 East, Cloud 6/8, Dry, 6c, Excellent visibility. On-site 09.00hrs – 15.50hrs.

Species recorded – Herring Gull, Black-headed Gull, Lesser black-backed Gull, Common Gull, Feral Pigeon, Black Guillemot, Cormorant, House Sparrow, Pied Wagtail.

Observations from 09.00hrs – 12.00hrs –

Herring Gulls and Black-headed Gull dominating throughout the morning with peak counts of Herring Gull (<45) and 10.45hrs and Black-headed Gull (<24) at 11.25hrs observed from Talbot Bridge, small number of Lesser black-backed Gull (<8) also in area. Gulls recorded mostly on Liffey north of the site with occasional sightings of Herring Gull and Black-headed Gull passing over the site (2-4 at a time usual). Pied Wagtail and Feral Pigeon observed occasionally land on site structure. Black Guillemot (<5) observed further south on Liffey from Talbot Bridge, mainly east of Sean O'Casey Bridge. No other target species recorded, and no target species recorded passing over the site.

Observations from 12.00hrs – 15.30hrs –

Herring Gull numbers peaked at 55 at 13.45hrs with Black-headed Gulls peaking at 38 at 14.30hrs, most on river Liffey. Small numbers of both occasionally passing over the site, generally just 2-3 or single birds, 8 Herring Gull noted soaring over the site at 15.05hrs. Common Gull (single birds) noted on Liffey at 13.15hrs and 14.35hrs north of site. A Cormorant passed east over Talbot Bridge at 12.25hrs and 14.10hrs. Black Guillemot (<4) noted again east of Sean O'Casey bridge with two birds between Talbot and Sean O'Casey Bridge at 14.00hrs. Pied Wagtail and Feral pigeon again occasionally on-site. No other target species recorded on-site or passing over the site.

Comments and observations on the survey results

11 bird species were recorded from observations made at the City Quay site. Results from the surveys suggest that the site is not an ex-situ foraging or roosting site for species of qualifying interest from nearby Special protection areas (SPA's). Results also suggest that the site is not a regular flightline path for such species like Brent Geese or other species of significant interest, from the observers experience of regular commuting through this part of the city center these species are not frequently encountered passing through this area. The birds move primarily from roost sites (in the case of Brent Geese for example - the North Bull) on the coast and travel west and northwest further north and east from Dublin city center. A nearby site being surveyed in Fairview concurrently in the same period that these surveys were conducted found Brent Geese were following the Tolka river from the coast as a route to negotiate towards feeding grounds inland. This would appear to be the closest flight path to the city center identified and some distance from this site.

7

CHAPTER 7

LAND, SOILS, GEOLOGY & HYDROGEOLOGY



7.0 LAND, SOILS, GEOLOGY AND HYDROGEOLOGY

7.1 INTRODUCTION

- 7.1 This chapter of the EIAR which assesses and evaluates the potential effects on the land, soil, geological and hydrogeological aspects of the site and surrounding area.
- 7.2 In assessing likely potential and predicted effects, account is taken of both the importance of the attributes and the predicted scale and duration of the likely effects.

7.2 METHODOLOGY

7.2.1 Appraisals Methodology

- 7.3 The assessment follows the Procedures set out in the Institute of Geologists of Ireland (IGI) *Guidelines for the preparation of Soils Geology and Hydrogeology Chapters of Environmental Impact Statements* (2013), the EPA guidelines for EIAR, and other relevant guidelines set out below to assess and evaluates land, soils, geology and hydrogeology within the context of the proposed development. This assessment includes a review of the existing environment, the potential impacts of the proposed development, mitigation measures, and the potential impacts.
- 7.4 In addition, the document entitled '*Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes*' by the National Roads Authority/ Transport Infrastructure Ireland (NRA/TII, 2009) is referenced where the methodology for assessment of impact is appropriate.
- 7.5 In this assessment, consideration is given to both the importance of an attribute and the magnitude of the potential environmental impacts of the proposed activities on that cited attribute.
- 7.6 The rating of potential environmental effects on the soils and geology environment is based on the matrix presented in Chapter 1 (Introduction) Table 1.2 which takes account of the quality, significance, duration, and type of impact characteristic identified.
- 7.7 The IGI and TII (previously NRA) criteria for rating the magnitude and significance of impacts at EIA stage on the geological related attributes are also relevant in determining impact assessment and are presented in Table 7.1 and 7.2 (see Appendix 7.1).
- 7.8 The principal attributes (and impacts) to be assessed include the following:
- The extent of topsoil and subsoil cover and the potential use of this material on site or requirement to remove it off-site as waste for disposal or recovery;
 - High yielding water supply springs/ wells in the vicinity of the site to within a 2Km radius and the potential for increased risk presented by the Proposed Development;
 - Classification (regionally important, locally important) and extent of aquifers underlying the site perimeter area and increased risks presented to them by the

Proposed Development associated with aspects such as for example removal of subsoil cover, removal of aquifer (in whole or part), drawdown in water levels, alteration in established flow regimes and/or change in groundwater quality;

- Natural hydrogeological/ karst features in the area and potential for increased risk presented by the activities at the site;
- Groundwater-fed ecosystems and the increased risk presented by operations both spatially and temporally; and,
- Presence of area of geological heritage and potential to impact on same.

7.2.2 Guidelines

7.9 The Assessment has been carried out generally in accordance with the following guidelines:

- Environment Protection Agency (EPA), *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (2022);
- European Union, *Guidance on the preparation of the Environmental Impact Assessment Reports* (2017);
- Institute of Geologists of Ireland (IGI) *Guidelines for the preparation of Soils Geology and Hydrogeology Chapters of Environmental Impact Statements* (2013);
- National Roads Authority (NRA) *Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes* (2009);
- Environment Protection Agency, *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements* (2003); and
- Institute of Geologists of Ireland (IGI) *Geology in Environmental Impact Statements, a Guide* (2002).

7.2.3 Sources of Information

7.10 Desk-based geological information on the substrata (both Quaternary deposits and bedrock geology) underlying the area in which the site is located was obtained through accessing databases and other archives where available. Data was sourced from the following:

- The Geological Survey of Ireland (GSI) well card, groundwater body descriptions, aquifer type, vulnerability, groundwater boreholes, geological heritage database and source protection zones for the area were inspected,
- Teagasc soil and subsoil database;
- Ordnance Survey Ireland - aerial photographs and historical mapping;
- Environmental Protection Agency (EPA) – website mapping and database information.

7.11 Information on the proposed design including civil engineering works are outlined in the planning drawings and the Engineering Planning Report prepared by Atkins which is included with the planning submission. Additional information has been compiled through consultation and feedback from the project/EIA Team.

7.3 RECEIVING ENVIRONMENT

7.3.1 Topography

- 7.12 The topography of the proposed development site is generally flat with the elevation of the site ranging from 2.97mOD (Ordnance Datum) to 3.01 mOD.

7.3.2 Site Area Description

- 7.13 The lands primarily comprise the former City Arts Centre Building and associated hard standing bounded to the north by City Quay, to the west by Moss Street, and to the south by Gloucester Street South. The City Quay Covid testing centre and City Quay National school are situated along the eastern boundary of the subject lands.
- 7.14 The City Quay Arts site is one of the most significant brownfield sites in Dublin City centre and presents an exceptional opportunity to deliver a high-density development in the city's central core. The site is located at the junction of City Quay and Moss Street the site extends to 0.22 hectares. The site is also bounded to the south by Gloucester Street South. This site is fully hardstanding.
- 7.15 For many years the site has been vacant, with the abandoned City Arts Centre building, occupying the north-west corner of the site, now a derelict ruin. The only activity on the site since the mid 1990's has been its use for surface car parking. A small storage shed is located along the western perimeter of the yard.
- 7.16 The site is ideally placed to be part of an emerging cluster of buildings which will frame the backdrop and urban setting of the customs house. The City Quay site can be developed as part of a balanced massing on the South Quays to include the recently approved scale of the Tara Steet Tower and College Square developments, which will reinforce the symmetrical setting of the Customs House on the North Quays.
- 7.17 The proposed development site is zoned 'Zone 25: City Centre' in the Dublin City Council Development Plan 2016-2022 and the draft Dublin City Council Development Plan 2022-2028.
- 7.18 The receiving environment in terms of land, soils, geology, and hydrogeology is described in the following sections.

7.3.3 Soils

- 7.19 The EPA soil map ([EPA Maps](#)) shows that at the location and surrounding area, the soil types found are predominantly Made (Made Ground) which is to be expected considering the urban location of the site. See Figure 7.1.

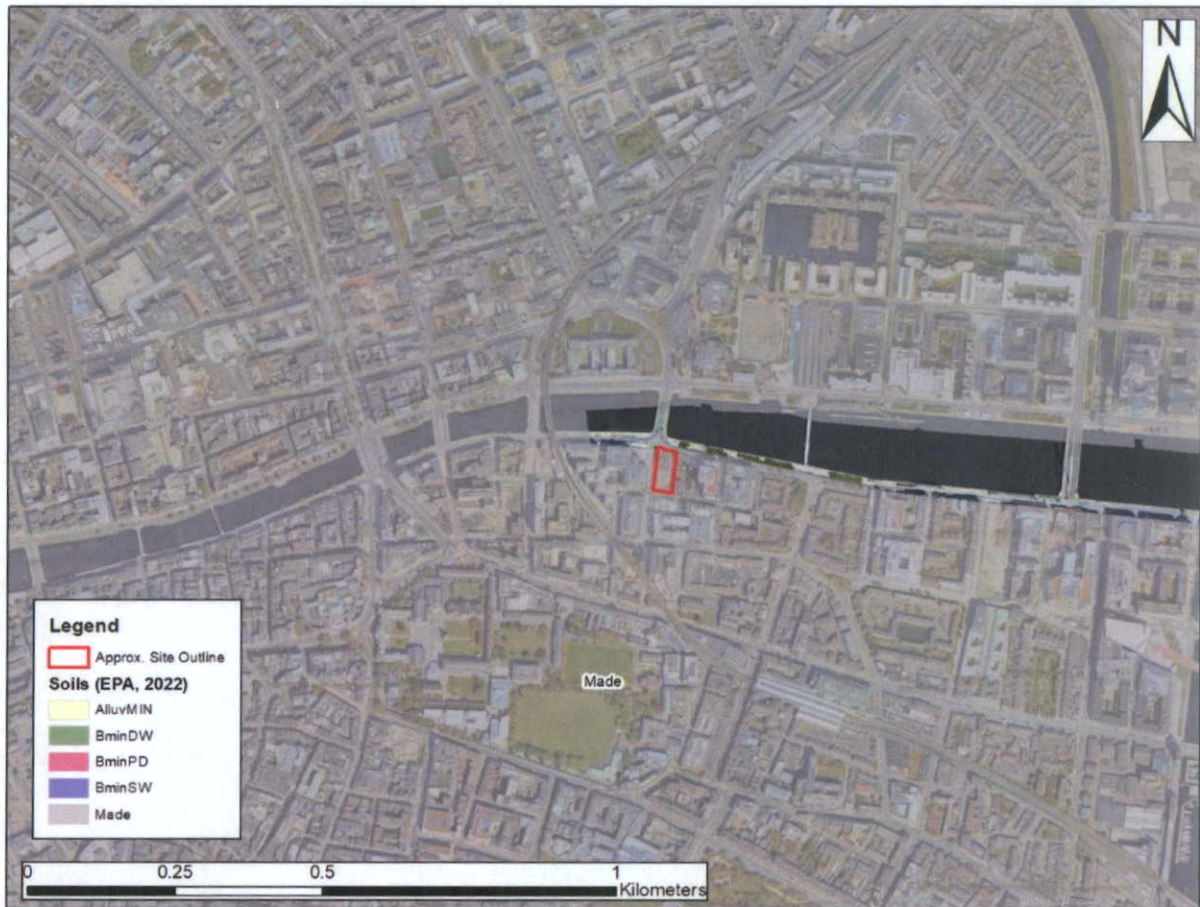


Figure 7.1 Soils Map

7.3.4 Quaternary Deposits

- 7.20 The Quaternary Period is the final stage of the geological time scale. This period includes the start of the Ice Age (approximately 1.6 million years ago), known as the Pleistocene Epoch right through to the postglacial period, known as the Holocene Epoch, which began 10,000 years ago and extends from the Pleistocene to the present day.
- 7.21 The Pleistocene Epoch in Ireland began when there was a significant cooling of the Earth's climate and was characterised by alternating extended periods of very cold conditions, during which time much of the country was covered by an ice sheet. These colder periods were interspaced with warmer periods, known as interglacials, which lasted for approximately 10,000 years at a time.
- 7.22 The GSI subsoil map ([Map Series \(arcgis.com\)](http://Map Series (arcgis.com))) indicates that the majority of the site and surrounding area is underlain Made Ground. Figure 7.2 shows the subsoils underlying the site.

