Strategic Housing Development (SHD) at Former O'Devaney Gardens, Dublin 7

Bartra ODG Limited (Applicant)

ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR)

May 2021

BMA PLANNING

Strategic Housing Development (SHD) at Former O'Devaney Gardens, Dublin 7

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Environmental Impact Assessment Report (EIAR) Submitted To An Bord Pleanála With Planning Application For Strategic Housing Development (SHD)

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NON-TECHNICAL SUMMARY

This Environmental Impact Assessment Report (EIAR) has been prepared on behalf of the applicant, Bartra ODG Limited, in association with the submission of a planning application to An Bord Pleanala, for a Strategic Housing Development at the former O'Devaney Gardens site, Dublin 7.

POLICY CONTEXT

The current application has been prepared in the context of a range of national, regional and local planning policy sources. These are reviewed and commented on in detail in the *Statement of Consistency*, prepared by BMA Planning and submitted with this application and the main sources are summarised below.

The *Dublin City Development Plan 2016 – 2022* (DCDP) is the current statutory development plan for the area.

A key aspect of the DCDP Core strategy is that future development is prioritised within the intercity, key district centres and Strategic Development and Regeneration Areas (SDRA's).

The application site is designated as *SDRA 11 - Stoneybatter, Manor Street and O'Devaney Gardens and these areas are Z14* where it is the objective '*To seek the social, economic and physical development and/or rejuvenation of an area with mixed use, of which residential and "Z6" would be the predominant uses.' (Section 14.8.13).* The overall SDRA11 site, measuring c.10 hectares) also includes the DCC O'Devaney Gardens Phase 1A lands, the adjoining St. Bricin's Military Hospital and the Department of Defence site on Infirmary Road. The current proposals are consistent with the SDRA 11 objectives.

Development Standards included in Chapter 16 of DCDP have been considered and the development has incorporated these principles and standards insofar as they are relevant to the proposals.

The proposed development is a Material Contravention of the *Dublin City Development Plan 20016-2022* in relation to Building Heights (Ref. Section 16.7.2). The proposed development is also contrary to the Development Plan provisions in relation Block Configuration relating to the number of units per core (Ref. Section 16.10.1). In the case of both considerations, the scheme complies with the Apartment Guidelines (Revised 2020) which allows consideration of Unit Mix (SPPR1) and which allows flexibility in relation to units per core (SPPR 6).

The following national and regional policy documents are also relevant to this project: -

- *Project Ireland 2040 - The National Planning Framework (NPF)*
- *Rebuilding Ireland – Action plan for Housing and Homelessness (2016)*
- *Regional Spatial and Economic Strategy (RSES) 2019-2031 for the Eastern and Midland Region*

The project will deliver a high-density scheme of modern and adaptable new homes, within an existing urban area, in close proximity to existing public transport and local service provision. This is in accordance with the principles and vision of the above national and regional plans.

In terms of Section 28 Ministerial Guidelines, the proposed development is conceived to comply with these Government Guidelines and, in particular, is consistent with two important Guidelines that have issued on foot of the NPF, namely the 'Sustainable Urban Housing: Design Standards for New Apartments – Guidelines for Planning Authorities (revised 2020)' and Urban Development and Building Heights Guidelines for Planning Authorities (2018)'.

In summary, therefore, the proposed development is set against a very favourable policy background which supports the development of the O'Deveney Gardens site for high density residential and mixed use scheme as proposed.

DESCRIPTION OF PROJECT AND ALTERNATIVES

The former O'Devaney Garden's development was constructed in 1954 by Dublin Corporation and consisted of 278 no. residential units in 13 no. four storey blocks. It also included a community building, crèche and a commercial / retail block. This development was demolished by Dublin City Council (DCC) between 2008-2018. Some of the foundations / areas of hard standing are still evident within the site, as well as a hard surface area in the centre of the site (previously a sports pitch / court and children's playground). The roads through the site were retained.

The application site (c.5.2 hectares) is located in the north Inner City and comprises of lands which were formerly in residential use - the O'Devaney Gardens Development. The application site also includes a strip of land previously part of St. Bricin's Military Hospital.

The development site is a backland site that is bounded to the north by North Circular Road; to the east by lands that comprise St Bricin's Military Hospital and residential developments including Thor Place, Ashford Street, Ashford Place, Ashford Cottages and Ross Street; to the south by Montpellier Gardens and Montpelier Park residential developments; and to the west by a housing development under construction on behalf of Dublin City Council as well as dwellings on Findlater Street, Black Street, Kinahan Street, Aberdeen Street, Sullivan Street and Montpellier Gardens.

Access to the site is available from a number of points with the principal vehicular access points being from Infirmary Road, via the Montpelier Gardens development at the south west corner of the site; from North Circular Road (NCR) to the north west; and from the east via Thor Place, immediately to the north of the St Bricin's Hospital lands. There is a laneway along the north west boundary of the site, providing access to the rear of No.'s 44-60 NCR.

The proposed development (102,759sqm gross floor area - GFA) will consist of:

- 1,047no. residential units (Blocks 2 to 10) comprising a mix of one, two and three bed apartments, three bed duplex and three bed houses and all associated ancillary accommodation (100,565sqm GFA)

- Non-residential uses (2194sqm GFA) including retail / commercial units, creche and a community facility.

The gross floorspace of non-residential uses as a percentage of the overall gross floorspace is 2.1%.

As part of the public realm and landscaping proposals, a large central neighbourhood park with a multi-use games area (MUGA) and a secondary park to the north will be provided.

Vehicular access will be provided via the existing entrances to the site from North Circular Road, Montpellier Gardens and Thor Place, with an upgrade to the existing internal roads comprising a central boulevard between North Circular Road and Montpellier Gardens and a new link street to Thor Place.

The development will also include parking (vehicles and bicycles), landscaping and all associated site and development works.

This EIAR contains a description of the construction process as it is known at this pre-consent stage and ahead of detailed design development and the details are based on the *Outline Construction Management Plan (OCMP)* [CS Consulting] has also been prepared and is submitted with the planning application documentation.

In the event of a grant of permission, the appointed contractor(s) will update the OCMP to comply with and implement the requirements and mitigation and monitoring measures set out in this EIAR and any conditions imposed as part of the granted planning approval. The Contractor's Construction and Environmental Management Plan (CEMP) will be submitted to the Planning Authority prior to commencement.

The construction of the project is planned to take between three and five years to complete. The current indicative phasing suggests that the project will be split into three phases following completion of initial mobilisation, site clearance and site development works.

The proposed site excavation will result in a surplus of "cut" material which will be exported off site for reuse or disposed to suitably licensed landfill facilities.

The construction compound for the infrastructure works will be entirely within the site boundary, although in some instances located outside the phase being constructed. On-site facilities will include a site office and staff welfare facilities (e.g. toilets, drying room, canteen, etc.). It is envisaged that one or more tower cranes will be temporarily erected to accommodate the construction works. Hoists and teleporters may also be used within the site and around its perimeter as required during the project. Vehicle parking for construction personnel will be accommodated within the development site. To the extent possible, personnel will also be encouraged to use public transport, and information on local transportation will be published on site.

The number of workers on the site will vary throughout the construction programme. During the site clearance and excavation, it is likely that no more than 50 workers will be present on site at any one time. However, during peak construction this could rise to 200-300 workers depending on the number of buildings under construction at any one time.

Typical working hours (Monday to Friday: 07:00 to 19:00; Saturdays: 08:00 to 14:00 and Sundays and Bank Holidays: Works not permitted) are envisaged but with scope for some construction operations to be undertaken outside the prescribed times where this is necessary or unavoidable. This can be agreed with the Planning Authority.

Piling will be required for the substructure of the apartment blocks. The concrete operations associated with the foundation will require concrete deliveries to site which will be managed by the contractor and subject to the CEMP.

There are a number of options for the superstructure design and these will not be decided until detail design and tender stage but the methods of construction will be typical of what would be expected for a development of this nature.

For the apartment Blocks, the most likely options would be Reinforced Concrete (RC) Column and Flat Slab, RC/Masonry Cross Wall and Precast Slab, Precast Concrete Twin Wall and Precast Slab or a combination of.

House Construction is more limited in terms of options and the they are likely to be traditional masonry construction or timber frame erection.

On completion of the works all construction materials, debris, temporary hardstands etc. from the site compound will be removed off site and the site compound area reinstated in full on completion of the works.

As the project is supported by the Development Plan, no other alternative locations were considered. The consideration of "alternatives" was however an integral part of the design process through numerous iterations of the site layout, the design of the buildings in their external manifestation. The iterative design process also involved alternative internal layouts of the buildings based on input from technical experts relating to topics such as mechanical and electrical engineering, structural engineering, fire and daylight/ sunlight. On this basis, it is considered that all reasonable alternatives to the project are considered and no alternatives have been overlooked which would significantly reduce or further minimise environmental effects.

POPULATION AND HUMAN HEALTH

During construction, the main likely significant effects are a positive impact on employment with c.200-300 direct jobs created and indirect employment generated in the local economy as a result of the multiplier effect.

During construction, the proposed development will cause loss of amenity, disruption and inconvenience to local residents and the nearest receptors. However, this impact will be temporary in nature and mitigated insofar as practicable through the Contractor's Construction and Environmental Management Plan (CEMP). The CEMP will implement the requirements and mitigation and monitoring measures set out in this EIAR and any conditions attached to a grant of planning. A Community Liaison Officer (CLO) will be appointed and will inform the public of site operations and be available to local residents / members of the public with concerns / complaints.

The effects caused by air quality, noise and vibration and transport are addressed in Chapters 8, 9 and 11 of this EIAR.

Subject to adherence to best practice construction health and safety procedures, no significant adverse effects on human health are anticipated during the construction of this development.

Overall, during the operational phase, the impact of the development on the wider population are considered to be significant and positive and the main impacts are :-

- an increase in population, a long term positive moderate effect which will accelerate the rate of population increase in the Arran Quay Electoral Divisions in accordance with local regional and national policy;
- a permanent positive significant change in the landscape from brownfield to urban;
- positive long term impact on employment and the local economy through the creation of jobs and associated multiplier effect;
- the commercial and community facilities in the proposed development will likely have a positive moderate impact on facilities in the area for existing and future populations;

In the operational stage, measures to address health and safety considerations, including risks of fire, flooding and universal access have been addressed as part of design mitigation and will be subject to the relevant regulations to ensure no significant adverse impacts on human health.

Impacts of the proposed development in terms of daylight/ sunlight, overshadowing and wind effects have also been examined in detail in tandem with the scheme design and no significant impacts are anticipated.

No significant impacts are expected on human health as a result of the risk or vulnerability to major accidents or disasters.

BIODIVERSITY

A review of the biodiversity of the site was carried out by OPENFIELD Ecological Services and this included a study of existing information from the area and a series of site surveys. Site surveys were carried out in February, March, June and July 2020. June and July are within the optimal season for general habitat survey while a survey of breeding birds was carried out at these times. A dedicated bat survey was carried during the optimal survey period – September / October 2020.

It was found that the site is not within or adjacent to any area that is designated for nature conservation at a national or international level. There are no plants recorded from the site that are listed as rare or of conservation value. There are no habitats that are examples of those listed on Annex I of the Habitats Directive. Japanese Knotweed and Himalayan Balsam, both alien invasive plant species as listed on Schedule 3 of European Communities (Birds and Natural Habitats) Regulations 2011, SI No. 477 of 2011, have been recorded from the site and have been undergoing treatment using best practice techniques.

The development site can be described highly modified with disturbed areas of bare soil, artificial surfaces and un-grazed grassland. There are no water courses on or directly adjacent to the site, no bodies of open water or habitats which could be classified as wetlands. The site contains no suitable roost locations for Bats. A treeline made up of native and broad-leaved species is of high local value for biodiversity. With the exception of the treeline however, the habitats on the site have been evaluated as 'low' and 'negligible' local value There was no evidence of Badgers using the site.

The lands are in the catchment of the River Liffey which flows eastward to Dublin Bay. Dublin Bay is the location of a number of Special Areas of Conservation and a Special Protection Areas. A separate Screening Report for Appropriate Assessment has found that significant effects are not likely to occur to these Natura 2000 sites.

Grassland, artificial surfaces, treeline and bare soil habitats are to be removed to accommodate the development. Good site management practices will ensure that pollution to water courses does not occur during the construction phase these routine and well-understood practices are not measures intended to avoid or reduce harmful effects on protected European sites. Sustainable drainage techniques have been employed to ensure that no negative effects arise from surface water leaving the site. Additional landscaping will compensate for the loss of habitat that will occur. Alien invasive species are to be treated and any remaining plants will be removed prior to any works being undertaken by a licenced contractor.

With the suggested mitigation in place, the ecological impacts by this proposed development will be neutral or, at worst, minor negative. There are no impacts that could affect any area designated for nature conservation.

LAND AND SOILS

The assessment of Land and Soils is contained within Chapter 6 of the EIAR report. CS Consulting analysed and prepared this chapter to take cognisance of the existing, during construction and proposed effects the development would have on the geology of the environment.

The subject lands are predominantly flat in nature with no water course or other physical features of note on the lands. The site has been cleared of its former residential flat complexes. To the north west of the lands a housing development (referred to as Phase 1A) is currently under construction.

Land use policy supports the comprehensive regeneration of these lands for residential and mixed uses in accordance with the SDRA11 principles and objectives included in the Dublin City Development Plan 2016-2022.

There is no predicted long-term impact on the soil, geology and hydrogeology environments associated with the operation phase of the proposed development.

Mitigation measures for the demolition phase will be as outlined in the Outline Construction and Demolition Management Plan, submitted as part of this application by CS Consulting. The main impacts are associated with the Construction Phase of the proposed development. Following construction there will be no long-term significant impacts with respect to soils and geology of the site.

The assessment concluded that the residual impacts would be minor in nature and would not cause off site issues pertaining to the sites geological setting.

It is recommended that the following are monitored in relation to the soil and geological environments during the demolition and construction stage:

- Testing and monitoring of soil and made ground that will be excavated for any potentially contaminated material to ensure adequate classification and disposal.
- Monitoring of the retaining wall using for example, inclinometers and monitoring of water movements either seepages or through control points.
- Monitoring of neighbouring structures immediate to the development site for the effects of any vibration, movement and settlement arising from the excavation works based on condition surveys carried out by the Contractor prior to the works.
- Monitoring of interrelated impacts such as noise and vibration levels, groundwater levels, dust emissions etc. are dealt with in their other chapters in this EIAR.
- Testing and monitoring of water and gas during excavation works.
- Monitoring of water movements either seepages or through control points.

These measures, and any triggers requiring action by the Contractor, will be addressed in the Construction and Environmental Management Plan (CEMP).

WATER

This section of the EIAR has been prepared by CS Consulting and describes the existing water aspects on the proposed development site.

The subject lands does not contain any water courses or water bodies. The site was serviced by public drainage and potable water infrastructure. The subject lands are located in Flood Zone 'C' based on the Office of Public Works and Dublin City Council's designation and the flood risks associated with the site have been addressed in the Site Specific Flood Risk Assessment (CS Consulting) submitted with the application.

The proposed development was assessed to look at the redevelopment of the site and the impact this would have on the potable water & storm water drainage infrastructure to service the proposed development.

In terms of stormwater, the proposed development will adhere to the requirements of Dublin City councils sustainable urban drainage systems. This will allow the storm water generated on site to be released in a controlled manner even during extreme storm water events while also using infiltration techniques to improve the overall storm water quality. A site specific flood risk assessment for the site has been carried out and the site's current, low risk designation will be maintained following the development of the site.

Existing live services which cross the subject lands will be diverted and incorporated into the new scheme without any loss of service.

The proposed development will include a range of mitigation measures to ensure that the scheme will have a minor impact on the local water services. The public elements for the stormwater drainage system will be taken in charge by Dublin City Council for up-keep and routine maintenance when required.

AIR AND CLIMATE

Byrne Environmental Consulting Ltd have assessed the potential air quality and climatic impacts that the O'Devaney Gardens Strategic Housing Development may have on the receiving environment during the construction and operational phases of the project. The assessment includes a comprehensive description of the existing air quality in the vicinity of the subject site, a description and assessment of how construction activities and the operation of the development may impact existing air quality and climate, the mitigation measures that will be implemented to control and minimise the impact that the development may have on local ambient air quality and finally to demonstrate how the development shall be constructed and operated in an environmentally sustainable manner.

In terms of the existing baseline air quality environment, site specific baseline data and published data available from similar environments indicates that levels of nitrogen dioxide (NO2), carbon monoxide (CO), sulphur dioxide (SO2) particulate matter less than 10 microns (PM10) and less than 2.5 microns (PM2.5) and benzene are well below the National and European Union (EU) ambient air quality standards.

The construction phase of the development has the potential to generate short term fugitive dust emissions and diesel engine exhaust emissions associated with construction vehicles and plant however these emissions will be controlled by appropriate mitigation techniques and through the implementation of the recommended construction phase air quality management and monitoring measures throughout the duration of the construction phase. The predicted construction phase residual impacts on air quality and climate will be not-significant and transient to short-term.

The operational phase the development will see the functioning of modern, well insulated thermally efficient buildings in which energy efficiency shall be achieved by implementing sustainable features into the developments buildings and infrastructure design. The design of the residential units will ensure their operation will have a minimum impact on the receiving climate and that their design will withstand future potential extreme weather events associated with climate change.

The predicted impacts of domestic heating and traffic generated air pollutants associated with the development will not exceed the ambient air quality standards and the impact of the development on ambient air quality and climate been determined to be imperceptible, neutral and long-term.

NOISE AND VIBRATION

Byrne Environmental Consulting Ltd have assessed the potential noise and vibrational impacts that the proposed O'Devaney Gardens Strategic Housing Development may have on the receiving environment during the construction and operational phases of the proposed development. The assessment includes a comprehensive description of the existing ambient baseline noise climate in the vicinity of the subject site, a description of how construction activities may impact the existing ambient noise climate, the mitigation measures that shall be implemented to control and minimise the impact that the development may have on the receiving environment and the mitigation by design measures that are intended to ensure that the inward noise impact from the external environment is controlled within the residential units of the development.

The existing baseline noise climate has been assessed at the site over the course of typical daytime and night time periods. The principal sources of existing noise experienced at the site include road traffic noise from the surrounding road network.

Ambient noise levels in the vicinity of the site shall temporarily increase during the construction phase, however noise levels shall be controlled, minimised and managed through the implementation of best practice construction noise and vibration mitigation measures. The operational phase of the development will not have an adverse or unacceptable outward noise impact on the receiving environment including existing noise sensitive receptors located in the vicinity of the site.

The noise impact assessment has considered the potential outward noise and vibrational impacts associated with the construction and operational phases of the proposed development on the surrounding environment. The assessment has also assessed the inward noise impact of the surrounding environment including external transportation noise on the proposed development in order to ensure that suitable internal noise levels can be achieved across the site within the residential dwellings.

Internal noise levels within the proposed residential dwellings across the site have been assessed with regard to the existing noise levels and future noise sources, in particular road traffic noise. Sound insulation performance values for glazing, walls, roofs and ventilation systems have been specified as part of the assessment in order to ensure acceptable internal noise levels are achieved during both daytime and nightime periods.

The impact assessment has concluded that the construction phase noise impacts with mitigation will be negative, slight to moderate and transient to short-term at existing local residential receptors and the operational phase noise impact will be neutral, imperceptible and long-term at local residential receptors. It is predicted that the inward noise impact with mitigation will be neutral, not-significant and long-term.

MATERIAL ASSETS: BUILT SERVICES

This section of the EIAR has been prepared by CS Consulting and describes the existing site services aspects on the proposed development site.

To develop the subject lands existing services will be required to be relocated on site without the loss of service. This has been factored into the proposed design and phasing of the scheme.

The proposed development was assessed to look at the redevelopment of the site and the impact this would have on the built services (ie, potable water, foul water infrastructure, electricity, gas and telecommunications) to service the proposed development.

The proposed development will include a range of mitigation measures to ensure that the scheme will have a minor impact on these services.

The scheme will ensure low water usage sanitary appliance and separate drainage runs for the foul and storm water systems to mitigate against any adverse effects of the scheme's re-development.

The proposed scheme will draw on the existing potable water and wastewater services in the environs. This has been assessed and validated by Irish Water. As the subject lands were previously developed and the site is zoned for the nature and scale of development applied for the residual assessment of the impact of water services is deemed to be minor. Existing live services which cross the subject lands will be diverted and incorporated into the new scheme without any loss of service.

The potable and foul infrastructure will be vested to Irish Water post completion. Irish Water will therefore take over the operational and maintenance aspects of the proposed development's potable water and foul infrastructure.

The proposed development will be serviced from existing electricity, gas and telecommunications infrastructure in the vicinity of the site and there is capacity within these networks to accommodate the proposed development.

Subject to adherence to best practice requirements of the relevant providers and implementation of best practice mitigation measures, there will be no adverse impact on material assets/ built services as result of the proposed development.

MATERIAL ASSETS: TRANSPORTATION

The assessment of Traffic and Transport has been prepared by CS Consulting and is contained within Chapter 11 of the EIAR report.

The development site benefits from proximity to good quality public transport services and is situated within a 10-minute walk of the Heuston Station stop on the Luas Red Line, which is served by high frequency trams to and from Dublin city centre. The site is also within a 5-minute walk of bus stops served by a total of 3no. Dublin Bus routes, all of which operate at intervals of less than 10 minutes at peak times.

Vehicular access to the proposed development will be accommodated via access junctions on the North Circular Road, Montpelier Gardens, and Thor Park. Traffic impact assessment encompassed these three junctions, as well as two further existing key junctions on Infirmary Road and on Aughrim Street. These are the locations at which the subject development shall result in the highest proportional traffic flow increases.

Junction performance assessment shows that these five junctions currently all operate well within their effective capacities and shall continue to do so past the year 2038 both under a 'Do-Nothing' scenario (without the subject development) and under a 'Do-Something' scenario (with the inclusion of traffic generated by the subject development). Traffic related to the subject development shall not have a significant influence on the operation of these junctions.

The impact of construction traffic on the surrounding road network will be less significant than the impact of operational traffic related to the subject development. This impact will be confined to the duration of construction activity on the subject site.

Mitigation measures proposed for the demolition and construction stages of the development include a detailed Construction and Environmental Management Plan (CEMP), including a plan for the scheduling and management of construction traffic. In the operational phase, the development will incorporate several design elements intended to mitigate the impact of the development on the operation of the surrounding road network.

A Travel Plan Co-ordinator will be appointed for the proposed development, with the remit to implement and oversee an ongoing Residential Travel Plan (RTP). This will assist development occupants and visitors in making the most of sustainable transport opportunities and in avoiding single-occupant car journeys. A residential car sharing club will also be established within the development, providing residents with an alternative to private car ownership.

MATERIAL ASSETS: RESOURCE AND WASTE MANAGEMENT

Byrne Environmental Consulting Ltd have assessed the potential impact that construction phase and operational phase wastes associated with the proposed O'Devaney Gardens Strategic Housing Development may have on the receiving environment and on local and regional waste management infrastructure.

The assessment includes a comprehensive description of the nature and quantities of wastes that shall be generated during the construction and operational phases of the development and a description of how wastes generated shall be managed in accordance with the Eastern-Midlands Region Waste Management Plan 2015-2021 and Fingal County Development Plan 2017-2023 Waste Management Objectives.

The Site Specific Construction and Operational Waste Management Plans have been designed to ensure that the construction and operational phases of the proposed development will be managed to reduce the generation of unsegregated wastes, to maximise the potential for recycling, recovery and re-use and to demonstrate how the development will operate in a sustainable manner in terms of waste management and how the development will contribute to the achievement of the regions compliance with the waste reduction targets specified in the Eastern-Midlands Region Waste Management Plan 2015-2021.

The residual impact associated with the construction phase with mitigation will generate a small quantity of unrecyclable and non-reusable construction wastes which will result in a neutral, not significant and short-term impact.

The residual impact associated with the operational phase with mitigation, will generate a small quantity of unrecyclable and non-reusable domestic and commercial waste which will result in a neutral, not significant and long-term impact.

CULTURAL HERITAGE

The O'Devaney Gardens estate is shown as an undeveloped greenfield site on historic maps from the seventeenth century until the middle of the twentieth century, and contains no known cultural heritage.The site is a not within Zone of Archaeological Interest and contains no recorded archaeological monuments.

The major ground disturbance which accompanied the construction of the 1950s flat complex is likely to have removed any archaeological material in the site. However, there are two areas within the site which have not been previously built on where archaeological material may survive below ground – the former football pitch, and a strip alongside St. Bricin's Hospital. It is recommended that further archaeological investigation (test trenching) is carried out in these areas prior to construction.

The site does not contain any Protected Structures, there are no Architectural Conservation Areas located within a reasonable distance of the site, and the site is not an example of a designed landscape. The site is surrounded by earlier developments which back onto the site, some of which are of architectural heritage significance. These include Protected Structures along the North Circular Road, single- and two-storey dwellings built by the Dublin Artisan's Dwellings Company (DADC) c.1879-1908 to the north-east and north-west of the site St. Bricin's Military Hospital complex which lies immediately to the east.

The project will have a neutral impact on the setting and views from the rear of Protected Structures these adjacent architectural heritage buildings. The redevelopment of the site proposes higher quality replacement buildings to the recently demolished 1950s flat complex which will have beneficial visual impacts on visual outlooks from these properties. The opening-up of views of the military hospital complex may create new visual landmarks and a new sense of 'place' within the site

LANDSCAPE

The site is centrally located in Dublin's metropolitan area, within walking distance of the city centre and a nearby neighbourhood centre, well served by all modes of public transport, and with access to extensive public open space. These characteristics, along with the site's large scale and its history of residential use, make the site a candidate for a strategic scale, high density residential development. The national policy of compact growth provides further impetus for development of a scale that would significantly affect the landscape/townscape character and the composition of views in the site's receiving environment.

The proposed development would introduce a large new high density residential quarter to the city centre north of the Liffey, comprised of nine development blocks of diverse typologies (including 2-3 storey houses, 3 storey duplex terraces and several apartment blocks of up to 14 storeys), a network of streets of diverse character including a central, wide retail-fronted street, and a range of open spaces (including a large neighbourhood park with a playground and multiple use games area).

There are several sensitive townscape elements, characteristics and character areas in the receiving environment, including:

- The older Z2 'Residential Conservation Area' neighbourhoods to the west, east and north of the site;
- The fine grain and small scale of the built form of the neighbourhoods to the west and east - with many small residential properties backing onto the site boundary, therefore highly exposed to change on the site;
- St Bricin's Military Hospital, which includes extensive complexes of 'buildings of potential heritage value' (as described in the DCDP) and a 'Focal Building' (the chapel) located adjacent to the site's east boundary.
- Phoenix Park, a Conservation Area and landscape/visual amenity asset of city-wide importance. The park includes several protected structures in its eastern area nearest the site;
- The Liffey River corridor, also a Conservation Area, which passes some 360m to the south of the site. The DCDP identifies the Liffey as one of the city's most sensitive townscape resources.

These sensitivities require consideration and a design response in the proposal to avoid undue negative impacts. However, the sensitivities are counterbalanced by several spatial and policy factors which suggest the receiving environment has capacity to accommodate significant townscape and visual change. These include the site's Z14 zoning and Strategic Development and Regeneration Area (SDRA) designation, the site's inner city location, the site's proximity to public transport networks and the strength and variety of character of the surrounding townscape.

Taking these various factors into account, the Landscape Chapter classifies the townscape sensitivity of the receiving environment as 'medium'. Considering the nature and scale of the proposal (in terms of spatial extent, building typologies and height), and the degree of contrast with the surrounding townscape, the magnitude of townscape change which would result from the proposed development would be 'high' and the significance of the townscape effects is predicted to be 'significant'. However, the Chapter also provides the context that this townscape change is an intended outcome of the SDRA designations and policy.

Whether this change can be considered positive, negative or neutral depends on (a) the extent to which the proposal complies with the townscape/ urban design-related policy in the Dublin City Development Plan (DCDP) and national guidance, (b) the responsiveness of the proposal to the sensitivities and opportunities in the context, and (c) the potential visual effects on the surrounding area. A detailed analysis was carried out to assess the proposal's compliance with (1) the DCDP's 'key guiding principles' for SDRA 11, and (2) the Building Height Guidelines criteria for assessment of proposals for taller buildings. The assessment (Table 14.6 of the Landscape and Visual Impact Assessment chapter) indicates that, while the development would result in significant townscape impacts, due to its appreciable response to the context and to relevant policy its effects on townscape character can be considered overwhelmingly positive.

30no. viewpoints were selected for assessment of the proposal's visual effects informed by Verified Photomontages. The viewpoints were selected to represent the key potentially affected areas in the receiving environment, and to address relevant policy in the DCDP. The assessment found that the proposed development would result in significant effects on the composition, character and quality of views in the immediate environs of the site. For the most part these effects can be considered positive.

CONCLUSION

The EIAR has considered the likely, significant, adverse effects of the proposed project on the receiving environment, including cumulative impacts and having regard to assessments under other European Directives.

Mitigation measures (see Chapter 15) are included, to avoid and / or reduce impacts on the environment where considered necessary. This includes mitigation measures incorporated into the design of the proposed development.

The EIAR concludes that there are no material or significant environmental issues arising from the project which would prohibit the competent authority from issuing consent for the development.

1. INTRODUCTION

1.1 PURPOSE OF REPORT

This Environmental Impact Assessment Report (EIAR) has been prepared on behalf of Bartra ODG Limited (hereafter Bartra / The Applicant) in association with the submission of a planning application to An Bord Pleanala, for a proposed Strategic Housing Development (SHD) at the Former O'Devaney Gardens site, Dublin 7.

The EIA process, including the preparation of this EIAR, and the examination of the information presented by the Local Authority, will inform the decision-making process. The purpose of this EIAR is to assist and inform the Competent Authority in undertaking an environmental assessment of this project.

Therefore, the objectives of this EIAR are summarised as follows:-

- To identify the significant environmental impacts of the project during the construction and operational phases having regard to the characteristics of the receiving environment.
- To evaluate the magnitude and significance of impacts and to propose appropriate measures to mitigate potential adverse impacts.
- To identify, where appropriate, monitoring measures to be implemented during the construction and operational phases.

The nature and extent of the development proposed, i.e. the project being assessed in this EIAR, is outlined in Chapter 3. This is prepared with reference to the plans and particulars submitted with the planning application.

Details of the project will be available online through the EIA Portal[1] and on the website of Competent Authority. A copy of the application, including this EIAR, will also be available on the project specific website for this SHD development – www.odg-shd.com

1.2 STATUTORY REQUIREMENTS

The EIA Directive, Council Directive 85/337/EEC of 27 June 1985 *on the assessment of the effects of certain public and private projects on the environment*, is designed to ensure that projects likely to have significant effects on the environment are subject to a comprehensive assessment of environmental effects prior to development consent being given.

Council Directive 85/337/EEC has been amended by Council Directives 97/11/EC, 2003/35/EC and 2009/31/EC. These amendments were codified in Directive 2011/92/EU. In 2014, the Directive was further amended by Directive 2014/52/EU.

[1] The EIA Portal is accessible via the Department of Housing, Planning and Local Government website at https://www.housing.gov.ie/planning/environmental-assessment/environmental-impact-assessment-eia/eia-portal

1.2.1 Directive 2014/52/EU (Amendment of Directive 2011/92/EU)

Directive 2014/52/EU amending Directive 2011/92/EU *on the assessment of the effects of certain public and private projects on the environment* was adopted on 16 April 2014

The definition of the EIA process is redefined under Article 2(g) as follows:-

> *"Environmental impact assessment" means a process consisting of:*
> *(i) The preparation of an environmental impact assessment report by the developer, as referred to in Article 5(1) and (2);*
> *(ii) The carrying out of consultations as referred to in Article 6 and, where relevant, Article 7;*
> *(iii) the examination by the competent authority of the information presented in the environmental impact assessment report and any supplementary information provided, where necessary, by the developer in accordance with Article 5(3), and any relevant information received through the consultations under Articles 6 and 7;*
> *(iv) the reasoned conclusion by the competent authority on the significant effects of the project on the environment, taking into account the results of the examination referred to in point (iii) and, where appropriate, its own supplementary examination; and*
> *(v) The integration of the competent authority's reasoned conclusion into any of the decisions referred to in Article 8a."*

The content of an EIAR is included in Article 5(1) and expanded upon in Annex IV (See Box 1.1):-

> *"Article 5*
> *1. Where an environmental impact assessment is required, the developer shall prepare and submit an environmental impact assessment report. The information to be provided by the developer shall include at least:*
> *(a) a description of the project comprising information on the site, design, size and other relevant features of the project;*
> *(b) a description of the likely significant effects of the project on the environment;*
> *(c) a description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;*
> *(d) a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;*
> *(e) a non-technical summary of the information referred to in points (a) to (d); and*
> *(f) any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected."*

BOX 1.1 ANNEX IV: DIRECTIVE 2011/92/EU AS AMENDED BY DIRECTIVE 2014/52/EU

INFORMATION REFERRED TO IN ARTICLE 5(1)
(INFORMATION FOR THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT)

1. *A Description of the project, including in particular:*
   (a) a description of the location of the project;
   (b) a description of the physical characteristics of the whole project, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases;
   (c) a description of the main characteristics of the operational phase of the project (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used;
   (d) an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation and quantities and types of waste produced during the construction and operation phases.
2. *A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.*
3. *A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.*
4. *A description of the factors specified in Article 3(1) likely to be significantly affected by the project: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.*
5. *A description of the likely significant effects of the project on the environment resulting from, inter alia:*
   (a) the construction and existence of the project, including, where relevant, demolition works;
   (b) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;
   (c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste;
   (d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters);
   (e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;
   (f) the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change;
   (g) the technologies and the substances used.
   The description of the likely significant effects on the factors specified in Article 3(1) should cover the direct effects and any indirect, secondary, cumulative,

transboundary, short-term, medium- term and long-term, permanent and temporary, positive and negative effects of the project. This description should take into account the environmental protection objectives established at Union or Member State level which are relevant to the project.

6. *A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.*
7. *A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.*
8. *A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to Union legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.*
9. *A non-technical summary of the information provided under points 1 to 8.*
10. *A reference list detailing the sources used for the descriptions and assessments included in the report.*

1.2.2 National EIA Legislation

The EIA Directive was first transposed into Irish law by the *European Communities (Environmental Impact Assessment) Regulations*, 1989 (S.I. No. 349 of 1989) which amended the *Local Government (Planning and Development) Act*, 1963 (and other legislation) to provide for environmental impact assessment. These Regulations, together with the *Local Government (Planning and Development) Regulations*, 1990 (S.I. No. 25 of 1990), which made more detailed provision in relation to planning consents, came into effect on 1 February 1990.

The 2014 EIA Directive has principally been transposed into national planning law by the *European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018* (S.I. No. 296 of 2018).

EIA provisions in relation to planning permissions are contained in the Part X of the *Planning and Development Act, 2000*, As Amended and Part 10 and Schedules 5, 6, 7 and 7A of the *Planning and Development Regulations*, 2001, As Amended.

1.2.3 National Guidance

The Department of Housing, Planning and Local Government (DHPLG) issued *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*, in August 2018. The footnote below contains a glossary of terms from these Guidelines and used in this EIAR[2].

The Environmental Protection Agency (EPA) prepared revised (draft) guidance to respond to the 2014 EIA Directive. The current Draft *Guidelines on the Information to be contained in Environmental Impact Assessment Reports* (2017) and Draft *Advice Notes for Preparing Environmental Impact Statements* (2015), have been referenced in the preparation of this EIAR.

1.3 THE NEED FOR AN EIAR – SCREENING

Schedule 5 of the Planning and Development Regulations 2001, As Amended, specifies a variety of projects which require an EIAR. Part 2 (10) relates to 'Infrastructure Projects' and states as follows:-

> *10. Infrastructure projects*
> *(a) Industrial estate development, where the area would exceed 15 hectares.*
> *(b) (i) Construction of more than 500 dwelling units.*
> *(ii) Construction of car-parks providing more than 400 spaces, other than a car-park provided as part of, and incidental to the primary purpose of, a development.*
> *(iii) Construction of shopping centres with a gross floor space exceeding 10,000 square metres*
> *(iv) Urban development which would involve an area greater than 2 hectares in the case of a Business District, 10 hectares in the case of other parts of a built-up area, and 20 hectares elsewhere. (In this paragraph "business district" means a district within a city or town in which the predominant land use is retail or commercial use.)"*

The development proposed is above the relevant threshold for Part 10(b)(i) and therefore an EIAR is required for this project.

1.4 SCOPING OF EIAR

'Scoping' is a process to determine what information should be contained in an EIAR. It will also decide what methods should be used to gather and assess that information.

1.4.1 Statutory Instruments and Guidance

[2] **Competent Authority** - The authority designated as responsible for performing the duties arising from the Directive. In this guidance competent authorities are planning authorities and An Bord Pleanála.
Development consent - The decision of the competent authority or authorities which entitles the developer to commence the project.
EIA - The process of carrying out environmental impact assessment as required by the EIA Directive.
EIA Report (EIAR) - The report prepared by the developer in accordance with the requirements of article 5 of the EIA Directive and submitted to the competent authority, together with the application documentation, for development consent.
Reasoned Conclusion - The statement made by the Competent Authority on the significant effects of the project on the environment, based on an examination of the EIA report and, where appropriate, the results of its own supplementary examination.

In the first instance, the scope of the EIAR has been determined with regard to the Statutory Instruments and Regulations relating to EIA and related guidance from the European Union, the Government and the EPA. These include the following:-

<u>EU Directives / Legislation</u>

- The EU Directives on Environmental Impact Assessment (85/337/EEC as amended by 97/11/EC, 2003/35/EC, 2009/31/EC, codified in 2011/92/EU and amended by 2014/52/EU)
- The Planning and Development Act, 2000 (as amended)
- The Planning and Development Regulations, 2001 (as amended)

<u>EIA and related Guidance</u>

- EPA (2002) *Guidelines on the Information to be contained in Environmental Impact Statements*
- EPA (2003) *Advice Notes on Current Practice in the preparation of Environmental Impact Statements*
- DEHLG (2003) *Environmental Impact Assessment (EIA) Guidance for Consent Authorities regarding Sub-threshold Development.*
- EPA (2015) *Advice Notes for preparing Environmental Impact Statements* (Draft)
- EPA (2017) *Guidelines on the Information to be contained in Environmental Impact Assessment Reports* (Draft)
- European Commission (2017) *Environmental Impact Assessment of Projects - Guidance on Scoping*
- European Commission (2017) *Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report*
- DHPCLG (2018) *Circular* PL05/2018 – *Transposition into Planning Law of Directive 2014/52/EU amending Directive 2011/92/EU on the effects of certain public and private projects on the environment (the EIA Directive) and Revised Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment.*
- DHPCLG (2018) *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment.*
- NRA. 2009. *Guidelines for Assessment of Ecological Impacts of National Road Schemes.* National Roads Authority.

The scope of the study is also informed by the extent to which other assessments have addressed some types of effects adequately and appropriately. This includes other sources of relevance to the proper planning and sustainable development of the site. Chapter 2.0 contains an overview of the main planning policy sources relevant to the project.

1.4.2 Environmental Factors

The 2017 EPA Draft Guidelines recommend that the scoping process use 'likely' and 'significant' as the principal determining criteria for what should be assessed in the EIAR. Any issues which do not pass the test are omitted or 'scoped out' from further assessment.

A description of the likely significant effects of the project on the environmental factors listed in Article 3(1) of the 2014 Directive is included in this EIAR under the following headings:-

- Population and Human Health — Chapter 4
- Biodiversity — Chapter 5
- Land and Soils — Chapter 6

• Water	Chapter 7
• Air and Climate	Chapter 8
• Noise and Vibration	Chapter 9
• Material Assets: Built Services	Chapter 10
• Material Assets: Transportation	Chapter 11
• Material Assets: Resource and Waste Management	Chapter 12
• Cultural Heritage	Chapter 13
• Landscape	Chapter 14

The scope of this EIAR focuses on the effects at project level and does not re-assess the alternatives or effects on the environment already considered at the higher strategic level. This is in accordance with Section 3.3.5 of the 2017 EPA Draft *Guidelines*:- *The extent to which higher level considerations have already been assessed and so do not need to be assessed again should inform and be referred to in the EIA scoping process."*

1.4.3 Consultation

A formal scoping opinion was not sought from An Bord Pleanala (ABP) in relation to this EIAR. However, the Stage 2 Pre-application Consultation with ABP noted that the final application would be accompanied by an EIAR. Issues raised in the context of the ABP Consultation have been taken on board in the compilation of this EIAR.

The application was also prepared following consultation with Dublin City Council Planning Department and the other departments responsible for roads, water services, parks and housing. This consultation took place at Stage 1 of the SHD process and continued between Stages 2 and 3.

Dublin City Council has engaged in consultation with the local community in relation to the O'Deveney gardens redevelopment project over a number of years. The feedback from this consultation has been taken into consideration in the DCC brief to Bartra ODG Limited.

Scoping of individual chapters was undertaken as appropriate by the experts assigned to the topic. Where this involved scoping the assessment with the Local Authority, Irish Water, utility providers and other prescribed bodies /consultees, details are provided in the relevant Chapter.

1.4.4 Related Projects/ Cumulative Impacts

The scoping of the assessment also considers other projects or activities (permitted or planned) that are not included in the project but which may result in cumulative impacts – i.e. '*The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects'.* (EPA, 2017 – Table 3.3).

By considering these projects, the EIAR allows the Competent Authority to form an overall understanding of the likely effects that will arise, including direct, indirect / secondary or cumulative impacts, if the current project proceeds. Related Projects and other projects whose implementation may coincide with the project are considered in Chapter 3.

Plans and programmes relevant to the project are listed in Chapter 2. These plans have been subjected to a higher tier of environmental assessment through the Strategic Environmental Assessment (SEA) process and in line with Section 3.3.5 of the EPA Guidance (see above), the higher level considerations do not need to be assessed again. This EIAR however, has due regard to the policies and objectives in the relevant plans and programmes.

1.5 RISK OF MAJOR ACCIDENTS AND/ OR DISASTERS

In accordance with Article 3(2) and Annex IV of the 2014 EIA Directive, the vulnerability of the project to risks of major accidents and/or disasters is considered, and the implications for likely significant effects on the environment if it did occur.

Article 3(2) of the 2014 EIA Directive states that an EIAR shall consider:-

> *'The effects referred to in paragraph 1 on the factors set out therein shall include the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned'.*

An EIAR should also contain the following information prescribed in 5(d) of Annex IV of the 2014 EIA Directive:-

> 5. *"A description of the likely significant effects of the project on the environment resulting from, inter alia:*
>   *….*
>   *(d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters);"*

The 2018 *Guidelines for Planning Authorities and An Bord Pleanala on carrying out Environmental Impact Assessment* sets out two key considerations to address this:-

- *"The potential of the project to cause accidents and/or disasters, including implications for human health, cultural heritage, and the environment;*
- *The vulnerability of the project to potential disasters/accidents, including the risk to the project of both natural disasters (e.g. flooding) and man-made disasters (e.g. technological disasters)."*

(Source: Page 31, Section 4.29)

During the construction phase the risk of accidents and/ or disasters arise from the potential for construction accidents are addressed under Health and Safety Regulations and other codes. Insofar as they are relevant to the planning and EIA process, mitigation measures that will prevent and/ or mitigate the significant effects are identified.

During the operational phase the risk of fire related accidents is similarly addressed through the Building Regulations (Fire Safety) and is therefore addressed through primary mitigation in the design process. Residual risks of fire and road traffic accidents will be managed by emergency services as per their standard procedures.

The risk of flooding and vulnerability of the project is addressed in the Site Specific Flood Risk Assessment (SSFRA) submitted with the planning application documentation. Adherence to best practice and "proper planning and sustainable development" principles means these risks are reduced to an acceptable level whereby the risk is unlikely and unexpected as a result and further assessments within the EIA process are not necessary.

Otherwise, in terms of the project, no other major accidents or disasters are considered to give rise to effects that are 'likely' and 'significant'.

1.6 STRUCTURE/ METHODOLOGY

1.6.1 Structure of EIAR

The overall structuring and scope of this EIAR has regard to the information requirements of the EC Directives, Irish Statutory Regulations and established best practice.

The EIAR has been written and illustrated with figures in a manner which, insofar as possible, is intended to be understandable to the public generally.

In accordance with the statutory regulations, a Non-Technical Summary has been prepared and included in this EIAR.

Chapters 1-3 of the EIAR provides the context for the EIA assessment including details of the planning policy context, alternatives considered, a description of the site, the project (i.e. the project) and the construction methodology.

This is followed by each of the assessment chapters. The structure used in this EIAR is a Grouped Format structure which examines each environmental topic in a separate chapter.

Chapter 15.0 summarises the significant effects, including cumulative effects (both the addition of many minor or significant effects and the effects of other projects), and addresses the interactions between impacts on different factors. It also contains a list of the mitigation and monitoring measures from each Chapter.

In accordance with Section 3.8.4 of the *Draft Guidelines on Information to be Contained in Environmental Impact Assessment Reports* (August 2017), a compendium of the mitigation and monitoring measures to be adopted during the construction and operational phases of the project, detailed within each chapter, are included in Chapter 16.0.

The Appendices contain background and technical details relating to the project and are referred to in the relevant Chapters (numbered with the relevant Chapter number and followed by A, B, C etc.).

Chapter 14A contains the Landscape and Visual Assessment – Verified Views - and is presented as a separate A3 volume (**Volume 2**)

1.6.2 Methodology

A systematic approach is employed using standard descriptive methods, replicable prediction techniques and standardised impact descriptions to provide an appropriate evaluation of each environmental topic under consideration.

An outline of the methodology employed to examine each environmental topic is provided below:

- Introduction: Provides an overview of the specialist area and identifies the specialist who prepared the assessment.
- Study Methodology: This subsection outlines the method by which the relevant impact assessment has been conducted within that chapter.

- The Existing Receiving Environment (Baseline Situation): In describing the receiving environment, the context, character, significance and sensitivity of the baseline receiving environment into which the project will fit is assessed. This also takes account of any projects that are likely to proceed.
- Impacts and Mitigation: This section provides a description of the impacts that may arise during the construction and operational phases of the project. Appropriate mitigation measures are included where required. A description of any Residual Impacts post implementation of the mitigation measures is given where they occur.
- The impacts will consider both "Do-Nothing" (where the development does not proceed and the environment would not change as a result) and worst case is undertaken.

Where necessary and appropriate the following are also considered:-

- Monitoring: This involves a description of monitoring in a post-development phase, if required. This section addresses the effects that require monitoring, along with the methods and the agencies that are responsible for such monitoring. The level of monitoring proposed is proportionate to the nature, location and size of the project and the significance of its effects.
- Reinstatement: While not applicable to every aspect of the environment considered within the EIAR, certain measures need to be proposed to ensure that in the event of the proposal being discontinued, there will be minimal impact to the environment.
- Interactions: Where applicable, the assessment refers to impact interactions, including potential indirect, secondary and cumulative impacts.

1.6.3 Forecasting Methods

The individual forecasting methods used to assess the various effects of the project on the environment are outlined in the relevant Chapters of this EIAR in the 'Methodology' section.

1.6.4 Difficulties Encountered

Some details of the project and the construction methodology / programme are matters which may be subject to change depending on the contractor(s) appointed and other considerations which are not finalised at this stage, and which cannot be finalised until a grant of planning permission for the project has been issued. These are matters which can be addressed prior to commencement of development in consultation with the planning authority and other relevant stakeholders.

Apart from progamme delays, Covid-19 restrictions did not impose particular difficulties in terms of surveys and much of the early survey work was undertaken prior to the Covid-19 restrictions being in place and those that were not could be undertaken within the restrictions.

No other significant difficulties were encountered in the preparation of the EIAR. Any limitations or technical difficulties associated with assessment of an environmental topic are detailed in the relevant chapter.

1.6.5 Reference List

The list of The EU Directives, Legislation and guidance documents in Section 1.4.1 references the sources of the descriptions and assessments included in the EIAR.

At the end of each assessment chapter, a reference list of additional sources relied on in that Chapter, specific to that assessment, is provided.

1.6.6 List of Abbreviations

The following abbreviations are used in this EIAR:-

AA	Appropriate Assessment
CA	Competent Authority
EIA	Environmental Impact Assessment
EIA Directive	Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, as amended by Directive 2014/52/EU
EIAR	Environmental Impact Assessment Report
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
NTS	Non Technical Summary
SEA	Strategic Environmental Assessment

Other abbreviations which are specific to a description / an environmental topic are clarified in the relevant chapters.

1.7 TERMINOLOGY

The descriptions used to describe the effects on the environment in this EIAR are listed below. These descriptions are taken from the Draft *Guidelines on the Information to be contained in Environmental Impact Assessment Reports* (2017) Table 3.3:-

Quality of Effects It is important to inform the non-specialist reader whether an effect is positive, negative or neutral	*Positive Effects* A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities). *Neutral Effects* No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error. *Negative/adverse Effects* A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance). *Positive Effects* A change which improves the quality of the environment (for example, by increasing

species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).

Describing the Significance of Effects
‘’Significance’ is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful (also see *Determining Significance* below.).

Imperceptible
An effect capable of measurement but without significant consequences.

Not significant
An effect which causes noticeable changes in the character of the environment but without significant consequences.

Slight Effects
An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.

Moderate Effects
An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.

Significant Effects
An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.

Very Significant
An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.

Profound Effects
An effect which obliterates sensitive characteristics

Describing the Extent and Context of Effects
Context can affect the perception of significance. It is important to establish if the effect is unique or, perhaps, commonly or increasingly experienced.

Extent
Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.

Context
Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)

Describing the Probability of Effects
Descriptions of effects should establish how

Likely Effects
The effects that can reasonably be expected

likely it is that the predicted effects will occur – so that the CA can take a view of the balance of risk over advantage when making a decision.

to occur because of the planned project if all mitigation measures are properly implemented.

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

Describing the Duration and Frequency of Effects
'Duration' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful.

Momentary Effects
Effects lasting from seconds to minutes

Brief Effects
Effects lasting less than a day

Temporary Effects
Effects lasting less than a year

Short-term Effects
Effects lasting one to seven years.

Medium-term Effects
Effects lasting seven to fifteen years.

Long-term Effects
Effects lasting fifteen to sixty years.

Permanent Effects
Effects lasting over sixty years

Reversible Effects
Effects that can be undone, for example through remediation or restoration

Frequency of Effects
Describe how often the effect will occur. ((once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually))

Describing the Types of Effects

Indirect Effects (or. Secondary Effects)
Impacts on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.

Cumulative Effects
The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.

'Do-Nothing Effects'
The environment as it would be in the future should the subject project not be carried out.

`Worst case' Effects
The effects arising from a project in the case where mitigation measures substantially fail.

Indeterminable Effects
When the full consequences of a change in the environment cannot be described.

Irreversible Effects
When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.

Residual Effects
The degree of environmental change that will occur after the proposed mitigation measures have taken effect.

Synergistic Effects
Where the resultant effect is of greater significance than the sum of its constituents, (e.g. combination of SOx and NOx to produce smog).

1.8 PROJECT TEAM / CONTRIBUTORS

This EIAR has been prepared on behalf of the developer by a team of qualified experts, as required by the EIA Directive. The contributors involved in the preparation of this EIAR are identified in Table 1.1.

Table 1.1 : EIA Team

Chapter	Company	Expert Contributor
Non- Technical Summary	Input from Contributors of each of the assessment chapters listed below.	All
1 Introduction	BMA Planning, Planning and Development Consultants, Taney Hall, Eglington Terrace, Dundrum, Dublin 14.	Louise O'Leary BA MRUP, Dip EIA Management, MIPI. Louise is a Senior Planner with BMA Planning and has over 15 years' experience in planning and development projects including experience of directing and contributing to the preparation of environmental impact assessments for a variety of projects.

2 Planning Policy Context	BMA Planning, Planning and Development Consultants, Taney Hall, Eglington Terrace, Dundrum, Dublin 14.	Louise O'Leary BA MRUP, Dip EIA Management, MIPI.
3 Description of Project and Alternatives	BMA Planning, Planning and Development Consultants, Taney Hall, Eglington Terrace, Dundrum, Dublin 14. O'Mahony Pike Architects, The Chapel, Mount Saint Anne's, Milltown, Dublin Cronin & Sutton Consulting, 1st Floor, 19-22 Dame Street, Dublin	Louise O'Leary BA MRUP, Dip EIA Management, MIPI. Brian Greenan dip Arch B.Arch Sc, Dip Construction Law Contract Admin (TCD). Brian is a Senior Architect in O'Mahony Pike Architects with over 20 years' experience working on various residential, leisure and educational schemes from inception through to completion. David Rehill, BE, C.Eng, MBA, Dip Proj Mgmt, MIstructE, MIEI. David is the Managing Director of CS Consulting and Chartered Civil and Structural Engineer with over 17 years' experience. David has experience on many large public and private developments and has contributed to various sections of environmental impact assessments. Niall Barrett BEng (Hons), CEng, Nat Dip Eng Cert, Cert Health and Safety, Cert PSDP, Cert RSA, MIEI. Niall is a Director and Chartered Engineer specialising in Civil, Traffic and Transportation Engineering and has over 15 years' experience in this field. He has worked on numerous projects including experience of directing and contributing to the preparation of environmental impact assessments for a variety of projects
4 Population and Human Health	BMA Planning, Planning and Development Consultants, Taney Hall, Eglington Terrace, Dundrum, Dublin 14.	Louise O'Leary BA MRUP, Dip EIA Management, MIPI
5 Biodiversity / Species and Habitats	Openfield Ecological Services, 12 Maple Avenue, Castleknock, Dublin 15	Pádraic Fogarty B.Sc. Analytical Science, Msc. in Environmental Protection, Dip. in Environment and Geography, Dip. Field Ecology, IEMA. Pádraic is Managing Director of Openfield Ecological Services and has

		25 years' experience in the environmental sector. He has a primary degree in Analytical Science from DCU, a Masters in Environmental Protection from Sligo IT, a Diploma in Environment and Geography from the Open University and a Diploma in Field Ecology from UCC. He is a full member of the Institute for Environmental Management and Assessment.
6 Land and Soils	Cronin & Sutton Consulting, 1st Floor, 19-22 Dame Street, Dublin	Robert Fitzmaurice, BEng (Hons), C.Eng, PG Dip Environmental Engineering, Adv. Dip Planning & Environmental Law, M.I.E, MIEI. Robert is a Director and Chartered Engineer specialising in Civil & Environmental Engineering and has over 20 years' experience in this field. He has worked on numerous projects including experience of directing and contributing to the preparation of environmental impact assessments for a variety of projects.
7 Water	Cronin & Sutton Consulting, 1st Floor, 19-22 Dame Street, Dublin	Robert Fitzmaurice, BEng (Hons), C.Eng, PG Dip Environmental Engineering, Adv. Dip Planning & Environmental Law, M.I.E, MIEI.
8 Air and Climate	Byrne Environmental Consulting Ltd., Red Bog Skryne Road Dunshaughlin Co. Meath	Ian Byrne MSc Environmental Protection, Dip Environmental and Planning Law, Member of the Institute of Acoustics. Ian has over 24 years' experience as an acoustic consultant and has particular speciality in the monitoring assessment and management of the impacts on noise and vibration on human health and on the receiving environment. Ian has prepared numerous air quality and climate impact assessments for large residential, commercial and industrial developments for private and public clients.
9 Noise and Vibration	Byrne Environmental Consulting Ltd., Red Bog Skryne Road Dunshaughlin Co. Meath	Ian Byrne MSc Environmental Protection, Dip Environmental and Planning Law, Member of the Institute of Acoustics.
10 Material Assets: Built Services	Cronin & Sutton Consulting, 1st Floor, 19-22 Dame Street, Dublin	Robert Fitzmaurice, BEng (Hons), C.Eng, PG Dip Environmental Engineering, Adv. Dip Planning & Environmental Law, M.I.E, MIEI.

			Andrew Clifford, Chartered Engineer with over 20 years' experience of JV Tierney and Company Mechanical, Electrical and Sustainable Consulting Engineers.
11	**Material Assets: Transportation**	Cronin & Sutton Consulting, 1st Floor, 19-22 Dame Street, Dublin	Niall Barrett BEng (Hons), CEng, Nat Dip Eng Cert, Cert Health & Safety, Cert PSDP, Cert RSA, MIEI
12	**Material Assets: Resource and Waste Management**	Byrne Environmental Consulting Ltd., Red Bog Skryne Road Dunshaughlin Co. Meath	Ian Byrne MSc Environmental Protection, Dip Environmental and Planning Law, Member of the Institute of Acoustics.
13	**Cultural Heritage**	ACAS (Aisling Collins Archaeological Services), 45 Richmond Park, Monkstown, Co Dublin Dr Jason Bolton, 12 Casement Villas, Kill of the Grange, Glenageary, Co. Dublin	Aisling Collins PGDip MIAI. Aisling is a fully licensed archaeological director with over 16 year's directing and project managing a huge variety of different archaeological sites and large scale commercial developments. Services include including pre-planning advice to developers, archaeological impact assessments, monitoring, testing and excavation. Dr Jason Bolton, MA Dip Archaeology PhD MIAI. Jason is an archaeological and architectural conservation consultant with over 20 years in planning, development and impact assessment of cultural heritage sites.
14	**The Landscape**	Model Works, The Old Courtyard, Newtownpark Ave, Glebe, Blackrock, Co. Dublin	Richard Butler MSc Sp. Planning, BSc Landscape Arch., Dip Proj Mgmt, MIPI, MILI. Richard is Director of Model Works Planning Services department. He has an MSc in planning, a BSc in landscape architecture and is an active member of the IPI and ILI. Richard has 23 years' experience in development and environmental planning, specialising in Landscape and Visual Impact Assessment (LVIA).
15	**Significant Effects, Interactions and Other Impacts**	BMA Planning, Planning and Development Consultants, Taney Hall, Eglington Terrace, Dundrum, Dublin 14.	Louise O'Leary BA MRUP, Dip EIA Management, MIPI

2. PLANNING POLICY CONTEXT

2.1 INTRODUCTION

The current application has been prepared in the context of a range of national, regional and local planning policy sources. These are reviewed and commented on in detail in the *Statement of Consistency*, prepared by BMA Planning and submitted with this application. It is not proposed to repeat these provisions in this document. The following is a summary of the most relevant plans to the current application.

2.2 DEVELOPMENT PLAN

The *Dublin City Development Plan 2016 – 2022* (the "Development Plan" or "DCDP") is the current statutory development plan for the area.

The following outlines the most relevant provisions of the Development Plan in the context of the project.

2.2.1 Vision and Core Strategy (Chapter 2)

A key aspect of the DCDP Core strategy is that future expansion, whether housing or mixed uses occur on a phased basis and in tandem with high-quality rail-based public transport. The settlement strategy prioritises this expansion spatially within the intercity, key district centres and Strategic Development and Regeneration Areas (SDRA's).

18 areas are designated as *SDRA's* in the Development Plan. Each of which are capable of delivering a significant quantum of residential and employment development.

The application site is designated as *SDRA 11 - Stoneybatter, Manor Street and O'Devaney Gardens*, with a capacity of c.1,000 units (Table E). (Refer to Chapter 15 below for further details).

2.2.2 Quality Housing (Chapter 5)

The Council has identified the need to create sustainable communities in a number of key regeneration areas and O'Devaney Gardens is named specifically as one of these areas.

Policy QH26 is in relation to Regeneration, and it states that it is a policy of Dublin City Council:

> "*To promote the transformation of the key regeneration areas into successful socially integrated neighbourhoods including those on the Main Inner City Regeneration Areas Map and promote area regeneration in parts of the city which require physical improvement and enhancement in terms of quality of life, housing and employment opportunities, including the Docklands*"

2.2.3 Built Heritage and Culture (Chapter 11)

There are no protected structures on site.

St. Bricin's Military Hospital is located adjacent to the eastern site boundary. The Record of Protected Structures does not include any structures within this site.

The North Circular Road includes many Protected Structures. However, there is only one adjoining the site - No. 66 North Circular Road (RPS No. 1582).

2.2.4 Land Use Zoning (Chapter 14)

The lands are zoned *Z14 Strategic Development and Regeneration Areas (SDRA's)* where it is the objective: -

> '*To seek the social, economic and physical development and/or rejuvenation of an area with mixed use, of which residential and "Z6" would be the predominant uses.'*
> *(Section 14.8.13 of Dublin City Development Plan 2016-2022)*

All uses proposed are permissible uses under this zoning objective.

2.2.5 Strategic Development and Regeneration Areas (Chapter 15)

The application site is identified as an SDRA site in the DCDP - SDRA 11 - *Stoneybatter, Manor Street and O'Devaney Gardens*. The overall SDRA11 site, measuring c.10 hectares) also includes the DCC O'Devaney Gardens Phase 1A lands, the adjoining St. Bricin's Military Hospital and the Department of Defence site on Infirmary Road.

The key principles which apply to SDRA 11 are set out in Chapter 15 and Fig.31 (below) and relate to the following:-

- Strategic Location
- Access, Connections and Permeability
- Height
- Mix of Uses
- Childcare facility
- Mix of Tenure
- Streetscapes/ Active Frontages
- Open Space / Neighbourhood Park
- Community Facility
- Residential boundaries
- Manor Street/Stoneybatter integration

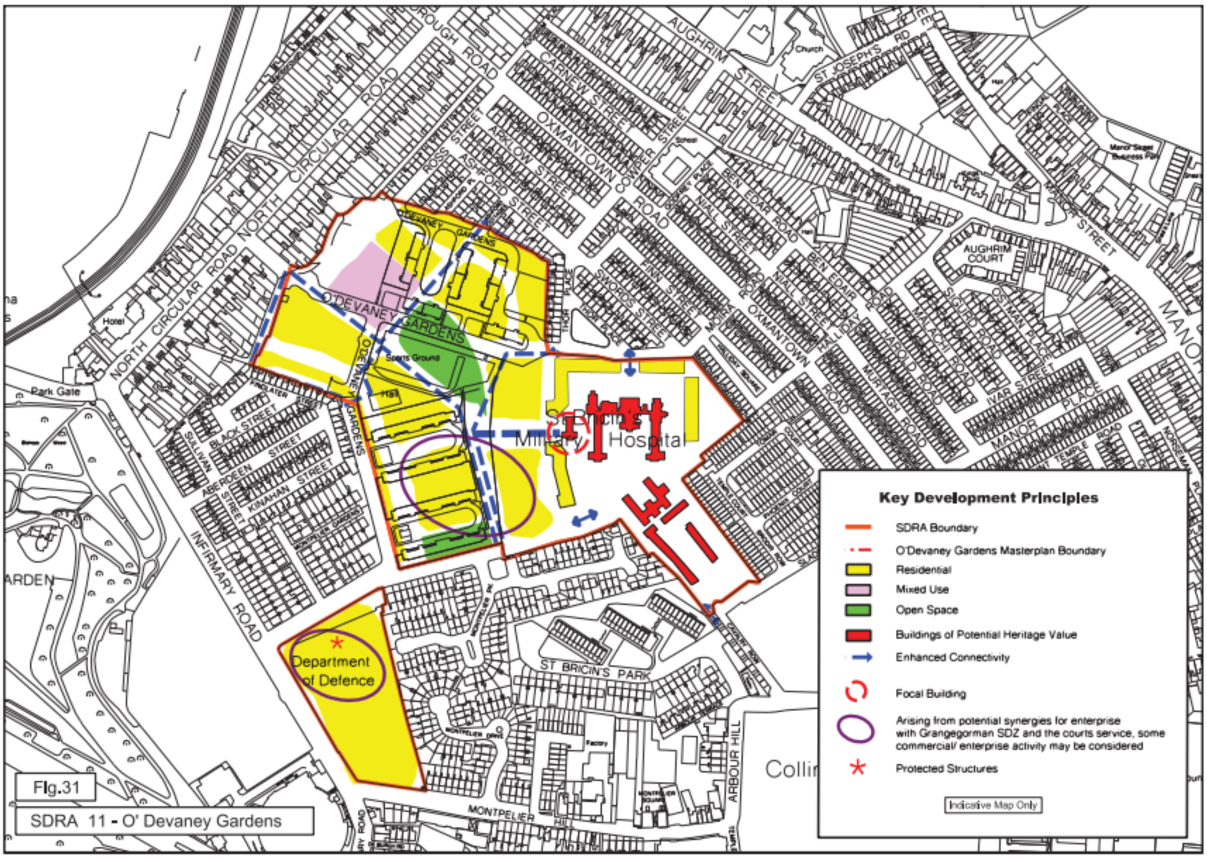

Figure 2.1 SDRA 11 Key Development Principles (Source DCDP 2016-2022)

2.2.6 Development Management (Chapter 16)

All Development Standards included in Chapter 16 have been considered and the development has incorporated these principles and standards insofar as they are relevant to the proposals.

The proposed development is a Material Contravention of the *Dublin City Development Plan 20016-2022* in relation to Building Heights (Ref. Section 16.7.2). The proposed development is also contrary to the Development Plan provisions in relation Block Configuration relating to the number of units per core (Ref. Section 16.10.1). In the case of both considerations, the scheme complies with the Apartment Guidelines (Revised 2020) which allows consideration of Unit Mix (SPPR1) and which allows flexibility in relation to units per core (SPPR 6).

2.3 NATIONAL AND REGIONAL POLICY

The following national and regional policy documents are relevant to this project: -

- *Project Ireland 2040 - The National Planning Framework*
- *Rebuilding Ireland – Action plan for Housing and Homelessness (2016)*
- *Regional Spatial and Economic Strategy (RSES) 2019-2031 for the Eastern and Midland Region*

2.3.1 Project Ireland 2040 – National Planning Framework

The National Planning Framework (NPF) is the Government's high-level strategic plan for shaping the future growth and development of the Country out to the year 2020.

A key element of the NPF's strategy is compact growth with the key features being: -

- *Targeting a greater proportion (40%) of future housing development to be within and close to the existing 'footprint' of built-up areas.*
- *Making better use of under-utilised land and buildings, including 'infill', 'brownfield' and publicly owned sites and vacant and under-occupied buildings, with higher housing and jobs densities, better serviced by existing facilities and public transport.*
- *Supporting both urban regeneration and rural rejuvenation through a €3 Billion Regeneration and Development Fund and the establishment of a National Regeneration and Development Agency.*

(Page 22)

In accordance with the National Policy Objectives of the NPF, the current application will deliver a high-density development of modern and adaptable new homes within an existing urban area in close proximity to existing public transport and local service provision.

One of the key future growth enablers for Dublin in Page 37 of the NPF include "*Identifying a number of ambitious large- scale regeneration areas for the provision of new housing and employment throughout the city and metropolitan area and the measures required to facilitate them as integrated, sustainable development projects".* The project will provide new housing and employment in the city centre and will also act as a catalyst for future development and regeneration of the area.

2.3.1 Rebuilding Ireland – Action Plan for Housing and Homelessness (2016)

This document is the Government's Action Plan on Housing and Homelessness. It seeks to improve the viability of housing construction and ensure that an average of 25,000 homes are produced every year in the period to 2021.

To achieve this, Five Pillars are outlined, each with specific key actions: -

1. Pillar 1 – Address Homelessness
2. Pillar 2 – Accelerate Social Housing
3. Pillar 3 – Build More Homes
4. Pillar 4 – Improve the Rental Sector
5. Pillar 5 – Utilise Existing Housing

The proposed residential development will help to achieve the objectives of this Action Plan, particularly Pillar 3, where a target of 25,000 homes annually, built by the private sector, is targeted for the period of 2016-2021.

2.3.2 Regional Spatial and Economic Strategy 2019-2031

The *Eastern and Midlands Regional Assembly Regional Spatial and Economic Strategy, 2019-2031* (RSES) is a strategic plan which provides a multifaceted approach to regional development.

The Strategy is based upon the 3 key Principles and 16 Regional Strategic Outcomes.

The *Dublin Metropolitan Area Strategic Plan* (MASP) is a land use and transportation strategy contained within the RSES. Consolidation of Dublin City and its suburbs is part of the vision of the MASP.

The project will deliver a high-density scheme of modern and adaptable new homes, within an existing urban area, in close proximity to existing public transport and local service provision. This is in accordance with the principles and vision of the Metropolitan Area Strategic Plan (MASP).

2.4 SECTION 28 MINISTERIAL GUIDELINES

2.4.1 Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas (2009) and Associated Urban Design Manual Best Practice Guidelines (2009)

The key principles for new residential developments in urban areas are contained in these Guidelines and translated into practice in the accompanying design manual. They generally relate to a plan led / sequential approach to development, densities and location, sustainable neighbourhoods and better design / urban design.

These are incorporated at a local level in the relevant development plan, local area plan or SDZ planning scheme and at project stage, to be considered in the preparation and assessment of planning applications.

2.4.2 Sustainable Urban Housing: Design Standards for New Apartments – Guidelines for Planning Authorities (revised 2020)

These Guidelines, hereafter referred to as the 'Apartment Guidelines' contain qualitative and quantitative measures for the design of apartments and related facilities including storage areas, open spaces and communal facilities.

Specific Planning Policy Requirements (SPPRs) included in the Guidelines take precedence over policies and objectives of development plans, local area plans or SDZ planning schemes.

2.4.3 Quality Housing for Sustainable Communities (2007)

The aim of these Guidelines is to identify principles and criteria that are important in the design of housing and to highlight specific design features, requirements and standards that have been found, from experience, to be particularly relevant. Guidance within this document is arranged under five headings :- Site Selection; Design Brief, Procurement and Cost Control; Urban Design Objectives in the Provision of Housing; Scheme Layout and Design; and Dwelling Design.

2.4.4 Urban Development and Building Heights Guidelines for Planning Authorities (2018)

The national planning policy guidance on building heights is set out in these Guidelines, building on the policies in the National Planning Framework (NPF).

The Building Height Guidelines support, in principle, heights of **6 storeys** at street level with scope to consider greater building heights within city centre areas including within the canal ring in Dublin.

2.4.5 The Planning System and Flood Risk Assessment - Guidelines for Planning Authorities (2009)

These Guidelines introduce comprehensive mechanisms for the incorporation of flood risk identification and management into the planning process.

A Site-Specific Flood Risk Assessment (SSFRA) has been prepared in accordance with these Guidelines and is enclosed with the application.

3. DESCRIPTION OF PROJECT AND ALTERNATIVES

3.1 INTRODUCTION

This Chapter provides a description of the project site in the context of its receiving environment and a description of the project and the main alternatives considered in so far as relevant from an environmental impact perspective.

The project description should be read in conjunction with the plans and particulars submitted with the planning application including the Planning Application Report, design statements and other technical studies. To avoid unnecessary repetition, it is not proposed to repeat the contents of these reports.

3.2 SITE AND SURROUNDINGS

3.2.1 The Site

The application site (c.5.2 hectares) is located in the north Inner City and comprises of lands which were formerly in residential use - the former O'Devaney Gardens Development. The application site also includes a strip of land previously part of St. Bricin's Military Hospital.

The development site is a backland site that is bounded:

- to the north west by the rear of properties that front onto the North Circular Road, a mix of residential and commercial premises and a social housing development under construction on behalf of Dublin City Council (see further details in below);
- to the west by dwellings on Findlater Street, Black Street, Kinahan Street, Aberdeen Street and Sullivan Street; and Montpellier Gardens;
- to the south by Montpellier Gardens and Montpelier Park residential developments;
- to the east by lands that comprise St Bricin's Military Hospital (this site currently employs a number of Irish Army personnel, providing a medical facility For Army personnel and a printing press. The campus also operates a homeless shelter [3]) and the residential streets of Thor Place and Swords Street; and
- To the north, residential streets in the Oxmantown / Stoneybatter area including Ross Street, Ashford Street, Ashford Place and Ashford Cottages.

See **Figures 3.1 and 3.2** for Site Location and Context Map and **Plates 3.1-3.27** showing images of the site and surrounding areas.

Access to the site is available from a number of points with the principal vehicular access points being from Infirmary Road, via the Montpelier Gardens development at the south west

[3] These services are to be relocated as part of the '*Defence Forces Built Infrastructure Programme 2020 – 2025*' published in January 2020 by the Department of Defence, Irish Defence Forces and The Government of Ireland.

corner of the site; from North Circular Road (NCR) to the north west; and from the east via Thor Place, immediately to the north of the St Bricin's Hospital lands. There is a laneway along the north west boundary of the site, providing access to the rear of No.'s 44-60 NCR.

Following the demolition of the former O'Devaney Gardens complex (see Site History section below), part of the site was seeded with grass. These spaces have not been maintained; the ground is uneven in parts and some construction rubble is found in places. There is also evidence of anti-social behaviour, fly tipping, and animals grazing on the lands.

A 3 metre high metal fence was erected on the lands north of the internal east – west road, between NCR and Thor Place. This fence closed off pedestrian / cycle connections with Ross Street, Ashford Place and Ashford Cottages. Over time, the fence has been damaged in a number of locations, making this part of the site accessible from east west road.

The site boundaries are generally defined by the boundary walls (rear garden or gable end) of adjoining developments or the road edge. The north western boundary includes the lane to the rear of the properties fronting NCR; and the northern boundary extends beyond the fence railing to the boundary wall of Ross Street and Ashford Place and the gable walls of Ashford Cottages, including the grassed / landscaped areas in between.

The strip of lands adjoining the western boundary of St. Bricin's Military Hospital (visible in Figure 3.4) were previously part of the hospital grounds. This was an area of open space, with a small building at the south west corner, used by the Military Hospital. Today the space is overgrown and the tarmac pathways are damaged. This rectangular plot is separated from the main area of the site by a tree lined blockwork boundary wall; and from St Bricin's by a precast concrete wall with railings above.

There are no Protected Structures or Recorded Monuments within the site.

The lands are owned by DCC with the St. Bricin's lands acquired c. 2008. A letter of consent from Dublin City Council to make this application is enclosed with the planning application particulars. Part of the application site, north of the road connecting North Circular Road to Swords Street, is listed on the Vacant Sites Register (VS-0006).

3.2.2 Site History

The former O'Devaney Garden's development was constructed in 1954 by Dublin Corporation and consisted of 278 no. residential units in 13 no. four storey blocks. It also included a community building, crèche and a commercial / retail block.

This development was demolished by Dublin City Council (DCC) between 2008-2018. Some of the foundations / areas of hard standing are still evident within the site, as well as a hard surface area in the centre of the site (previously a sports pitch / court and children's playground). The roads through the site were retained.

Refer to Section 3.2.1 for further details on the planning history.

3.2.3 Surrounding Area

As previously noted, the development is a backland site that is bounded on all sides by development. It is located c2km west of the GPO / O'Connell Street, with Stoneybatter to the east, Heuston Station to the south and Phoenix Park to the west. The area is predominantly residential.

Refer to **Figure 3.2** Site Context Map and **Plates 3.17-3.27**.

Adjoining the north west corner of the application site, the first phase of redevelopment for the Former O'Devaney Gardens site has commenced with the construction of 56 dwellings by DCC. Further details on this development, referred to as Phase 1A are included in Section 3.3.1. Phase 1A is bounded to the north west by the rear of properties fronting North Circular Road (NCR) and west by single storey cottages on Findlater Street. The cottages on Findlater Street were built in the late 19th Century by the Dublin Artisan Dwellings Company as part of a wider house building programme in the Oxmantown / Stoneybatter area including Findlater Street, Black Street, Kinahan Street, Aberdeen Street and Sullivan Street off Infirmary Road.

To the north and east of the site, housing was built along Thor Place, Ashford Street, Ashford Place, Ashford Cottages and Ross Street. These areas have a strong architectural character. The Dublin Artisan Dwellings are 1-2 storey, with single storey dwellings adjoining the site on Findlater Street, Ross Street, Ashford Cottages, Ashford Place and Ashford Street.

The properties on North Circular Road are 4 storeys, with long back gardens. Some of the properties have built a garage / store adjoining the rear boundary wall (1-2 storeys) and / or created an access off the laneway.