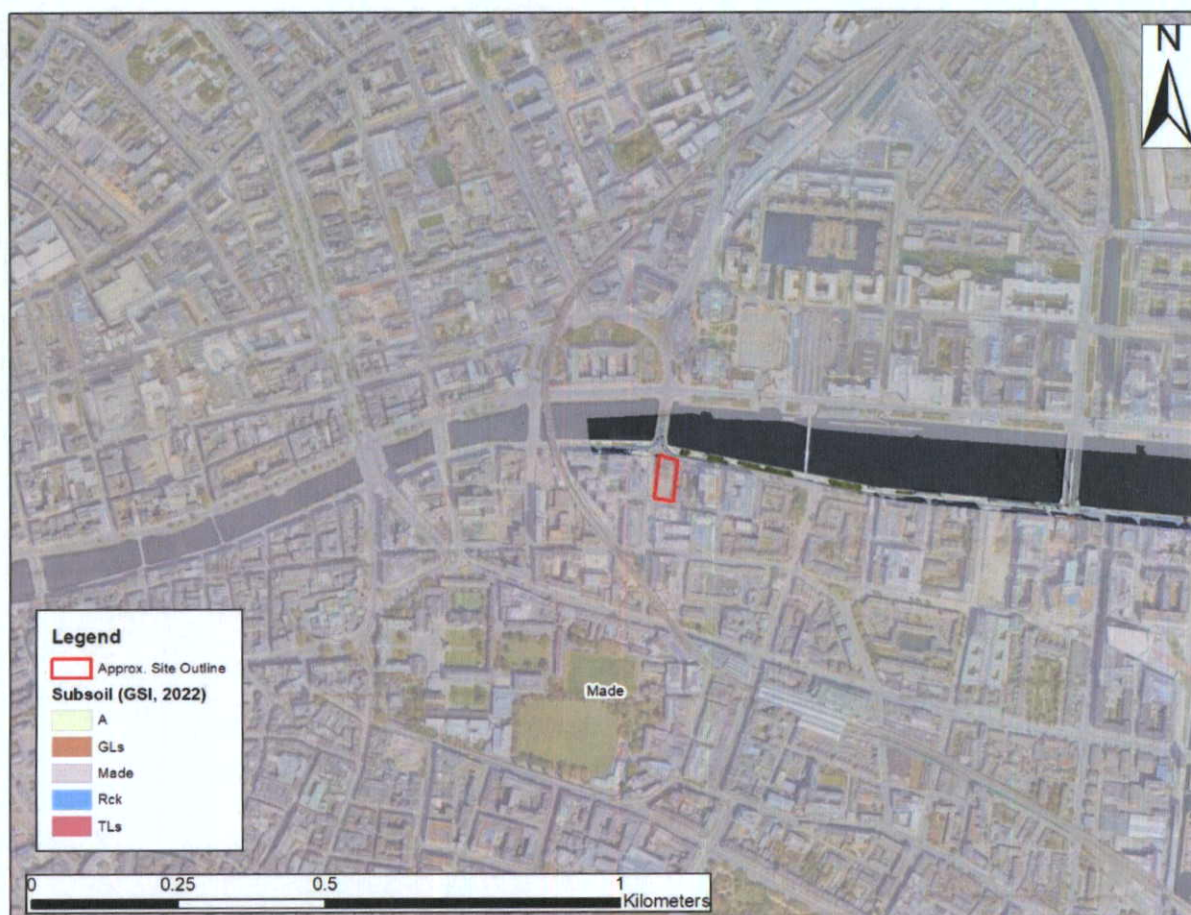


Figure 7.2 Subsoils Map

7.3.5 Site Investigations

7.23 Site investigations were carried out in January 2020 by Site Investigations Limited (SIL). The fieldworks comprised the use of a cable percussive borehole. All fieldwork was carried out in accordance with BS 5930:2015, Engineers Ireland GI Specification and Related Document 2nd Edition 2016 and Eurocode 7: Geotechnical Design. Laboratory testing has been performed on representative soil samples recovered from the boreholes and these were completed in accordance of BS1377: 1990. The fieldworks comprised of the following:

- Three (3) no. cable percussive boreholes

7.24 Cable percussion boring was undertaken at 3 No. locations using a Dando 150 rig and constructed 200mm diameter boreholes. Prior to drilling commencing, a hand dug inspection pit was excavated to check for underground services. The boreholes terminated at similar depths from 8.90mbgl (metres below ground level) to 9.10mbgl when obstructions were encountered. Bulk disturbed samples were recovered at regular intervals and returned to SIL for laboratory testing.

7.25 Borehole logs are available as Appendix 7.2 at the end of this report.

7.26 A second round of site investigations were carried out in April and May 2022 by Ground Investigations Ireland (GII). The purpose of these site investigations was to investigate subsurface conditions utilising a variety of investigative methods in accordance with

the project specification. The scope of the works for the April and May investigations undertaken for this project included the following and these are in addition to January 2020 investigations:

- Visit project site to observe existing conditions
- Carry out 3 No. Rotary Core Boreholes to a maximum depth of 12.30m BGL
- Installation of 3 No. Groundwater monitoring wells
- Installation of 3 No. Groundwater data loggers and 1 No. Barologger
- Groundwater laboratory testing

7.3.5.1 Ground Conditions

7.27 According to the SIL investigations, the site ground conditions show MADE GROUND encountered to 2.80mbgl and 2.90mbgl. This was logged as clay soils overlying gravel soils with red brick and concrete fragments running through them.

7.28 Underlying the fill material is granular SAND and GRAVEL soils with cohesive CLAY and SILT soils underlying these with the boundaries between 4.80mbgl and 5.60mbgl. BH02 recorded further granular soils at 5.60mbgl whereas the two holes closer to the river recorded cohesive soils until termination.

7.29 According to the GII investigations, the following ground conditions were encountered:

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

SURFACING: Concrete surfacing was present to a depth of between 0.05m and 0.15m BGL.

MADE GROUND: Made Ground deposits were encountered beneath the Surfacing and were present to a relatively consistent depth of between 3.50m and 3.80m BGL, with Possible Made Ground noted in BH03 to a maximum depth of 5.30m BGL. These deposits were described generally as *brown/grey clayey gravelly Sand with frequent red brick and concrete fragments onto greyish brown sandy gravelly Clay with red brick and mortar fragments onto greyish dark brown slightly silty slightly sandy gravelly Clay with organic matter*. In BH03 *grey angular coarse gravel FILL* was noted beneath the Surfacing to a depth of 0.30m BGL, overlying Made Ground deposits following the descriptions outlined above.

GRANULAR DEPOSITS: Granular deposits were encountered beneath the Made Ground in BH01 and BH03 and were typically described as *grey slightly clayey slightly sandy subrounded to rounded fine to coarse GRAVEL*. In BH02 there was no recovery from 3.80m to 5.30m BGL, but the driller noted a Sandy deposit. The secondary sand/gravel and silt/clay constituents were relatively consistent across the site but varied with depth. There was no cobble or boulder content recorded.

COHESIVE DEPOSITS: Cohesive deposits were encountered beneath the Granular Deposits and were described typically as *grey sandy gravelly CLAY*, with silt and shells also noted as a secondary constituent in BH01 and BH03. The secondary sand and gravel constituents varied across the site and with depth. The strength of the cohesive deposits varied across the site and with depth, but was typically stiff below 3.80m BGL in most of the exploratory holes.

BEDROCK: The rotary core boreholes recovered *Weak to Medium Strong to Strong thinly laminated grey fine to medium grained LIMESTONE interbedded with weak to Medium Strong thinly laminated fine-grained Mudstone*. This is typical of the Lucan Formation, which is noted on the geological mapping at the proposed site.

- 7.30 The depth to rock varies from 8.30mbgl in BH03 to a maximum of 9.80mbgl in BH01 and 8.60mbgl in BH02. Borehole logs are available as Appendix 7.2 at the end of this report.
- 7.31 As per Chapter 12 of this EIA Report, there is potential for a section of a disused underground stream called the 'Gallows Stream' to cross the proposed development area. Documentary sources refer to the stream as rising near Leeson Lane, off Leeson Street, and flowing close to Government Buildings (Oram 2004; Sweeney 2017). However, based on the available site investigations it was not encountered.

7.3.5.2 Soil Quality

- 7.32 Soil samples were collected during the SIL investigations. Environmental testing was carried out on three samples from the investigation and the results are shown in Appendix 7.3. For material to be removed from site, Rilta Suite testing was carried out to determine if the material is hazardous or non-hazardous and then the leachate results were compared with the published waste acceptance limits of BS EN 12457-2 to determine whether the material on the site could be accepted as '*inert material*' by an Irish landfill.
- 7.33 The Waste Classification report created using HazWasteOnline™ software shows that the material tested has to be classified as *hazardous* material. All three samples recorded elevated levels of lead with BH01 and BH03 recording elevated levels of zinc.
- 7.34 A trace sample of chrysotile (white asbestos) was recorded in the sample from BH02 and further analysis of possible asbestos on site should be included within the Environmental Engineer's investigation.
- 7.35 Any MADE GROUND excavated on site should be stockpiled separately to natural soils to avoid any potential cross contamination of the soils prior to removal from site.

7.3.5.3 Groundwater Conditions

- 7.36 Groundwater details in the borehole during the fieldworks are noted on the log in Appendix 7.2. Two groundwater ingresses were noted during the drilling process but were recorded at depths of 4.80mbgl or greater. The initial strike was sealed off by the borehole casings and then a second strike was recorded as the borehole progressed. At the end of drilling, the highest water level was recorded at 3.00mbgl.
- 7.37 According to the GII site investigations, no groundwater was noted however it was pointed out that these exploratory holes did not remain open for sufficiently long periods of time to establish the hydrogeological regime and groundwater levels that would be expected to vary with the time of year, rainfall, nearby construction and other factors. For this reason, standpipes were installed in each of the three boreholes to allow the equilibrium groundwater level to be determined.
- 7.38 However, three (3) no. continuous data loggers were installed as part of these investigations. These data loggers measure the groundwater elevations in each of the three (3) no. groundwater monitoring wells. The loggers were set at 1-hour intervals and were left in-situ for approximately 1 month.