Montpellier Gardens is a residential estate off Infirmary Road, south and south west of the application site. These are two storey terrace dwellings. Montpellier Park is located at the end of the Montpellier Gardens cul de sac. These are a mix of semi-detached and terraced 2 storey dwellings.

St. Bricin's Military Hospital is located to the east of the site. There are a number of buildings within the grounds of the hospital including a former tuberculosis hospital, church and nurses accommodation. Today, the facility employs a number of Irish Army personnel with services on site including a medical facility for Army personnel and printing press. The campus also operates a homeless shelter.

No buildings within the Hospital Campus are protected structures. Some of the buildings are noted in the National Inventory of Architectural Heritage (NIAH) .

There is a range of retail, cultural, educational, community and leisure facilities in the local area.

There is good public transport infrastructure within the area with buses operating along the North Circular Road, Infirmary Road and Stoneybatter. Heuston Station is within a 10 minute walking distance and includes rail, luas and bus connections and a taxi rank.

There is only one protected structure adjoining the application site – No. 66 North Circular Road (RPS No. 1582), located at the North East corner beside Ross Street.

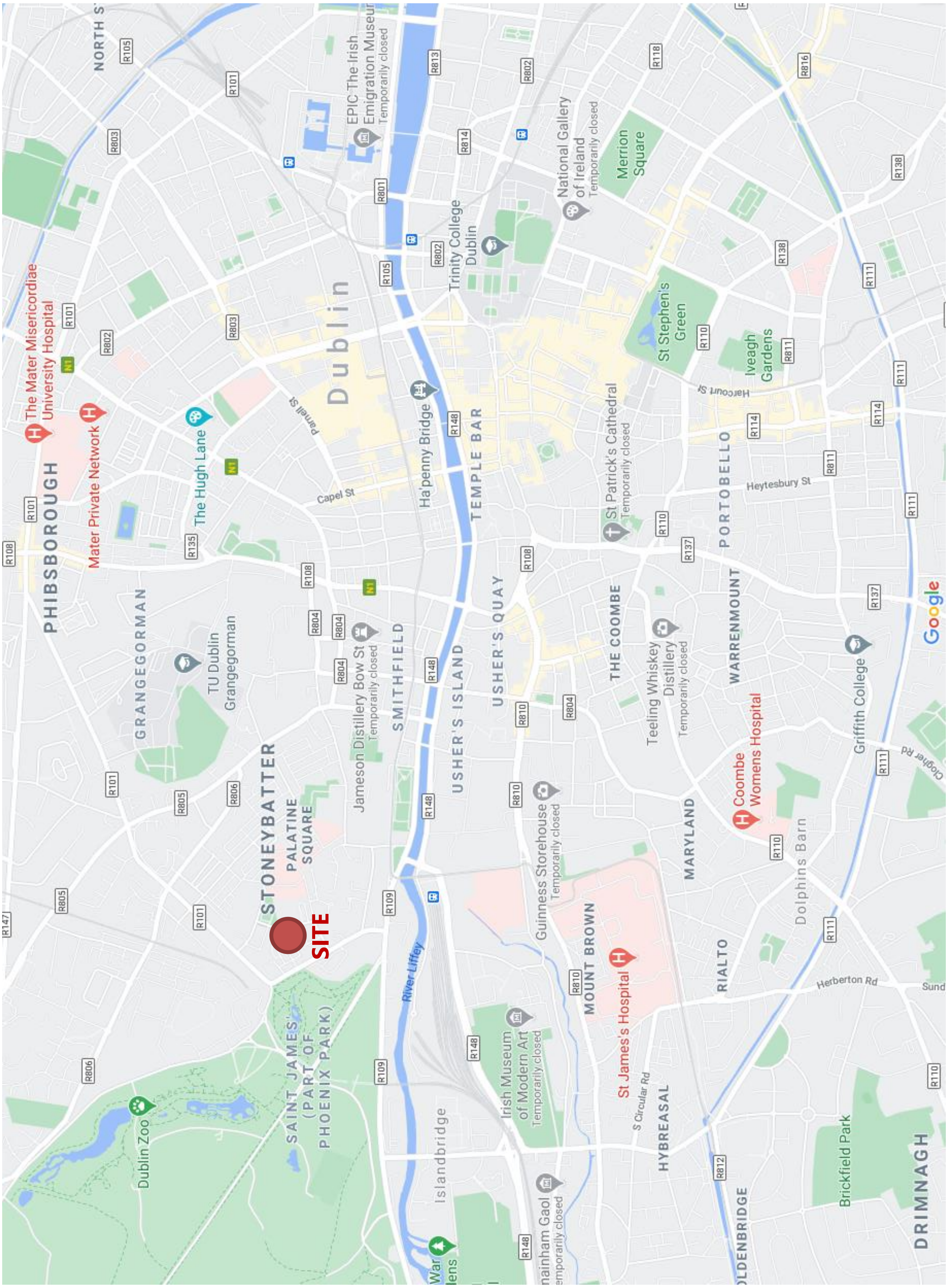

Figure 3.1 Site Context Map

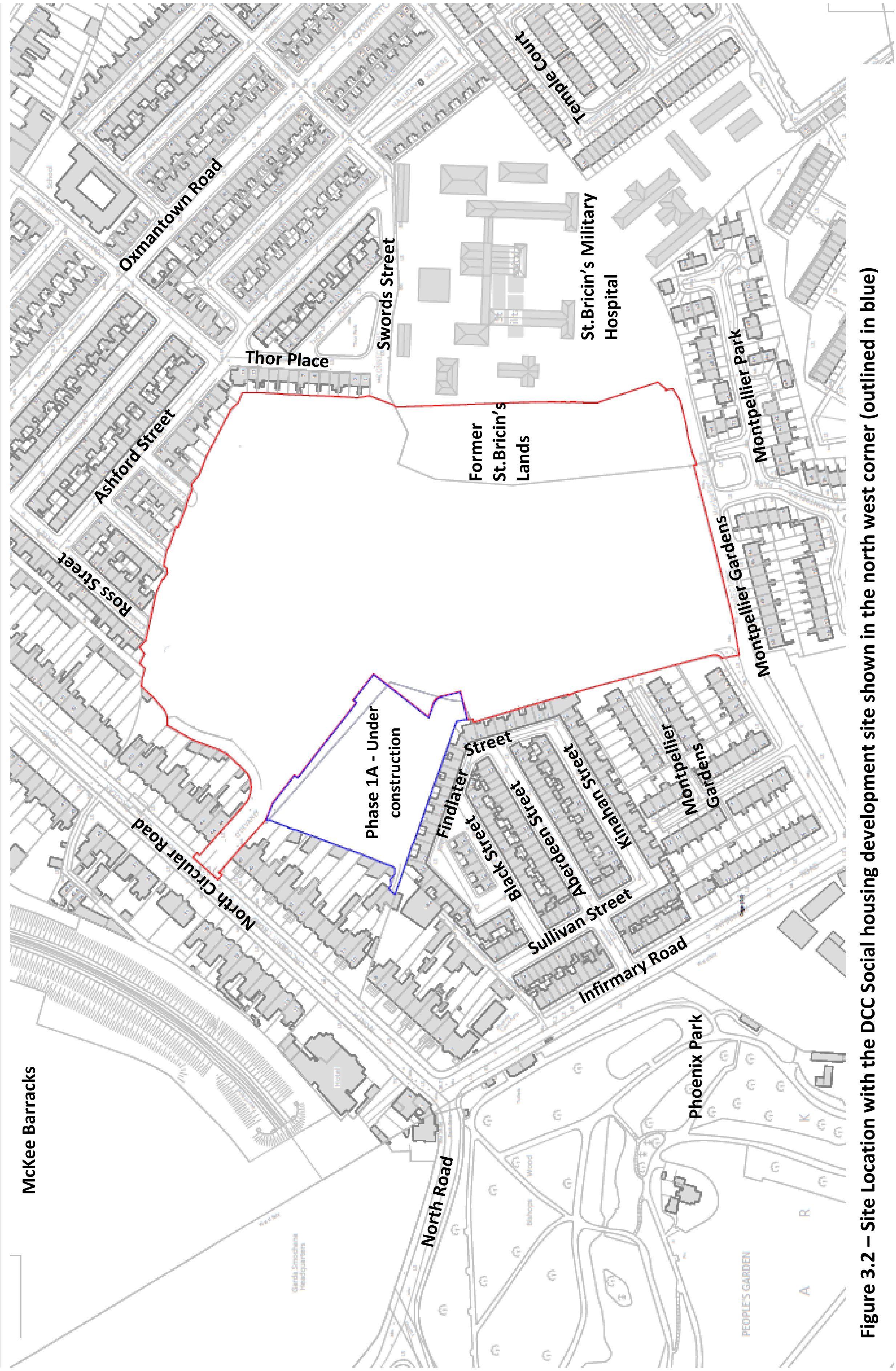

Figure 3.2 – Site Location with the DCC Social housing development site shown in the north west corner (outlined in blue)

3.3 PLANNING HISTORY

The former O'Devaney Garden's development comprised of 278 no. residential units in 13 no. four storey blocks, a community building, crèche and a commercial / retail block.

Under Ref. 3544/08, a Part VIII permission was granted for the demolition of 4 no. four storey blocks, including flat no.'s 1-32, 117-148; single storey community building; crèche; and the two storey block containing 4 no. retail units (unit no.'s 113-116).

The demolition of the remaining nine apartment blocks was approved in two separate Part VIII applications by DCC. 5 blocks including flat no.'s 33-112 were demolished pursuant to Reg. Ref. 3607/10 and 4 blocks including flat no.'s 149-276 were demolished pursuant to Reg. Ref. 2945/16.

All blocks have been demolished on the O'Devaney Gardens site.

The redevelopment of the O'Devaney Gardens development was first identified by DCC c.2006. Detailed feasibility studies were prepared in consultation with residents and a development of 823 residential units, 900 sqm commercial uses and 2,600 sqm community uses was designed as part of a Public Private Partnership (PPP) development. These proposals were not progressed to planning due to market forces.

DCC brought forward the broad principles of the PPP plans and submitted the first planning application for the site to An Bord Pleanala (ABP) in 2010. Permission was sought for the redevelopment of part of the overall O'Devaney Gardens site (2.47ha) comprising 110 no. residential units (12 no. one bedroom units, 47 no. two bedroom units and 51 no. three - bedroom units) in four blocks. This included a mix of apartments, 2 + 3 storey houses, 2 storey duplex and live work units. The application was approved by ABP on 5th August 2011 under PL29N.JA0024.

56no. of the permitted units (29 houses and 27 duplex/apartment units) are currently under construction on behalf of DCC. The building heights range from 2 – 4 storeys. These units are referred to throughout this planning application as Phase 1A. The design and layout of the remaining units, boulevard and open space will be superseded by the current application.

3.4 THE PROJECT

The proposed development (102,759sqm gross floor area - GFA) will consist of:

- 1,047no. residential units (Blocks 2 to 10) comprising a mix of one, two and three bed apartments, three bed duplex and three bed houses and all associated ancillary accommodation (100,565sqm GFA)

- Non-residential uses (2194sqm GFA) including retail / commercial units, creche and a community facility.

The gross floorspace of non-residential uses as a percentage of the overall gross floorspace is 2.1%.

The following is a summary of the key statistics.

KEY STATISTICS

• *No of Units:*	1047
• *Unit Mix:*	318no. 1 beds (30%), 567no. 2 beds (54%), 162no. 3 beds. (16%)
• *Total GFA:*	102,759sqm.
• *Residential (Gross):*	100,565sqm
• *Residential (Net):*	76,526sq.m.
• *Housing Density:*	201 units / ha based on site of 5.2ha.
• *Non-residential (GFA):*	2194sqm GFA
• *Non-Residential %:*	2.1%
• *Non-GFA (Parking etc.)*	7,992sq.m.
• *Plot Ratio:*	1: 1.98
• *Site Coverage:*	44%
• *Building Height:*	2 to 14 storeys
• *Car Parking Spaces:*	276 (0.26 per unit)
• *Bicycle Parking Spaces:*	2000 (1.9 per unit)

3.4.1 Project Description

The development will consist of 1,047no. residential units and all associated ancillary accommodation, site and development works. The total gross floorspace (gfa) of the overall development is 102,940sqm, of which 100,646sqm is residential and 2294sqm are non-residential uses.

The development is described below on a block by block basis. The block numbering in the current application commences at Block 2 (As noted previously, the development underway in the north west corner is referred to as Block 1).

The development is described below on a block by block basis:

BLOCK 02 (5649sqm gfa): 5 to 6 storey apartment building with 74 no. apartments (comprising 44no. 1 bed, 23no. 2 bed and 7no. 3 bed units) with ancillary accommodation and associated private balconies and associated communal amenity space at ground floor level.

BLOCK 03 (489sqm gfa): 2 to 3 storey crèche building with associated outdoor play space;

BLOCK 04 (1202sqm gfa): 11no. 2 storey 3 bed houses in two terraces (Blocks 04a and 04b) with associated private gardens located on the north-eastern and eastern boundary. Blocks 04A consists of 4no. 2 storey 3 bed houses. Block 04B consists of 7no. 2 storey 3 bed houses.

BLOCK 05 (30430sqm gfa): 4 to 9 storey building arranged around 2no. landscaped communal podium courtyards consisting of 294no. apartments (comprising 71no. 1 bed, 143no. 2 bed and 80no. 3 bed units) with ancillary accommodation and residents amenities, associated private balconies, landscaped podium communal amenity spaces (2no.) and communal roof terraces (2no.). Block 5 also includes non-residential uses at ground floor level comprising 4no. retail units (1027sqm) and a community facility (157sqm). Undercroft car parking (96 spaces) is provided on a single level below podium level with access from the new internal street on the eastern side of Block 5;

BLOCK 06 (8482sqm gfa): Predominantly 6 to 12 storey building, with part 2 storey element with 93no. apartments (comprising 24no. 1 bed, 54no. 2 bed and 14no. 3 bed units and 1no. 2 bed duplex unit) with ancillary accommodation, associated private balconies, communal amenity space at ground level and communal roof terrace;

BLOCK 07 (26924sqm gfa): 6 to 14 storey building arranged around a central landscaped podium courtyard with 264no. apartments (comprising 87no. 1 bed, 161no. 2 bed and 16no. 3 bed units) with ancillary accommodation and residents amenities, associated private balconies, landscaped podium communal amenity space and communal roof terraces (2no.). Block 07 also includes non-residential uses at ground floor level comprising 2no. retail units (totalling 366sqm) and a café (155sqm). Undercroft car parking (95 spaces) is provided over 2 levels below podium level with access from the east-west Link Street and a basement plant room area (146sqm) is also provided;

BLOCK 08 (2995sqm gfa): 26no. units in 4 terraces of 2 / 3 storeys. Blocks 08A and 08B each consist of 6no. 3 bed houses with associated private gardens. Block 08C consists of a block comprising of 5no. 3 bed duplex apartments over 5no. 2 bed apartments with associated private amenity areas. Block 08D consists of a block comprising 1no. 3 bed duplex unit over 1no. 2 bed apartment and 2no 3 bed triplex units with associated private amenity areas;

BLOCK 09 (18281sqm gfa): Predominantly 6 to 10 storey building, with part 3 storey element fronting Montpelier Gardens arranged around a central landscaped courtyard with 192no. units (comprising 68no. 1 bed, 120no. 2 bed and 4no. 3 bed units) with ancillary accommodation and residents amenities, associated private balconies, landscaped podium communal amenity space and communal roof terraces (2no.). Undercroft car parking (35 spaces) is provided on a single level below podium with access from Montpelier Gardens and a basement plant room area (154sqm) is also provided;

BLOCK 10 (8475sqm gfa): Predominantly 6 to 12 storey building, with part 2 storey element opposite Montpelier Park, with 93no. apartments (comprising 24no. 1 bed, 54no. 2 bed and 14no. 3 bed units and 1no. 2 bed duplex unit) with ancillary accommodation, private balconies and communal amenity space at ground level and communal roof terrace.

Vehicular access to serve the proposed development will be provided via the existing entrances to the site from North Circular Road, Montpelier Gardens and Thor Place/ Thor Park. The internal road networks will comprise a central boulevard between North Circular Road and Montpelier Gardens and a link street to Thor Place/ Thor Park. Additional pedestrian/ cycle connections are proposed at Ross Street and Ashford Cottages.

Tie in works are required for the lands immediately adjoining the Phase 1A residential units under construction to the north east of the site under and in accordance with previous approval granted by An Bord Pleanála (ABP Ref: PL29N.JA0024) and include a revised on street parking layout and revised hard and soft landscaping.

273no. parking spaces are provided in total with 226no. spaces below podium, as already described above, in Blocks 05 (96no.), Block 07 (95no.) and Block 09 (35no.) and 47no. on street spaces. 11no. motorcycle parking spaces are provided.

1,484no. bicycle parking spaces are provided for residents in secure facilities with additional visitor bicycle parking spaces provided in the public realm (380no.) and within private thresholds (136 no.).

Provision is made for vehicular access to the rear of 43 Montpelier Gardens between Blocks 08C and 08D.

Permission is also sought for associated boundary treatments, hard and soft landscaping, public open space (including a central park with a multi-use games area (MUGA) and a northern park with a community garden), ESB substations, mechanical and electrical roof plant and all associated site and development works.

The development will include the demolition of an existing ESB Substation (relocated to the northern end of the site adjacent to Block 03) and demolition of existing security hut (totalling 37.5sqm) and the removal of the block wall and gate pier at the entrance to St. Bricin's Military Hospital.

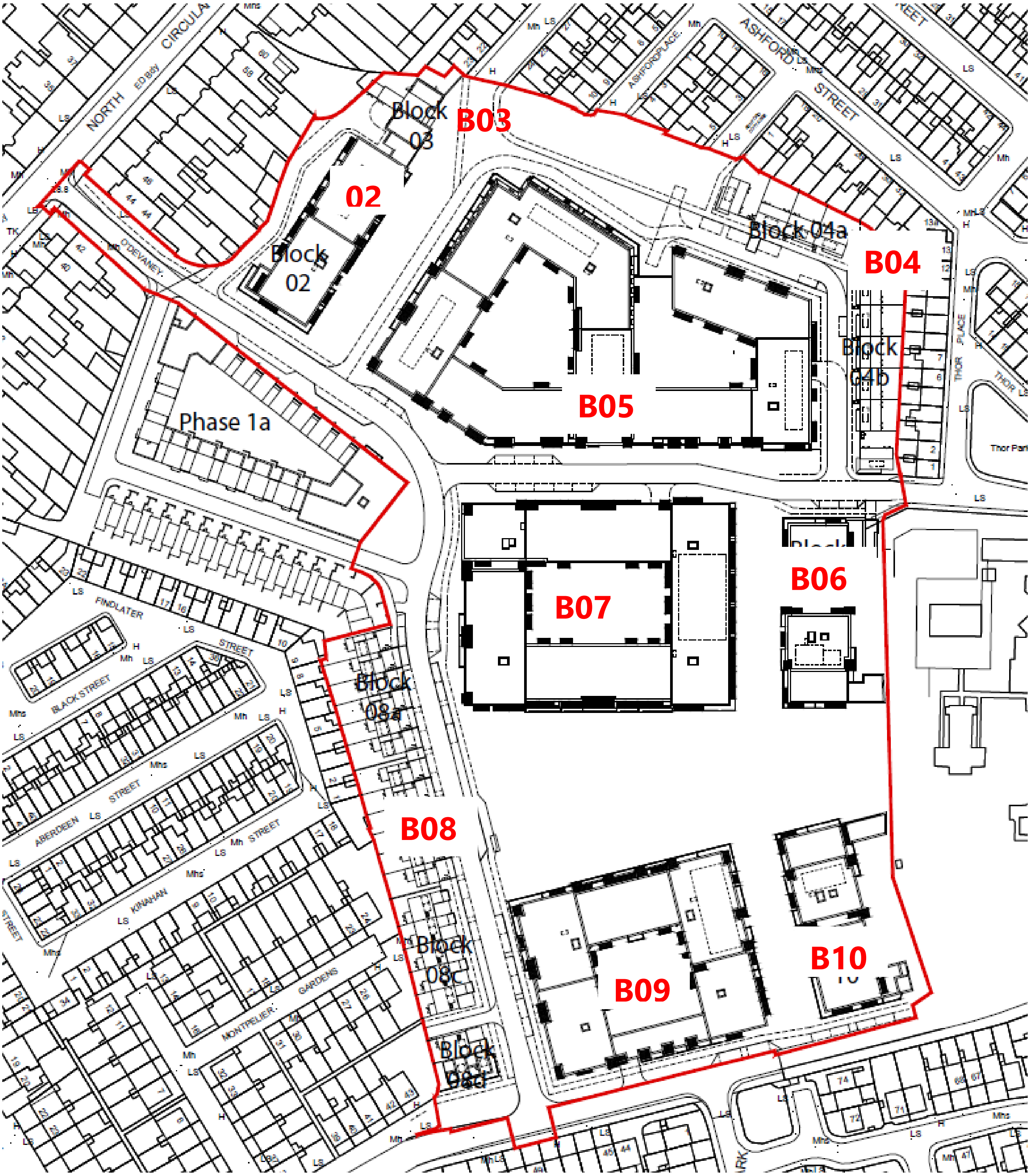

Figure 2: Block Layout Plan

3.5 CONSTRUCTION ACTIVITIES

3.5.1 Introduction

This section contains a description of the construction process as it is known at this pre-consent stage and ahead of detailed design development. An ***Outline Construction Management Plan*** [CS Consulting] has also been prepared and is submitted with the planning application documentation.

The description has considered the outermost or "not to exceed" parameters where full details of the construction process is not known or available at this stage. It is considered that the description of the construction phase activities provides a sufficient level of detail for planning permission / EIA purposes.

Certain assumptions are made in the OCMP based on the information available at this time and, for the avoidance of doubt, it is not proposed or intended that the applicant / contractor(s) are bound by these proposals which may change depending on the timing and circumstances pertaining at the time of construction.

The OCMP contains further detail on the construction programme and construction related activities outlined below. It also addresses issues relating to volumes of materials, traffic and environmental controls, health and safety etc.

On receipt of a grant of permission, the appointed contractor(s) will update the OCMP to comply with and implement the requirements and mitigation and monitoring measures set out in this EIAR and any conditions imposed as part of the granted planning approval. The Contractor's Construction and Environmental Management Plan (CEMP) can be submitted to the Planning Authority prior to commencement.

3.5.2 Construction Phasing

The construction of the project is planned to take between three and five years to complete. The current indicative phasing suggests that the project will be split into three phases with the accompanying infrastructure and green spaces being handed over with each phase, as it is constructed (see Figure 3.3 below).

As part of the initial site development works, there are service diversions necessary to the utilities serving the DCC Phase 1A Development to the north-west, which is currently under construction.

As part of these works a new foul and storm line and watermain will be constructed along with a new roadway which will run from north to south of the site. In addition, and existing attenuation tank will be relocated, and also a new ESB substation constructed. These diversion and service construction will form part of the Phase 1 works. Any necessary temporary pumping provisions will be provided to ensure or interruption of supply or service to the DCC Development, currently under construction.

The phasing noted is indicative, and the final phasing, and associated Construction Traffic Management Plans will be appointed by the appointed Contractor, and submitted to Dublin City Council for approval, prior to commencement.

Figure 3.3 : Indicative Construction Phasing

3.5.3 Site Clearance

The existing land previously had a development and the site may contain existing services and hazards. The following is a high-level method statement for the demolition/break up of existing hardstanding.

- Establish a site set-up and welfare facilities;
- Carry out an invasive species survey using a qualified and approved surveyor (see above);
- Carry out a detailed services survey of the site to identify all buried services, determine what services are live, redundant and potentially serve neighbouring properties. To be performed before any ground break up is performed on site.
- Carry out any necessary services diversions and decommissioning works;

Breaking ground will only take place following a full survey. Any materials identified as being hazardous will be removed and disposed of in strict accordance with the applicable legislation. All services will be disconnected and removed. Any existing slabs or hardstanding and concrete foundations will be broken by excavators.

All reinforced concrete will be partially processed on site to separate the steel from the concrete. All materials will either be fully separated on site and disposed of to the applicable landfills / processing facility or failing that material will be sent to a processing facility for separation. Relevant certification and documentation confirming the final separation and most environmentally friendly disposal will be available.

3.5.4 Excavation

The proposed site levels are determined by a combination of factors such as tie-ins with existing roads, existing topography, TGD Part M compliant access to ground floor levels etc. The profiling of the site to accommodate the proposed site levels, and the absence of any raised landscaping features, will result in a surplus of "cut" material which will be exported off site to suitably licensed landfill facilities (c. 42,000m^3).

The Contractor must prepare a Construction Waste Management Plan in accordance with the "*Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects*" (Department of Environment, Heritage and Local Government, 2006) and ensure that all material is disposed of at an appropriately licensed land fill site. The Contractor must also outline detailed proposals within the Construction Management Plan to accommodate construction traffic.

3.5.5 Site Management and Accommodation

The construction compound for the infrastructure works will be entirely within the site boundary, although in some instances located outside the phase being constructed.

The facilities to be provided and maintained by the contractor will include:

- construction plant;
- hoisting equipment and cranes;
- scaffolding, platforms, access ladders, barriers, handrails;
- barricades and hoardings;
- temporary driveways, road crossovers and construction zone;
- 24/7 emergency vehicle access to site during working hours;
- on-site hardstand areas for vehicle loading and unloading;
- storage sheds and compounds;
- rubbish sorting areas;
- site amenities with all required equipment and facilities;
- construction worker accommodation;
- first aid facilities;
- site administration accommodation.

Plant and equipment used during the entire works are:

- articulated and rigid trucks;

- Pilling-rigs, bulldozers, excavators, backhoes, with ancillary equipment (rock hammers or saws);
- Tower cranes/mobile cranes;
- concrete delivery trucks;
- concrete pumps;
- man, and material hoists;
- scissor, boom and fork lifts.

The number of workers on the site will vary throughout the construction programme and so it is difficult to put a precise estimate on the numbers of workers employed on the site. During the site clearance and excavation, it is likely that no more than 50 workers will be present on site at any one time. However, during peak construction this could rise to 200-300 workers depending on the number of buildings under construction at any one time.

On-site facilities will include a site office and staff welfare facilities (e.g. toilets, drying room, canteen, etc.).

Vehicle parking for construction personnel will be accommodated within the development site. To the extent possible, personnel will also be encouraged to use public transport, and information on local transportation will be published on site.

Harmful material will be stored on site for use in connection with the construction works only. These materials will be stored in controlled manner. Where on site facilities are used, there will be a bunded filling area using double bunded steel tank at a minimum.

On completion of the works all construction materials, debris, temporary hardstands etc. from the site compound will be removed off site and the site compound area reinstated in full on completion of the works.

3.5.6 Vehicular Access to Site

The site will be serviced via the 3 existing vehicular access points to the site at the North Circular Road, Montpelier Gardens and Thor Place. The use of access points will be determined by the Contractor in their Construction Traffic Management Plan (CTMP) and will vary depend on the phase of construction. Heavy vehicle movements will be limited to access/egress from North Circular Road and Montpelier Gardens only. Fulltime Traffic Management Operatives will be located at all vehicle access points during the construction works.

3.5.7 Site Working Hours

Subject to the agreement of the Planning Authority, the following site operation hours are proposed:

Monday to Friday:	07:00 to 19:00
Saturdays:	08:00 to 14:00
Sundays and Bank Holidays:	Works not permitted

It may be necessary for some construction operations to be undertaken outside these times, for example: service diversions and connections; concrete finishing and fit-out works; etc.

There may also be occasions where it is necessary to make certain deliveries outside these times, for example, where large loads are limited to road usage outside peak times.

3.5.8 Erection and operation of cranes

It is envisaged that one or more tower cranes will be temporarily erected to accommodate the construction works for the distribution of reinforcing steel, concrete skips, concrete formwork element and general building materials. No loads will be lifted over the public domain or adjacent properties.

The Contractor will need to obtain all necessary licences from the Local Authority. A "mast climber" may be installed at some local areas to facilitate façade features. The mast climber is essentially a climbing platform that allows the user to safely access any level without the requirement for a full scaffold tower.

Hoists and teleporters may also be used within the site and around its perimeter as required during the project, to facilitate material and waste movements into and out of the site.

3.5.9 Substructure and Superstructure

There are a number of options for the superstructure design and these will not be decided until detail design and tender stage.

For the apartment Blocks, the most likely options would be reinforced concrete (RC) column and flat slab, RC/masonry cross wall and precast slab, precast concrete twin wall and precast slab or a combination of.

House Construction is more limited in terms of options and they are likely to be traditional masonry construction or timber frame erection.

The following outlines a general construction sequence for the development:

<u>Foundations:</u>
The site is relatively flat and therefore no exceptional foundation solutions are required. It is likely that piling will be required for the substructure of the apartment blocks. The concrete operations associated with the foundation will require concrete deliveries to site.

<u>Building Structure:</u>
- Construction of the foundations/substructure.
- Construction of rising elements to 1st floor and 1st floor slabs.
- Similar sequence of construction of rising elements and floor slabs.
- Note allowance for service construction concurrently or before superstructure.

<u>Envelope / Cladding:</u>
- Envelope works will follow in a sequential manner.

<u>Mechanical and Electrical fit-out:</u>
- First fix will commence at each level behind structure.
- This will be followed by the second fix and the final connections.

Fit-out:

- Initial installation of any stud work when cladding is complete and floor is weather tight.
- Installation of equipment and associated connection to services.
- Completion of finishes.

Commissioning:

- The final commissioning period will commence during fit-out.

The above is an indicative construction sequence. The final sequence will be dictated by the Contractor.

3.5.10 Environmental Management

The contractor will establish guidelines and controls for all activities that may impact on the surrounding environment for the duration of the works and, in particular, will ensure that the mitigation and monitoring measures contained in this EIAR are implemented.

A Construction and Environmental Management Plan (CEMP) will be prepared by the Contractor and will address, inter alia, commitments made in relation to noise, air quality/ dust suppression, management of waste, traffic management, storm water management and invasive species.

3.6 RELATED PROJECTS / OTHER PROJECTS

There are no projects (off-site or secondary) occurring as a direct result of the project.

The construction of 56 no. residential units, in a mix of houses and apartments is underway in the north west corner of the site, pursuant to PL29N.JA0024 (refer to further details in Section 3.3). This is a social housing development, being completed on behalf of DCC. For the purposes of this EIAR, it is assumed that there will be some overlap with the enabling works / phase 1 for the project but for the most part, the Phase 1a units will treated as occupied. Where relevant, the assessments have taken into account the cumulative effects of the current project and the Phase 1A project.

The other development site in the area is the Former Department of Defence site, Infirmary Road (DCC Part 8 development). Permission was approved under Reg Ref 3210/19 for the demolition of existing buildings and the construction of 38 no. dwellings on the southern lower part of the former military stores site, bounded by Montpelier Gardens to the North, Infirmary Road to the West and Montpelier Hill to the South, Dublin 7. The upper part of the site was not included.

St. Bricins Military Hospital is likely to be developed at some stage but there is currently no indication that this project will come forward in the same timeline as the ODG development.

The cumulative (in-combination) effects caused by the overlapping with these other projects in the vicinity has been considered, where relevant, in the various assessment chapters.

It is possible that other projects will be under construction / completed in the area at the same time as the current project but these are not considered material to the assessment of the ODG project.

3.7 ALTERNATIVES EXAMINED

The consideration of "Alternatives" is requirement of the EIA process. By outlining alternatives considered, it is possible to reduce or minimise environmental impacts and ensure that better solutions are not overlooked.

3.7.1 Alternative Locations

The EPA Guidelines (2002 and 2017 Draft Guidelines) recognises that it is always necessary or appropriate to consider alternative options for projects which have been previously determined in a higher plan.

> *"Hierarchy*
> *EIA is only concerned with projects. Many projects, especially in the area of public infrastructure, arise on account of plans, strategies and policies which have previously been decided upon. It is important to acknowledge that* ***in some instances neither the applicant nor the competent authority can be realistically expected to examine options which have already been previously determined by a higher authority*** *(such as a national plan or regional programme for infrastructure or a spatial plan)."*
>
> (Source: EPA *Guidelines on the information to be contained in Environmental Impact Statements,* Section 2.4.3 Alternatives, page 12)

The location of the project has been determined by the designation of the area as a Strategic Development Regeneration Area (SDRA) which supports the development of a new residential community in place of the earlier O'Devaney Gardens scheme. As the development of this site for the land uses proposed has been identified at a local / national scale in the CDP / LAP / Planning Scheme, no alternative sites were considered in this EIAR.

3.7.2 Alternative Layout / Designs

Alternative designs for the different parts of the site were considered and developed by the Architects during the design process, with input from the overall project team. This involved a constantly evolving design whereby different solutions were constantly tested to establish the optimum design solution.

Insofar as effects on the environment are concerned, these issues were taken into considered in arriving at the chosen scheme and, in that sense, the proposed development embodies these considerations.

The main alternatives considered in terms of layout, and the main reasons for the option chosen, included:-

- Basements were minimised due to the excessive cost of basement construction and the layout options considered all involved providing parking at grade. Various permutations were considered in relation to the ratio of residential parking provided.

- The height strategy has evolved throughout the design phase and was informed by the Landscape and Visual Assessment and the Daylight / Sunlight Assessments which informed a decision on the capacity of the site and the impact of the proposed development on the immediate vicinity of the site and on views from the wider district.

- Houses on the northeastern boundary were included in earlier layouts, including the Stage 2 scheme submitted to An Bord Pleanala, but were removed in the final application based on consultation with Dublin City Council and having regard to the desire to maintain a community garden at Ashford Cottages.

- Various layout options were examined in order to facilitate vehicular access to the rear of No.43 Montpelier Gardens. This resulted in revisions between the Stage 2 and Stage 3 schemes and the addition of Block 8D as a standalone block.

- A number of design alternatives were examined to address the laneway north of Block 2 which provides access to the rear of the properties on North Circular Road. The chosen design provides own door access at ground floor and a shared surface for existing and future residents to use.

- Various alternative locations within the Central Open Space were considered for the MUGA and the chosen location was deemed optimal in terms of its central location and the need to provide for future visual and physical connection to St. Bricins.

- The possibility of a vehicular access to Ross Street was considered as an option but was omitted in favour of the pedestrian / cycle link proposed in this application.

- Roof gardens were chosen based on their location but also taking into account micro-climatic conditions based on advise from the relevant experts.

- Daylight/ sunlight analysis was undertaken as an iterative process during the course of the design of the apartment blocks and alternative layouts were examined.

A synopsis of the environmental effects of the main alternative scenarios which have been dismissed in favour of the proposed development is summarised as follows with reference to the topics in the EIA Directive

Table 3.1 Synopsis of Comparison of the Environmental Effects of Alternatives Considered

Population and Human Health	• A number of alternative proposals for the tower elements on Blocks 7 (14 storeys) and Blocks 6 and 10 (12 storeys) were considered but were deemed to have a greater impact on the wider area in terms of the visual impacts experienced by the existing communities surrounding the site. • Removal of houses from the northwestern boundary has a positive effect on the existing residents of Ashford Cottages relative to the proposed scheme. • The Stage 2 scheme included a Block 8D which would have had a negative impact on the ability of the owners of No.43 Montpelier Gardens to access the rear of their property • Layout alternatives relating to Block 2 were discounted in favour of the current proposals on the basis that they adversely impacted on the rear of the NCR properties • Layout options for the main public open space centralised within the site were discounted in favour of the current proposals which had greater potential and a better interface with St. Bricins Military Hospital lands
Biodiversity	• None of the alternative layouts or designs had significantly different environmental effects to the proposed development insofar as biodiversity is concerned
Land and Soils	• None of the alternative layouts or designs had significantly difference effects to the proposed development insofar as Land and Soils are concerned.
Water	• None of the alternative layouts or designs had significantly different environmental effects to the proposed development insofar as impacts on groundwater or surface water are concerned
Air and Climate	• None of the alternative layouts or designs had significantly different environmental effects to the proposed development insofar as Air and Climate are concerned
Noise and Vibration	• None of the alternative layouts or designs had significantly different environmental effects to the proposed development insofar as Noise and Vibration are concerned
Material Assets: Built Services	• None of the alternative layouts or designs had significantly different effects to the proposed development insofar as Material Assets: Built Services are concerned
Material Assets: Transportation	• The layout options considered included alternatives for greater parking provision ranging from the proposed ratio of 0.26 spaces per unit to 0.75 spaces per unit which would have required up to 785 parking spaces. Providing this level of parking without basements would have had the dual effect of reducing development density and increasing the level of private car traffic on the adjoining road network. These alternatives were therefore not favoured due to their effects on the road network and variance with the current policy objectives for promotion of public transport, pedestrian and cycle modes

Material Assets: Resource and Waste Management	• None of the alternative layouts or designs had significantly different environmental effects to the proposed development insofar as Resource and Waste Management is concerned
Cultural Heritage	• None of the alternative layouts or designs had significantly different environmental effects to the proposed development insofar as Cultural Heritage is concerned
Landscape	• A number of alternative proposals for the tower elements on Blocks 7 (14 storeys) and Blocks 6 and 10 (12 storeys) were considered but were deemed to have a greater impact on the wider area in terms of visual impacts.

3.7.3 Alternative Processes

This is an urban residential development and therefore the consideration of alternative processes to be considered relates to the methods of construction to be used in the the development. The alternatives have been considered and the Outline Construction Management Plan (OCMP) details the construction processes likely to be employed and which have been assumed for the purposes of this EIAR.

3.7.4 Conclusion on Assessment of Alternatives

On the basis of the foregoing, it is considered that all reasonable alternatives to the project are considered and no alternatives have been overlooked which would significantly reduce or further minimise environmental effects.

Having considered all alternatives, the final design chosen by the developer, ie. the project as now submitted for considered is deemed to be the most suitable project for the site.

THE SITE

Plate 3.1 Infirmary Road entrance to site, via Montpellier Gardens

Plate 3.2 Entrance via Thor Place

Plate 3.3 North Circular Road Entrance (with No. 42 NCR on the right and No. 44 NCR on the left)

Plate 3.4 Laneway providing access to the rear of No.'s 44-60 North Circular Road. This laneway is within the application site, with a right of way for the properties.

Plate 3.5: Part of the application site with Ashford Street at the top and Thor place on the right. There is evidence of anti-social behaviour in the foreground.

Plate 3.6: Former site of Flat No.'s 97-112. Thor place is to the left, out of the frame.

Plate 3.7: Internal road between North Circular Road and Thor Place. The development underway is the DCC Phase 1A development, with part of the current application site in use as site compounds.

Plate 3.8: View from the application site towards the rear of properties fronting North Circular Road (The gable wall of No. 23 Ross Street is visible on the right).

Plate 3.9: View from the application site north towards Ross Street (left) and Ashford Place (right).

Plate 3.10: Boundary fencing adjoining Ashford Cottages and Ashford Place – the application site extends beyond this fence to the gable walls of Ashford Cottages and Ashford Place (refer to Section 2.1).

Plate 3.11 Former Sportsground with Montpellier Gardens and Court of Justice visible in the background. The Dublin Mountains are visible in the distance on a clear day.

Plate 3.12 Lands formerly part of St. Bricin's with former O'Devaney Gardens lands to the left and St. Bricin's visible in the distance on the right.

Plate 3.13 Boundary wall between the former O'Devaney Gardens Site and strip of lands formerly part of St. Bricin's.

Plate 3.14 Existing building on site (to be demolished)

SITE HISTORY

Figure 3.3: Former O'Devaney Gardens Flat Complex comprising 13 residential blocks, retail block and community centre, with the lands acquired from St. Bricin's

Plate 3.15 Former O'Devaney Gardens Flat Complex (Source Google Maps – Image Captured May 2009)

Plate 3.16 Former O'Devaney Gardens Flat Complex (Source Google Maps – Image Captured May 2009)

SURROUNDING CONTEXT

Plate 3.17 DCC Development - Phase 1A (Dated 11th February 2020)

Plate 3.18 Laneway to the rear of No.'s 20-42 North Circular Road. The DCC development is visible on the left.

Plate 3.19 Findlater Street with the DCC development (Phase 1A) visible behind the cottages.

Plate 3.20 Black Street with the DCC development (Phase 1A) visible in the background, behind the cottages on Findlater Street.

Plate 3.21 Aberdeen Street looking west towards Phoenix Park, with Wellington Monument visible in the background.

Plate 3.22 Montpellier Gardens, looking east towards the site.

Plate 3.23 View of St. Bricin's with the former St. Bricin's lands, included within the application site, behind the railing.

Plate 3.24 View of Thor Place, looking south towards St. Bricin's.

Plate 3.25 Current View from Ashford Cottages into the site.

Plate 3.26 Current View from Ashford Place into the site

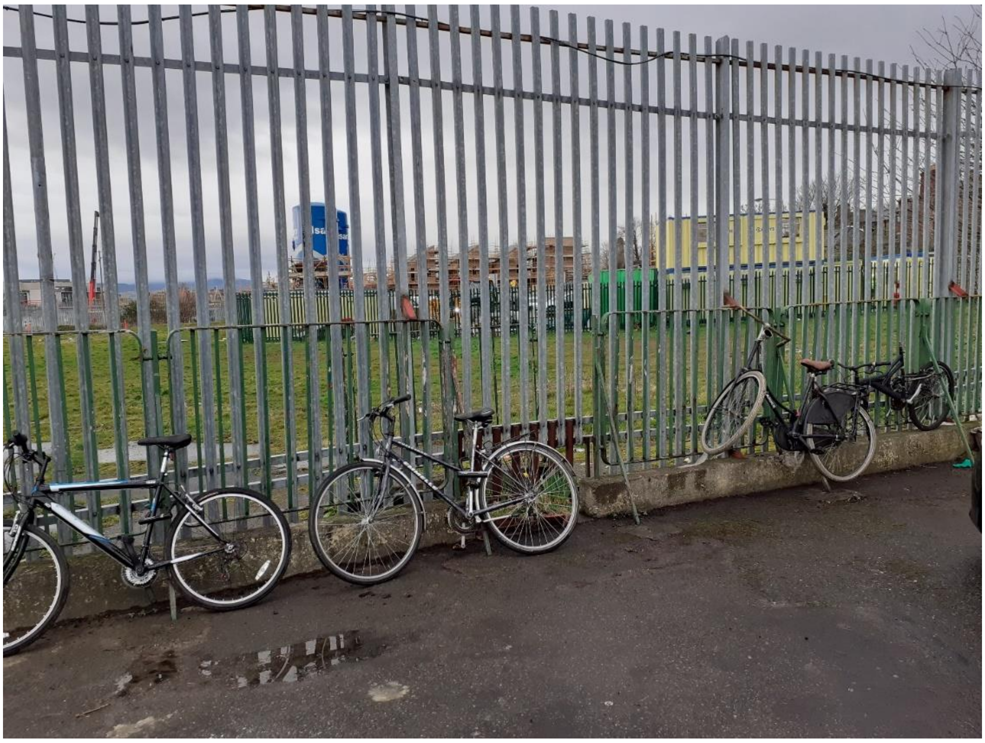

Plate 3.27 Site Boundary at the end of Ross Street, with the former pedestrian access to O'Devaney Gardens visible between the lower railings.

4. POPULATION AND HUMAN HEALTH

4.1 INTRODUCTION

This chapter was prepared by Louise O'Leary BA MRUP MIPI of BMA Planning and addresses impacts on 'Population and Human Health' as required under the 2014 EIA Directive. Refer to Table 1.1 for details on relevant qualifications and experience.

Impacts on population include impacts on the social and economic environment arising from the development such as impacts on population change, demographic trends, employment and economic activity, implications for land use patterns and, impacts on social and community infrastructure.

According to European Commission's *Environmental Impact Assessment of Projects: Guidance on the Preparation of the Environmental Impact Assessment Report* (2017), human health would relate to matters such as release of toxic substances, health risks arising from major hazards, changes in disease vectors, changes in living conditions, effects on vulnerable groups and exposure to traffic noise or air pollutants. These could impact on workers on the project or the local population.

The Environmental Protection Agency (EPA) *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* - Draft (2017) acknowledge that *"..the assessment of impacts on population and human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in this EIAR e.g. under the environmental factors of air, water, soil etc."* (EPA, 2017, Section 3, page 29).

In this regard, potential impacts of this project on population and human health are also addressed in the following Chapters of this EIAR: -

- Air Quality and Climate (Chapter 8)
- Noise and Vibration (Chapter 9)
- Material Assets: Transportation (Chapter 11)
- Landscape (Chapter 14)

4.2 ASSESSMENT METHODOLOGY

4.2.1 Site Visit

Site visits was undertaken on February 11th and 28th 2020 as part of this assessment and a further site visit was undertaken on 13th May 2021. The application site and surroundings were visited to examine the receiving environment insofar as people and communities are concerned and, in particular, to identify the people most likely to be affected by the project.

4.2.2 Desktop Assessment

The study area was identified and the nearest sensitive receptors were identified.

The presentation of the receiving environment is based on site visits and a desk-based study. The study area profile is based on official Census data by the Central Statistics Office (CSO) (www.cso.ie). Ordnance Survey maps and aerial photography were examined and the policy sources referred to in Chapter 3 were also consulted.

Existing social and community infrastructure in the vicinity is identified and the nearest sensitive receptors (individual or grouped) are listed to assist in the identification of people and communities who would be most affected by the project.

Based on this baseline presentation of the receiving environment, the likely significant adverse impacts on population and human health were considered and are presented under the following headings: -

- Land Use
- Population
- Employment and Economic Activity
- Human Health

Mitigation and Monitoring Measures are proposed in respect of the above topics where appropriate.

The impact assessment section of this chapter follows the terminology (where applicable) used in the EPA Guidelines as set out in Chapter 1 of this EIAR. While perceptions of project can be somewhat subjective, it is considered that the impacts presented are broadly representative of the impacts on the population within the study area.

4.2.3 Consultation

The proposed O'Devaney Gardens Regeneration project has been the subject of a continual process of consultation with the residents on site through the structures established by the community. This structure includes a Regeneration Board where resident representatives and key stakeholders including DCC, elected councillors and other key stakeholders have a forum to meet on a regular basis to discuss the project. In this context, the issues and opinions of the residents were taken and included in the design process.

4.3 RECEIVING ENVIRONMENT

4.3.1 Study Area Profile

The principal study area has been determined as the project site (i.e. all areas within the planning application boundary for the project).

A wider study area is examined in the context of the baseline environment, and with regard to the potential for significant effects on population and human health. The site is located within the Arran Quay D Electoral Division (ED). Arran Quay E to the northwest is also included in the Study Area. The project study area for the purposes of this assessment is therefore considered to be the Arran Quay D and Arran Quay E Electoral Divisions (ED). The baseline environment of the study area is set against the Dublin City Administrative area to provide a context within trends can be examined.

Figure 4.1 identifies the site in the context of these Electoral Areas.

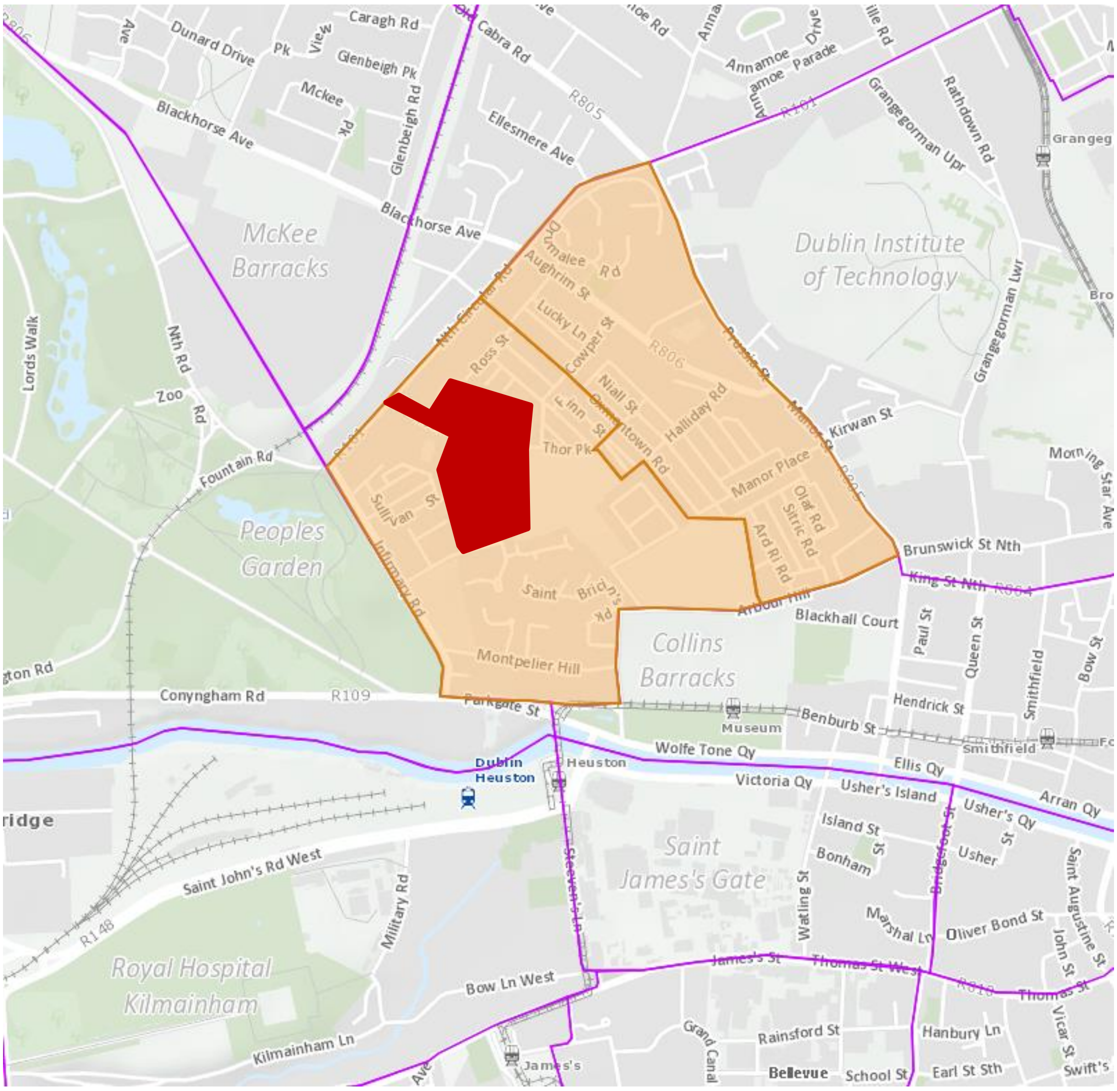

Figure 4.1 Electoral Divisions of Arran Quay D and Arran Quay E.

4.3.2 Population

In 2016, the population of the Dublin City Administrative area was recorded as being 554,554 persons. This represents a population increase of 5.1% in the last inter-censal period from 2011 to 2016.

The 2016 Census results indicate that the total population of the Arran Quay D and Arran Quay E ED's was 6,402 in 2016. This represents a 2.35% increase in population between 2011 and 2016. Since 2006, the population has declined by -1.34%. Most of this population decline occurred in the ED of Arran Quay D and reflects the de-occupation and demolition of the former O'Devaney Gardens complex..

The population trends relative to the study area suggest an area that is growing but at a slower rate that the wider Dublin City administrative area.

Table 4.1: Population Profile (Source: Pobal Maps, 2020).				
ED Name	ED ID	Total Population 2006	Total Population 2011	Total Population 2016
Arran Quay D	2004	3600	3218	3109
Arran Quay E	2005	2889	3037	3293
Study Area TOTAL		6489	6255	6402
Dublin City		506233	527612	554554

4.3.3 Demographic Profile

12.5% of the population in Arran Quay D and E are aged between 0-18 years of age; 61.5% are aged between 25-39 years of age and 11.5% of the population in these Ed's are aged 65 years and older. This highlights that there is a mostly young population in the area, with majority of the age profile between 25-39 years of age.

There is a difference in Unemployment rates between the two ED's:- Arran Quay E is in line with the County rate for male and female. The female unemployment rate is also generally in line for Arran Quay D. However, the male unemployment rate is 20.36% in Arran Quay D in comparison to 12.56% for Dublin City.

The Deprivation Index has changed from Marginally Below Average in 2006 for both ED's to Marginally Above Average for Arran Quay E in 2011 and Arran Quay D in 2016.

The proportion of Local Authority rented accommodation reduced from the 2006 to 2011 to 2016 census. In Arran Quay D, this is explained largely by the demolition of the *O'Devaney Gardens* apartment blocks during this period where the proportion of Local Authority rented accommodation reduced from *25.66* in 2006, to 13.19 in 2016.

4.3.4 Land Use and Receptors

The EPA Advice Notes (2015) identify receptors as neighbouring landowners, local communities and other parties which are likely to be directly affected by the project.

The site is currently undeveloped. There are no residences or buildings within the site. (Refer to the description of the site and its context in Chapter 3).

The sensitive population receptors in the area are the communities and properties identified below, and geographically presented on Figure 4.2:-

R1 *Phase 1A: DCC Social Housing Development*
56 no. dwellings currently under construction (due for completion Q3/Q4 2021), located on the north – western boundary of the site.

R2 *North Circular Road.*

NCR properties include houses and former houses split into apartments/ bedsits. There are a number of offices and a local shops on North Circular Road close to the Phoenix Park entrance. The laneways at the rear of NCR properties adjacent to the subject site are used to access the rear of these properties.

R3	*Residential streets to west including Findlater Street, Black Street, Aberdeen Street, Kinahan Street, Sullivan Street and Montpellier Gardens*
R4	*Montpellier Gardens - Residential estate to the west*
R5	*Residential estates to the south and west including Montpellier Park and Montpellier Gardens (No.'s 44-53)*
R6	*St. Bricin's Military Hospital* - Located adjacent to the eastern boundary, this site currently employs a number of Irish Army personnel. Services on site include a medical facility for Army personnel and printing press. The campus also operates a homeless shelter. [4]
R7	*Residential streets to north and east including Ross Street, Ashford Street, Ashford Place, Ashford Cottages, Thor Place, Swords Street and Oxmanstown Road.*

[4] These services are to be relocated as part of the '*Defence Forces Built Infrastructure Programme 2020 – 2025'* published in January 2020 by the Department of Defence, Irish Defence Forces and The Government of Ireland.

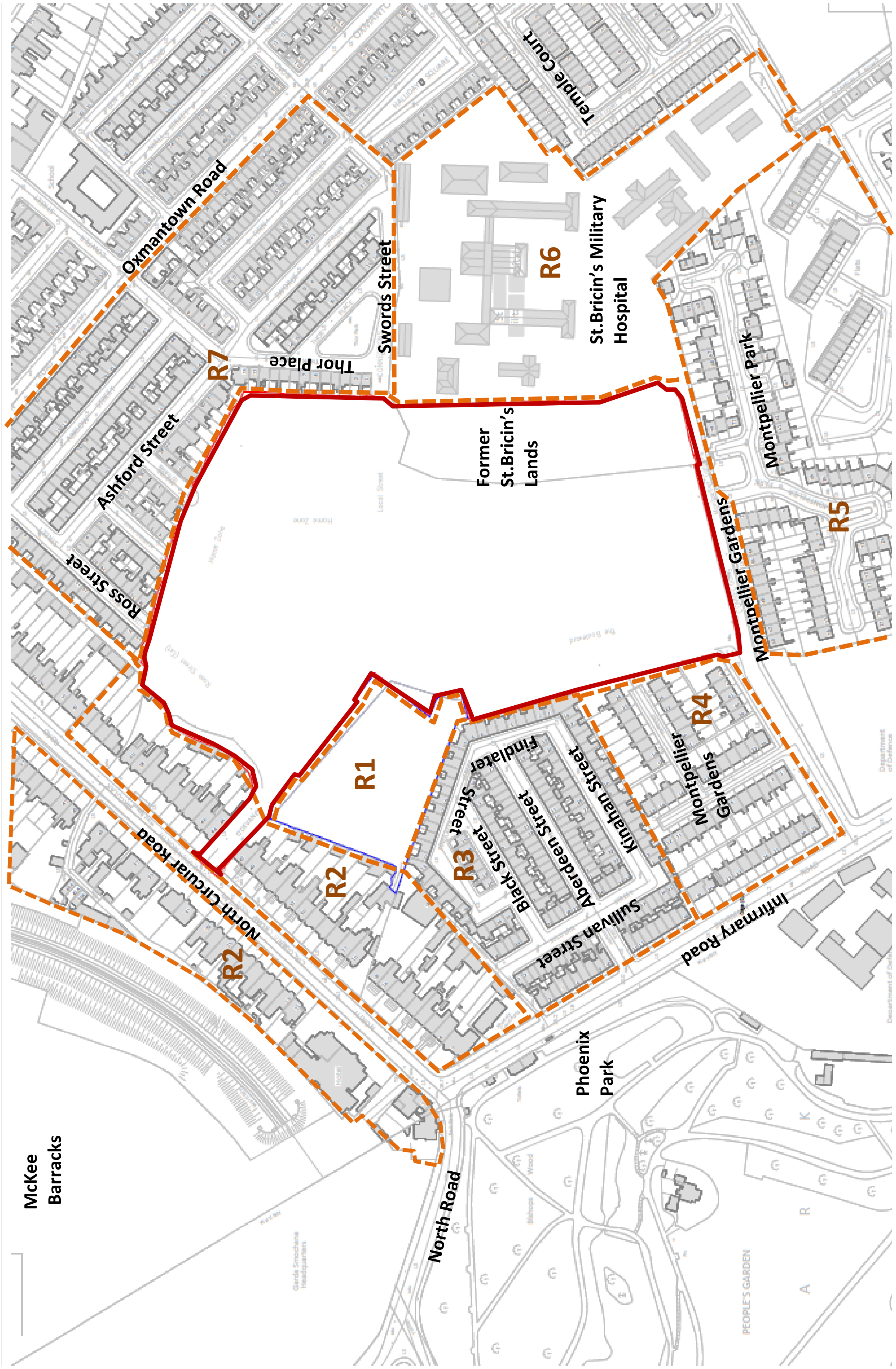

Figure 4.2 – Site Location with Local Receptors

4.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The project is described in Chapter 3. The following elements are relevant to the assessment of effects in this Chapter.

The characteristics of the development are typical of any new residential development in an existing inner city context.

The development will involve the construction of 1,047 new residential units comprising apartments and houses. This will return the lands to their former residential use and transform the receiving residential environment into a modern residential space.

There is also an element of non-residential development proposed including a mix of retail / commercial, café/restaurant, creche, and community uses.

There is a large neighbourhood park proposed as part of the development with a MUGA space; the secondary park includes community garden / allotments for the locals to operate / maintain. Ancillary road / infrastructure associated with the development comprises of roads, bus stop and cycle and pedestrian connections.

4.5 CONSTRUCTION IMPACTS

The main likely significant effects of the project are as follows: -

4.5.1 Land Use

The site will be hoarded off and inaccessible to the public. Construction activities will be generally confined to the site. Some level of construction activity is likely over a period of up to 5 years. Movements by the general public (vehicular, cycle or pedestrian) through the site will be affected during the construction phase resulting in a moderate short term negative impact. Access to the rear of NCR properties will be maintained insofar as possible and so no major disruption to these residences is expected.

4.5.2 Population Change and Demographic Trends

Some increase in population may arise during the construction period related to construction workers seeking accommodation. However, the location of the project within the inner city area means that impacts in relation to population will be short term in nature and not significant.

4.5.3 Economy

The construction phase of the project will provide for the employment of a substantial number of construction workers over the construction programme. This will be a significant positive short term impact in terms of employment and further indirect multiplier effects to the wider economy.

4.5.4 Human Health

The construction phase of the project will cause a certain amount of loss of amenity, disruption, nuisance and inconvenience to the local community, particularly the residents who are located closest to the project. Potential effects on human health arising during the construction phase of the project relate generally to quality of life including air quality, climate, noise, water and hydrology, resource and waste management, potential disruption of services and the risk of major accidents/disasters. While the assessment of effects relating to each of these environmental factors are dealt with separately elsewhere in this EIAR (Refer to Chapters 7-10), this section provides a summary as to how these effects have the potential to give rise to human health effects.

- Traffic - The level of construction generated traffic is not expected to be significant. As outlined in Chapter 10, Materials Assets: Transportation, proposed access routes will keep trucks to an established HGV route, minimising their impact on residential areas. The potential disturbance is likely to result in a slight negative short term impact on the local population.

- Water - As outlined in Chapter 7, Water, the construction phase of the project has the potential to alter the water quality and hydrological regime temporarily in the study area. Any effect on water quality has the potential to give rise to human health effects. Leaks from the waste may contaminate soils and water streams, and produce air pollution through contamination, creating health hazards. Subject to adherence to best practice construction measures, such impacts are not considered to be likely or significant in this instance.

- Air Quality - As outlined in Chapter 8, Air Quality, the construction phase of the project has the potential to give rise to dust emissions from construction traffic, building demolition, excavation works, piling etc. Poor air quality has the potential to affect human health by increasing the risk of asthma and other respiratory diseases. There is therefore potential for short term air quality effects during construction to affect human health. Best practice mitigation measures for construction activities are proposed to ensure adverse air quality impacts are minimised. The likely impact will be negative, short-term and imperceptible. Monitoring of air quality shall be carried out for the duration of the construction phase in accordance with the Chapter 8 recommendations

- Noise - The most common effects of excessive noise on people include annoyance, sleep disruption, health problems to vulnerable persons and general quality of life problems. As outlined in Chapter 9, Noise and Vibration, the assessment has determined that, during the construction phase, noise and vibration emissions will be temporary and transient. The receptors affected will vary depending on the phase of development and the works being undertaken within close proximity. With the mitigation measures in place, and by complying with all relevant guidance, the overall impact will be short-term and slight. Monitoring of noise shall be carried out for the duration of the construction phase in accordance with the Chapter 9 recommendations

- Waste – Waste generated during the construction phase of the project will be segregated at source and disposed of appropriately. No potential effects on human health are therefore likely if waste is managed correctly. Measure to address vermin and pest control shall be included in the Contractors CEMP.

- Accidents – The construction of any project of this nature has potential to give rise to unplanned events or accidents, including fire, which impact on health and safety of human beings if such activities are not managed appropriately. Subject to adherence to best practice construction measures, such impacts are not considered to be likely or significant in this instance. A 'worst-case' scenario resulting from the construction of the development would be an accident leading to serious injury or death to a worker. However, the mitigation measures outlined should ensure that this should not occur.

- Other - The population will be also be affected by impacts associated with traffic disruption, utility and services disruptions and visual impacts. These effects are considered in the relevant chapters of this EIAR (namely Chapters 10 – Materials Assets: Built Services, 11 – Materials Assets: Transportation and 14 – Landscape) and mitigation measures proposed to reduce the significance.

- **Aviation –** Cranes operating during the construction phase will not be of sufficient height to impact directly on aviation, however, lighting has the potential to impact on aviation if not properly installed and site the developer should notify and consult with the Irish Aviation Authority as a precaution prior to cranes being erected on the site.

The level of disturbance and impacts to human health are predicted to be commensurate with the normal disturbance associated with the construction industry where a site is efficiently and properly managed having regard to neighbouring activities. These negative impacts will be, cumulatively, significant but short term. Measures to address such human health considerations will be mitigated through the implementation of a Contractor's Construction and Environmental Management Plan (CEMP) and will be subject to Regulations and the relevant Health and Safety codes – see Mitigation Measure PPH-C1 below.

4.2.1 Mitigation – Construction Phase

PPH-C1	**Construction and Environmental Management Plan (CEMP)-** In order to mitigate potential temporary community disturbance during construction, a Construction Management Plan (OCMP) has been prepared and is included with the application. If the project is approved and implemented, the appointed contractor will incorporate the environmental commitments contained in this EIAR and prepare a Construction and Environment Management Plan (CEMP) for the agreement of the Planning Authority prior to development commencing on site.
PPH-C2	**Liaison Officer** - The contractor(s) will appoint a liaison officer to ensure that any issues from the local community are dealt with promptly and efficiently during construction. These details will be included in the Contractor(s) CEMP prepared prior to construction commencing.
PPH-C3	**Working Hours -** Typically, construction working hours will be limited to 7am – 6pm Monday to Friday and 8am to 2pm on Saturday. It is anticipated that there will be times, due to exceptional circumstances, that construction work will be necessary outside these standard hours i.e. large concrete pours. Deviations from these standard times will be agreed in advance with the Planning Authority.
PPH-C4	Prior to the erection of cranes on the site the developer shall notify and consult with the Irish Aviation Authority.

4.2.2 Monitoring

No monitoring measures are proposed with respect to population and human health.

4.6 OPERATIONAL IMPACTS

The main areas of impact are as follows: -

4.6.1 Land Use

The project will deliver a new residential community with supporting land uses which will change the character of the existing landscape. This project may also act as a catalyst for further development / investment in the area and there is likely to be a positive impact on existing property and land values in the area. This change is consistent with planning policy and is a long term positive effect.

4.6.2 Population

The residential population of the proposed housing units will be in excess of 2,000 people. The impact on the population is considered to be a long term significant positive effect insofar as it reflects the emerging trend in the wider area. New residential units will contribute to the delivery of a critical mass of population which will support a wide range of additional local businesses, services, transport infrastructure and employment opportunities.

4.6.3 Economy

The project will have a slight to moderate positive impact on the local economy through the direct employment in the retail and community units and indirectly in relation to support services to the new residential population. The increased population will also have an indirect positive impact on the local economy through its spending power.

4.6.4 Amenity and Human Health

For the future residents, the living environment was carefully considered in the design process to ensure a high quality scheme was designed in accordance with the relevant codes and guidance. The scheme meets all quantitative standards and the qualitative aspects of the scheme are demonstrated in the Housing Quality Assessment and other supporting documents submitted with the planning application such as the Daylight Sunlight Analysis (JVT). The iterative design process has included introduction of design mitigation measures to improve the quality of residential units. The overall impact is considered to be neutral/ positive.

The main impacts on human health, associated with air quality, noise, traffic and transportation and landscape, are considered elsewhere in this EIAR (Chapters 8 - Air and Climate, 9 - Noise and Vibration, 11 - Materials Assets: Transportation and 14 – The Landscape including mitigation measures). This section provides a summary as to how these effects have the potential to give rise to human health effects:-

- Traffic - As outlined in Chapter 10, Materials Assets: Transportation, the level of traffic generated by the proposed development will not be significant. the impact will be neutral and slight or imperceptible.

- Noise - As outlined in Chapter 9, Noise and Vibration, operational noise levels will be managed to achieve the relevant noise limit values. The impacts, therefore, on human health will be neutral for the life of the development.

- Air Quality - As outlined in Chapter 8, the operational phase of the project will not generate air emissions that would have an adverse impact on local ambient air quality or local human health.

- Water - As outlined in Chapter 7, Water, the proposed development will connect to existing public water infrastructure in the area and will not give rise to any significant impacts on ground water.

- Landscape - As outlined in Chapter 14, The Landscape, the proposed landscaping and open space proposals have a potential positive impact on health in the new population. The impact of the insertion of the proposed development into the existing urban setting of the development is also addressed with reference to key views from the wider area. When taken in the context of current planning policies, the proposed impact is considered to be neutral / positive.

- Waste – No likely significant impacts on human health are predicted for the operational phase of the project. As outlined in Chapter 12, Material Assets: Resource and Waste Management, the residents and non-residential users will be provided with suitable waste management facilities to safely dispose of their recycling and waste materials.

- Accidents – The risk of accidents / unplanned events is addressed through the Building Regulations (Fire Safety) and is therefore addressed through primary mitigation in the design process. Residual risks of fire and road traffic accidents will be managed by emergency services as per their standard procedures.

- Aviation - The highest buildings on the site are 12 and 14 storeys (36-42 metres approx.). Under the Standardised European rules of the Air (SERA), it is not permissible to fly over built up areas at a height of less than 1000ft (approx. 304 metres). The proposed development does not impact on the standardised approaches\departures to Dublin airport, Casement aerodrome or Westin Airport. The proposed development does not impact on any of the Dublin hospitals where a helipad is used. Therefore, there are no long term impacts on aviation as a result of the development.

Subject to implementation of the mitigation measures, the cumulative negative impacts of the development during the operational phase are typical of any urban development and are considered to be slight to moderate long term. The effects are in keeping with those expected for an area transitioning to a more urban form as promoted in the Dublin City Development Plan and the other planning sources described in Chapter 2

4.6.5 Mitigation

Mitigation measures relating to those factors under which population and human health effects might occur have been addressed elsewhere in this EIAR, under the relevant environmental factors. Other than the mitigation measures outlined these Chapters, no further mitigation measures have been proposed with respect to population and human health for the operational phase.

4.6.6 Monitoring

No monitoring measures are proposed with respect to population and human health.

4.7 RESIDUAL EFFECTS

Following the implementation of the mitigation measures outlined above, and elsewhere in this EIAR relating to human health, no significant negative residual effects are identified in respect of the project.

4.8 'DO-NOTHING' SCENARIO

In the event that the project does not proceed, the site would remain as it is currently in a semi-derelict state and an opportunity would be missed to consolidate and rejuvenate this inner centre location in accordance with national, regional and local planning policy guidance.

4.9 WORST CASE SCENARIO

In the worst case scenario the site would remain undeveloped and in a derelict state or the development would commence but no be completed.

4.10 INTERACTIONS

Population and Human Health interactions are primarily linked to the environmental factors listed below. These interactions, and the impacts being considered, are identified in the relevant Chapters.

- Air Quality and Climate (Chapter 8)
- Noise and Vibration (Chapter 9)
- Material Assets: Transportation (Chapter 11)
- Landscape (Chapter 14)

References

- Census (2016) www.cso.ie (Date Accessed on 14th February 2020)
- Department of Defence, Irish Defence Forces and The Government of Ireland (2020) '*Defence Forces Built Infrastructure Programme 2020 – 2025*'
- Dublin City Council (2016) *Dublin City Development Plan 2016-2022*
- European Commission (2017) *Environmental Impact Assessment of Projects: Guidance on the Preparation of the Environmental Impact Assessment Report*
- Pobal (2020) https://maps.pobal.ie/ (Date Accessed on 14th February 2020)
- IAIP (Integrated Aeronautical Information Package), dated 22nd April 2021

5 BIODIVERSITY

5.1 INTRODUCTION

This section of the EIAR has been prepared by Pádraic Fogarty of OPENFIELD Ecological Services. Pádraic Fogarty has worked for 25 years in the environmental field and in 2007 was awarded an MSc from Sligo Institute of Technology for research into Ecological Impact Assessment (EcIA) in Ireland. OPENFIELD is a full member of the Institute of Environmental Management and Assessment (IEMA) and an affiliate member of the Chartered Institute of Ecology and Environmental Management (CIEEM).

Under the EIA Directive as well as best practice methodology from the EPA, the analysis of impacts to biodiversity is an essential component of the EIA process, and so is a required chapter in any EIAR.

Under Article 6(3) of the Habitats Directive an 'appropriate assessment' of projects must be carried out to determine if significant effects are likely to arise to the integrity of Natura 2000 sites. An Appropriate Assessment Screening Report has been prepared as a separate stand-alone report with this planning application. This concluded that the likelihood of significant effects can be excluded.

5.2 ASSESSMENT METHODOLOGY

The assessment was carried out in accordance with the following best practice methodology: *'Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland'* by the Institute of Ecology and Environmental Management (IEEM, 2016) and *'Guidelines on the information to be contained in Environmental Impact Assessment Reports'* by the Environmental Protection Agency (EPA, 2018).

Site visits were carried out on the 28th of February, March 9th, June 10th and July 22nd 2020 in fair weather. The site was surveyed in accordance with the Heritage Council's Best Practice Guidance for Habitat Survey and Mapping (Smith et al., 2010). Habitats were identified in accordance with Fossitt's Guide to Habitats in Ireland (Fossitt, 2000).

The nomenclature for vascular plants is taken from *The New Flora of the British Isles* (Stace, 2010) and for mosses and liverworts *A Checklist and Census Catalogue of British and Irish Bryophytes* (Hill et al., 2009).

Both June and July lie within the optimal survey period for general habitat surveys (Smith et al., 2010) and so it was possible to classify all habitats on the site to Fossitt level 3. March and June lie within the optimal season for surveying breeding birds. March is optimal for surveying breeding amphibians and Badgers.

5.3 RECEIVING ENVIRONMENT

5.3.1 Zone of Influence

Best practice guidance suggests that an initial zone of influence be set at a radius of 2km for non-linear projects (IEA, 1995). However, some impacts are not limited to this distance and so sensitive receptors further from the project footprint may need to be considered as this assessment progresses. This is shown in Figure 5.1.

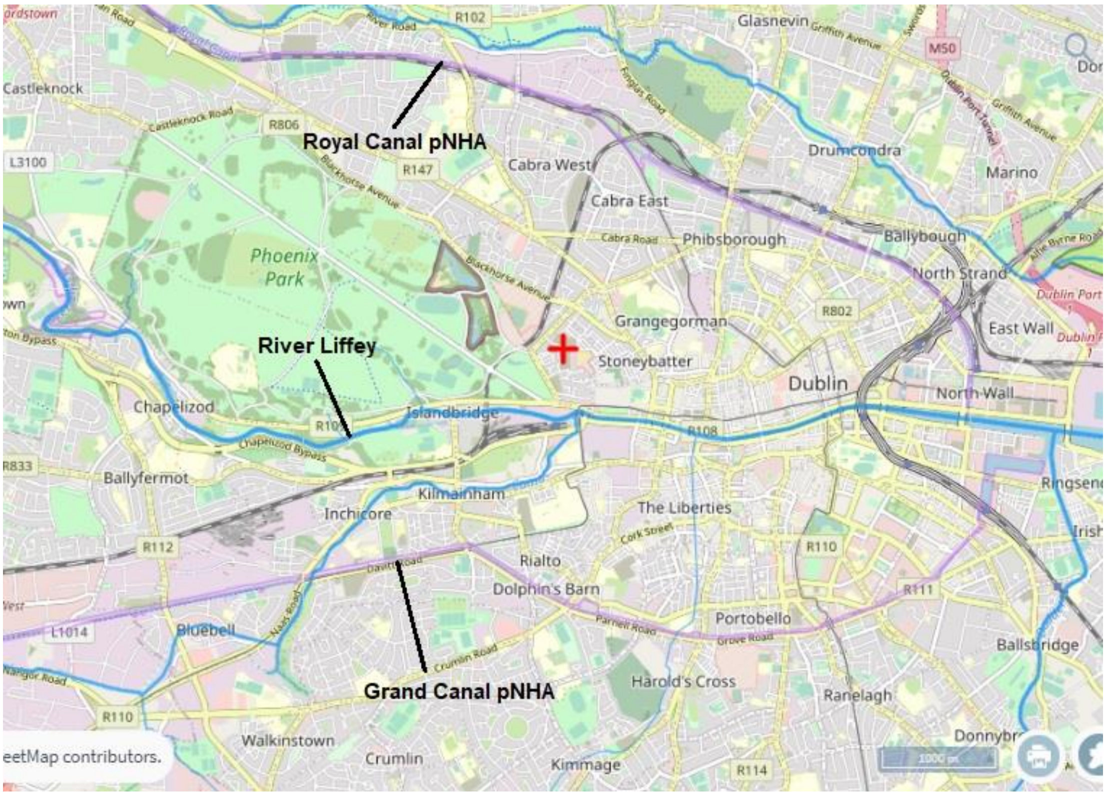

Figure 5.1 – Site location showing nearby areas designated for nature conservation

There are a number of designations for nature conservation in Ireland including National Park, National Nature Reserve, RAMSAR site, UNESCO Biosphere reserves, European sites including Special Protection Areas (SPA – Birds Directive), candidate SPA, Special Areas of Conservation (SAC – Habitats Directive), candidate SAC, Sites of Community Importance ; and Natural Heritage Areas. The mechanism for these designations is through national or international legislation. Proposed NHAs (pNHA) are areas that have yet to gain full legislative protection. They are generally protected through the relevant County Development Plan. There is no system in Ireland for the designation of sites at a local, or county level. The following areas were found to be located within an approximate 2km radius of the application site, or are within the hydrological catchment:

Royal and Grand Canal pNHA (site codes: 2103 and 2104): The Royal Canal and Grand Canals were constructed in the 18th century and link Dublin to the River Shannon. They are nationally valuable wildlife corridors and are home to a wide range of plants and animals, many of conservation value, including the Otter *Lutra lutra*.