- 7.39 Based on the available groundwater level data, groundwater levels across the site are generally 3.29 mbgl (-0.20mOD, BH02) to 3.78 mbgl (-0.63mOD, BH01). There appears to be no tidal influence on the groundwater levels at the site. All boreholes are screened within the underlying bedrock.

7.3.5.4 Groundwater Quality

- 7.40 During the GII investigations, three (3) no. groundwater monitoring wells were installed to examine the underlying groundwater quality at the site by GII under the supervision of Byrne Looby. No groundwater monitoring wells were installed as part of the 2020 SIL investigations.
- 7.41 Groundwater samples were collected from each of the groundwater monitoring wells that was installed within the proposed development site. Therefore, three (3) no. groundwater samples were collected in total.

Metals

- 7.42 Overall, all metals are below the available Groundwater Threshold values (GTVs, S.I. No. 9/2010 & S.I. No. 366/2016). Refer to Table 7.1 below.

Sample ID	Details				Groundwater		
					BH01	BH02	BH03
Laboratory					Element	Element	Element
Sample Type					Ground Water	Ground Water	Ground Water
Location					Onsite	Onsite	Onsite
Sample Date					11/05/2022		
Parameters	Units	MDL	GTV (Groundwater)	IGV (Groundwater)			
Aluminium	mg/l	0.02	0.15	0.2	-	-	-
Antimony	mg/l	0.002	<i>nv</i>	<i>nv</i>	-	-	-
Arsenic	mg/l	0.0025	0.0075	0.01	-	-	-
Cadmium	mg/l	0.0005	0.00375	0.005	-	-	-
Chromium	mg/l	0.0015	0.0375	0.03	-	-	-
Cobalt	mg/l	0.002	<i>nv</i>	<i>nv</i>	-	-	-
Copper	mg/l	0.007	1.5	0.03	-	-	-
Total Iron	mg/l	0.02	<i>nv</i>	0.2	0.058	-	-
Lead	mg/l	0.005	0.01875	0.01	-	-	-
Manganese	mg/l	0.002	<i>nv</i>	0.05	0.004	0.552	0.552
Mercury	mg/l	0.001	0.00075	0.001	-	-	-
Nickel	mg/l	0.002	0.015	0.02	-	0.003	0.009
Selenium	mg/l	0.003	<i>nv</i>	<i>nv</i>	-	-	-
Zinc	mg/l	0.003	0.075	0.1	0.058	0.017	0.068
Key							
	Value exceeds the Threshold Value (Groundwater)						
GTV	Groundwater Threshold Value						
IGV	Interim Guideline Value						
MDL	Method Detection Limit						
-	Less than the MDL						
<i>nv</i>	No Value						
	<i>nt</i> Not tested						

Table 7.1 Metals Suite Table Compared to the Available Standards and Guidelines.

General Suite (Major Ions and Cations)

- 7.43 Overall, the majority of the general suite analytes are below the available Groundwater Threshold values (GTVs, S.I. No. 9/2010 & S.I. No. 366/2016). Refer to Table 7.2 below. However, there is elevated concentrations of chloride, sodium and sulphate at BH2 & BH3. These elevated concentrations with a high concentration of electrical conductivity indicates that there is some tidal influence due to the close proximity of the River Liffey and Dublin Bay (c. 1.50km east from the site).

Sample ID	Details				Groundwater		
					BH01	BH02	BH03
Laboratory					Element	Element	Element
Sample Type					Ground Water	Ground Water	Ground Water
Location					Onsite	Onsite	Onsite
Sample Date					11/05/2022		
Parameters	Units	MDL	GTV (Groundwater)	IGV (Groundwater)			
Anions & Cations							
Calcium	mg/l	0.2	<i>nv</i>	200	24.9	<u>448.5</u>	<u>370.2</u>
Chloride as Cl	mg/l	0.3	187.5	30	80.9	<u>6,956.20</u>	<u>216.4</u>
Magnesium	mg/l	0.1	<i>nv</i>	50	5.6	<u>492</u>	<u>54.1</u>
Potassium	mg/l	0.1	<i>nv</i>	5	2.8	<u>144.8</u>	<u>31.1</u>
Sodium	mg/l	0.1	150	150	46.3	<u>4074.3</u>	136.4
Sulphate as SO ₄	mg/l	0.05	187.5	200	32.7	<u>993.7</u>	<u>623.4</u>
Nutrients							
Nitrite as NO ₂	mg/l	0.02	<i>nv</i>	<i>nv</i>	-	-	0.98
Nitrate as NO ₃	mg/l	0.2	<i>nv</i>	<i>nv</i>	3.5	-	19
Total Alkalinity as CaCO ₃	mg/l	1	<i>nv</i>	No abnormal change	58	238	470
Total Ammonia as NH ₃	mg/l	0.03	<i>nv</i>	<i>nv</i>	0.12	2.55	7.6
Electrical Conductivity @25C	uS/cm	<2	(800 or 1875) ^(note 1)	1000	427	<u>21,677</u>	<u>2,501</u>
pH	pH units	<0.01	<i>nv</i>	≥6.5 and ≤9.5	6.96	7.77	7.8
COD	NTU	7	<i>nv</i>	<i>nv</i>	37	201	29
Key							
	Value exceeds the Threshold Value (Groundwater)		Note 1		Different GW Thresholds apply to different status classification tests		
GTV	Groundwater Threshold Value						
IGV	Interim Guideline Value		<u>Underlined</u> = IGV Threshold values exceeded				
MDL	Method Detection Limit						
-	Less than the MDL						
<i>nv</i>	No Value		<i>nt</i>		Not tested		

Table 7.2 General Suite Table Compared to the Available Standards and Guidelines.

Hydrocarbons

7.44 Table 7.3 below at the end of this report summaries the results of hydrocarbon testing. In summary, there were no detections above the available groundwater threshold values with the majority of analytes being below the respective laboratory’s detection limit, across the hydrocarbon suite in all three of the groundwater samples, except for one (1) groundwater well location – BH1.

7.45 At BH1, EPH (C8-C40) recorded a concentration of 3,330 ug/l which exceeds the available GTV concentration of 7.5 ug/l.

Sample ID	Details				Groundwater		
					BH01	BH02	BH03
Laboratory					Element	Element	Element
Sample Type					Ground Water	Ground Water	Ground Water
Location					Onsite	Onsite	Onsite
Sample Date					11/05/2022		
Parameters	Units	MDL	GTV (Groundwater)	IGV (Groundwater)			
PAH MS							
Naphthalene	ug/l	<0.1	75	10	-	-	-
Acenaphthylene	ug/l	<0.005			-	-	-
Acenaphthene	ug/l	<0.005			-	-	0.006
Fluorene	ug/l	<0.005			-	-	-
Phenanthrene	ug/l	<0.005			-	0.025	0.036
Anthracene	ug/l	<0.005			-	-	-
Fluoranthene	ug/l	<0.005			0.015	0.025	0.086
Pyrene	ug/l	<0.005			0.015	0.022	0.074
Benzo(a)anthracene	ug/l	<0.005			0.006	0.012	0.027
Chrysene	ug/l	<0.005			0.006	0.01	0.035
Benzo(b)fluoranthene	ug/l	<0.008			-	0.015	0.051
Benzo(a)pyrene	ug/l	<0.005			-	0.009	0.028
Indeno(1,2,3-cd)pyrene	ug/l	<0.005			-	-	0.018
Dibenzo(a,h)anthracene	ug/l	<0.005			-	-	-
Benzo(ghi)perylene	ug/l	<0.005			-	-	0.014
PAH 16 Total	ug/l	<0.173			-	-	0.375
Benzo(b)fluoranthene	ug/l	<0.008			-	0.011	0.037
Benzo(k)fluoranthene	ug/l	<0.008	-	-	0.014		
VOC TICs	None		<i>nv</i>	<i>nv</i>	ND	ND	ND
Methyl Tertiary Butyl Ether	ug/l	<0.1	10		-	-	-
Benzene	ug/l	<0.5	0.75	0.1	-	-	-
Toluene	ug/l	<5	525	10	-	-	-
Ethylbenzene	ug/l	<1	<i>nv</i>	10	-	-	-
m/p-Xylene	ug/l	<2	<i>nv</i>	10	-	-	-
o-Xylene	ug/l	<1	<i>nv</i>	10	-	-	-
GRO (>C4-C8)	ug/l	<10	<i>nv</i>	<i>nv</i>	-	-	-
GRO (>C8-C12)	ug/l	<10			102	-	-
GRO (>C4-C12)	ug/l	<10			102	-	-
PAH Surrogate % Recovery	%	0	<i>nv</i>	<i>nv</i>	52	59	47
EPH (C8-C40)	ug/l	0.01	7.5	<i>nv</i>	3,330	-	-
Key BOLD Value exceeds the Groundwater Threshold Value (GTV) <u>Underlined</u> Value exceeds the EPA Interim Guideline Values (IGV)							
Notes: <ul style="list-style-type: none"> GTV Groundwater Threshold Value (S.I. No. 9, 2010 Groundwater Regulations) Groundwater Threshold Value (S.I. No. 366, 2016 Groundwater (Amendment) Regulations) IGV Interim Guideline Values (EPA, 2003) Note 1: Sum of Total Petroleum Hydrocarbons (TPH) including the volatile petroleum hydrocarbons (VPH) range and extractable petroleum hydrocarbons (EPH) range hydrocarbons C2-C5 and hydrocarbons C6-C40 respectively (S.I. 366 of 2016). The IGV value is a 'catch-all' and includes for analysis of TPH, MTBE, as well as Toluene, Ethylbenzene, m/p-Xylene, and o-Xylene. Note 2: For reference, IGV for Ammonia (as ammonium) is 0.15mg/l							

Table 7.3 Hydrocarbon Table Compared to the Available Standards and Guidelines.

Volatile Organic Compounds (VOCs)

7.46 Tables 7.4 below summaries the results of VOCs testing. In summary, there were no exceedances reported for VOCs in any of the groundwater samples collected at the subject site. All concentrations were below the respective laboratory’s limit of detection (LOD).

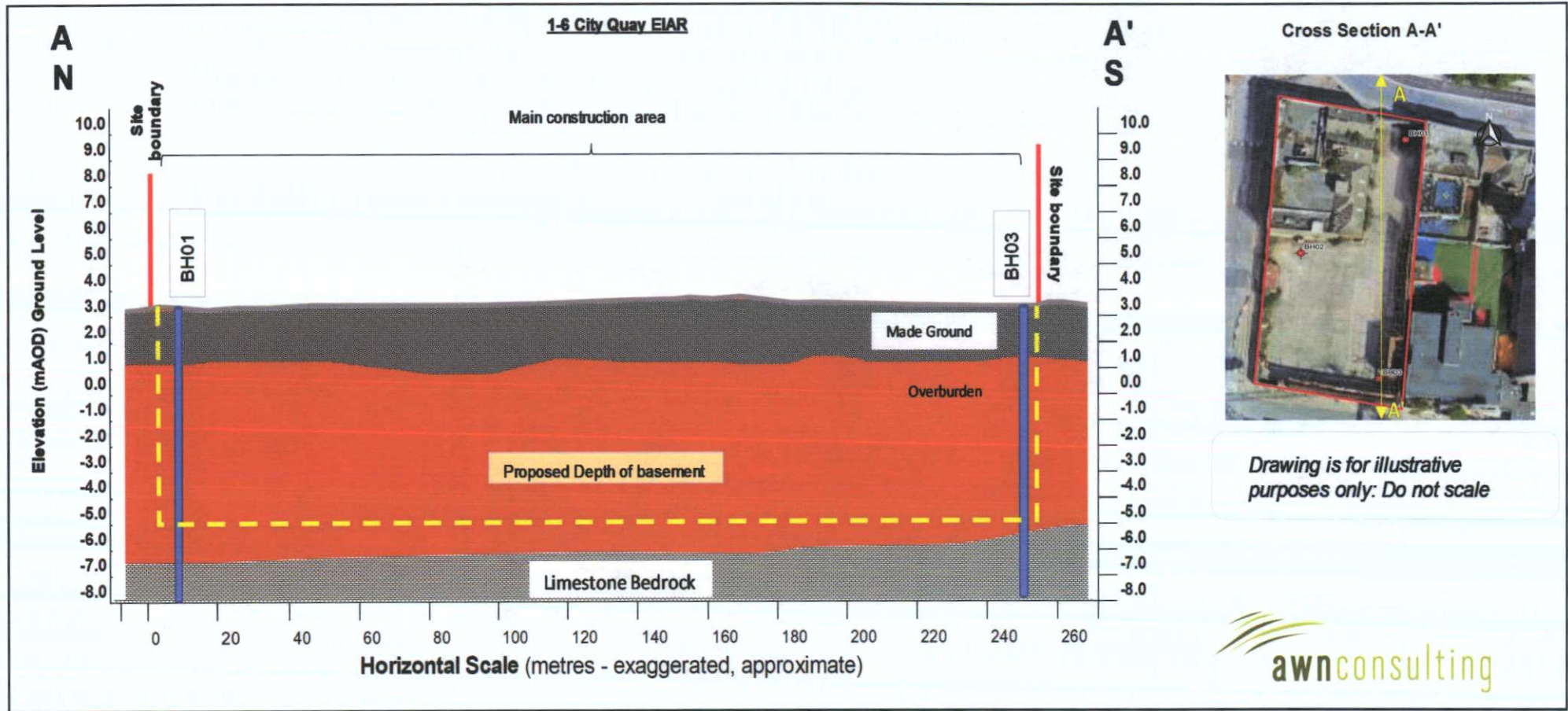
Sample ID	Details				Groundwater		
					BH01	BH02	BH03
Table 5f Laboratory					Element	Element	Element
Sample Type					Ground Water	Ground Water	Ground Water
Location					Onsite	Onsite	Onsite
Sample Date					11/05/2022		
Parameters	Units	MDL	GTV (Groundwater)	IGV (Groundwater)			
Dichlorodifluoromethane	ug/l	<2		nv	-	-	-
Methyl Tertiary Butyl Ether	ug/l	<0.1	nv	30	-	-	-
Chloromethane	ug/l	<3			-	-	-
Vinyl Chloride	ug/l	<0.1	0.375		-	-	-
Bromomethane	ug/l	<1			-	-	-
Chloroethane	ug/l	<3			-	-	-
Trichlorofluoromethane	ug/l	<3		nv	-	-	-
1,1-Dichloroethene (1,1 DCE)	ug/l	<3			-	-	-
Dichloromethane (DCM)	ug/l	<3			-	-	-
trans-1-2-Dichloroethene	ug/l	<3			-	-	-
1,1-Dichloroethane	ug/l	<3	nv	3	-	-	-
cis-1-2-Dichloroethene	ug/l	<3			-	-	-
2,2-Dichloropropane	ug/l	<1		nv	-	-	-
Bromochloromethane	ug/l	<2			-	-	-
Chloroform	ug/l	<2		12	-	-	-
1,1,1-Trichloroethane	ug/l	<2		500	-	-	-
1,1-Dichloropropene	ug/l	<3		nv	-	-	-
Carbon tetrachloride	ug/l	<2			-	-	-
1,2-Dichloroethane	ug/l	<2	2.25	3	-	-	-
Benzene	ug/l	<0.5	0.75	nv	-	-	-
Trichloroethene (TCE)	ug/l	<3	7.5	10	-	-	-
1,2-Dichloropropane	ug/l	<2			-	-	-
Dibromomethane	ug/l	<3		nv	-	-	-
Bromodichloromethane	ug/l	<2			-	-	-
cis-1-3-Dichloropropene	ug/l	<2	nv		-	-	-
Toluene	ug/l	<0.5		10	-	-	-
trans-1-3-Dichloropropene	ug/l	<2		nv	-	-	-
1,1,2-Trichloroethane	ug/l	<2			-	-	-
Tetrachloroethene (PCE)	ug/l	<3	7.5	10	-	-	-
1,3-Dichloropropane	ug/l	<2			-	-	-
Dibromochloromethane	ug/l	<2		nv	-	-	-
1,2-Dibromoethane	ug/l	<2			-	-	-
Chlorobenzene	ug/l	<2		1	-	-	-
1,1,1,2-Tetrachloroethane	ug/l	<2		nv	-	-	-
Ethylbenzene	ug/l	<0.5		10	-	-	-
m/p-Xylene	ug/l	<1		10	-	-	-
o-Xylene	ug/l	<0.5			-	-	-
Styrene	ug/l	<2			-	-	-
Bromoform	ug/l	<2			-	-	-
Isopropylbenzene	ug/l	<3			-	-	-
1,1,1,2,2-Tetrachloroethane	ug/l	<4			-	-	-
Bromobenzene	ug/l	<2			-	-	-
1,2,3-Trichloropropane	ug/l	<3			-	-	-
Propylbenzene	ug/l	<3			-	-	-
2-Chlorotoluene	ug/l	<3	nv		-	-	-
1,3,5-Trimethylbenzene	ug/l	<3		nv	-	-	-
4-Chlorotoluene	ug/l	<3			-	-	-
tert-Butylbenzene	ug/l	<3			-	-	-
1,2,4-Trimethylbenzene	ug/l	<3			-	-	-
sec-Butylbenzene	ug/l	<3			-	-	-
4-Isopropyltoluene	ug/l	<3			-	-	-
1,3-Dichlorobenzene	ug/l	<3			-	-	-
1,4-Dichlorobenzene	ug/l	<3			-	-	-
n-Butylbenzene	ug/l	<3			-	-	-
1,2-Dichlorobenzene	ug/l	<3		10	-	-	-
1,2-Dibromo-3-chloropropane	ug/l	<2		nv	-	-	-
1,2,4-Trichlorobenzene	ug/l	<3		0.4	-	-	-
Hexachlorobutadiene	ug/l	<3		0.1	-	-	-
Naphthalene	ug/l	<2		1	-	-	-
1,2,3-Trichlorobenzene	ug/l	<3		nv	-	-	-

Key	BOLD Value exceeds the Groundwater Guideline Value (Groundwater)	- MDL above available guideline values
	GTV Groundwater Threshold Value	
	IGV Interim Guideline Value	
	MDL Method Detection Limit	
	- Less than the MDL	<u>Underlined</u> exceeds the EPA IGV
	nv no criteria value available	

Table 7.4 VOCs Table Compared to the Available Standards and Guidelines.

7.3.6 Conceptual Site Model (CSM)

- 7.47 The site ground conditions show MADE GROUND encountered to 2.80mbgl (metres below ground level) and 2.90mbgl. This was logged as clay soils overlying gravel soils with red brick and concrete fragments running through them.
- 7.48 Underlying the fill material is granular SAND and GRAVEL soils with cohesive CLAY and SILT soils underlying these with the boundaries between 4.80mbgl and 5.60mbgl. BH02 recorded further granular soils at 5.60mbgl whereas the two holes closer to the river recorded cohesive soils until termination (approx. 9 metres below ground level).
- 7.49 Bedrock was encountered during the site investigations in 2020 by SIL. The three (3) no. boreholes were drilled to a maximum depth of 9.10 metres below ground level (mbgl). Therefore, the depth to bedrock is greater than 9 metres at the proposed development site.
- 7.50 The bedrock geology of the site is classified as Calp formation which is described as dark grey to black limestone & shale of Lower Carboniferous age. The National Draft Gravel Aquifer Map has been researched and does not note a gravel aquifer under the site or in the study area. The aquifer underlying the site is considered a locally important gravel aquifer (Lg).
- 7.51 Two groundwater ingresses were noted during the drilling process but were recorded at depths of 4.80mbgl or greater. The initial strike was sealed off by the borehole casings and then a second strike was recorded as the borehole progressed. At the end of drilling, the highest water level was recorded at 3.00mbgl.
- 7.52 Three (3) no. continuous data loggers were installed as part of the most recent site investigations (GII, 2022). These data loggers measure the groundwater elevations in each of the three (3) no. groundwater monitoring wells. The loggers were set at 1-hour intervals and were left in-situ for approximately 1 month. Based on the available groundwater level data, groundwater levels across the site are generally 3.29 mbgl (-0.20mOD, BH02) to 3.78 mbgl (-0.63mOD, BH01). There appears to be no tidal influence on the groundwater levels at the site. All boreholes are screened within the underlying bedrock.
- 7.53 In addition, no groundwater source protection zones, which are zones defined by the GSI within which development is limited in order to protect groundwater from potential pollution, are identified by the GSI under the site or in the immediate vicinity. There are no karst features in the area.
- 7.54 Reference to the GSI Vulnerability data indicates that the aquifer vulnerability is considered 'Low' which indicates that there is greater than 10 metres of subsoil thickness which was confirmed in the recent site investigations.
- 7.55 It is proposed that the basement excavation will extend to approx. -5.50m OD, a depth of 9.5m below the highest ground floor level.
- 7.56 A cross section of the site geology has been undertaken (see Figure 7.3 below).



Drawing is for illustrative purposes only. Do not scale

7.3.7 Groundwater Wells

- 7.57 The GSI Well Card Index ([Map Series \(arcgis.com\)](http://Map Series (arcgis.com))) is a record of wells drilled in Ireland. This Index shows a number of wells in the vicinity of the site. While much useful information can be obtained from this Index, it is important to note that it is by no means exhaustive, as it requires individual drillers to submit details of wells in each area.
- 7.58 There are no mapped GSI wells in close vicinity of the proposed development site.