South Dublin Bay SAC (side code: 0210) is concentrated on the intertidal area of Sandymount Strand. It has one qualifying interest (i.e. feature which qualifies the area as being of international importance) which is mudflats and sandflats not covered by seawater at low tide. A site synopsis is available at http://www.npws.ie/en/media/Media,3896,en.pdf.

South Dublin Bay and Tolka Estuary SPA (side code: 4024) is largely coincident with the SAC boundary with the exception of the Tolka Estuary. The North Bull Island SPA (site code: 0206) is largely coincident with the North Dublin Bay SAC with the exception of the terrestrial portion of Bull Island. Table 6.1 lists the features of interest for these SPAs.

Table 5.1: Features of interest for the South Dublin Bay and Tolka Estuary SPAs in Dublin Bay (EU code in square parenthesis)

Light-bellied Brent Goose (*Branta bernicla hrota*) [A046]
Oystercatcher (*Haematopus ostralegus*) [A130]
Ringed Plover (*Charadrius hiaticula*) [A137]
Grey Plover (*Pluvialis squatarola*) [A140]
Knot (*Calidris canutus*) [A143]
Sanderling (*Calidris alba*) [A144]
Dunlin (*Calidris alpina*) [A149]
Bar-tailed Godwit (*Limosa lapponica*) [A157]
Redshank (*Tringa totanus*) [A162]
Black-headed Gull (*Croicocephalus ridibundus*) [A179]
Roseate Tern (*Sterna dougallii*) [A192]
Common Tern (*Sterna hirundo*) [A193]
Arctic Tern (*Sterna paradisaea*) [A194]
Wetlands and Waterbirds [A999]

Bird counts form BirdWatch Ireland are taken from Dublin Bay as a whole and are not separated between the two SPAs in this area.

Dublin Bay is recognised as an internationally important site for water birds as it supports over 20,000 individuals. Table 5.2 shows the most recent count data available (Crowe et al., 2011).

Table 5.2 – Annual count data for Dublin Bay from the Irish Wetland Birds Survey (IWeBS)

Year	2010/11	2011/12	2012/13	2013/14	2014/15	Mean
Count	27,931	30,725	30,021	35,878	33,486	31,608

There were also internationally important populations of particular birds recorded in Dublin Bay (i.e. over 1% of the world population): Light-bellied brent geese *Branta bernicula hrota*; Black-tailed godwit *Limosa limosa*; Knot *Calidris canutus* and Bar-tailed godwit *L. lapponica*.

North Dublin Bay pNHA (site code: 0206). This are stretches north along the Dublin coast as far at Howth Head and east to the waters around (but not including) Bull Island. Much of the pNHA is now within the North Dublin Bay SAC (site code: 0206) while that portion that falls within the Tolka estuary is within the aforementioned SPA.

The NPWS web site (www.npws.ie) contains a mapping tool that indicates historic records of legally protected species within a selected Ordnance Survey (OS) 10km grid square. The O'Devaney Gardens site is located within the square O13 and six species of protected flowering plant are highlighted. These species are detailed in Table 5.3. It must be noted that this list cannot be seen as exhaustive as suitable habitat may be available for other important and protected species.

Table 5.3: Known records for protected species within the O13 10km square

<table>
<tr><th>Species</th><th>Habitat[5]</th><th>Current status[6]</th></tr>
<tr><td>Groenlandia densa
Opposite-leaved Pondweed</td><td>Rivers, canals and estuarine mud</td><td>Current</td></tr>
<tr><td>Galeopsis angustifolia Red Hemp-nettle</td><td>Calcareous gravels</td><td rowspan="3">Record pre-1970</td></tr>
<tr><td>Hordeum secalinum Meadow Barley</td><td>Upper parts of brackish marshes, chiefly near the sea</td></tr>
<tr><td>Puccinellia fasciculata Borrer's salt-marsh grass</td><td>Muddy inlets on the coast</td></tr>
<tr><td>Hypericum hirsutum Hairy St. John's-wort</td><td>Woods and shady places</td><td rowspan="2">Current</td></tr>
<tr><td>Viola hirta Hairy Violet</td><td>Sand dunes, grasslands, limestone rocks</td></tr>
</table>

In summary it can be seen that of the six species only three records remain current. Opposite-leaved Pondweed was recorded as being 'common in the Grand Canal' in the *Flora of County Dublin* (Doogue et al., 1998). This source elaborates that the plant was *"scattered along the Grand Canal at Dolphin's Barn from Portobello to Charlemont Bridge, and between Drimnagh and Kilmainham."*

Water quality in rivers, canals and estuaries is monitored on an on-going basis by the Environmental Protection Agency (EPA). The subject lands are approximately 360m from the banks of the River Liffey. The river is tidally influenced throughout its length in Dublin city centre. The riverbanks at this location are composed of artificial quay walls while water is assessed as 'good status' for the 2013-2018 reporting period. These data are taken from the ENVision mapping tool on www.epa.ie.

As canals are artificial water bodies they are assessed using different methodology. The 'ecological potential' of canals is assessed by the EPA. The Royal and Grand canals are achieving 'good ecological potential' with the exception of the Grand Canal Basin in Dublin which was deemed to be in moderate ecological potential due to elevated levels of faecal coliforms and ammonia (EPA, 2019)

5 Parnell et al., 2012
6 Preston et al., 2002

5.3.2 Site Survey

Aerial photography from the OSI and historic mapping shows that this area has long been a part of the built environment of Dublin City. The canals were constructed in the 18th Century to facilitate trade between Dublin and the rest of Ireland. Their subsequent decline left behind a semi-natural corridor that is now recognised for its wildlife value. The site and its immediate vicinity are entirely composed of buildings and artificial surfaces. The subject development lands had buildings in the past but these have now been demolished.

5.3.2.1 Flora

The development lands include areas of **buildings and artificial surfaces – BL3**, **recolonising bare ground – ED3** and **dry meadow – GS2**. Species here are ruderal or associated with managed grassland including Thistles *Cirsium sp.,* Docks *Rumex sp.,* Clovers *Trifolium sp.,* Willowherbs *Epilobium sp.,* and grasses such as Common Couch *Elytrigia repens,* Creeping Bent *Agrostis stolonifera* and Cock's-foot *Dactylis glomerata.* Some Brambles *Rubus fruticosus agg.* and the non-native Butterfly-bush *Buddleja davidii* are emergent in some locations.

A tall treeline – WL2 runs from north to south to the south-east of the development site. This is made up of Alder *Alnus glutinosa,* Ivy *Hedera helix,* Elder *Sambucus nigra* and non-native, horticultural species such as *Pyracantha sp.* To the east of this treeline there is an expanse of dry meadow while a small patch of scrub – WS2 can be found to the north of this. This is predominantly Brambles. Using methodology from the Heritage Council this treeline can be assessed as 'lower significance' due to the relatively poor species diversity and lack of connectivity to other ecological features. Nevertheless, mature native trees are uncommon in this urbanised setting and for this reason they can be considered to be high local value to biodiversity.

There are no surface water courses on the development site. There are no bodies of open water or habitats which could be classified as wetlands. Japanese Knotweed *Fallopia japonica* has previously been recorded on the lands and has been subject to a control programme by DCC. Japanese Knotweed is listed as an alien invasive species under S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011. The survey in July 2020 found signs of regrowth in some areas and so further treatment will be required.

5.3.2.2 Fauna

The site survey included incidental sightings or proxy signs (prints, scats etc.) of faunal activity, while the presence of certain species can be concluded where there is suitable habitat within the known range of that species. This included an inspection of the external surfaces (walls and roof space) and internal spaces which may be accessible (e.g. basement areas or roof cavities). Table 5.4 details those mammals that are protected under national or international legislation in Ireland. Cells are greyed out where suitable habitat is not present or species are outside the range of the study area.

Table 5.4 – Protected mammals in Ireland and their known status within the zone of influence[7]. Those that are greyed out indicate either that suitable habitat is not present or that

7 From the National Biodiversity Data Centre, excludes marine cetaceans.

there are no records of the species from the National Biodiversity Date Centre.

Species	Level of Protection	Habitat[8]
Otter *Lutra lutra*	Annex II & IV Habitats Directive; Wildlife (Amendment) Act, 2000	Rivers and wetlands
Lesser horseshoe bat *Rhinolophus hipposideros*		Disused, undisturbed old buildings, caves and mines
Grey seal *Halichoerus grypus*	Annex II & V Habitats Directive; Wildlife (Amendment) Act, 2000	Coastal habitats
Common seal *Phocaena phocaena*		
Whiskered bat *Myotis mystacinus*	Annex IV Habitats Directive; Wildlife (Amendment) Act, 2000	Gardens, parks and riparian habitats
Natterer's bat *Myotis nattereri*		Woodland
Leisler's bat *Nyctalus leisleri*		Open areas roosting in attics
Brown long-eared bat *Plecotus auritus*		Woodland
Common pipistrelle *Pipistrellus pipistrellus*		Farmland, woodland and urban areas
Soprano pipistrelle *Pipistrellus pygmaeus*		Rivers, lakes and riparian woodland
Daubenton's bat *Myotis daubentonii*		Woodlands and bridges associated with open water
Nathusius' pipistrelle *Pipistrellus nathusii*		Parkland, mixed and pine forests, riparian habitats
Irish hare *Lepus timidus hibernicus*	Annex V Habitats Directive; Wildlife (Amendment) Act, 2000	Wide range of habitats
Pine Marten *Martes martes*		Broad-leaved and coniferous forest
Hedgehog *Erinaceus europaeus*	Wildlife (Amendment) Act, 2000	Woodlands and hedgerows
Pygmy shrew *Sorex minutus*		Woodlands, heathland, and wetlands
Red squirrel *Sciurus vulgaris*		Woodlands
Irish stoat *Mustela erminea hibernica*		Wide range of habitats
Badger *Meles meles*		Farmland, woodland and urban areas
Red deer *Cervus elaphus*		Woodland and open moorland
Fallow deer *Dama dama*		Mixed woodland but feeding in open habitat
Sika deer *Cervus nippon*		Coniferous woodland and adjacent heaths

8 Harris & Yalden, 2008

Although a number of mammals are known to be present in Dublin city, most notably Fox *Vulpes vulpes,* there are no habitats on the site which are suitable for the majority of these species. There are no buildings or very old trees which might be suitable for roosting bats (Hundt, 2011). The lack of semi-natural vegetation in the immediate vicinity of the development site is considered to be a significant limiting factor for bat activity. The lack of roosting or foraging routes has been confirmed by the survey completed by Altemar Ltd. in September / October 2020 (refer to Appendix 5A).

A site visit took place in March 2020 and included a survey of the lands for breeding/nesting birds. Three species were noted: Blackbird *Turdus merula,* Chaffinch *Fringilla coelobs* and Dunnock *Prunella prunella.*

In June 2020 the following birds were noted: Blue Tit *Parus caeruleus,* Starling *Sturnus vulgaris,* House Sparrow *Passer domesticus,* Blackbird and Great Tit *P. major.*

These are all listed by BirdWatch Ireland as of 'low conservation concern' (Colhoun and Cummins, 2013). Nesting birds were found along the treeline and Bramble scrub to the south-east of the site only. Elsewhere, suitable nesting habitat is very limited and no birds were recorded beyond this south-east corner.

There are no suitable habitats on the site for amphibians or fish.

Most habitats, even highly altered ones, are likely to harbour a wide diversity of invertebrates. In Ireland only one insect is protected by law, the Marsh Fritillary butterfly *Euphydryas aurinia,* and this is not to be found on built-up sites. Other protected invertebrates are confined to freshwater and wetland habitats and so are not present on this site.

5.3.3 Overall Evaluation of the Context, Character, Significance and Sensitivity of the Proposed Development Site

In summary, it has been seen that the application site is within a built-up area of Dublin city. There are no examples of habitats listed on Annex I of the Habitats Directive or records of rare or protected plants. Japanese Knotweed is known from the site and is listed as alien invasive as per European Communities (Birds and Natural Habitats) Regulations 2011, SI 477 of 2011 however it has been part of a control programme since 2018.

The treeline is a habitat of high local value however other habitats are of low, or negligible, biodiversity value.

Significance criteria are available from guidance published by the National Roads Authority (NRA, 2009). These are reproduced in Table 5.5. From this an evaluation of the various habitats and ecological features on the site has been made and this is shown in Table 5.6.

Figure 5.2 – Site boundary and habitats of the subject site

Table 5.5 Site evaluation scheme taken from NRA guidance 2009

Site Rating	***Qualifying criteria***
A - International importance	SAC, SPA or site qualifying as such. Sites containing 'best examples' of Annex I priority habitats (Habitats Directive). Resident or regularly occurring populations of species listed under Annex II (Habitats Directive); Annex I (Birds Directive); the Bonn or Berne Conventions. RAMSAR site; UNESCO biosphere reserve; Designated Salmonid water
B - National importance	NHA. Statutory Nature Reserves. Refuge for Flora and Fauna. National Park. Resident or regularly occurring populations of species listed in the Wildlife Act or Red Data List 'Viable' examples of habitats listed in Annex I of the Habitats Directive

C - County importance	Area of Special Amenity, Tree Protection Orders, high amenity (designated under a County Development Plan) Resident or regularly occurring populations (important at a county level, defined as >1% of the county population) of European, Wildlife Act or Red Data Book species Sites containing semi-natural habitat types with high biodiversity in a county context, and a high degree of naturalness, or populations of species that are uncommon in the county
D - Local importance, higher value	Sites containing semi-natural habitat types with high biodiversity in a county context, and a high degree of naturalness, or populations of species that are uncommon in the locality Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.
E - Local importance, lower value	Sites containing small areas of semi-natural habitat that are of some local importance for wildlife; Sites or features containing non-native species that are of some importance in maintaining habitat links.

Table 5.6 Evaluation of the importance of habitats on the site

Buildings and artificial surfaces – BL3	Negligible biodiversity value
Dry meadow – GS2 Scrub – WS1 Recolonising bare ground – ED3	Low local biodiversity value
Treeline – WL2	High local biodiversity value

5.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The project will see clearance of existing habitats and a construction phase. Connections to the combined foul and surface water drainage already exist. The proposal will provide for a separate foul and surface water connection to the drainage networks serving the area. Trees on site will be removed.

The potential impacts to biodiversity arise from the loss of habitats, the disturbance to nesting birds during the construction phase and the increase in loading to the wastewater sewer resulting in the change of activity on the site.

5.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

This section provides a description of the potential impacts that the project may have on biodiversity in the absence of mitigation. Table 3.3 of the EPA guidance note sets out the criteria for determining the significance of impacts. This based on the valuation of the ecological feature in question and the scale of the predicted impact. In this way it is possible to assign an impact significance in a transparent and objective way. Table 5.7 summaries the nature of the predicted impacts.

5.5.1 Construction Phase

The following potential impacts are likely to occur during the demolition and construction phase in the absence of mitigation:

- **The removal of building and artificial surface habitats.**

  The removal of habitats including the loss of treeline, scrub, dry meadow, recolonising bare ground and artificial surfaces. Most of these habitats are of low or negligible biodiversity value while the treeline is of high local biodiversity value. The loss of these habitats will remove resources for a range of common plants and animals, none of which is of conservation concern.

  Offset planting will occur as part of the landscaping scheme which will provide equivalent habitat.

  This impact of the loss of artificial surfaces, dry meadow, recolonising bare ground and scrub is assessed as negative, slight, likely and permanent.

  The impact of the loss of high local value treeline is assessed as negative, significant, likely and permanent.

- **The direct mortality of species during site clearance.**

  This impact is most acute during the bird breeding season which can be assumed to last from March to August inclusive. The treeline and Bramble scrub have been confirmed as a nesting site for birds and mitigation will be required during the construction phase as all birds' nests and eggs are protected.

  This impact is assessed as negative, significant, likely and permanent.

- **Pollution of water courses through the ingress of silt, oils and other toxic substances**.

  The distance from the River Liffey means that there is a buffer between potential pollution sources and this sensitive receptor. The Liffey holds populations of Brown Trout *Salmo trutta* and Atlantic Salmon *S. salar* and these species are highly sensitive to pollutants (Hendry and Craig-Hine, 2003). Atlantic Salmon is listed under Annex II of the Habitats Directive. However, there is no pathway to the freshwater portion of the Liffey from this location. The tidal portion of the river is not vulnerable to the input of sediment in the way that upstream spawning habitats are and so impacts from this source are not expected. There is no pathway for pollutants to reach the canals.

This impact is assessed as negative, imperceptible, likely and permanent.

5.5.2 Operational Phase

The following potential impacts are likely to occur during the operational phase in the absence of mitigation:

- **Pollution of water from foul wastewater arising from the development**.

  The Ringsend plant is licenced to discharge treated effluent by the EPA (licence number D0034-01) and is managed by Irish Water. It treats effluent for a population equivalent (P.E.) on average of 1.65 million however weekly averages can spike at around 2.36 million. This variation is due to under-capacity as well as storm water inflows during periods of wet weather as this is not separated from the foul network for much of the older quarters of the city, including at the subject site. The Annual Environmental Report for 2018, the most recent available, indicated that there were a number of exceedances of the emission limit values set under the Urban Wastewater Treatment Directive. In April 2019 Irish Water was granted planning permission to upgrade the Ringsend plant. This will see improved treatment standards and will increase network capacity by 50%, with a target completion date of 2022. According to the Engineering Services Report prepared by CS Engineers the project will result in an additional loading to the sewer of 466.9m^3/day.

  This impact is assessed as negative, imperceptible, likely and permanent.

- **Pollution of water from surface water run-off.**

  The Greater Dublin Strategic Drainage Study (2005) identified issues of urban expansion leading to an increased risk of flooding in the city and a deterioration of water quality. This arises where soil and natural vegetation, which is permeable to rainwater and slows its flow, is replaced with impermeable hard surfaces. The site is currently entirely of hard standing with no surface water attenuation in place. According to the engineering report prepared by: the use of green roofs, permeable paving, water butts, land drains, swales, tree pits, storage attenuation, an oil separator and controlled discharge to the combined sewer.

  This impact is assessed as negative, imperceptible, likely and permanent.

- **Japanese Knotweed**

  The Japanese Knotweed on the site has been subject to a treatment programme since 2018. This has included herbicide spraying in October 2018, May 2019, October 2019 and July 2020. Further monitoring, and treatment if necessary, is to be undertaken during the growing season in 2021.

  This impact is assessed as neutral, significant, unlikely and long-term.

- **Impacts to protected areas.**

  No impacts are predicted to occur to the status of the Royal or Grand Canal pNHAs as there is no pathway to these areas. Impacts to Natura 2000 areas (SACs or SPAs) in Dublin Bay are not predicted to occur, principally due to the separation distance between the site and these areas. A full assessment of potential effects to these areas is contained within a separate Screening Report for Appropriate Assessment.

This impact is assessed as negative, imperceptible and unlikely.

Table 5.7: Significance level of likely impacts in the absence of mitigation

Impact		Significance
Construction phase		
1a	Loss of negligible or low local value habitat	negative, slight, likely and permanent
1b	Loss of high local value habitat	negative, significant, likely and permanent
2	Mortality to animals during construction	negative, significant, likely and permanent
3	Pollution of water during construction phase	negative, imperceptible, likely and permanent
4	Wastewater pollution	negative, imperceptible, likely and permanent
5	Surface water pollution	negative, imperceptible, likely and permanent
6	Japanese Knotweed	negative, significant, likely and long-term
7	Protected areas	negative, imperceptible and unlikely

Overall, it can be seen that three potential significant impacts are predicted to occur as a result of this project in the absence of mitigation.

5.5.3 Cumulative impacts

A number of the identified impacts can also act cumulatively with other impacts from similar developments in this area of Dublin. These primarily arise through the additional loading to the Ringsend Wastewater Treatment Plant. It is considered that this effect is not significant as there is no evidence that current pollution is resulting in negative effects to high-value biodiversity features in Dublin Bay. Upgrading works which are currently underway will bring it in line with the requirement of the Urban Wastewater Treatment Directive.

In this instance the incorporation of SUDS attenuation measures into a city centre brown-field site is contributing to the cumulative positive effective of reducing rainwater run off to the municipal treatment plant.

There are no other effects which could act in a cumulative way to result in significant impacts to biodiversity.

5.6 DO NOTHING IMPACT

In the absence of this project nesting habitat for Blackbird, Chaffinch and Dunnock and the existing trees will be retained. Habitats on the site are mostly of negligible or low biodiversity value This will not change in the absence of this project.

Water quality may improve throughout the Liffey catchment with the implementation of the

Water Framework Directive however its target of 'good ecological status' for all water bodies by 2016 was not been met. In 2018 a second River Basin Management Plan was published which highlights 190 'priority areas for action' where resources will be focussed during the 2018-2021 period. The Tolka and Dodder, as well as the upper Liffey are among those areas where improvements are expected.

5.7 MITIGATION MEASURES

These measures include avoidance, reduction and constructive mitigation measures as set out in Section 4.7 of the Development Management Guidelines. Under the EIA Directive, where significant negative effects are predicted to arise from a project then mitigation measures are required.

This chapter has identified three impacts that were assessed as 'negative, significant, likely and permanent' and therefore mitigation is needed to reduce the severity of these potential effects.

The following mitigation measures are proposed for the development.

Construction Phase

B-C1 **Disturbance of birds' nests**
Removal of trees and other nesting vegetation should be undertaken outside the bird nesting season. Where a bird has is found to be nesting during the construction phase, and disturbance of same is required, a licence must first be procured from the NPWS. Site clearance should proceed outside the nesting season, i.e. from September to February inclusive. If a nest is encountered then works must stop, until such time as nesting has ceased. Otherwise, a derogation licence must be sought from the NPWS to allow the destruction of the nest.

B-C2 **Loss of high value treeline habitat**
The landscaping scheme includes substantial addition of semi-mature trees which will be native where possible.

B-C3 **Japanese Knotweed**
These areas have been identified and marked on the ground indicating a 7m buffer zone from visible plant parts. In advance of works, this soil is to be excavated and disposed of off-site by a suitably qualified contractor. This is a proven and established technique which is suitable for the conditions on this development site.

No mitigation measures are proposed during the operational phase.

5.8 PREDICTED IMPACTS OF THE PROPOSED DEVELOPMENT

This section allows for a qualitative description of the resultant specific direct, indirect, secondary, cumulative, short, medium and long-term permanent, temporary, positive and negative effects as well as impact interactions which the project may have, assuming all mitigation measures are fully and successfully applied.

No significant negative effects to biodiversity are predicted to arise from this development subject to the mitigation measures outlined above.

Table 5.8 summarises the likely impacts arising from this project.

Table 5.8: Significance level of likely impacts in the absence of mitigation

Impact		**Significance**
Construction phase		
1	Loss of habitat	negative, slight, likely and permanent
2	Mortality to animals during construction	negative, imperceptible, unlikely and permanent
3	Pollution of water during construction phase	negative, imperceptible, likely and permanent
4	Wastewater pollution	negative, imperceptible, likely and permanent
5	Surface water pollution	negative, imperceptible, likely and permanent
6	Japanese Knotweed	negative, imperceptible, likely and permanent
7	Protected areas	negative, imperceptible and unlikely

5.8 MONITORING

B-C4 Japanese Knotweed **-** Monitoring is required to ensure that Japanese Knotweed is eradicated and is not spread during the construction phase and this should be addressed as part of the Contractor's Construction and Environmental Management Plan (CEMP).

5.9 REINSTATEMENT

No reinstatement works are required for ecological features.

5.10 INTERACTIONS

This section provides a description of impact interactions together with potential indirect, secondary and cumulative impacts.

The key environmental interaction with Biodiversity is Water. A series of mitigation measures are proposed in Chapter 8 – Water of this EIAR document to ensure the quality (pollution and sedimentation) and quantity (surface run-off and flooding) is of an appropriate standard.

5.11 DIFFICULTIES ENCOUNTERED IN COMPILING

The site survey was carried out at an appropriate time of year for general habitat and breeding bird survey and access to all buildings was facilitated. No difficulties were encountered by the environmental specialist in compiling the required information

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6. LAND AND SOILS

6.1 INTRODUCTION

This section of the EIAR has been prepared by Cronin and Sutton Consulting (CS Consulting) and describes the existing *Land & Soils* aspects on the proposed development site. An assessment is made of the likely impact arising during the demolition, construction and operational phases of the development on these elements.

This chapter was prepared by Robert Fitzmaurice of CS Consulting. Robert is a Chartered Engineering with Engineers Ireland and has been practicing as a consulting engineer for over twenty years. Robert holds an undergraduate degree in Civil & Environmental Engineering, a postgraduate Diploma in Environmental Engineering, an advanced Diploma in Planning & Environmental Law and has a master's degree in Industrial Engineering.

6.2 ASSESSMENT METHODOLOGY

In addition to the sources listed in Chapter 1, other reference documents used in the preparation of this assessment include the following:

- National Roads Authority (NRA) Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.
- Ground Investigation Report No. 22682, October 2020 Prepared by Irish Geotechnical Services Ltd.

The site, which is the subject of this application, is developed. An assessment of the soils and bedrock geology underlying the study area was undertaken in the form of a desktop study using information from The Geological Survey of Ireland (GSI) such as the Bedrock Geology Map of Dublin. An assessment of the existing groundwater underlying the study area was undertaken in the form of a desktop study using information available from The Geological Survey of Ireland (GSI).

Specific geological information was obtained from a preliminary site investigation which was undertaken at the proposed development site by Irish Geotechnical Services Limited, IGSL. The corresponding Ground Investigation Report by IGSL for Cronin and Sutton Consulting Engineers, October 2020 is attached in **Appendix 6A**.

6.3 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposed strategic housing development will include 1047no. mixed residential units, retail, a crèche, community facilities and public open space. All associated site development works and services provisions including parking, bin storage, substations, landscaping and all services required to facilitate the proposed development.

A full description is provided in the statutory notices and in Chapter 3 of the EIAR.

6.4 RECEIVING ENVIRONMENT

The site is located in the administrative jurisdiction of Dublin City Council and has a total area of approximately c5.2ha. The site is bounded to the east by Saint Bricin's Military Hospital and residential properties, to the west by future development lands and residential properties and on all other sides by residential properties. The subject site had previously been used for residential housing, in the form of a number of flat complexes. These have been removed from site. The subject lands are predominantly flat in nature with no water course or other physical features of note on the lands. To the north west of the lands a housing development is currently under construction. This estate and the services currently serving same will be required to be re-located into the proposed development.

6.4.1 Geology

The geology of subject site and the surrounding area is interpreted from information from the Geological Survey of Ireland (GSI) and the Site Investigation carried out. The site and surrounding area is underlain by 'Calp' Formation comprising of Dark Grey to Black Limestone and Shale. The natural deposits are overlain with various thicknesses of made ground consisting of various fill material and paved surfaces of macadam and concrete. The bedrock is also known as 'Calp' Limestone which is a dark grey argillaceous limestone encountered at depths of between 12.3m BGL to 16.5mBGL.

A summary of the ground conditions encountered in the site investigation is outlined in Table 6.1 below:

Table 6.1: Ground Conditions

Stratum	Typical Depth (m BGL)
Made Ground: Hardcore fill, clay with rubble fill, medium dense grey and brown clayey sandy angular to sub-angular fine to coarse gravel with occasional cobbles, crushed concrete with red brick fill and occasional pockets of soft dark brown clay.	0.1- 3.5
Very still to hard, greyish brown, gravelly, slightly sandy, silty CLAY with cobbles and occasional boulders.	0.8 - 7.3
Very dense, grey, slightly silty, sandy, fine to coarse, angular GRAVEL with cobbles and occasional boulders.	5.5 – 8.0
Limestone bedrock	12.30 – 15.5

6.4.2 Hydrogeology

The subject site is within the Dublin Urban Groundwater Body as designated in the ERBD Management Plan. The groundwater body chemical and quantitative status of both of these groundwater bodies has been designated as 'good'. The Geological Survey of Ireland, GSI, has developed a classification system for aquifers based on the value of the resource and their hydrogeological characteristics. The bedrock aquifer is classified as a Locally Important Aquifer (Li) Aquifer which is designated as a productive aquifer in local zones. The GSI, vulnerability rating for pollution from the ground surface is Low. The groundwater flows in a southerly direction towards the River Liffey.

Based on review of historical maps available from Ordinance Survey Ireland (OSI) the site has been occupied by various residential facilities since the early 1960's. There is no evidence to suggest that the previous land had significant potential for contamination.

6.4.3 Soils Contamination

A detailed intrusive testing regime was carried out on site to establish if the site contained any historical materials which made require to be addressed prior to the site being developed. The intrusive works were carried out IGSL and the analytical interpretation was caried out by O'Callaghan Moran. Their findings and reports are appended to this submission. The findings indicated minor local hot spots with elevated levels of materials which would require mitigation prior to the development being used for housing upon completion. As such elevated materials will be removed off site in accordance with statutory requirements during the re-development of the subject lands.

6.5 POTENTIAL IMPACTS

6.5.1 Potential Impact on Soils, Subsoils and Bedrock

Demolition

The potential impact pertaining to the proposed development with regard to land and soil involves the removal of the existing structure and services on site and the excavation of disposal of material to allow the development to be constructed and the disposal of these material. The potential impacts potentially are;

- air quality issues pertaining to demolition on site structures,
- noise issues due to demolition of structures on site,
- subsidence issues regarding adjacent landowners, due to excavation works,
- increased in temporary local traffic volumes due to removal of demolition and excavated site,
- reduction in regional landfill capacity due to acceptance of classified waste material.

Construction

The principal risks associated with the Construction Phase are:

- The presence of contaminants in the underlying strata and the exposure of site workers to contaminated ground through direct contact, inhalation of dust and vapours or oral intake.
- Excavated and stripped soil can be disturbed and eroded by site vehicles during the construction. Rainfall and wind can also impact on non-vegetated/uncovered areas within the excavation or where soil is stockpiled.
- Noise and vibration will be generated through the construction phase particularly during pilling and excavation work. Given that some rock excavation is required it is anticipated that rock breaking techniques will be used. Noise and vibration impacts are considered in detail in Chapter 9 - Noise and Vibration.
- The removal of soil from the ground could, without the adoption of appropriate control measures, lead to some ground movement in the immediate surrounds of the excavation with an associated risk of settlement and damage to buildings in the immediate area. Details of mitigation methods are outlined in the next section.
- The presence of contaminants in the groundwater and the exposure of site workers to existing contaminated groundwater.

- The potential impact of dewatering and temporarily reducing the ground water level on surrounding structures.
- The impact on existing ground water flow regime. The concern would be that the basement could act as a barrier to the groundwater flow and the potential for ground water levels to rise on the up-stream side of the site, this has been assessed and the potential is deemed to be very low, refer to CS Consulting Engineering Services Report for comment on same.
- The potential for groundwater from the demolition and construction phase of the project to contribute to contamination of the local groundwater.
- The mobilisation and migration of soluble contaminants in groundwater.

<u>Operation</u>

During the operational phase of the new development on the subject site it is envisaged that there will be little to no potential impact on the geology of the area or on groundwater.

Run-off from hardstanding areas will pass through a closed drainage system, which will incorporate silt traps and oil/petrol interceptors, to mitigate the possibility of potentially contaminated surface water from contaminating the soil and bedrock geology. This drainage system will then discharge into the Local Authority operated sewer system. It is not predicted that there will be any adverse effects on the soils and geology during the operational phase of the development.

The development will be supported by the underlying rock through either direct bearing or through the secant pile wall. It is not envisaged that this will have any negative impact on the bedrock geology.

Run-off from hardstanding areas will pass through a closed drainage system, which will incorporate silt traps and oil/petrol interceptors, to mitigate the possibility of potentially contaminated surface water from contaminating the soil and bedrock geology. This drainage system will then discharge into the Local Authority operated system. It is not predicted that there will be any adverse effects on the groundwater during the operational phase of the development.

6.5.2 Cumulative Impacts

Cumulative impacts on the proposed development can be considered in two areas:

i) Impact due to the basement construction on adjoining underground structure due to the potential to block groundwater flow patterns,

ii) The requirement for excavated soils deemed to be disposed on in licenced landfill facilities, thereby reducing the capacity in the landfills to accept future material.

6.5.3 Do Nothing Impact

The "Do Nothing Impact" assesses the environmental impact of not redeveloping the proposed development site in respect of the existing impacts to land and soils, at the proposed site.

Under the "Do Nothing Scenario" there would be no change in the current land use of the site and therefore the soil and bedrock geology environments would remain in their current state.

6.6 MITIGATION MEASURES

Potential issues noted above during the construction phase can be mitigated by following the measures noted below.

6.6.1 Construction Phase

The main impacts are associated with the Construction Phase of the proposed development. Following construction there will be no long-term significant impacts with respect to soils and geology of the site.

Mitigation measures relating to impacts outlined in the previous section are outlined below:

LS-C1	The excavated material will be monitored and assessed to determine the most suitable disposal outlet. Material will be categorised according to the Landfill Directive and will be sent to appropriately licensed facilities for treatment/disposal. This will entail carrying out soil analysis to determine the appropriate waste facility for disposal. Where applicable, material on site will be segregated and divided into material re-use, material re-cycling and waste material streams in accordance with current guidelines and best practice.
LS-C2	Dust suppression measures will be implemented to minimise dust generation during extended dry periods. Dust monitoring will be conducted through the excavation period. The provision of vehicle wheel wash facilities at site exits and implementation of a road sweeping programme will reduce effect on surrounding road network.
LS-C3	Excavation work for the construction of the basement could act as a barrier to the groundwater flow and the potential for ground water levels to rise on the up-stream side of the site. And as such mitigation measures to ensure that the existing flow paths are maintained will be incorporated into the construction phase if required.
LS-C4	Inherent in any redevelopment is the potential for groundwater from the demolition and construction phase of the project to contribute to contamination of the local groundwater. By developing a detailed construction methodology and strict adherence to this policy by vigilant site management, these potential risks can be mitigated to acceptable levels.
LS-C5	During the demolition and excavating phase of the works monitoring will be ongoing for noise, vibration, settlement, gas and water levels as well as ground contamination as described in the section below on Monitoring

Moderate negative impacts during the construction phase will be short term only in duration. Implementation of the above measures will mitigate any significant long-term adverse impact.

6.7 PREDICTED IMPACTS

6.7.1 Construction

The demolition material generated on site to enable the proposed development to be completed, will be segregated and assessed to establish the viability of material to be reused or recycled. The nature of the development will inevitably mean that waste material generated on site will not be suitable for re-use of recycling and therefore will be required to be removed from site and disposed of in accordance with current legislation. The waste material taken from site deemed to be inert or non-hazardous, will be committed to a regional landfill.

The proposed development will result in a large volume of excavated material including existing made ground, soil and rock being removed off site for disposal. The material may contain contaminants and therefore will need tested and be exported to an approved licensed waste facility. The need for dewatering of the site will require pumping of a large volume of water from the site. The ground and groundwater may contain contaminants and therefore will need to be tested and monitored during construction. This is to facilitate the construction of the basement and therefore is unavoidable. The disposal of groundwater shall be in accordance with the licensed requirements of Dublin City Council and will be on a short term basis. When the secant pile wall is in place the dewatering process will remove groundwater located behind the secant pile wall. The licencing agreement with the Council, may call for, subject to analysis of the groundwater, the groundwater water to pass through filtration system to remove sediment from the water and an oil separator prior to discharge to a designated sewer and at a controlled rate. The predicated impacts of same would be classed as moderate.

6.7.2 Operation

There is no predicted long-term impact on the soil, geology and hydrogeology environments associated with the operation phase of the proposed development.

6.8 MONITORING

LS-C6	It is recommended that the following are monitored in relation to the soil and geological environments during the demolition and construction stage: • Testing and monitoring of soil and made ground that will be excavated for any potentially contaminated material to ensure adequate classification and disposal. • Monitoring of the retaining wall using for example, inclinometers and monitoring of water movements either seepages or through control points. • Monitoring of neighbouring structures immediate to the development site for the effects of any vibration, movement and settlement arising from the excavation works based on condition surveys carried out by the Contractor prior to the works. • Monitoring of interrelated impacts such as noise and vibration levels, groundwater levels, dust emissions etc. are dealt with in their other chapters in this EIAR. • Testing and monitoring of water and gas during excavation works.

	• Monitoring of water movements either seepages or through control points.

6.9 REINSTATEMENT

Any temporary construction compounds will be removed from the site following the end of the construction phase. Reinstatement at completion of the works will involve removal of all deleterious materials that may have been deposited during construction works and restoring any areas within the public realm/pedestrian corridor with an appropriate and acceptable hard-wearing layer.

6.10 INTERACTIONS

The impacts described previously in this Chapter also relate to and interact with other chapters within the EIAR specifically; Population and Human Health, Water, Biodiversity, Noise and Vibration, Air Quality and Climate and Material Assets. These impacts are described in more detail in the various corresponding chapters however some general points are described below:

- There is a potential for dust from demolition work and excavations or stockpiles to impact on air quality/human beings.

- Noise and vibration will be generated through the Construction Phase particularly during the pilling and excavation works.

- Construction workers will be exposed to any contaminants present in the underlying strata through direct contact and inhalation of dust and vapours.

In assessing the impact on lands and soils we have also considered and had regard to a number of the separate standalone reports included with this planning application, particularly the Basement Impact Assessment, Construction and Demolition Waste Management Plan and Demolition and Construction Management Plan.

6.11 DIFFICULTIES ENCOUNTERED IN COMPILING

The soil and geology profiles described are extracted from available site investigation information which uses testing and observation of a sample within boreholes and trial pits to give an overall representation of the site. The assumptions made regarding the site are based on this available information only and cannot account for localised areas which differ however unlikely. There was no available information to confirm the existence of or the extent of contamination and therefore assumptions are based on the known historical land use of the proposed development site and the surrounding area. However, the mitigation measures proposed during demolition and construction stage will ensure that if any contamination is identified it will be addressed to ensure no adverse impacts on the environment. This will include monitoring and testing of materials to be removed from site following segregation of waste materials. Waste materials will be assessed in accordance relevant waste classification and waste disposal legislation.

7. WATER

7.1 INTRODUCTION

This section of the EIAR has been prepared by Cronin and Sutton Consulting and describes the existing water, wastewater and flooding zoning aspects on the proposed development site. An assessment is made of the likely impact arising during the demolition, construction and operational phases of the development on these elements.

This chapter was prepared by Robert Fitzmaurice of CS Consulting. Robert is a Chartered Engineering with Engineers Ireland and has been practicing as a consulting engineer for over twenty years. Robert holds an undergraduate degree in Civil & Environmental Engineering, a postgraduate Diploma in Environmental Engineering, an advanced Diploma in Planning & Environmental Law and has a master's degree in Industrial Engineering.

7.2 ASSESSMENT METHODOLOGY

In addition to the sources listed in Chapter 1, other reference documents used in the preparation of this assessment include the following:

- National Roads Authority (NRA) Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.
- Good practice guidelines on the control of water pollution from construction sites developed by the Construction Industry Research and Information Association (CIRIA).

A desktop study was carried out on the local and regional surface water and drainage network. Information was obtained from documents including the following sources:

- Eastern River Basin District (ERBD) Catchment Characterisation Report (ERBDA, 2005)
- ERBD River Basin Management Plan 2009-2015 (ERBDA, 2010a)
- ERBD Programme of Measures 2009-2015 (ERBDA, 2010b)
- ERBD River Basin Management Plan - Strategic Environmental Assessment (ERBDA, 2011)
- EPA online Water Quality Database and Envision Map Viewer (www.epa.ie)
- Dublin City Council Water and Drainage Department record drawings and discussions with Drainage Division Engineers;
- Flood Risk Assessment Report completed by Cronin and Sutton Consulting which accompanies this Planning Application.
- All available information concerning the development including development plans.

The following legislation was referred to in compiling this chapter:

<u>Water Framework Directive 2000/60/EC:</u>
The EU Water Framework Directive (WFD) 2000/60/EC came into force on 22nd December 2000, and enacted into Irish legislation through S.I. No. 722 of 2003 European Communities (Water Policy) Regulations 2003. This legislation and regulation is a significant piece of legislation for water policy, as it provides a co-ordinated approach across Europe for all water policies, establishing a management structure for future water policy. A few key objectives of the Directive are to:

- Protect all waters, including rivers, lakes, groundwater, transitional and coastal waters.
- Achieve "good status" in all waters by 2015, and maintaining "high status" where the status already exists.
- Have water management based on River Basin Districts (RBD).

The strategies and objectives of the Water Framework Directive in Ireland have been influenced by a range of National and European Union legislation and regulation including:

- European Communities (Quality of Salmonid Waters) Regulations 1988 (S.I. No. 293 of 1988),
- Local Government (Water Pollution) Acts 1977 – 1990,
- Water Quality Standards for Phosphorus Regulations 1998 (S.I. No. 258 of 1998).

In turn the implementation of the Water Framework Directive and its associated policies has necessitated the introduction of new regulations in Ireland including, the European Communities Environmental Objectives (Surface Waters) Regulations 2009, which are discussed further in the following section.

European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No.272 of 2009*):*
These regulations have been devised as a more complete and stringent set of surface water quality regulations which covers the requirements of the Water Framework Directive and the Dangerous Substances Directive. These regulations came into effect on 30th July 2009 and have been adopted by the Government. These new regulations supersede previous water quality regulations (both EU and national). This project must still be cognisant of previous regulations as they form the basis for a wide range of impact assessment and monitoring methodologies. It is envisaged that a detailed construction management plan which will include the management or disposal of surface water runoff will be prepared in advance of construction commencing on site. The construction management plan will be cognisant of these new regulations and apply them throughout the construction phase.

European Communities Priority Substances Directive 2008:
These regulations have been devised to assign a chemical status assessment for water bodies. Directive 2008/105/EC provides environmental quality standards in the field of water policy.

European Communities (Quality of Salmonid Waters) Regulations 1988 (S.I. No. 293 of 1988)
The Salmonid Regulations set water quality standards for salmonid waters, with identification of salmonid waters, water quality standards, and frequencies of sampling and methods of analysis and inspection.

Local Government (Water Pollution) Acts 1977 – 1990:
The Act is the main legislation for the prevention and control of water pollution, including the general prohibition of polluting matter to waters. While this act has largely been superseded by the 2009 Regulations, current impact assessment and monitoring methodologies must still be cognisant of this legislation.

Water Quality Standards for Phosphorus Regulations 1998 (S.I. No. 258 of 1998):
As part of the Water Pollution Acts, these regulations require water quality be maintained or improved, with reference to the biological quality river rating system (Q Rating) as assigned by the Environmental Protection Agency between 1995 to 1997. While this act has also largely been superseded by the 2009 Regulations, current impact assessment and monitoring methodologies must still be cognisant of this legislation.

An assessment of the existing water quality was also carried out in the form of a desktop study examining water quality data from the EPA from surveys predominately conducted by the EPA and local authorities. Various quality classes are used to establish and monitor the condition of rivers and streams in Ireland. Quality classes relate to the potential beneficial use of a water body, and can be effected by the quality of water discharged to surface water during construction and operation of a development.

Background Information on the local drainage network and water supply was obtained from documents from local authorities.

A *Site Specific Flood Risk Assessment* Report compiled by Cronin & Sutton Consulting was undertaken for the proposed development and is included as part of the planning application. The potential sources of flooding considered were:

- Tidal/Coastal flooding;
- Fluvial flooding (from adjacent surface water bodies)
- Pluvial (direct rainfall)
- Groundwater flooding
- Potential for offsite flooding due to infrastructure failure.

No particular difficulties were encountered while compiling this Chapter.

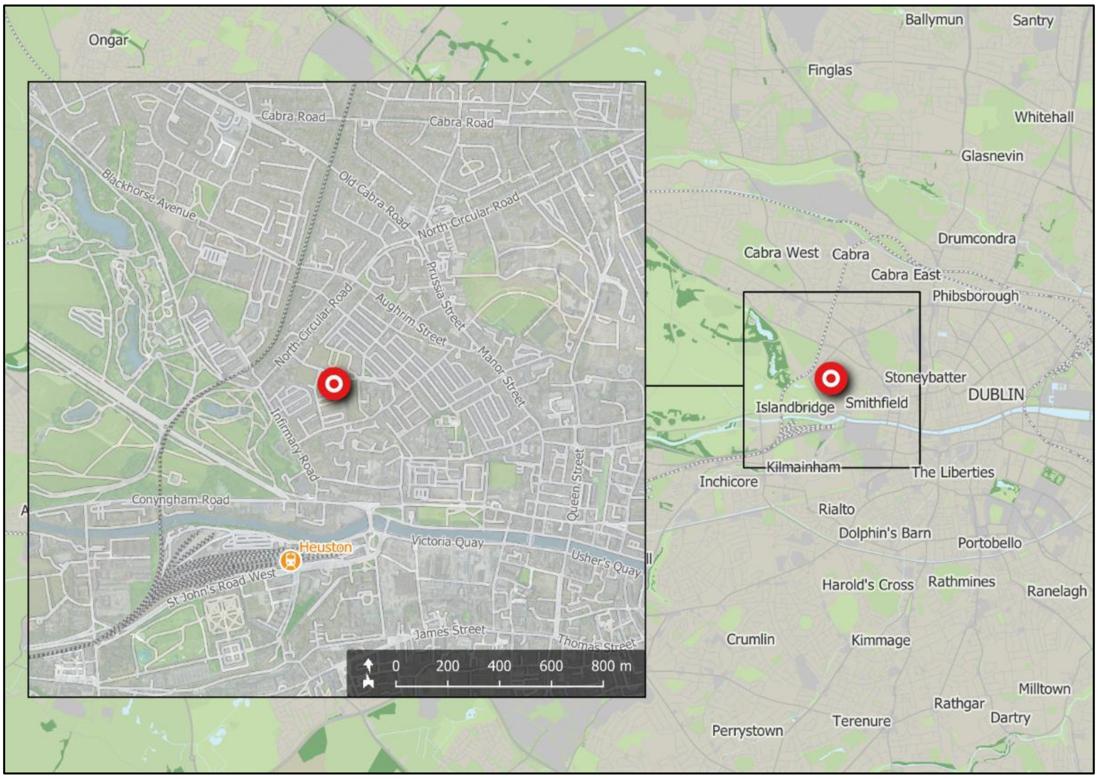
7.3 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposed strategic housing development at this site in O'Devaney Gardens, Stoneybatter, will include 1047no. mixed residential units, retail, a crèche, community facilities and public open space. All associated site development works and services provisions including parking, bin storage, substations, landscaping and all services required to facilitate the proposed development. A full description is provided in the statutory notices and in Chapter 3 of the EIAR.

The application site (c.5.2 hectares) and is located in the north Inner City, comprising lands which were formerly in residential use - O'Devaney Gardens Development. The application site also includes a portion of land which was previously part of St. Bricin's Military Hospital.

The location of the proposed development site is shown in Figure 7.1.

Figure 7.1 : Location of proposed development site (sources: EPA, OSM Contributors, Google)



The development site is a brown field site that is bounded to the north by North Circular Road; to the east by lands that comprise St Bricin's Military Hospital and residential developments including Thor Place, Ashford Street, Ashford Place, Ashford Cottages and Ross Street; to the south by Montpelier Gardens and Montpelier Park residential developments; and to the west by a permitted housing development under construction on behalf of Dublin City Council (further details provided previously under Trip Generations) as well as dwellings on Findlater Street, Black Street, Kinahan Street, Aberdeen Street, Sullivan Street and Montpellier Gardens.

Access to the site is available from a number of points with the principal vehicular access points being from Infirmary Road, via the Montpelier Gardens development at the south west corner of the site; from North Circular Road (NCR) to the north west; and from the east via Thor Place, immediately to the north of the St Bricin's Hospital lands. There is a laneway along the north west boundary of the site, which is an existing right of way, providing access to the rear of No.'s 44-60, R101 North Circular Road.

The indicative extents of the development site, as well as relevant elements of the surrounding road network, are shown in more detail in Figure 7.2.

Figure 7.2 : Site extents and surrounding transport infrastructure (sources: NTA, OSM Contributors, Google)

7.4 RECEIVING ENVIRONMENT

This sub section addresses the implications for the proposed development on the existing environment and looks at the possible affects the proposed development may have during the construction and operational phase.

7.4.1 River Liffey

The main freshwater receiving environment within the vicinity of the proposed development is the River Liffey which is located approximately 380m to the south of the site. The River Liffey flows in an easterly direction and discharges into the Irish Sea approximately 7 km east of the site. The site is located within the Eastern River Basin District which is the Water Framework Directive (WFD) designated catchment for the local area.

The WFD classification scheme for water quality includes five status classes: high, good, moderate, poor and bad. 'High status' is defined as the biological, chemical and morphological conditions associated with no or very low human pressure. This is also called the 'reference condition' as it is the best status achievable - the benchmark. These reference conditions are type-specific, so they are different for different types of rivers, lakes or coastal waters so as to take into account the broad diversity of ecological regions in Europe. Assessment of quality is based on the extent of deviation from these reference conditions, following the definitions in the Directive. 'Good status' means 'slight' deviation, 'moderate status' means 'moderate' deviation, and so on. The definition of ecological status takes into account specific aspects of the biological quality elements, for example "composition and abundance of aquatic flora" or "composition, abundance and age structure of fish fauna. The River Liffey in the vicinity of the site is categorised on the EPA Water Quality Map as a transitional waterbody. EPA sampling of watercourses dating from 2010-2015 indicate that the River Liffey had a 'moderate' status.

Information available from the EPA suggests that the River Liffey is "at risk of not achieving good water status" in terms of the WFD. The water quality within the designated water courses will be particularly affected by the quantity and quality of surface water run-off from the adjacent lands. Currently the lands in the vicinity of the site are classified as urban in use.

The most recent surface water quality data for the Liffey and Dublin Bay (2010-2012) indicate that they are 'Unpolluted'. Under the 2015 'Trophic Status Assessment Scheme' classification of the EPA, 'Unpolluted' means there have been no breaches of the EPA's threshold values for nutrient enrichment, accelerated plant growth, or disturbance of the level of dissolved oxygen normally present. Annual precipitation for this area is approximately 727mm (2018 figures from Met Eireann website).

7.4.2 Surface Water Drainage Infrastructure

Dublin City Council's drainage records indicate a 225mm diameter stormwater sewer at east of Montpelier Gardens, which flows through Montpelier Park, Montpelier Drive and Montpelier Hill, and finally connected to a combined sewer on Infirmary Gardens.

7.4.3 Flood Risk

The site of the proposed development is in Flood Zone C, based on Dublin City Councils Strategic Flood Risk Assessment from the current Development Plan. The primary risk of flooding to the site is by Pluvial flooding.

7.5 POTENTIAL IMPACTS

7.5.1 Construction Phase

This sub section addresses the implications for the proposed development on the existing environment and looks at the possible affects the proposed development may have during the construction and operational phase. The principal risks associated with the Construction Phase are:

Surface Water

Surface water run-off will occur from hardstanding and roof structures during the construction period. Surface water run-off from construction activities has the potential to be contaminated.

- Suspended solids arising from ground disturbance and excavation.
- Hydrocarbons from accidental spillage from construction plant and storage.
- Concrete/cementitious products: arising from construction materials.
- Water removed from surface excavations as a result of rainfall or groundwater seepage.
- Vehicle wheel wash water.
- Runoff from exposed work areas and excavated material storage areas.

- Leakage of temporary foul water services; and
- Solid (municipal) wastes being disposed or blown into watercourses or drainage systems.

During excavation works, groundwater within the shallow perched aquifer and the sand and gravel aquifer will be dewatered to facilitate the construction of the basement. The removal of impacted groundwater will likely have a permanent positive effect on receiving surface waters.

Flood Risk

Surface water run-off has the potential to flood basement levels and excavations during the construction period. Ground water encountered during excavations has the potential to flood basement construction. Construction works, excavations etc. have the potential to contaminate surface and ground waters.

7.5.2 Operational Phase

The principle risks associated with the Operation Phase are:

Surface Water

The completed stormwater system will remain under the control of a management company and will not be offered to be taken in charge by the Local Authority. As such operational and maintenance requirements will be addressed by the company's maintenance contractor. Issues which my interfere with the stormwater network pertain to blockages and the lack of appropriate jetting and cleaning of gullies, drains and main sewers are required.

Due to the proposed stormwater system which will be implemented at the site there is considered to be minimal risk of the site impacting the water quality of the River Liffey during the operational stage.

Proposed Attenuation Arrangements

The first aspect is to reduce any post development run-off to pre-development discharge rates. The development is to retain storm water volumes predicted to be experienced during extreme rainfall events. This is defined as the volume of storm water generated during a 1 in 100 year storm event increased by 20% for predicted climate change factors.

To ensure an accurate calculation of the required attenuation for the site Met Eireann was contacted to provide:

a) The SAAR (Standard Annual Average Rainfall) for the area: 727mm/year.
b) The sliding duration table for the site indicating the 1:100 year rainwater intensities to be used.
c) Soil type value obtained from the Flood Studies Report, (for the subject lands this has been established as soil type 4.

These parameters allow the Q-Bar, greenfield runoff rate, to be calculated. The Q-Bar value for the site is 5.0 l/sec/Ha. As the proposed system will cater for the existing development currently under construction and the proposed development, the overall allowable discharge rate has been calculated for same, 29.0l/sec, based on the overall site of 5.8Ha, 5.2Ha for this application and 0.6Ha for the residential development currently under construction.

The proposed development is to retain storm water volumes predicted to be experienced during extreme rainfall events. This is defined as the volume of storm water generated during a 1 in 100 year storm event increased by 20% for predicted climate change factors. The attenuation volume requirement of approximately 4042m^3 for the 1 in 100 year storm event. See CS Consulting's Engineering Services Report.

Proposed Sustainable Urban Drainage System, SuDS

The second aspect is the policy of the Local Authority is to include Sustainable Urban Drainage Systems, SuDS, for all new applications. The aim is to provide an effective system to mitigate the adverse effects of storm water runoff on the environments, through enhanced quality systems and on local infrastructure to aid in preventing downstream flooding. The features proposed will reduce run-off volumes, pollution concentrations and enhance groundwater recharge and biodiversity.

The proposed SuDS features consist of:

a) Green-roof – this allows the roof areas of the proposed apartments to use a Sedum type covering to absorb the first 'flush' from rainfall events. Typically, 5-10mm of rain can be retained on the sedum surface. As more intense rain is experienced the green roof can overflow from the roof through down pipes and into the schemes main drainage runs.
b) Water-'butts' – when the rain water from the green roofs and from the roofs of the housing units is drained to ground floor it will be directed into rainwater storage units, commonly referred to as water butts. The retained rainwater can then be stored and re-used for local landscaping and maintenance purposes. It would not be envisioned that the captured rainwater would be reused in the apartment units for public health reasons.
c) Permeable Paving – this system allows rainwater to be directed into carparking bays whereby the rainwater can filter through gaps in the paving blocks and percolate into the subsoil. The area which can be drainage is a subject to the infiltration characteristics of the subsoil, which is established following ground investigation testing on site in accordance with BRE 365.
d) Land drains – it is also proposed to use land drains to the rear of individual dwellings to allow the percolation of rainwater locally, again subject to the infiltration rates of the subsoil, which has to be established. The land drains will be fitted with an overflow system to allow excess storm water to be directed into the main drainage runs.
e) Swales and Tree Pits – it is proposed to allow storm water to be directed locally into tree pits for prevent this storm water from entering the main drainage network. As the tree pits can only accommodate relatively small surface areas this proposal cannot be used to drain the site as a whole but can play an important part in contributing to the overall Suds strategy.
f) Main Attenuation Tank – As noted above the for extreme storm events, will require a dedicated system to contain the storm water flows generated during a 1-in-100 year storm, increased by 20%. It is proposed to use a proprietary underground storage tank for this purpose. The tank will be placed under open spaces, not roads so the open space above can be enjoyed while not preventing the schemes ability to retain the storm water.
g) Low Water Usage Appliances – It is also worth highlighting that low water usage appliances will also be utilised to aid in the reduction of water usage on the development.
h) Oil Separator – Prior to final disposal of storm water from the main drainage network into the public system the stormwater will pass through an oil separator to remove any hydrocarbons which may have entered the network from car parking areas.

The combination of the above noted elements will allow the proposed development to adhere to the principles of sustainable drainage practices while enhancing overall storm water quality.

Interception Storage will be provided via the use of the green roofs on the apartment buildings and by the use of local drainage into landscaped areas and tree pits where applicable. This will allow both interception and treatment volumes from the proposed development to be provided for.

Flood Risk

The proposed development will not adversely affect the subject sites Flood Zone designation or alter same for the local environs. The scheme has been reviewed in accordance with the requirements of the of both the Local Authorities Site specific flood risk assessment requirements and the requirements of the Department of the Environment and Planning. The proposed scheme will not increase the potential for localized or off-site flooding. For a detailed breakdown of the flood risk assessment for the scheme refer to the *Site Specific Flood Risk Assessment* prepared by CS Consulting for this scheme and submitted with this application.

7.6 MITIGATION MEASURES

7.6.1 Construction Phase

The main potential impacts are associated with the Construction Phase of the proposed development. Mitigation measures relating to impacts outlined in the previous section are outlined below:

W-C1	Prior to construction the Contractor will be required to develop an Construction Environmental Management Plan which will incorporate mitigation measures such as containment procedures, audit and review schedules and an Emergency Response Plan in the event of spills, flooding or other incidents that may contribute to pollution to water during construction.
W-C2	All batching and mixing activities will be located in areas away from watercourses and drains.
W-C3	Protection measures will be put in place to ensure that all materials used during the construction phase are appropriately handled, stored and disposed of in accordance with recognized standards and manufacturer's guidance.
W-C4	Surface water drainage around the batching plant will be controlled and washout from mixing plant will be carried out in a designated, contained impermeable area.
W-C5	Spills of concrete, cement, grout or similar materials will not be hosed into drains.
W-C6	Rainwater that accumulates on site will be discharged to the DCC sewer system.
W-C7	The Contractor will comply with the following guidance documents: i)CIRIA – Guideline Document C532 Control of Water Pollution from Construction Sites (CIRIA, 2001) ii)CIRIA – Guideline Document C624 Development and Flood Risk - guidance for the construction industry (CIRIA, 2004).

W-C8	Dewatering and surface water discharges on the site, during construction and prior to completion will be controlled. All necessary facilities will be incorporated such as settlement ponds/tanks, oil/grit interceptors with shut down valves, bunded oil storage tanks adjacent to a petrol interceptor for storage of any recovered oil. A monitoring programme including sampling for water quality before discharge to the Council sewer during construction will be carried out to ensure that only clean surface water is discharged to the receiving systems.

7.6.2 Operational Phase

W-O1	**Outline Construction Management Plan -** In order to mitigate potential temporary community disturbance during construction, a Construction Management Plan (OCMP) has been prepared and is included with the application. If the project is approved and implemented, the appointed contractor will prepare an updated CEMP for the agreement of the Planning Authority prior to development commencing on site.
W-O2	Incidental surface run-off from underground basement car parks, compactor units and waste / service yard areas will be discharged into the foul drainage system. Grit / petrol / oil separators will be provided in all of the above areas to improve the quality of water discharging.
W-O3	The provision of flow control with storm-water attenuation will ensure the rate of discharge of surface water is limited to greenfield run-off rates of 5 litres/second/hectare with a total allowable surface water discharge of 29.0 litres/second in line with the recommendations of the Greater Dublin Regional Code of Practice for Drainage Works and the Greater Dublin Strategic Drainage Study.
W-O4	SuDS proposals will improve the quality and reduce the quantity of surface water discharging into the receiving system.
W-O5	Removal of the surface water from the existing combined sewers will reduce the hydraulic loading on the existing sewerage network and Waste Water Treatment Plant (WWTP) at Ringsend.

Moderate negative impacts during the construction phase will be short term only in duration. Implementation of the above measures will mitigate any significant long-term adverse impact.

7.7 PREDICTED IMPACTS

7.7.1 Construction Phase

The implementation of the mitigation measures outlined in section 7.6 should reduce the potential for impact on the River Liffey during the construction phase of the project. The risk of impact to the River Liffey during the construction phase to considered to be low and temporary in nature.

- Prior to construction the Contractor will be required to develop an Environmental Management Plan which will incorporate mitigation measures such as containment procedures, audit and review schedules and an Emergency Response Plan in the event of spills, flooding or other incidents that may contribute to pollution to water during construction.

- All batching and mixing activities will be located in areas away from watercourses and drains.

- Protection measures will be put in place to ensure that all materials used during the construction phase are appropriately handled, stored and disposed of in accordance with recognized standards and manufacturer's guidance.

- Surface water drainage around the batching plant will be controlled and washout from mixing plant will be carried out in a designated, contained impermeable area.

- Spills of concrete, cement, grout or similar materials will not be hosed into drains.

- Rainwater that accumulates on site will be discharged to the DCC sewer system.

- The Contractor will comply with the following guidance documents:
  CIRIA – Guideline Document C532 Control of Water Pollution from Construction Sites (CIRIA, 2001)
  CIRIA – Guideline Document C624 Development and Flood Risk - guidance for the construction industry (CIRIA, 2004).

- Dewatering and surface water discharges on the site, during construction and prior to completion will be controlled. All necessary facilities will be incorporated such as settlement ponds/tanks, oil/grit interceptors with shut down valves, bunded oil storage tanks adjacent to a petrol interceptor for storage of any recovered oil. A monitoring programme including sampling for water quality before discharge to the Council sewer during construction will be carried out to ensure that only clean surface water is discharged to the receiving systems.

The Contractor will make all necessary arrangements for a temporary water supply in agreement with Irish Water and or Dublin City Council, in addition temporary pumping of ground water to facilitate the proposed basement construction will be licensed by Dublin City Council and the water levels monitored as outline sin the basement impact assessment.

7.7.2 Operational Phase

Surface Water

In accordance with the Water Framework Directive (WFD) 2000/60/EC, the proposed development does not prejudice or affect achievement of "good status" of any waterbody.

The provision of petrol/ oil interceptors and grease trays where required will ensure improved quality of surface water run-off from the development to the existing system. The provision of flow control with storm attenuation will ensure a reduced quantity of surface water discharging to the existing surface water sewerage system, therefore reducing the impact on the receiving system.

In addition, it is likely that the long term impact of the proposed development will be positive for the River Liffey due to the removal of impacted made ground which is a source of contamination.

7.8 'DO NOTHING' SCENARIO

The "Do Nothing Impact" assesses the environmental impact of not redeveloping the proposed development site in respect of the existing impacts to water, hydrology and existing drainage and water supply systems at the proposed site.

Under the "Do Nothing Scenario" there would be no change in the current site and therefore the hydrology environment and the drainage systems and water supply would remain as is. However, as the proposed development will provide separate foul and storm water systems and the storm water system will have a fixed discharge rate for all storm water events. This will allow a reduced flow from the site during extreme storm events, thereby increasing the hydraulic capacity in the public drainage network.

7.9 WORST CASE SCENARIO

7.9.1 Construction Phase

A 'worst case scenario' during the construction phase of the proposed scheme would entail a loss of potable and drainage services to the surrounding community.

7.9.2 Operational Phase

From an operational standpoint post development, the worst case scenario would be minimal, as the site was previously developed and the proposed development will provide attenuation to aid in alleviating potential off site flooding.

7.10 MONITORING AND REINSTATEMENT

7.10.1 Construction Phase

All on site monitor works connected to the proposed project will be under the prepared (and approved by Dublin City Council) construction plans. These plans will clearly outline the safety measures required to ensure that the proposed development is constructed in accordance with current best practice and legislative requirements.

7.10.2 Operational Phase

When the proposed development is complete, elements of the scheme will be under the maintenance control of different entities.

- Public Roads/Landscaping/elements of the housing units will be taken in charge by Dublin City Council,
- All remaining elements will be under the control of a private management company.

The various bodies noted above will take responsibility for the maintenance and operation of the facilities when complete.

No further monitoring specific monitoring or reinstatement measures are proposed.

References

In addition to the sources noted above the documents listed below were also consulted.

- Dublin City Development Plan 2016–2022;
- Dublin City Strategic Flood Risk Assessment, 2016 – 2022;
- Regional Code of Practice For development works, Version 6;
- Greater Dublin Strategic Drainage Study;
- Office of Public Works Flood Maps;
- Department of the Environment Flooding Guidelines;
- Local Authority/Irish Water Drainage Records

8. AIR AND CLIMATE

8.1 INTRODUCTION

Byrne Environmental Consulting Ltd have assessed the potential air quality and climatic impacts that the project may have on the receiving environment during the construction and operational phases of the project. The assessment includes a comprehensive description of the existing air quality in the vicinity of the subject site; a description and assessment of how construction activities and the operation of the development may impact existing air quality; the mitigation measures that will be implemented to control and minimise the impact that the development may have on local ambient air quality and reduce the impact on the local micro climate; and, finally, a description as to how the development will be constructed and operated in an environmentally sustainable manner.

8.2 METHODOLOGY

The general assessment methodology of the potential impact of the project on air quality and climate has been conducted in accordance with:

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DoHPLG, August 2018)
- Guidelines on information to be contained in Environmental Impact Assessment Reports (EPA, Draft 2017).
- Guidelines on Information to be Contained in an Environmental Impact Statement (EPA 2002).
- Advice Notes on Current Practice (in preparation of Environmental Impact Statements) (EPA 2003).
- Revised Guidelines on the Information to be Contained in Environmental Impact Statements (EPA 2015).
- Planning and Development Regulations 2001, as amended, in particular by the European Union (Planning & Development)(Environmental Impact Assessment) Regulations 2018 (SI No. 296 of 2018).
- Environmental Impact Assessment of Projects – Guidance on the preparation of the EIAR, European Commission, 2017.
- Climate Action and Low Carbon Development Act 2015

8.2.1 Legislation and Guidance

Air quality standards and guidelines are available from a number of sources. The guidelines and standards referenced in this report include those from Ireland and the European Union.

In order to reduce the risk to health from poor air quality, National and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or "Air Quality Standards" are health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set (Ref Table 8.1).

Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland include the National Air Quality Standards Regulations 2011 (S.I No. 180 of 2011), which incorporate European Commission

Directive 2008/50/EC which has set limit values for the pollutants SO2, NO2, PM10, benzene and CO Council Directive 2008/50/EC combines the previous Air Quality Framework Directive (96/62/EC) and its subsequent daughter directives (including 1999/30/EC and 2000/69/EC). Provisions are also made for the inclusion of new ambient limit values relating to PM2.5. The European 2008/50/EC Clean Air for Europe (CAFÉ) Directive is the current air quality directive for Europe which supersedes the European Directives 1999/30/EC and 2000/69/EC.

In order to assess a wider range of air pollutants in the development area it is necessary to review current air quality monitoring data from published sources such as the most recent EPA's 2019 Annual report entitled Air Quality in Ireland. This EPA report provides detailed monitoring data collected from a number of monitoring locations throughout Ireland on an annual basis to assess national compliance with National Air Quality Regulations. Given the location of the site within. Dublin city it is characterised as a Zone A area as defined by the EPA.

EU legislation on air quality requires that Member States divide their territory into zones for the assessment and management of air quality. The zones currently in place in Ireland in are as follows:

- Zone A is the Dublin conurbation,
- Zone B is the Cork conurbation
- Zone C comprising 23 large towns in Ireland with a population >15,000.
- Zone D is the remaining area of Ireland.

The air quality in each zone is assessed and classified with respect to upper and lower assessment thresholds based on measurements over the previous five years. Upper and lower assessment thresholds are prescribed in the legislation for each pollutant. The number of monitoring locations required is dependent on population size and whether ambient air quality concentrations exceed the upper assessment threshold, are between the upper and lower assessment thresholds, or are below the lower assessment threshold. A summary of the EPA's Annual report entitled Air Quality in Ireland 2019 is detailed below in Table 8.1 below.

Table 8.1 – Air Quality Standards Regulations 2011 (based on EU Council Directive 2008/50/EC)

Pollutant	Regulation	Limit Criteria	Tolerance	Limit Value
Nitrogen Dioxide	2008/50/EC	Hourly limit for the protection of human health – not to be exceeded more than 18 times/year Annual limit for the protection of human health Annual limit for the protection of vegetation	40% until 2003 reducing linearly to 0% by 2010 40% until 2003 reducing linearly to 0% by 2010 None	200 µg/m3 40 µg/m3 400 µg/m3 NO and NO2
Lead	2008/50/EC	Annual limit for the protection of human health	100%	0.5 µg/m3
Sulphur Dioxide	2008/50/EC	Hourly limit for protection of human health – not to be exceeded more than 24 times/year	150 µg/m3 None	350 µg/m3 125 µg/m3

Pollutant	Regulation	Limit Criteria	Tolerance	Limit Value
		Daily limit for protection of human health – not to be exceeded more than 3 times/year Annual and Winter limit for the protection of ecosystems	None	20 µg/m3
Particulate Matter PM10	2008/50/EC	24-hour limit for protection of human health – not to be exceeded more than 35 times/year Annual limit for the protection of human health	50% 20%	50 µg/m3 40 µg/m3
Particulate Matter PM2.5 Stage 1	2008/50/EC	Annual limit for the protection of human health	20% from June 2008. Decreasing linearly to 0% by 2015	25 µg/m3
Particulate Matter PM2.5 Stage 2	2008/50/EC	Annual limit for the protection of human health	None	20 µg/m3
Benzene	2008/50/EC	Annual limit for the protection of human health	20% until 2006. Decreasing linearly to 0% by 2010	5 µg/m3
Carbon Monoxide	2008/50/EC	8-hour limit (on a rolling basis) for protection of human health	60%	10 mg/m3
Dust Deposition	German TA Luft Air Quality Standard Note 1	30 Day Average	None	350 mg/m2/day

Note 1 Dust levels in urban atmospheres can be influenced by industrial activities and transport sources. There are currently no national or European Union air quality standards with which these levels of dust deposition can be compared. However, a figure of 350 mg/m^2-day (as measured using Bergerhoff type dust deposit gauges as per German Standard Method for determination of dust deposition rate, *VDI 2129*) is commonly applied to ensure that no nuisance effects will result from industrial or construction activities.

Table 8.2 – EPA 2019 Assessment Zone A Classification

Pollutant (Annual Mean)	EPA 2019 Assessment Classification
NO_2 Zone A	Above lower assessment threshold (St John Rd Dublin)
SO_2 Zone A	Below lower assessment threshold
CO Zone A	Below lower assessment threshold
Ozone Zone A	Below long term objective
PM_{10} Zone A	Below lower assessment threshold
$PM_{2.5}$ Zone A	Below lower assessment threshold
Benzene Zone A	Below lower assessment threshold
Heavy Metals (As, Ni, Cd, Pb) Zone A	Below lower assessment threshold
Poly Aromatic Hydrocarbons (PAH) Zone A	Below lower assessment threshold

8.2.2 Construction Impact Assessment Criteria

The Institute of Air Quality Management – Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2014) classifies demolition and construction sites according to the risk of impacts and to identify mitigation measures appropriate to the risk. The main air quality impacts that may arise are:

- Dust Deposition resulting in the soiling of surfaces
- Visible dust plumes, which are evidence of dust emissions
- Elevated PM_{10} concentrations as a result of dust generating activities on site
- Increase in airborne particles and NO_2 from diesel fuelled site vehicles and plant

The risk assessment considers the following site activities and their associated potential impacts:

- Demolition activities
- Earthworks
- Construction works
- Trackout (vehicle movements)

The risk assessment considers the following dust related impacts:

- Annoyance due to dust soiling
- The risk to health from exposure to PM_{10}
- Harm to Ecological receptors.

The magnitude of the potential dust emission requires the scale of the works to be classified as Small, Medium or Large which are defined as follows:

Demolition Works

Large Building Volume >50,000m^3
Medium Building Volume 20,000m^3 – 50,000m^3
Small Building Volume <50,000m^3

ODG Site Volume Small <50,000m^3

Table 8.3 - Risk of Dust Impacts - Demolition

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Low Risk

Earthworks

Large Site Area >10,000m^2
potentially dusty soil prone to suspension (eg clays)
>10 earth moving vehicles operating simultaneously
Medium Site Area 2500m^2 – 10,000m^2
moderately dusty soil (eg silts)
5- 10 earth moving vehicles operating simultaneously
Small Site Area <2500m^2
Large grain size (eg sands)
<5 earth moving vehicles operating simultaneously

ODG Site Area Medium Volume <52,000m^2

Table 8.4 - Risk of Dust Impacts - Earthworks

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Low Risk

Construction Works

Large Total Building Volume >100,000m^3
Medium Total Building Volume 25,000m^3 - 100,000m^3
Small Total Building Volume <25,000m^3

ODG Building Volume Large Volume <100,000m^2

Table 8.5 - Risk of Dust Impacts - Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Low Risk

Trackout

Large	>50 HGV outward movements per day of potentially dusty clays on unsealed road >100m
Medium	10 - 50 HGV outward movements per day of potentially dusty clays on unsealed road 50 - 100m
Small	<10 HGV outward movements per day of potentially dusty clays on unsealed road >50m

ODG Trackout Movements *Large Volume <50 HGV/day*

Table 8.6 - Risk of Dust Impacts - Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Low Risk

The dust risk assessment for soiling, health and ecology completed for each of the four aspects of dust emissions has been determined from the characteristics of the development as detailed above. Table 8.7 presents the dust risk for each aspect.

Table 8.7 – Dust Risk Assessment to Define Site-Specific Mitigation Measures

Sensitivity of Area High	Dust Emission Magnitude			
	Demolition	Earthworks	Construction	Trackout
Soiling	Low Risk	High Risk	High Risk	High Risk
Human Health	Low Risk	High Risk	High Risk	High Risk
Ecology	Low Risk	Medium Risk	Medium Risk	Medium Risk

In order to reduce the risk that generated dusts and particulate matter as PM_{10} may have on the receiving environment, an appropriately high degree of mitigation measures will be required for the duration of the construction phase.

8.2.3 Operational Impact Assessment Criteria

Once operational, the proposed residential development may impact on air quality as a result of the requirements of new buildings to be heated and with the increased traffic movements associated with the development.

Air quality significance criteria are assessed on the basis of compliance with the national air quality limit values. The Air Quality Standards Regulations 2011 replace the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), the Ozone in Ambient Air Regulations 2004 (S.I. No. 53 of 2004) and S.I. No. 33 of 1999.

8.2.4 Climate Assessment Methodology

Climate has implications for many aspects of the environment from soils to biodiversity and land use practices. The proposed development may impact on both the macro-climate and micro-climate. The macro-climate is the climate of a large geographic area such as Ireland. The micro-climate refers to the climate in the immediate area.

With respect to microclimate, green areas are considered to be sensitive to development. Development of any green area is generally associated with a reduction in the abundance of vegetation including trees and a reduction in the amount of open, undeveloped space. The removal of vegetation or the development of man-made structures in these areas can intensify the temperature gradient.

To assess the impacts of converting vegetative surfaces to hard-standing with residential buildings and its significance, the amount of vegetative surfaces associated with the proposed development that will be converted to residential buildings and hard-standing has been considered.

The impact of the proposed scheme upon the macro-climate is assessed through the consideration of the change in CO_2 emissions that will occur due to the changes in traffic flow that occur in response to the proposed scheme.

The Conference of the Parties to the Convention (COP25) occurred in December 2019 and focussed on advancing the implementation of the Paris Agreement. The Paris Agreement was established at COP21 in Paris in 2015 and is an important milestone in terms of international climate change agreements. The "Paris Agreement", agreed by 200 nations, has a stated aim of limiting global temperature increases to no more than 2°C above pre-industrial levels with efforts to limit this rise to 1.5°C. The aim is to limit global GHG emissions to 40 gigatonnes as soon as possible whilst acknowledging that peaking of GHG emissions will take longer for developing countries. Contributions to greenhouse gas emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020. Significant progress has also been made on elevating adaption onto the same level as action to cut and curb emissions. The EU, on the 23/24th of October 2014, agreed the "2030 Climate and Energy Policy Framework" (EU, 2014). The European Council endorsed a binding EU target of at least a 40% domestic reduction in greenhouse gas emissions by 2030 compared to 1990. The target will be delivered collectively by the EU in the most cost-effective manner possible, with the reductions in the ETS and non-ETS sectors amounting to 43% and 30% by 2030 compared to 2005, respectively. Secondly, it was agreed that all Member States will participate in this effort, balancing considerations of fairness and solidarity. The policy also outlines, under "Renewables and Energy Efficiency", an EU binding target of at least 27% for the share of renewable energy consumed in the EU in 2030.