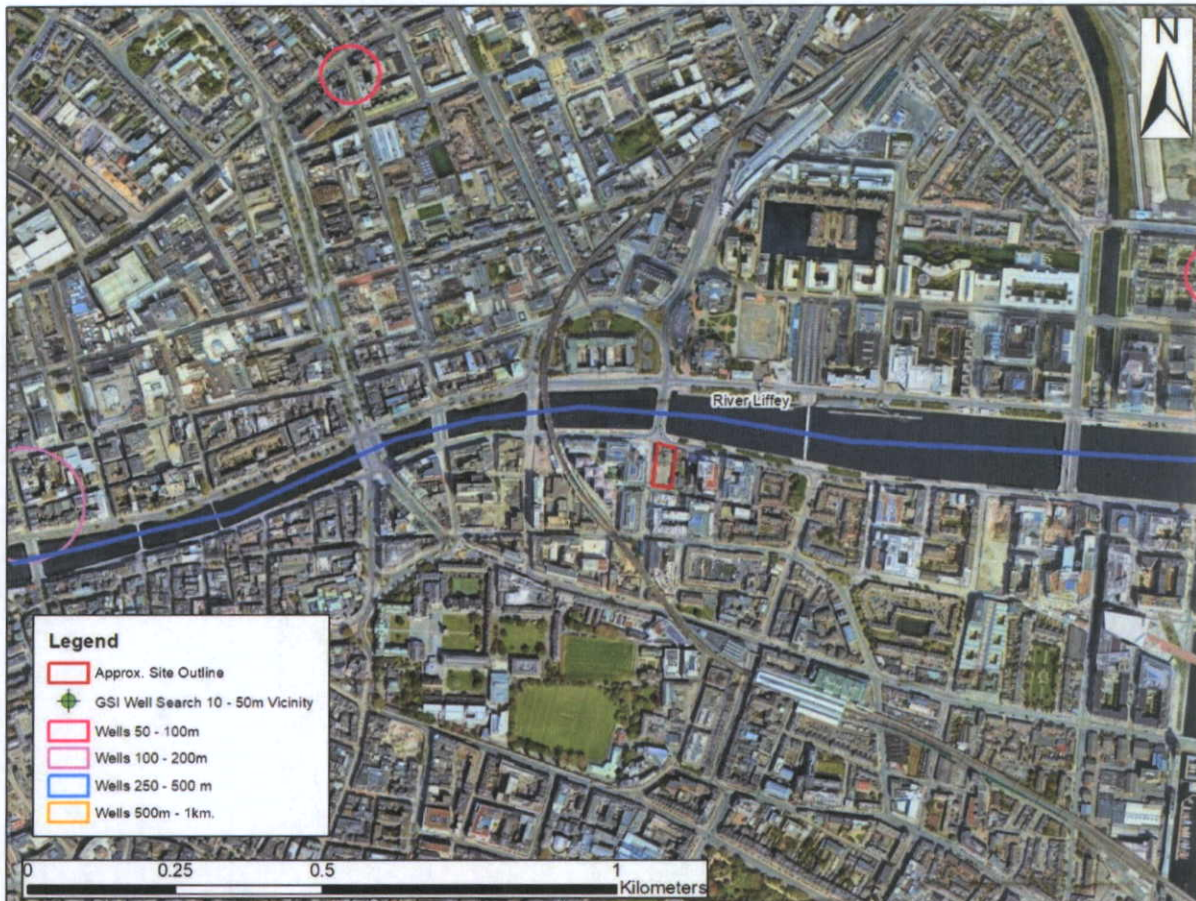


Figure 7.4 GSI Well Locations

7.3.8 Geology (Bedrock)

- 7.59 The bedrock geology of the site ([Map Series \(arcgis.com\)](http://Map Series (arcgis.com))) is classified as Calp formation which is described as dark grey to black limestone & shale of Lower Carboniferous age. See Figure 7.5.
- 7.60 Bedrock was encountered during the site investigations in 2020 by SIL. The three (3) no. boreholes were drilled to a maximum depth of 9.10 metres below ground level (mbgl). Therefore, the depth to bedrock is greater than 9 metres at the proposed development site.

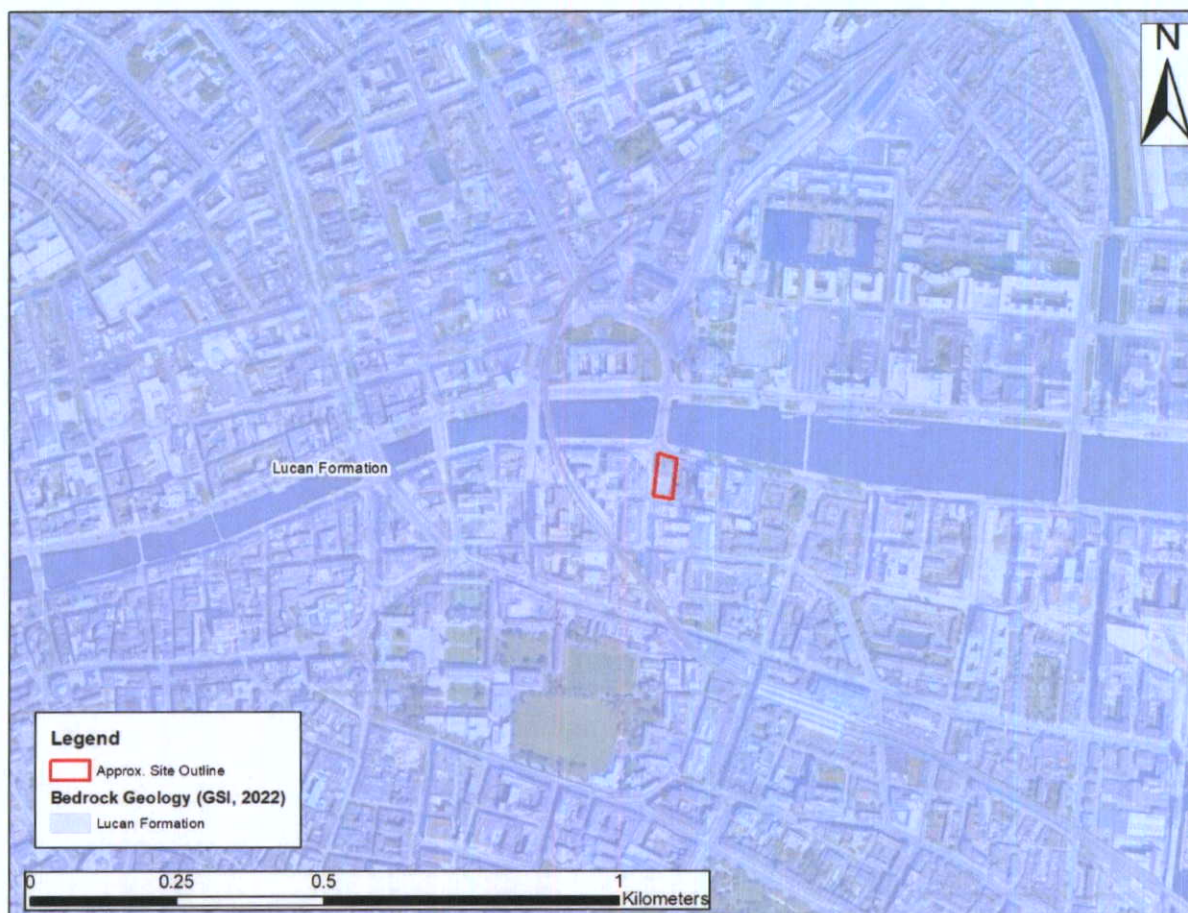


Figure 7.5 *Bedrock Geology.*

- 7.61 There are no sites of geological heritage within the vicinity of the site. The closest site of geological heritage is located approximately 0.39km to the south of the site and consists of museum building of Trinity College Dublin, especially the original interior, completed in 1857 (Museum Building, Trinity College).

7.3.9 Aquifer Classification and Water Body Status

- 7.62 Groundwater can be defined as water that is stored in, or moves through, pores and cracks in sub-soils. Aquifers are rocks or deposits that contain sufficient void spaces, and which are permeable enough, to allow water to flow through them in significant quantities. The potential of rock to store and transport water is governed by permeability of which there are two types, intergranular and fissure permeability.
- 7.63 Intergranular permeability is found in sediments, sands, gravels and clays and fissure permeability is found in bedrock, where water moves through (and is stored in) cracks, fissures, planes, and solution openings. The aquifer underlying the study area is a bedrock aquifer and therefore the primary characteristic of this aquifer is defined by fissure permeability as opposed to intergranular permeability which would apply in the case of a quaternary aquifer.
- 7.64 The major bedrock aquifer underlying the site has been classified by the GSI ([Map Series \(arcgis.com\)](http://arcgis.com)) as a Locally Important (Lg) Gravel Aquifer which is moderately productive in local zones only (refer to Figure 7.6). One area included which may have high salinity.

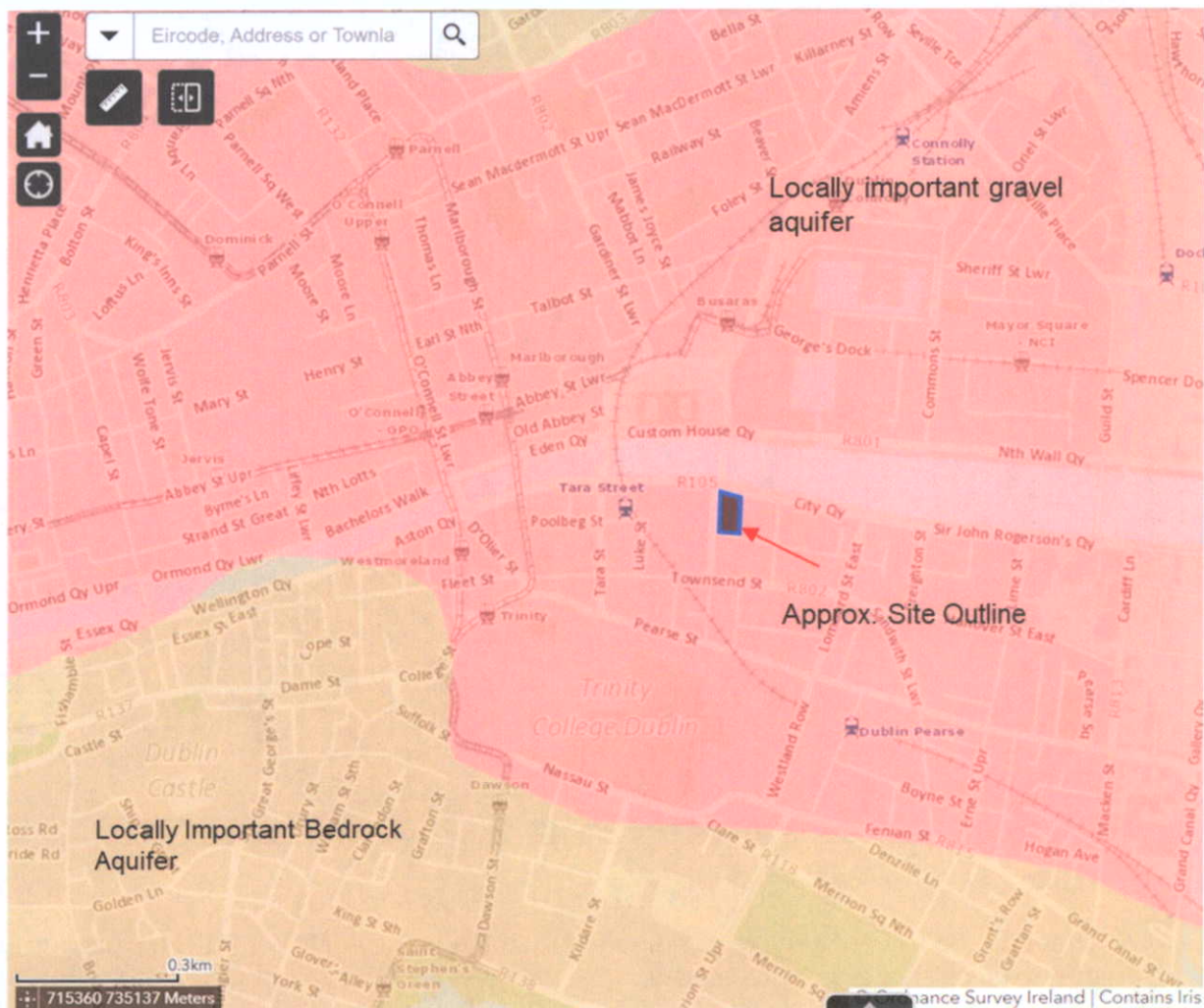


Figure 7.6 Bedrock Aquifer Map

- 7.65 The National Draft Gravel Aquifer Map has been researched and does not note a gravel aquifer under the site or in the study area. The aquifer underlying the site is considered a locally important gravel aquifer (Lg).
- 7.66 The European Communities Directive 2000/60/EC established a framework for community action in the field of water policy, (commonly known as the Water Framework Directive [WFD]). The WFD required 'Good Water Status' for all European waters by December 2015, to be achieved through a system of river basin management planning and extensive monitoring. 'Good status' means both 'Good Ecological Status' and 'Good Chemical Status'.
- 7.67 Based on the most recent data (www.epa.ie) the Dublin groundwater body (IE_EA_G_008) within which the Proposed Development has a "Good" status (2018) and is "under review" (2015).
- 7.68 In addition, no groundwater source protection zones, which are zones defined by the GSI within which development is limited in order to protect groundwater from potential pollution, are identified by the GSI under the site or in the immediate vicinity. There are no karst features in the area.

7.3.10 Aquifer Vulnerability

- 7.69 The GSI, EPA, and the Department of Environment, Heritage and Local Government (DoEHLG) have developed a programme of Groundwater Protection Schemes, with the aim of maintaining the quantity and quality of groundwater in Ireland, and in some cases improving groundwater quality, by applying a risk assessment approach to groundwater protection and sustainable development.
- 7.70 As part of this scheme, the GSI have mapped ([Map Series \(arcgis.com\)](http://Map Series (arcgis.com))) the vulnerability of the country's aquifers. Reference to the GSI Vulnerability data indicates that the aquifer vulnerability is considered 'Low' which indicates that there is greater than 10 metres of subsoil thickness which was confirmed in the recent site investigations. A small portion (south-eastern corner) of the proposed development site is underlain by 'Moderate' aquifer vulnerability which indicates a subsoil thickness of 5.0 to 10.0 metres. However, based on recent site investigations by SIL bedrock was not encountered in the top 8.90 metres at this location as BH02 is located within the south-eastern corner of the site.



Figure 7.7 Groundwater Vulnerability

Vulnerability Rating	Hydrogeological Conditions				
	Subsoil Permeability (Type) and Thickness			Unsaturated Zone	Karst Features
	High permeability (sand/gravel)	Moderate permeability (e.g. Sandy subsoil)	Low permeability (e.g. Clayey subsoil, clay, peat)	(Sand/gravel aquifers only)	(<30 m radius)
Extreme (E)	0 - 3.0m	0 - 3.0m	0 - 3.0m	0 - 3.0m	-
High (H)	> 3.0m	3.0 - 10.0m	3.0 - 5.0m	> 3.0m	N/A
Moderate (M)	N/A	> 10.0m	5.0 - 10.0m	N/A	N/A
Low (L)	N/A	N/A	> 10.0m	N/A	N/A

Notes: (1) N/A = not applicable.
 (2) Precise permeability values cannot be given at present.
 (3) Release point of contaminants is assumed to be 1-2 m below ground surface.

Table 7.5 Vulnerability Mapping Guidelines

7.3.11 Geo-Hazards

- 7.71 In general, Ireland suffers few landslides. Landslides are more common in unconsolidated material than in bedrock, and where the sea constantly erodes the material at the base of a cliff landslides and falls lead to recession of the cliffs. Landslides have also occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities.
- 7.72 Based on the GSI spatial map viewer ([Map Series \(arcgis.com\)](http://Map Series (arcgis.com))), the proposed development site is not in an area susceptible to landslides. This is consistent with the topography and the geology across the site. There are no active volcanoes in Ireland

7.3.12 Rating of site importance of the geological and hydrogeological features

- 7.73 Based on the NRA/IGI methodology, the criteria for rating the importance of geological features, the importance of the geological features at this site is rated as **Low Importance**.
- 7.74 Based on the NRA/IGI methodology, the criteria for rating the importance of hydrogeological features, the importance of the hydrogeological features at this site is rated as **Medium Importance**.
- 7.75 This is based on the assessment that the attribute has a medium quality significance or value on a local scale. The aquifer is a *locally important* (Lg) gravel aquifer over part of the site and is not used for public water supply or widely used for potable use. In addition, it does not host any groundwater dependent ecosystems (SACs/NHAs).

7.3.13 Landfills

- 7.76 Dublin City Council was contacted to carry out a search of current and historical landfills in the vicinity of the site. There were no illegal landfills identified in the immediate surrounding area.

7.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

- 7.77 The proposed building extends to 24 floors above ground floor and also contains 2 No. basement levels.
- 7.78 The building structure is reinforced concrete columns with flat-slab post-tensioned floors on a piled and rafted foundation.
- 7.79 There are 2 basement levels, the lower of which provides 11 car parking spaces including 2 disabled accessible spaces and 20 motorbike spaces.
- 7.80 The Proposed Development is described in further detail in Chapter 2 (Description of the Proposed Development). The characteristics of the proposed development with regard to the land, soil, geological and hydrogeological environment are outlined below.

7.4.1 Construction Activities

- Additional removal of shallow made ground and superficial deposits for foundations and civil engineering works.
- Excavation for two (2) no. basement levels.
- Infilling with engineering fill and landscaping will be undertaken.
- Site clearance and enabling works
- Temporary storage of fuel will be required on site for construction traffic.
- Small localised accidental releases of hydrocarbons have the potential to occur from construction traffic operating on site.
- Dewatering is anticipated to be required for construction as excavation into underlying subsoil (water bearing strata) will be required for the basement.

7.4.2 Operational Activities

- There will be no direct discharges to ground required for operation of the facility.
- Water supply will be supplied from public mains and effluent discharge will be to public sewer.
- No increased hard stand area.

7.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

- 7.81 An analysis of the potential impacts of the proposed development on the land, soils, geology and hydrogeological environment during the construction and operation is outlined below. Due to the inter-relationship between land, soils, geology, and hydrogeology and Hydrology the following impacts discussed will be considered applicable to Chapter 8 of the EIAR. Waste Management (Chapter 15) is also considered an interaction.

7.5.1 Construction Phase

- 7.82 Potential impacts considered during construction are as follows:

Excavation and Infilling

- 7.83 Excavation and infilling of soil and subsoil will be required for levelling of the site to render it suitable for building the building platform. The volume of material to be excavated has been estimated by the project engineers to be approximately 25,000m³ of material. Any suitable excavated material will be temporarily stockpiled for reuse as fill (although this is considered minimal due to the extents of the proposed development across the site footprint), where possible, with remaining soil to be removed off-site for appropriate reuse, recovery and / or disposal. These estimates will be refined prior to commencement of construction. If the material that requires removal from site is deemed to be a waste, removal and reuse/recycling/recovery/disposal of the material will be carried out in accordance with the 'Waste Management Act 1996' (as amended), the 'Waste Management (Collection Permit) Regulations 2007' as amended, and the 'Waste Management (Facility Permit & Registration) Regulations 2007' as amended.
- 7.84 It is currently anticipated that some excavated material will be taken off site. When this material is removed off-site it could be reused as a by-product (and not as a waste), if this is done, it will be done in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011. Article 27 requires that certain conditions are met and that by-product notifications are made to the EPA via their online notification form. It is however anticipated that all excavated material being removed off this site will be removed as a waste and not as a by-product under article 27.
- 7.85 In order to establish the appropriate reuse, recovery and/or disposal route for the soils and stones to be removed off-site, it will first need to be classified. Waste material will initially need to be classified as hazardous or non-hazardous in accordance with the EPA publication 'Waste Classification – List of Waste and Determining If Waste is Hazardous or Non-Hazardous'. Environmental soil analysis will be carried out prior to removal of the material on a number of the soil samples in accordance with the requirements for the acceptance of waste at landfills (Council Decision 2003/33/EC Waste Acceptance Criteria). This legislation sets limit values on landfills for acceptance of waste material based on properties of the waste including potential pollutant concentrations and leachability. It is likely that the surplus of material will be suitable for acceptance at either inert or non-hazardous soil recovery facilities/landfills in Ireland or, in the unlikely event of hazardous material being encountered, be transported for treatment/recovery or exported abroad for disposal in suitable facilities. However, more soil sampling will be required as part of the construction program to know the extent of the asbestos material. The asbestos material will be appropriately segregated and disposed off to a licenced hazardous landfill by a licenced contractor.

Basement Construction

- 7.86 The Basement Development Policy document (DCC, January 2020) explains the historical context which created the need for a new policy to be put in place. It also presents existing Planning and Legislative background relating to the matter and describes the implementation process of this new policy.
- 7.87 The Basement Development Guidance document (DCC, January 2020) presents a methodology where the impact of basement on the surrounding ground and groundwater is assessed on a site-specific basis. This policy sets out the requirements to complete this risk-based impact assessment with regard to hydrology, hydrogeology and land stability.
- 7.88 An impact assessment (refer to Section 7.7.1 below) was undertaken to assess the likely impact on the existing water regime during and post construction of a basement

within the proposed development. The objective is to ensure that the basement development:

- Protects and enhances where possible the groundwater quality, quantity and classification.
- Provides evidence that the construction of the basement shall not place groundwater at undue risk.
- Provides evidence that the structural stability of adjoining or neighbouring buildings and land areas are not put at risk.
- Provides a management plan for any demolition works and for the construction of the basement.
- Does not have an adverse effect on existing patterns of surface water drainage.
- Shall not significantly impact on groundwater or surface water flows to the extent that this is likely to increase the risk of flooding.
- Ensures appropriate handling and dealing with waste removal.
- Conserves and where possible enhances the biodiversity value of the site.
- Generally, complies with the relevant regulations such as the Basement Development Policy and the Basement Development Guidance.

7.89 A full site investigation was carried out by SIL in 2020 and then by GII in 2022. A specialist ground works contractor (piling contractor) will be appointed to carry out the excavation. There will be no rock breaking due to the depth of the bedrock being greater than 10 metres below ground level. The appointed specialist contractor will carry out a full risk assessment prior to the commencement of work.

7.90 A ground works operation will be carried out in order to ensure that material removed from the ground is taken away at regular intervals in order to reduce the amount of material that will be stored on site. Excavated material will be reused on site where possible subject to the WAC (Waste Acceptance Criteria) analysis.

7.91 The site level will be graded to a uniform level following demolition and removal of the building foundations and redundant services. The temporary site level shall be lower than external footpath levels to prevent any outward migration of water runoff.

7.92 The main construction works following demolition shall be installation of an embedded pile retaining wall to facilitate the excavation and construction of the proposed basement. The following is a high-level sequence of works expected.