European Commission Directive 2001/81/EC, the National Emissions Ceiling Directive (NECD) (2014), prescribes the same emission limits as the 1999 Gothenburg Protocol. A National Programme for the progressive reduction of emissions of these four transboundary pollutants has been in place since April 2005 (DEHLG, 2007a; 2004). Data available from the EU in 2010 indicated that Ireland complied with the emissions ceilings for SO_2, VOCs and NH_3 but failed to comply with the ceiling for NOX (EEA, 2012). Directive (EU) 2016/2284 "On the Reduction of National Emissions of Certain Atmospheric Pollutants and Amending Directive 2003/35/EC and Repealing Directive 2001/81/EC" was published in December 2016.The Directive will apply the 2010 NECD limits until 2020 and establish new national emission reduction commitments which will be applicable from 2020 and 2030 for SO_2, NOX, NMVOC, NH_3, $PM_{2.5}$ and CH_4. In relation to Ireland, 2020-29 emission targets are for SO_2 (65% below 2005 levels), for NOX (49% reduction), for VOCs (25% reduction), for NH_3 (1% reduction) and for $PM_{2.5}$ (18% reduction). In relation to 2030, Ireland's emission targets are for SO_2 (85% below 2005 levels), for NOX (69% reduction), for VOCs (32% reduction), for NH_3 (5% reduction) and for $PM_{2.5}$ (41% reduction).

The following guidelines and EU Directives relating to Climate Change aspects of EIA reports have been applied to this assessment in order to determine the potential impacts that the proposed development may have on climate change.

- 2017 EPA Guidelines on information to be contained in Environmental Impact Assessment Reports
- European Union (Planning & Development) (Environmental Impact Assessment) Regulations 2018 (SI No. 296 of 2018)
- European EIA Directive 2014/52/EU
- The Irish Building Regulations Technical Guidance Document L – Conservation of Fuel and Energy – Dwellings amended in 2017 includes requirements for all residential dwellings to be "Nearly Zero Energy Buildings" (NZEB's) by 31st December 2020.
  - Irelands National Energy and Climate Plan 2021 - 2030

8.2.5 Difficulties Encountered

There were no particular difficulties encountered in compiling this Chapter of the EIAR.

8.3 RECEIVING ENVIRONMENT (BASELINE SCENARIO)

The application site is located in the north Dublin inner city. The lands are owned by DCC and were formerly in residential use - the O'Devaney Gardens Development. The application site also includes a strip of land previously part of St. Bricin's Military Hospital, acquired by DCC c. 2006.

It is a backland site that is primarily bounded by residential units. There are some commercial premises on North Circular Road. St Bricin's Military Hospital (which currently employs a number of Irish Army personnel, providing a medical facility and printing press) is located to the east. It also operates a homeless shelter.

Refer to the detailed description in Section 3 of this EIAR.

The general area surrounding the subject site is currently comprised of existing and under construction residential developments. Local residential areas will generate emissions to air associated with heating.

8.3.3 Description of Existing Climate

The nearest synoptic meteorological station to the subject site is at Dublin Airport which is located approximately 8km north of the O'Devaney Gardens site and as such, long-term measurements of wind speed/direction and air temperature for this location are representative of prevailing conditions experienced at the subject site. Recent meteorological data sets for Dublin Airport were obtained from Met Éireann for the purposes of this assessment study.

Rainfall

Precipitation data from the Dublin Airport meteorological station for the period 2011-2020 indicates a mean annual total of about 767 mm. This is within the expected range for most of the eastern half of the Ireland which has between 750 mm and 1000 mm of rainfall in the year.

Temperature

The annual mean temperature at Dublin Airport (2011-2020) is 9.5ºC with a mean maximum of 15.3ºC and a mean minimum of 4.0ºC. Given the relative close proximity of this meteorological station to the proposed development site, similar conditions would be observed. Table 8.4 details meteorological data for Dublin Airport from 2011-2020.

Table 8.4 – Meteorological Data for Dublin Airport 2011-2019

Year	Period	Rainfall (mm)	Mean Temperature (^{0}C)
2011	Annual Mean	672	9.4
2012	Annual Mean	850	9.3
2013	Annual Mean	764	9.9
2014	Annual Mean	870	10.6
2015	Annual Mean	766	9.0
2016	Annual Mean	725	10.1
2017	Annual Mean	661	9.9
2018	Annual Mean	709	9.7
2019	Annual Mean	886	9.6
2020	Annual Mean	749	9.6
Mean		767	9.5

Note : Data supplied by Met Eireann

Wind

Wind is of key importance for both the generation and dispersal of air pollutants. Meteorological data for Dublin Airport indicates that the prevailing wind direction, in the Dublin area, is from the West and Southwest and blows Northeast across the proposed development. The mean annual wind speed in the Dublin area between 2009 - 2020 is 5.7 m/s.

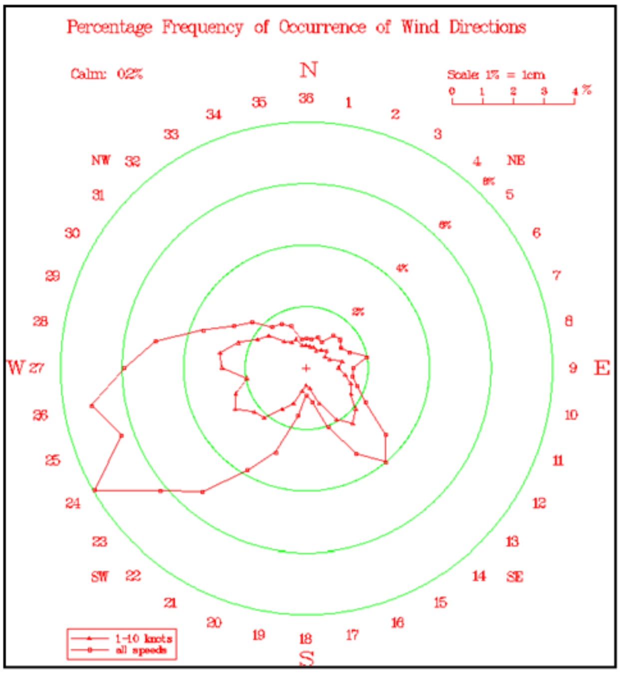


Figure 8.1 – Windrose for Dublin Airport

8.3.4 Description of existing air quality

The existing ambient air quality in the vicinity of the site has been characterised with information obtained from a number of sources as follows:

- Environmental Protection Agency's Annual Air Quality in Ireland 2019 Report;
- Site specific air quality monitoring surveys;

The ambient air quality data collected and reviewed for the purpose of this study focused on the principal substances (dust, vehicle exhaust emissions and boiler emissions) which may be released from the site during the construction and operation phases and which may exert an influence on local air quality.

The existing ambient air quality at and in the vicinity of the site is typical of an urbanised urban location and as such, domestic and commercial heating sources and road traffic are identified as the dominant contributors of hydrocarbon, combustion gases and particulate emissions to ambient air quality.

Trends in air quality

Annual air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities. The most recent annual report on air quality "Air Quality in Ireland 2019 (Published September 2020) details the range and scope of monitoring undertaken throughout Ireland. The Dublin Conurbation is categorised as Zone A.

The most recent 2019 EPA publication includes a number of Zone A monitoring locations which would be comparable to the expected air quality at the subject site at O'Devaney Gardens. The various Zone A air quality monitoring stations within Dublin provide a comprehensive range of air quality monitoring data sets which have been selected as part of this assessment to describe the existing ambient air quality at the subject site.

Nitrogen Dioxide

The Air Quality Standards Regulations 2011 specify a limit value of 40 µg/m3, for the protection of human health, over a calendar year. The standard, taken from the 2008 CAFÉ Directive 2000/69/EC, came into force in 2011.

Long term NO2 monitoring was carried out at three Zone C locations in 2019. The NO2 annual mean in 2019 for these sites ranged from 15 - 43 µg/m3 compared against the annual average limit of 40 µg/m3.

The monitoring of NO2 during 2019 at St John Road located <1km from the O'Devaney Gardens site, reported an exceedance (43ug/m3) of the EU Air Quality Annual Limit of 40ug/m3. The EPA 2019 Reports states that heavy road traffic along St John Road was the cause of the elevated concentrations of NO2.

Sulphur Dioxide

The Air Quality Standards Regulations 2011 specify a daily limit value of 125 µg/m3 for the protection of human health. The standard, taken from the 2008 CAFÉ Directive 2000/69/EC, came into force in 2011.

Long term SO2 monitoring was carried out at four Zone A locations in 2019. The daily SO2 daily means in 2019 for these sites ranged from 0.8 – 2.5 µg/m3. Therefore, long term averages were below the daily limit of 125 µg/m3.

The annual mean SO2 concentrations in Ireland have being declining since 2003. This trend is reflective in the shift in fuel choice across Ireland in both residential heating and the energy production sector.

Carbon Monoxide

The Air Quality Standards Regulations 2011 specify an 8-hour limit value (on a rolling basis) for the protection of human health of 10,000 µg/m3. The standard, taken from the 2008 CAFÉ Directive 2000/69/EC, came into force in 2011.

Long term CO monitoring was carried out at one Zone A location in 2019. The 8-hour CO concentrations was 0.2 – 0.3mg/m3 which is below the 8-hour limit value (on a rolling basis) of 10 mg/m3.

Particulate Matter PM10

The Air Quality Standards Regulations 2011 specify a PM10 limit value of 40 µg/m3 over a calendar year. The standard, taken from the 2008 CAFÉ Directive 2000/69/EC, came into force in 2011.

Long term PM10 monitoring was carried out at thirteen Zone A locations in 2019. The PM10 annual mean in 2019 for these sites ranged from 11 - 19µg/m3. Therefore, long term averages were below the annual average limit of 40 µg/m3.

Particulate Matter PM2.5

The Air Quality Standards Regulations 2011 specify a PM2.5 limit value of 25 µg/m3 over a calendar year.

Long term PM2.5 monitoring was carried out at ten Zone a locations in 2019. The PM2.5 average in 2018 for these sites ranged from 8 - 11µg/m3. Therefore, long term averages were below the target value 25 µg/m3.

Table 8.5 – Summary of the 2019 Air Quality data obtained from Zone A area

Pollutant	**Regulation**	**Limit type**	**Limit value**	**EPA monitoring data 2019**
Nitrogen dioxide	2008/50/EC	Annual limit for protection of human health	40 µg/m^3	15 – 43* µg/m^3
Sulphur dioxide	2008/50/EC	Daily limit for protection of human health (not to be exceeded more than 3 times per year)	125 µg/m^3	0.8 – 2.5 µg/m^3
Carbon monoxide	2008/50/EC	8-hour limit (on a rolling basis) for protection of human health (Zone C)	10,000 µg/m^3	300 µg/m^3

Pollutant	Regulation	Limit type	Limit value	EPA monitoring data 2019
Particulate matter (as PM_{10})	2008/50/EC	Annual limit for protection of human health	40 µg/m^3	11 – 19 µg/m^3
Particulate matter (as $PM_{2.5}$)	2008/50/EC	Annual limit for protection of human health	25 µg/m^3	8 - 11 µg/m^3
Benzene	2008/50/EC	Annual limit for protection of human health	5 µg/m^3	< 0.21µg/m^3

8.3.5 Baseline air quality monitoring

A site-specific short-term monitoring study was conducted for Nitrogen Dioxide and dust deposition measured at two site boundary locations A1 and A2 using passive diffusion tubes over a two-week period and dust deposition gauges for a 30 day period.. Figure 8.2 identifies the monitoring locations. The baseline survey was conducted during February 2020.

These locations were chosen in order to obtain representative short-term sample concentrations for the identified parameters.

The survey was indicative only and results obtained cannot be used to demonstrate compliance with short-term or annual limit values detailed in Table 8.1 above. The survey does, however, aid in identifying the influence of sources in the vicinity of the proposed development site. The results from the monitoring surveys are presented in Table 8.6.

The concentrations of NO_2 and dust deposition levels measured during the short term measurement survey were significantly below their respective annual limit values and broadly comparable with levels reported by the EPA.

Table 8.6 – Results of passive diffusion tube monitoring at O’Devaney Gardens development site

Pollutant	Sampling period	Measured Concentration A1 and A2	Assessment criteria
Nitrogen dioxide	March 2020	A1 9.59 µg/m^3 A2 12.04 µg/m^3	40 µg/m^3 (as annual average)
Dust Deposition	March 2020	A1 140 mg/m^2-day A2 45 mg/m^2-day	350 mg/m^2-day (as monthly average)

Note 1: Gradko Environmental Test Certificate 002481R
Note 2: City Analysts Test Certificate 2073064

8.3.6 Significance

Based on published 2019 EPA air quality data for the Zone A (Dublin) area in which the subject site is located together with site specific monitoring data, it may be concluded that the existing baseline air quality at the subject site may be characterised as being good with no exceedances of the National Air Quality Standards Regulations 2011 (S.I No. 180 of 2011) limit values of individual pollutants. There is therefore currently sufficient atmospheric budget to accommodate the development without adversely impacting existing ambient air quality. The quality of existing air quality at the subject site must be maintained and improved where possible as a result of the proposed development to ensure that local human health and the ecological environment is not adversely affected.

8.3.7 Sensitivity

The subject site will be developed by ground clearance and site preparation works and the subsequent construction of residential buildings, a creche and open landscaped areas. The principal local receptors that may be impacted by the development are existing residential developments to the north, south, southeast, and west of the site and St. Bricin's Hospital to the east of the site.

Figure 8.2 – Baseline Air Quality Location A1 and A2

8.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposed development is described in Section 3 of this EIAR.

When considering a development of this nature, the potential impact on air quality and climate must be considered for each distinct stage: the short term (1-7 years) impact of the construction phase and the longer term impact of the operational phase.

8.4.1 Potential Impacts of the proposed development

The construction phase of the development has the potential to generate short term fugitive dust emissions during ground preparation and enabling works and from general site construction activities.

The operational phase of the development has the potential to increase emissions to air from the use of fossil fuels for heating.

Road traffic and residential heating are the typical sources of greenhouse gas emissions associated with a residential or mixed-use development. EPA guidance states that a development may have an influence on global climate where it represents "a significant proportion of the national contribution to greenhouse gases".

Various elements of both the construction and operational phases of the proposed development have the potential to impact on the local receiving environment, on adjacent residential properties and on human health which are considered with regard to National Air Quality Standards designed to protect human health. The likely potential impacts for both construction and operation of the proposed scheme prior to mitigation are described in this section of the EIAR. The mitigation measures are described in Section 8.8 and the predicted impacts in Section 8.9.

8.4.2 Potential Construction Phase Impacts

Air quality

The development of the site will be conducted in the following phased stages:

- Enabling works - Site set up and Site clearance
- Construction works including site infrastructure, houses, apartments commercial buildings and landscaping

Construction impacts associated with both of these phased stages are considered below.

Enabling works - Site Set Up and Clearance

Works activities associated with the 'Site set up' will be undertaken prior to construction works commencing in each sub-phase. The setting up of the site will involve the construction of site security hoarding and site compounds, site offices, materials and waste storage areas and staff welfare facilities. These temporary activities will have a minimal potential to generate fugitive dust emissions or combustion gas emissions.

Site clearance and ground excavation works will be undertaken in separate phases and these activities have the potential to generate fugitive windblown dust emissions rising from the operation of mechanical plant such as dozers, excavators and tipper trucks and the movement of these vehicles on exposed surfaces at the site. Infrastructural works will be required to facilitate site services.

With regard to the volume of waste material (top and sub soils) generated during site clearance, there will be a requirement for HGV trucks to remove the material from the site. Stripped top-soils will be stockpiled and covered on site for re-use during final landscaping works. Trucks will be loaded with material on-site by mechanical excavators and loading shovels which will generate fugitive dust emissions as a result of the transfer of the excavated materials comprised principally of soils and stones from stockpile to truck.

The movements of construction vehicles on the site will also generate windblown dust emissions. Where dusty waste material is loaded onto exposed open trucks, fine dusts may be released as the truck travels along public roads.

It is estimated that there will be a maximum of 22 (No.) x 20 tonne tipper truck movements per hour over a 10-hour day or an average of 220 movements per day associated with site clearance works. Site clearance works should occur for an approximate 2 - 3 month period.

Building and Site Infrastructure Construction Works

During the construction phase there will be extensive site works, involving construction machinery, construction activities on site which have the potential to generate fugitive windblown dust emissions.

Construction equipment including generators and compressors will also give rise to some exhaust emissions.

Construction traffic to and from the site will result in a short-term increase in the volume of diesel fuelled HGV's along the local road network which will generate additional hydrocarbon and particulate emissions from the vehicle exhausts.

Climate

During the construction phase, existing vegetated areas throughout the development site will be removed due to site clearance works and associated movement of construction traffic thus impacting the micro-climate.

CO_2 will be released into the atmosphere as a result of the movement of construction vehicles and use of construction plant including generators and cranes.

Covid-19

Depending on the future status of the Covid-19 pandemic, the construction phase could be subject to Construction Industry Federation Standard Operating Procedures and Government guidance on safe working practices in relation to Covid-19.

8.4.3 Potential Operational Phase Impacts

Air quality

The operational phase of the proposed development will result in a slight impact on local air quality primarily as a result of the requirements of new buildings to be heated and with the increased traffic movements associated with the development.

Traffic movements associated with the development have been evaluated and assessed as part of the ***Traffic and Transport Assessment*** [CS Consulting] for the development up to 2038 (Design Year) which includes parking for vehicles which will enter and exit the site via the NCR / ODG junction, the Montpellier Gardens/ODG junction, The ODG/Thor Place junction, the Infirmary Rd/Montpellier Gardens junction and the Aughrim St/Cowper St junction. The split in am and pm peak traffic movements may increase the impact on local air quality at the junctions times.

The design and construction of all buildings in accordance with National Building Regulations (The Irish Building Regulations Technical Guidance Document L – Conservation of Fuel and Energy – Dwellings) will ensure that modern building materials are used and that they are designed to be thermally efficient resulting in a reduction in the volume of fossil fuels required to heat the buildings. It is predicted that fossil fuel combustion gas emissions including Carbon Dioxide, Sulphur Dioxide, Nitrogen Oxides, Carbon Monoxide and hydrocarbon particulate emissions will be slight and will not have an adverse significant impact on the existing ambient air quality in the vicinity of the proposed development site.

Climate

The overall site area of the development lands is c. 5.2 hectares will include open space, playground and landscaped areas. The overall development includes the construction of buildings and roadways which may have the effect of marginally raising localised air temperatures, especially in summer.

The proposed development includes apartment structures which may have a minor impact on the local micro-climate by means of wind sheer effects however a Microclimatic Wind Analysis and Pedestrian Comfort Report completed as part of this application by IN2 concludes that the development will not introduce any adverse wind effects to the receiving environment.

Motor vehicles are a major source of atmospheric emissions which contribute to climate change and vehicle exhaust emissions may have a potential minor impact on the macro-climate.

Embodied carbon is the resultant CO2 emissions from all activities involved in the creation of a building. The *Royal Institution of Chartered Surveyors Methodology to calculate embodied carbon of materials* suggests that medium rise apartment building would have a value of 860Kg CO2 per unit. In this case, it is estimated that an embodied carbon value of 900 tonnes of CO2 applies to the ODG development.

8.5 MITIGATION MEASURES

This section provides the avoidance, remedial and mitigation measures that shall be implemented during the construction and operational phases of the development and into the design of the development to minimise the impacts on ambient air quality in the receiving environment, on local population and human health, on local flora and fauna and on climate.

8.5.1 Construction Phase

The following air quality and climate mitigation measures shall be implemented at the site from the outset of site activities to control and manage the impact of works on air quality and climate levels in accordance with Best Practice during the construction phase of the proposed development:

AC-C1 **Construction Management**

- During dry periods, dust emissions from heavily trafficked locations will be controlled by spraying surfaces with water
- Hard surface roads will be mechanically swept to remove mud and dust as required.
- Re-suspension in the air of spillages material from trucks entering or leaving the site will be prevented by limiting the speed of vehicles within the site to 20kmh and by use of a mechanical road sweeper.
- The overloading of tipper trucks exiting the site will not be permitted.
- Where the likelihood of windblown fugitive dust emissions is high and during dry weather conditions, dusty site surfaces will be sprayed by a mobile tanker bowser.

- Wetting agents will be utilised to provide a more effective surface wetting procedure.
- Exhaust emissions from vehicles operating within the construction site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor by ensuring that emissions from vehicles are minimised by routine servicing of vehicles and plant
- Soil stockpiles will be wetted down in dry and windy conditions.
- Material stockpiles containing fine or dusty elements including top soils will be covered with tarpaulins.
- Where drilling or pavement cutting, grinding or similar types of stone finishing operations are taking place, measures to control dust emissions will be used to prevent unnecessary dust emissions by the erection of wind breaks or barriers. All concrete cutting equipment will be fitted with a water dampening system.

8.5.2 Operational Phase

The operational phase will not generate air emissions that would have an adverse impact on local ambient air quality or local human health.

The operational phase includes mitigation by design of the development to minimise the impact of the operational phase of the development on air quality and climate are as follows:

AC-O1 **Climate Impact Mitigation Measures by Design**

- Energy Efficiency – All residential units shall be designed and constructed in accordance with The Irish Building Regulations Technical Guidance Document L – Conservation of Fuel and Energy – Dwellings amended in 2017 includes requirements for all residential dwellings to be "Nearly Zero Energy Buildings" (NZEB's) by 31st December 2020.
- Energy Consumption - The following mitigation by design features have been integrated into the design and construction of the residential units to reduce energy consumption:
  - Photovoltaic Cells will be installed on all roofs
  - The use of green building materials: low embodied energy and recycled materials will be utilised where possible
  - Energy efficient window units and frames with certified thermal performance shall be used
  - Building envelope air tightness will reduce the loss of warm air to the external environment
  - Installation of Exhaust Air Heat Pump systems in all units which operate by extracting warm air from kitchens and bathrooms, cleaning it and distributing it to other rooms in the unit.
  - Thermal insulation of walls and roof voids of all units

AC-O2 **Air Quality Mitigation Measures**

- Natural Gas heating in all units
- Inclusion of electric car charging points to encourage electric vehicle ownership
- Proximity of Public Transport including LUAS, Dublin Bus and Iarnrod

Eireann services will reduce private vehicle use
- Provision of open landscaped areas, to encourage residents to avail of active lifestyle options and which will contribute albeit in a minor way to the adsorption of Carbon Dioxide from the atmosphere and the release of Oxygen into the atmosphere.

8.6 RESIDUAL IMPACTS

8.6.1 Construction Phase - Air Quality and Climate

Various elements associated with the construction phase of the proposed development have the potential to impact local ambient air quality, human health and climate. However, the potential construction phase impacts shall be mitigated as detailed above to ensure there is no adverse impact on ambient air quality for the duration of all construction phase works. It is predicted that the operational phase of the development will not generate air emissions that would have an adverse impact on local ambient air quality or on local human health or on the local micro-climate or the wider macro-climate.

With dust mitigation measures implemented the impact on local air quality during the construction phase will be short-term, localised and slight.

Impacts to Climate during the construction phase will be not significant and short-term.

8.6.2 Operational Phase - Air Quality

The sustainable features that are incorporated into the design of all residential units will ensure that the operational phase of the development will not have an adverse impact on human health, local air quality or on local or global climate patterns. The residential units will be designed to ensure that they can withstand the potential changes in climate which may generate more extreme and prolonged meteorological events in the future.

Greenhouse gases occur naturally in the atmosphere (e.g. carbon dioxide, water vapour, methane, nitrous oxide and ozone) and in the correct balance, are responsible for keeping the lower part of the atmosphere warmer than it would otherwise be. These gases permit incoming solar radiation to pass through the Earth's atmosphere, but prevent most of the outgoing infrared radiation from escaping from the surface and lower atmosphere into the upper levels. However, human activities are now contributing to an upward trend in the levels of these gases, along with other pollutants with the net result of an increase in temperature near the surface.

Motor vehicles are a major source of atmospheric emissions which contribute to climate change, however, vehicle exhaust emissions generated from vehicles associated with the development will have a negligible impact on the macro-climate given modern technological developments in cleaner and more efficient vehicle engines. Current trends suggest that vehicle manufacturers are ceasing the manufacture of large diesel engines for private cars and instead adopting hybrid engine and all electric technologies which will contribute to the reduction of engine exhaust emissions including particulate matter, Nitrogen Oxides, Sulphur Dioxide, Carbon Dioxide and Carbon Monoxide.

To further reduce the climatic impact of the operational phase of the development, electric vehicle charging points shall be installed in dedicated parking spaces to facilitate residents who own electric vehicles and to encourage other residents to purchase electric vehicles.

The impact on local air quality during the operational phase will be not significant and long-term.

8.6.3 Operational Phase - Climate

A Microclimatic Wind Analysis and Pedestrian Comfort Report completed as part of this application by IN2 concludes that the development will not introduce any adverse wind effects to the receiving environment.

The scheme has been designed to provide thermally efficient buildings which will reduce the consumption of fossil fuels within each individual dwelling. This will reduce the impact the operational phase of the development will have on the micro and macro climate. In particular, there will be no "traditional" passive air vents in the apartments which are both thermally and acoustically inefficient. Exhaust Air Heat Pump systems will be incorporated into the design of all units. These efficient energy reducing systems together with thermally rated window sets will reduce the potential future impacts that the external climate will have in terms of wind and changing temperatures on the internal environment within the residential units. These design features will ensure the units are thermally efficient thus reducing the use of fossil fuels leading to a reduction of the impact on the micro and macro climate.

The thermal efficiency of the buildings will ensure that the development will be sustainable and will be protected against the impacts of future climate change which may include storm events and prolonged colder periods during the winter season. These factors will contribute to reducing the impact the operational development has on the local and global climate which will ultimately contribute in a positive manner in reducing the impact on local and further afield human health.

Impacts to Climate during the operational phase will be imperceptible and long-term.

8.7 CUMULATIVE IMPACTS

This section has considered the cumulative impact of the proposed development in conjunction with future and current developments in the vicinity of the subject site.

The cumulative air quality impact of the proposed development, on other developments and existing local transport infrastructure is assessed with regard to having established the baseline air quality and then predicting the impact that the proposed development will have on the baseline air quality. Together the combined impact can be assessed to determine if there is sufficient "atmospheric budget" to facilitate the proposed development.

It is considered that, in the absence of mitigation measures, there will be the potential for a short term slight negative cumulative impact associated with the construction phase of the subject development and other local developments on ambient air quality and climate.

Should the construction phase of the proposed former O'Devaney Gardens development coincide with the construction of any other permitted developments within 500m of the site in the future then there is the potential for cumulative dust emissions to impact the nearby sensitive receptors. The dust mitigation measures outlined above should be applied throughout the construction phase of the proposed development, with similar best practice mitigation measures applied for other permitted developments which will avoid significant cumulative impacts on air quality. With appropriate mitigation measures in place, the predicted cumulative impacts on air quality and climate associated with the construction phase of the proposed development are deemed short-term and not significant.

Other permitted and proposed developments are identified in Section 3.6 and include the DCC Phase 1A development (Ref: PL29N.JA0024) and the Former Department of Defence site, Infirmary Road (DCC Part 8 development Reg Ref 3210/19)

If additional residential or commercial developments are proposed in the vicinity of the proposed former O'Devaney Gardens development site in the future, this has the potential to add further additional vehicles to the local road network. However, as the traffic impact for the proposed development is predicted to have a slight impact on local air quality, it is unlikely that other future developments of similar scale would give rise to a dissimilar impact on climate or air quality during the construction and operational stages of those projects. Future projects of a large scale would need to conduct an EIAR to ensure that no significant impacts on air quality will occur as a result of those developments.

It is predicted that the cumulative impact of the construction phase of the proposed development and other local development sites will be short-term and slight.

It is predicted that the cumulative impact of the operational phase of the proposed development and other local development sites will be long-term and insignificant.

8.7.1 Do Nothing Impact

The subject site is currently comprised of brown field lands which have been previously cleared of the former O'Devaney Gardens residential blocks. If they remain undeveloped the site will continue to have no adverse impact on existing ambient air quality or on the local micro-climate.

Based on the projected increase in traffic up to the design year of 2038, the increase in traffic related emissions, based on projected ***Traffic and Transport Assessment*** [CS Consulting] figures without the subject development would be insignificant. This increase above the existing situation would be minor and would not result in a perceptible change in the existing local air quality environment.

8.7.2 Risk To Human Health

Construction Phase

Best practice mitigation measures are proposed for the construction phase of the proposed development which will focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction of the proposed development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the impact of construction of the proposed development is likely to be not significant and short-term with respect to human health.

Operational Phase

Operational traffic emissions as a result of the proposed development are compliant with all National and EU ambient air quality limit values which are set for the protection of human health and therefore, will not result in an adverse or harmful impact on human health.

8.8 MONITORING

8.8.1 Construction Phase

This section describes the dust monitoring methodologies that will be implemented at the site during the construction phases to ensure that dust, particulate matter (PM_{10} and $PM_{2.5}$) and construction vehicle exhaust emissions as NO_2 generated by site activities does not cause nuisance or cause adverse health effects to residential areas and other receptors located in the vicinity of the site boundaries.

AC-C2 **Dust Deposition Monitoring Methodology**

Dust deposition levels will be monitored to assess the impact that site construction site activities may have on the local ambient air quality and to demonstrate that the environmental control measures in place at the site are effective in minimising the impact of construction site activities on the local receiving environment including existing residential developments and lands bordering the site. The following procedure shall be implemented at the site on commencement of site activities:

The dust deposition rate will be measured by positioning Bergerhoff Dust Deposit Gauges at strategic locations near the boundaries of the site for a period of 30 +-2 days. Monitoring shall be conducted on a monthly basis during the construction phase. The proposed monitoring locations (D1 – D5) are presented below in Figure 7.3.

The selection of sampling point locations will be completed after consideration of the requirements of Method VDI 2119 with respect to the location of the samplers relative to obstructions, height above ground and sample collection and analysis procedures. The optimum locations will be determined by a suitably qualified air quality expert to ensure that the dust gauge locations are positioned in order to best determine potential dust deposition in the vicinity of the site boundaries and existing on-site buildings.

After each (30 +-2 days) exposure period, the gauges will be removed from the sampling location, sealed and the dust deposits in each gauge will be determined gravimetrically by an accredited laboratory and expressed as a dust deposition rate in mg/m2-day in accordance with the relevant standards.

Technical monitoring reports detailing all measurement results, methodologies and assessment of results shall be subsequently prepared and maintained by the Site Manager. Monitoring reports shall be made available to the Local Authority as requested.

A dust deposition limit value of 350 mg/m2-day (measured as per German Standard Method VDI 2119 – Measurement of Particulate Precipitations – Determination of Dust Precipitation with Collecting Pots Made of Glass (Bergerhoff Method) or Plastic. is commonly specified by Local Authorities and by the EPA to ensure that no nuisance effects will result from specified activities and it is to this Best Practice standard method that this programme of dust monitoring and control has been prepared.

The German Federal Government Technical Instructions on Air Quality Control - TA Luft specifies an emission value for the protection against significant nuisances or significant disadvantages due to dustfall. This limit value is 350 mg/m2-day and it is to this limit value that all measured dust deposition levels shall be assessed. This limit value is commonly specified by Local Authorities at construction sites.

AC-C3 **NO_2 Monitoring Methodology**

In order to assess the impact on existing air quality that vehicle and plant exhaust emissions associated with the construction phase of the development may have, it is proposed that a programme of Nitrogen Dioxide monitoring shall be undertaken for a 2 year period at the baseline air quality locations, A1 and A2. The purpose of this monitoring programme will be to verify the effectiveness of the various construction phase mitigation measures and to quantify by measurement, the concentration of NO2 in the ambient air to allow for the assessment of measured NO2 levels against levels measured in EPA Zone A areas over a similar period. NO2 levels shall also be assessed against the annual limit value NO2 as defined in National Air Quality Standards Regulations 2011 (S.I No. 180 of 2011) which specify an annual limit value of 40 μg/m3, for the protection of human health, over a calendar year.

AC-C4 **PM_{10} and $PM_{2.5}$ Monitoring Methodology**

Fine particulate matter as PM_{10} and $PM_{2.5}$ shall be monitored using continuous data logging air quality monitoring instruments during the stripping and excavation of soils at the site. The monitoring systems shall be located along the western and eastern site boundaries adjacent to sensitive receptors.

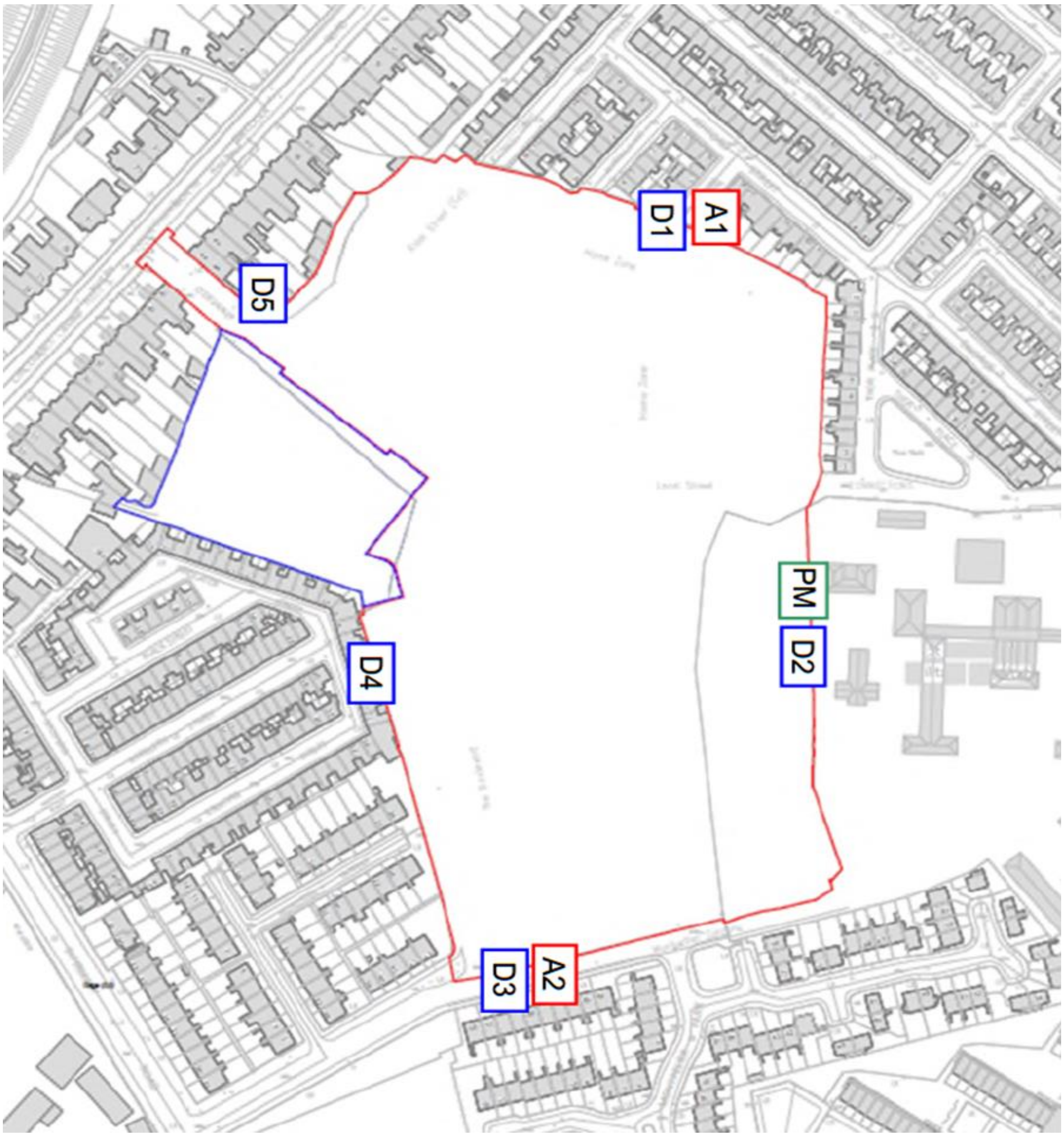


Figure 8.3 – Dust Monitoring (D1 – D5), NO2 Monitoring (A1 - a2) and PM_{10} and $PM_{2.5}$ Monitoring Locations

8.8.2 Operational Phase

Air quality monitoring is not proposed for the operational phase of the proposed development.

8.9 INTERACTIONS

The interaction between human beings and ambient air quality will vary between the construction and operational phases of the development. The construction phase may cause nuisance to the existing local population including the soiling of properties with dust, however, provided that the construction phase air quality control and mitigation measures are implemented ,it is predicted that the impact on humans and air quality will be short-term and minor.

The interaction between human beings and air quality during the operational phase of the development will be minimal with a relatively low quantum of combustion engine vehicles at the proposed development, once fully occupied. Although there will be an increase in traffic movement on the existing road network as a result of the operational phase, the predicted impact will be long-term and imperceptible.

The Appropriate Assessment Screening Report prepared as part of this EIAR concludes that the proposed development will not have any significant impacts on European Sites, therefore the interaction between air quality and the receiving natura environment is predicted to be long-term and imperceptible.

REFERENCES

- Air Quality Regulations 2011, SI 180 of 2011
- European Union (Planning & Development)(Environmental Impact Assessment) Regulations 2018 (SI No. 296 of 2018).
- Environmental Impact Assessment of Projects – Guidance on the preparation of the EIAR, European Commission, 2017.
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DoHPLG, August 2018).
- Environmental Protection Agency, 2017 Draft Guidelines on information to be contained in Environmental Impact Assessment Reports.
- Environmental Protection Agency, 2002, 2015. Guidelines on the Information to be Contained in Environmental Impact Statements
- Environmental Protection Agency, 2020. Air Quality in Ireland 2019 – Key Indicators of Ambient Air Quality
- The Institute of Air Quality Management – Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2014)
- European Union Directive (2008/50/EC).
- German Federal Government Technical Instructions on Air Quality Control - TA Luft 2002
- German Standard Method for determination of dust deposition rate, VDI 2129.
- Greater London Authority – The Control of dust emissions from construction and demolition – Best Practice Guidelines, Nov 2006.
- Transport Infrastructure Ireland (TII) 2011 Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes Revision 1.
- The Irish Building Regulations Technical Guidance Document L – Conservation of Fuel & Energy – Dwellings
- EPA 2019 Air Quality in Ireland

9 NOISE AND VIBRATION

9.1 INTRODUCTION

This section of the EIAR has been prepared by Byrne Environmental Consulting Ltd to identify and assess the potential noise and vibrational impacts associated with the proposed former O'Devaney Gardens site at Stoneybatter, Dublin 7 during both the Construction and Operational Phases of the development.

This document includes a comprehensive description of the receiving ambient noise climate in the vicinity of the subject site; a description of how the construction and operational phases may impact the existing ambient noise climate, the mitigation measures that shall be implemented to control and minimise the impact that the development may have on ambient noise levels and the proposed acoustic design features required to minimise the impact of external noise sources on the residential units.

The mitigation measures designed for the development demonstrate how the development will be constructed and operated in an environmentally sustainable manner in order to ensure its minimal impact on the receiving noise climate and to provide adequate sound insulation in residential units from external sound sources and adjoining residential properties.

9.2 STUDY METHODOLOGY

In addition to the sources listed in Chapter 1, the general assessment methodology of the potential noise and vibrational impacts that the proposed development will have on the receiving environment has been prepared in accordance with and with reference to:

- Planning and Development Regulations 2001, as amended by European Union (Planning & Development)(Environmental Impact Assessment) Regulations 2018.
- IOA/ANC ProPG: Planning and Noise-New Residential Development, May 2017
- Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes (Transport Infrastructure Ireland (TII) guidance, March 2014).
- UK Department of Transport (Welsh Office) - Calculation of Road Traffic Noise [CRTN] and the Highways Agency Design Manual for Roads and Brides Part 7 HD 213/11 – Revision 1 Noise and Vibration.
- World Health Organisation (WHO) in their 2018 publication entitled 'Environmental Noise Guidelines for the European Region'

9.2.1 Noise Assessment Methodology

Baseline Environment

The existing ambient noise climate in the vicinity of the site has been characterised with information obtained from site specific baseline noise surveys conducted in the vicinity of the closest noise sensitive receptors to the subject site. Baseline noise surveys were conducted in accordance with ISO 1996-1: 2017: Acoustics – Description, measurement and assessment of environmental noise and with regard to the EPA's 2016 Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4).

The EPA' Round 3 2017 Strategic Noise Mapping of Aircraft, Road and Rail was reviewed to establish the specific impact that transportation related noise sources has on the O'Devaney Gardens site.

9.2.2 Impact Assessment Methodology

The impact of the proposed development has been determined through prediction of future noise levels associated with the scheme using established calculation techniques.

Construction noise and vibration impacts have been assessed in accordance with Transport Infrastructure Irelands (TII) guidance document Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes (March 2014). Indicative construction noise calculations have been undertaken using the methodology set out in BS 5228 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise 2009+A1 2014.

Impacts associated with road traffic movements on the development when operational have been assessed with regard to TII's Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes (March 2014). UK Department of Transport (Welsh Office) - Calculation of Road Traffic Noise [CRTN] and the Highways Agency Design Manual for Roads and Brides Part 7 HD 213/11 – Revision 1 Noise and Vibration.

The operational phase of the development has been assessed with regard the Department of the Environment, Building Regulations 2014, Technical Guidance Document E – Sound. Acoustic design of apartments refers to the Ministerial Guidelines "Sustainable Urban Housing – Design Standards for New Apartments (Revised 2020)". Paragraph 1.18 of the document refers specifically to the Building Regulations Technical Guidance Documents and states that the construction of the apartment building shall comply with all relevant requirements.

9.2.3 Construction Impact Assessment Criteria

The construction noise limits which are presented in Table 12.1 are specified in British Standard BS 5228 – 1:2009+A1 2014 Code of practice for noise and vibration control on open sites: Part 1 Noise and are based on the noise measured at the external façade of a receptor.
BS5228 states that noise sensitive receptors (houses) are designated a category based on existing ambient noise levels. Each category is then assigned with a noise limit value.

Category A Threshold values when ambient noise levels are less than these values.
Category B Threshold values when ambient noise levels are the same as the Category A values.
Category C Threshold values when ambient noise levels are higher than the Category A values.

Table 9.1 - Threshold of Potential Significant Effect at Dwelling

Category and Threshold Value Period LAeq dB(A)	Category A	Category B	Category C
Night 23:00 – 07:00	45	50	55
Evening 19:00 - 23:00 & Weekends	55	60	65
Day 07:00 – 19:00 & Sat 07:00 – 13:00	65	70	75

9.2.4 Operational Impact Assessment Criteria

Relative impact assessment criteria associated with road traffic noise is set out in Table 9.2 below.

Table 9.2 – Likely impact associated with change in traffic noise level

Change in sound level (L_{10})	Subjective reaction	Impact
<3	Inaudible	Imperceptible
3-5	Perceptible	Slight
6-10	Up to a doubling of loudness	Moderate
11-15	Over a doubling of loudness	Significant
>15		Profound

A change in traffic noise of less than 2dBA is generally not noticeable to the human ear whilst a change of 3dBA is generally considered to be just perceptible. Changes in noise levels of 3 to 5 dBA would however be noticeable and, depending on the final noise level, there may be a slight or moderate noise impact. Changes in noise level in excess of 6dBA would be clearly noticeable, and depending on the final noise level, the impact may be moderate or significant. However, a significant change in traffic volumes or traffic category i.e. increase in the use of a road by HGVs, would be required to result in such increases.

The UK Design Manual for Roads and Bridges (DMRB, Volume 11, Section 3, Part 7) states that a change in noise level of 1dB LA10,18h is equivalent to a 25% increase or a 20% decrease in traffic flow, assuming other factors remain unchanged and a change in noise level of 3dB LA10,18h is equivalent to a 100% increase or a 50% decrease in traffic flow.

Traffic noise levels in excess of 60dBA (LDEN) are considered to be potentially intrusive. LDEN is the day-evening-night composite noise indicator for assessing overall noise annoyance. For new roads projects the National Roads Authority design goal is to mitigate when predicted levels exceed 60dB Lden. However, for existing roads the Dublin Agglomeration, within the Noise Action Plan, have set a level of 70dB (LDay) and 55dB (LNight) above which mitigation measures should be considered.

The World Health Organisation (WHO) in their 2018 publication entitled 'Environmental Noise Guidelines for the European Region' has proposed new guidelines for community noise. In this guidance, a LDEN threshold daytime noise limit of 53dB is suggested to protect against adverse health effects. LNIGHT Levels of 45dB or less are proposed at night-time to protect against adverse effects on sleep.

The operational phase of the development shall be assessed with regard to the 2018 WHO guidelines and appropriate acoustic design of residential units to ensure that they comply with the Department of the Environment, Building Regulations 2014, Technical Guidance Document E – Sound.

Professional Practice Guidance on Planning and Noise: New Residential Developments (ProPG) is considered in the assessment of the operational phase of the residential development in terms of ensuring that each residential unit in the O'Devaney Gardens development will not be adversely impacted by external related noise sources

9.2.5 Vibration Assessment Methodology

Vibration standards come in two varieties: those dealing with human comfort and those dealing with cosmetic or structural damage to buildings. In both instances, it is appropriate to consider the magnitude of vibration in terms of Peak Particle Velocity (PPV).

Construction impacts have been assessed in accordance with BS 7385-2:1993 – Evaluation and Measurement for Vibration in Buildings: Part 2 – Guide to Damage Levels from Groundborne Vibration and BS 5228 Code of Practice for noise and vibration control of construction and open sites - Part 2: Vibration 2009+A1 2014.

Operational impacts have been assessed in accordance with the Transport Infrastructure Ireland, TII Guidelines for the Treatment of Noise and Vibration in National Road Schemes, 2014.

9.2.6 Construction Impact Assessment Methodology

Table 9.3 details the limits above which cosmetic damage could occur for transient vibration. Minor damage is possible at vibration magnitudes which are greater than twice those shown in Table 9.3, and major damage to a building structure would only generally occur at values greater than four times the tabulated values. These values only relate to transient vibration. If there is a continuous vibration, the guide values shown in Table 9.3 shall be reduced by up to 50%.

This guidance is reproduced from BS 5228-2:2009+A1 2014 – Code of Practice for Noise and Vibration Control on Construction and Open Sites: Part 2 – Vibration and BS 7385-2:1993 – Evaluation and Measurement for Vibration in Buildings: Part 2 – Guide to Damage Levels from Groundborne Vibration.

Table 9.3 – Transient vibration guide values for cosmetic damage

Type of building	PPV (mm/s) in frequency range of predominant pulse	
	4-15Hz	15Hz and above
Reinforced or framed structures. Industrial and heavy commercial buildings.	50mm/s at 4Hz and above.	50mm/s at 4Hz and above.
Unreinforced or light framed structures. Residential or light commercial buildings.	15mm/s at 4Hz increasing to 20mm/s at 15Hz.	20mm/s at 15Hz increasing to 50mm/s at 40Hz and above.

Table 9.4, reproduced from BS 5228 Code of Practice for noise and vibration control of construction and open sites - Part 2: Vibration 2009+A1 2014 outlines the vibration levels (in terms of PPV) from construction activities and their likely effect on humans.

Table 9.4 – Guidance on the effect of construction vibration levels on humans

Vibration Level (PPV)	Effect
0.14mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.30mm/s	Vibration might be just perceptible in residential environments.

1.0mm/s	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.
10mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level.

9.2.7 Operational Impact Assessment Methodology

It is acknowledged that humans are particularly sensitive to vibration stimuli and that any perception of vibration may lead to concern. In the case of road traffic, vibration is perceptible at around 0.5mm/s and may become disturbing or annoying at higher magnitudes.

Ground vibrations produced by road traffic are unlikely to cause perceptible structural vibration in properties located near to well-maintained and smooth road surfaces. Vibration impacts associated with road traffic can therefore be largely avoided by good maintenance of the road surface.

9.2.8 Difficulties Encountered

There were no particular difficulties encountered in compiling this Chapter of the EIAR.

9.3 EXISTING RECEIVING ENVIRONMENT (BASELINE SCENARIO)

The site is located in the north Dublin inner city. It is a backland site that is primarily bounded by residential units. There are some commercial premises on North Circular Road. St Bricin's Military Hospital (which currently employs a number of Irish Army personnel, provides GP and outpatient services to Defence Forces and operates a homeless shelter) is located to the east.

Refer to the detailed description in Section 3.2 of this EIAR.

The site is a relatively quiet location that is not impacted by transport, commercial or industrial related noise sources.

9.3.1 Baseline environmental noise survey

Baseline noise data in the vicinity of the closest residential receptors to the proposed development site boundaries has been obtained from noise monitoring surveys conducted by Byrne Environmental Consulting Ltd during February 2020 during periods when normal ambient noise sources were prevalent.

9.3.2 Noise Measurement locations

Baseline noise measurement surveys were conducted at site boundaries, N1 and N5 as described in Table 9.5 and as shown in Figure 9.1 between 25th – 29th February 2020 during suitably dry and calm (<5mm/sec) wind conditions.

Baseline surveys were conducted under free-field conditions at a height of approximately 1.5m above ground and approximately 3.5m away from reflecting surfaces for a period of 5-hours during the daytime period and for 1-hour periods during the nightime period at each on-site location in order to obtain detailed noise data and assess the existing noise climate at the locations accurately.

Table 9.5 – Baseline noise measurement locations

Location	Description
N1	Site boundary at residential houses off North Circular Road
N2	Site boundary at residential houses on Ashford Street
N3	Site boundary at St. Bricin's Hospital
N4	Site boundary at residential houses on Montpellier Gardens
N5	Site boundary at residential houses at Kinahan Street

Figure 9.1 – Baseline Noise Monitoring Locations N1 – N5

It is noted that vibration surveys were also conducted during the baseline noise survey locations N1 - N5. It was established that there are no existing inherent sources of vibration at the development site.

The noise parameters used to describe the existing ambient noise climate are described as follows:

LAeq: The equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period.

LA10: The sound level that is exceeded for 10% of the sample period. It is typically used as a descriptor for traffic noise.

LA90: The sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

LAmax: The instantaneous maximum sound level measured during the sample period.

1/3 Octave band analysis The frequency analysis of a sound such that the frequency spectrum is subdivided into bands of one-third of an octave each. Used to determine tonal components of a sound source.

Noise levels are measured using a logarithmic noise scale (decibel) and are denoted dBA. The "A" indicates that a frequency weighting has been applied to allow for the variation in the sensitivity of the human ear.

9.3.3 Baseline noise measurement results

Table 9.6 – Location N1 Residential Houses off North Circular Road

Period 25th Feb 2020 N1	Measured sound pressure levels dBA (re 20µPa)			
	$L_{Aeq,}$	L_{A10}	L_{A90}	L_{AMax}
Daytime period 11:00 – 16:00hrs	56	60	52	71
Nightime period 23:15 – 00:15hrs	50	54	45	65

The noise climate at N1 is moderately influenced by traffic on the North Circular Road. No tonal or impulsive noise sources were observed.

Recorded vibration were negligible <0.125mm/sec PPV during the survey period at Location N1.

Table 9.7 – Location N2 Residential Houses on Ashford Street

Period 26th Feb 2020 N2	Measured sound pressure levels dBA (re 20µPa)			
	$L_{Aeq,}$	L_{A10}	L_{A90}	L_{AMax}
Daytime period 10:30 – 16:30hrs	55	58	53	72
Nightime period 23:30 – 00:30hrs	49	52	43	61

The noise climate at N2 is influenced by local traffic movements and pedestrians. No tonal or impulsive noise sources were observed.

Recorded vibration were negligible <0.125mm/sec PPV during the survey period at Location N2.

Table 9.1 – Location N3 Adjacent St Bricin's Military Hospital

Period 27th Feb 2020 N3	Measured sound pressure levels dBA (re 20µPa)			
	$L_{Aeq,}$	L_{A10}	L_{A90}	L_{AMax}
Daytime period 13:25 – 18:25hrs	53	56	49	65

Nightime period 01:30 – 02:30hrs	43	49	40	58

The noise climate at N3 is influenced by local traffic movements and pedestrians. No tonal or impulsive noise sources were observed.

Recorded vibration were negligible <0.125mm/sec PPV during the survey period at Location N3.

Table 9.9 – Location N4 Residential Houses on Montpellier Gardens

Period 28th Feb 2020 N4	**Measured sound pressure levels dBA (re 20µPa)**			
	$L_{Aeq,}$	L_{A10}	L_{A90}	L_{AMax}
Daytime period 11:45 – 16:45hrs	57	60	53	71
Nightime period 00:30 – 01:30hrs	44	48	40	66

The noise climate at N4 is influenced by local traffic movements and pedestrians. No tonal or impulsive noise sources were observed.

Recorded vibration were negligible <0.125mm/sec PPV during the survey period at Location N4

Table 9.10 – Location N5 Residential Houses on Kinahan Street

Period 29th Feb 2020 N5	**Measured sound pressure levels dBA (re 20µPa)**			
	$L_{Aeq,}$	L_{A10}	L_{A90}	L_{AMax}
Daytime period 15:00 – 20:00hrs	58	61	49	66
Nightime period 00:45 – 01:45hrs	48	56	43	59

The noise climate at N5 is influenced by local traffic movements and pedestrians. No tonal or impulsive noise sources were observed.

Recorded vibration were negligible <0.125mm/sec PPV during the survey period at Location N5

Dublin Agglomeration Environmental Noise Plan 2018 - 2023 and EPA Round 3 Road Noise Mapping Assessment

In order to further establish existing background noise levels associated with the identified dominant noise source identified as being road traffic, the EPA's noise mapping data was reviewed to assess L_{den} and L_{night} road traffic noise indicators.

The EPA's Round 3 Transport Noise Maps has been reviewed as part of this assessment.

Figures 9.2 and 9.3 present the daytime L_{den} and nighttime L_{night} Noise Maps for road traffic relative to the location of the subject O'Devaney Gardens development site.

The L_{den} parameter is a descriptor of noise level based on energy equivalent noise level (L_{eq}) over a whole day with a penalty of 10dB(A) for nightime noise (23:00 – 07:00hrs) and an additional penalty of 5dB(A) for evening noise (19:00 – 23:00hrs).

The L_{night} parameter is a descriptor of noise level based on energy equivalent noise level (L_{eq}) over an 8-hour night period between (23:00 – 07:00hrs).

Desirable and undesirable sound levels are defined as follows:

Desirable Levels 24-hour Day-Evening-Night Noise Value <70dB(A) L_{den}

Desirable Nighttime Noise Value <55 dB(A) L_{night}

Table 9.10 Strategic Noise Mapping Results for O'Devaney Gardens site boundaries

Source	EPA Round 3 L_{den} dB(A)	Limit Criteria L_{den} dB(A)	EPA Round 3 L_{Night} dB(A)	Limit Criteria L_{Night} dB(A)
Road Traffic	55 - 59	<70	<50	<55

The Road Noise Mapping assessment concludes that the O'Devaney Gardens development site is not adversely impacted by road traffic noise during the daytime or nightime periods and verifies the accuracy of the on-site attended baseline noise surveys conducted.

Figure 9.2 O'Devaney Gardens Area Road Traffic Lden noise map (Source Round 3 Noise Mapping EPA.ie)

Figure 9.3 O'Devaney Gardens Area Road Traffic Lnight noise map (Source Round 3 Noise Mapping EPA.ie)

9.3.4 Significance

It may be concluded that the impact of road traffic noise on the proposed development is below the Lden and Lnight unacceptable noise limit criteria s specified in the Dublin Agglomeration Environmental Noise Plan 2018 - 2023 and that the proposed development will not be subject to unacceptable or adverse road traffic noise. It is also noted that rail or aircraft noise do not have an adverse impact on the O'Devaney Gardens development site.

9.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposed development is described in Section 3 of this EIAR.

When considering a development of this nature, the potential impacts of noise and vibration must be considered for each distinct stage: the medium term (3-5 years) impact of the construction phase and the ongoing long term impact of the operational phase. It is important that there is no unacceptable increase in ambient noise levels during the construction phases and during the operational phase.

Short term noise exposure during the construction phase must be managed and controlled to acceptable levels. There are a number of existing residential noise sensitive receptors located in proximity to the development site boundaries.

The operation of the proposed development and noise associated with its operation will be limited to normal domestic activities such as internal residential vehicle movements, children playing, pedestrians, bin collections and occasional delivery van movements. These normal residential activities are not considered "noise" as they are part of everyday living.

As the development will include some retail / commercial units, a café and a community facility, these activities have the potential to generate noise during the daytime period between 07:00 – 19:00hrs and the evening period between 19:00hrs – 23:00hrs.

9.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

Various elements of both the construction and operational phases of the proposed development have the potential to impact on the receiving on the local receiving noise environment, on adjacent residential properties and on human health. The likely potential impacts for both construction and operation of the proposed scheme prior to mitigation are described in this chapter of the EIAR. The mitigation measures are described in Section 9.7 and the predicted impacts with the development in place and the mitigation measures incorporated in Section 9.9.

9.5.1 Construction Impacts

The development of the site will be conducted in the following phased stages:

- Enabling works - Site set up and Site clearance
- Construction works including infrastructure and building construction and landscaping

Enabling works - Site Set Up and Clearance

Works activities associated with the 'Site set up' will be undertaken prior to construction works commencing. The setting up of the site will involve the construction of site security hoarding and site compounds, site offices, materials and waste storage areas and staff welfare facilities. These short-term activities will have a minimal potential to generate excessive noise levels.

The proposed development involves the ground clearance of the existing site to facilitate the proposed development including buildings, internal roads and hard standing areas, services and landscaped areas.

Site clearance, levelling and an element of ground excavation will also occur at this stage. A variety of items of plant will be in use during site clearance and ground excavation. These will include excavators, dump trucks, compressors and generators, pneumatic breakers and mobile and crushing plant. The operation of these items of plant has the potential to generate short term elevated noise levels beyond the site boundary.

During the site clearance works, Construction and Demolition (C&D) waste shall be segregated as per the requirements of the *Site Specific Construction and Demolition Waste Management Plan* [Byrne Environmental] for the site and shall be exported off-site by an appropriately permitted waste contractor. The movement of these trucks to and from the site will result in an increase in the volume of HGV's within the immediate area and along the proposed haul routes which will generate additional noise levels.

A quantity of excavated top and subsoils will be stockpiled on site and used for landscaping purposes. These stockpiles will assist in attenuating the propagation of construction noise through the site as they will in effect be an absorbent noise barrier.

General Construction Works

During the construction phase there will be extensive site works, involving construction machinery, construction activities on site, and construction traffic, which will all generate noise. The highest noise levels will be generated during the general construction activities. The construction noise levels will be of relatively short term duration and will only occur during daytime hours which will serve to minimise the noise impacts at local existing receptors.

It is predicted that the construction phases will result in a short-term moderate increase in noise levels in the area as well as introducing tonal and impulsive noise as a result of construction activities such as pneumatic breaking, cutting, excavating, vehicle movements and general manual construction activities.

Due to the phased nature of the development there will be slight to moderate impacts on the existing residential estates and St Bricin's Military Hospital which operates as a GP and Outpatient Clinic to the armed forces as well as being a shelter for the homeless located opposite the site boundaries. However, as the development will be constructed in phases, no one receptor will be subject to an excessive period of construction activity as each phase is completed and becomes operational.

The noise and vibrational impacts of construction works will only be prevalent when construction works are occurring in proximity to these residential receptor areas and as such the impacts will not extend over the entire duration of the total construction phase.

The proposed construction phase noise mitigation measures as detailed in Section 9.7 will ensure that all construction activities are controlled and managed and audited by an independent acoustic consultant to confirm that the mitigation measures are implemented throughout the construction phase.

Construction noise predictions

The predicted construction noise levels that will be experienced at the nearest residential receptors as a result of construction activities have been calculated using the activity LAeq method outlined in BS 5228 1:2009+A1 2014 – Code of Practice for noise and vibration control on construction and open sites – Part 1 Noise.

Tables 9.11 to 9.13 detail assumed plant items during the key phases of construction with the associated source reference from BS 5228: 2009+A1 2014. The closest residential properties to the proposed development site are located at distances ranging from approximately 10-30m. Construction noise calculations have therefore been conducted with regard to the simultaneous operation of all plant and expected operating periods.

Table 9.11 – Predicted construction noise predictions associated with Site Enabling works

Plant Item	BS 5228 Reference	sound pressure levels L_{Aeq} dB	
		10m	30m
Generator (enclosed)	C.4 Ref 84	68	58
Compressor (enclosed)	D.6 Ref 19	71	61
Tracked Excavator	C.2 Ref 3	76	66
Wheeled Excavator	C.2 Ref 26	77	66
HGV	C.4 Ref 19	75	65
Dozer	C.2 Ref 11	79	69
Tracked crusher	C1. Ref 14	82	72
LAeq,1hr @ 10m	**70**		
LAeq,1hr @ 30m	**58**		

Table 9.12 – Predicted construction noise predictions associated with piling works

Plant Item	BS 5228 Reference	sound pressure levels L_{Aeq} dB	
		10m	30m
Rotary Piling	C.3 Ref 14	83	73
Concrete Pump	C.3 Ref 25	78	68
Tracked Excavator	C.2 Ref 3	76	66
LAeq,1hr @ 10m	**70**		
LAeq,1hr @ 30m	**58**		

Table 9.13 – Predicted construction noise predictions associated with general construction works

Plant Item	BS 5228 Reference	sound pressure levels L_{Aeq} dB	
		10m	30m
Generator (enclosed)	C.4 Ref 84	68	58
Compressor(enclosed)	D.6 Ref 19	71	61
Tracked Excavator	C.2 Ref 3	76	66
Wheeled Excavator	C.2 Ref 26	77	67
HGV	C.4 Ref 19	75	65
Concrete Pump	C.3 Ref 25	78	68
Tower Crane	C.2 Ref 30	76	66
Teleporter	C.4 Ref 54	79	69
LAeq,1hr @ 10m	**69**		
LAeq,1hr @ 30m	**57**		

The results of the assessment has predicted that, in general, at distances of greater than 10m from the works site provided all mitigation measures including site hoarding are implemented, the construction day time noise limit of 70dB LAeq, 1hr can be complied with during both enabling works, piling works and general construction works. It is also important to note that the impact due to construction activities will be transient in nature and the noise levels detailed in Tables 9.11 and 9.12 represent worst case scenarios when all items of plant are operating simultaneously.

The proposed construction phase noise mitigation measures as detailed in Section 9.9 will ensure that all construction activities are controlled and managed and audited by an independent acoustic consultant to confirm that the mitigation measures are implemented throughout the construction phase.

Where works are required to occur at distances of less than or at 10m from existing residential receptors, enhanced noise mitigation measures including the use of acoustic screens between the activities and the receptors will be required to reduce the impact of works. These measures are detailed in Section 9.9.

Construction Traffic Noise

Based on the assumption of up to 220 HGV movements per day on the haul routes to and from the site along public roads, the resulting average predicted traffic noise level at the closest receptors is calculated as follows:

The predicted noise levels at any receptor located within 5m of the haul route road has been calculated using a standard international acoustical formula as described below.

$$L_{Aeq,T} = SEL + 10\log_{10}(N) - 10\log_{10}(T) + 20\log_{10}(r1/r2) \text{ dB}$$

where

LAeq, Tis the equivalent continuous sound level over time period (T) (3600 sec);
SEL is the A weighted Sound Exposure Level of the noise event (77dB);
N is the number of events over the time period T (60);
r1 is the distance at which SEL is assessed (5m)
r2 is the closest distance to the receptor from the road (10m)

The calculations assumed a maximum scenario of 22 truck movements per hour based on a 10-hour working day a maximum Sound Exposure Level of 77dBA for the trucks and the minimum distance between the local road passing by each of the nearest noise sensitive receptors to the public road (10m). No attenuation, above geometric spreading, has been considered within these calculations may be considered the worst case scenario.

The maximum predicted LAeq, period values as a result of the HGV traffic movements at the nearest noise sensitive receptors located along the haul route roads is predicted to be 48 dBA, LAeq, period.

It is not expected that the predicted short-term increase in HGV movements associated with the construction phase of the development will have an adverse impact on the existing noise climate of the wider area or on local receptors.

Construction generated vibration

The most significant potential sources of ground borne vibrations that may be generated during the construction phase of the development will be generated by the following practices:

- Ground preparation excavation activities that require the use of pneumatic rock breakers
- Movement of site vehicles bulldozers, tracked excavators and dump trucks on ground surfaces
- Hard core surfaces and haul road compaction with vibro-rolling vehicles
- Road construction surface vibro-rolling

Vibration impacts have been considered from any particular plant items that have the potential to generate perceptible levels of vibration.

The nearest off-site residential receptors will be closer than 10m from construction works (eg. Findlater Street, Montpelier Gardens, Ashford Cottages, Ashford Place and Ashford Street, Thor Place and Ross Street). Depending on the methods of construction, there is the possibility of construction related vibration impacts on human beings as a result of ground preparation and concrete foundation excavation activities. However, such sources of vibration will be temporary and intermittent.

It is highly unlikely that any construction generated vibrations at buildings 10m from the proposed development would result in cosmetic damage. Experience of similar construction projects has shown that beyond this distance there is no risk of cosmetic damage occurring within buildings.

A programme of structural vibration monitoring will be conducted at residential receptors located within 10m of site activities as detailed in Section 9.9 below.

9.5.2 Operational Phase

The noise aspects to be considered for the completed development can be divided into two categories:

- Outward noise impacts on built residences during other local construction works
- Inward noise impacts on the development and other existing receptors from road traffic

Traffic Noise Impact

The main potential for altering the noise environment once the development is operational, and thus impacting neighbouring residential receptors , will be associated with increased traffic movement in the area.

The *Traffic and Transport Assessment* [CS Consulting] submitted with this application includes a detailed assessment of the traffic impact associated with the proposed development. As part of this assessment, detailed traffic flow information as Annual Average Daily Traffic flows (AADT) has been derived for the existing road network junctions up to the 2038 Design Year as follows:

J1. North Circular Road (R101) / O'Devaney Gardens (3-arm priority-controlled junction)
J2. Montpelier Gardens / O'Devaney Gardens (3-arm priority-controlled junction)
J3. O'Devaney Gardens / Thor Place / Thor Park (3-arm priority-controlled junction)
J5. Infirmary Road (R101) / Montpelier Gardens (3-arm priority-controlled junction)
J8. Aughrim Street (R806) / Cowper Street (3-arm priority-controlled junction)

Refer to Figure 9.4

Table 9.13 AM Peak Traffic Movements

AM Peak	J1	J2	J3	J5	J8
2020 Surveyed Flows	1128	102	124	1145	443
2038 Design Year (Do-Nothing)	1176	110	133	1191	463
	+4.26%	+7.84%	+7.26%	+4.02%	+4.51%

2038 Design Year (Do-Something)	1291	179	205	1260	535
	+14.45%	+75.49%	+65.32%	+10.04%	+20.77%
Increase dB(A)	**<1**	**+3**	**+2.5**	**<1**	**<1**
Impact	**Imperceptible**	**Slight**	**Imperceptible**	**Imperceptible**	**Imperceptible**

Table 9.14 PM Peak Traffic Movements

PM Peak	J1	J2	J3	J5	J8
2020 Surveyed Flows	1132	121	57	953	457
2038 Design Year (Do-Nothing)	1182	130	65	992	480
	+4.42%	+7.44%	+14.04%	+4.09%	+5.03%
2038 Design Year (Do-Something)	1343	205	174	1068	589
	+18.64%	+69.42%	+205.26%	+12.07%	+28.88%
Increase dB(A)	**<1**	**+2.5**	**+8**	**<1**	**1**
Impact	**Imperceptible**	**Imperceptible**	**Moderate**	**Imperceptible**	**Imperceptible**

The UK Design Manual for Roads and Bridges (DMRB, Volume 11, Section 3, Part 7) states that it takes a 25% increase or a 20% decrease in traffic flows in order to get a 1dBA change in traffic noise levels. On this basis, the traffic flow increases associated with the fully completed development will result in an increase of between +1 dB(A - +8dB(A) over existing traffic noise levels.

This increase may be characterised as longterm ranging between imperceptible – slight – moderate with the highest impact associated with PM traffic at Junction 3 O'Devaney Gardens / Thor Place / Thor Park.

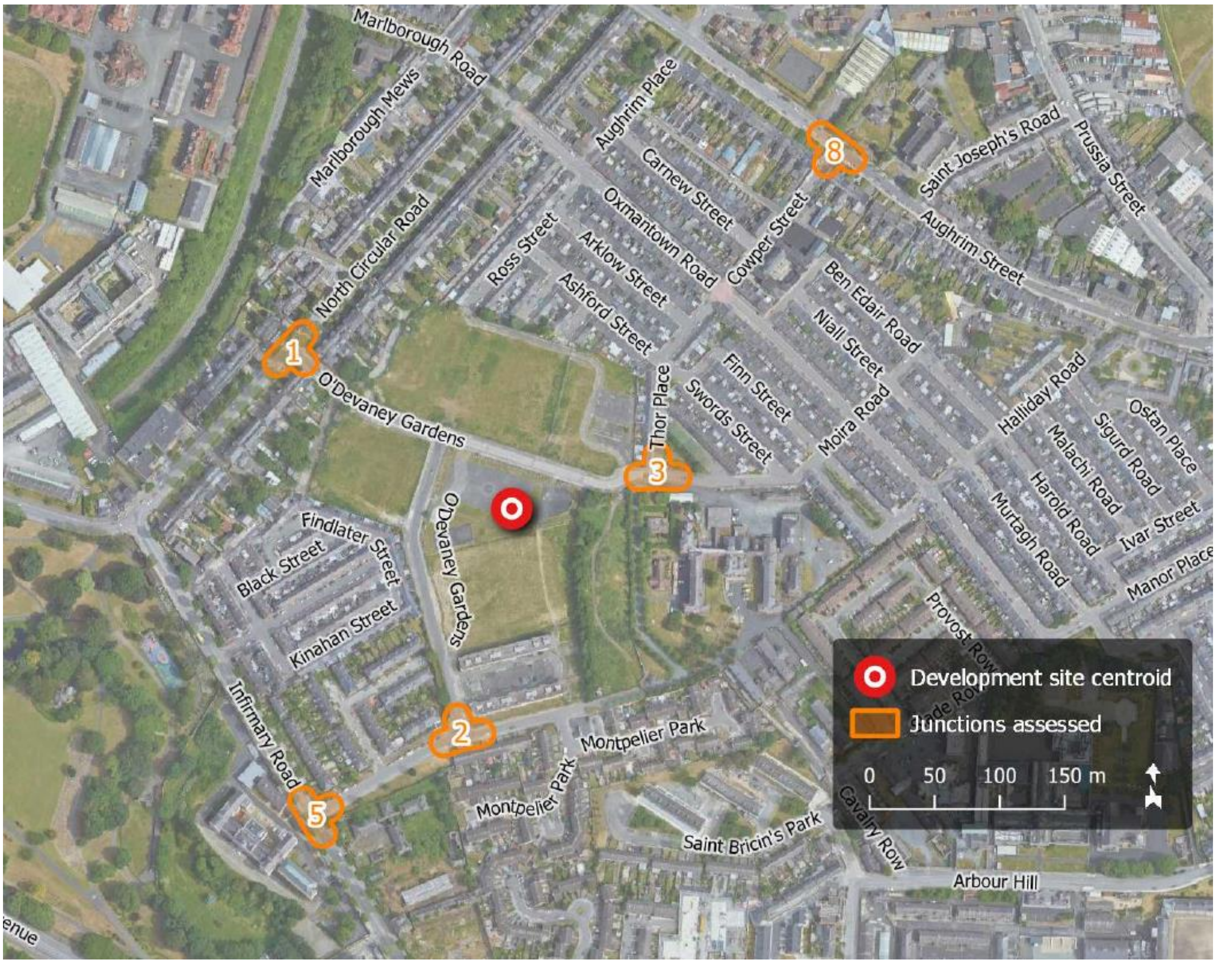


Figure 9.4: Traffic Junctions Analysed

On-Site Noise Sources

Internal Residential Traffic Noise

The project includes the provision of surface and below podium car parking spaces for the residential units. Vehicles within the residential areas will generally travel at speeds <20kmph as a result of speed limit signage and speed reducing ramps throughout the development which result in relatively low noise levels being generated by internal vehicle movements.

Neighbourhood Noise

Within the proposed development, sounds generated by everyday domestic activities including waste collection activities, pedestrians, children, and use of open spaces, are part of everyday living, and are not considered "noise" in the sense of a potential nuisance. These activity noises would not have any potential to cause an adverse noise impact beyond the boundaries of the site or within the site itself.

Games Court / Pitch Noise

The principal aspect of the development which has the potential to have an inward noise impact on the proposed residential units is that of the operation of the proposed all-weather games court / pitch.

Noise associated with a sports pitch is generally comprised of the following sources/activities:

Raised voice (Adult Male)	89dB(A) at 1m
Noise from ball impacts	80dB(A) at 1m

The maximum noise associated with the use of the proposed playing pitches that will be experienced at an on-site residential receptor at a distance of c.20m from the pitches has been determined to be 63dB(A) by the acoustic formula below:

$Lp(R2) = Lp(R1) - 20 \log_{10} (R2/R1)$

Where

$Lp(R1)$ = Sound Pressure Level at source
$Lp(R2)$ = Sound Pressure Level at receptor
$R1$ = Distance at which noise source relates
$R2$ = Distance from noise source to receptor

The acoustic screening of the games court / pitch will be necessary to control and minimise the noise impact that their use will have on proposed residential units located opposite. the Noise mitigation measures for this aspect of the development are provided in Section 9.9.

Commercial / Retail Unit and Community Facility Noise

The proposed retail units associated with the development will be located at ground floor level within the apartment block structures. These units will be acoustically isolated and insulated to ensure that noise generated by activities conducted within does not transfer into the apartment structure in which they are located.

All retail units are located within the central area of the development away from existing established residential areas surrounding the site. It is predicted that the operation of any retail unit will not result in adverse noise levels at any receptor beyond the site boundaries.

All mechanical plant will be acoustically insulated by means of acoustic cladding and/or sound attenuators.

9.5.3 Vibration

The only source of vibration predicted, once the development has been constructed and is operational, is vibration associated with internal road traffic movements.

As a vehicle travels along a road, vibration can be generated in the road and subsequently propagate towards nearby buildings. Such vibration is generated by the interaction of a vehicle’s wheels and the road surface and by direct transmission through the air of energy waves. Some of these waves arise as a function of the size, shape and speed of the vehicle, and others from pressure fluctuations due to engine, exhaust and other noises generated by the vehicle.

Ground vibrations produced by residential road traffic are unlikely to cause perceptible, cosmetic or structural vibration in properties located near to well-maintained and smooth road surfaces. Vibration impacts associated with road traffic in particular commercial van and trucks can therefore be largely avoided by good maintenance of the road surface.

It has been assessed that vibration levels related to road traffic movements would be significantly lower than those levels required to lead to disturbance of occupiers or to cause cosmetic or structural damage to buildings.

9.5.4 'Do Nothing' Scenario

If the site remains undeveloped it will continue to have no noise or vibrational impact on the receiving environment.

9.6 CUMULATIVE IMPACTS

This section has considered the cumulative impact of the proposed development in conjunction with existing adjacent development and future development in the vicinity of the subject site.