- A suitably designed piling platform shall be installed to support the piling rig and prevent rutting and softening of surface soils on site.
- The embedded pile retaining wall will be constructed around the site boundary, to facilitate deep excavation. This will involve the installation of augered or bored piles. The augering of the piles will generate spoil that must be disposed at an appropriate licensed facility off-site. The spoil shall be stockpiled on site ahead of disposal.
- Waste Acceptability Classification testing will be carried out on all stockpiled spoil prior to the material leaving the site. This will ensure that it is disposed of in line with legislative requirements and local requirements.
- The concrete operations associated with the pile wall construction will require concrete and steel reinforcement deliveries to site which will be managed in accordance with the Contractors Construction Management Plan. Pile reinforcement cages can be stored on site and concrete deliveries managed within the site footprint.
- Following installation of the pile wall, excavation of the basement will commence. This excavation phase shall be informed by a detailed phase of

site investigation and chemical testing of the soils to develop a phased dig plan for the site. Any contamination identified during the investigation phase and subsequently the excavation phase will be segregated, removed and disposed in an appropriate registered facility. Any Made Ground excavated on site should be stockpiled separately to natural soils to avoid any potential cross contamination of the soils prior to removal from site

- 7.93 Localised sump pumps will be installed to remove the water through settlement tanks and after appropriate treatment into the local drainage network infrastructure for discharge. Drainage channels beside construction areas will flow into settlement sumps in series to allow primary and secondary settlement of sediment. Each sump series will have an outfall directly downstream in which final settlement can take place and the outflow to the existing network can be monitored. Outfall manholes will be regularly emptied of sediment during periods of heavy rainfall. These measures will prevent run-off from the site and total suspended solid levels in all discharge shall be in compliance with the Quality of Salmonid Water Regulations(SI 293:1988).
- 7.94 On completion of the excavation works to the formation level of the basement slab, this will be blinded to the final design levels. Any below ground services will be installed and tested below the basement slab. Prior to construction of the foundations and suspended slab at the lower basement level, a proprietary basement tanking system and water bar will be installed at all construction joints. A typical basement slab construction is as follows:
- The installation of male and female piles prior to the main excavation of the basement. Once piles are set, concrete will be poured to fill the space between the piles with a dual-proof T membrane. Once this is complete, the main excavation will commence to target floor depth of the basement.
 - Trim & grade to slab formation with suitable well compacted capping material.
 - Cast mass concrete blinding to form a surface for applying waterproof membrane and tanking.
 - Apply continuous waterproof tanking material and seal all laps (and along perimeter of secant wall/slab junction).
 - Install slab reinforcement to slab area (including any columns and wall starters) Formwork to perimeter and any box-outs necessary (around raking props).
 - Clean & inspect slab pour prior to concrete operations.
 - Note: The placement of large volumes of concrete such as the deep foundations will be carried out by a mobile or static concrete pump. The above process will repeat until the foundation raft is constructed.
- 7.95 When a sufficient area of basement slab is constructed, the vertical elements will be constructed to allow the upper level; basement slabs to be constructed.
- 7.96 Once piling is installed, there will be limited groundwater to dewater due to the enclosing of potential water bearing strata.
- 7.97 The potential impacts of the basement construction include:
- During construction, a very localised impact may occur during early stages of excavation until the piling wall is in place. Once these are installed into the low permeability clay (made ground and clays/silts), any horizontal flow from the water bearing gravel layer (or other strata) will be cut off and minimal inflows from the base of construction (along with any collected rainwater) will occur until the floor is constructed. In the event that perched water is encountered during excavation

works, based on the construction design and average hydraulic conductivity for this type of overburden, the zone of influence would be expected to be within or close to the extent of the excavation and will not extend past the excavation due to the presence of the pile wall enclosure.

- The regional water table within bedrock will not be affected by the planned basement construction. The effect on the shallow water table will at most be temporary. The basement is estimated to be completed within approximately 12-16 weeks.
- The proposed development will result in no increase in hardstanding area. Therefore, groundwater recharge and groundwater regime will not be affected.
- The proposed basement construction, which would involve c. 8-metre-deep excavations has the potential to cause minor ground movements inside the excavated area as a result of changes in vertical load on the ground. The construction sequence was developed to control any potential movement to within acceptable limits. Due to the presence of the piling wall surrounding the excavation there is no potential ground movements outside the excavation area.
- There is no source-pathway-receptor hydrogeological connection between the subject site and Dublin Bay through the Dublin aquifer as vertical migration to the underlying limestone bedrock is minimised due to the thickness of overburden ('Low' vulnerability) present at the site providing a high level of aquifer protection from any potential source. Therefore, no likely impact on the status of the aquifer is expected due to natural attenuation within overburden and reducing potential for off-site migration.

Accidental Spills and Leaks

7.98 During construction of the development, there is a risk of accidental pollution incidences from the following sources if not adequately mitigated:

- Spillage or leakage of oils and fuels stored on site.
- Spillage or leakage of oils and fuels from construction machinery or site vehicles.
- Spillage of oil or fuel from refuelling machinery on site.
- The use of concrete and cement during pad foundation construction.

7.5.2 Operation Phase

7.99 There will be no direct discharges to the water or soil environment during the operational phase.

7.100 Any accidental emissions during storage, transfer, or delivery or leakage in the car parks could cause localised contamination if the emissions enter the soil and groundwater environment. without adequate mitigation. However, it is noted that any accidental discharge will more likely impact stormwater drainage due to the hardstand and drainage infrastructure proposed.

7.101 There is no increase in hardstanding as the site is already fully hardstanding. The use of SUDs techniques will have a minor effect on local recharge to ground; however, the impact on the overall groundwater regime will be insignificant as the site was already covered in hardstand. It is proposed that the surface water drainage will be upgraded to facilitate the proposed development, refer to Chapter 8 Hydrology for further information on the drainage system.

7.102 There will no loss of amenity/agricultural land as a result of the proposed development.

7.6 DO NOTHING SCENARIO

- 7.103 Should the proposed development not take place, the land, soils, geology and hydrogeology will remain in their current state. The site will remain as a brownfield development.

7.7 REMEDIAL AND MITIGATION MEASURES

- 7.104 The design has taken account of the potential impacts of the development on the land, soils, geology, and hydrogeology environment local to the area where construction is taking place. Measures have been incorporated in the design, and CEMP during construction, to mitigate the potential effects on the surrounding land, soils, geology, and hydrogeology. These measures seek to avoid or minimise potential effects in the main through the implementation of best practice construction methods and adherence to all relevant legislation.
- 7.105 Due to the inter-relationship between land, soils, geology and hydrogeology and water (hydrology) the following mitigation measures discussed will be considered applicable to both.

7.7.1 Construction Phase

Construction Environmental Management Plan

- 7.106 A project-specific Outline Construction and Environmental Management Plan (CEMP) has been established by Byrne Looby and is submitted as part of this planning application. Prior to commencement of construction this CEMP will be updated and will be maintained by the contractors during the construction and operational phases. The CEMP will cover all potentially polluting activities and include an emergency response procedure. All personnel working on the site will be trained in the implementation of the procedures.

Soil handling, Removal and Compaction

- 7.107 Soil sampling (three samples) was carried out at the site and the soil was considered hazardous due to elevated concentrations of lead and zinc. Further soil sampling and testing will be required should any soils be required to be removed from site. Any soils to be removed from site will be disposed of by a licenced contractor to a licenced facility.
- 7.108 Temporary storage of soil will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment and the material will be stored away from any surface water drains. Movement of material will be minimised in order to reduce degradation of soil structure and generation of dust.

Basement Assessment

- 7.109 The following mitigation measures will be included in the design to protect water quality:
- 7.110 Any minor ingress of groundwater and collected rainfall in the excavation will be pumped out during construction. It is proposed that the water be discharged via the existing stormwater sewer network. The use of slit traps and an oil interceptor (if

required) will be adopted if monitoring indicates the requirements for the same with no silt or contaminated water permitted to discharge to the sewer.

- 7.111 Site investigation has not identified any significant water bearing gravels within the basement footprint. However, if water bearing gravels are encountered then the design should facilitate discharge around the basement structure.
- 7.112 To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas; these areas shall be bunded to a volume of 110% of the capacity of the largest tank/container.
- 7.113 Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility offsite.
- 7.114 An Outline Construction and Environmental Management Plan (CEMP) has been prepared by Byrne Looby Engineers as part of the planning application. Prior to commencement of construction the appropriate contractor will produce a detailed CEMP which will include management of any collected water.
- 7.115 Due to the potential for minor ground movements during excavation works at locations where movements are of critical importance, appropriate instrumentation will be installed, and the wall and ground movements monitored accordingly. The predictions of ground movement based on the ground movement analysis should be checked by monitoring the basement wall. The monitoring will include the installation of inclinometers in the basement wall elements so the pattern of wall behaviour can be reviewed with predicted values and due to the presence of residential dwellings and protected structures close to the site boundary. From this understanding, the designer will carry out back analysis of the observed (monitored) wall behaviour and recalibrate the analytical model in terms of the excavation geometry and the behaviour of the ground and the structural elements with appropriate modifications or contingencies applied as required.
- 7.116 It is recommended that movement monitoring should be undertaken with surveying points set up prior to commencement of the works and readings be undertaken at weekly intervals. It is recommended that trigger values for monitoring are based on the predicted ground movements to ensure conservatism and that they are agreed under the Party Wall Act. In cases where vibration from construction methods could potentially damage sensitive neighbouring buildings and structures vibration monitors are to be installed. The precise monitoring strategy will be developed at a later stage, and it will be subject to discussions and agreements with the owners of the adjacent properties and structures. Contingency measures will be implemented if movements of the adjacent structures exceed predefined trigger levels. Both contingency measures and trigger levels will need to be developed within a future monitoring specification for the works.
- 7.117 Based on ground water monitoring on the adjacent site, it is considered that there is a low risk of inflow during construction works due to the installation of piles prior to excavation works on the basement.

- 7.118 The proposed basement will have no long-term impact on water levels in the overburden or underlying aquifer and no impact on the current water body status. The bedrock water table will not be affected by the excavation works. Temporary dewatering of the perched water table within the clayey deposits to facilitate excavation works is expected to be minor and it will have a temporary local impact only.
- 7.119 The basement will need to be fully waterproofed to ensure no groundwater enters the finished basement. Site investigation has not identified any significant water bearing gravels within the basement footprint. However, if water bearing gravels encountered then the design should facilitate discharge around the basement structure.
- 7.120 Management of any collected rainwater and any groundwater seepage during basement excavations will be pumped to existing sewers (following appropriate treatment) in agreement with the regulatory authority.

Fuel and Chemical Handling

- 7.121 To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents, and paints used during construction will be stored within temporary bunded areas. Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be bunded to a volume of 110% of the capacity of the largest tank/container within the bunded area(s) (plus an allowance of 30 mm for rainwater ingress). Drainage from the bunded area(s) shall be diverted for collection and safe disposal.
- 7.122 Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles, will take place in a designated area (or where possible off the site) which will be away from surface water gulleys or drains. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) will be complied with.
- 7.123 All ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. The pouring of concrete will take place within a designated area using a geosynthetic material to prevent concrete runoff into the soil/groundwater media. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility offsite.
- 7.124 In the case of drummed fuel or other chemical which may be used during construction containers will be stored in a dedicated internally bunded chemical storage cabinet and labelled clearly to allow appropriate remedial action in the event of a spillage.

7.7.2 Operational Phase

- 7.125 During operation measures there is no requirement for bulk fuels. There is also no requirement for discharge to ground and no requirement for abstraction of groundwater.

- 7.126 An environmental management plan will apply to the development during the operational phase incorporating mitigation measures and emergency response measures.

7.7.2.1 Management of Surface water during Operation

- 7.127 The proposed development will provide full attenuation for the hardstand areas in compliance with the requirements of the Greater Dublin Strategic Drainage Study. The proposed surface water drainage service to the development comprises various drainage components including positive stormwater networks, attenuation systems and several Sustainable Drainage Systems (SuDS) elements. The proposed surface water drainage was designed in accordance with the SuDS Manual 2015. This is further detailed in Chapter 8 Hydrology of this EIA Report.