Other permitted and proposed developments are identified in Section 3.6 and include the DCC Phase 1A development (Ref: PL29N.JA0024) and the Former Department of Defence site, Infirmary Road (DCC Part 8 development Reg Ref 3210/19)

It is predicted that the cumulative impact of the construction and operational phases of the proposed former O'Devaney Gardens development and other local development sites will not have an adverse impact on the receiving environment provided best practice mitigation measures are implemented at all developments.

9.7 MITIGATION MEASURES

9.7.1 Construction Phase

The following noise and vibration mitigation measures shall be implemented at the site from the outset of site activities to control and manage noise and vibration levels in accordance with Best Practice during the construction phase of the proposed development:

NV-C1 Noise Mitigation Measures

- no plant used on-site will be permitted to cause an ongoing public nuisance due to noise;
- the best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on-site operations;
- all vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract;
- compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers;
- machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use;
- during construction, the appointed Contractor will manage the works to comply with noise limits outlined in *BS 5228-1:2009+A1 2014. Part 1 – Noise;*
- all items of plant will be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise

and can serve to prolong the effectiveness of noise control measures;

- limiting the hours during which Site activities which are likely to create high levels of noise or vibration are permitted; and
- monitoring levels of noise and vibration during critical periods and at sensitive locations.
- Furthermore, it is envisaged that a variety of practicable noise control measures will be employed. These may include:
- selection of plant with low inherent potential for generation of noise and/or vibration;
- erection of good quality site hoarding to the site perimeters which will act as a noise barrier to general construction activity at ground level;
- erection of barriers as necessary around items such as generators or high duty compressors; and
- situate any noisy plant as far away from sensitive properties as permitted by site constraints.

NV-C2 **Vibration Mitigation Measures**

The following specific vibration mitigation and control measures shall be considered during the construction phase:

- Breaking out concrete elements using low vibration tools
- Choosing alternative, lower-impact equipment or methods wherever possible
- Scheduling the use of vibration-causing equipment, such as jackhammers, at the least sensitive time of day
- Routing, operating or locating high vibration sources as far away from sensitive areas as possible
- Sequencing operations so that vibration causing activities do not occur simultaneously
- Isolating the equipment causing the vibration on resilient mounts
- Keeping equipment well maintained.
- Confining vibration-generating operations to the least vibration-sensitive part of the day which could be when the background disturbance is highest

The images below describe the use of noise screens for construction activities under NV-C1.

Double height acoustic blanket enclosure

Acoustic blankets screening piling and excavations

3 sided Acoustic enclosure for surrounding breaking, cutting works

9.7.2 Operational Phase Noise Mitigation

Outward Noise Mitigation Measures

As set out in Section 9.5.1 the operational phase of the development is predicted not to have an adverse noise impact on the receiving environment or on existing residential developments adjacent to the site during the operational phase. Therefore, no outward noise mitigation measures are proposed.

Inward Noise Mitigation Measures

NV-O1 **Acoustic Design requirements for residential buildings**

External noise can enter rooms within dwellings through windows, ventilators, walls, roof and doors. In most cases, however, windows provide the main path and therefore, mitigation by design has focussed on this building element to ensure that their insulation is adequate.

Windows

In order to ensure a sufficient level of sound insulation is provided for all dwellings within the development, the following lists the minimum sound insulation performance of windows and window frame sets in terms of the in-situ weighted sound reduction index (Rw):

40dB Rw for Living rooms and Bedrooms

37dB Rw for Kitchen – Dining Rooms.

The acoustic performance specifications detailed are the minimum requirements which shall apply to the overall glazing system when installed on site. In the context of the acoustic performance specification the 'glazing system' is understood to include any and all of the component parts that form part of the glazing element of the façade, i.e. glass, frames, seals, openable elements etc. All exterior wall and door frames should be sealed tight to the exterior wall construction.

NV-O2 **Internal Noise Control – Apartments and Semi-detached houses**

At the earliest stage during the construction phase, test apartment units and semi-detached houses shall be constructed to their finished level and shall be tested by a suitably qualified independent Acoustic Engineer to ensure that they comply with Department of the Environment, Building Regulations 2014, Technical Guidance Document E – Sound. Table 9.15 provides detail on the recommended sound insulation values that shall be achieved to ensure acoustic privacy between adjoin apartment units.

Table 9.15 – Recommended sound insulation values for internal party walls / floors

Dwellings	Airborne Sound Insulation D_{nTw} (dB)	Impact Sound Insulation L_{nTw} (dB)
Floors and Stairs	53	58
Walls	53	N/A

For other non-traffic related sources appropriate guidance on internal noise levels for dwellings is contained within BS 8233: 2014: Guidance on Sound Insulation and Noise Reduction for Buildings. This British Standard sets out recommended noise limits for indoor ambient noise levels in dwellings as detailed in Table 9.16.

Table 9.16 – Recommended Indoor Ambient Indoor Noise Levels from BS 8233: 2014

Typical situations	Design Range, $L_{Aeq,T}$ dB	
	Daytime $L_{Aeq,16hr}$ (07:00 to 23:00hrs)	Night-time $L_{Aeq, 8hr}$ (23:00 to 07:00hrs)
Living / Dining Rooms	35 / 40	n/a
Bedrooms	35	30

NV-O3 **Ventilation Systems**

The ventilation strategy for the development will be in accordance with Part F of the Building Regulations. The apartment units shall include mechanical heat recovery ventilation systems which will negate the requirement for passive wall vents in bedrooms and living spaces which would otherwise allow the transfer of external noise into the building through the air gaps in the passive vents. However, windows may remain openable for rapid or purge ventilation, or at the occupant's choice.

NV-O4 **Wall Construction**
The wall construction typically provides the highest level of sound insulation performance to a residential building. The residential dwellings will be built using either masonry or a timber framed construction. The minimum sound insulation performance of the chosen wall construction will be 55dB Rw.

NV O5 **Roof Construction**
The insulated roof constructions proposed across the site will provide an adequate level of sound insulation to the properties within the development site. A minimum sound insulation value of 40dB Rw should be used for roof spaces.

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As set out in Section 9.5.1 the operational phase of the development is predicted not to have an adverse noise impact on the receiving environment or on existing residential developments adjacent to the site during the operational phase of the scheme. Therefore, no mitigation measures additional to those set out above are proposed.

9.7.3 'Worst-case' scenario

The worst-case scenario would be that the attributes and mitigation measure were not carried out.

The main potential for adverse impacts on local quality will occur during the construction phase. The worst-case scenario, therefore, corresponds to the situation where the mitigation measures for construction activities fail or are not implemented. Should noise mitigation measures not be implemented during the construction phase, significant noise nuisance is likely in areas close to the construction site. There would be significant adverse effect on human health in the absence of such mitigation measures.

9.8 PREDICTED IMPACTS OF THE PROPOSED DEVELOPMENT

9.8.1 Construction phase

The implementation of the construction phase noise and vibration mitigation measures and a noise monitoring programme as detailed in Section 9.7 above and Section 9.9 below, will minimise the potential noise and vibration impact on the receiving environment including existing residential receptors.

The predicted construction phase noise impact will be negative, short-term and transient and not-significant to moderate.

Site activities, in particular ground clearance and piling works will generate perceptible vibration at the closest residential receptors located west of the site. It is predicted that vibration levels associated with construction activities at the closest receptors to the site will not exceed 15 mm/sec PPV. Human response to groundbourne vibrations will be perceptible at levels between 0.14 to 1.0 mm/sec PPV.

The predicted construction vibration impact will be negative, short-term and not significant.

9.8.2 Operational Phase

Inward Noise Impact

The noise impact generated by additional traffic movements associated with the development is predicted to be of a slight impact on existing ambient noise levels at receptors along the local road network.

It may be concluded that during daytime and night-time periods, acceptable internal noise levels can be achieved in all residential units as defined in *BS 8233* with windows closed, using the measures detailed above in Section 9.7 above.

With regard to the recommended mitigation by design measures as specified above, it may be concluded that residential properties located within the proposed development can be appropriately designed and constructed to achieve acceptable internal noise levels and to ensure the required acoustic performance of adjoining residential units.

Risks to Human Health

Construction phase noise and vibration emissions will be temporary and transient and will be managed so as to minimise impact to population and human health by complying with all relevant guidance.

Operational phase noise will also be managed to achieve relevant noise limit values and is predicted to meet all such requirements. No operational phase vibration impacts are predicted. Therefore, the operational phase noise impacts will be neutral for the life of the development.

9.9 MONITORING

This section describes the noise and vibration monitoring methodologies that shall be implemented at the site to ensure that construction site activities do not cause excessive nuisance or cause cosmetic or structural damage to properties or structures in the vicinity of the site.

NV-C4 **Proposed Noise Monitoring Programme During Site Construction**

Prior to the commencement of the site construction activities, a programme of continuous noise monitoring at site boundary locations shall be undertaken to assess and manage the impact that site activities may have on ambient noise levels at local receptors.

these surveys will establish the noise impacts of site activities at the closest receptors to the site, to assess compliance with the specified construction noise limit criteria and to ensure that mitigation and control measures are being implemented as required.

All noise monitoring data will be compiled into a monthly technical monitoring report which will include a full assessment of the potential noise impacts arising from site construction activities.

The environmental noise measurements will be completed in accordance with the requirements of *ISO 1996-1: 2017: Acoustics – Description,* *measurement and assessment of environmental noise* and with regard to the *EPA's 2016 Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4).* The measurement parameters to be recorded include wind speed, temperature, L_{Aeq}, L_{A90}, L_{A10} and L_{Amax} , 1/3 Octave Frequency analysis and impact noise analysis.

Noise Monitoring Locations
The monitoring locations selected for the noise monitoring survey will be at site boundary locations adjacent to noise sensitive receptors N1 – N5 as per Figure 9.1 above.

NV-C5 **Proposed Vibration Monitoring Programme During Site Construction**
In order to ensure that site construction activities are conducted to minimise the vibration impacts on the receiving environment, it is proposed that structural vibration monitoring may be implemented during the course of the construction phase as required. It is proposed that vibration monitoring will be conducted at adjacent properties opposite the site boundaries as required using calibrated vibration monitors and geophones with live text and email alert functionality to ensure that if vibration levels approach or exceed specified warning and limit values, site personnel will be alerted to cease at the earliest instance and appropriate mitigation measures may then be implemented to minimise the vibrational impacts of protected structures.

Vibration Monitoring Locations
The monitoring points chosen for locating the geophone of the vibration measuring instrument will be chosen according to the guidelines in *British Standard BS 7385:, Evaluation and measurement for vibration in buildings, Part1 1990 Guide for measurement of vibrations and evaluation of their effects on buildings and Part 2 1993 Guide to damage levels arising from groundborne vibration.*

9.9.1 Operational Phase

No monitoring required.

9.10 INTERACTIONS

The principal interactions between Noise and Vibration impacts and Human Beings have been addressed in this report which describes in detail the mitigation measures that will be implemented to ensure that human health and residential amenity are not adversely impacted by any aspect of the construction or operational phases of the development.

REFERENCES

- Dublin Agglomeration Noise Action Plan 2018 – 2023 (NAP).
- Design Manual for Roads and Bridges – Volume 11 Section 3.
- Professional Guidance on Planning and Noise (ProPG), (IoA, 2017).

- British Standard BS 5228 (2009 +A1 2014): Code of Practice for Control of Noise and Vibration on Construction and Open Sites Part 1: Noise and Part 2: Vibration.
- British Standard BS 7385 (1993): Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration.
- British Standard BS 8233: 2014: Guidance on sound insulation and noise reduction for buildings.
- British Standard BS 4142: 2014: Methods for Rating and Assessing Industrial and Commercial Sound
- Calculation of Road Traffic Noise, Department of Transport Welsh Office, HMSO, 1988.
- ISO 1996-2: 2017: Acoustics – Description, measurement and assessment of environmental noise.
- ISO 9613 (1996): Acoustics – Attenuation of sound during propagation outdoors, Part 2: General method of calculation.
- EPA Guidelines on the Information to be contained in Environmental Impact Statements, (EPA, 2002).
- EPA Advice Notes on Current Practice (in the preparation of Environmental Impact Statements), (EPA, 2003).
- EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports, (Draft August 2017).
- EPA Advice Notes for Preparing Environmental Impact Statements, (Draft, September 2015).

10 MATERIAL ASSETS: BUILT SERVICES

10.1 INTRODUCTION

This section of the EIAR has been prepared by Cronin & Sutton Consulting and describes the existing material assets for the drainage and potable water aspects on the proposed development site. An assessment is made of the likely impact arising during the demolition, construction and operational phases of the development on these elements.

This Chapter also considers the potential impacts associated with the proposed development, if any, are assessed with regards to the following proposed built services: Electricity, Gas, and Telecommunications.

This chapter was prepared by Robert Fitzmaurice of CS Consulting. Robert is a Chartered Engineering with Engineers Ireland and has been practicing as a consulting engineer for over twenty years. Robert holds an undergraduate degree in Civil & Environmental Engineering, a postgraduate Diploma in Environmental Engineering, an advanced Diploma in Planning and Environmental Law and has a master's degree in Industrial Engineering.

Input was also provided in relation to proposed built mechanical and electrical services environment has been prepared by Andrew Clifford, Chartered Engineer with over 20 years' experience of JV Tierney and Company Mechanical, Electrical and Sustainable Consulting Engineers.

10.2 METHODOLOGY

10.2.1 Water Services

In addition to the sources listed in Chapter 1, other reference documents used in the preparation of this assessment include the following:

- National Roads Authority (NRA) Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.
- Good practice guidelines on the control of water pollution from construction sites developed by the Construction Industry Research and Information Association (CIRIA).

A desktop study was carried out on the local and regional surface water and drainage network. Information was obtained from documents including the following sources:

- Eastern River Basin District (ERBD) Catchment Characterisation Report (ERBDA, 2005)
- ERBD River Basin Management Plan 2009-2015 (ERBDA, 2010a)
- ERBD Programme of Measures 2009-2015 (ERBDA, 2010b)
- ERBD River Basin Management Plan - Strategic Environmental Assessment (ERBDA, 2011)
- EPA online Water Quality Database and Envision Map Viewer (www.epa.ie)
- Dublin City Council Water and Drainage Department record drawings and discussions with Drainage Division Engineers;
- Flood Risk Assessment Report completed by Cronin and Sutton Consulting which accompanies this Planning Application.

- All available information concerning the development including development plans.

The following legislation was referred to in compiling this chapter:

- Water Framework Directive 2000/60/EC:

The EU Water Framework Directive (WFD) 2000/60/EC came into force on 22nd December 2000, and enacted into Irish legislation through S.I. No. 722 of 2003 European Communities (Water Policy) Regulations 2003. This legislation and regulation is a significant piece of legislation for water policy, as it provides a co-ordinated approach across Europe for all water policies, establishing a management structure for future water policy. A few key objectives of the Directive are to:

- Protect all waters, including rivers, lakes, groundwater, transitional and coastal waters.
- Achieve "good status" in all waters by 2015, and maintaining "high status" where the status already exists.
- Have water management based on River Basin Districts (RBD).

The strategies and objectives of the Water Framework Directive in Ireland have been influenced by a range of National and European Union legislation and regulation including:

- European Communities (Quality of Salmonid Waters) Regulations 1988 (S.I. No. 293 of 1988),
- Local Government (Water Pollution) Acts 1977 – 1990,
- Water Quality Standards for Phosphorus Regulations 1998 (S.I. No. 258 of 1998).

In turn the implementation of the Water Framework Directive and its associated policies has necessitated the introduction of new regulations in Ireland including, the European Communities Environmental Objectives (Surface Waters) Regulations 2009, which are discussed further in the following section.

<u>European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No.272 of 2009*):*</u>

These regulations have been devised as a more complete and stringent set of surface water quality regulations which covers the requirements of the Water Framework Directive and the Dangerous Substances Directive. These regulations came into effect on 30th July 2009 and have been adopted by the Government. These new regulations supersede previous water quality regulations (both EU and national). This project must still be cognisant of previous regulations as they form the basis for a wide range of impact assessment and monitoring methodologies. It is envisaged that a detailed construction management plan which will include the management or disposal of surface water runoff will be prepared in advance of construction commencing on site. The construction management plan will be cognisant of these new regulations and apply them throughout the construction phase.

<u>European Communities Priority Substances Directive 2008:</u>
These regulations have been devised to assign a chemical status assessment for water bodies. Directive 2008/105/EC provides environmental quality standards in the field of water policy.

- European Communities (Quality of Salmonid Waters) Regulations 1988 (S.I. No. 293 of 1988)

The Salmonid Regulations set water quality standards for salmonid waters, with identification of salmonid waters, water quality standards, and frequencies of sampling and methods of analysis and inspection.

- Local Government (Water Pollution) Acts 1977 – 1990:

The Act is the main legislation for the prevention and control of water pollution, including the general prohibition of polluting matter to waters. While this act has largely been superseded by the 2009 Regulations, current impact assessment and monitoring methodologies must still be cognisant of this legislation.

- Water Quality Standards for Phosphorus Regulations 1998 (S.I. No. 258 of 1998):

As part of the Water Pollution Acts, these regulations require water quality be maintained or improved, with reference to the biological quality river rating system (Q Rating) as assigned by the Environmental Protection Agency between 1995 to 1997. While this act has also largely been superseded by the 2009 Regulations, current impact assessment and monitoring methodologies must still be cognisant of this legislation.

An assessment of the existing water quality was also carried out in the form of a desktop study examining water quality data from the EPA from surveys predominately conducted by the EPA and local authorities. Various quality classes are used to establish and monitor the condition of rivers and streams in Ireland. Quality classes relate to the potential beneficial use of a water body, and can be effected by the quality of water discharged to surface water during construction and operation of a development.

Background Information on the local drainage network and water supply was obtained from documents from local authorities.

Discussions were held between Irish Water and Dublin City Council, along with the other members of the design team.

10.2.2 Public Utilities

As part of a desktop study of the existing services infrastructure, serving the development site, the following data was sourced online, for information:

- Electricity Supply Networks (ESB Networks);
- Gas Supply (Gas Networks Ireland);
- Telecommunications (Éir).

Information provided by the above providers was reviewed, in order to gain an appreciation of how the development site is currently served and determine its adequacy in terms of the proposed overall mixed-use development.

The assessment of potential impacts on the built services for the proposed development were assessed through a desktop study of the information provided in consultation with the relevant utility providers, listed above.

10.3 RECEIVING ENVIRONMENT

10.3.1 Foul Water

The Following review of Dublin City Council's drainage records indicates that there are:

- A 225mm diameter concrete combined sewer on O'Devaney Gardens, flowing west to east;
- A 300-375mm diameter concrete combined sewer on O'Devaney Gardens, flowing north to south towards Montpelier Gardens;
- A 300mm diameter concrete combined sewer which connects the end of the 225mm diameter concrete combined sewer to 300mm diameter concrete combined sewer on O'Devaney Gardens, both mentioned previously. Note that this 300mm diameter concrete combined sewer has been indicated traversing the site.
- A 225mm diameter uPVC combined sewer on Montpelier Gardens, which flows towards Infirmary Gardens;
- A 225mm diameter vitrified clay combined sewer, which flows towards Infirmary Gardens;
- A 375mm diameter concrete combined sewer on Montpelier Gardens, which flows from O'Devaney Gardens to towards Infirmary Gardens;
- A 225mm diameter foul sewer at east of Montpelier Gardens, which flows through Montpelier Park and Montpelier Drive and finally connected to a combined sewer on and Montpelier Hill.

All foul effluent in the region is directed via public drainage infrastructure to Ringsend Regional Waste Water Treatment Plant for processing before final discharge to Dublin Bay.

10.3.2 Potable Water

Following review of Dublin City Council's watermain records indicates that there are:

- A 100mm diameter cast-iron located in O'Devaney Gardens. There are a several number of a 100mm diameter cast-iron which were located to supply the previous developments, currently demolished.
- A 100mm and 150mm diameter cast-iron on Montpelier Gardens.

Dublin City is serviced by a public watermain supply under the operational control of Irish Water.

10.3.4 Electricity

Based on information received from ESB Networks, the existing site is serviced by an existing Electricity sub-station and in discussions with ESB Networks, there is no concern regarding power availability of supply going forward. Please refer to ESB Networks drawing below (Figure 10.1).

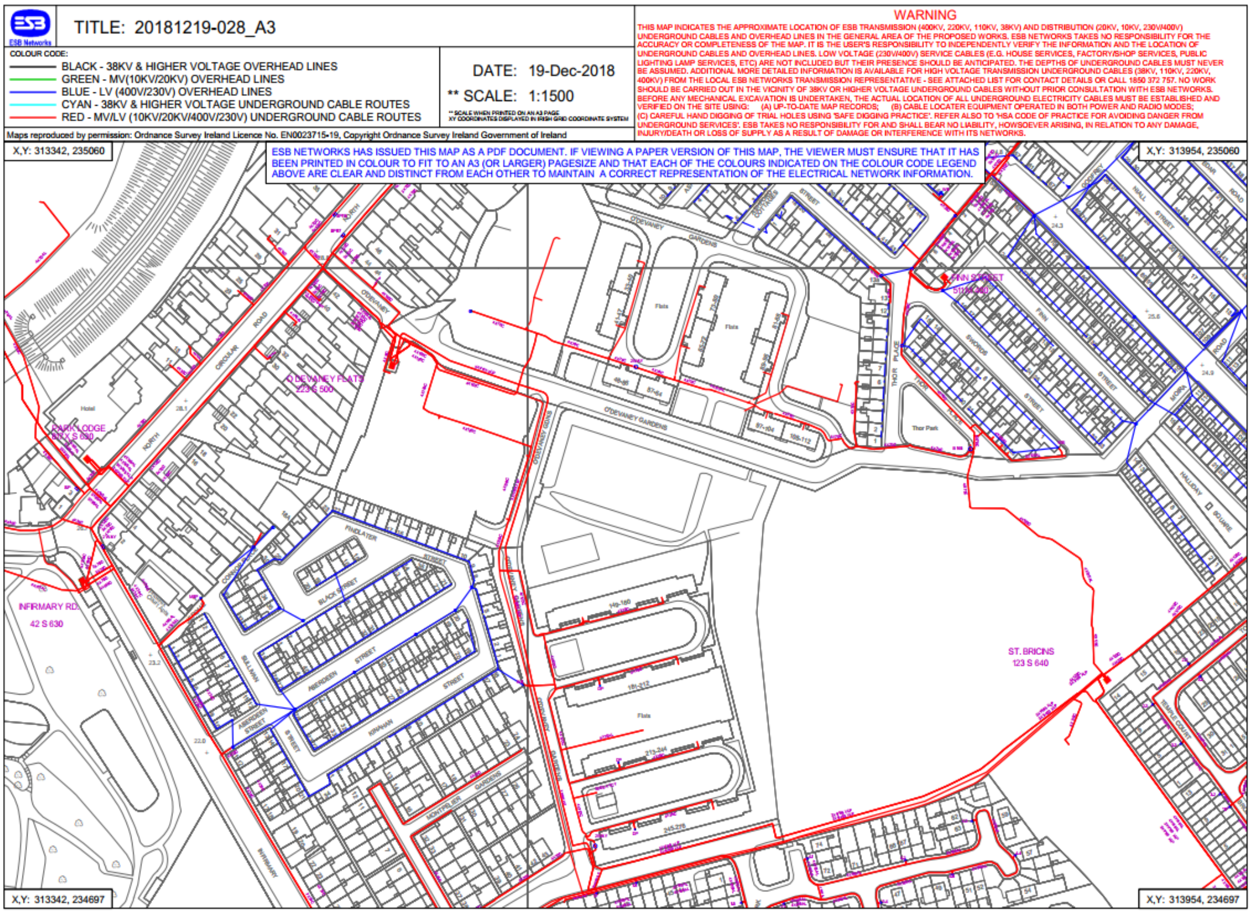


Figure 10.1: Existing ESB Infrastructure

10.3.4 Bord Gais

Based on information received from Gas Networks Ireland (GNI), there is an existing 125mm low pressure supply network running through the development site with a connection into the site currently. Based on information received from GNI, there are no supply issues going forward at this time. Please refer to GNI drawing below (Figure 10.2).

10.3.5 Telecommunications

Based on information received from Eir, the current site is well serviced and there will be no supply issues going forward. Refer to the Telecommunication drawing IN Figure 10.3 below.

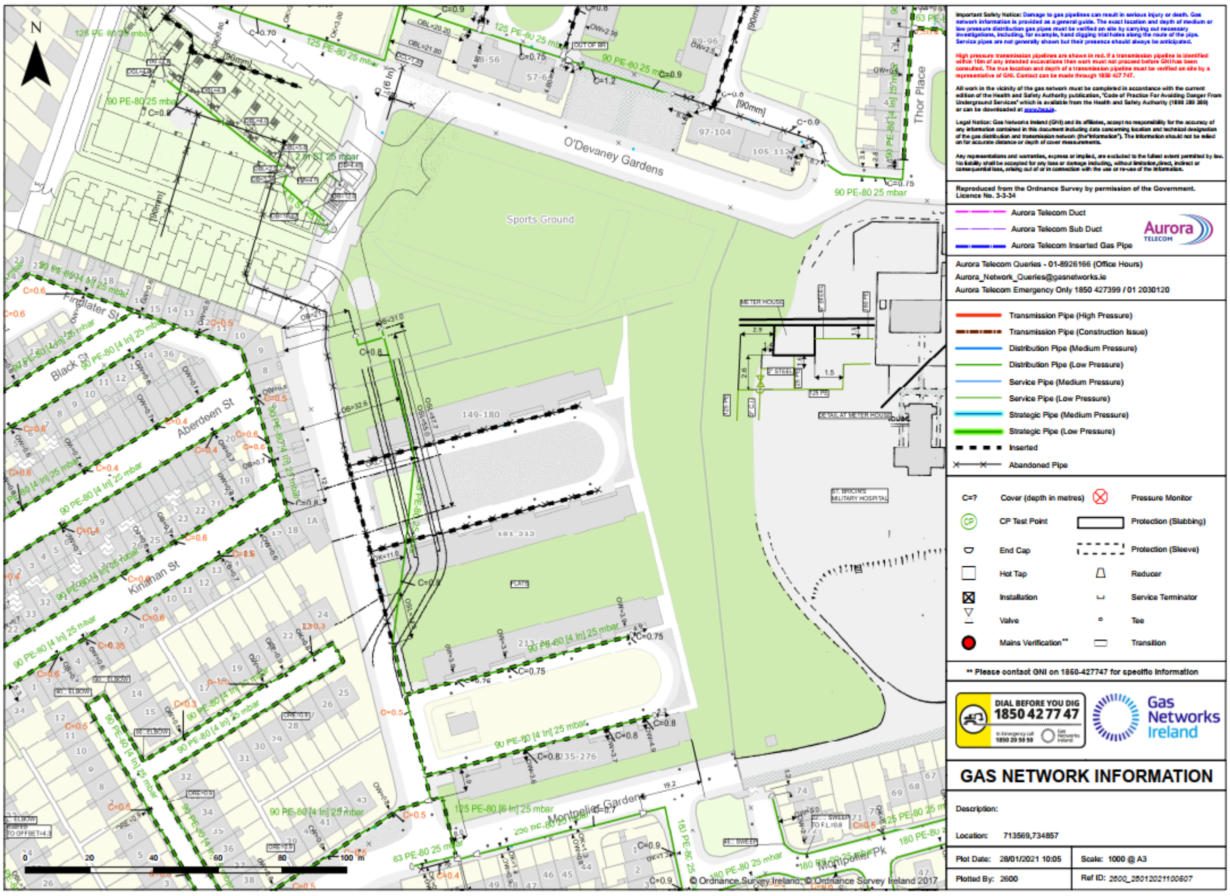


Figure 10.2: Existing Gas Infrastructure

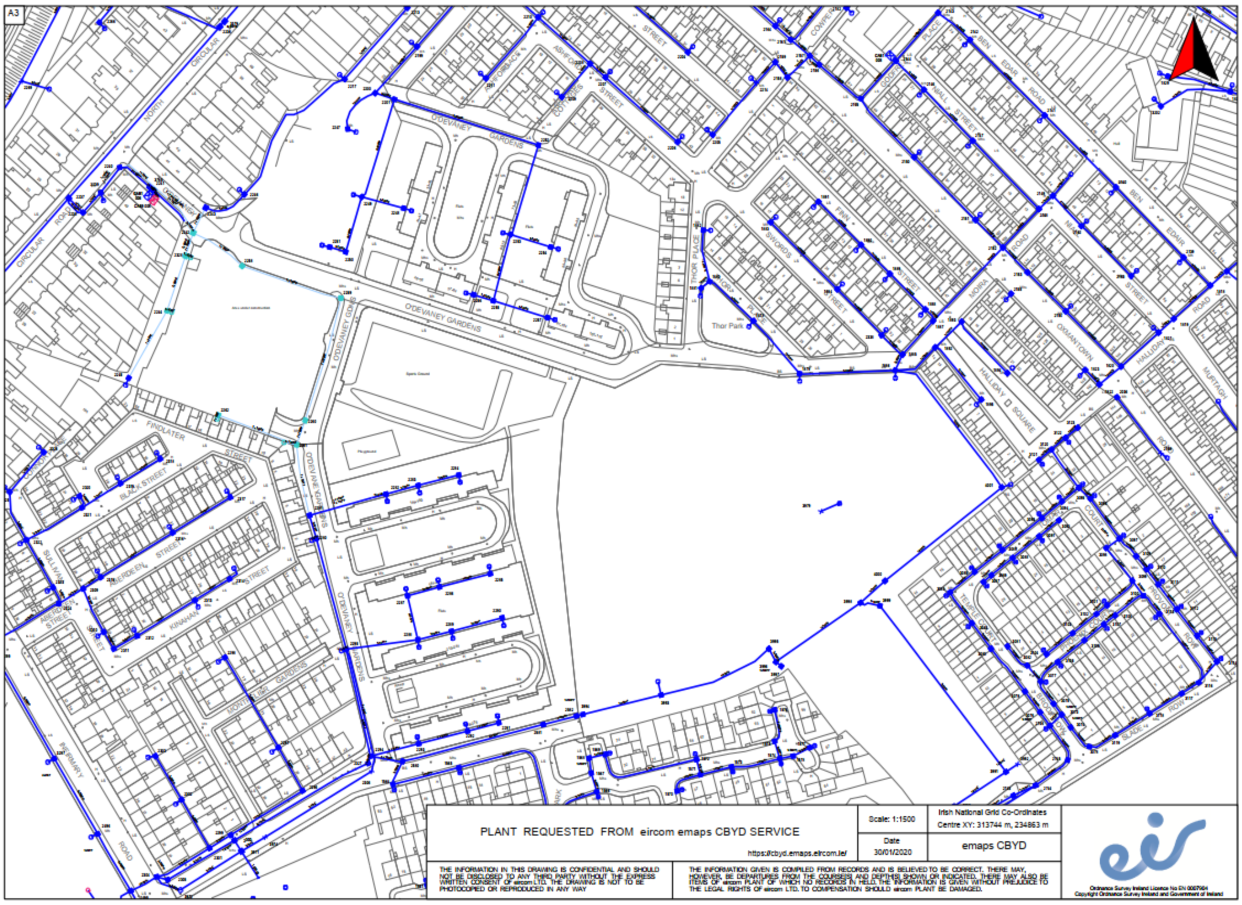


Figure 10.3: Existing Telecoms Infrastructure

10.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

10.4.1 Foul Drainage

A The proposed development will require a new separate drainage network to collect and convey the effluent generated by the proposed development. The drainage network for the proposed development has been designed in accordance with:

- The Regional Code of Practice Drainage Works,
- The Greater Dublin Strategic Drainage Study,
- Irish Water Code of Practice for Wastewater Infrastructure.

The drainage network for the development will be in accordance with Part H of the Building Regulations and to the requirements and specifications set out in the Irish Water Code of Practice for Wastewater.

Proposed Effluent Generation

The proposed development is to consist of 1047 and based on Irish Water guidelines, the foul effluent generated will be:

⇒ 446l/day per apartment (based on 2.7 persons per apartment x 150l/person/day, + a 10% increase factor).

⇒ 446 l/day/apt x 1047 units = 466,962 l/day = 466.96 m^3/day;

⇒ 5.40 l/sec Average flow (1 DWF);

⇒ 32.4l/sec Peak Flow (6 DWF).

Proposed Foul Drainage Arrangements

All foul effluent generated from the proposed development will be collected in separate foul pipes and flow under gravity, to the 375mm diameter concrete combined sewer on Montpelier Gardens, which flows from O'Devaney Gardens to towards Infirmary Gardens. The proposed drainage infrastructure and routing plan is shown on ODG-CSC-XX-XX-DR-C-0013 and 0014 included with this submission.

Irish Water Confirmation of Feasibility

Irish Water have issued a pre-connection response. They note that investigation works are required by the applicant of the downstream network to guarantee that foul and stormwater are not interconnected. Irish Water has not indicated any restrictions with the local infrastructure network, and a such the proposed development can be accommodated. Please refer to the *Engineering Services Report* for a copy of the confirmation of feasibility and Design Acceptance letter.

10.4.2 Water Supply

Proposed Potable Water System

The proposed development is to consist of 1047 and based on Irish Water guidelines, the water demand will be:

⇒ 405 l/day per apartment (based on 2.7 persons per unit x 150l/person/day);

⇒ 405 l/day x 47C units = 424,035l/day = 424.035 m^3/day;

⇒ 4.90 l/sec Average water demand;

⇒ 24.53 l/sec Peak water demand (5 times average water demand).

The proposed watermain infrastructure and routing plan is shown on ODG-CSC-XX-XX-DR-C-0015 included with this submission.

Proposed Watermain Alterations

The subject lands currently have a watermain infrastructure located at north side of the O'Devaney Gardens access road from Montpeller Gardens, northwest of the subject land. Subject to agreement with Irish Water and Dublin City Council these services will be decommissioned as part of Phase 1. The proposed house units will have individual water connection from a proposed 160mm diameter watermain. Please refer to ODG-CSC-XX-XX-DR-C-0015_Proposed Watermain for details.

Irish Water Confirmation of Feasibility

Irish Water have issued a pre-connection response. They note that local connection works will be required to facilitate the development. As per Irish Water requirements these works will be carried out by Irish Water and form part of the post planning connection agreement requirements. Irish Water has not indicated any restrictions with the local infrastructure network, and a such the proposed development can be accommodated. Please refer to the *Engineering Services Report* for a copy of the confirmation of feasibility and Design Acceptance letter.

10.4.3 ESB

The proposed development will connect to the MV (Medium Voltage) electricity network in the area and 7no. ESB Substations are to be provided throughout the development. One of the substations is existing on the site and will be relocated and continue to serve its existing customers. The substations have being sized to supply the load of the entire development and to the requirements of ESB Networks based on:

- 1047 apartments
- Landlord areas
- Ancillary spaces
- Carparks
- Creche
- Street power
- Retail units
- Fire fighting services

Each substation will have a maximum capacity of 1000kVA (killivolt-Ampere) and a maximum design connected load of 800kVA so there will be ample spare capacity within the development to power any future connections in the local environs or to extend the charging network for cars, e-bikes or e-scooters.

The substations will be spread throughout the site to feed each of the blocks and they will also be connected on an ESB ring main to increase their redundancy in the event of a cable fault.

10.4.4 Bord Gais

The site is currently fed by a low pressure 25mBar (millibar) gas main feeding from Montpelier Gardens. This main will be relocated from close to the site perimeter to align with the new roadway within O'Deveney Gardens as agreed with Gas Networks Ireland.

This gas main is suitable to directly supply the houses, duplexes, creche and the retail units within the development without the need for a pressure reducing gas skid. There is no requirement to serve the apartment blocks with gas as space heating is provided using heat pump technology to comply with our NZEB design.

10.4.5 Telecommunications

Based on information received from Eir, the site is well serviced from a number of separate tie-in points and there are no supply issues in the area. The scheme allows for an extensive network of in-ground ducting and chambers throughout the site to allow future flexibility of supply. All houses, apartment blocks and retail units are connected to this ducting network.

JV Tierney & Co also consulted with other providers (eg. Virgin Media) and have allowed for supply ducting to each dwelling on the site. The apartment blocks are designed with splitter panels to allow distribution through the electrical risers to each apartment.

10.5 POTENTIAL IMPACTS

10.5.1 Construction Phase

Foul Water

The contractors operations will result in the generation of effluent and sanitary waste from facilities provided for the work force on site. This is expected to have a slight negative impact on the existing foul drainage network in the short term for the duration of construction work.

Potable Water

The contractors will require a separate water supply connection for the works. The impact on the water supply network is likely to be slight negative, and short term for the duration of the construction works.

Electricity

The following are the likely impacts of the proposed scheme during the construction stage:

- Electricity cable currently located in the development serving the Sub-Station could be damaged during excavation works. This would result in a loss of power to the site and may impact the wider area.
- The striking of an underground electricity cable during construction operations could potentially result in serious injury or death of site staff.
- Power will be required for the construction activities, for temporary lighting and temporary signals required during construction works with power coming from the existing sub-station.
- The power demands during the construction phase on the existing electricity network are considered to be slight, negative and of short-term impact.
- Due to a cable strike outside of the proposed site, the potential to disrupt electricity services inside the development site is a possibility causing moderate effects to the construction programme. This is a possible indirect effect.

Gas

The following are the likely impacts of the proposed scheme during the construction stage:

- The striking of an underground gas main during construction operations could potentially result in serious injury or death of site staff due to a potential explosion.
- Excavation works causing damage and leaks to gas mains with a resultant negative impact on the climate and human health.
- The potential impact from the construction phase of the proposed development on the local gas supply network is likely to be low. The new gas main diversion will be fully installed and tested before any removal of the live network takes place.

Telecommunications

The following are the likely impacts of the proposed scheme during the construction stage:

- The striking of an underground/overhead telecommunications lines during construction operations could potentially result in serious downtime of the network in the development site leading to communication difficulties for the Construction Teams.
- The construction phase is likely to give rise to the requirement to divert existing fixed telecom lines. If not undertaken in accordance with best practise procedure, this has the potential to impact on local telecoms connectivity.
- The potential impact from the construction phase of the proposed development on the local telecoms network is likely to be imperceptible, short-term and low.

10.5.2 Operational Phase

Foul Water

The proposed wastewater network has been designed to cater for the full quantum of the development required for the development. Irish Waters Pre-connection enquiry has been received, indicating that the development can be accommodated.

Potable Water

The proposed potable network has been designed to cater for the full quantum of the development required for the development. Irish Waters Pre-connection enquiry has been received, indicating that the development can be accommodated.

Electricity

The proposed development will require electricity supplies during the operational phase of the scheme and these will be provided by the installation of new sub-stations within the development and the decommissioning and moving of the existing sub-station based on its current location all in agreement with ESB Networks. Please refer to JVT drawing 4083-(60)-00A – Proposed Electrical Site Services layout indicating proposed locations of sub-stations. As the new cable services will be located underground, this will result in a permanent but imperceptible effect. The apartment buildings will be NZEB compliant and with the incorporation of renewable technology, the demand on the electrical supply should be further reduced. The likely impact from the operational phase on the electricity supply network is likely to be long term and moderate.

The indirect impact will allow ESB Networks to provide additional resilience in their network through the provision of new Sub-Stations (Assuming agreement with ESB Networks) which in turn should impact positively on the wider area's electrical infrastructure.

A 'worst-case' scenario resulting from the operation of the development would be a breakage on the cable feeding the Sub-Stations possibly caused by a third party leading to downtime of power supplies in the local network.

With the proposed installation of new sub-stations this should allow ESB Networks to cater for any secondary projects that may arise within the vicinity.

The cumulative impact from the operational phase of the development on the electricity supply network is likely to be long term, positive and moderate.

Gas

The proposed development will require gas supplies during the operational phase of the scheme and these will be provided by the installation of new connections to the development site as outlined in JVT drawing 4083-(54)-00 – Proposed Utility Drawing – Gas. As the new services will be located underground this will result in a permanent but imperceptible effect. The buildings will be NZEB compliant and with the increased thermal performance of the buildings, the potential impact from the operational phase on the gas supply network is likely to be long term, neutral and low.

The additional demand on the gas network is not deemed to have any material impact on the surrounding area as there is sufficient capacity in the gas network system to manage the additional demand created by the development.

The cumulative impact from the operational phase of the development on the gas supply network is likely to be long term and low.

Telecommunications

The proposed development will require telecommunication connections during the operational phase of the scheme and given the number of telecommunication providers with infrastructure available within the Dublin 7 area this will provide the building users with a greater choice of service and will result in a positive effect for the users. As the new services will be located underground this will result in a permanent but imperceptible effect. Please refer to the JVT drawing 4083-(60)-01A - Proposed Utility Drawing – Eir.

The additional demand on the telecoms network is not deemed to have any material impact on the surrounding area as there is sufficient capacity in the telecoms network system to manage the additional demand created by the development. The likely impact from the operational phase on the telecoms network is likely to be long term and low.

The 'worst case scenario' would be an outage created by a third party on the telecoms supply to the development causing loss of service.

The cumulative impact from the operational phase on the telecoms network is likely to be long term and low.

10.6 'DO NOTHING SCENARIO'

Under a 'do nothing' scenario, there would be no change in the sites current use and the existing status would remain and the impact would be neutral.

In the scenario where the proposed development does not proceed as planned, the existing land-use and water services infrastructure and public utilities in the study area would remain as currently identified in the desktop study, site visit and site specific investigations.

10.7 MITIGATION MEASURES

10.7.1 Construction Mitigation Measures

MA:BS-C1	***Foul Drainage -*** Effluent generated on site from the contractors sanitary facilities will be discharged to a holding tank and removed off site by a licenced removal contractor in accordance with Dublin City Council requirements. Temporary discharge utilising the existing, or permitted sewerage network will be in agreement with Dublin City Council and Irish Water. All necessary health and safety measures will be undertaken to ensure the safety and welfare of construction personnel, the public and road users during construction of the foul infrastructure.
MA:BS-C2	***Water Supply -*** The contractor will make all necessary arrangements for a temporary water supply in agreement with Irish Water and Dublin City Council. A water meter will be installed to monitor water consumption on the site and to enable early detection of any potential leaks.

MA:BS- C3	***Electricity*** The locations of the electricity network infrastructure relative to the proposed works will be confirmed as part of the Detailed Design Phase The Contractor will be obliged to put measures in place to ensure that there are no interruptions to existing services and all services and utilities are maintained unless this has been agreed in advance with ESB Networks Prior to excavation the Contractor will carry out additional site investigation, including slit trenches, in order to determine the exact location of the electricity network in close proximity to the works area. This will ensure that the underground electricity network will not be damaged during the construction phase All works in the vicinity of ESB Networks infrastructure will be carried out in ongoing consultation with ESB Networks and will be in compliance with any requirements or guidelines they may have have including procedures to ensure safe working practices are implemented when working near live overhead/underground electrical lines Where new services are required, the Contractor will apply to ESB Networks for a connection permit where appropriate and will adhere to their requirements
MA:BS-C4	***Gas*** The locations of the gas network infrastructure relative to the proposed works will be confirmed as part of the Detailed Design Phase The Contractor will be obliged to put measures in place to ensure that there are no interruptions to existing services and all services and utilities are maintained unless this has been agreed in advance with Gas Networks Ireland (GNI) Prior to excavation the Contractor will carry out additional site investigation, including slit trenches, in order to determine the exact location of the gas network in close proximity to the works area. This will ensure that the underground gas network will not be damaged during the construction phase All works in the vicinity of GNI infrastructure will be carried out in ongoing consultation with GNI and will be in compliance with any requirements or guidelines they may have including procedures to ensure safe working practices are implemented when working near live gas mains. Where new services are required, the Contractor will apply to GNI for a connection permit where appropriate and will adhere to their requirements

MA:BS-C5	***Telecommunications*** The locations of the telecommunications network infrastructure relative to the proposed works will be confirmed as part of the Detailed Design Phase The Contractor will be obliged to put measures in place to ensure that there are no interruptions to existing services and all services and utilities are maintained unless this has been agreed in advance with the relevant telecommunication provider Prior to excavation the Contractor will carry out additional site investigation, including slit trenches, in order to determine the exact location of the telecommunications network in close proximity to the works area. This will ensure that the underground telecommunications network will not be damaged during the construction phase All works in the vicinity of the telecommunications providers infrastructure will be carried out in ongoing consultation with the relevant provider and will be in compliance with any requirements or guidelines they may have Where new services are required, the Contractor will apply to the relevant provider for a connection permit where appropriate and will adhere to their requirements It is considered that any likely impacts to overhead cables in the vicinity will be mitigated by applying standard construction practices

10.7.2 Operational Mitigation Measures

MA:BS-O1	***Foul Drainage -*** The proposed foul network when completed will be vested to Irish Water whom will have responsibility for the on-going maintenance and operation of the service. Private drainage areas, such as the various apartment blocks, will be maintained by the units maintenance company. Any issues going forward will there for be addressed and mitigation against.
MA:BS-O2	***Water Supply –*** The proposed potable water network when completed will be vested to Irish Water who will have responsibility for the on-going maintenance and operation of the service. Private drainage areas, such as the various apartment blocks, will be maintained by the unit's maintenance company. Any issues going forward will there for be addressed and mitigation against.
MA:BS-O3	***Electricity*** The power demands during the operational phase on the existing electricity network are considered to be imperceptible due to the energy efficient design including LED lighting, high performance heating equipment
MA:BS-O4	***Gas*** The gas demands during the operational phase on the existing gas network are considered to be low due to the NZEB energy efficient design, thermal performance of the buildings and the use of renewable technology to reduce the heating demand. The design and construction of the required electrical services infrastructure in accordance with the relevant guidelines and codes of practice is likely to mitigate any potential impacts during the operational phase of the development, with the exception of any routine maintenance of the site services

MA:BS-O5	***Telecommunications*** The telecommunications demand during the operational phase on the existing telecommunications network are considered to be imperceptible due to the resilience built into the networks by the relevant providers The design and construction of the required Telecommunication services infrastructure in accordance with the relevant guidelines and codes of practice is likely to mitigate any potential impacts during the operational phase of the development, with the exception of any routine maintenance of the site services

10.8 RESIDUAL IMPACTS

Subject to implementation of the mitigation measures above there will be no residual adverse impacts to the material assets/ built services infrastructure as a result of the proposed development.

10.9 MONITORING AND REINSTATEMENT

It is not foreseen that any monitoring will be required on completion of the proposed development.

Any proposed works for the foul and watermain networks which are to take place outside of the subject lands will be carried out by Irish Water agents. Therefore, all reinstatement works will be in accordance, supervised and signed off by Irish Water or agents acting on their behalf.

All electricity, gas and telecommunications excavations will be fully reinstated to the requirements of ESB, Gas Networks Ireland (GNI) and the relevant telecommunications providers respectively

REFERENCES

In addition to the sources noted in above the documents listed below were also consulted.

- Dublin City Development Plan 2016–2022;
- Dublin City Strategic Flood Risk Assessment, 2016 – 2022;
- Regional Code of Practice For development works, Version 6;
- Irish Waters Code of Practice for Water Infrastructure;
- Irish Waters Code of Practice for Wastewater Infrastructure;
- Greater Dublin Strategic Drainage Study;
- Geological Survey of Ireland Maps;
- Local Authority/Irish Water Drainage Records.
- ESB Construction Standards for MV Sub-Station Buildings.
- ESB electrical services handbook for housing schemes.
- GNI – Guidelines for Designers and Builders Domestic Sites
- https://www.esbnetworks.ie/staying-safe/contractor-safety/digging-and-excavation-work
- https://www.gasnetworks.ie/corporate/freedom-of-information/make-a-request/
- https://cbyd.emaps.eircom.ie/Eircom-CBYD/

11 MATERIAL ASSETS: TRANSPORTATION

11.1 INTRODUCTION

This chapter of the EIAR assesses any likely or significant impacts associated with traffic and transportation issues arising from the proposed development, in respect of both the operational and construction stages. Relevant mitigation measures are also presented in this chapter.

This assessment is based principally on the outcome of the Traffic and Transport Assessment (TTA) prepared by CS Consulting and submitted separately in support of this planning application. For full details of the assessment methodology and other transport-related aspects of the proposed development, particularly those that have no bearing on environmental impact, please refer to the TTA report.

11.2 ASSESSMENT METHODOLOGY

The methodology adopted for the assessment of traffic impact is summarised as follows:

1) A vehicular traffic count survey was undertaken at 10no. sites on the surrounding road network, to establish background traffic flows and existing peak hour periods.

2) A development trip generation assessment was carried out using industry standard trip rate database TRICS, to determine the potential vehicular trips to and from the proposed development site during peak hours. The vehicular trip generation of other nearby permitted developments was also assessed.

3) An appropriate distribution across the surrounding highway network was assigned to vehicular trips generated by the subject development and by other permitted developments, based upon existing traffic characteristics on the mainline traffic flows.

4) A spreadsheet model was created containing baseline year do-nothing traffic flow data.

5) These traffic data were used to develop traffic models using industry standard traffic modelling software PICADY. There were 5no. junctions assessed using PICADY modelling software, which included the various site accesses onto the existing highway network.

6) Baseline traffic flows were established and calculated using forecast growth factors from Transport Infrastructure Ireland (TII). The baseline traffic flow was derived and applied to the PICADY junction models. The performance of these junctions was assessed for the baseline year of 2020, planned year of opening 2023 and the design year of 2038 (15 years after opening) with and without subject development traffic flows.

11.2.1 Background Peak Hour Identification

A 12-hour manual classified vehicular turning count survey was undertaken on Thursday 27th February 2020 by Traffinomics Limited, on behalf of CS Consulting. This survey was conducted between 07:00 and 19:00 at 10no. sites on North Circular Road, Aughrim Street, Infirmary

Road, Montpelier Park, and Thor Park. These included the 3no. existing junctions that give direct access to the subject development site.

The weekday peak hour background traffic flows across all survey sites were found to occur between 08:00 and 09:00 (AM peak hour) and between 16:45 and 17:45 (PM peak hour).

The surveys undertaken pre-dated the Covid-19 restrictions and flows can be assumed to have reduced during times of public health restriction, but are expected to return to pre-restriction level during the period of construction and operation, so lower levels are not considered representative.

11.2.2 Vehicular Trip Generation of Subject Development – Operational Phase

The proposed development comprises a mix of residential units, dwelling houses (43no. including 20no. duplex units), apartments (1,004no.), retail units (1,393m²), crèche facilities (489m²), café (155m²), and community space (157m²).

The non-residential elements of the development are likely to serve primarily the development itself, as well as the adjacent existing established residential developments. This is particularly true of the retail, café unit and community space, which are expected to generate negligible external vehicular traffic; and therefore, these two elements have been excluded from the trip generation analysis.

For the various elements of the development, the TRICS sub-categories '03 Residential / A – Houses Privately Owned', '03 Residential / C – Flats Privately Owned', '01 Retail / I – Shopping Centre – Local Shops', and '04 Education / D – Nursery' have been applied.

These trip rates have been carefully selected insofar as possible to similar locations and further refined with reference to 2016 CSO census data based on:

- the population within 1 mile of the development site (65,000 approx.);
- the population within 5 miles of the development site (720,000 approx.);
- the aggregate mean car ownership rate within 5 miles of the development site (0.96 cars per household).

The selected residential and non-residential TRICS trip rates are given in Table 11.2 and Table 11.3.

Table 11.2 : TRICS Residential Trip Generation Rates

Peak Hour	Arrivals per residential unit		Departures per residential unit	
	Houses	Apartments	Houses	Apartments
AM Peak	0.121	0.038	0.255	0.132
PM Peak	0.212	0.148	0.130	0.102

Table 11.3 : TRICS Non-Residential Trip Generation Rates

Peak Hour	Arrivals per 100sqm		Departures per 100sqm	
	Retail	Crèche	Retail	Crèche
AM Peak	3.487	6.399	3.109	5.250
PM Peak	5.466	2.953	5.986	3.302

Residential trip numbers in this instance have been calculated as a function of the TRICS trip rates given in Table 11.2 and the total numbers of dwellings (43no. houses and 1,004no. apartments) within the proposed development. Non-residential trip numbers have been calculated as a function of the TRICS trip rates given in Table 11.3 and the gross floor areas of the retail units and crèche. The resultant TRICS-derived trip generation figures obtained are given in Table 11.4 and Table 11.5, respectively.

Table 11.4 : **Residential Trip Generation**

Peak Hour	Arrivals		Departures	
	Houses	Apartments	Houses	Apartments
AM Peak	5	38	11	133
PM Peak	9	149	6	102

Table 11.5 : **Non-Residential Trip Generation**

Peak Hour	Arrivals		Departures	
	Retail	Crèche	Retail	Crèche
AM Peak	49	31	43	26
PM Peak	76	14	83	16

As previously noted, the non-residential elements of the development may be expected to serve primarily the development itself, as well as the adjacent existing established residential developments. This is particularly true of the community space and the café unit, which are expected to generate negligible vehicular traffic. To account for this expected usage pattern, the community space and café unit have been excluded from the trip generation analysis, while a reduction in 50% of vehicular trips has been applied to the remaining non-residential elements of the development.

Table 11.6 : **Adjusted Non-Residential Trip Generation**

Peak Hour	Arrivals		Departures	
	Retail	Crèche	Retail	Crèche
AM Peak	24	16	22	13
PM Peak	38	7	42	8

The resultant TRICS-derived combined development vehicular trips, with the reduction in 50% of the proposed retail and creche trips applied, are presented in Table 11.7.

Table 11.7 : **Total Subject Development Trip Generation – Operational Phase**

Peak Hour	Arrivals	Departures	Total Trips
Residential			
AM Peak (08:00-09:00)	43	143	186
PM Peak (16:45-17:45)	158	108	266
Retail			
AM Peak (08:00-09:00)	24	22	46
PM Peak (16:45-17:45)	38	42	80
Crèche			
AM Peak (08:00-09:00)	16	13	29
PM Peak (16:45-17:45)	7	8	15
Total Combined Development			
AM Peak (08:00-09:00)	83	178	261

PM Peak (16:45-17:45)	203	158	361

11.2.3 Vehicular Trip Generation of Subject Development – Construction Phase

During construction of the subject development, it is expected that vehicular traffic to and from the site shall reach a peak during site clearance works and basement excavation earthworks, which shall require the removal from site of construction waste and spoil. Under a 'worst-case' scenario, it is possible that up to 10no. HGV trips may be made to the site each hour during this phase (one HGV arrival and one HGV departure every 6 minutes); this would equate to total movements of 20 HGVs in each of the background peak hours, equivalent to 46 Passenger Car Units (PCU).

Allowing for a potential additional 50no. light vehicle arrivals and 5no. light vehicle departures during the AM peak, with these movements reversed during the PM peak, the maximum potential construction-related vehicle movements in either of the peak hours is 101 PCU. This is significantly lower than the operational phase peak hour trip generation given in Table 11.7.

Table 11.8 : **Total Development Trip Generation – Construction Phase**

Peak Hour	Arrivals	Departures	Total Trips
Light Vehicles (PCU)			
AM Peak (08:00-09:00)	50	5	55
PM Peak (16:45-17:45)	5	50	55
Heavy Vehicles (PCU)			
AM Peak (08:00-09:00)	23	23	46
PM Peak (16:45-17:45)	23	23	46
Total Trips (PCU)			
AM Peak (08:00-09:00)	73	28	101
PM Peak (16:45-17:45)	28	73	101

11.2.4 Vehicular Trip Generation of Nearby Permitted Developments

Figure 11.4 : Relevant residential committed development (sources: OSM Contrib. Google)

The nearby committed development is The Phase 1A housing development 56no. dwellings, directly adjacent to the subject development site, with vehicular access via the internal road network of the O'Devaney Gardens site. This development is currently under construction and is shown in

Figure 11.4. The other nearby planning permission identified in Section 3.6 of this EIAR is the Infirmary Road site on Montpelier Gardens which is currently inactive. Other developments in the wider area include a number of smaller schemes and student residences with a negligible associated vehicular trip generation; these are therefore not considered further in this assessment.

The vehicular trips predicted to be generated by this permitted development have been included in all future year operational assessments.

The adjacent committed development comprises 36no. dwelling houses and 20no. apartments, all of which will be for use as social housing managed by the Local Authority. The TRICS sub-categories '03 Residential / B – Affordable/Local Authority Houses' and '03 Residential / D – Affordable/Local Authority Flats' have therefore been employed in this instance.

TRICS trip rates for this committed development are provided in Table 11.9, and the resultant trip generation figures are given in
Table 11.10.

Table 11.9: TRICS Social Housing Trip Generation Rates

Peak Hour	Arrival Trips per residential unit		Departures Trips per residential unit	
	Houses	Apartments	Houses	Apartments
AM Peak	0.113	0.054	0.169	0.168
PM Peak	0.261	0.083	0.209	0.046

Table 11.10: Committed Development Trip Generation

Peak Hour	Arrival Trips			Departures Trips		
	Houses	Apartments	TOTAL	Houses	Apartments	TOTAL
AM Peak	4	1	5	6	3	9
PM Peak	9	2	11	8	1	9

11.2.5 Vehicular Trip Distribution

Vehicular access to/from the subject development from/to the wider road network will be via 3no. 3-arm priority junctions:

- North Circular Road / O'Devaney Gardens
- Infirmary Road / Montpelier Gardens
- Aughrim Street / Cowper Street

These access junctions are connected by the internal road network, and it is assumed that vehicles arriving or departing from the development will use whichever access junction is the most convenient, given their origin or destination on the surrounding road network.

Vehicular traffic arriving to or departing from the development site is expected to enter or leave the immediate surrounding area via the following five routes:

1. Infirmary Road to/from south;

2. Phoenix Park to/from west;
3. Blackhorse Avenue to/from west;
4. North Circular Road to/from north; or
5. Manor Street to/from south.

The predicted distribution of vehicular trips to and from the subject development has been established following the proportions of the surveyed inbound and outbound mainline traffic flows at these five key points on the local road network, in each of the peak hour periods. These proportions (for both arrivals and departures, in both peak hour periods) are shown in Figure 11.5 and Figure 11.6, respectively.

Also shown in these images are the mapped routes providing the predicted driving routes between the development site and each of the five network points.

Table 11.11 and Table 11.12 summarise the distribution of development arrival and departure trips according to the network point from which they arrive or to which they depart. These tables indicate the proportions and numbers of trips from/to each network point, the development access junction used in each case, and the other surveyed junctions through which they will pass.

Figure 11.5 : Predicted distribution of development arrival trips (sources: OSi, OSM Contributors, Google)

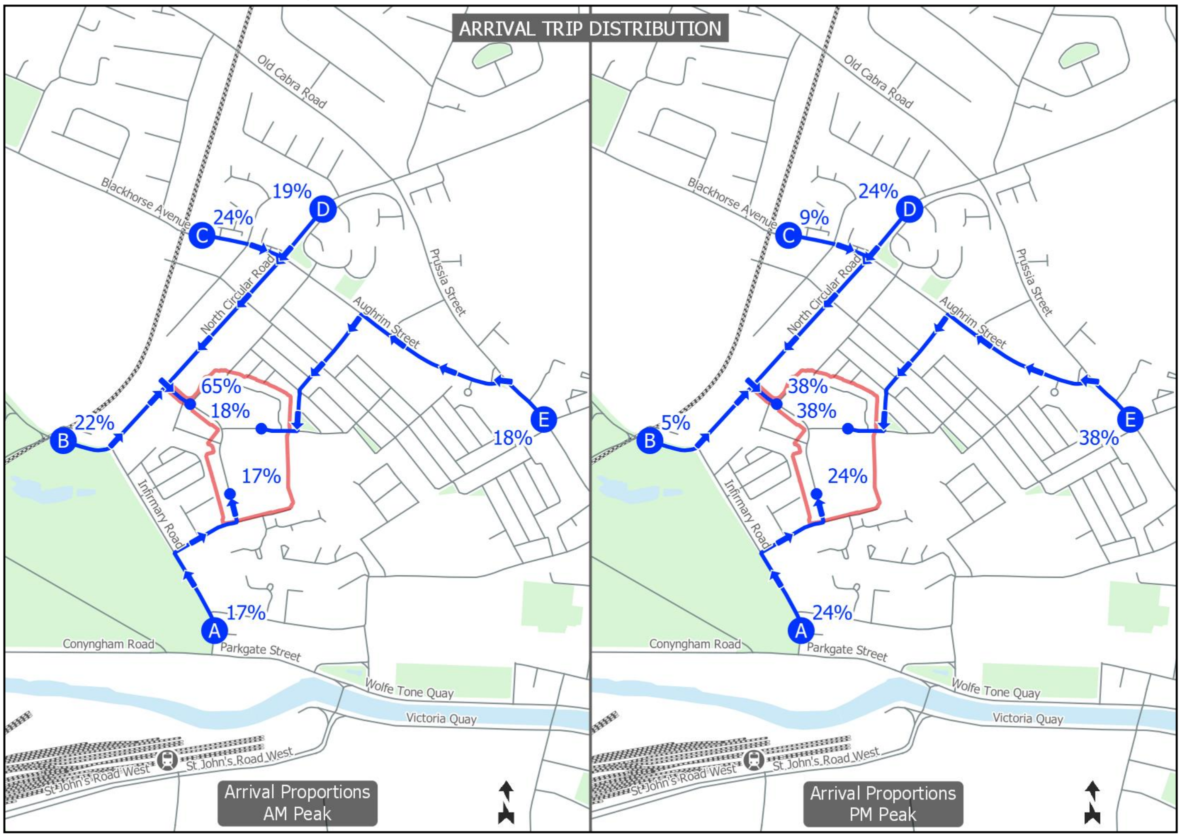


Figure 11.6 : Predicted distribution of development departure trips (sources: OSi, OSM Contributors, Google)

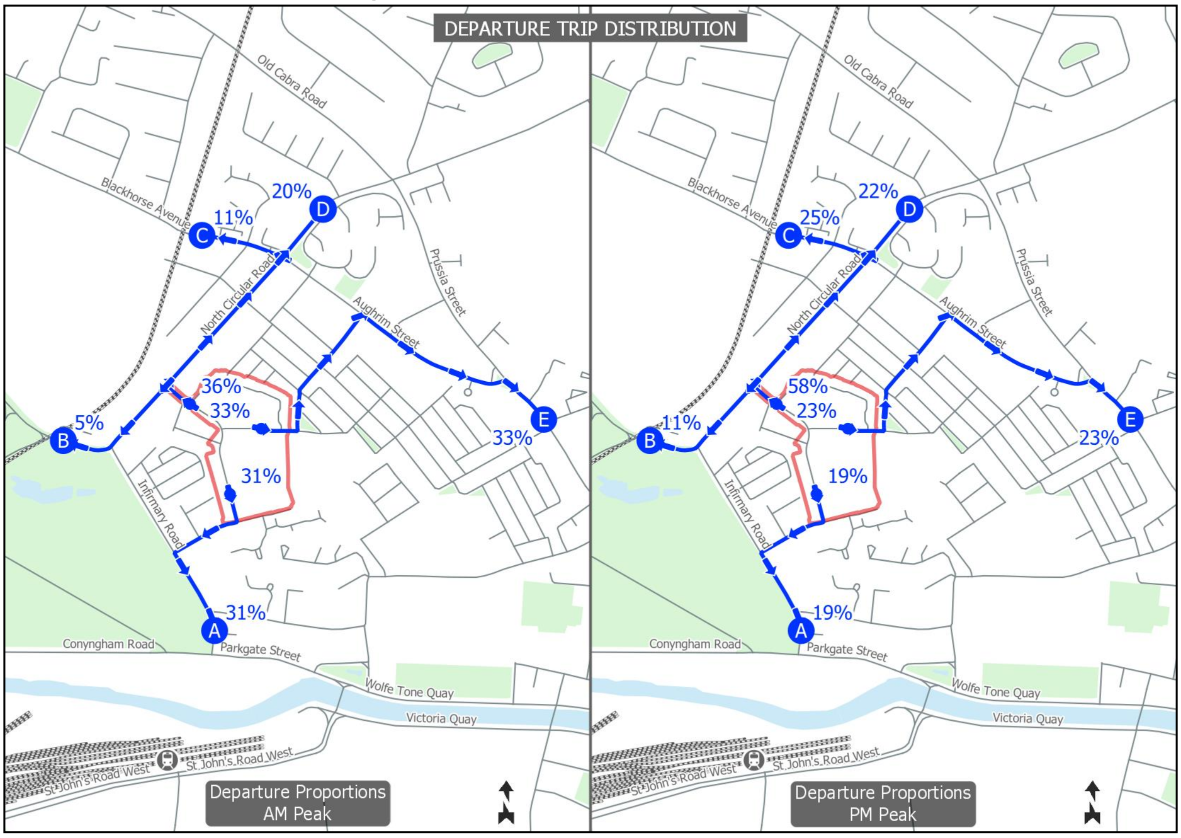


Table 11.11 : Distribution of Development Arrival Trips

Network Entry Point	Development Access Junction No.	Other Junctions Passed Through	% of AM Trips	% of PM Trips	Number of AM Trips	Number of PM Trips
A	2	6, 5	17.6%	23.8%	15	48
B	1	7	21.5%	5.1%	18	10
C	1	9	23.9%	8.6%	20	17
D	1	9	18.6%	24.3%	15	49
E	3	10, 8	18.4%	38.2%	15	78

Table 11.12 : Distribution of Development Departure Trips

Network Exit Point	Development Egress Junction No.	Other Junctions Passed Through	% of AM Trips	% of PM Trips	Number of AM Trips	Number of PM Trips
A	2	5, 6	31.1%	19.2%	55	30
B	1	7	5.1%	11.1%	9	17
C	1	9	11.2%	24.8%	20	39
D	1	9	20.1%	22.1%	36	35
E	3	8, 10	32.6%	22.8%	58	36

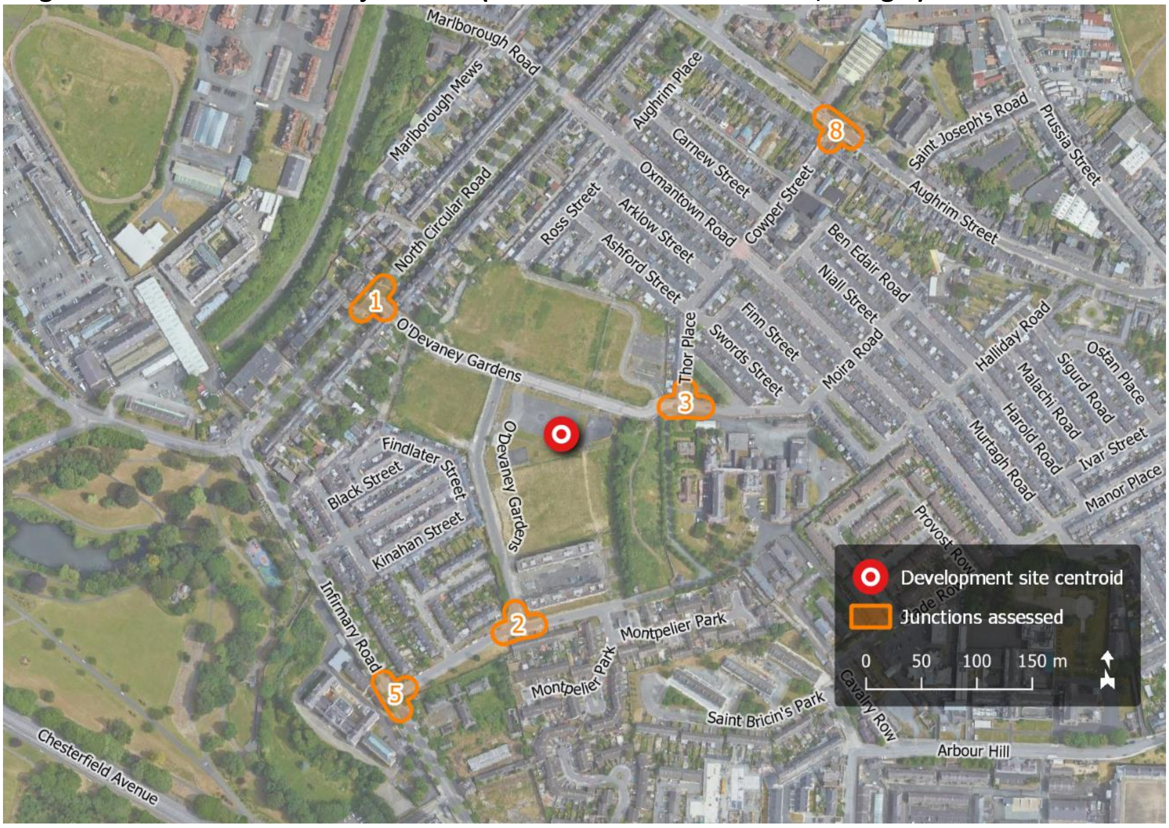
11.2.6 Operational Assessment

The operational performance of the following 5no. existing and proposed road junctions were assessed using industry standard TRL software PICADY (illustrated in Figure 11.7):

- J1 - North Circular Road (R101) / O'Devaney Gardens (3-arm priority-controlled junction)
- J2 - Montpelier Gardens / O'Devaney Gardens (3-arm priority-controlled junction)
- J3 - O'Devaney Gardens / Thor Place / Thor Park (3-arm priority-controlled junction)
- J5 - Infirmary Road (R101) / Montpelier Gardens (3-arm priority-controlled junction)
- J8 - Aughrim Street (R806) / Cowper Street (3-arm priority-controlled junction)

Further existing junctions were surveyed but did not require operational assessment, as vehicular traffic generated by the subject development will result in increases of less than 10% in total peak hour traffic flows at these locations.

Figure 11.7 : Modelled road junctions (sources: OSM Contributors, Google)



The performances of these junctions have been assessed under the following scenarios:

- 2020 – existing baseline traffic conditions;
- 2023 – proposed year of opening;
- 2028 (future year) – with and without subject development; and
- 2038 (design year) – with and without subject development.

For future and design years, the surveyed 2020 background traffic flows were scaled up using standard growth factors sourced from Unit 5.3 of the TII Project Appraisal Guidelines (PE-PAG-02017 Travel Demand Projections).

Junction performance was assessed under the following criteria, for each junction approach arm:

- Degree of Saturation (the ratio of current traffic flow to ultimate capacity on a link or traffic stream);
- Mean Maximum Queue (the highest estimated mean number of Passenger Car Units queued in any lane of a junction approach link, averaged over the entire analysis period);
- Mean Delay per PCU (the average delay incurred by a vehicle on a junction approach); and
- Practical Reserve Capacity (the percentage by which the arriving traffic flow on a stream could increase before the stream would reach its effective capacity).

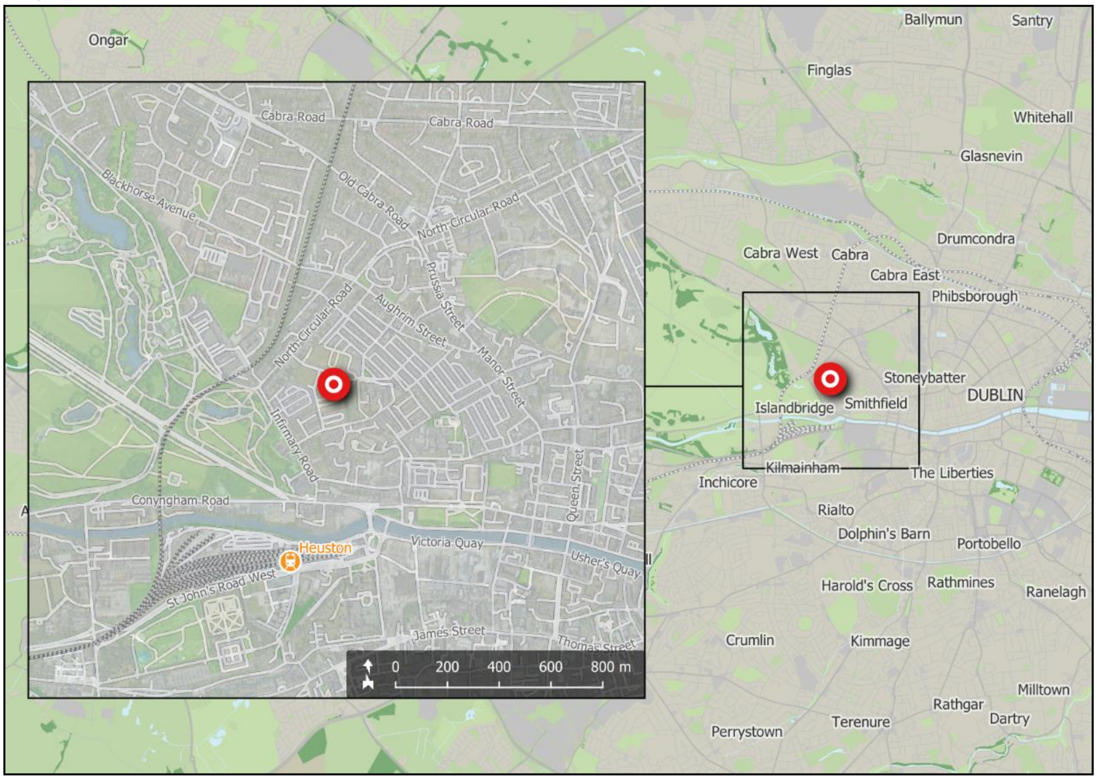
11.3 RECEIVING ENVIRONMENT

11.3.1 Location

The application site (c.5.2 hectares) is in the north Inner City, comprising lands which were formerly in residential use – O'Devaney Gardens Development. The application site also includes a portion of land which was previously part of St. Bricin's Military Hospital.

The location of the proposed development site is shown in Figure 11.8.

Figure 11.8 : Location of proposed development site (sources: EPA, OSM Contributors, Google)



The development site is a brownfield site. The site is bounded to the east by Saint Bricin's Military Hospital and by existing residential properties, to the west by an adjacent residential development currently under construction and by existing residential properties, and on all other sides by existing residential properties.

The subject development's internal road network will tie into the existing surrounding road network at a total of 3no. site access locations providing vehicular access to the development. The indicative extents of the development site, as well as relevant elements of the surrounding road network, are shown in more detail in Figure 11.9.

Figure 11.9 : Site extents and surrounding transport infrastructure (sources: NTA, OSM Contributors, Google)

11.3.2 Existing Road Network

Relevant elements of the existing road network in the immediate vicinity of the subject site include the North Circular Road, Infirmary Road, Montpelier Gardens, Conyngham Road and Parkgate Street. The characteristics of these roads are provided below.

North Circular Road

- Single carriageway road with a pavement width of 8m in the vicinity of the subject development.
- Regional road with an east-west alignment overall, leading to Phoenix Park in the west and leading to the docklands in the east.
- Subject to a 50km/h speed limit.
- Raised footpaths are present along both sides of North Circular Road. Advisory cycle tracks are present in the westbound direction.
- On-street parking is not prohibited along sections of North Circular Road in the vicinity of the subject development site.

Infirmary Road

- Single carriageway road with a pavement width of approximately 10m in the vicinity of the subject development site.
- Local road with a north-south alignment, leading to Parkgate Street in the south and to North Circular Road in the north.
- Subject to a 50km/h speed limit.
- Raised footpaths are present along both sides of Infirmary Road.
- No cycle tracks or bus lanes are present along Infirmary Road.

- On-street parking is present on Infirmary Road in the vicinity of the subject development site.

Montpelier Gardens

- Single carriageway road with a pavement width of approximately 8m in the vicinity of the subject development site.
- Residential Street with an east-west alignment, leading to St. Bricin's Military Hospital and the subject development in the east and connecting to Infirmary Road in the west.
- Subject to a 30km/h speed limit.
- Raised footpaths are present along both sides of Montpelier Gardens.
- No cycle tracks or bus lanes are present along Infirmary Road.
- On-street parking is not prohibited on Montpellier Gardens in the vicinity of the subject development site.

Conyngham Road / Parkgate Street

- Single carriageway road with a pavement width of approx. 14m in the vicinity of its junction with Infirmary Road
- Regional road with an east-west alignment generally, connecting to Dublin city centre in the east and to Lucan in the west.
- Subject to a 50km/h speed limit.
- Raised footpaths are present along both sides of Conyngham Road/Parkgate Street.
- A shared bus/cycle lane is present in the eastbound direction on Parkgate Street to the east of its junction with Infirmary Road.
- On-street parking is prohibited on Conyngham Road/ Parkgate Street.

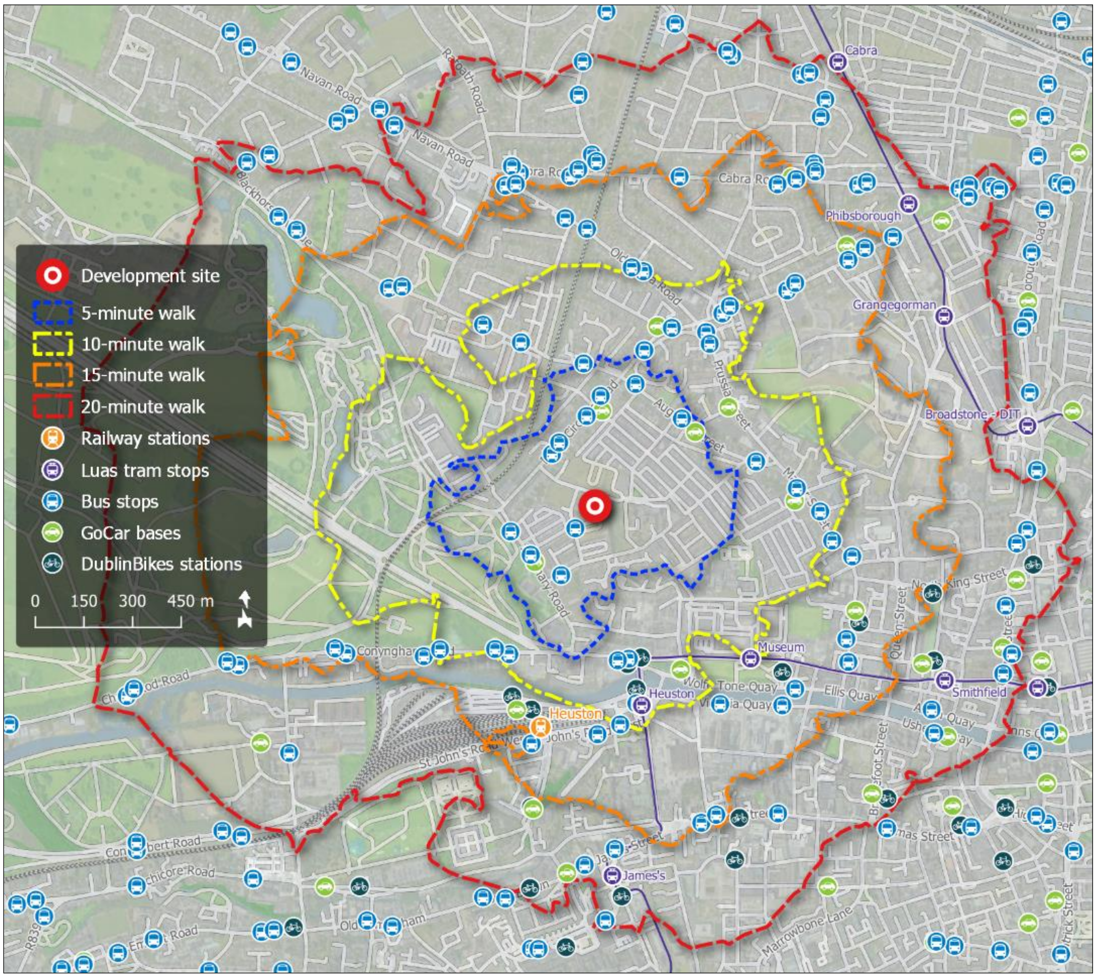
11.3.3 Site Accessibility – Walking and Public Transport

The development site benefits from proximity to good quality public transport services. As shown in Figure 11.10, the development site is situated within a 10-minute walk of the Heuston Station stop on the Luas Red Line, which is served by frequent trams to and from Dublin city centre, as well as to/from Saggart and Tallaght in the south-west. The site is also within a 20-minute walk of tram stops on the Luas Green Line.

Bus stops within a 5-minute walk of the site are served by a total of 3no. Dublin Bus routes, all of which operate at intervals of less than 10 minutes at peak times. 21no. additional bus routes serve stops which are within a 10-minute walk of the subject site.

For further details of the public transport provision in the vicinity of the development site, refer to the Residential Travel Plan Framework (RTPF) document prepared by CS Consulting and submitted under separate cover in support of this application.

Figure 11.10 : Walking Times and Public Transport Locations (sources: NTA, OSi, DCC, EPA, OSM Contributors, Google)



11.3.4 Existing Traffic Conditions

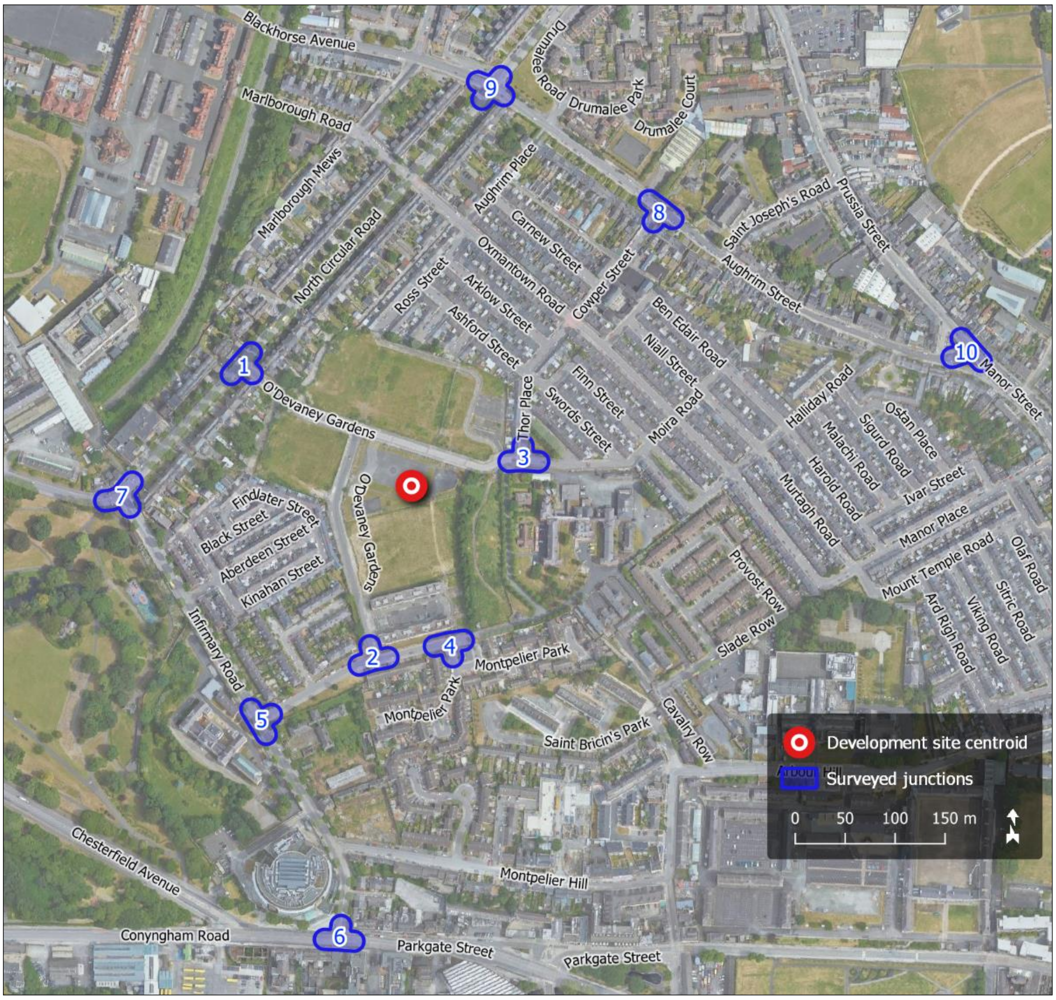
Full 12-hour manual classified traffic turning counts were conducted by Traffinomics Limited, on behalf of CS Consulting, over a 12-hour period (07:00–19:00) on Thursday the 27th, 29th February and 1st March 2020, as illustrated in Figure 11.11.

Manual classified traffic count information was obtained at the following 10no. sites:

1. North Circular Road (R101) / O'Devaney Gardens
   (3-arm priority-controlled junction)
2. Montpelier Gardens / O'Devaney Gardens
   (3-arm priority-controlled junction)
3. O'Devaney Gardens / Thor Place / Thor Park
   (3-arm priority-controlled junction)
4. Military Hospital / Montpelier Park / Montpelier Gardens
   (3-arm priority-controlled junction)
5. Infirmary Road (R101) / Montpelier Gardens
   (3-arm priority-controlled junction)
6. Conyngham Road (R109) / Infirmary Road (R101) / Parkgate St. (R109)
   (3-arm signal-controlled junction)
7. Infirmary Road (R101) / Phoenix Park / North Circular Road (R101)

(3-arm signal-controlled junction)
8. Aughrim Street (R806) / Cowper Street
   (3-arm priority-controlled junction)
9. North Circular Rd (R101) / Aughrim Street (R806) / Blackhorse Avenue
   (4-arm signal-controlled junction)
10. Manor Street (R805) / Aughrim Street (R806) / Prussia Street (R805)
   (3-arm priority-controlled junction)

Figure 11.11 : Surveyed road junction sites (*map data and imagery: OSM Contributors, Google*)



The peak hour traffic flows across all 10no. survey sites were found to be between 08:00 and 09:00 (AM peak hour) and between 16:45 and 17:45 (PM peak hour). Table 11.13 provides the total traffic volumes associated with each junction surveyed as part of the operational assessment.

Table 11.13: Total Peak Hour Traffic at Surveyed Junctions

Time Period	Total Surveyed Junction Traffic Movements in Passenger Car Units (PCUs)									
	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10
2020 – Survey Year										
AM Peak (08:00-09:00)	1128	102	124	69	1145	1777	1405	443	1561	1162
PM Peak (16:45-17:45)	1132	121	57	83	953	2401	1145	457	1604	1326

11.3.6 Traffic Increases Resulting from Subject Development

The TII Traffic and Transport Assessment Guidelines (PE-PDV-02045) advise that Transport Assessments should generally be applied where traffic to and from a development is predicted to exceed 10% of the existing background traffic on the adjoining road (or 5% at sensitive locations). Table 11.14 provides a summary of the percentage change in total traffic flows at all survey junctions that are predicted to result from the subject development during its operational phase. Construction phase traffic flow increases shall be uniformly lower and are therefore not represented in this table.

Within the scope of the present assessment, only the existing junctions J1, J2, J3, J5, and J8 have been subjected to detailed operational assessment. All other surveyed junctions are considered at low risk of detrimental effects as a result of the proposed development, given the generally lower proportional increases in traffic flows that it will give rise to at these locations.

Table 11.14: Total Peak Hour Traffic at Surveyed Junctions

Surveyed Junction No.	Background Traffic Flows at Junction (Year 2020)		Development-Related Trips Through Junction (Operational Phase)		Proportional Change	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
J1	1128	1132	118	169	10.5%	14.9%
J2	102	121	70	79	68.6%	65.3%
J3	124	57	73	114	58.9%	200.0%
J4	69	83	0	0	0.0%	0.0%
J5	1145	953	70	79	6.1%	8.3%
J6	1777	2401	70	79	3.9%	3.3%
J7	1405	1145	27	28	1.9%	2.4%
J8	443	457	73	114	16.5%	24.9%
J9	1561	1604	91	141	5.8%	8.8%
J10	1162	1326	73	114	6.3%	8.6%

11.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

11.4.1 Development Description

The proposed strategic housing development at this site in O'Devaney Gardens, Stoneybatter, will include 1047no. mixed residential units, retail, a crèche, community facilities, and public open space. All associated site development works and services provisions including parking, bin storage, substations, landscaping and all services required to facilitate the proposed development.

A full description is provided in the statutory notices and in Chapter 3 of the EIAR.

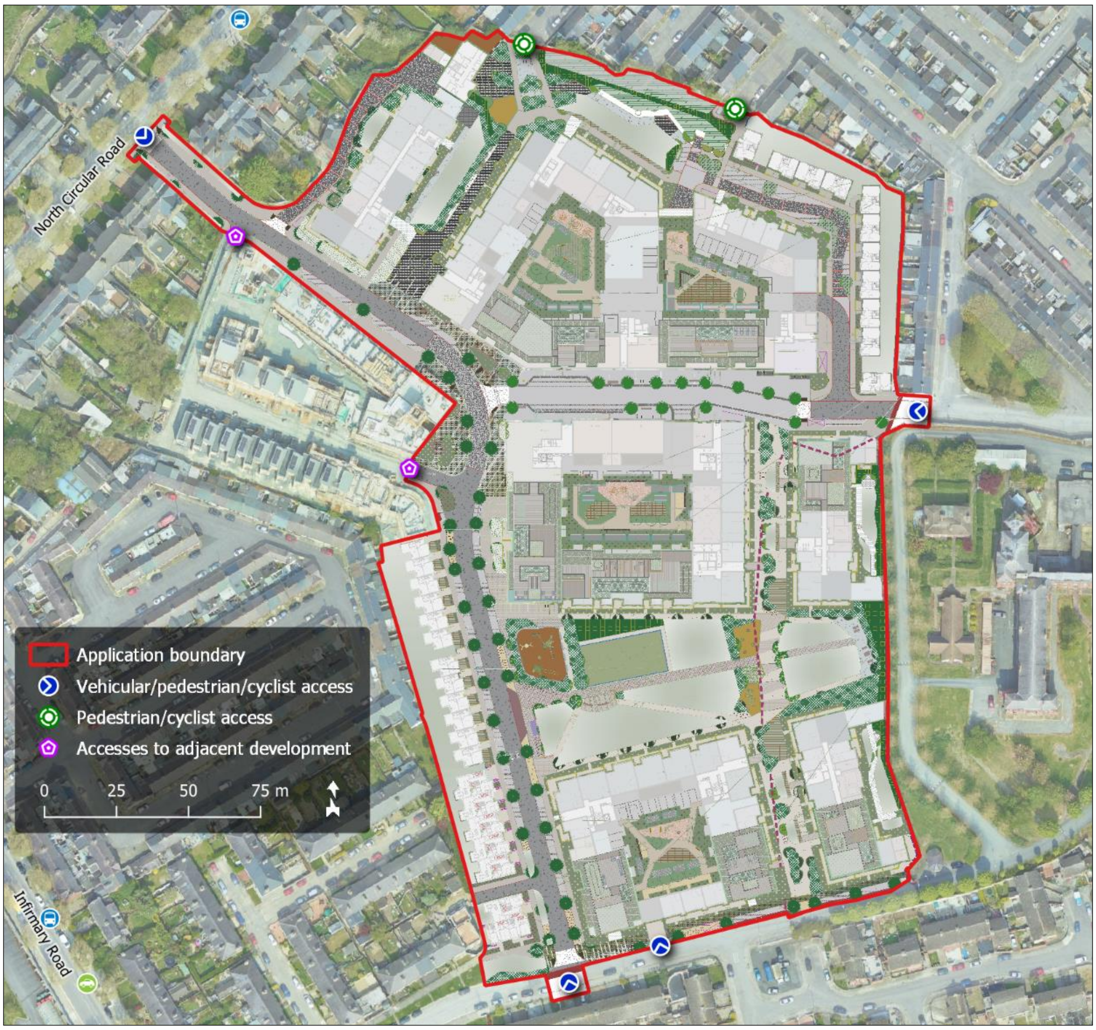
11.4.2 Site Access Arrangements

There are 3no. primary vehicular access points to/from the proposed development as follows:

1. the existing O'Devaney Gardens / North Circular Road junction (north of the development site);
2. the repositioned O'Devaney Gardens / Montpelier Gardens junction (south of the development site); and
3. the existing connection between O'Devaney Gardens and Thor Park (east of the development site).

The subject development's 3no. vehicle access locations to existing surrounding road network are illustrated in Figure 11.12. These access points are interconnected by the development's internal road network. This provides permeability and connectivity through the site for vehicular traffic, as well as for pedestrians and cyclists.

Figure 11.12 : Development layout and access points (sources: NTA, OSM Contributors, Murray & Associates, Google)



In addition to these primary access points, one of the buildings within the development (residential Block 09) will have a direct vehicular access onto Montpelier Gardens, at the site's southern boundary. Provision is also made for pedestrian and cyclist connectivity onto Ross Street and onto Ashford Cottages, at the development site's northern boundary.

All connections between the development's internal road network and the existing external road network have been designed in accordance with the requirements of the Design Manual for Urban Roads and Streets. Where the development's internal road network connects with the North Circular Road (to the north) and with Montpelier Gardens (to the south), the internal road carriageway is ramped up to the level of the existing footpath, ensuring ease of pedestrian movement across the access and emphasising pedestrian priority.

11.4.3 Internal Site Layout and Road Hierarchy

The internal road network of the development consists of two principal elements:

- Primary Boulevard between the North Circular Road and Montpelier Gardens, extending through the entire development site with an overall north-south orientation; and
- East-west Link street connecting the Boulevard (at approximately its mid-point) to Thor Park at the site's eastern boundary.

Two further Local streets will extend northward from the Boulevard and the Link street, giving access to the residential blocks along the northern boundary. All other buildings within the development will be accessed directly from the Boulevard, the Link Street, or (in the case of Block 09) from Montpelier Gardens. Turning heads are provided at the ends of both Local Streets.

The Boulevard and link streets both have carriageway widths of 6.0m, while the local streets 1 and 2 have carriageway widths of 4.8m and 5.2m respectively. All road widths, corner radii, pedestrian and cyclist facilities, kerbs, boundary treatments, and landscaping have been designed in accordance with the Design Manual for Urban Roads and Streets (DMURS). Forward sight distances and visibility splays of 24m are achieved at all new junctions.

Typical road cross sections of the proposed development internal roads are illustrated in Figure 11.13 to Figure 11.15.

Figure 11.13 : Proposed Boulevard cross-section (with on-street parking)

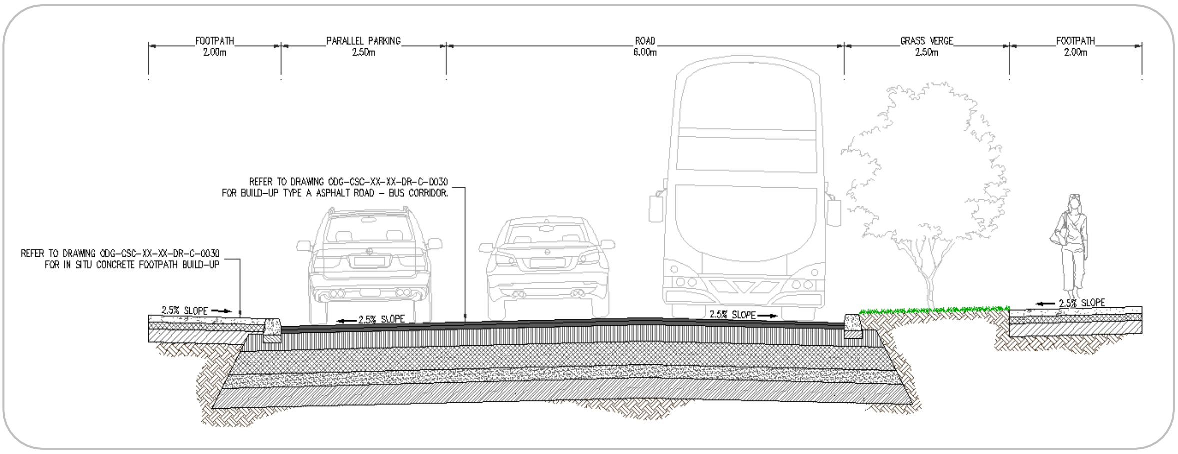


Figure 11.14 : Proposed Link street cross-section

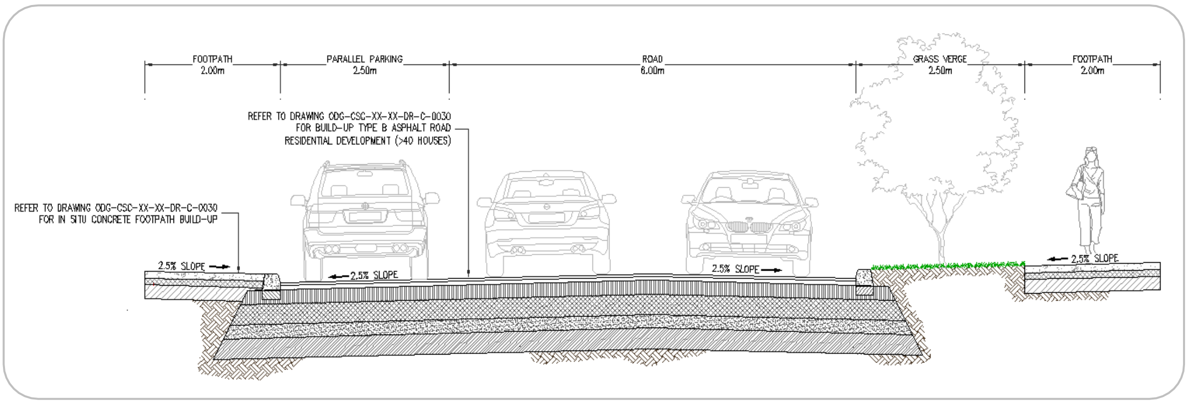
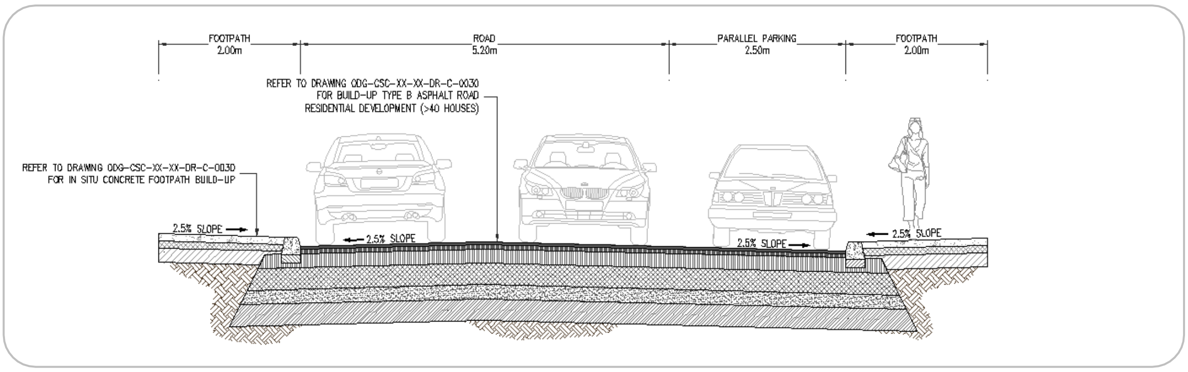


Figure 11.15 : Proposed Local street cross-section



The internal layout of the proposed development also incorporates design features such as distinctive surface materials and colours, strong landscaping proposals, and modern furniture structures, to establish a sense of place within an urban neighbourhood environment.

CS Consulting met with Dublin City Council Roads and Transportation Department on the 4th of December 2019, to discuss the roads layout within the development. Refer to CS Consulting drawings for further details of the internal road layout, road marking and signage, road profiles, road hierarchy, and Quality Audit.

11.4.4 Car Parking

The subject development includes a total of 273no. car parking spaces, comprising:

- 96no. spaces located at undercroft level beneath the podium of Block 05 (of which 3no. spaces allocated to retail units, 5no. spaces allocated to the crèche, and 1no. space allocated to the community space);
- 95no. spaces located across four basement/undercroft levels beneath the podium of Block 07 (of which 2no. spaces allocated to retail units and 1no. space allocated to the café);
- 35no. spaces located at undercroft level beneath the podium of Block 09; and
- 47no. on-street spaces arranged along the development's internal road network and on the northern side of Montpelier Gardens.

An additional 3no. crèche set-down spaces are provided on the internal street immediately to the south of Block 05.

The majority of the internal (undercroft) car parking spaces will be allocated to residents. A proportion of these internal spaces will be allocated to shared vehicles provided as part of a residential car club. On-street car parking spaces shall serve primarily to accommodate visitors to the residential units and patrons of the development's retail/café elements.

The car parking provision of the proposed development does not exceed the maximum permitted by *Dublin City Development Plan 2016–2022* and is in accordance with the recommendations of the national policy document *Sustainable Urban Housing: Design Standards for New Apartments (Guidelines for Planning Authorities),* published in December 2020 by the Department of Housing, Planning and Local Government.

The *Dublin City Development Plan 2016–2022* outlines specific conditions under which reduced car parking in residential developments is appropriate, based on proximity to more sustainable transport modes. The subject development site is close to a number of bus, rail and light rail services and is therefore considered an appropriate location for a limited residential car parking provision in line with standards and guidelines.

The development includes a total of 13no. disabled-accessible car parking spaces, of which:
- 4no. spaces are located at undercroft level within Block 05;
- 2no. spaces are located at undercroft level within Block 09;
- 5no. spaces are arranged along the development's internal road network; and
- 2no. spaces are located on the northern side of Montpelier Gardens, at the southern boundary of the development site.

The development's overall provision of disabled-accessible car parking facilities thereby satisfies the requirements of the *Dublin City Development Plan 2016–2022*.

11.4.5 Bicycle and Motorcycle Parking

The development includes a total of 2,000no. bicycle parking spaces. These consist of:
- 58no. internal bike storage spaces within Block 02 and Block 03;
- 22no. internal bike storage spaces within Block 04;
- 344no. internal bike storage spaces within Block 05;
- 76no. internal bike storage spaces within Block 06;
- 600no. internal bike storage spaces within Block 07;
- 40no. internal bike storage spaces within Block 08;
- 264no. internal bike storage spaces within Block 09;
- 80no. internal bike storage spaces within Block 10;
- 136no. visitor bicycle parking spaces within dwelling curtilages; and
- 380no. publicly accessible short-stay visitor bicycle parking spaces distributed at surface level throughout the development site.

The development also includes 11no. motorcycle spaces, equivalent to 4% of the total development car parking provision. The development's bicycle and motorcycle parking provisions meet the requirements of the *Dublin City Development Plan 2016–2022.*

11.4.6 Parking Management

It is proposed to establish a car-sharing club for residents of the development. 30no. dedicated shared vehicles will be provided and maintained under the development's management scheme; 30no. internal (undercroft) car parking spaces within the development will be reserved for these vehicles.

11.5 BASELINE ASSESSMENT

Table 11.16 gives the PICADY junction performance modelling results under existing surveyed traffic conditions at the 5no. junctions identified as requiring detailed assessment. The peak hour traffic flows employed under this assessment scenario are those surveyed in 2020, with no modification.

These results show that the 5no. junctions assessed all currently operate well within their respective effective capacities, with negligible vehicle queueing and minimal vehicle delays on junction approaches.

Table 11.15 : Baseline Junction Assessment Results for Year 2020

Junction Approach Arm	Degree of Saturation (%)		Maximum Queue (PCU)		Mean Delay per PCU (seconds)		Practical Reserve Capacity (%)	
	AM	PM	AM	PM	AM	PM	AM	PM
JUNCTION 1								
North Circular Road (to north-east)	n/a	n/a	n/a	n/a	n/a	n/a	77	96
O'Devaney Gardens (to south-east)	0	3	0	0	0	12		
North Circular Road (to south-west)	27	3	1	0	5	4		
JUNCTION 2								
Montpelier Gardens (to west)	n/a	n/a	n/a	n/a	n/a	n/a	718	487
O'Devaney Gardens (to north)	8	12	0	0	7	7		
Montpelier Gardens (to east)	1	1	0	0	6	6		
JUNCTION 3								
O'Devaney Gardens (to west)	n/a	n/a	n/a	n/a	n/a	n/a	900	900
Thor Place (to north)	3	4	0	0	8	8		
Thor Park (to east)	0	0	0	0	0	0		
JUNCTION 5								
Infirmary Road (to north)	n/a	n/a	n/a	n/a	n/a	n/a	88	145
Montpelier Gardens (to east)	14	11	0	0	11	9		
Infirmary Road (to south)	4	2	0	0	7	6		
JUNCTION 8								
Aughrim Street (to south-east)	n/a	n/a	n/a	n/a	n/a	n/a	260	293
Cowper Street (to south-west)	14	8	0	0	8	7		
Aughrim Street (to north-west)	4	3	0	0	5	6		

11.6 DO NOTHING SCENARIO

Table 11.16 gives the PICADY junction performance modelling results under a 'Do-Nothing' scenario for the design year 2038, at the 5no. junctions identified as requiring detailed assessment. The peak hour traffic flows employed under this assessment scenario are those surveyed in 2020, scaled up to 2038 levels using TII growth factors, with the addition of traffic to be generated by the adjacent committed development. Vehicular traffic to be generated by the subject development is not included.

These results show that the 5no. junctions assessed shall all continue to operate well within their respective effective capacities in the year 2038, with vehicle queue lengths and vehicle delays at levels similar to those currently existing.

Table 11.16 : Do-Nothing Junction Assessment Results for Design Year 2038

Junction Approach Arm	Degree of Saturation (%)		Maximum Queue (PCU)		Mean Delay per PCU (seconds)		Practical Reserve Capacity (%)	
	AM	PM	AM	PM	AM	PM	AM	PM
JUNCTION 1								
North Circular Road (to north-east)	n/a	n/a	n/a	n/a	n/a	n/a	44	56
O'Devaney Gardens (to south-east)	0	6	0	0	0	14		
North Circular Road (to south-west)	39	5	1	0	6	4		
JUNCTION 2								
Montpelier Gardens (to west)	n/a	n/a	n/a	n/a	n/a	n/a	522	367
O'Devaney Gardens (to north)	11	16	0	0	7	8		
Montpelier Gardens (to east)	2	1	0	0	6	6		
JUNCTION 3								
O'Devaney Gardens (to west)	n/a	n/a	n/a	n/a	n/a	n/a	706	900
Thor Place (to north)	4	5	0	0	8	8		
Thor Park (to east)	0	0	0	0	0	0		
JUNCTION 5								
Infirmary Road (to north)	n/a	n/a	n/a	n/a	n/a	n/a	54	99
Montpelier Gardens (to east)	20	15	0	0	13	10		
Infirmary Road (to south)	5	3	0	0	8	6		
JUNCTION 8								
Aughrim Street (to south-east)	n/a	n/a	n/a	n/a	n/a	n/a	186	209
Cowper Street (to south-west)	18	11	0	0	8	8		
Aughrim Street (to north-west)	5	4	0	0	5	6		

11.7 PREDICTED IMPACTS

11.7.1 Operational Phase

Table 11.16 gives the PICADY junction performance modelling results under the 'Do-Something' scenario for the design year 2038, at the 5no. junctions identified as requiring detailed assessment. The peak hour traffic flows employed under this assessment scenario are those surveyed in 2020, scaled up to 2038 levels using TII growth factors, with the addition of both traffic to be generated by the adjacent committed development and traffic to be generated by the subject development.

Table 11.17 : Operational Phase Junction Assessment Results for Design Year 2038

Junction Approach Arm	Degree of Saturation (%)		Maximum Queue (PCU)		Mean Delay per PCU (seconds)		Practical Reserve Capacity (%)	
	AM	PM	AM	PM	AM	PM	AM	PM
JUNCTION 1								
North Circular Road (to north-east)	n/a	n/a	n/a	n/a	n/a	n/a	15	10
O'Devaney Gardens (to south-east)	33	46	0	1	24	26		
North Circular Road (to south-west)	45	9	2	0	7	4		
JUNCTION 2								
Montpelier Gardens (to west)	n/a	n/a	n/a	n/a	n/a	n/a	217	225
O'Devaney Gardens (to north)	23	23	0	0	9	9		
Montpelier Gardens (to east)	2	1	0	0	6	6		
JUNCTION 3								
O'Devaney Gardens (to west)	n/a	n/a	n/a	n/a	n/a	n/a	500	608
Thor Place (to north)	4	5	0	0	8	8		
Thor Park (to east)	0	0	0	0	0	0		
JUNCTION 5								
Infirmary Road (to north)	n/a	n/a	n/a	n/a	n/a	n/a	41	84
Montpelier Gardens (to east)	34	22	1	0	14	10		
Infirmary Road (to south)	9	12	0	0	8	7		
JUNCTION 8								
Aughrim Street (to south-east)	n/a	n/a	n/a	n/a	n/a	n/a	96	123
Cowper Street (to south-west)	32	20	0	0	11	10		
Aughrim Street (to north-west)	5	4	0	0	5	6		

These results show that the 5no. junctions assessed shall all continue to operate well within their respective effective capacities in the year 2038, with the subject development in place. Vehicle queue lengths and vehicle delays on junction approaches shall for the most part be similar to those currently existing.

Table 11.18 : Variation between 2038 Do-Nothing and Do-Something Assessment Results

Junction Approach Arm	Degree of Saturation (%)		Maximum Queue (PCU)		Mean Delay per PCU (seconds)		Practical Reserve Capacity (%)	
	AM	PM	AM	PM	AM	PM	AM	PM
JUNCTION 1								
North Circular Road (to north-east)	n/a	n/a	n/a	n/a	n/a	n/a	-29	-46
O'Devaney Gardens (to south-east)	+33	+40	0	+1	+24	+11		
North Circular Road (to south-west)	+6	+4	0	0	+1	0		
JUNCTION 2								
Montpelier Gardens (to west)	n/a	n/a	n/a	n/a	n/a	n/a	-305	-142
O'Devaney Gardens (to north)	+12	+7	0	0	+2	+1		
Montpelier Gardens (to east)	0	0	0	0	0	0		
JUNCTION 3								
O'Devaney Gardens (to west)	n/a	n/a	n/a	n/a	n/a	n/a	-206	-292
Thor Place (to north)	0	0	0	0	0	0		
Thor Park (to east)	0	0	0	0	0	0		
JUNCTION 5								
Infirmary Road (to north)	n/a	n/a	n/a	n/a	n/a	n/a	-13	-15
Montpelier Gardens (to east)	+14	+7	0	0	+1	0		
Infirmary Road (to south)	+4	+9	0	0	0	+1		
JUNCTION 8								
Aughrim Street (to south-east)	n/a	n/a	n/a	n/a	n/a	n/a	-90	-86
Cowper Street (to south-west)	+14	+9	0	0	+2	+2		
Aughrim Street (to north-west)	0	0	0	0	0	0		

Table 11.18 summarises the differences between the 'Do-Nothing' and 'Do-Something' junction assessment results for the design year 2038. This isolates the specific effects of the subject development on the operational performance of these 5no. junctions.

At Junction 1 (the subject development's access on the North Circular Road), the development shall result in a maximum increase of 1 PCU in vehicle queue length on any junction approach, in either peak hour period, and a maximum increase of 24 seconds in mean vehicle delay. At all other assessed junctions, the development shall result in no discernible increase in vehicle queue length, and a maximum increase of 2 seconds in mean vehicle delay.

During its operational phase, the subject development is therefore predicted to result overall in a long-term slight adverse impact on the operation of junctions on the surrounding road network. This impact should be considered reversible to a degree, as any future measures that reduce local vehicular traffic volumes (e.g. improvements in public transport or cycling infrastructure, junction redesign, or changes in general traffic flow restrictions) have the potential to improve local traffic flows generally, as well as to reduce vehicle trips to/from the subject development.

11.7.2 Construction Phase

As noted previously, peak hour vehicular trip generation during the development's construction phase shall be significantly less than that during its operational phase. Junction performance assessment has therefore not been conducted for the construction phase of the development. During its construction phase, the subject development is predicted to result overall in a temporary slight adverse impact on the operation of junctions on the surrounding road network.

It is also recognised that there is potential during the construction phase for construction-related activity to impact upon the surrounding road network in ways beyond the operational performance of the junctions assessed. These further impacts would potentially take the form of surrounding roads being temporarily obstructed by stopped/parked construction vehicles or by delivery/loading operations, or their condition being temporarily degraded by the presence of dirt/debris originating from the construction site. The construction phase mitigation measures to be implemented as part of the lead contractor's Construction and Environmental Management Plan (CEMP) are intended specifically to minimise such impacts, and these measures will be strictly adhered to.

11.8 CUMULATIVE IMPACTS

As is standard in the evaluation of traffic impact, the future year junction performance assessments conducted in respect of the proposed development also include other traffic flows to be generated by relevant nearby committed development. The predicted impacts outlined in section 11.7 of this EIAR chapter therefore also represent the potential cumulative impacts.

11.9 MITIGATION MEASURES

11.6.1 Construction Phase

MA:T-C1	The lead contractor appointed for the construction of the development will be required to prepare a Construction and Environmental Management Plan (CEMP) that will include a plan for the scheduling and management of construction traffic. This CEMP will outline measures to be taken to mitigate the impact of construction traffic on the surrounding road network. Such measures are expected to include: • Prohibition of haulage vehicles parking at the entrance to the site or

	stopping along their access routes. • Limiting the number of haulage vehicles travelling in convoy to a maximum of two vehicles at any time. • Maintaining a minimum separation of 250m at all times between haulage vehicles travelling to and from site. • Conducting all loading of excess material within the site boundary. In addition, it is expected that construction-related vehicle movements will be minimised through: • Consolidation of delivery loads to/from the site. • Scheduling large deliveries to occur outside of peak periods. • Use of precast/prefabricated materials where possible. • Reuse on site wherever possible of 'cut' material generated by the construction works. • Provision of adequate storage space on site for material and plant. • Promoting the use of public transport by construction personnel.

11.6.2 Operational Phase

As described in the accompanying Traffic and Transport Assessment (TTA) report, the development incorporates several design elements intended to mitigate the impact of the development on the operation of the surrounding road network. These include:

- an appropriate level of car parking provision, in line with Local Authority Development Plan standards (for houses) and Apartment Guidelines recommendations (for apartments and duplexes), which will discourage excessively high vehicle ownership rates and unnecessary vehicular trips to the development (by residents and visitors); and
- a high provision of secure bicycle parking, which will serve to encourage bicycle journeys by both residents and visitors.

MA:T-O1	**Residential Travel Plan Framework** As described in the accompanying Residential Travel Plan Framework (RTPF) document, a Residential Travel Plan (RTP) Coordinator shall be appointed for the proposed development, with the remit to implement and oversee Residential Travel Plan Framework (RTPF). This will assist residents and their visitors in making the most of sustainable transport opportunities and in avoiding single-occupant car journeys where possible. Briefly, the following measures are proposed under the Residential Travel Plan Framework: • Creation of an Access Map. • Provision of travel information to development occupants, in the form of Sustainable Travel Welcome Packs and a travel hub website. • Identification of safe walking and cycling routes. • Provision of secure and attractive cycle parking and ancillary facilities for cyclists and pedestrians. • Provision of information on locations of public transport stops, routes, timetables, walking times to main public transport facilities,

	etc. • Provision of specific advice to development occupants on multi-modal trip planning.

11.10 WORST CASE SCENARIO

11.10.1 Construction Phase

During the construction phase, the worst-case scenario is represented by a failure to correctly manage construction-related traffic and site-generated dirt/debris, resulting in temporary obstruction or fouling of surrounding roads. As previously noted, the construction phase mitigation measures described in this EIAR chapter, to be implemented as part of the lead contractor's Construction and Environmental Management Plan (CEMP), are intended specifically to minimise the risk of such occurrences and will be strictly adhered to.

11.10.2 Operational Phase

As is standard in the evaluation of traffic impact, the future year junction performance assessments conducted in respect of the proposed development also include other traffic flows to be generated by relevant nearby committed development, as well as robust traffic growth factors prescribed by TII. The predicted impacts on surrounding junction performance that are outlined in section 11.7 of this EIAR chapter therefore represent a worst-case operational phase scenario by default.

11.11 MONITORING AND REINSTATEMENT

11.12.1 Construction Phase

MA:T-C2	A Visual Condition Survey (VCS) will be carried out of all surrounding streets prior to any site works commencing. During the development's construction phase, the lead contractor will liaise with the Roads and Transportation Department of Dublin City Council to agree any changes to load restrictions and construction access routes for the site. Measures will be put in place as required to facilitate construction traffic whilst simultaneously protecting the built environment.

No reinstatement works of relevance to traffic and transport are proposed as part of the subject development, with the exception of any repair works made necessary by the passage of construction traffic.

11.12.2 Operational Phase

As described in the accompanying Residential Travel Plan Framework (RTPF) document, a Residential Travel Plan (RTP) Coordinator shall be appointed for the proposed development, with the remit to implement and oversee an ongoing RTP. In conjunction with this, the Residential Travel Plan Coordinator will be responsible for monitoring the travel habits of development occupants and visitors.

An RTP is a dynamic process whereby a package of measures and campaigns is identified, piloted, and then monitored on an ongoing basis. The RTP will identify specific targets against which the effectiveness of the plan can be assessed at each review; these will typically take the form of target modal splits for journeys to and from a site. The RTP Coordinator will gather data on travel patterns, for instance by conducting periodic travel surveys of development occupants.

Post-development monitoring of the surrounding street network's performance is not required or proposed in this case.

11.12 DIFFICULTIES ENCOUNTERED

No significant difficulties were experienced in compiling this Chapter of this EIAR document.

REFERENCES

- Environmental Protection Agency (EPA): *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (2017)
- Transport Infrastructure Ireland (TII): *Traffic and Transport Assessment Guidelines* (2014)
- Transport Infrastructure Ireland (TII): *Project Appraisal Guidelines* (2011)
- Dublin City Council (DCC): *Dublin City Development Plan 2016–2022* (2016)
- Department of Housing, Planning and Local Government (DHPLG): *Sustainable Urban Housing: Design Standards for New Apartments (Guidelines for Planning Authorities)* (2020)
- Department of Transport, Tourism and Sport (DTTS): *Design Manual for Urban Roads and Streets* (2019)
- National Transport Authority (NTA): *National Cycle Manual* (2011)
- National Transport Authority (NTA): *Greater Dublin Area Cycle Network Plan* (2013)
- TRICS Consortium: Trip Rate Information Computer System (TRICS) database
- Central Statistics Office (CSO): 2016 Census data

12 MATERIAL ASSETS: RESOURCE AND WASTE MANAGEMENT

12.1 INTRODUCTION

Byrne Environmental Consulting Ltd have assessed the potential impacts that construction and operational wastes associated which the proposed development may have on the receiving environment.

The assessment includes a comprehensive description of the types and quantities of wastes that will be generated, how wastes will be managed and how the principals of reduce-reuse and recycle shall be implemented into the design of the development to ensure that the development will be constructed and operated in an environmentally sustainable manner.

12.2 ASSESSMENT METHODOLOGY

A *Site Specific Construction and Demolition Waste Management Plan* has been prepared by Byrne Environmental to demonstrate how the Construction Phase will comply with the following relevant legislation and relevant Best Practice Guidelines.

- Waste Management Acts 1996
- Waste Management (Collection Permit) Regulations 2007 (SI No. 820 of 2007)
- Waste Management (Collection Permit) Amendment Regulations 2008 (SI No. 87 of 2008)
- Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects (Department of the Environment, Heritage and Local Government, 2006).
- Guidance on Soil and Stone By-Products in the context of Article 27 of the European Communities (Waste Directive) Regulations – (EPA, Version 3 June 2019)

The *Operational Waste Management Plan* [Byrne Environmental Consulting Ltd] accompanying this application has been prepared to demonstrate how the Operational Phase will comply with the following relevant regulations and DCC's design standards for waste management in residential developments.

- Waste Management Acts 1996.
- Waste Management (Collection Permit) Regulations 2007 (SI No. 820 of 2007).
- Waste Management (Collection Permit) Amendment Regulations 2008 (SI No. 87 of 2008).
- Eastern-Midlands Region Waste Management Plan 2015-2021.
- Sustainable Urban Housing : Design Standards for New Apartments – Guidelines for Planning Authorities(Department of Housing, Planning and Local Government, Section's 4.8 and 4.9 Refuse Storage of The, 2018.
- Dublin City Development Plan 2016 – 2022.

The *Operational Waste Management Plan* has been prepared with regard to relevant waste management policies and objectives of the *Dublin City Development Plan 2016 – 2022* as detailed below:

It is the Policy of Dublin City Council:

SI19: To support the principles of good waste management and the implementation of best international practice in relation to waste management in order for Dublin city and the region to become self-reliant in terms of waste management.

SI20: To prevent and minimise waste and to encourage and support material sorting and recycling.

SI21: To minimise the amount of waste which cannot be prevented and ensure it is managed and treated without causing environmental pollution.

SI22: To ensure that effect is given as far as possible to the 'polluter pays' principle.

It is an Objective of Dublin City Council:

SIO15: To provide for municipal/public recycling and recovery facilities in accessible locations throughout the city.

SIO16: To require the provision of adequately-sized recycling facilities in new commercial and large-scale residential developments, where appropriate.

SIO19: To implement the Eastern-Midlands Regional Waste Management Plan 2015–2021 and achieve the plan targets and objectives.

The waste management strategies included in this Chapter of the EIAR present the potential environmental impacts, proposed monitoring methodologies, limit values where applicable, based on the concept of Best Practice and the proposed mitigation measures to be implemented at the development site. Reference to National and International Standards are also included where relevant.

The projection of material assets of human origin was conducted, and resource use and management of wastes generated were assessed for both the constructional and operational phases of the proposed development and their associated impacts assessed. Mitigation and best practice waste management are proposed where appropriate.

12.3 RECEIVING ENVIRONMENT

The construction and operation of the proposed residential and commercial development will introduce new volumes of waste into the local area in terms of the short-term generation of construction waste and the longer-term generation of domestic waste when the development is occupied.

There are a number of recycling centres and local bring banks in Dublin City Centre and a range of domestic and commercial waste collection operators that will serve the proposed development.

12.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposed development is described in Section 3 of this EIAR.

Various construction waste streams will arise during the construction phase. General domestic waste will arise during the operational phase and commercial waste will be generated by the retail units when operational.

Specific Waste Management Plans shall be implemented throughout the construction phase and operational stage of the development to ensure the following:

- That all site activities are effectively managed to minimise the generation of waste and to maximise the opportunities for on-site reuse and recycling of waste materials.
- To ensure that all waste materials generated by site activities are removed from site by appropriately permitted waste haulage contractors and that all wastes are disposed of at approved waste licensed / permitted facilities in compliance with the Waste Management Act 1996 and all associated Waste Management Regulations.
- The Waste Management Plan for the Operational Phase of the development which will ensure that users of the development are provided with sufficient infrastructure and facilities to store, segregate and recycle waste.

12.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

12.5.1 Construction Phase

The development of the subject site will initially require the stripping of top and subsoils and the excavation of ground to basement level. The range of works required for the Construction Phases are summarised in Table 12.1. The expected construction wastes that will be generated throughout the course of the development are described in Table 12.2.

Construction wastes if not managed and segregated on-site will have the potential to be difficult to separate into different waste streams to allow for further processing, recovery, re-use or to be recycled

The range of development works to which this Waste Management Plan will be integrated into during the design phase, construction phase and operation phase of the site are summarised as follows:

- Ground preparation works;
- Development of site infrastructure;
- Construction of buildings and hard standing areas;
- Landscaping of entire site including open soft landscaped areas;
- Waste Management for the Operational Phase of the development

Table 12.1 – Sequence of Construction Works

Activity Sequence	General Description
Identification of Existing Utility Services	Set up bunting, mark location of live services, including E.S.B., Gas etc.
Demolition of existing building and structures	Hard surface removal ESB sub station removal
Removal of Vegetation	e.g. Trees and vegetation
Site Preparation	Soil stripping, stockpiling, export
Infrastructure installation	Drainage, Utility ducts, power
Substructure	Basement excavation Rebar, Formwork
Superstructure	Rebar, Formwork and Pour
Roof	Rebar, Formwork and Pour and Waterproof
External Envelope	Place façade to superstructure
Internal Finishes	Mechanical and Electrical etc.

External Landscaping	Hard and soft landscaping

Table 12.219 – Typical Construction Waste Composition

Description of Waste	%
Mixed Construction and Demolition Waste	33
Wood	28
Plasterboard (Gypsum materials)	10
Ferrous Metals	8
Concrete	6
Mixed other wastes	15
Total	100

Table 12.20 – Predicted Demolition Waste Generation

Waste Type	Predicted tonnage to be produced	Re-Use		Recyclable		Disposal	
		Tonnage	%	Tonnage	%	Tonnage	%
Concrete	5097	5097	100	0	0	0	0
ESB Substation	90	90	100	0	0	0	0
Total	5187	5187	100	0		0	

Table 12.4 – Predicted Waste Soil Generation

Waste Type	Predicted tonnage to be produced	Re-Use		Recyclable		Disposal	
		Tonnage	%	Tonnage	%	Tonnage	%
Soils	63,000	31,500	50	0	0	31,500	50

Table 12.5– Predicted Construction Waste Generation

Waste Type	Predicted tonnage to be produced	Re-Use		Recyclable		Disposal	
		Tonnage	%	Tonnage	%	Tonnage	%
Mixed CandD	1250	125	10	1000	80	125	10
Timber	1000	400	40	550	55	50	5
Plasterboard	500	150	30	300	60	50	10
Metals	250	12.5	5	225	90	12.5	5
Concrete	200	60	30	130	65	10	5
Mixed waste	800	160	20	480	60	160	20
Total	4000	907.5		2685		407.5	

The Project Engineers [CS Consulting] have estimated that c. 42,000m^3 of soils will be exported from the site.

Excavated excess soils that are required to be exported off-site shall be tested to determine their classification as hazardous or non-hazardous in accordance with EPA Waste Classification – List of Waste and Determining if Waste is Hazardous or Non-Hazardous. Non-Hazardous soils may be suitable for re-use in other construction sites and may be declared as a by-product in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011. Where feasible non-hazardous excavation material may be re-used within the proposed scheme as engineering fill or in landscaping. This will be investigated by the contractor and is subject to appropriate testing to ensure material is suitable for its proposed end use. Where excavation material may not be re-used within the proposed scheme the Contractor will endeavour to send material for authorised recovery or recycling so far as is reasonably practicable. All wastes generated from the proposed development will be delivered to authorised waste facilities granted a Waste Licence, Waste Facility Permit or Certificate of Registration.

12.5.4 Operational Phase

The operational phase of the development will consist of:

- Residential units comprised of houses, duplex units and apartments
- Retail / Commercial units
- Community Facility
- Creche

The 2014 EPA Publication, National Waste Prevention Programme, 2013 Annual Report, states:

> *"The household waste per person in Ireland has been decreasing over the period 2006 to 2012 from 470 kg/person in 2006 to 344 kg/person in 2012. This indicates success in national campaigns and awareness as regards waste minimisation – though effects of reduced consumption are also likely to have contributed. In addition, it suggests an economy and society that are improving the efficiency of consumption patterns with respect to waste generation."*

A value of 0.942Kg of waste generated per person per day has been therefore assumed for the purposes of this report to estimate the volume of waste to be generated at the development as detailed in the tables below.

Table 12.21 – Calculated waste generation at O'Devaney Gardens

House Type	# Units	Waste/Day	Waste/week
	No.	Kg	Kg
Residential Units	1047	3490	24,431
Retail / commercial 1000sq.m total	7	1520	10,640
Creche	1	61	320
Total for development	n/a	5071	35,391

Table 12.22 – Calculated domestic waste composition Residential Development – O'Devaney Gardens

Waste Type	% Waste	Kg/week	Kg/day
Organic waste	30.6	7476	1068
Paper	12.5	3054	436
Cardboard	3.6	880	126
Composites	1	244	35
Textiles	15.5	3787	541
Plastics	13.6	3323	475
Glass	3.4	831	119
Metals	3.1	757	108
Wood	1.2	293	42
Hazardous municipal waste	0.9	220	31
Unclassified combustables	1.4	342	49
Unclassified incombustables	1.2	293	42
Fines	11.7	2858	408
Bulky Waste & WEEE	0.3	73	10
Totals	***100***	***24431***	***3490***

If waste infrastructure and appropriate waste management systems are not integrated into the design and the operation of the proposed development, domestic waste will not be segregated at source or appropriately managed on-site and the operation of the development will not function in accordance with the waste management policies of DCC or comply with the waste reduction and recycling and re-use targets defined in the *Eastern-Midlands Region Waste Management Plan 2015-2021*.

12.6 DO NOTHING SCENARIO

Should the site not be developed for residential use it will continue not to have any impact or demand on local waste services or on the receiving environment. A vacant site may however be subject to unauthorised illegal dumping or fly-tipping.

12.7 CUMULATIVE IMPACTS

With regard to other completed and under construction residential developments within the local area including the DCC apartment development on a separate area within the former O'Devaney Gardens site, there will be a greater demand on existing local waste management services and on waste acceptance facilities. It is necessary that the subject development in addition to others are operated in a sustainable manner that reduces the generation and disposal of un-segregated domestic mixed waste and that provide the infrastructure and management services to assist residents to segregate domestic waste at source.

12.8 MITIGATION MEASURES

The Construction and Operational Waste Management Plans have been designed to ensure that the construction and operational phases of the proposed development will be managed to reduce the generation of unsegregated wastes, to maximise the potential for recycling, recovery and re-use and to demonstrate how the development will operate in a sustainable manner in terms of waste management and contribute to the achievement of the Regions compliance with the waste reduction targets specified in The *Eastern-Midlands Region Waste Management Plan 2015-2021* (and any subsequent future revisions).

12.8.1 Site Specific Construction & Demolition Waste Management Plan

The ***Site Specific Construction and Demolition Waste Management Plan*** prepared by Byrne Environmental (and included with the planning application) specifically addresses the following points:

MA:RWM-C1 Waste materials generated by construction activities will be managed according to the Department of the Environment, Heritage and Local Government's 2006 Publication - Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects

- Analysis of waste arisings / material surpluses
- Specific Waste Management objectives for the Project including the potential to re-use existing on-site materials for further use in the construction phase.
- Methods proposed for Prevention, Reuse and Recycling
- Waste Handling Procedures
- Waste Storage Procedures
- Waste Disposal Procedures
- Record Keeping

MA:RWM-C2 Waste minimisation and prevention shall be the primary responsibilities of the Construction Project Manager who shall ensure the following:

- Materials will be ordered on an "as needed" basis to prevent over supply
- Materials shall be correctly stored and handled to minimise the generation of damaged materials
- Materials shall be ordered in appropriate sequence to minimise materials stored on site
- Sub contractors will be responsible for similarly managing their wastes

Programme of Waste Management for Construction Works

It is proposed that the construction Contractor as part of regular site inspection audits will determine the effectiveness of the waste management statement and will assist the project manager in determining the best methods for waste minimisation, reduction, re-use, recycling and disposal as the construction phase progresses and waste materials are generated.

Construction Waste Disposal Management

It is proposed that from the outset of construction activities, a dedicated and secure compound containing bins, and/or skips, and storage areas, into which all waste materials generated by construction site activities, will be established within the active construction phase of the development site.

In order to ensure that the construction contractor correctly segregate waste materials, it is the responsibility of the site construction manager to ensure all staff are informed by means of clear signage and verbal instruction and made responsible for ensuring site housekeeping and the proper segregation of construction waste materials.

It will be the responsibility of the Project Construction Manager to ensure that a written record of all quantities and natures of wastes exported -off site are maintained on-site in a Waste File at the Project office.

It is the responsibility of the Project Manager or his/her delegate that all contracted waste haulage drivers hold an appropriate Waste Collection Permit for the transport of waste loads and that all waste materials are delivered to an appropriately licenced or permitted waste facility in compliance with the following relevant Regulations:

- Waste Management (Collection Permit) Regulations 2007 (SI No. 820 of 2007)
- Waste Management (Collection Permit) Amendment Regulations 2008 (SI No. 87 of 2008)
- Waste Management (Facility Permit and Registration) Regulations S.I.821 of 2007 and the Waste Facility Permit under the Waste Management (Facility Permit and Registration) Amendment Regulations S.I.86 of 2008.

Prior to the commencement of the Project, the Construction / Project Manager shall identify and nominate a permitted Waste Contractor who shall be employed to collect and dispose of all wastes arising from the project works. In addition, the Construction / Project Manager shall identify and all waste licensed / permitted facilities that will accept all expected waste exported off-site and will maintain copies of all relevant Waste Permits / Licences as required.

All waste soils prior to being exported off-site, shall be classified as inert, non-hazardous or hazardous in accordance with the EPA's Waste Classification Guidance – List of Waste and Determining if Waste is Hazardous or Non-Hazardous document dated 1st June 2015 to ensure that the waste material is transferred by an appropriately permitted waste collection permit holder and brought to an appropriately permitted or licensed waste facility.

Where site areas are identified to contain Japanese Knotweed or other invasive species infestation, a Treatment Plan shall be developed in accordance with published guidelines (namely, The Environment Agency, Managing Knotweed on Development Sites, Knotweed Code of Practice, 2013). For the subject site, it would be proposed to utilise controlled excavation with off-site disposal ("dig and dump") to eradicate any identified areas of Japanese Knotweed. Each identified stand of Japanese knotweed shall be excavated under the supervision of a specialist invasive species contractor, whereby all viable knotweed material (crown, stem, rhizome) and contaminated soil will be removed from the site and disposed of at a licensed landfill facility such as Integrated Material Solutions, Hollywood Great, Naul, Co. Dublin.

All necessary protection measures shall be implemented to prevent the spread of the knotweed, such as thorough cleaning of machinery, good hygiene amongst operatives etc. Following removal of the material, a monitoring programme shall be maintained to check any re-growth.

On-Site Waste Reuse and Recycling Management

Construction waste material such as soils, damaged or broken concrete slabs, blocks, bricks and tiles generated that is deemed by the Project Engineer to be suitable for reuse on the Project site for ground-fill material and landscaping. This initiative will provide a positive environmental impact to the construction phase as follows:

- Reduction in the requirement for virgin aggregate materials from quarries
- Reduction in energy required to extract, process and transport virgin aggregates
- Reduced HGV movements associated with the delivery of imported aggregates to the site
- Reduced noise levels associated with reduced HGV movements
- Reduction in the amount of landfill space required to accept C&D waste
- Reduction in the volume of soils to be exported off-site

Waste Storage Compound

A waste storage compound shall be set up on-site from the commencement of site activities. The compound shall include the following:

- Separate waste skips labelled with signage stating the nature of waste materials that can only be placed in the skips.
- Waste oils / containers shall be placed in dedicated mobile bunds units.
- Soils contaminated by accidental on-site spillages of oils / construction hydrocarbons shall be stored in clearly identified hazardous waste storage containers.
- Spill kits with instructions shall be located in the waste storage compound.

Waste Soils

Soils at the site have been previously characterised by O'Callaghan Moran (Environmental Site Assessment and Waste Characterisation Assessment, September 2020) and are classified as both non-hazardous and hazardous in accordance with the Landfill Directive (2003/33/EC).

Top and subsoils will be re-used on-site for landscaping purposes to minimise the volume of soils to be exported off-site

Excess soils estimated to be c.42,000m^3 shall be exported to an appropriate waste permitted/licenced facility.

The construction project manager shall inform DCC of the volume of excess soils generated and the permitted / licenced waste facility they are to be exported to.

Non-Hazardous soils may be suitable for re-use in other construction sites and may be declared as a by-product in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011. Article 27 requires that the material classified not a waste but a by-product must meet specific criteria and that that a declaration of a material as a by-product is notified to the EPA.

Therefore, the 42,000m^3 being exported to a licenced facility is a worst case scenario where inert soils are be re-used.

Contaminated Soils

Where contaminated soils/materials are discovered or occur as a result of accidental spillages of oils or fuels during the construction phase, these areas of ground will be isolated and tested in accordance with the 2002 Landfill Directive (2003/33/EC) for contamination, and subject to the results of laboratory WAC testing, will be excavated.

Construction Waste Record Keeping

It is the responsibility of the Construction Project Manager or his/her delegate that a written record of all quantities and natures of all wastes reused / recycled and exported off-site and Article 27 declarations during the project are maintained in a Waste File at the Project office.

The following information shall be recorded for each load of waste exported off-site:

- Waste Type EWC Code and description
- Volume of waste collected
- Waste collection contractor's Waste Collection Permit Number and collection receipt including vehicle registration number
- Destination of waste load including Waste Permit / Licence number of facility
- Description of how waste at facility shall be treated : disposal / recovery / export
- The waste records shall be issued to DCC as required / requested.

Waste Management Auditing

In order to ensure that construction wastes generated during the course of the development are being effectively managed and recorded, a waste management audit shall be conducted on a routine basis by an independent waste management consultant to determine compliance with the Construction Phase Waste Management Strategy.

12.8.2 Operational Waste Management Plan

An ***Operational Waste Management Plan*** (OWMP) has been prepared by Byrne Environmental as a stand-alone report to accompany this application and has been prepared to demonstrate how the required infrastructure will be incorporated into the design and operational management of the development to ensure that domestic wastes will be managed and monitored with the objective of maximizing the quantity of waste segregated at source and maximizing the volume of clean recyclable materials generated by the residents of the development.

The Goal of the OWMP is to achieve a compliance with The Eastern-Midlands Region Waste Management Plan 2015-2021 which defines the following Waste Targets:

- 1% reduction per annum in the quantity of household waste generated per capita over the period of the plan.
- Achieve a recycling rate of 50% of managed municipal waste by 2020.
- Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill.

The Operational Waste Management Strategy has been prepared with regard to the strategy, policy and objectives of the DCDP.

Key Aspects of the OWMP to achieve Waste Targets:

- All residential units shall be provided with information on the segregation of waste at source and how to reduce the generation of waste by the Facilities Management Company.
- All waste handling and storage activities shall occur in the dedicated communal apartment waste storage areas.
- The development's Facility Management Company shall appoint a dedicated Waste Services Manager to ensure that waste is correctly and efficiently managed throughout the development.

The OWMP is defined by the following stages of waste management for both the residential and commercial aspects of the development:

- Stage 1 Occupier Source Segregation
- Stage 2 Occupier Deposit and Storage
- Stage 3 Bulk Storage and On-Site Management
- Stage 4 On-site treatment and Off-Site Removal
- Stage 5 End Destination of wastes

The OWMP has been prepared with regard to *British Standard BS 5906:2005 Waste Management in Buildings-Code of Practice which provides guidance on methods of storage, collection, segregation for recycling and recovery for residential building.*

The apartments and houses which will include a 3-bin waste segregation at source system together with the communal waste storage areas have been designed with regard to Section's 4.8 and 4.9 Refuse Storage of The Department of Housing, Planning and Local Government – *Sustainable Urban Housing : Design Standards for New Apartments – Guidelines for Planning Authorities. (Revised 2020).*

MA:RWM-O1 The proposed development shall be designed and managed to provide residents with the required waste management infrastructure to minimise the generation of un-segregated domestic waste and maximise the potential for segregating and recycling domestic waste fractions.

MA:RWM-O2 The Objective of the OWMP is to maximise the quantity of waste recycled by residents by providing sufficient waste recycling infrastructure, waste reduction initiatives and waste collection and waste management information services to the residents of the development.

MA:RWM-O3 The Goal of the OWMP is to achieve a residential recycling rate of 50% of managed municipal waste by 2020 (and future targets in subsequent Eastern-Midlands Regional Waste Management Plans).

MA:RWM-O4 All apartments, duplex units and houses will have a 3-bin system (non-recyclable, organic and recyclable) in each kitchen to encourage residents to segregate waste at source.

MA:RWM-O5 Apartment residents will be provided with waste recycling and waste disposal information by the development's Facility Management Company who will be responsible for providing clean, safe and mobility impaired accessible communal waste storage areas for the apartment blocks.

MA:RWM-O6 The Facility Management Company shall maintain a register of all waste volumes and types collected from the development each year including a break-down of recyclable waste and where necessary, shall introduce initiatives to further encourage residents to maximise waste segregation at source and recycling. They shall also provide an annual bulky waste and WEEE collection service for all residents.

The development shall be designed to provide adequate domestic waste storage areas for each apartment blocks. This will promote the appropriate segregation at source of domestic generated waste from all residential units at the development. Communal waste bin storage areas shall be designed in a manner to ensure that appropriate signage for the correct disposal and recycling of waste is available for residents.

MA:RWM-07 The development shall include a glass and aluminium can bring bank which will further reduce these waste materials entering the mixed waste stream and enhance the segregation of wastes on-site.

12.9 PREDICTED IMPACTS

12.9.1 Construction and Operational Phases

The management of wastes generated during the construction of the proposed development will be in accordance with a Construction Phase Waste Management Plan (CWMP). With regard to how it has been demonstrated how construction wastes will be managed through design, management and waste reduction and recycling initiatives at the proposed development, it is predicted that the impact of the development on the receiving environment, existing material assets and local waste management services will be short-term and slight.

There is likely to be significant available capacity within existing Irish waste management infrastructure to manage operational phase wastes from the proposed development.

The development shall be designed to provide adequate domestic waste infrastructure and storage areas for common residential areas (apartments) and individual houses and non-domestic spaces. This will promote the appropriate segregation at source of domestic generated waste from all residential units at the development. The predicted impact of operational waste will be long term, moderate and negative.

12.9.2 Worst Case Scenario

There are no worst-case impacts associated with the proposed development as sufficient capacity and waste storage space will be provided for both the construction and operational phases.

12.10 MONITORING

Construction Phase

MA:RWM-C3	The Construction Project Manager shall maintain a register of all

	construction wastes generated and shall compile a monthly report detailing the types and quantities of construction wastes generated at the site and the destinations that the wastes were exported to.

Operational Phase

MA:RWM-O7	The Facility Management Company shall prepare an annual report for DCC and residents of the development on the quantities of waste generated within the development to demonstrate how waste reduction and recycling targets are being achieved with regard to the targets defined in The *Eastern-Midlands Region Waste Management Plan 2015-2021* (and subsequent revisions).

References

- Waste Management Acts 1996;
- Waste Management (Collection Permit) Regulations 2007 (SI No. 820 of 2007);
- Waste Management (Collection Permit) Amendment Regulations 2008 (SI No. 87 of 2008);
- Eastern-Midlands Region Waste Management Plan 2015-2021;
- European Communities (Waste Directive) Regulations 2011;
- Dublin City Development Plan 2016 – 2022;
- Department of the Environment, Heritage and Local Government – Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects – July 2006;
- Sustainable Urban Housing : Design Standards for New Apartments – Guidelines for Planning Authorities (Revised 2020) Department of Housing, Planning and Local Government, Section's 4.8 and 4.9 Refuse Storage.
- British Standard BS 5906:2005 Waste Management in Buildings-Code of Practice which provides guidance on methods of storage, collection, segregation for recycling and recovery for residential building.

13. CULTURAL HERITAGE

13.1 INTRODUCTION

The cultural heritage of the site was considered in terms of tangible and intangible heritage aspects. The archaeology, architectural heritage and intangible (oral traditions, folklore etc.) cultural heritage of the site are considered in this chapter.

The archaeological section of the Cultural Heritage chapter was carried out by Aisling Collins MA PG Dip, M.I.A.I. Licenced Archaeologist of ACAS (Aisling Collins Archaeological Services) in March 2020. This section considers the potential impact on archaeological sites or features within or in proximity to the proposed development at the former O'Devaney Gardens.

The architectural heritage, folklore and history sections of this chapter was carried out by Dr Jason Bolton MA Dip Archaeology PhD MIAI.

13.2 ASSESSMENT METHODOLOGY

A desk-based assessment and walkover survey were completed to determine the pre-development condition of any cultural heritage features, particularly archaeological sites which may be impacted directly or indirectly by the proposed Strategic Housing Development and ancillary services. The following sources were consulted in the preparation of this report:

- Record of Monuments and Places (RMP)
- National Inventory of Architectural Heritage (NIAH)
- Dublin City Development Plan (2016 – 2022)
- Topographical Files of the National Museum of Ireland as published on Heritagemaps.ie
- Aerial photography (various collections including National Museum of Ireland, Geological Survey of Ireland and/or Ordnance Survey Ireland)
- Historical maps (including early edition Ordnance Survey (OS) maps and pre-Ordnance Survey maps)
- Reference material (journals, papers, books etc.) held by the National Library of Ireland, local libraries and/or on-line search facilities/collections (e.g. excavations.ie; archaeology.ie; heritage maps.ie; JSTOR etc.)

The architectural heritage and intangible heritage desktop survey is based on published work and documentary and cartographic available through online repositories. Due to the current Covid-19 outbreak, no access was available to libraries, archives and other physical information repositories; and the desktop study was limited to available online sources, and publications and references held by the report authors. The study consulted a representative selection of maps from the seventeenth century up to the present day, including John Rocque's maps of 1756-60 and Bernard Scalé's 1773 revision, William Duncan's 1821 map of Dublin and Ordnance Survey maps from 1838 onwards.

The site visit was carried out on the 27th February and 11th March 2020 by Aisling Collins and Dr Jason Bolton. The site visit included a visit to surrounding architectural developments on Infirmary Road, the North Circular Road and the adjacent Dublin Artisan's Dwellings in Stoneybatter. The proximity of St. Bricin's military hospital, the Phoenix Park and the Royal Military Infirmary were also noted.

13.3 RECEIVING ENVIRONMENT

The proposed development site is located in the area once identified as Grangegorman West townland and in the Civil Parish of Grangegorman. Grangegorman West is in the Barony of Dublin and was under the poor law union of Dublin north. The Site lies east of Infirmary Road, south-east of the North Circular Road and west of the Oxmantown complex. It is bordered on the east side by the grounds of St Bricin's Hospital and on the south side by modern housing. The proposed development site has an overall area of c.5.2 hectares and is located on the former O'Devaney Gardens residential development, built c.1954 by Dublin Corporation on a greenfield site. The site also includes a strip of land which previously formed part of St. Bricin's Military Hospital.

13.3.1 Historical Context

The history of the area was summarised by Roseanne Meenan in 2010 (Section 6):

> *"The site lies to the west of the core of the medieval town which was situated on the south side of the river Liffey. There is increasing evidence for settlement on the north side of the river in both the Viking and Anglo-Norman periods (www.opw.ie; Cryerhall 2006; Purcell 2005). The development site is located on land, which in medieval times was situated between the lands of the Knights Hospitallers of St John of Jerusalem at Kilmainham on the west side and the lands of St Mary's Abbey on the east side. By the seventeenth century, the lands currently occupied by the Phoenix Park had been sold to Sir Edward Fisher; the park was walled at the end of the 17th century. The present wall along Infirmary Road is on the same line as the 17th century wall and may incorporate elements of that wall. It would appear that the land on which the development site is located may have formed part of the manor of Grangegorman which in Anglo-Norman times was in the ownership of the Priory of the Holy Trinity otherwise known as Christchurch, Dublin. At the Dissolution the lands went to Sir Francis Agard; his descendant John was in ownership of the lands at the time of the rebellion in 1641. The Civil Survey of 1654-56 recorded that Mr Agar was the proprietor of 800 acres in Grangegorman (sic) of which 500 were in arable.*
>
> *Smithfield was developed in the 17th century and development spread northwestwards into Grangegorman through the late 17th and early 18th centuries. This area became built up in the 18th and 19th centuries with construction of military barracks and hospitals, the military prison today known as Arbour Hill, the Constabulary Barracks currently known as the Garda Depot and other elements of government administration. Oxmantown as is known to day and which borders the development lands on the east side was laid out in the late 19th century although Oxmantown Green lay further to the east, marked on Rocque's map of 1756 as lying between the Royal Barracks and Smithfield and possibly extending even further at an earlier period."*

13.3.2 Archaeology

Designations

The Dublin City Development Plan 2016-2022 designates the site as SDRA 11 strategic and representation area Stoneybatter, Manor Street and O'Devaney Gardens; and are zoned Z14 with the stated objective to seek the social economic and physical development and /or rejuvenation of an area of mixed use of which residential and Z6 (employment) would be predominant uses.

The development site is not marked as a Zone of Archaeological Interest, nor as a Site of Archaeological Interest. There are no recorded monuments on the footprint of the development site.

Record of Monuments and Places

The Record of Monuments and Places (RMP) is the most widely applying provision of the National Monuments Acts. It comprises a list of recorded monuments and places together with accompanying maps on which such monuments and places are shown for each county. Monuments listed on the RMP may comprise either individual sites or a complex of sites, sometimes making up an archaeological landscape.

A large part of Dublin city centre has been designated as DU018-020. This includes the medieval core of the city. This designation covers the area to the north-east, the east and the south of the proposed development. Lands south of the River Liffey extending to Kilmainham and Islandbridge also fall under this designation. However, the O'Devaney Gardens estate is outside the area covered by DU018-020.

The closest individual monument to the development site is DU018-020532 which is classified as a 'dwelling'; and located on the Georgian enclave of Montpelier Hill where houses were first constructed in the 1720s.

See Table 13.1.

Topographical Files

The topographical files in the National Museum of Ireland were consulted and no finds were found in the townland of Grangegorman West.

The National Museum of Ireland finds database (2010) is also published on heritagemaps.ie and the finds listed below in Table 13.2 were obtained from this source.

Please note: This dataset has been designed to visually represent the distribution of archaeological artefact finds, based on the Irish Antiquities Division's Collections Database, at local and national coverage where possible. Find locations shown on the Heritage Map Viewer are not an accurate representation of the actual find spot. In some cases, the location symbol may only represent the townland within which the find was located. The distance from site is based on the heritage maps and is only approximate. The list of finds in Table 13.2 suggests a certain degree of activity in the area dating as far back as prehistoric times.

Previous Excavations

Archaeological monitoring of site investigations for the proposed development was carried out in July 2020 by ACAS (license 20EO293) on behalf of Bartra ODG Limited. No archaeology was identified. See Appendix 13A.

The excavation bulletin is a database of over 15,000 summary accounts of all the archaeological excavations carried out in Ireland and Northern Ireland from 1970 to 2008. Reports on licensed archaeological works are also held by the Archive Unit of the National

Monuments Section. There have been no excavations carried out on the site previously. Six excavations have been carried out within a distance of c. 200m from the site. Four of these had no archaeological significance, and two were of post medieval date (see Table 13.3).

Cartographic Analysis

Analysis of historic mapping can show human impact on landscape over a prolonged period. Large collections of historical maps (pre- and early Ordnance Survey maps as well as estate or private maps) are held at the Glucksman Map Library, Trinity College and other sources (UCD Library, Ordnance Survey Ireland, local libraries and published material). Relevant historical maps were consulted in the compilation of this assessment (see Table 13.4).

Site Walkover Visit

The strip of land on the eastern part of the site 'former St Bricin's lands' was not previously developed and is currently very overgrown. It is bounded with St Bricin's to the east, Montpellier Park to the south, and the rest of the development site to the north and west. There is a tarmac pathway running north-south through this narrow strip of land and there is overgrown grass, modern debris and mounds of earth throughout the site. Trees line the western boundary of this part of the site. This strip of land is enclosed by walls on three sides with a metal fence enclosing the southern side. (Plates 13.1-13.3).

The remainder of the site is a wasteland following the demolition of the O'Devaney flats complex built in 1954. The last of the original 13 four-storey blocks was demolished in 2018. Most of the area is now covered with grass, weeds and modern debris. The site is bisected by a road (O'*Devaney Gardens)* running east west from North Circular Road to Thor Park. To the south of the road lies a large wasteland area with concrete blocks, broken walls and boulders along its eastern side. The tarmacadam surface of a previous playing/football pitch is visible. However, there were no previous buildings on the site of the football pitch. (Plates 13.4-13.5 and Figure 3.4 of EIAR)

The north-eastern part of the site has some concrete pathways/foundations visible. The northern part of the site shows some small allotments along the boundary. There is a residential site under construction by Dublin City Council adjacent to the site to the northwest. (Plate 13.6).

No archaeological features were noted during site visit.