7.8 RESIDUAL IMPACT OF THE PROPOSED DEVELOPMENT

- 7.128 There are no likely significant impacts on the land, geological or hydrogeological environment associated with the proposed operational development of the site with mitigation in place.
- 7.129 The appropriate mitigation measures set out in see Section 7.6 reduce the potential for any impact of accidental discharges to ground during the construction phase. Overall, the construction phase is considered to have a **short term, imperceptible significance**, with a **neutral** impact on quality.
- 7.130 During operations the predicted impact during operation is considered to be **long term**, neutral in terms of quality and of an **imperceptible** significance as a result of this proposed development on the surrounding land, soils, geology and hydrogeological environment.

7.9 MONITORING OR REINSTATEMENT

7.9.1 Construction Phase

- 7.131 Regular inspection of surface water run-off and sediments controls e.g. silt traps will be carried during the construction phase. Soil sampling to confirm disposal options for excavated soils. Regular inspection of construction/mitigation measures will be undertaken e.g. concrete pouring, refuelling etc.

7.9.2 Operational Phase

- 7.132 There is no monitoring required during the operational phase.

7.10 CUMULATIVE IMPACTS OF THE PROPOSED DEVELOPMENT

- 7.133 The cumulative impact of the Proposed Development with any/all relevant other planned or permitted developments are discussed below. Related and permitted, concurrent, and future developments are listed in Chapter 2 (Description of the Proposed Development).

7.10.1 Construction Phase

7.134 In relation to the potential cumulative impact on the geological or hydrogeological environment during the construction phases, those key engineering works which would have additional impacts above are:

Run-off containing large amounts of silt could cause damage to surface water systems and receiving watercourses. Run-off for the development and the other permitted developments will therefore need to be managed using similar methods described for the Proposed Development.

Contamination of soils and groundwater underlying the site from accidental spillage and leakage from construction traffic and construction materials may occur unless project-specific Construction Environmental Management Plans (CEMPs) are put in place and complied with. It is proposed that project-specific CEMP's will be put in place for the Proposed Development and any future proposed developments.

7.135 The proposed development does require dewatering and with standard mitigation in place (as outlined in Section 7.6) for management of construction water, accidental discharges, the effect due to construction in this area is considered to be **neutral** on groundwater and soil quality and an **imperceptible** significance.

7.136 Contractors for the proposed development will be contractually required to operate in compliance with a CEMP which will include the mitigation measures outlined in this EIA report. Other developments will also have to incorporate measures to protect soil and water quality in compliance with legislative standards for receiving water quality. As a result, there will be no cumulative potential for change in soil quality or the natural groundwater regime. The cumulative impact is considered to be **neutral and imperceptible**.

7.10.2 Operational Phase

7.137 In relation to the potential cumulative impacts from the operational stages, the following would apply:

7.138 Overall, there will no change in recharge pattern as there is no increase in hardstand from the proposed development and surrounding planned or permitted developments. Therefore, there will be no overall change on the groundwater body status. There is no requirement for bulk fuel storage at the proposed development.

7.139 Localised accidental discharge of hydrocarbons could occur in car parking areas and along roads unless diverted to surface water drainage system with petrol interceptors. However, all developments are required to ensure they do not have an impact on the receiving water environment in accordance with the relevant legislation (primarily the European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010) as amended by S.I. No. 366/2016) such that they would be required to manage runoff and fuel leakages.

7.140 As such there will be no cumulative impact to groundwater quality. The cumulative impact is concluded to have a **long-term, imperceptible** significance with a **neutral** impact on soil and water quality.

- 7.141 The land is commercial, and the development is considered commercial therefore the cumulative impact on the land is considered to be **long-term, imperceptible** significance *with a neutral* impact.

7.11 DIFFICULTIES ENCOUNTERED IN COMPILING INFORMATION

- 7.142 There were no difficulties encountered during the writing of this EIAR chapter.

7.12 REFERENCES

1. CIRIA, (2011). *Environmental good practice on site*; Construction Industry Research and Information Association publication C692 (3rd Edition - an update of C650 (2005); (I. Audus, P. Charles and S. Evans), 2011
2. CIRIA, (2012). *Environmental good practice on site –pocket book*; Construction Industry Research and Information Association publication C715 (P. Charles, and G. Wadams), 2012
3. Dublin City Council (2020) “Dublin City Council Basement Development Policy Document Version 1.1 January 2020”.
4. EPA, (2002). *EPA Guidelines on the information to be contained in Environmental Impact Statements*; (March 2002); Environmental Protection Agency, Co. Wexford, Ireland
5. EPA, (2003). *EPA Advice Notes on Current Practice in the Preparation of Environmental Impact Statements*; Environmental Protection Agency, Co. Wexford, Ireland.
6. EPA, (2022). ‘*Guidelines on the Information to be contained in Environmental Impact Statements*’; Environmental Protection Agency, Co. Wexford, Ireland.
7. EPA, (2013). Environmental Protection Agency; Available on-line at: <http://gis.epa.ie>
8. IGI, (2002). *Geology in Environmental Impact Statements, a Guide*; (September 2002); Institute of Geologists of Ireland; Geology Department, University College Dublin
9. IGI, (2013). *Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements*
10. NRA, (2008). *Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes*; June 2009. National Roads Authority, Dublin.

APPENDIX 7.1
METHODOLOGY FOR ASSESSMENT OF THE IMPACTS

APPENDIX 7.2
AVAILABLE BOREHOLE LOGS (SIL, 2020 & GII, 2022)

APPENDIX 7.3
SOIL QUALITY DATA (SIL, 2020)

APPENDIX 7.4
GROUNDWATER QUALITY DATA (GII, 2022)

7.0 LAND, SOILS, GEOLOGY AND HYDROGEOLOGY

7.1 INTRODUCTION

- 7.1 This chapter of the EIAR which assesses and evaluates the potential effects on the land, soil, geological and hydrogeological aspects of the site and surrounding area.
- 7.2 In assessing likely potential and predicted effects, account is taken of both the importance of the attributes and the predicted scale and duration of the likely effects.

7.2 METHODOLOGY

7.2.1 Appraisals Methodology

- 7.3 The assessment follows the Procedures set out in the Institute of Geologists of Ireland (IGI) *Guidelines for the preparation of Soils Geology and Hydrogeology Chapters of Environmental Impact Statements* (2013), the EPA guidelines for EIAR, and other relevant guidelines set out below to assess and evaluates land, soils, geology and hydrogeology within the context of the proposed development. This assessment includes a review of the existing environment, the potential impacts of the proposed development, mitigation measures, and the potential impacts.
- 7.4 In addition, the document entitled '*Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes*' by the National Roads Authority/ Transport Infrastructure Ireland (NRA/TII, 2009) is referenced where the methodology for assessment of impact is appropriate.
- 7.5 In this assessment, consideration is given to both the importance of an attribute and the magnitude of the potential environmental impacts of the proposed activities on that cited attribute.
- 7.6 The rating of potential environmental effects on the soils and geology environment is based on the matrix presented in Chapter 1 (Introduction) Table 1.2 which takes account of the quality, significance, duration, and type of impact characteristic identified.
- 7.7 The IGI and TII (previously NRA) criteria for rating the magnitude and significance of impacts at EIA stage on the geological related attributes are also relevant in determining impact assessment and are presented in Table 7.1 and 7.2 (see Appendix 7.1).
- 7.8 The principal attributes (and impacts) to be assessed include the following:
- The extent of topsoil and subsoil cover and the potential use of this material on site or requirement to remove it off-site as waste for disposal or recovery;
 - High yielding water supply springs/ wells in the vicinity of the site to within a 2Km radius and the potential for increased risk presented by the Proposed Development;
 - Classification (regionally important, locally important) and extent of aquifers underlying the site perimeter area and increased risks presented to them by the

Proposed Development associated with aspects such as for example removal of subsoil cover, removal of aquifer (in whole or part), drawdown in water levels, alteration in established flow regimes and/or change in groundwater quality;

- Natural hydrogeological/ karst features in the area and potential for increased risk presented by the activities at the site;
- Groundwater-fed ecosystems and the increased risk presented by operations both spatially and temporally; and,
- Presence of area of geological heritage and potential to impact on same.

7.2.2 Guidelines

7.9 The Assessment has been carried out generally in accordance with the following guidelines:

- Environment Protection Agency (EPA), *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (2022);
- European Union, *Guidance on the preparation of the Environmental Impact Assessment Reports* (2017);
- Institute of Geologists of Ireland (IGI) *Guidelines for the preparation of Soils Geology and Hydrogeology Chapters of Environmental Impact Statements* (2013);
- National Roads Authority (NRA) *Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes* (2009);
- Environment Protection Agency, *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements* (2003); and
- Institute of Geologists of Ireland (IGI) *Geology in Environmental Impact Statements, a Guide* (2002).

7.2.3 Sources of Information

7.10 Desk-based geological information on the substrata (both Quaternary deposits and bedrock geology) underlying the area in which the site is located was obtained through accessing databases and other archives where available. Data was sourced from the following:

- The Geological Survey of Ireland (GSI) well card, groundwater body descriptions, aquifer type, vulnerability, groundwater boreholes, geological heritage database and source protection zones for the area were inspected,
- Teagasc soil and subsoil database;
- Ordnance Survey Ireland - aerial photographs and historical mapping;
- Environmental Protection Agency (EPA) – website mapping and database information.

7.11 Information on the proposed design including civil engineering works are outlined in the planning drawings and the Engineering Planning Report prepared by Atkins which is included with the planning submission. Additional information has been compiled through consultation and feedback from the project/EIA Team.

7.3 RECEIVING ENVIRONMENT

7.3.1 Topography

- 7.12 The topography of the proposed development site is generally flat with the elevation of the site ranging from 2.97mOD (Ordnance Datum) to 3.01 mOD.

7.3.2 Site Area Description

- 7.13 The lands primarily comprise the former City Arts Centre Building and associated hard standing bounded to the north by City Quay, to the west by Moss Street, and to the south by Gloucester Street South. The City Quay Covid testing centre and City Quay National school are situated along the eastern boundary of the subject lands.
- 7.14 The City Quay Arts site is one of the most significant brownfield sites in Dublin City centre and presents an exceptional opportunity to deliver a high-density development in the city's central core. The site is located at the junction of City Quay and Moss Street the site extends to 0.22 hectares. The site is also bounded to the south by Gloucester Street South. This site is fully hardstanding.
- 7.15 For many years the site has been vacant, with the abandoned City Arts Centre building, occupying the north-west corner of the site, now a derelict ruin. The only activity on the site since the mid 1990's has been its use for surface car parking. A small storage shed is located along the western perimeter of the yard.
- 7.16 The site is ideally placed to be part of an emerging cluster of buildings which will frame the backdrop and urban setting of the customs house. The City Quay site can be developed as part of a balanced massing on the South Quays to include the recently approved scale of the Tara Steet Tower and College Square developments, which will reinforce the symmetrical setting of the Customs House on the North Quays.
- 7.17 The proposed development site is zoned 'Zone 25: City Centre' in the Dublin City Council Development Plan 2016-2022 and the draft Dublin City Council Development Plan 2022-2028.
- 7.18 The receiving environment in terms of land, soils, geology, and hydrogeology is described in the following sections.

7.3.3 Soils

- 7.19 The EPA soil map ([EPA Maps](#)) shows that at the location and surrounding area, the soil types found are predominantly Made (Made Ground) which is to be expected considering the urban location of the site. See Figure 7.1.