Table 13.1 RMP sites located within 800m of the proposed development

SMR	Class	Townland	Scheduled for inclusion in next RMP	Distance from development site
DU018-020532	House - indeterminate date	Dublin South City	Yes	213m south
DU018-045	Graveyard	Dublin North City	Yes	390m southeast
DU018-020306	Barracks	Dublin North City	Yes	397m southeast
DU018-020251	House - 18th/19th century	Dublin North City	No	475m northeast
DU018-007009	Megalithic structure (present location)	Dublin North City	Yes	550m west

DU018-020447-	Burial ground	Dublin North City	Yes	562m southeast
DU018-020477-	Mill - unclassified	Dublin South City	Yes	570m south
DU018-020341-	Hospital	Dublin South City	Yes	572m south
DU018-020292-	Hospital	Dublin South City	Yes	572m south
DU018-020308-	Park	Dublin North City	Yes	638m
DU018-112----	Pit-burial	Kilmainham	Yes	655m southwest
DU018-020307	Building	Dublin North City	Yes	679m
DU018-007008-	Well	Dublin North City	Yes	775m northwest

Table 13.2 National Museum of Ireland finds located within 800m of the proposed development

Museum Reg	Find	Location	Approximate distance from site
1955:11	2 x Boars tusk	Aughrim Street	250m north (approximate)
1984:40	Iron Dagger	Arbor court/Hill	260m south (approximate)
IA/48/52	Human remains	Disarticulated skeletons	800m southeast (approximate)
1866:Wk148 1937:3641 1995:2000 RIA1908:36 RIA1916:37 RIA1916:44	Iron mail Bronze pin Copper alloy pin Bronze pin Copper axehead Bronze axehead.	Phoenix park	Unknown

Table 13.3 Previous archaeological excavations in the surrounding area (within c. 200m)

Excavation number	Location	Site type	Author
97E0446	29-31 Montpellier Hill, Dublin	No archaeological significance	Mary McMahon
07E0488	Criminal Courts Complex, Infirmary Road, Dublin	Urban, post-medieval	Franc Myles
94E0104	Salmon Pool, Islandbridge	Urban	Neil O'Flanagan
95E0197	12-24 Montpelier Hill, Dublin	No archaeological significance	Deirdre Murphy
93E0063	Junction of Infirmary Rd. and Montpelier Hill	No archaeological significance	Alan Hayden
18E0402	Former Military Barracks, Infirmary Road	18th- and 19th-century military barracks	Antoine Giacometti

Table 13.4 Historical cartographic sources for the site

Map	Date	Description
De Gomme's map of Dublin	1673	This map shows the site well outside the city in a green field area. The nearest roads to the site are Clonee Road and

		Cabragh Road. The Duke of Ormonde's grounds are depicted south of the site. Seven acres were offered to the Duke of Ormonde as a site for a proposed palace that never materialised. It is drawn as an enclosure called the "Duke of Ormonde's Ground' in de Gommes map.
John Rocque's plan of the city of Dublin	1756	This shows green fields extending all the way from the rear gardens of the houses along Mountpellier Hill to 'Black Horse Lane'. The site lies within this green field area. There is a laneway/track depicted at the eastern part of the site with a pump shown on it. The Phoenix Park gate and The Royal Barracks are shown. Infirmary road is not depicted.
Ordnance Survey	1829-41	The area surrounding the site is still mostly open fields with the exception of more hospitals. Military Road is depicted and the 'Circular Road' gate. A hospital is depicted on the site of St Bricin's. There is a nameway/track shown along the eastern boundary of the site with a pump marked on it.
Ordnance Survey	1897-1913	The development site is still shown as open fields but the surrounding area is now more build up. Infirmary road is depicted and also Arbour Hill Military Hospital is located where St Bricin's Hospital stands today. An isolation hospital is depicted on Infirmary Road. The laneway/trackway in Rocque's map is still depicted along the eastern boundary of the site but stops halfway. Terraces of residential houses now surround the northern sides of the site.
Ordnance Survey	1943	The development site is still marked as open ground in the 1940's although surrounded by buildings on all sides except the south where the land is marked as Dept of Defence. The field boundaries are still marked. It appears that the construction of St Bricin's hospital in the early 20th century may have interfered with the line of the lane although it may have survived in the lines of Thor Place.
Record of Monuments and Places map (RMP)	current	This map shows the nearest RMP sites in red and sites on the National Inventory of Architectural Heritage marked in blue
Aerial image of former DCC flat complex O Devaney Gardens	Pre 2018	Aerial photo of O'Devaney Gardens residential complex prior to demolition
Google map (2020) with approximate location of new buildings	2020	Approximate location of proposed buildings on current aerial photo

13.3.3 Intangible Heritage

The site has no known intangible cultural heritage assets under the criteria set out under the 2003 UNESCO Convention for the Safeguarding of the Intangible Heritage as ratified by Ireland in December 2015.

13.3.4 Architectural Heritage

The application site has no statutory architectural heritage designation and the site retains no special values of architectural heritage significance. However, the site is located surrounded by buildings and complexes of architectural heritage interest including Protected Structures along the North Circular Road (Table 13.5), Residential Neighbourhoods (Conservation Areas zoned Z2) and by nineteenth and twentieth century military complexes to the east and south-west (Table13.6) and the proposed development may impact their curtilage, views, setting and prospects.

Architectural Heritage Context

The site lay as an undeveloped greenfield site until the middle of the twentieth century, by which time it had become surrounded by significant historical developments such as the Phoenix Park and its associated military complexes, the residential developments along the North Circular Road and Infirmary Road, and the Dublin Artisan's Dwellings Company (DADC) c.1879-1908.

North Circular Road

A 1763 statute '*for making more convenient approaches to the city'* established trustees to make a circular road around the north and south sides of Dublin city to improve the approaches and reduce congestion. The North Circular Road was laid out between the 1760s and 1780s to link the Phoenix Park with the North Docks. The road was not developed in an organised fashion, with the earliest dwellings located close to the city, and with larger institutions gradually developing during the nineteenth century along its length. These included the Mater Hospital c.1855-61, Mountjoy Prison c.1847-50, and a cluster of institutions at Grangegorman (which now comprise TUDublin) including Richmond Penitentiary c.1812-16, Richmond Lunatic Asylum c.1810-15 and St. Brendan's Hospital from 1848 onwards. The North Circular Road developed slowly at its east and west extremes with no development shown on the west end of the road close to the Phoenix Park and the fields which comprise the application site shown on the first edition Ordnance Survey map of 1838. At this time, Infirmary Road was still referred to as part of the 'North Circular Road' and ran along the eastern boundary of the Phoenix Park. In 1838, the future site of the former O'Devaney Gardens development appears as fields very similar to that depicted by Rocque almost a century earlier. An Ordnance Store and a series of Georgian dwellings line Montpelier Hill to the south, and Arbour Hill Military Hospital and the Old Provost Prison and associated buildings lie to the east.

By 1887, development had reached the west end of the North Circular Road, which would become characterised by substantial two- and three-storey-over-basement red brick residential dwellings. These were built between c.1860 and c.1905 and arranged as short terraces along the tree-lined avenue. Terraces on the south side of the North Circular such as Wodehouse, Belmont, Weston, Longfield and Carlisle Terrace were largely built in the last decade of the nineteenth century, and show typical late Victorian brick and window detailing and boundary ironwork to the roadside facades, but with much plainer rear elevations oriented towards O'Devaney Gardens. By the turn of the twentieth century, the terraces were fully formed with Epworth Terrace, Weston Terrace, Longfield Terrace and part of Carlisle Terrace backing separated from the open fields by a mews lane which serviced the rear of the buildings. The rear of the properties have a variety of boundary treatments ranging from simple boundary walls, to outbuildings to occasional mews buildings, but with well-built high Dublin Calp limestone masonry walls at the properties flanking the current road entrance to O'Devaney Gardens. The majority of these substantial buildings feature mature trees in the rear gardens which obscure views of Devaney's Gardens.

Military Architecture

The area to the south, west and east of the site contains a significant number of buildings built for the military. After the Williamite Wars 1688-91, the practice of housing the military among the civilian populace was discontinued and the construction of fortifications, barracks, hospitals and other military structures passed to the Barrack Board. Over time, Dublin came to have the highest concentration of military buildings in Ireland. These included the eighteenth-century Royal Barracks (now Collins Barracks), Arbour Hill Prison built to the designs of the Royal Engineers 1845-8, and the Royal Military Infirmary of 1786-7 in the Phoenix Park. In addition to these key structures, further buildings were constructed along Infirmary Road which functioned as extensions to the Royal Military Infirmary including a T-plan infirmary hospital at Montpelier Gardens built c.1860, an multiple-bay isolation hospital built c.1880, and the three-bay three-storey former Montpelier Hill Barracks building built c.1890.

The closest military site to the proposed development is St. Bricin's Military Hospital to the east; a complex of nineteenth and twentieth century buildings of architectural heritage merit set in landscaped gardens behind boundary walls; with an access road from the Royal Military Hospital and the Phoenix Park formed by Montpelier Gardens. These are not Protected Structures but do contain buildings of architectural heritage significance rated by the NIAH (Table 13.6). This detached U-plan military hospital was built in three stages by the War Department 1902-13 when it opened as King George V Hospital. The hospital now forms part of a cluster of associated hospital buildings known as St. Bricin's which include a former cruciform-plan Roman Catholic chapel c.1930 built in the Arts and Crafts style; a former U-plan tuberculosis hospital built c.1944 in red brick following the style of St.Bricin's; and a former nurses residence built c.1950 by the Irish Defence Forces. The site also retains nineteenth century military buildings including the Provost Marshall's House built c.1800; the Old Provost Prison built c.1800 where Theobald Wolfe Tone died in November 1798; and a range of cavalry stables built c.1820. The St. Bricin's Military Hospital complex is set behind boundary walls and is currently partly screened from view from O'Devaney Gardens by mature trees (Plate 13.4). The c.1902-13 U-plan hospital, the c.1930 church and the c.1950 former nurse's home are the closest structures to O'Devaney Gardens; and the upper floors of the hospital will overlook the new development.

Dublin Artisan's Dwellings

The large suburb of Dublin Artisan's Dwellings to the north-east and north-west will be overlooked by the development. These houses are largely composed of single- and two-storey dwellings built by the Dublin Artisan's Dwellings Company (DADC) c.1879-1908, a private profitable company created after legislation was enacted to provide for government loans on favourable terms through the Commissioners of the Board of Works to developers building working class homes. These terraces do not directly engage with the site except via local road access to Thor Place as some of the adjoining streets are separated from the site by railings. These buildings were rated by the National Inventory of Architectural Heritage as being of 'local' architectural heritage value. These buildings are not Protected Structures.

The Dublin Artisans Dwellings Company was set up in 1876 and built 3,300 houses in Dublin by 1914. These included a large estate of 182 houses at Infirmary Road north-west of the site, which was opened by the Lord Lieutenant in 1886. To the north-east of the site lies the western part of the large suburb of Stoneybatter built by the DADC c.1890-1908. The houses were designed by Charles Herbert Ashworth who was appointed architect to the DADC in July 1890, where he remained until his death in 1926. Ashworth's designs were based on five house types built as terraces and courts, comprising single-storey two-room cottages of Portland Cement, and larger two-storey houses of brick with a parlour, scullery, two bedrooms and in some cases, a living room. The houses were built by different contractors with Cramptons building c700 houses by 1903 in Oxmanstown. Casey noted that the final phase in the south-east quarter adjacent to Arbour Hill were provided with Viking names built adjacent to the site and were given Viking names such as Viking Road and Viking Place and Sitric Road and Sitric Place, and it is tempting to place the angular protrusion of Thor Park and Thor Place also into this final phase of construction in the first decade of the twentieth century. The DADC sold the houses to Folio Homes in the 1980s and many have since passed into private ownership.

The cluster of DADC dwellings off Infirmary Road comprise four blocks of two-storey red brick houses arranged in a T-configuration on the axis of Sullivan Street and Aberdeen Street, surrounded by an enclosing ring of single-storey cottages on Kinahan Street (south), Black Street (north) and Findlater Street (east). The cottages on Findlater Street back onto the proposed development, but are separated by boundary walls. Most of the cottages have flat-roofed single-storey extensions which occupy most of the rear yards, and have limited, if any, views or visual links with the site.

The large suburb of DADC dwellings in Stoneybatter has a direct road connection with the site at Thor Place. The single-storey dwellings on the west side of Thor Place and Ashford Street back onto the site, and have rear boundary walls with most of the houses having single-storey flat-roofed extensions to the rear. The houses at the west end of Ross Street and Ashford Place present their gable end to the development site. Views are obscured by mature vegetation from Ashford Place and only a small number of cottages on the north side of Ross Street would have any views or prospects of the development. All the cottage dwellings are separated from O'Devaney Gardens by boundary walls, and many of the rear yards of the properties show substantial single-storey extensions. Only four of the cottages on Thor Place and Ashford Street do not show relatively large extensions. All of these buildings will be overlooked by the development.

Former O'Devaney Gardens Development

The former O'Devaney Gardens development was opened in 1954, comprising thirteen four-storey blocks of flats in landscaped recreational grounds. The development was named after a seventeenth century martyr, Bishop Conor O'Devaney who had been appointed Bishop of Down by Pope Gregory XIII in May 1582. O'Devaney was imprisoned in 1588 after the Spanish Armada but was released to his diocese. He was arrested in 1611, and charged in 1612 of assisting Hugh O'Neill and Brian MacArt O'Neill in treason during the Nine Years War. O'Devaney was hung on gallows on George's Hill, beheaded and dismembered. The blocks were demolished on a phased basis as part of the O'Devaney Gardens Regeneration project between 2008 and 2018.

The surrounding built environment

This is predominantly residential in character. Terraces of substantial Late Victorian and Edward dwellings occupy the north-west boundary of the site. These period houses have generous south-facing rear gardens, often with mature trees, and are separated from the site by a narrow mews lane. A number of these houses are Protected Structures (Table 13.5) and their curtilage adjoins the development site. The elevated site has views south across the city to the Dublin Mountains, and west towards the Phoenix Park where the tower of the Royal Military Hospital and the Wellington Monument provide visual reference points.

Table 13.5 Protected Structures (houses) adjacent to the development site

RPS Ref	House	Address
1555	2	North Circular Road, Dublin 7
1556	4	North Circular Road, Dublin 7
1557	6	North Circular Road, Dublin 7
1558	8	North Circular Road, Dublin 7
1559	10	North Circular Road, Dublin 7
1560	12	North Circular Road, Dublin 7
1561	14	North Circular Road, Dublin 7
1562	16	North Circular Road, Dublin 7
1563	18	North Circular Road, Dublin 7

Protected Structures

The site does not contain any Protected Structures.

Adjacent Buildings

A small portion of the north-west boundary backs onto the rear of terraces of late Victorian and Edwardian houses on the North Circular Road. A number of these buildings at the west and east edges of the site are Protected Structures (Table 13.5). These are separated from the site by a narrow stable lane which runs along the rear of the terraces.

The military hospital complex of St. Bricin's directly adjoints the site. A number of these buildings were rated by the National Inventory of Architectural Heritage as being of 'Regional' architectural heritage value (Table 13.6). These buildings are not Protected Structures. The former Montpelier Hill Barracks buildings at the corner of Infirmary Road and Montpelier Gardens were similarly rated by the NIAH as being of 'Regional' architectural heritage value but are not Protected Structures.

Table 13.6 Military buildings adjacent to the development site

NIAH Ref	Building	Type
50070110	St. Bricin's Military Hospital, c.1902-13	Hospital/Infirmary
50070508	St. Bricin's Hospital Chapel, c.1940	Church
50070109	St. Bricin's Military Hospital, c.1944	Hospital/Infirmary
50070107	Provost Marshalls House, St. Bricin's, c.1800	Officer's house
50070108	Old Provost Prison, c.1800	Prison/Jail
50070106	St. Bricin's Stables, c.1820	Stables
50070132	T-plan Hospital, c.1860	Hospital/Infirmary
50070133	Isolation Hospital, c.1880	Hospital/Infirmary
50070131	Montpelier Hill Barracks, c.1890	Barracks
50070130	Montpelier Hill Barracks, c.1820-90	Gates/railings/walls

Landmarks

A number of distinctive local landmarks add to the distinctiveness of the area:

- Wellington Testimonial, c.1818
- Clock Tower of the Royal Military Infirmary, c. 1786-7
- Phoenix Park (signified by mature trees)

The existing views of these local landmarks should not be affected by the proposed development.

13.4 CHARACTERISTICS OF PROPOSED DEVELOPMENT

A detailed description of the proposed development is set out in Section 3.0 .

There are no plans for basements (there will be some cut and fill).

The proposed development is set back from St. Bricin's Military Complex to the east and the rear of the DADC housings off Infirmary Road and those of the western fringe of the DADC Stoneybatter suburb. Block 2 is separated from the curtilage of the Protected Structures on the North Circular Road by the existing stable lane. This lane will be upgraded as part of the development.

13.5 ASSESSMENT OF IMPACTS

13.1.1 Construction Phase

Archaeology

The main findings in relation to archaeological heritage are as follows:

- No obvious areas of archaeological potential were noted in the course of the site visit.
- There are no Recorded Monument within the area of the proposed development.
- There are no Protected Structures within the area of the proposed development.
- The nearest previous archaeological excavations were c. 200m from the site, and either revealed no archaeological significance or were of post medieval date.
- No areas of archaeological potential were noted in the review of cartographic sources.
- No areas of archaeological potential were noted on or adjacent to the site on aerial photography.
- It is highly likely that construction of the flat complex in the 1950s involved major ground disturbance and removal of soil, destroying archaeological material that might have survived up to the 1950s.
- Archaeological monitoring by Aisling Collins Archaeology Services (ACAS) of site investigations associated with this development was carried out in July 2020 did not reveal any archaeology.
- There are two areas identified within the proposed development site that were not previously built upon (or archaeologically monitored during site investigations) and it is possible that archaeological material may have survived below the ground.
  - The strip of land formerly owned by St Bricin's as it shows no evidence of previous construction on the site. It may have been landscaped as part of a formal garden to the

west of the hospital, and it is possible that services may also have disturbed some of the ground. This is the proposed location of blocks 6 and 10.

- The former O'Devaney Garden complex football pitch as it shows no evidence of previous buildings standing at this location (apart from the pitch). This is the proposed location of part of new building block 7.

Conclusion

No archaeology was identified during the monitoring of site investigations carried out in July 2020.

The area of archaeological potential is the strip of land formerly owned by St Bricin's. Archaeological testing is recommended in this area and also in the former football pitch as it was not possible to monitor this area during the site investigations.

A programme of archaeological test trenching will be carried out within each area prior to construction. Testing will provide information on the nature and extent of any archaeological remains within the proposed development.

13.1.2 Operation Phase

Archaeology

No potential impacts are identified at this moment during the operational phase as it is anticipated that issues of archaeological and cultural heritage interest will have been resolved prior to or during the construction phase.

Archaeological Heritage

The greatest threat to unrecorded, buried archaeological sites/ features occurs during the construction stage. It is likely that previous major ground disturbances during the 1950's construction will have destroyed any material that may have survived. There are two areas identified that were not previously built upon: the strip of land formerly owned by St Bricin's, and the former football pitch of the former O'Devaney Gardens complex.

A programme of archaeological test trenching will be carried out within the two areas identified prior to construction.

Intangible Heritage

There are no known intangible cultural heritage assets associated with the site, and consequently the development has no impact on intangible cultural heritage.

Architectural Heritage

The site contains no Protected Structures, and new buildings or structures will consequently not have any direct impact on architectural cultural heritage. The site is surrounded by dwellings and military buildings of varying levels of architectural heritage significance, and the development will have indirect impacts on these through changes to setting, views and vistas.

The proposed development will have a moderate impact on the setting and views to the rear of Protected Structures on the North Circular Road, particularly Nos.31-61 and of the rear of DADC dwellings on Infirmary Road and at the western fringe of the DADC Stoneybatter suburb. The redevelopment of the site proposes higher quality replacement buildings to the recently demolished 1950s flat complex which will have beneficial visual impacts on visual outlooks from these properties.

The proposed development will also have a moderate visual impact on the setting and views of the St. Bricin's Military Hospital complex, in particularly the U-shaped hospital, chapel and former nurse's home in its western sector. These buildings are largely shielded from public view by mature tree cover. The proposed development will remove the outer layer of trees along the former boundary and hedgerow (the mature trees within St. Bricin's are outside the development site).

The development is intended to renew and rejuvenate the site, and that the scheme will provide a 'sense of place' to the area. The new residential units are designed in a contemporary architectural idiom and will be a considerable improvement on the now-demolished 1950s flat complex. The proposal does not alter boundaries or insert new routes that would impact historical activity. The development does not directly interact with the late Victorian and Edwardian terraces on the North Circular Road or the DADC artisan dwellings to the west or north-east, though it is expected that there will be an increase in vehicular and pedestrian traffic using the existing roads of Montpelier Gardens to access Infirmary Road; O'Devaney Garden road to access the North Circular Road, and Thor Place providing access to the warren of DADC housing in Stoneybatter. The proposed development is separated from St. Bricin's Military Hospital by a circuit of boundary walls, and has only peripheral engagement with the former Montpelier Hill Barracks on Infirmary Road.

The proposed regeneration of the site should create a new pattern of usage in the area, but the operational phase will have neutral impact on the surrounding architectural heritage. The distribution of heights among the new development has been carefully considered to not overshadow or detract from the surrounding historic building stock. The existing Protected Structures on the North Circular Road and the flanking DADC houses generally turn their backs on the development, and the proposed planting and landscaping of the development should create a new urban space which will positively contribute to the urban landscape.

Predicted Impacts on View and Vistas

The introduction of new residential units into the existing wasteland has the potential to alter the views of a number of buildings of architectural heritage interest; particularly the Protected Structures on the North Circular Road, and the buildings at the western edge of the St. Bricin's Military Hospital complex. The multi-storey nature of the new development will have a neutral impact on the predominant context of fine-grained small-scale buildings of the Dublin Artisans Dwellings which flank parts of the site.

Points of reference will be lost, particularly views of the Wellington Testimonial monument and the clock tower of the Royal Military Hospital from the upper floors of St. Bricin's Military Hospital. These views are not protected.

Views from the existing houses on the North Circular Road and the DADC dwellings flanking parts of the site will display high quality modern housing and landscaping. Such a view is more positive than the existing views and the former views into the site from both prospects. It should also be noted that many of the buildings in the St. Bricin's Military Hospital complex, on the North Circular Road, Infirmary Road and the western fringe of Stoneybatter are partly shielded by mature trees in many instances.

The impact of the proposed development on the architectural heritage is considered acceptable and therefore, it is considered that mitigation measures are not required.

13.6 MITIGATION AND MONITORING

The following Mitigation and Monitoring Measures are recommended:-

CH-C1	An archaeological assessment, including test trenching, be carried out on that strip of land formerly owned by St Bricin's prior to commencement of development (proposed blocks 6 & 10). Full excavation may subsequently be necessary, depending on the recommendations of the planning authority and the Department of the Environment, Heritage and Local Government.
CH-C2	An archaeological assessment, including test trenching, be carried out on the former football pitch (proposed block 7) prior to commencement of development. Full excavation may subsequently be necessary, depending on the recommendations of the planning authority and the Department of the Environment, Heritage and Local Government.

NOTE: All conclusions and mitigation measures expressed in relation to archaeology are subject to the approval of The Department of Culture, Heritage and the Gaeltacht and the relevant local authorities. As the statutory body responsible for the protection of Ireland's archaeological and cultural heritage resource, the DOCHG may issue alternative or additional recommendations.

13.7 DO-NOTHING SCENARIO

If the proposed development does not take place there will be no negative impact on any archaeological material that might survive there.

In a 'do nothing' scenario, the empty open site will have a significant negative impact on the immediate environs and its cultural heritage. The present boundaries and circular pattern would remain unaltered and no impact would occur to views or vistas, vehicular or pedestrian traffic. However, the retention of the site as an urban 'wasteland' would detract from the setting, views and vistas from the adjacent Protected Structures and would a negative impact on the architectural heritage.

13.8 INTERACTIONS

Should archaeological features be uncovered on this site and protected as green space then human traffic (walking, cycling or motorised) may degrade the archaeological feature. Any uncovered archaeological features should be assessed on discovery of their full extent, and consideration given to the design of green space to include protective berms, fencing and signage may mitigate any impact on archaeological features while also enhancing the green infrastructure of the development.

Surface water drainage has the potential to interact harmfully with archaeological features which may be uncovered on this site as drainage measures may dry out or waterlog the features and make them subject to change. Such interactions may be reduced by appropriate testing with following further recommendations at the construction phase where appropriate.

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14. LANDSCAPE

14.1 INTRODUCTION

This chapter assesses the potential effects of the proposed development on the landscape/ townscape character and views/ visual amenity in the receiving environment. It should be read in conjunction with the verified photomontages contained in Appendix 14A of the EIAR.

The Landscape and Visual Impact Assessment (LVIA) was prepared by Richard Butler of Model Works Ltd. Richard has degrees in Landscape Architecture and Town Planning, is a member of the Irish Landscape Institute and the Irish Planning Institute and has over 20 years' experience in development and environmental planning, specialising in LVIA.

14.2 ASSESSMENT METHODOLOGY

The assessment was carried out with reference to:

- *Guidelines for Landscape and Visual Impact Assessment*, 3rd edition, 2013 (GLVIA), published by the Landscape Institute;
- *Technical Information Note on Townscape Character Assessment*, 2016, published by the Landscape Institute;
- *Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*, 2017, published by the EPA;
- *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*, 2018, published by the Department of Housing, Planning and Local Government.

The draft EPA guidelines provide a general methodology and impact ratings for all environmental topics covered in an EIAR; the GLVIA provides specific guidelines for landscape and visual impact assessment. Therefore, a combination of the draft EPA guidelines and the GLVIA has informed the methodology for this assessment.

The GLVIA requires that effects on views and visual amenity be assessed separately from the effects on townscape, although the two topics are inherently linked. 'Landscape' (or 'townscape' in built up areas) results from the interplay between the physical, natural and cultural components of our surroundings. Different combinations and spatial distribution of these elements create variations in landscape/ townscape character. Landscape impact assessment identifies the changes to this character which would result from the proposed development, and assesses the significance of those effects on the landscape/ townscape as a resource.

Visual impact assessment is concerned with changes that arise in the composition of available views, the response of people to these changes and the overall effects on the area's visual amenity - with particular focus on public views and public visual amenity.

14.2.1 Methodology for Assessment of Townscape Effects

Assessment of potential townscape effects involves (a) classifying the sensitivity of the townscape resource, (b) classifying the magnitude of townscape change which would result from the development, and (c) combining these factors to arrive at a classification of significance of the effects.

Townscape Sensitivity

The sensitivity of the townscape is a function of its land use, patterns and scale, visual enclosure and the distribution of visual receptors, and the value placed on the townscape. The nature and scale of the proposed development is also taken into account, as are any trends of change, and relevant policy. Five categories are used to classify sensitivity (Table 14.1).

Table 14.1: Categories of Townscape Sensitivity

Sensitivity	**Description**
Very High	Areas where the townscape exhibits very strong, positive character with valued elements, features and characteristics that combine to give an experience of unity, richness and harmony. The townscape character is such that its capacity to accommodate change is very low. These attributes are recognised in policy or designations as being of national or international value and the principal management objective for the area is protection of the existing character from change.
High	Areas where the townscape exhibits strong, positive character with valued elements, features and characteristics. The character is such that it has limited/low capacity to accommodate change. These attributes are recognised in policy or designations as being of national, regional or county value and the principal management objective for the area is conservation of the existing character.
Medium	Areas where the townscape has certain valued elements, features or characteristics but where the character is mixed or not particularly strong, or has evidence of alteration, degradation or erosion of elements and characteristics. The townscape character is such that there is some capacity for change. These areas may be recognised in policy at local or county level and the principal management objective may be to consolidate townscape character or facilitate appropriate, necessary change.
Low	Areas where the townscape has few valued elements, features or characteristics and the character is weak. The character is such that it has capacity for change; where development would make no significant change or would make a positive change. Such townscapes are generally unrecognised in policy and the principal management objective may be to facilitate change through development, repair, restoration or enhancement.
Negligible	Areas where the townscape exhibits negative character, with no valued elements, features or characteristics. The character is such that its capacity to accommodate change is high; where development would make no significant change or would make a positive change. Such townscapes include derelict industrial lands, as well as sites or areas that are designated for a particular type of development. The principal management objective for the area is to facilitate change in the townscape through development, repair or restoration.

Magnitude of Townscape Change

Magnitude of change is a factor of the scale, extent and degree of change imposed on the townscape by a development, with reference to its key elements, features, characteristics and any affected surrounding character areas (collectively known as 'townscape receptors'). Five categories are used to classify magnitude of change (Table 14.2).

Table 14.2: Categories of Townscape Change

Sensitivity	Description
Very High	Change that is large in extent, resulting in the loss of or major alteration to key elements, features or characteristics of the townscape, and/or introduction of large elements considered totally uncharacteristic in the context. Such development results in fundamental change in the character of the townscape.
High	Change that is moderate to large in extent, resulting in major alteration to key elements, features or characteristics of the townscape, and/or introduction of large elements considered uncharacteristic in the context. Such development results in change to the character of the townscape.
Medium	Change that is moderate in extent, resulting in partial loss or alteration to key elements, features or characteristics of the townscape, and/or introduction of elements that may be prominent but not necessarily substantially uncharacteristic in the context. Such development results in change to the character of the townscape.
Low	Change that is moderate or limited in scale, resulting in minor alteration to key elements, features or characteristics of the townscape, and/or introduction of elements that are not uncharacteristic in the context. Such development results in minor change to the character of the townscape.
Negligible	Change that is limited in scale, resulting in no alteration to key elements features or characteristics of the townscape, and/or introduction of elements that are characteristic of the context. Such development results in no change to the townscape character.

Significance of Effects

To classify the significance of effects the magnitude of change is measured against the sensitivity of the townscape using the guide in Table 14.3 below. This matrix is only a guide. The assessor also uses professional judgement informed by their expertise, experience and common sense to arrive at a classification of significance that is reasonable and justifiable.

Table 14.3: Guide to Classification of Significance of Townscape and Visual Effects

		Sensitivity of the Townscape/View				
		Very High	High	Medium	Low	Negligible
Magnitude of Townscape/ Visual Change	Very High	Profound	Profound to Very Significant	Very Significant to Significant	Moderate	Slight
	High	Profound to Very Significant	Very Significant	Significant	Moderate to Slight	Slight to Not Significant
	Medium	Very Significant to Significant	Significant	Moderate	Slight	Not Significant
	Low	Moderate	Moderate to Slight	Slight	Not significant	Imperceptible

	Negligible	Slight	Slight to Not Significant	Not significant	Imperceptible	Imperceptible

14.2.2 Methodology for Assessment of Visual Effects

Assessment of visual effects involves identifying a number of key/representative viewpoints in the receiving environment, and for each of these: (a) classifying the viewpoint sensitivity, (b) classifying the magnitude of change which would result in the view (informed by verified photomontages), and (c) combining these factors to arrive at a classification of significance of the effects on the view.

Sensitivity of the Viewpoint/Visual Receptor

Viewpoint sensitivity (see categories in Table 14.4) is a function of two main considerations:

- Susceptibility of the visual receptor to change. This depends on the occupation or activity of the people experiencing the view, and the extent to which their attention is focussed on the views or visual amenity they experience at that location. Visual receptors most susceptible to change include residents at home, people engaged in outdoor recreation focused on the landscape (e.g. trail users), and visitors to heritage attractions and places of congregation where the setting contributes to the experience. Visual receptors less sensitive to change include travellers on road, rail and other transport routes (unless on recognised scenic routes), people engaged in outdoor recreation where the surrounding landscape does not influence the experience, and people in their place of work or shopping.

- Value attached to the view. This depends to a large extent on the subjective opinion of the visual receptor but also on factors such as policy and designations (e.g. scenic routes, protected views), or the view or setting being associated with a heritage asset, visitor attraction or having some other cultural status (e.g. by appearing in arts).

Table 14.4: Categories of Viewpoint Sensitivity

Sensitivity	**Description**
Very High	Iconic viewpoints (views towards or from a landscape feature or area) that are recognised in policy or otherwise designated as being of national value. The composition, character and quality of the view are such that its capacity for change is very low. The principal management objective for the view is its protection from change.
High	Viewpoints that are recognised in policy or otherwise designated as being of value, or viewpoints that are highly valued by people that experience them regularly (e.g. views from houses or outdoor recreation amenities focused on the landscape). The composition, character and quality of the view may be such that its capacity to accommodate change may or may not be low. The principal management objective for the view is its protection from change that reduces visual amenity.
Medium	Views that may not have features or characteristics that are of particular value, but have no major detracting elements, and which thus provide some visual amenity. These views may have capacity for appropriate change and the principal management objective is to facilitate change to the composition that does not detract from visual amenity, or which enhances it.

Low	Views that have no valued feature or characteristic, and where the composition and character are such that there is capacity for change. This category also includes views experienced by people involved in activities with no particular focus on the landscape. For such views the principal management objective is to facilitate change that does not detract from visual amenity or enhances it.
Negligible	Views that have no valued feature or characteristic, or in which the composition may be unsightly (e.g. in derelict landscapes). For such views the principal management objective is to facilitate change that repairs, restores or enhances visual amenity.

Magnitude of Change to the View

Classification of the magnitude of change takes into account the size or scale of the intrusion of development into the view (relative to the other elements and features in the composition, i.e. its relative visual dominance), the degree to which it contrasts or integrates with the other elements and the general character of the view, and the way in which the change will be experienced (e.g. in full view, partial or peripheral view, or in glimpses). Five categories are used to classify magnitude of visual change to a view (Table 14.5):

Table 14.5: Categories of Magnitude of Visual Change

Sensitivity	Description
Very High	Full or extensive intrusion of the development in the view, or partial intrusion that obstructs valued features or characteristics, or introduction of elements that are completely out of character in the context, to the extent that the development becomes dominant in the composition and defines the character of the view and the visual amenity.
High	Extensive intrusion of the development in the view, or partial intrusion that obstructs valued features, or introduction of elements that may be considered uncharacteristic in the context, to the extent that the development becomes co-dominant with other elements in the composition and affects the character of the view and the visual amenity.
Medium	Partial intrusion of the development in the view, or introduction of elements that may be prominent but not necessarily uncharacteristic in the context, resulting in change to the composition but not necessarily the character of the view or the visual amenity.
Low	Minor intrusion of the development into the view, or introduction of elements that are not uncharacteristic in the context, resulting in minor alteration to the composition and character of the view but no change to visual amenity.
Negligible	Barely discernible intrusion of the development into the view, or introduction of elements that are characteristic in the context, resulting in slight change to the composition of the view and no change in visual amenity.

Significance of Visual Effects

As for townscape effects, to classify the significance of visual effects the magnitude of change to the view is measured against the sensitivity of the viewpoint using the guide in Table 14.3 above.

14.2.3 Quality of Effects

In addition to predicting the significance of the effects, EIA methodology [draft EPA guidelines Table 3.3, p.50] requires that the quality of the effects be classified as positive/ beneficial, neutral, or negative/ adverse. For townscape to a degree, but particularly for visual effects, this is an inherently subjective exercise. This is because townscape and visual amenity are perceived by people and are therefore subject to variations in the attitude and values - including aesthetic preferences - of the receptor. One person's attitude to a development may differ from another person's, and thus their response to the effects of a development on a townscape or view may vary.

Additionally, in certain situations there might be policy encouraging a particular development in an area, in which case the policy is effectively prescribing townscape and visual change. If a development achieves the objective of the policy the resulting effect might be considered positive, even if the townscape character or views are profoundly changed. The classification of quality of townscape and visual effects should seek to take these variables into account and provide a reasonable and robust assessment.

14.2.4 Photomontage Methodology

The photomontages were produced by Model Works Ltd. The photomontage methodology is based on the Landscape Institute advice note 01/11 Photography and Photomontage in Landscape and Visual Impact Assessment and 20 years' experience in photomontage production. The method has five main steps:

- Photography
- Survey
- 3D Modelling and Camera Matching
- Rendering and Finishing of Photomontages
- Presentation

Photography

- <u>Date, Time and Conditions</u>: The photography is timed so that the scene conditions, weather conditions and sun position allow - as far as possible - for a clear and representative baseline photograph to be captured. The objective is to ensure that all key elements of the view are clearly visible and unobscured by, for example, vehicular or pedestrian traffic in the foreground, precipitation, darkness/shade, sun glare, etc. The date and time of each photograph are recorded so that the sun position can be accurately portrayed in the 3D model ultimately montaged into the baseline photograph.
- <u>Camera and Camera Set-up</u>: The photographs are taken using a Canon EOS5D Mark II camera with a 21 mega pixel sensor and image resolution of 5616 x 3744 pixels. At each viewpoint the camera is positioned on a tripod with the lens 1.65m above ground level (the level of the average adult's eyes), directed at the site and levelled in the horizontal and vertical axes.
- <u>Lenses</u>: Prime lenses (fixed focal length with no zoom function) are used as this ensures that the image parameters for every photograph are the same and that all photographs taken with the same lens are comparable. For the close-up to middle distant views a 24mm prime lens is normally used. This lens captures a field of view of 73 degrees. This relatively wide field of view is preferred for the purpose of Landscape and Visual Impact Assessment as it shows more of the context landscape/townscape surrounding a site. For

distant viewpoints a 50mm prime lens may be used, capturing a 39 degree horizontal field of view.

Survey

The coordinates of each viewpoint/camera position, including the elevation, are recorded using a survey grade GPS receiver, the Trimble Geo7X, which is accurate to within 1cm. For each viewpoint, the coordinates of several static objects in the view are also surveyed (e.g. lamp posts, bollards, corners of buildings, etc.). The coordinates of these 'markers' are used as reference points later in the process, to ensure that the direction of view of the cameras in the 3D model matches the direction of view of the photographs.

3D Model and Camera Matching

- Creation of 3D Model: An Autodesk Revit model of the proposed development was supplied by the architect for the production of the photomontages. Model Works exported the Revit model into the software package Autodesk 3DS Max, in which materials were applied to the model's buildings and surfaces. Model Works built a 3D model of the proposed public realm/landscaping based on AutoCAD drawings provided by the landscape architect.
- 3D Camera Positions: The surveyed camera positions and the markers for each view are inserted into the 3D model, with information on the focal length of the lens attributed to each camera. For each camera/view, the date and time is set to match those of the original photograph. This ensures that the direction of sunlight and shadows in the 3D model match those of the photographs.
- Camera Matching: The photographs are then inserted as backdrops to the views of each camera in the 3D model. The direction of view of the cameras in the 3D model are matched with the direction of view of the photographs using the surveyed markers. This ensures that the camera positions, the direction of the views and the focal length of the cameras in the 3D model are accurate, so that the proposed development appears in the correct position and scale when montaged into the photographs.

Rendering of 3D Model and Finishing of Photomontages

For each view a render of the development is generated. This is the process of creating a photo-realistic image of the 3D model, as seen from each camera position, with sunlight and shadow applied to the model. The render of the development is then montaged into the photograph to create the photomontage.

Presentation and Viewing

The individual photomontages are presented on A3 pages in landscape format in Appendix 14.1. For each photomontage, the viewpoint number, location description, and the date and time of photography are provided on the page.

14.3 RECEIVING ENVIRONMENT

14.3.1 The Site - Strategic Urban Location

The c.5.2 ha site is located in the central urban area of Dublin, inside the ring formed by the canals and North and South Circular Roads. It is less than 3km by road from O'Connell Street at the centre of the city, some 550m from a neighbourhood centre in Stoneybatter (with TUD's Grangegorman campus adjacent), 650m from Heuston Station and Luas stop, and 300m from the nearest entrance to Phoenix Park. There are bus stops within minutes' walk in all directions from the site, on North Circular Road, Aughrim Street, Infirmary Road and Parkgate Street.

The site is thus centrally located in the metropolitan area, within walking distance of the city centre and a nearby neighbourhood centre, well served by all modes of public transport, and with access to extensive, high quality public open space. These characteristics, along with the site's large scale and its history of residential use, make the site a candidate for a strategic scale, high density residential development.

Accordingly, the site is identified as part of Strategic Development and Regeneration Area (SDRA 11) in the Dublin City Development Plan 2016-2022 (the DCDP). The national policy of compact growth provides further impetus for development of a scale that would significantly affect the landscape/townscape character and the composition of views in the site's receiving environment.

14.3.2 Townscape Character – Historic Development

Prior to the development of O'Devaney Gardens in the 1950s the area was characterised by inner suburban residential use (wrapping around the site to the north, east and west) and institutional uses (to the east and south). The O'Devaney Gardens site was a large area of grassland fields part of the St Bricin's Military Hospital grounds (see Figure 14.1). In addition to St Bricin's there were extensive institutional complexes to the south east (Collins Barracks), north west (McKee Barracks) and south west (Department of Defence). Along Parkgate Street and the Liffey Quays to the south there was a strip of commercial and mixed use development.

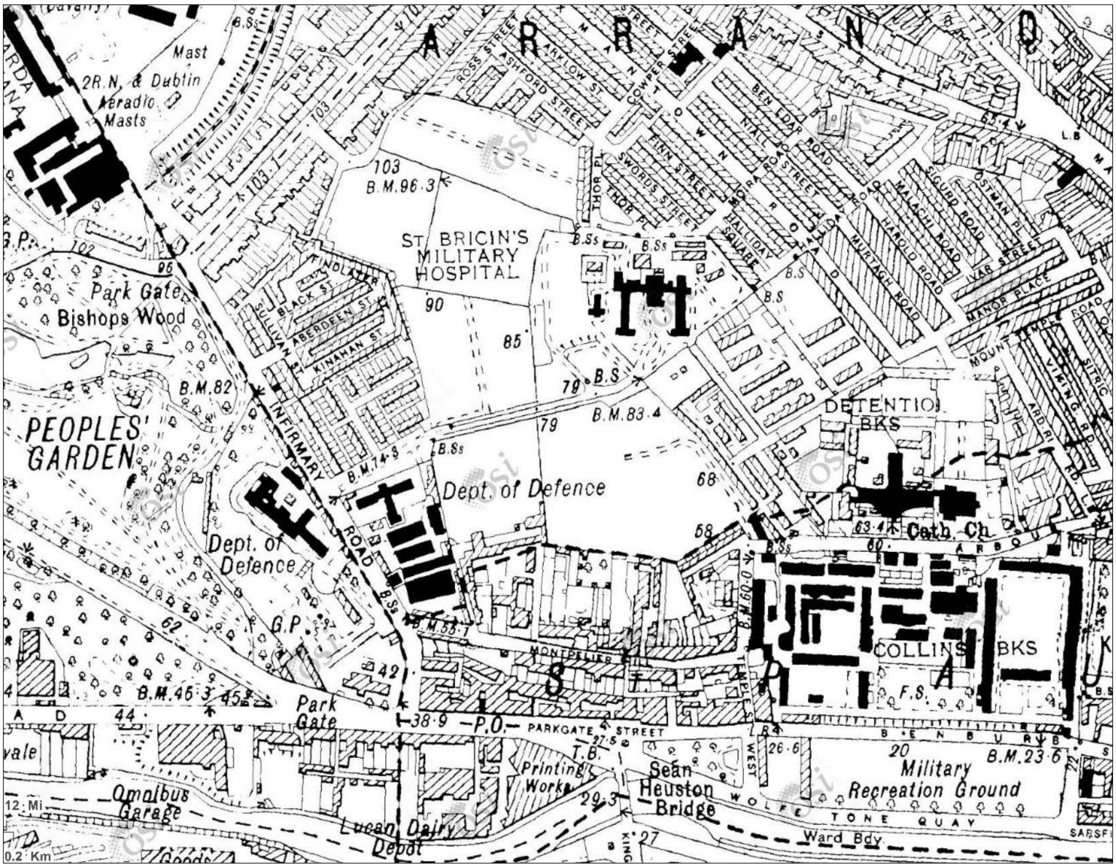


Figure 14.1: Cassini 6 inch map (surveyed between 1830s and 1930s)

The O'Devaney Gardens flats were completed by Dublin Corporation in 1954. The development was comprised of 13 no. apartment buildings of four storeys containing a total of 278 no. units, and a community building, crèche and commercial/ retail block (see Figure 14.2). At the centre of the site was a large open space with a playing field, a playground and community building. A road crossed the site from the north west to the east (connecting North Circular Road to Swords Street/ Moira Road). Another road gave access from Infirmary Road via Montpelier Gardens to the south.

Figure 14.2: O'Devaney Gardens flat complex prior to demolition (2008)

In the period from 2008-2018 O'Devaney Gardens was demolished and the site cleared in preparation for redevelopment.

Figure 14.3: The O'Devaney Gardens lands showing Phase 1A under construction (2020)

Redevelopment of the lands is now underway, following a grant of permission to DCC by An Bord Pleanála (ABP) in 2011 (see Figure 14.3 and Plate 14.1). The permitted development of 110 no. units includes a mix of apartments (up to four storeys), two- and three storey houses and two storey duplex and live work units. This development (known as Phase 1A) is located in the north western portion of the O'Devaney Gardens lands, bordering on the residential properties of North Circular Road to the north west and Findlater and Kinahan Streets to the west.

The O'Devaney Gardens lands outside of the Phase 1A construction area are now covered in rough grassland (having been seeded after demolition of the flats complex) - except for the former sports field which is a hard standing area. Due to the long period of disuse and a lack of passive surveillance parts of the area have been used for antisocial activities and dumping.

Plate 14.1: Phase 1A under construction near the former O'Devaney Gardens central open space (December 2020)

In addition to the remaining O'Devaney Gardens lands the subject site includes an adjoining field which was previously part of the St Bricin's grounds. The field is enclosed on its west side by a belt of trees. This is the only vegetation of note on the site (see Figure 14.3 and Plates 14.2 and 14.3).

Plate 14.2: The belt of trees (in the middle distance) enclosing the field in the eastern part of the site adjacent to St Bricin's

Plate 14.3: A view of the tree belt from within the site

Due to its scale and typology the O'Devaney Gardens flats complex was previously a defining element of the local townscape character. With the demolition of the flats the receiving environment is - for the time being - dominated by fine grained, low density residential neighbourhoods. Another key element of the townscape is St Bricin's Military Hospital adjacent to the east of the site. The hospital is included in SDRA 11 along with the subject site and the Department of Defence property to the south west at the corner of Montpelier Gardens and Infirmary Hill.

While the site environs are currently characterised by historic residential neighbourhoods and institutional buildings, the SDRA 11 designation (in combination with national policy) prescribes that the area will undergo profound change in the coming years. This will involve the reintroduction of higher density residential (and other) building typologies. There has been some change of this type (i.e. the introduction of contemporary, large scale buildings) in the area, notably the Criminal Courts of Criminal Justice beside the entrance to Phoenix Park (this is prominent in views from the site - see Plate 14.3). Further change is due to occur following approval by ABP for a development that will include landmark tower on the former Hickey's site beside the Liffey River 320m to the south of the site (ABP approved the principle of the building's height but required the façade design to be refined). Also of note are the evolving high density quarters at Heuston South Quarter and Clancy Quay. These are areas with similar strategic locational advantages to the site.

14.3.3 Surrounding Townscape Character – Key Elements and Character Areas

One of the noteworthy characteristics of the site is its separation from urban thoroughfares (such as Infirmary Hill and North Circular Road in the locality) and other areas of public realm. Rather than fronting public streets (except for Montpelier Gardens to the south) the site borders on a multitude of private residential properties, and St Bricin's Hospital. It has (and always had) a significant presence in the setting of these properties/ neighbourhoods, but a very limited presence in the wider townscape (due to its removal from the public streets).

This characteristic of the site is potentially significant since it is a policy of the DCDP to (a) extend the inner city westwards (as far as Heuston, i.e. including O'Devaney Gardens - ref. DCDP 2.3.2), (b) for the extended inner city to 'perform the function of a capital city core' (ref. DCDP 4.5.1), (c) for the regeneration areas to 'strengthen place-making in the city in order to consolidate and enhance the city centre' (ref. DCDP 4.5.1.1), and (d) for new urban development generally to improve the legibility of the city.

In order for the development on the site to achieve these objectives, i.e. to have a presence in the wider townscape (and to deliver compact growth) it must include buildings of substantial scale/ height. However, in doing so it will also unavoidably result in abrupt transitions in development typology and scale at its boundaries due to the character of the existing surrounding development.

The key elements and character areas in the receiving environment, i.e. the main potential receptors of townscape and visual change, are identified below under the following headings (refer to Figure 14.4 overleaf):

- Residential neighbourhoods;
- Other potentially sensitive receptors.

Residential Neighbourhoods

- Montpelier Park: To the south of the site across Montpelier Gardens is Montpelier Park. This is a late 20th century estate of two storey terraced houses. It includes a terrace facing the site directly across Montpelier Gardens (see Google Street View from 2014 – Plate 14.4), as well as a plaza (used for parking) across the road from the site, fronted on three sides by houses – all of which have views from their front windows and gardens towards the site (Plate 14.5).

- St Bricin's Park: To the rear/south of Montpelier Park is the mixed density estate of St Bricin's Park. This includes three recently renovated apartment buildings of two storeys, which are arranged so that views towards the site are framed from the courtyards between the buildings (Plate 14.6). Although buffered from the site by the Montpelier Park estate, any buildings of substantial height on the site would be visible from St Bricin's Park.

- Department of Defence site: To the south west of the site at the corner of Montpelier Gardens and Infirmary Road, is the former Isolation Hospital, a protected structure on a site owned by the Department of Defence. The site is included in SDRA 11 and is thus is thus designated for redevelopment along with the subject site and St Bricin's. The Isolation Hospital building itself is a low building in the northern part of the site alongside Montpelier Gardens. It is currently hidden behind a boundary wall and fence but may be expected to be revealed to the street – one of the main approaches to O'Devaney Gardens – when the Department of Defence site is redeveloped.

- Montpelier Gardens: Montpelier Gardens is a small estate to the west of the southern portion of the site. It is comprised of terraced two storey houses set behind shallow front gardens (with deep back gardens). The positioning of the houses close to the street results in a distinctive character and a relatively high degree of visual enclosure. A noteworthy characteristic of the estate is that there are no houses either facing or backing onto the site boundary. The houses nearest the site all present gable ends towards the site (i.e. their visual exposure is limited). However, a central eat-west aligned street frames a view directly towards the site from the estate (see Plate 14.7).

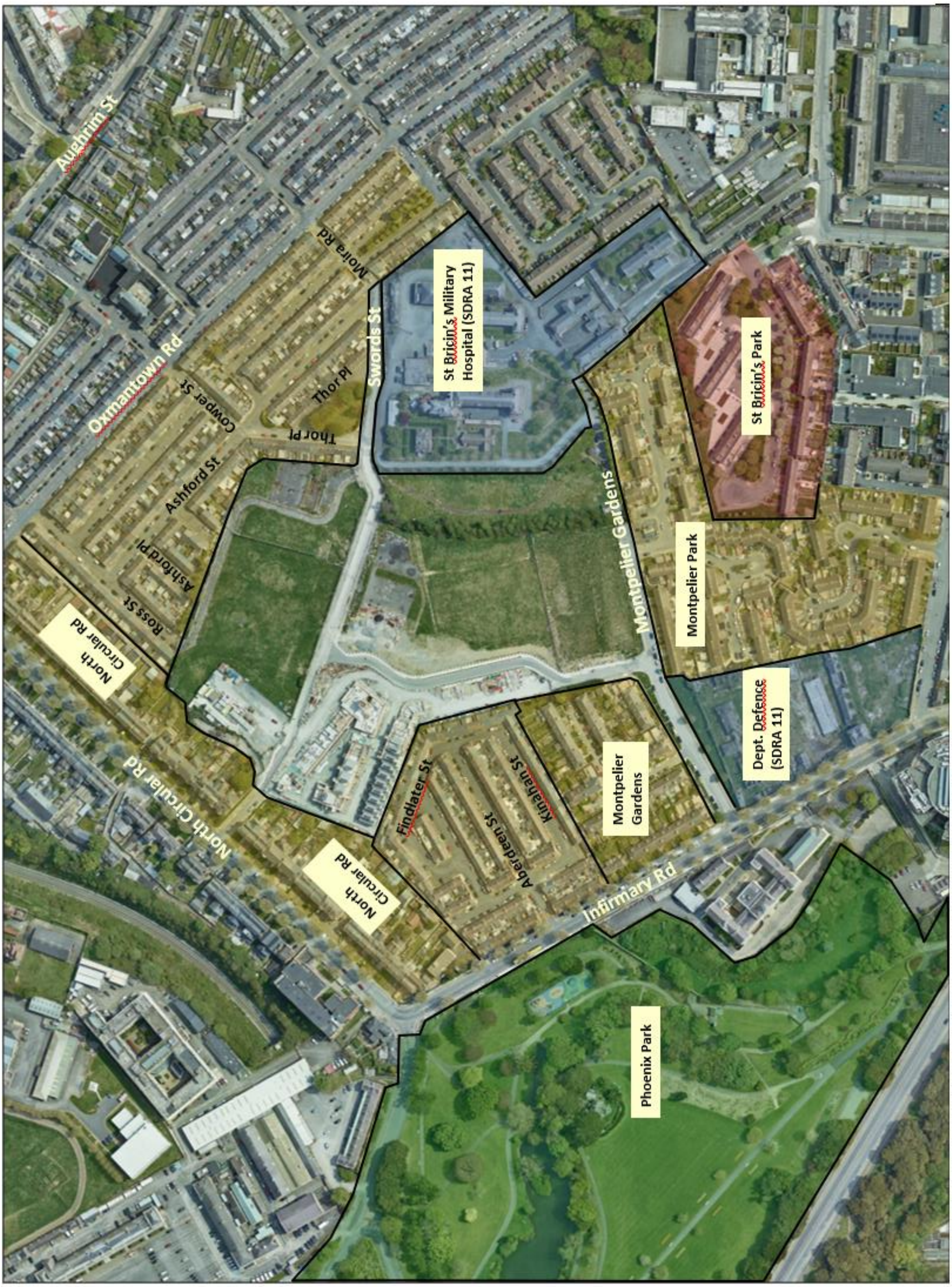


Figure 14.4: Key townscape elements and character areas in the receiving environment

Plate 14.4: The terrace of Montpelier Park houses facing the site across Montpelier Gardens (source: Google Earth, date 2014)

Plate 14.5: The view from Montpelier Park across the estate plaza/parking area towards the site, where a four storey block previously stood

Plate 14.6: A view from St Bricin's Park towards the site

Plate 14.7: A view towards the site from Montpelier Gardens

Residential Neighbourhoods Continued

Aberdeen, Sullivan, Kinahan, Back and Findlater Streets: To the west of the central portion of the site is a Victorian estate of terraced houses of two types –two storey red brick houses fronting Aberdeen and Sullivan Streets, and artisan's cottages fronting Kinahan, Back and Findlater Streets. The houses are also positioned close to the street edge, creating an inner urban character, but with the lower roofline (along the streets of cottages in particular) the visual enclosure is less pronounced than in Montpelier Gardens. Like Montpelier Gardens the estate has a very well defined, distinctive character. Aberdeen, Kinahan and Back Streets are all aligned east-west, framing a view towards the site (Plate 14.8). There is a row of cottages on the east side of Kinahan Street which back onto the O'Devaney Gardens Boundary, with only short yards (if not extended over) between the houses and the site (Plate 14.9).

North Circular Road: North Circular Road to the north of the site is fronted by terraced three storey red brick Victorian houses. The houses on the south side of the street in particular are set well back from the road, and there are broad footpaths both sides of the road featuring majestic London plane trees. Along with the tall terraces the trees contribute to a high degree of visual enclosure (Plate 14.10). Like the neighbourhoods described above, North Circular Road has a very strong, distinctive character. The houses on the south side of the road back onto the site boundary and the proposed development will therefore be a feature of views from the rear windows and gardens of these houses.

Stoneybatter (Ross, Street, Ashford Place and Ashford Street, Thor Place and Swords Street): To the east of the site – between the site (and St Bricin's) and Oxmantown Road, is an extensive, fine grained estate of artisan's cottages. The western part of this area - including the western end of Ross Street, Ashford Place, some of the cottages fronting Ashford Street and Thor Place - is highly visually exposed to the site (see Plate 14.11). Similar to Findlater Street to the west, it is inevitable that there will be an abrupt and pronounced transition in development typology and scale along the boundary between the site and this western part of Stoneybatter. This area also provides one of the gateways to the site, along Swords Street alongside St Bricin's (Plate 14.12).

Plate 14.8: The view along Aberdeen Street towards the site

Plate 14.9: The view along Findlater Street where the cottages east of the street back onto the site boundary. The tops of the O'Devaney Gardens Phase 1A houses (under construction) can be seen just above the roofline of the cottages

Plate 14.10: A view along North Circular Road from a position to the north west of the site

Plate 14.11: The view along Ross Street towards the site, with the fence on the site boundary visible

Plate 14.12: The view along Swords Street into the site, with Thor Place to the right and St Bricin's to the left

Other Potentially Sensitive Receptors

<u>St Bricin's Military Hospital:</u> St Bricin's hospital is comprised of several building clusters and individual buildings of various style and scale, dating from different periods of development. At the centre of the site is a large complex of red brick buildings of up to three (tall) storeys (Plates 14.13 and 14), enclosing a wide courtyard in front of the main entrance in the south façade, with yards/parking areas to the north and east. There are additional building clusters in a projection of the site to the south east of the main hospital complex. In the western part of St Bricin's, west of the main hospital complex and closest to the subject site, there is a stand-alone chapel and a large house (Plate 14.15).

St Bricin's is included in SDRA 11 and is thus designated for redevelopment. The DCDP map for SDRA 11 identifies most of the buildings (excluding the house and some outbuildings) as 'buildings of potential heritage value' although none are protected structures. The chapel is identified as a 'focal building', and this is of particular importance with respect to the site's development (being located close to the site boundary).

Plate 14.13: A view towards the site from the courtyard in front of the main St Bricin's hospital complex

Plate 14.14: A view towards the site from the yard to the north of the main St Bricin's hospital complex

Plate 14.15: A view of the St Bricin's chapel, located between the main hospital complex and the east site boundary

Phoenix Park: Phoenix Park is some 170m from the site at its nearest point. The park is a Conservation Area and there are several protected structures within the park, including the Park Gate and a row of buildings inside the entrance off North Circular Road. Any development of substantial height on the site may be visible from parts of the park, although it should be recognised that large parts of the city centre are visible from Phoenix Park so the park cannot be considered highly sensitive to change in its wider environs.

14.3.4 Relevant Planning Policy – Dublin City Development Plan 2016-2022

The Dublin City Development Plan 2016-2022 (DCDP) has prescribed the site's redevelopment by designating it part of SDRA 11. This indicates that DCC considers the receiving environment capable of accommodating significant townscape and visual change.

The following policies of the DCDP are relevant to the assessment of potential townscape and visual impacts.

Land Use Zoning

The site is zoned Z14: "To seek the social, economic and physical development and/or rejuvenation of an area with mixed use of which residential and 'Z6' would be the predominant uses". (Z6 is "To provide for the creation and protection of enterprise and facilitate opportunities for employment creation".)

SDRA 11 Stoneybatter, Manor Street and O'Devaney Gardens

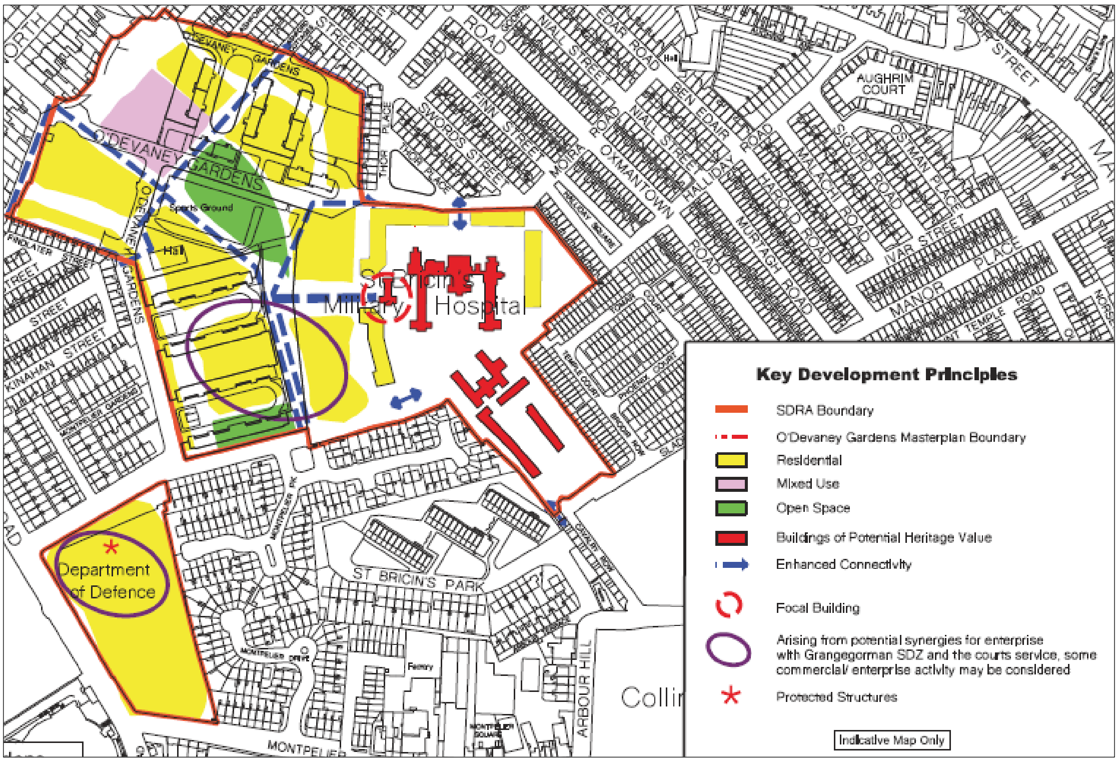


Figure 14.5: DCDP Fig. 31: SDRA 11 – O'Devaney Gardens

The site is a large part of the area identified as SDRA 11. The 'Key Guiding Principles' of relevance to this assessment include:

- *"The strategic location context of this site within the city (close to the amenities of the Phoenix Park, Heuston Station and the new Criminal Courts of Justice), its potential positive contribution to the character of the city and the potential that exists for greater synergies to Stoneybatter and Grangegorman will be valued and promoted; there is an opportunity for a mid-rise residential building towards the centre of the site, similar to that within the Grangegorman SDZ*
- *The development of a high-quality residential quarter comprising quality new homes supported by a complementary range of mixed commercial, community and recreational facilities will be promoted for this site. The site will provide for a mix of tenure with social, affordable and private housing all provided on site*
- *The development of attractive new streetscapes with mixed typologies of high-quality accommodation, a high-quality public realm and active street frontages will be promoted to complement the architectural legacy of streetscapes adjoining this location, including the special streetscapes of the North Circular Road, Infirmary Road and Oxmantown areas*
- *Accessible locations for commercial and community facilities to encourage interaction between the site and established communities adjoining will be promoted*
- *The development of a neighbourhood park as a key feature of the design to provide recreational amenities, encourage community interaction and provide a focal point/ meeting place for the wider local community; the location will be bounded by high quality streetscapes accommodating commercial, community and residential uses to generate activity, encourage active use of the space and provide passive surveillance. To provide space for an all-weather pitch, multiple use games area (MUGA), community centre, and community garden. Provide quality open green spaces consisting of a minimum of 15% of the site area. Green spaces can serve as sites of social exchange and communicate a respect for nature as a guiding design principle for the site.*
- *The established character of streets and residential amenities for adjoining residents will be respected in the urban design proposals and layout of a new development; opportunities for new building forms to aid legibility through the scheme and create streetscapes of visual interest will incorporate appropriate height transitions from site boundaries and propose locations that avoid negative impact on adjoining residential boundaries*

Of note in the guiding principles is the following: The site is recognised as being strategically located 'within the city', with potential to make a 'positive contribution to the character of the city', including by creating greater synergy with Stoneybatter and Grangegorman. The potential to employ building height (mid-rise, i.e. 50m – by the DCDP definition) to improve townscape legibility is recognised. It is also recognised that the scale of the SDRA is such that it will constitute a distinct 'quarter' in the city, incorporating diverse residential building typologies, a network of streets – which should connect to the existing urban grain to achieve permeability - and public open spaces. The main open space/neighbourhood park should be a focal point of the new quarter. While the potential for 'new building forms' and taller buildings in the SDRA is recognised (to deliver legibility and 'visual interest'), building height should transition from the surrounding areas to avoid negative impacts on adjoining residential properties.

Urban Density and Building Height

Policy SC13: *"To promote sustainable densities, particularly in public transport corridors, which will enhance the urban form and spatial structure of the city, which are appropriate to their context, and which are supported by a full range of community infrastructure such as schools,* *shops and recreational areas, having regard to the safeguarding criteria set out in Chapter 16 (development standards), including the criteria and standards for good neighbourhoods, quality urban design and excellence in architecture. These sustainable densities will include due consideration for the protection of surrounding residents, households and communities".*

QH8: *"To promote the sustainable development of vacant or under-utilised infill sites and to favourably consider higher density proposals which respect the design of the surrounding development and the character of the area"*.

In Section 16.7.1 regarding building height the DCDP states: *"It is important to protect and enhance the skyline of the inner city and to ensure that any proposals for high buildings make a positive contribution to the urban character of the city, and create opportunities for place-making and identity…*

"A co-ordinated approach shall be taken to the potential positioning of higher building forms across the city to create clusters, where appropriate, and prevent visual clutter or negative disruption of the city skyline."

Although O'Devaney Gardens is not identified in the table in Section 16.7.2 of the DCDP as one of the areas suitable for mid-rise development, the policy for SDRA 11 does state that there is potential for a mid-rise (i.e. 50m) residential building on the SDRA 11 site.

Design Principles, Urban Form and Architecture

Section 16.2.1 of the DCDP states: "*In the appropriate context, imaginative contemporary architecture is encouraged, provided that it respects Dublin's heritage and local distinctiveness and enriches its city environment. Through its design, use of materials and finishes, development will make a positive contribution to the townscape and urban realm."*

SC25: *"To promote development which incorporates exemplary standards of high-quality, sustainable and inclusive urban design, urban form and architecture befitting the city's environment and heritage and its diverse range of locally distinctive neighbourhoods, such that they positively contribute to the city's built and natural environments. This relates to the design quality of general development across the city, with the aim of achieving excellence in the ordinary, and which includes the creation of new landmarks and public spaces where appropriate."*

Also of note is Section 16.2.2.1, which defines 'Large-Scale Development' as *"large comprehensive sites which are of sufficient scale to differentiate it from the surrounding townscape"*. This definition applies to the subject site, and it infers that sites of such scale can differentiate themselves from existing development/townscape character in their context, including by 'creating new compositions and points of interest'.

Public Realm

QH10: *"To support the creation of a permeable, connected and well-linked city and discourage gated residential developments as they exclude and divide established communities."*

SC3: "*To develop a sustainable network of safe, clean, attractive pedestrian routes, lanes and cycleways in order to make the city more coherent and navigable."*

SC20: *"To promote the <u>development of high quality streets and public spaces</u> which are accessible and inclusive, and which deliver vibrant, attractive, accessible and safe places and meet the needs of the city's diverse communities."*

Section 4.5.5: *"A <u>high-quality public realm makes a more attractive place to live, work and visit</u>, and provides for an improved quality of life for all. Such a public realm can have a very positive impact on Dublin's competitiveness with other city regions internationally, both for tourism and for investment."*

Policy SC15: *"To recognise and promote green infrastructure and landscape as an integral part of the form and structure of the city, including streets and public spaces."*

The above policies are relevant as they promote new development (of buildings and spaces) of high design and finish quality - including innovative contemporary buildings with landmark potential and highly effective public realm - in recognition of the potential benefits of such development to the townscape.

Conservation Areas

The site is not covered by Conservation Area (CA) or Architectural Conservation Area (ACA) designation. However, there are conservation areas in the wider townscape (e.g. the Liffey River corridor, Phoenix Park, Collins Barracks and McKee Barracks).

Section 11.1.5.6 of the DCDP states: "*<u>Development outside Conservation Areas can also have an impact on their setting</u>. Where development affects the setting of a Conservation Area, an assessment of its impact on the character and appearance of the area will be required… Any development which adversely affects the setting of a Conservation Area will be refused planning permission and the City Council will encourage change which enhances the setting of Conservation Areas*."

The selection of viewpoints for the visual effects assessment took account of the Conservation Areas in the site environs - to allow assessment of the proposal's effects on the Conservation Areas' setting.

In addition to the Conservation Areas the majority of the existing residential neighbourhoods around the site (all but Montpelier Park and St Bricin's Park) are zoned Z2 'Residential Conservation Areas'.

Regarding these areas the DCDP states: "*The overall quality of the area in design and layout terms is such that it requires special care in dealing with development proposals <u>which affect structures in such areas</u>, both protected and non-protected. The general objective for such areas is to protect them from unsuitable new developments or works that would have a negative impact on the amenity or architectural quality of the area."*

The focus of the Z2 zoning is the protection of the buildings in the Z2-zoned neighbourhoods themselves, and not the prevention of change outside of the Z2 zoning. However, as with all residential zonings (Z1 and Z2) the principal objective is the protection of the amenities of these areas.

Key Views and Prospects

Figure 14.6, taken from the DCDP (Fig. 4) identifies the indicative Key Views and Prospects.

Of most relevance to this assessment is the view north from Royal Hospital Kilmainham towards the Wellington Monument in Phoenix Park. Development on the site could be visible at the periphery of this protected cone of view. It should be recognised that the protected cone of view includes several recent large scale developments, such as the Clancy Quay area and the Criminal Courts of Justice. Therefore the protection of the view has not been interpreted as a requirement to prevent all change in the view.

Also of note is Section 16.7.1 of the DCDP which states: *"There is a recognised need to protect conservation areas and the architectural character of existing buildings, streets and spaces of artistic, civic or historic importance. In particular, <u>any new proposal must be sensitive to the historic city centre, the river Liffey and quays, Trinity College, Dublin Castle, the historic squares and the canals</u>."*

The proposal is too far removed from Trinity, Dublin Castle, the historic squares and the canals to cause any significant visual effects on these sensitive features. However, development of substantial height may be visible from the Liffey corridor which is some 360m to the south of the site.

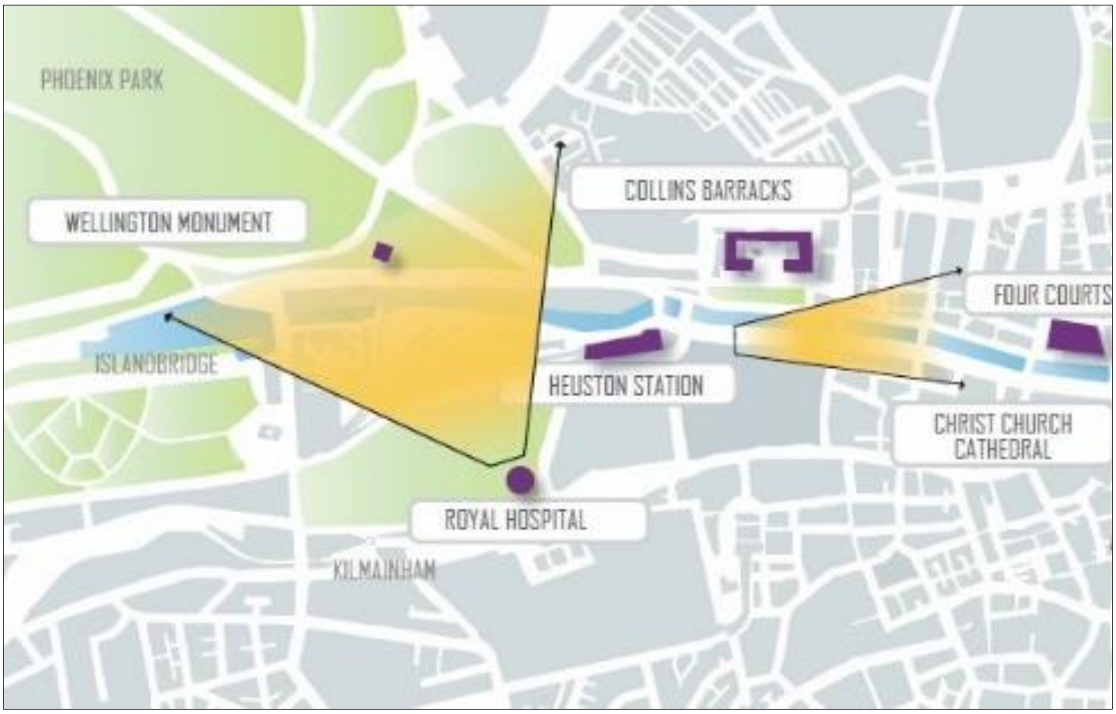


Figure 14.6: DCDP Fig. 4: Key Views And Prospects (Indicative)

14.3.4 Relevant Planning Policy – National Policy

National Planning Framework

Compact growth is one of the main principles and intended outcomes of the National Planning Framework (NPF). This encourages higher density - and therefore taller - development in urban areas where supporting infrastructure and services are available.

National Policy Objective 11 of the NPF states: *"In meeting urban development requirements, there will be a presumption in favour of development that can encourage more people and* *generate more jobs and activity within existing cities… subject to development meeting appropriate planning standards and achieving targeted growth."*

Regarding brownfield development the NPF states: *"The National Planning Framework targets a significant proportion of future urban development on infill/brownfield development sites within the built footprint of existing urban areas… This means encouraging more people, jobs and activity generally within our existing urban areas… and requires a change in outlook... It also requires active management of land and sites in urban areas."*

The subject site, as a brownfield site of large scale within Dublin city centre, presents a significant opportunity for achieving the compact growth objective.

Building Height Guidelines

The Building Height Guidelines state: "*Implementation of the National Planning Framework requires increased density, scale and height of development in our town and city cores*…

"*to meet the needs of a growing population without growing our urban areas outwards requires more focus in planning policy and implementation terms on reusing previously developed 'brownfield' land, building up urban infill sites… and either reusing or redeveloping existing sites and buildings that may not be in the optimal usage or format taking into account contemporary and future requirements*…"

In Section 3.2, 'development management criteria' are set out to guide the evaluation of development proposals for buildings taller than the prevailing heights in the area:

"*In the event of making a planning application, the applicant shall demonstrate to the satisfaction of the Planning Authority/ An Bord Pleanála, that the proposed development satisfies the following criteria:*

At the scale of the relevant city/town

- *"The site is well served by public transport with high capacity, frequent service and good links to other modes of public transport.*
- *Development proposals incorporating increased building height, including proposals within architecturally sensitive areas, should successfully integrate into/ enhance the character and public realm of the area, having regard to topography, its cultural context, setting of key landmarks, protection of key views. Such development proposals shall undertake a landscape and visual assessment, by a suitably qualified practitioner such as a chartered landscape architect.*
- *On larger urban redevelopment sites, proposed developments should make a positive contribution to place-making, incorporating new streets and public spaces, using massing and height to achieve the required densities but with sufficient variety in scale and form to respond to the scale of adjoining developments and create visual interest in the streetscape*."

At the scale of district/ neighbourhood/ street:

- *"The proposal responds to its overall natural and built environment and makes a positive contribution to the urban neighbourhood and streetscape*
- *The proposal is not monolithic and avoids long, uninterrupted walls of building in the form of slab blocks with materials / building fabric well considered.*

- *The proposal enhances the urban design context for public spaces and key thoroughfares and inland waterway/ marine frontage, thereby enabling additional height in development form to be favourably considered …*
- *The proposal makes a positive contribution to the improvement of legibility through the site or wider urban area within which the development is situated and integrates in a cohesive manner.*
- *The proposal positively contributes to the mix of uses and/ or building/ dwelling typologies available in the neighbourhood*."

A notable aspect of the above policy is that the Guidelines allow for taller development even in architecturally sensitive areas. The site context can be considered such an area, with the surrounding neighbourhoods mostly zoned residential conservation areas (Z2) and St Bricin's including 'buildings of potential heritage value' (although not protected structures).

14.4 CHARACTERISTICS OF PROPOSED DEVELOPMENT

The proposed development is described in detail in the architectural and landscape design statements submitted with the planning application, and in Chapter 3 of the EIAR. The key aspects of the proposal with regard to its potential townscape and visual effects are (1) the layout, massing and height, (2) the architecture/ façade treatments, and (3) the landscape proposals. These are discussed below.

14.4.1 **Layout, Massing and Height**

The proposed layout and arrangement of massing and height were determined by a combination of (a) the potential road and pedestrian access points to the site, (b) the varying sensitivity of the surrounding townscape (see Figure 14.7 and 14.8 below), and (c) the objective to deliver a new residential quarter of high density in the city centre.

- The development includes a central high density core comprised of three blocks of apartment buildings – BLD 02 and 05 in the north of the site, BLD 05 and 06 in the centre, and BLD 09 and 10 in the south of the site.
- These three urban blocks are divided by a central east-west aligned main street (fronted by retail units at ground level), and by a large wedge shaped neighbourhood park positioned to align with St Bricin's to the east.

Figure 14.7: Aerial photomontage from the south east showing the position of the neighbourhood park and the arrangement of height of buildings BLD 06 and 10 with respect to St Bricin's Military Hospital

Figure 14.8: Aerial photomontage showing the variations in façade material across the proposed new quarter

- The height of the apartment buildings ranges from 3-14 storeys, with the height responding to various sensitivities and opportunities in the surrounding townscape. The height variations are also intended to break down the massing of the buildings, and to create visual interest in the streetscapes. For example:

- Along the site's southern frontage to Montpelier Gardens, BLD 09 and 10 range from 3 storeys to 6 storeys. The 3 storey element (with own-door entrances on the street) responds to the 2 storey houses of Montpelier Park across the road, while the 6 storey volumes frame the entrances to the site – one the southern road entrance and one a new pedestrian/ green street.

- In the northern part of the site BLD 07 includes a tower of 14 storeys at its north west corner, adjacent to the central junction in the site. The positioning of the tallest building in this location, and its height, are intended to achieve visibility from the surrounding townscape, identifying the core of the new residential quarter.

- In the south eastern part of the site, inside the boundary shared with St Bricin's, two buildings (BLD 06 and 10) are positioned parallel to the boundary, on either side of the neighbourhood park which extends to the boundary in order to 'borrow' the St Bricin's chapel as a 'focal building'. BLD 06 and 10 both include a 12 storey volume, and these face and overlook St Bricin's. This arrangement of built form is intended to take advantage of the scale of the St Bricin's buildings, the existing landscape buffer and the relative insensitivity of the military hospital as a receptor of change.

- Terraces of houses and duplex units (BLD 04 and 08) are proposed inside the east and west boundaries where the site adjoins existing neighbourhoods of small scale. These buildings are arranged back-to-back with the cottages that back onto the site boundary – this layout reflecting that of the existing estates. The houses and duplex building are intended to function as both a transitional building typology/scale (in views from a distance) and a physical screen (in views from the adjoining houses themselves).

14.4.2 **Architecture/ Façade Treatments**

The predominant façade material across the proposed development is brick. Three different colours of brick are used, namely red, buff and blue/ grey. The brick colour differs between the various buildings in response to the surrounding architecture. For example, the predominant brick colour in the buildings facing St Bricin's is red, while the BLD 05 is buff brick in response to the distinctive yellow brick houses of Oxmantown Road nearby. Colour variations are also used to differentiate between the component volumes of the buildings and to generate visual interest. Light coloured render is used in places, for example the inner facades enclosing the courtyards of the perimeter blocks, where light capture/reflection is a priority. The window frames, balcony fascias and railings are metal.

Figure 14.9: Aerial photomontage showing the variations in façade material across the proposed new quarter

14.4.3 Landscape Proposals

The following are the key elements of the landscape proposals:

- The neighbourhood park. The main open space is a wedge shaped area over 130m long and c. 30-50m wide). It incorporates two playground areas and a multi use games area (basketball, etc.), exercise equipment, large lawn areas and areas of undergrowth/shrub planting. The various spaces within the park are divided by lines of trees, and there is a concentration of trees inside the east boundary shared with St Bricin's. The neighbourhood park is intended to provide a high quality open space of scale and diverse uses/ attractions, catering for the residents and neighbouring communities, complementing the nearby Phoenix Park.

- Northern park. Inside the north east boundary of the site a linear open space c. 90m long and c. 25-45m wide is proposed. This space is intended to function as a green buffer between BLD 05 and the neighbouring streets of cottages, as well as delivering various ecosystem services. The space includes an area of community gardens/ allotments, lawn and shrub planting areas and a framework of trees. It also includes a green plaza space in front of the proposed creche inside the new pedestrian entrance from Ross Street. From this entrance plaza the space extends across the site between BLD 05 and BLD 02, forming a wide green/ pedestrian street featuring three lines of trees, lawn area, shrub planting and privacy planting in front of the ground floor apartments.

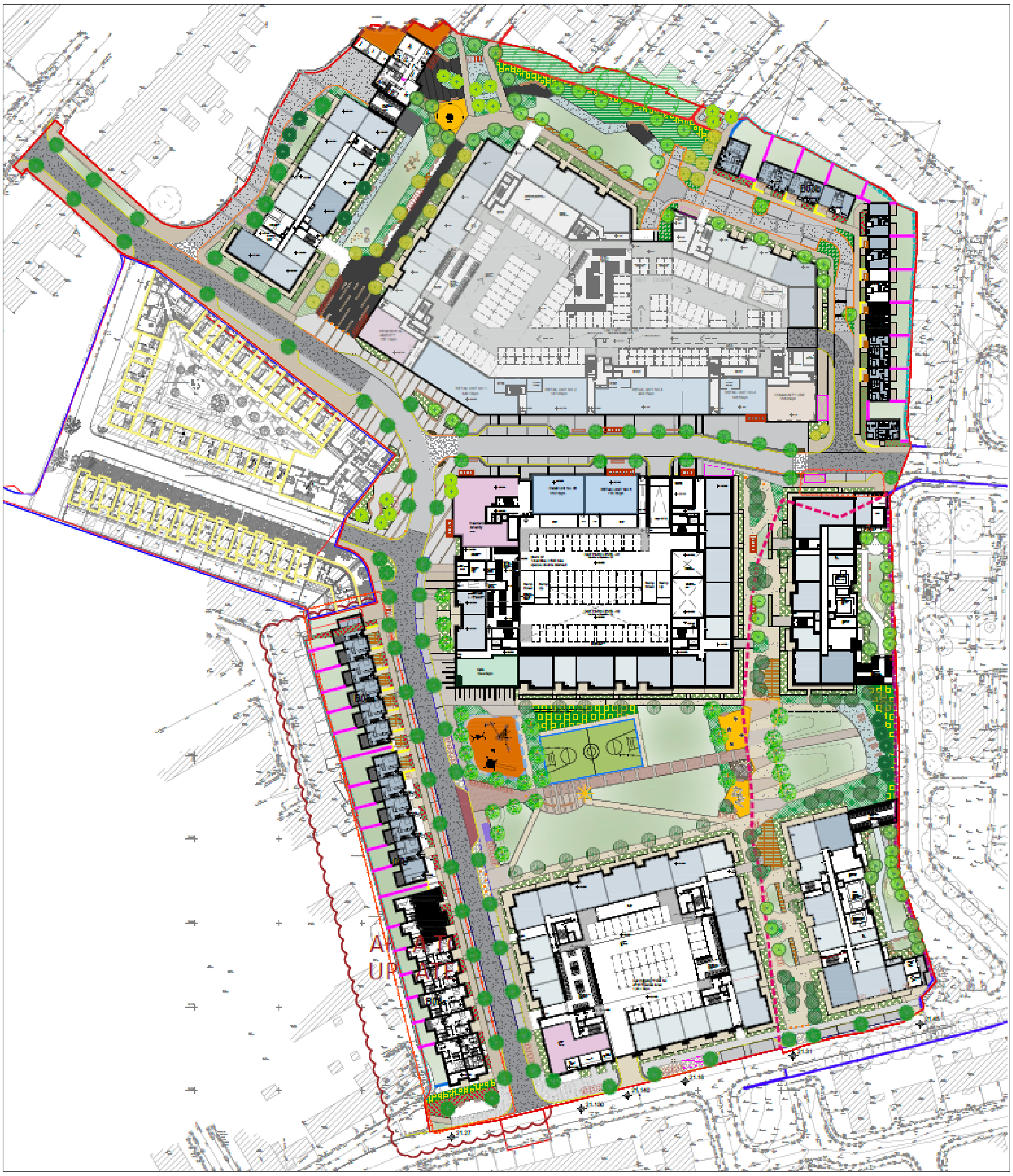


Figure 14.10: Proposed Landscape Masterplan

- Green streets. Two similar green streets are proposed between BLDs 06 and 07, and 09 and 10, together forming a wide green corridor aligned north-south across the site, connecting across the neighbourhood park. These linear spaces prioritise pedestrian circulation but also feature numerous trees as well as areas of shrub planting and privacy planting in front of the ground floor apartments.

- Streets. The proposed streets are tree-lined on both sides. The streetscapes are variously paved to indicate differences in traffic priority/sharing – with the central retail street designed as a shared surface. The wide pavements around the central junction have a distinctive paving and raised planters with built-in seating to differentiate this space in the public realm.

- Green roofs and roof gardens. The majority of the development's roof area is proposed to be sedum covered, and several buildings include roof terraces/ gardens adding to the communal open space area.

Figure 14.11: CGI of Proposed Neighbourhood Park

Figure 14.12: CGI of Proposed Central Junction Streetscape

14.5 ASSESSMENT OF IMPACTS

14.5.1 Construction Phase

The construction process would entail the following:

- Set up site perimeter hoarding;
- Set up site construction compound, internal transport routes;
- Site clearance;
- Excavation;
- Site services installations;
- Construction of new buildings, frames and envelopes;
- Interior fit-out of buildings;
- Exterior streetscape, landscaping and site boundary works.

During construction the site and immediate environs would be disturbed by construction activities and haulage, and the incremental growth of the buildings on site. In the earlier stages, until the buildings reach substantial height above ground, the effects would be largely limited to the immediate environs (adjoining properties and streets). As the buildings begin to grow above ground level the visual effects would become more widespread, with indirect effects on townscape character (change to the setting of existing areas).

The magnitude of change would range from high in the immediate environs to negligible or none further from the site. Therefore the significance of the effects would also vary – although they would typically be negative during construction. Such temporary negative townscape and visual effects are unavoidable and not unusual in the urban context where change is continuous.

The following Mitigation and Monitoring Measures are recommended:-

Mitigation

L-C1	Construction during normal construction hours only to avoid negative visual effects of construction activity outside of these hours.

Monitoring

L-C2	Regular check of boundary hoarding to ensure effectiveness in screening ground level construction activity.

14.5.2 Operational Phase

Townscape Sensitivity

There are several sensitive townscape elements, characteristics and character areas in the receiving environment, including:

1. The older Z2 'Residential Conservation Area' neighbourhoods to the west, east and north of the site;
2. The particularly fine grain and small scale of the built form of the neighbourhoods to the west and east - with many small residential properties backing onto the site boundary, therefore highly exposed to change on the site;

3. St Bricin's Military Hospital, which includes extensive complexes of 'buildings of potential heritage value' (as described in the DCDP) and a 'Focal Building' (the chapel) located adjacent to the site's east boundary.
4. Phoenix Park, a Conservation Area and landscape/visual amenity asset of city-wide importance. The park includes several protected structures in its eastern area nearest the site;
5. The Liffey River corridor, also a Conservation Area, which passes some 360m to the south of the site. The DCDP identifies the Liffey as one of the city's most sensitive townscape resources.

At the local scale there is variable sensitivity to townscape and visual impacts around the site, depending on the particular conditions around the boundary (see Figure 14.14 below):

- The most sensitive areas are the streets of artisan's cottages that run parallel to the site boundary, where the existing small houses back onto the site (e.g. Findlater Street to the west and Thor Place and part of Ashford Street to the east).
- Where the streets of cottages are perpendicular to the site boundary, so that the streets frame views towards the site (as opposed to the direct views being from the rear windows and gardens of the houses) the sensitivity is slightly lower (e.g. Kinahan Street to the west and Ross Street to the east).
- Of lesser sensitivity (due to the larger scale of built form and the higher degree of visual enclosure) are the streets/ estates of two storey houses, where the streets are perpendicular to the site boundary and the houses/terraces present their gable ends towards the site (e.g. Montpelier Gardens and Aberdeen Street, both to the west).
- Montpelier Park to the south is of lower sensitivity due to factors including: (a) the estate faces the site across the only public road along a site boundary, i.e. the estate is buffered from the site by a street; (b) where houses back onto the site (e.g. Nos. 69-71 Montpelier Park) there is a row of trees directly behind the houses (these trees are outside the site and will therefore be retained).
- Of least sensitivity among the surrounding residential neighbourhoods is North Circular Road. While a number of the houses do back onto the site, the scale of built form (three storey Victorian houses) along this urban thoroughfare is considerably larger, and the houses are separated from the site boundary by generally larger/longer back gardens.

Regarding St Bricin's Hospital, while the buildings are of cultural heritage value, they are not protected structures, and being an institutional use the site is of lesser sensitivity than the residential neighbourhoods. The central complex of buildings is large (tall for three storeys, with a vertical emphasis in the architecture, and sprawling – see Plates 14.13 and 14.14), with a strong character. The buildings - apart from the chapel - are buffered from the site boundary by the hospital grounds. It is also a factor that St Bricin's is part of the SDRA, i.e. it is likely to be further developed in the future.

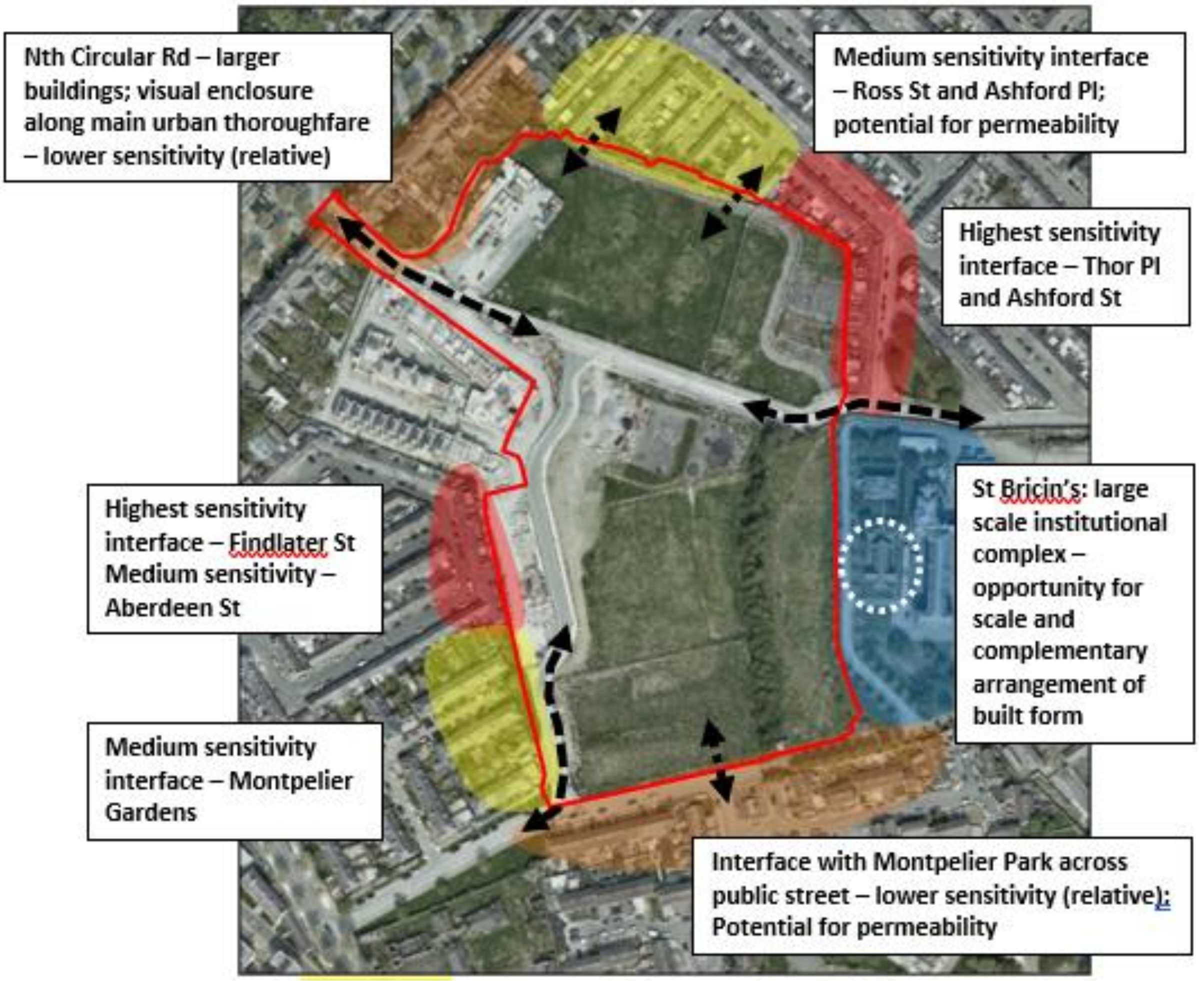


Figure 14.14: Varying sensitivity around site boundaries

These sensitivities require consideration and a design response in the proposal to avoid undue negative impacts. However, the sensitivities are counterbalanced by several spatial and policy factors which suggest the receiving environment has capacity to accommodate significant townscape and visual change. These include:

1. The site's Z14 zoning and SDRA designation. This recognises (a) the site's previous use for higher density residential development, (b) its brownfield status and (c) its large scale – making it capable of establishing its own townscape character distinct from the surrounding neighbourhoods (the DCDP refers to the SDRA 11 area as a 'quarter');
2. The site's position within the central urban area of Dublin - and the related access to public transport, employment and education facilities, retail and services, public open space and other urban amenities. The site has potential to accommodate a large resident population with minimal need for private car use. Compact growth policy requires that opportunities be maximised and that blanket height restrictions should not apply.
3. The SDRA 11 policy allowing for a mid-rise building (defined in the DCDP as 50m tall) among other residential building typologies, to establish a new residential quarter, and to improve legibility and visual interest in the townscape.
4. The strength of character of the surrounding townscape. The strong definition and strength of character of the adjacent residential neighbourhoods and St Bricin's Hospital is a particular characteristic of the receiving environment. These areas can withstand change in their context without dilution of their own intrinsic character. While

development should respond in some ways to these neighbourhoods (e.g. connecting to the urban grain to improve permeability; transitions in scale to avoid dominance, etc.), it should also seek to establish its own equally strong character and sense of place. The following statement from Section 4.5.1.1 of the DCDP is relevant: *"A positive feature of the identity of the inner city is the strength of the sense of place which exists in different clusters. The development plan seeks to strengthen place-making in the city in order to consolidate and enhance the city centre, at the heart of the city region"*.

Taking these various factors into account, the townscape sensitivity of the receiving environment can be classified 'medium' (definition: *Areas where the townscape has certain valued elements, features or characteristics but where the character is mixed or not particularly strong, or has evidence of alteration, degradation or erosion of elements and characteristics. The townscape character is such that there is some capacity for change. These areas may be recognised in townscape policy at local or county level and the principal management objective may be to consolidate townscape character or facilitate appropriate, necessary change* – refer to Table 14.1).

Magnitude of Townscape Change

The development would introduce a large new high density residential quarter to the city centre townscape north of the Liffey, comprised of nine development blocks of diverse typologies (including 2-3 storey houses, 3 storey duplex terraces and several apartment blocks of up to 14 storeys), a network of streets of diverse character including a central, wide retail-fronted street, and a range of open spaces (including a large park with a playground and multiple use games area).

Considering the nature and scale of the proposal (in terms of spatial extent, building typologies and height), and the degree of contrast with the surrounding townscape, the magnitude of townscape change which would result from the proposed development would be 'high' (definition: *Change that is moderate to large in extent, resulting in major alteration to key elements, features or characteristics of the townscape, and/or introduction of large elements considered uncharacteristic in the context. Such development results in change to the character of the townscape*).

Significance and Quality of Townscape Effects

Measuring the magnitude of change against the townscape sensitivity (refer to Table 14.3) the significance of the townscape effects is predicted to be 'significant' (definition: *An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment*).

Townscape change of significance is an intended outcome of the SDRA designations and policy. The DCDP states specifically that the redevelopment of O'Devaney Gardens has the potential to contribute to the character of the city. Whether this significant townscape change can be considered positive, negative or neutral depends on (a) the extent to which the proposal complies with the townscape/ urban design-related policy in the DCDP and national guidance, and (b) the responsiveness of the proposal to the sensitivities and opportunities in the context townscape, and (c) the potential visual effect of the proposed development on the surroundings.

These questions are discussed in the tables below, with reference to (1) the 'key guiding principles' for SDRA 11, and (2) the Building Height Guidelines criteria for assessment of proposals for taller buildings.

Table 14.6: Assessment of Compliance with Townscape-related Policy for SDRA 11

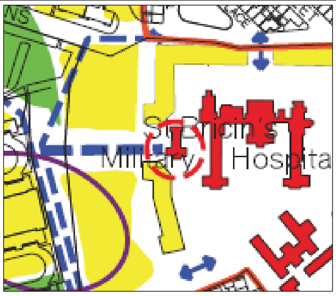
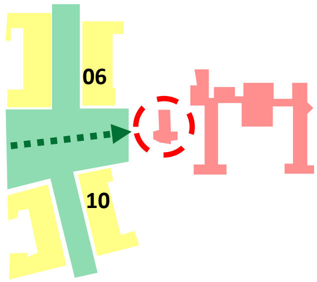
DCDP 'Key Guiding Principles' for SDRA 11	Assessment
"The strategic location context of this site within the city (close to the amenities of the Phoenix Park, Heuston Station and the new Criminal Courts of Justice),… *its potential positive contribution to the character of the city and* *the potential that exists for greater synergies to Stoneybatter and Grangegorman will be valued and promoted…*	The proposal recognises and responds to the urgent need to make sustainable use of a brownfield, city centre site of strategic scale. The benefits of delivering high density residential use on such a site are significant – in terms of sustainable mobility in particular. The proposed typology and scale of the development are such that it can have a significant impact on the townscape character of the north west inner city, establishing a new sustainable residential quarter of distinct identity between Stoneybatter/ Grangegorman and Phoenix Park.
The established character of streets and residential amenities for adjoining residents will be respected in the urban design proposals and layout of a new development; *opportunities for new building forms to aid legibility through the scheme and create streetscapes of visual interest will incorporate appropriate height transitions from site boundaries and propose locations that avoid negative impact on adjoining residential boundaries*	Where existing small scale houses (cottages) back onto the site (e.g. Findlater Street to the west and Thor Place and Ashford Street to the east) building typologies of small scale (houses) are proposed in a back-to-back arrangement with those cottages – to minimise direct impacts on their residential amenities. Along the site boundary with Montpelier Park (2 storey houses) a row of 2-3 storey duplexes is proposed, to perform a similar buffering function (from the high density core of the development). Inside the north east boundary (the interface with Ross Street, Ashford Place and Ashford Cottages), an apartment block (BLD 05) is proposed, but the building is set back from the boundary by c. 26-44m. This wide green space incorporates the community garden/ allotment area and two rows of Alder trees (a fast growing species), to buffer the neighbouring estate of cottages from the higher density development. With these specific mitigation measures taken to avoid negative impacts on adjoining residential boundaries, the remainder of the site is occupied by high density residential typologies – apartment buildings of up to 14 storeys. Height is moderated around the edges, e.g. fronting Montpelier Gardens (3-6 storeys) where the development faces 2 storey houses across the street. Elsewhere height is employed to take advantage of specific opportunities (e.g. the interface with St Bricin's where two 12 storey volumes are proposed) and to achieve visibility/ legibility in the townscape (e.g. the 14 storey corner volume of BLD 07).
… there is an opportunity for a mid-rise residential building towards the centre of the site, similar to that within the Grangegorman SDZ	The site is large enough to accommodate more than one mid-rise building; a cluster makes more sustainable use of the large site, and of the opportunities for response to context and strengthening of townscape character and legibility. A cluster of taller buildings (as part of a development of diverse typologies and scale) will be more effective in establishing 'an urban quarter' than just a single tall building surrounded by lower buildings. The photomontages of the proposal show that there are few locations from which more than one of the taller buildings would be seen at once, and in none of the views do the taller

	buildings appear too closely spaced/ crowded.
The development of a high-quality residential quarter comprising quality new homes supported by a complementary range of mixed commercial, community and recreational facilities will be promoted for this site… *Accessible locations for commercial and community facilities to encourage interaction between the site and established communities adjoining will be promoted*	The residential component of the quarter is complemented by (a) a dedicated retail street where the ground floor of the buildings on both sides of the street are retail units, (b) a café located alongside a large public park incorporating a playground and multi-use games area, (c) a variety of other open spaces, and (d) a community space and a creche. The proposed retail street is at the centre of the site, directly accessed from both North Circular Road and Swords Street (the entry to the site from Stoneybatter). This is positioned for maximum accessibility from the surrounding neighbourhoods. The proposed creche is located adjacent to the east site boundary at a proposed new pedestrian link from Ross Street, i.e. adjacent to an established neighbouring community. The proposed neighbourhood park, multiple use games area and adjacent café are centrally located within the site. These will collectively function as an attraction, bringing people from the neighbouring communities into the new neighbourhood.
The development of attractive new streetscapes with mixed typologies of high-quality accommodation, a high-quality public realm and active street frontages will be promoted to complement the architectural legacy of streetscapes adjoining this location, including the special streetscapes of the North Circular Road, Infirmary Road and Oxmantown areas	The proposal is characterised by a variety of streetscapes including (a) traditional urban streets incorporating vehicular surface, parking and footpaths, (b) the shopping street with active frontage on both sides, and (c) several green/pedestrian streets/ spaces incorporating soft surfaces and numerous trees. The proposed public realm (comprised of diverse streets and open spaces including a large new public park) is of high design and material quality. The proposal incorporates a range of dwelling types including houses, duplex units and apartments of 1, 2 and 3 bedrooms.
The development of a neighbourhood park as a key feature of the design to provide recreational amenities, encourage community interaction and provide a focal point/ meeting place for the wider local community; the location will be bounded by high quality streetscapes accommodating commercial, community and residential uses to generate activity, encourage active use of the space and provide passive surveillance. To provide space for an all-weather pitch, multiple use games area (MUGA), community centre, and community garden. Provide quality open green spaces consisting of a minimum of 15% of the site area. Green spaces can serve as sites of social exchange and communicate a respect for nature as a guiding design principle for the site.	The proposed development dedicates in excess of 15% of the site area to green open space in the form of a neighbourhood park, green streets/corridors and other open spaces. The neighbourhood park is of substantial scale (over 130m long and c. 30-50m wide) and incorporates two playground areas and a multi use games area (basketball, etc.), exercise equipment and large lawn areas, surrounded by belts of trees and ornamental planting. In its scale and diverse attractions this park will constitute a significant recreation amenity asset for the residents and neighbouring communities, complementing the nearby Phoenix Park. The co-location of the proposed café with the neighbourhood park will further encourage meeting/ community interaction. The neighbourhood park is positioned alongside the main road through the site – a wide tree-lined street with dedicated footpaths on both sides. A wide pedestrian street is proposed, extending from Montpelier Gardens to the central retail/ commercial street, traversing the neighbourhood park. This green infrastructure feature gives equal emphasis in the townscape to pedestrian circulation (and other ecosystem services) as to vehicular traffic.

<u>Permeability through the site will be promoted to integrate the location more successfully with the adjoining community</u>; the existing bus route will be retained and incorporated along a main boulevard route connecting the North Circular Road to Montpelier Gardens; <u>opportunities for connections with streets to the north-east boundary, with particular emphasis on walking and cycling routes</u>, will be encouraged…"	The proposal maximises connectivity/ integration with the surrounding urban grain and vehicular and pedestrian circulation systems – with: (a) road access from North Circular Road to the north, Montpelier Gardens to the south and Swords Street to the east, and (b) additional pedestrian and cycle access points from Ross Street and Ashford Cottages to the north east, and Montpelier Gardens to the south. This high degree of permeability, along with the favourable location with respect to Stoneybatter neighbourhood centre and Grangegorman, the wider city centre, Heuston Station and the Luas line, and Phoenix Park, will encourage sustainable mobility.

Table 14.7: Assessment of Compliance with Building Height Guidelines Criteria

Building Height Guidelines Criteria	Assessment
***At the scale of the relevant city/ town**:*	
"The site is <u>well served by public transport</u> with high capacity, frequent service and good links to other modes of public transport.	The site is less than 3km by road from O'Connell Street (i.e. walking/ cycling distance), some 550m from a neighbourhood centre in Stoneybatter (with TUD's Grangegorman campus adjacent), and 650m from Heuston Station and Luas stop. There are bus stops within minutes' walk in all directions from the site, on North Circular Road, Aughrim Street, Infirmary Road and Parkgate Street. It is also proposed – as required by the policy for SDRA 11 – that a Dublin Bus route would serve the site directly.
Development proposals incorporating increased building height, <u>including proposals within architecturally sensitive areas</u>, should successfully <u>integrate into/ enhance the character and public realm of the area</u>, having regard to topography, its cultural context, <u>setting of key landmarks, protection of key views</u>. *Such development proposals shall undertake a landscape and visual assessment, by a suitably qualified practitioner such as a chartered landscape architect.*	It is significant that the Building Height Guidelines envisages/ allows for taller developments taking place in 'architecturally sensitive areas' in certain circumstances. The receiving environment is such an area. However, its city centre location demands that opportunity provided by the large brownfield site be optimally used for sustainable development. The proposed development would integrate with and enhance the urban grain, circulation network and public realm of the area by providing: (a) road access from North Circular Road to the north, Montpelier Gardens to the south and Swords Street to the east, and (b) additional pedestrian and cycle access points from Ross Street and Ashford Cottages to the north east, and Montpelier Gardens to the south. The proposed layout and arrangement of built form respond appreciably to the key landmark, namely St Bricin's Military Hospital including the identified 'focal building' (the chapel). The proposed neighbourhood park is located and designed so that the chapel is positioned as a focal point at its eastern end. The proposed buildings BLD 06 and 10 are positioned and aligned in response to the main central complex of St Bricin's – as indicated on the DCDP diagram for SDRA 11.

	   The visual effects assessment (Section 14.5.3 below) includes assessment of 'key views' such as views from Phoenix Park, the Liffey quays, Royal Hospital Kilmainham, North Circular Road and the neighbouring estates. The assessment found that the development would have no negative impacts on any of these views.
On larger urban redevelopment sites, proposed developments should make a positive contribution to place-making, incorporating new streets and public spaces, using massing and height to achieve the required densities but with sufficient variety in scale and form to respond to the scale of adjoining developments and create visual interest in the streetscape.	The proposed development would make a positive contribution to place-making by (a) introducing a large new neighbourhood park to the townscape, (b) providing a connected network of streets and pedestrian corridors, and (c) establishing a distinct new high density residential quarter in the city centre between Stoneybatter/ Grangegorman and Phoenix Park. The cluster of diverse building typologies steps down in height towards the most sensitive boundaries, while employing height elsewhere to achieve place-making and visibility/ legibility objectives (in addition to density). The photomontages and CGIs show that the proposal would deliver a new quarter and streetscapes of distinct character and visual interest.
At the scale of district/neighbourhood/street:	
The proposal responds to its overall natural and built environment and makes a positive contribution to the urban neighbourhood and streetscape… *The proposal is not monolithic and avoids long, uninterrupted walls of building in the form of slab blocks with materials / building fabric well considered…*	The proposed apartment buildings are of two types, i.e. linear blocks and perimeter blocks. The design avoids monolithic forms and uninterrupted walls of building by dividing the linear blocks into distinct volumes of different heights and materials. This height and materials variations respond to the both the sensitivities in the buildings' immediate context and the opportunities for legibility (e.g. using height to indicate junctions/ places in the townscape). The resulting composition of built form will generate visual interest and legibility in the internal/ adjacent streetscapes and when the scheme is seen at a distance across the townscape.
The proposal enhances the urban design context for public spaces and key thoroughfares and inland	The site is characterised by its physical separation from key thoroughfares (the nearest being North Circular Road, Infirmary Road and Oxmantown Road) as well as open spaces

waterway/ marine frontage, thereby enabling additional height in development form to be favourably considered in terms of enhancing a sense of scale and enclosure while being in line with the requirements of "The Planning System and Flood Risk Management – Guidelines for Planning Authorities" (2009). *The proposal makes a positive contribution to the improvement of legibility through the site or wider urban area within which the development is situated and integrates in a cohesive manner…* *The proposal positively contributes to the mix of uses and/ or building/ dwelling typologies available in the neighbourhood."*	(the nearest being Phoenix Park) and waterway frontage (the Liffey River). However, the proposal does use building height to generate visibility from the key thoroughfares, by positioning taller volumes to be visible from the nearest/access points from North Circular Road, Infirmary Road and Oxmantown Road (refer to the photomontages for Viewpoints 11, 5 and 15 respectively). The development would thereby achieve a presence in the wider townscape, improving legibility. The height of the buildings would also make the development visible (without being excessively intrusive) from certain locations in Phoenix Park and the Liffey corridor (refer to the photomontages for Viewpoints 27, 28 and 29). It would thus achieve the dual objective of contributing to character and improving legibility in the townscape of the city centre north of the Liffey. The proposed development would make a positive contribution to the mix of dwelling typologies by introducing a large number of 1, 2 and 3 bedroom apartments and a number of duplex units (and houses), to a part of the city centre that is dominated by historic, low density residential typologies. It would also introduce a new retail street to the townscape, thereby enhancing the mix of uses. A Site Specific Flood Risk Assessment is submitted with the planning application
At The Scale Of The Site/ Building	
The form, massing and height of proposed developments should be carefully modulated so as to maximise access to natural daylight, ventilation and views and minimise overshadowing and loss of light	The form, massing and height of all the blocks have been designed to maximise access to natural daylight, ventilation and views with particular focus on the ground / podium level corner units and courtyard spaces. Refer to Daylight and Sunlight Analysis (JV Tierney & Co) The positioning of blocks within the site with the lowest elements positioned on the shared boundaries with existing low-rise housing and the orientation of the blocks relative to neighbours has ensured that there is no undue overshadowing / loss of light to neighbouring properties.
Appropriate and reasonable regard should be taken of quantitative performance approaches to daylight provision outlined in guides like the Building Research Establishment's 'Site Layout Planning for Daylight and Sunlight' (2nd edition) or BS 8206-2: 2008 – 'Lighting for Buildings – Part 2: Code of Practice for Daylighting'.	As stated above, the proposed development has been designed by the architects in collaboration with JV Tierney regarding daylight. The modelling undertaken, following the BRE Guidelines, has produced quantitative data to inform the design of the scheme with revisions made to ensure good quality living environments. Refer to *Daylight and Sunlight Analysis Report* by JVT.
Where a proposal may not be able to fully meet all the requirements of the daylight provisions above, this must be clearly identified and a rationale for any alternative, compensatory design solutions must be set out, in respect of which the planning authority or An Bord	The majority of the units proposed meet the required daylight provisions. Compensatory measures are included in the design to improve the daylight provisions for the affected apartments. Refer to *Daylight and Sunlight Analysis Report* by JV Tierney & Co. The level of compliance with BRE standards is appropriate for the proposed development, having regard to its location and character and the wider planning objectives for this inner city

Pleanála should apply their discretion, having regard to local factors including specific site constraints and the balancing of that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution.	regeneration site.

The above assessment of the proposed development against the key DCDP and Building Height Guidelines policy indicates that, while the development would result in significant townscape impacts, due to its appreciable response to the context and to relevant policy its effects on townscape character can be considered overwhelmingly positive.

In relation to the other specific assessments referred to in the Building Height Guidelines, these have also been considered insofar as they are relevant to the proposed development and these criteria are addressed in the Statements of Consistency/ Material Contravention Statement (BMA Planning) under the section of the Building Height Guidelines. The following is a summary of these other assessments in the context of this planning application submission.

Table 14.8: Details of Other Specific Assessments referred to in Building Height Guidelines (2018)

To support proposals at some or all of these scales, specific assessments may be required and these may include:	
Specific impact assessment of the micro-climatic effects such as downdraft. Such assessments shall include measures to avoid/ mitigate such micro-climatic effects and, where appropriate, shall include an assessment of the cumulative micro-climatic effects where taller buildings are clustered.	Refer to *Microclimatic Wind Analysis and Pedestrian Comfort Report (IN2)*.
In development locations in proximity to sensitive bird and / or bat areas, proposed developments need to consider the potential interaction of the building location, building materials and artificial lighting to impact flight lines and / or collision.	Refer to Screening Report for Appropriate Assessment (Openfield Ecology)
An assessment that the proposal allows for the retention of important telecommunication channels, such as microwave links.	Given its inner-city location, the height, scale and orientation of the proposed development is such that it will not impact on existing telecommunication channels or microware links. Refer to EIAR Chapter 10 – Material Assets: Built Services
An assessment that the proposal maintains safe air navigation.	The proposed development is well below the height that could affect air navigation, airports or helipads. Under the Standardised European rules of the Air (SERA), it is not permissible to fly over built up areas at a height of less than 1000ft (approx 304 metres). Refer also to EIAR Chapter 4 – Population and Human Health

An urban design statement including, as appropriate, impact on the historic built environment.	There are no protected structures within or in the immediate vicinity of the site. The impact of the development on St. Bricin's Military Hospital complex is addressed in Design Statement (OMP Architects) and EIAR Chapter 13 – Cultural Heritage
Relevant environmental assessment requirements, including SEA, EIA, AA and Ecological Impact Assessment, as appropriate.	An Environmental Impact Assessment Report (EIAR) and an AA Screening Report are enclosed with the current application.

14.5.3 Operational Phase – Visual Amenity

30no. viewpoints were selected for assessment of the proposal's visual effects informed by Verified Photomontages (see Figure 14.15 below). The viewpoints were selected to represent all of the potentially affected areas identified in 14.3.3 above, and to address relevant policy in the DCDP (e.g. with views from the Liffey quays and Royal Hospital Kilmainham). The selection is also intended to provide photomontages of the proposed development from a range of angles and distances. The viewpoints are as follows:

South of site (Viewpoints 1, 2, 3, 4, 5)
- Montpelier Gardens streetscape,
- Montpelier Park estate
- St Bricin's Park estate

West of site (Viewpoint 6)
- Montpelier Gardens estate

West of site (Viewpoints 7, 8, 9)
- Kinahan Street
- Aberdeen Street
- Findlater Street

North of site (Viewpoints 10, 11, 12, 13)
- North Circular Road to west
- North Circular Road at O'Devaney Gardens entrance
- North Circular Road to north
- North Circular Road to north east

East of site – Stoneybatter (Viewpoints 14, 15, 16, 17, 18, 19, 20)
- Oxmantown Road
- Ross Street, Ashford Street and Ashford Cottages
- Cowper Street
- Swords Street and Thor Place

East of site – St Bricin's Military Hospital (Viewpoints 21, 22, 23, 24, 25)
- Various positions on the hospital grounds

South east of site (Viewpoint 26)

- Arbour Hill beside Collins Barracks Conservation Area)

South of site, distant (Viewpoint 27)

- Liffey River Conservation Area, Victoria Quay

West of site, distant (Viewpoints 28, 29)

- Phoenix Park Conservation Area

South west of site, distant (Viewpoint 30)

- Royal Hospital Kilmainham protected view

The viewpoints are assessed in Table 14.6 below. The assessment should be read in conjunction with the baseline views (photographs) and verified photomontages provided in Appendix 14A (Vol 2). For the methodology and the criteria and terms used in the assessments, refer to Section 14.2.2 above.

Figure 14.15: Viewpoints for Visual Effects Assessment (Refer to EIAR Volume 2: Appendix 14A for the A3 Views identified below)

Table 14.6: Visual Effects Assessment

No	Viewpoint Location	Baseline View	Sensitivity	Proposed Change	Magnitude of Change	Significance of Effects
1	Montpelier Gardens along site frontage	The cleared and fenced off site (part of a large designated strategic regeneration area) is to the right of the road - refer to Plate 14.4 for a picture of this view prior to the flats' removal. To the left is a row of houses fronting the street, and a plaza/parking area – both part of the late 20th century Montpelier Park estate. The Montpelier Gardens estate, the trees along Infirmary Road and the distant obelisk in Phoenix Park lend character, quality and visual amenity to the wider townscape. However, the streetscape quality and visual amenity in the foreground are poor, and given the site's history and SDRA designation, the viewpoint sensitivity can be classified low.	Low	The Montpelier Gardens streetscape would be transformed, with a linear apartment building of 3-6 storeys fronting the road, enclosing the street and generating a distinctly urban character. The 6 storey element marks the junction where the newly aligned through-road enters O'Devaney Gardens from Montpelier Gardens. The brick façade and metal window frames and balcony railings lend an appreciable quality to the building, raising the quality of the foreground townscape overall. The street trees and low ornamental planting soften the streetscape and provide some privacy for the ground floor apartments. The existing valued elements in the view are retained, and overall the character and quality of the view would be significantly improved.	High	Moderate positive
2	Montpelier Park – Houses fronting the entrance plaza/ parking area	The houses are arranged to form a plaza space at the entrance to the estate off Montpelier Gardens. This space, which slopes down steeply from the street, is used for parking. The houses frame the view across the plaza/ parking area and Montpelier Gardens into the site, which is cleared and fenced off. The site appears as a large gap in the urban structure and it contributes to a weak townscape character and poor visual amenity. There are no elements or characteristics of value in the view and the viewpoint sensitivity can be classified low.	Low	The townscape in view would be transformed by the development, with a cluster of buildings of contemporary urban character and scale (appropriate for the metropolitan centre) introduced along the Montpelier Gardens frontage. 6 storey volumes frame the entrance to a new pedestrian street leading into the site from Montpelier Gardens diagonally across from the estate entrance, and the buildings step up in height towards the centre of the site. (The policy for SDRA 11 allows for 'a mid-rise residential building towards the centre of the site'.) While the degree of built enclosure would be significantly increased, due to (a) the positioning of the 6 storey element opposite the plaza/ parking area, and (b) the positioning of the mid-rise volumes further within the site, the enclosure would not be excessive. The change to the view would be significant but the design and material quality, and the responsiveness of the	Very High	Significant positive

No	Viewpoint Location	Baseline View	Sensitivity	Proposed Change	Magnitude of Change	Significance of Effects
				development to the context, are appreciable - resulting in a pleasing composition of built form, to the benefit of the neighbouring estate.		
3	Montpelier Gardens at repositioned entrance to O'Devaney Gardens	This viewpoint represents the views from the Montpelier Park houses across the road from the site. The cleared and fenced off site fills the frame of view to the north. It is a large gap in the urban structure and contributes to a weak townscape character and poor visual amenity. There are no elements or characteristics of value in the view and the viewpoint sensitivity can be classified low.	Low	The proposed development includes the realignment of the road entering O'Devaney Gardens from Montpelier Gardens, to accommodate a duplex terrace on the west side of the road (for a transition in height between the high density core of the development and the existing low density estates to the west). As a result of the road's realignment the junction shifts into this view, and the new tree-lined street is framed by the new buildings. To the left is a 2-3 storey duplex terrace, and to the right a 6 storey apartment building marks the junction. The height steps up along the street further into the site. There would be an increase in built enclosure to Montperlier Gardens, but the 6 storey frontage to a street in the city centre is not inappropriate. The townscape in view would be transformed from disturbed/ unfinished suburban to contemporary urban in character, with buildings and streets of high design and material quality. Legibility and permeability would also be improved.	Very High	Significant positive
4	Junction of Infirmary Road and Montpelier Gardens	This is the main view of the site from the public realm to the west, where a large number of people pass along Infirmary Road. The Criminal Courts of Justice building is 100m to the south; To the right of the street in the foreground is the Department of Defence property included in SDRA 11 (the former 'Isolation Hospital' is behind the high wall). This property can be expected to be developed in the future. To the left of the street is the Montpelier Gardens estate.	Medium	BLD 09 is prominent in the middle distance, the corner building giving definition and urban-type enclosure to both Montpelier Gardens (the street) and the newly aligned O'Devaney Gardens access road. The 3 storey duplex building is visible on the near side of the junction, functioning as a transition in scale between the houses of Montpelier Gardens and the new high density quarter. Taller volumes of BLD 10 further towards the centre of the site protrude above the streetfront roofline of BLD 9. These give depth/ substance to the development, so that it has the appearance of a quarter as opposed to an isolated development.	Medium-High	Significant positive

No	Viewpoint Location	Baseline View	Sensitivity	Proposed Change	Magnitude of Change	Significance of Effects
		In the middle distance along the street is the site, cleared of buildings and fenced off, with a belt of maturing trees forming a backdrop. The townscape appears unfinished, with Montpelier Gardens and the foreground street trees the only elements of value.		The resulting composition of streetscape, building typologies and scale has an attractive urban complexity. The character of both the Montpelier Gardens estate and the new O'Denaney Gardens quarter is strengthened by juxtaposition with the other. While very different in character, they are both of high quality. The wider townscape character would be enhanced, as would the sense of place and legibility.		
5	St Bricin's Park estate	The view is taken from the courtyard between two of the recently refurbished 2 storey St Bricin's Park apartment buildings, approximately 120m from the site. The buildings frame a view towards the site but the Montpelier Park estate occupies the intervening landscape. The terraced houses behind a tall boundary wall enclose the vista. It should be noted that St Bricin's Park is adjacent to Collins Barracks and only minutes' walk from the Liffey Quays and Heuston Station. This underlines the city centre location.	Medium	BLD 09 and 10 would be visible in the middle distance protruding above the roofline of the Montpelier Park houses and the foreground trees. The lower roofline (of the streetfront buildings facing Montpelier Park) indicates the alignment of the street (Montpelier Gardens), and the tall volume of BLD 10 suggests a new place of significance and substance in the city centre townscape, i.e. the new high density O'Devaney Gardens quarter. (The SDRA 11 policy specifically identifies the potential for a mid-rise building to strengthen the urban character of the new quarter and improve townscape legibility.) No valued element or characteristic of the view would be lost or compromised; a cluster of new buildings of high design and material quality would be added to the city centre townscape in a location designated for strategic regeneration. The townscape character would be strengthened, and visual interest and legibility improved.	Medium	Moderate positive
6	Montpelier Gardens estate	Montpelier Gardens is comprised of terraced two storey houses set behind shallow front gardens (with deep back gardens). The positioning of the houses close to the street results in a distinctive, urban character and a relatively high degree of visual enclosure. There are no houses either facing or backing onto the site boundary. The terraces present gable ends towards the site (i.e. the houses'	Medium	The 2-3 storey duplex terrace protrudes above the estate boundary wall, partially screened by the tree at the end of the street. Beyond the duplex terrace is the 8 storey corner volume of BLD 09 (which overlooks the proposed new central open space on O'Devaney Gardens). The resulting composition of an enclosed, historic urban estate in the foreground and a diverse contemporary residential quarter in the middle distance has an	Medium	Moderate positive

No	Viewpoint Location	Baseline View	Sensitivity	Proposed Change	Magnitude of Change	Significance of Effects
		direct visual exposure is limited). However, a central east-west aligned street (View 6) frames a view directly towards the site. (The tree at the end of the street is in Montpelier Gardens, not on the site, i.e. it will remain.) The former O'Devaney Gardens development was visible from this street. It is also a factor that the side is an SDRA. Therefore the viewpoint sensitivity can be classified medium.		attractive urban complexity – not inappropriate for the city centre location. The character of both Montpelier Gardens and the new O'Denaney Gardens quarter would be strengthened by juxtaposition with the other. The wider townscape character would be enhanced, as would the sense of place and legibility.		
7 and 9	Kinahan Street and Findlater Street	Kinahan Street and Findlater Street are part of a Victorian estate of artisans cottages and two storey houses (Aberdeen Street) to the west of the site, between O'Devaney Gardens and Infirmary Road/ Phoenix Park. Similar to the neighbourhood to the east of the site (see Viewpoints 14-21 below), the estate is characterised by a fine urban grain and buildings of small scale. The sensitivity of the area to new development is tempered by its city centre location, by the former use/occupation of the site by higher density buildings, and the adjacent site's zoning and SDRA designation. The two streets are so aligned that that views towards the site are framed by the terraced cottages (therefore development on the site will unavoidable be prominent in views from the streets), and a small number of cottages on the east side of Findlater Street back onto the site boundary.	Medium	BLD 07 would be the most prominent element of the development in view, including and in particular the landmark corner volume of 14 storeys at the central junction in the site. The vertical recesses in the west façade and the stepped height of the tower break down the building's massing so that, while unavoidably prominent, there is visual relief and visual interest in the built form. A notable element of the proposal is the terrace of houses inside the site's west boundary, aligned back-to-back with the cottages on the east side of Findlater Street. These function successfully as a transition in typology and scale. In both views (View 7 in particular) BLD 07 and BLD 09 (to the right) can be seen defining/ enclosing a large open space (although the ground plain is hidden). This, along with the steps in the building line and roofline and the variations in materials of the elevations facing the open space, provides relief in the density of built form. The tall volumes of BLD 06 (in View 7) and BLD 10 (View 9) can be seen in the distance, giving depth to the cluster, so that it reads as an urban quarter. In summary, the development would result in a pleasing composition (in View 7 in particular) in which the historic small scale, low density neighbourhood and the adjacent	High	Significant positive

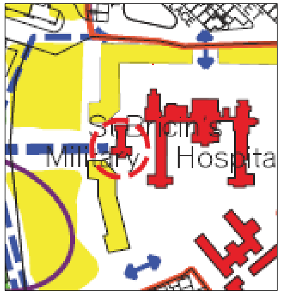
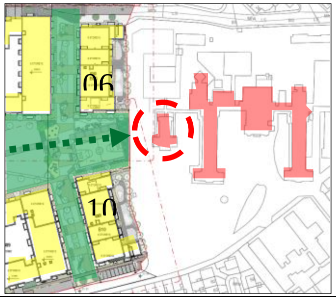
No	Viewpoint Location	Baseline View	Sensitivity	Proposed Change	Magnitude of Change	Significance of Effects
				contemporary, high density quarter are co-dominant in the view. Both are of equal value as elements of the townscape, and both benefit from juxtaposition with the other. Such pronounced differences in development typology and scale are not inappropriate nor undesirable in the city centre context.		
8	Aberdeen Street	Aberdeen Street is the central street in the Victorian estate of houses and cottages to the west of the site. It gives access to the estate from Infirmary Road, and is aligned east-west, framing a view towards the site. Aberdeen Street is lined with 2 storey red brick houses positioned close to the road edge, giving the street a distinctive Victorian inner suburban character not unlike Oxmantown Road to the east.	Medium	BLD 07 is positioned on the axis of Aberdeen Street, so that the 14 storey landmark tower marking the central junction in the future O'Devaney Gardens quarter is the focal point of the view. As in View 7 and 9 described above, the building will be a prominent addition to the view (and the view from Infirmary Road as it passes Aberdeen Street), becoming the co-dominant element of the view along with the Victorian streetscape in the foreground. While the magnitude of change to the view would be high, there would be no loss or compromise of valued elements or characteristics (taking account of the city centre location – i.e. an absence of buildings on a strategically located site zoned for regeneration should not be considered a positive characteristic). The resulting composition - including the stark contrasts in building typology, scale and architecture - would add character, visual interest and legibility to the townscape.	High	Significant positive
10	North Circular Road west of site	This viewpoint represents the stretch of North Circular Road to the south west of the O'Devaney Gardens entrance. There is full visual enclosure along the street except at this position, where a gap between two terraces allows a glimpse of the landscape behind the tall Victorian houses. At the time the photograph was taken the scaffolding for the construction of Phase 1 could be discerned through this gap.	Medium	A small part of the 8 storey BLD 07 would be visible through the gap in the foreground buildings. The deep recess in the visible part of the elevation, combined with a variation in material (brick and dark render) reduces the perception of massing. The building would be a minor addition to the composition, although the brief glimpse at this point would indicate the presence of the new quarter behind the North Circular Road buildings.	Negligible-Low	Not significant, neutral

No	Viewpoint Location	Baseline View	Sensitivity	Proposed Change	Magnitude of Change	Significance of Effects
11	North Circular Road at O'Devaney Gardens entrance	The entrance to O'Devaney Gardens from North Circular Road is one of the three main gateways to the future quarter. The view along the entrance road is framed by large red brick terraced houses characteristic of North Circular Road. Behind the houses, to the right of the road, the site of Phase 1 can be seen and beyond that is the main body of the subject site, currently vacant. The belt of trees formerly on the boundary between O'Devaney Gardens and St Bricin's, contained within the site, can be seen in the distance.	Medium	The development would transform the townscape in view, introducing a cluster of buildings of contemporary urban character and scale - appropriate to the central metropolitan location - to the vacant backlands behind the North Circular Road houses. There is a gradation of height along the tree-lined road towards the centre of the site and the most prominent building is the 14 storey corner volume of BLD 07, marking the junction at the centre of the quarter. The built form to either side of the feature building defines the edges of the streets. The tall building in the distance (the 12 storey volume of BLD 06) gives depth to the cluster, strengthening the impression of a new urban quarter. Variations in height and facade material make each building distinct, while maintaining an architectural theme that gives the development a distinct identity. Despite the magnitude of change on the site, there would be no harm to the North Circular Road houses; the two character areas both benefit from their juxtaposition. The development would add to the character, visual interest and legibility of the townscape.	High	Significant positive
12	North Circular Road north of the site	This viewpoint represents the stretch of North Circular Road to the north east of the O'Devaney Gardens entrance. There is an unbroken terrace of 3 storey Victorian houses along this stretch. The buildings combine with the trees to generate a high degree of visual enclosure.	Medium	The development would be screened by the houses.	None	No effect
13	North Circular Road to north east of site	The view is taken from North Circular Road travelling towards Phoenix Park. At this point near the junction with Aughrim Street there is a roadside open space which allows a view towards the site - unobstructed by buildings but filtered by the trees along	Medium	In the summertime view the development would be largely screened, with only the tall volume of BLD 03 discernible. In winter with the trees out of leaf more of the buildings would be visible but they would still have a relatively minor presence in the view.	Low	Not significant, neutral

No	Viewpoint Location	Baseline View	Sensitivity	Proposed Change	Magnitude of Change	Significance of Effects
		Aughrim street and in the back gardens of the North Circular Road houses.		The development would add a new (not inappropriate) element to the townscape, contributing to the diversity of character and visual interest - with no loss or compromise of any value element or characteristic.		
14 and 15	Ross Street: - Oxmantown Road junction - Ashford St junction	Oxmantown Road is the main north-south thoroughfare serving the western residential portion of Stoneybatter. To the west is a fine grained neighbourhood of streets lined by artisan's cottages. In View 14 the view is framed by 2 storey buildings characteristic of Oxmantown Road in the foreground, and the cottages along the street. In View 15, from closer to the site, all the buildings in view are the cottage typology. Ross Street terminates at the eastern site boundary. The boundary fence can be seen at the end of the street (and Phase 1 under construction is indistinctly visible in the distance beyond the fence). The neighbourhood in the foreground is distinctive and attractive but the townscape character is weakened by the site condition.	Medium	The proposed buildings BLD 02/03 (the creche) and 05, enclosing a wide green corridor crossing the northern part of the site, are prominent additions to the views. The linear public space is aligned with Ross Street so that the vista is not closed by built form, inviting movement along the street into the new quarter. The buildings step up in height from the boundary towards the centre of the site, and the scale is moderated to avoid an overly abrupt transition despite the clear difference in typology. A large number of trees are proposed in a wide green plaza space inside the site boundary (in front of the creche) to further soften the transition. While the townscape would be altered by the addition of the contemporary, higher density development, the character and value of the historic neighbourhood would not be diminished. View 15 shows that the two character areas would mutually benefit from their juxtaposition. The development would add to the townscape character, visual interest and legibility as well as improving pedestrian permeability.	Medium	Moderate positive
16	Ashford Cottages	Ashford Cottages is parallel to Ross Street and also terminates at the site boundary. The cottage-lined street is distinctive and attractive but the cleared and fenced off site gives the landscape a disturbed/unfinished appearance, detracting from visual amenity.	Medium	A complex of buildings of diverse form and scale is proposed in this part of the site. The gable wall of a 2 storey house is visible to the left beside a new pedestrian entrance to the site, and beyond the house (across an internal street) is the 5 storey BLD 05D, with the 6 storey BLD 05B to the right featuring a mansard roof. A taller volume of BLD 05 towards the centre of the site protrudes above their roofline. The new apartment building (BLD 05) is set back over 30m from the boundary, and the wide space in front of the	High	Significant neutral

No	Viewpoint Location	Baseline View	Sensitivity	Proposed Change	Magnitude of Change	Significance of Effects
				building features a large number of trees to soften the transition. Nonetheless the difference in development typology and scale is pronounced in this view. Taking account of the existing (and former) condition of the site, the city centre location, and the mitigation measures built into the proposal, the townscape change would not be inappropriate and there would be no reduction in visual amenity.		
17 and 18	Cowper Street: - Oxmantown Rd junction - Aughrim St junction	Cowper Street leads from Aughrim Street at the edge of Stoneybatter's urban centre through a neighbourhood of deceasing density and scale towards the site. The distant view from the Aughrim Street junction (View 18) shows a greater diversity of built form (there is also more varied land use – with a school to the left of the road behind the tree). View 17 shows the smaller scale of the Oxmantown Road houses and the cottages at the western end of Cowper Street approaching the site. One of the cottages on Thor Place, backing onto the site boundary, can been at the end of the street. As in the other views from the surroundings the absence of buildings on the site is a notable characteristic. There is a relative lack of built enclosure and given the city centre location and the site's zoning for regeneration this should not be considered a visual asset.	Medium	The alignment of Cowper Street frames a view of BLD 05, part of the high density core of the new quarter. There is a visible gradation in height of the built form – from a terrace of 2 storey houses directly behind the Thor Place cottages, to the 6 storey BLD 05, and in the distance the landmark tower of BLD 07 marks the centre of the new O'Devaney Gardens quarter. The variations in height and materials, and steps in the building lines and roofline, are successful in breaking down the massing and generating visual interest. A notable element of the design is the use of buff brick in the façade of BLD 05, referencing the distinctive houses of Oxmantown Road (see house in the foreground of View 18). In views from the west (e.g. Views 8, 27) and south (View 2) the predominant material is red brick, reflecting the red brick houses of the neighbouring estates in those directions. There would be no loss or compromise of any valued element or characteristic of the views. The development would result in a complex urban composition appropriate to the city centre location, in which the historic smaller scale, low density neighbourhood and the contemporary, high density quarter are co-dominant in the views.	Medium-High	Significant positive
19, 20, 21	Swords Street	Swords Street is the main link between O'Devaney Gardens and Stoneybatter and will	Medium	In all three views the central east-west street – extending across the site from Swords Street – would be legible. This	High	Significant positive

No	Viewpoint Location	Baseline View	Sensitivity	Proposed Change	Magnitude of Change	Significance of Effects
	approaching the site	carry a large volume of pedestrian and road traffic (including a bus route). View 19 shows the small scale of the cottages along Swords Street to the right. The trees in the small open space of Thor Place are prominent. In View 20 the direction of view swings to the south west, showing the nearest portion of the central complex of St Bricin’s Hospital behind the boundary wall and railing. View 21 is taken from a position approaching the site boundary/ entrance, showing the Thor Place cottages and a portion of the open space to the right. The site in its existing condition detracts from the townscape character and visual amenity. The boundary of St Bricin’s is also a detractor. The condition of these elements contrasts strongly with Thor Place to the right of the view. While Thor Place/ Swords Street as a residential neighbourhood is sensitive to change, the current site condition, its historic use and its SDRA designation lessen the area’s sensitivity to change of the type proposed.		continuation of the urban grain and public realm is an important aspect of the proposal. In Views 19 and 20 the northern part of the development (north of the central street) would be hidden from view by the trees in Thor Place. BLD 06 and 07 would be prominent in the view, the buildings announcing the new quarter in views from the eastern approach and fronting the internal retail street. The tall (12 storey) volume of BLD 06 is prominent. View 20 shows the tall building’s arrangement in relation to St Bricin’s, and its separation distance from the cottages in Thor Place. The contrast in typology and scale is pronounced but responsive to the context. View 21 shows the BLD 04B and 05 behind the cottages of Thor Place. BLD 04B is a terrace of 2 storey houses, with the end house turned to front the street at the entrance. BLD 05, beyond an internal street, is 6 storeys at the near corner, marking the entrance/ junction, with the height stepping down and up along the street (to allow sunlight into the courtyards of the perimeter block), generating visual interest in the streetscape. As in the other views where the new quarter interfaces with the adjacent neighbourhoods of artisans cottages the transition in building typology and scale is pronounced. However, the design response to the context is appreciable and the resulting compositions of built form are attractive. The character, quality and visual amenity of the neighbouring estates would not be diminished by the development.		
22 and 23	St Bricin’s Military Hospital to front and rear of main complex	View 22 is taken from the rear of St Bricin’s inside the boundary wall alongside Swords Street. View 23 is from the large space front of the building’s main entrance. Both views illustrate the spatial extent, the height and architectural character of the St	Low-Medium	The new high density quarter will be prominent in views from within St Bricin’s, with the two 12 storey volumes of BLD 06 and 10 rising well above the hospital’s (in places – View 22) complex roofline. The positioning of these buildings relative to the central hospital complex is appreciable and in View 23 the main open space between	High	Moderate positive

No	Viewpoint Location	Baseline View	Sensitivity	Proposed Change	Magnitude of Change	Significance of Effects
		Bricin's complex. The buildings are not particularly attractive and are not protected structures, although they are described as 'buildings of potential heritage value' in the DCDP. The main hospital building is centrally located in the extensive property with large hard standing/ parking areas (View 22) and green space with mature trees (View 23). Despite its scale the hospital is somewhat isolated from its surrounding townscape, with limited presence in views due to its separation from the public realm. As an institutional use it is inherently less sensitive to change than the residential neighbourhoods around the site.		BLD 06 and 10 is legible. The use of red brick as the predominant material in the tall buildings' facades, reflecting St Bricin's, is notable. While the magnitude of change to the views is high, the change would not be significant. This is due to the relatively low sensitivity of the hospital property - being institutional in use, also part of SDRA 11, and generally inwardly oriented. There is also a substantial separation distance between the proposed buildings and the central hospital complex. The character of St Bricin's and the visual amenities of the property would not be diminished by a new high density quarter on the adjacent lands.		
24 and 25	St Bricin's western boundary	Views 24 and 25 show the interface between St Bricin's and the site – in particular the chapel inside the hospital's west boundary, which is identified as a 'focal building' in the DCDP policy for SDRA 11. View 24 shows the small chapel located to the side of the central hospital complex in a linear green space featuring numerous trees including a row of trees along an access road inside the boundary. View 25 shows the view west from St Bricin's along Montpelier Gardens, with the Wellington Testimonial obelisk in Phoenix Park visible in the distance.	Medium	View 24 shows the proposed buildings BLD 06 and 10 located just outside the St Bricin's hospital boundary, the linear buildings aligned parallel with the boundary (an arrangement suggested in the DCDP policy for SDRA 11 – see diagram below). The buildings flank a wide open space that extends west across the site. The chapel is positioned as a focal point of the open space (the new neighbourhood park). The steps in height and variations in materials of the buildings, and the retained and supplemented vegetation along the boundary, reduce the perception of scale despite the buildings' height.  	High	Significant neutral

No	Viewpoint Location	Baseline View	Sensitivity	Proposed Change	Magnitude of Change	Significance of Effects
				The contrast in scale between the small chapel and the new buildings is substantial. However, in the evolving urban context: (a) such tensions are not inappropriate or undesirable, and (b) it is the chapel that will be considered the anomaly in the city centre townscape, not the apartment buildings.		
26	Arbour Hill at the Cavalry Row junction	The view is taken from Arbour Hill to the rear of Collins Barracks. Cavalry Row leads off Arbour Hill to an entrance to St Bricin's (and a modern estate adjacent to the hospital grounds). The St Bricin's buildings are visible at the end of the street, which is lined by a low stone building to the right and terraced houses to the left. The small church in the foreground to the left of Cavalry Row is included in SDRA 11 along with the buildings both sides of Cavalry Row. There are further terraced houses along the road to the left.	Medium	The 12 storey volume of BLD 06 would be visible in the distance, protruding above the roofline of St Bricin's. It adds a new building typology to the complex composition but it is sufficiently removed to avoid any negative impacts on the historic buildings. The location is close enough to the city centre (less than 250m from the Liffey, with the Guinness brewery across the river) that the building would not appear out of place. (On turning the corner of Arbour Hill to the left there is a view down the hill towards the Liffey and the Guinness site, with a variety of modern buildings in view.)	Low	Slight neutral
27	Victoria Quay, Liffey River	The view is taken from the quay near Sean Heuston Bridge and Heuston Station. The Liffey in the foreground is hidden by the quay wall. Across the river is a complex townscape of buildings from various eras, streets and open space. It should be noted that the Criminal Courts building to the left will likely be screened in future when the Hickeys site is developed following a recent planning permission which includes allowance for a landmark tower.	Medium	The tops of three buildings would protrude above the complex roofline across the river. There would be no loss or compromise of any valued element or characteristic of the view. The extent of protrusion is limited, but sufficient for the buildings to be recognisable (the common theme of architectural/ façade treatment of the buildings contributes to its recognisability), thus adding to the character and legibility of the townscape.	Low	Slight positive
28	Phoenix Park eastern exit to North Circular Road	The view is taken from North Road approaching the exit from Phoenix Park onto North Circular Road and Infirmary Road. The viewpoint was selected as (a) the alignment of the road affords a view towards	High	The tall feature volume of BLD 07 would protrude above the roofline of the North Circular Road houses. This would amount to a relatively minor intrusion in the complex view and it would cause no harm (e.g. through screening, dominance, etc.) of any of the protected structures.	Low	Slight neutral

No	Viewpoint Location	Baseline View	Sensitivity	Proposed Change	Magnitude of Change	Significance of Effects
		the site on exiting the park, and (b) there is a cluster of protected structures in this area, including the park gates, the gate lodge (the small building to the left of the gate largely hidden from view by vegetation), and a row of red brick buildings inside the gate (to the left in the view). In the existing view the houses across the junction at the corner of North Circular Road and Infirmary Road close the vista. The site is c. 180m beyond these houses. A notable element in the view is the corner of a modern apartment block protruding to the side of the buildings to the left of the road.		The view shows the appropriateness of red brick as the predominant material of the development. It reduces the building's prominence despite its clearly different typology and scale. The building would have the effect of indicating a new place of significance in the townscape, i.e. the new O'Devaney Gardens residential quarter. The potential for such a gain in legibility, delivered by a mid-rise building at the centre of the site, is specifically mentioned in the policy for SDRA 11.		
29	People's Garden, Phoenix Park	The view is taken from a footpath in the eastern part of Phoenix Park (the 'People's Garden' area), to the east of the main avenue (Chesterfield Avenue), which in this part of the park is lined by evergreen oak trees that restrict views to the east. In the view east from the footpath a large amenity grassland field is enclosed by a broad belt of mature trees of various species. A single building is visible inside the park – the former Head Gardener's Lodge, a protected structure.	High	In the summertime view the development would be largely screened, with only the feature volume of BLD 07 clearly visible in the distance beyond the Gardener's Lodge, between the crowns of the trees. The tall volumes of BLD 06 and 10 would be discernible although heavily filtered by the trees. In winter with the trees out of leaf the cluster of buildings would be more clearly visible, although filtered (except for BLD 07) by the bare tree canopies. The development would add a new cluster of buildings of urban typology and scale to the townscape east of Phoenix Park. While a significant change to this particular view, it should be noted that there are numerous views of different parts of the city from different locations in the park. This is an unavoidable and not inappropriate characteristic of a park that extends right to the edge of the city's central urban area. The photomontage shows that there would be no loss of visual amenity as a result of the change. The park is so well defined and of such strong intrinsic character that it	Low-Medium	Slight-Moderate neutral

No	Viewpoint Location	Baseline View	Sensitivity	Proposed Change	Magnitude of Change	Significance of Effects
				can withstand change in the surrounding cityscape with no loss of value or visual amenity.		
30	Royal Hospital Kilmainham	The DCDP identifies a 'cone of vision' north from Royal Hospital Kilmainham across the hospital gardens, the Liffey and Phoenix Park, stating "Any new developments within this 'cone' shall not adversely affect this view". The site, although visible from Royal Hospital Kilmainham, falls outside of the protected 'cone of vision' (see Figures 14.16 a and b below), forming part of the city centre townscape east of Heuston Station and Phoenix Park. Heuston South Quarter and the Criminal Courts of Justice are located in a similar part of the view. The Clancy Quay quarter has developed within the cone of vision to the west.	Medium	While the site is outside of the area covered by the protected 'cone of vision', the cluster of buildings would be visible in the distance - to the left of the Criminal Courts, above the roofline of the Infirmary (now occupied by the DPP) at the eastern edge of Phoenix Park. Compared to the Heuston South Quarter buildings and the Criminal Courts the development would have a limited visual presence, and it would have no negative effect on any valued element or characteristic of the view. It would however (a) contribute to the diversity of character in the city centre townscape east of Phoenix Park, and (b) indicate a new place of significance in the townscape (as the South Quarter and Courts buildings do), improving legibility.	Low	Slight positive

Figure 14.16 a and b: The DCDP's 'Protected Cone of View' from Royal Hospital Kilmainham

14.5.3.1 Summary of Visual Effects Assessment

The assessment found that the proposed development would result in significant effects on the composition, character and quality of views in the immediate environs of the site. For the most part these effects can be considered positive. The following are the key conclusions:

- ***South of site: Montpelier Gardens streetscape, Montpelier Park and St Bricin's Park estates (Viewpoints 1- 5)***
  The proposed buildings BLD 09 and 10 would have a transformational impact on the streetscape of Montpelier Gardens and the townscape context of the Montpelier Park estate. 6 storey volumes in the new streetfront buildings would frame the southern road entrance to O'Devaney Gardens, and a 2nd entrance – to a new green/ pedestrian street connecting Montpelier Park to the neighbourhood park internal to the site. The Montpelier Gardens streetscape would be enhanced by improved surfaces and street trees. While the degree of built enclosure would be increased, 3-6 storeys on one side of a street in the city centre context is not excessive. Overall the streetscape and townscape character, quality and legibility would be significantly improved.

- ***West of site: Montpelier Gardens and Kinahan Street, Aberdeen Street and Findlater Street (Viewpoints 6-9)***
  2-3 storey houses and duplex terraces (BLD 08a-c) are proposed inside the west site boundary, which is shared with the Victorian estates of cottages and 2 storey houses to the west. These smaller buildings would function as a transition in typology and scale between the central high density core of O'Devaney Gardens and the neighbouring low density estates. While the central apartment buildings are large (with some volumes deliberately of a height to achieve visibility over a distance), the modulation of the massing and variations in materials would successfully reduce the perceived scale. The development would nonetheless result in a pronounced contrast in character along this boundary. The resulting composition of views from the neighbouring estates would however be pleasing – the two character areas co-dominant, both benefitting from their juxtaposition. Both development types belong in the evolved city centre and are of equal value as elements of the townscape.

- ***North of site: North Circular Road to west, north including the O'Devaney Gardens entrance, and north east (Viewpoints 10-13)***
  Of the four viewpoints assessed along North Circular Road only one would experience a significant change. This is the view from the junction/ entrance to O'Devaney Gardens where the gap in the tall Victorian Houses fronting North Circular Road reveals the site. In this view along the road entering the site a composition of new buildings would define the internal streets and the landmark 14 storey volume of BLD 07 would stand prominently at the central junction of the new quarter. Overall the visual effects on North Circular Road would be limited but from this position the change would be significant and positive, adding to the character, visual interest and legibility of the townscape.

- ***East of site: Stoneybatter including Ross Street, Ashford Street and Ashford Cottages, Cowper Street, Swords Street and Thor Place (Viewpoints 14-21)***
  The proposed development responds appreciably (and effectively) to the estate of cottages to the east of the site. Terraced houses are proposed along the boundary, back-to-back with the Thor Place and Ashford Street. These houses and an internal road will function as a buffer between the cottages and the apartment buildings in the centre of the site. Where the streets of cottages are perpendicular to the site boundary (e.g. Ross Street, Ashford Cottages and Ashford Place) a wide open space corridor is proposed inside the boundary, with allotment plots and a double row of trees, to form a green buffer,

mitigating the visual effects on the nearest cottages. An important aspect of the proposal with respect to the estate to the east is the three connection points, including the all-mode entrance from Swords Street/Thor Place and two further pedestrian entrances (Ross Street and Ashford Cottages). Overall, while the views from the streets to the east would be dramatically changed, the effects can be considered positive. The development would result in attractively complex compositions appropriate to the urban environment, with the built form complemented by a heightened level of street animation.

- ***East of site: St Bricin's Military Hospital (Viewpoints 22-25)***
  The spatial arrangement and height of the proposal responds meaningfully to the presence of St Bricin's in the townscape, and to the policy for SDRA 11 expressed in the DCDP. Most importantly, the proposed neighbourhood park is positioned and aligned to incorporate the St Bricin's chapel as a 'focal building'. The two buildings proposed along the St Bricin's boundary (BLD 06 and 10) are positioned and designed to (a) frame the chapel and (b) address the symmetry, spatial extent, vertical emphasis and materials of the hospital's central complex of buildings. The changes to views from St Bricin's would be of high magnitude, but the effects are not as significant as those on the residential receptors. St Bricin's is an institutional use, a place of work, historically separated from the wider townscape and internally oriented. The presence of a new urban quarter on the adjacent lands, even one of contemporary urban character and scale, would not diminish the value of St Bricin's as a townscape resource.

- ***South of site: Arbour Hill beside Collins Barracks Conservation Area and Victoria Quay in the Liffey River Conservation Area (Viewpoints 26, 27)***
  The distant views from the south would experience a low magnitude of change. Only the tops of the buildings would protrude above the complex existing rooflines. The extent of protrusion would be limited but sufficient for the development to be recognisable, thereby adding character to the townscape and improving legibility – with no negative impact on any valued features or characteristic of the views.

- ***West of site: Phoenix Park (Viewpoints 28, 29)***
  The effects on Phoenix Park would be similar to the views from the south. The taller buildings would be visible from certain positions in the park, but relatively inconspicuous due to the separation distance. It should be noted that there are numerous views of different parts of the city from different locations in the park. This is an unavoidable and not inappropriate characteristic of a park that extends right to the edge of the city's central urban area. There would be no loss of visual amenity as a result of the development; the park is so well defined and of such strong intrinsic character that it can withstand change in the surrounding city with no loss of value or visual amenity.

- ***South west of site: Royal Hospital Kilmainham protected view (Viewpoint 30)***
  The site, although visible from Royal Hospital Kilmainham, falls outside of the DCDP's protected 'cone of vision', forming part of the city centre townscape east of Heuston Station and Phoenix Park. The proposed development but would be visible but would have a lesser visual presence than the Criminal Courts, Heuston South Quarter and Clancy. It would have no negative effect on the protected view.

14.6.3 Mitigation and Monitoring

The townscape and visual effects on all receptors are predicted to be neutral or positive. Therefore, no mitigation measures other than those incorporated into the design proposal are considered necessary.

14.6 DO-NOTHING' SCENARIO

The site would remain as a large vacant brownfield land parcel in Dublin's central urban area. Its disturbed condition would continue to detract from the local and wider townscape character and from the visual amenities of the immediate environs. This would represent an unsustainable use of valuable, well serviced urban land, and of the townscape resource. The DCDP objective for the site's 'strategic development and regeneration', and the national policy of concentrating population growth in the city centre, would be unrealised.

14.7 INTERACTIONS

Population and Human Health

The proposed development would introduce a new, high density residential neighbourhood to the city centre townscape, making more sustainable use of the valuable urban land resource. The proposal includes a substantial area of communal and public open space, most notably a new neighbourhood park (including playgrounds and a multi use games area). The park would be accessible from within the new quarter and from the surrounding neighbourhoods, representing a significant gain in public open space – with positive impacts on the health of the existing population and the new resident community.

The high density neighbourhood located in the city centre, with pedestrian and cycle access to a neighbourhood centre in Stoneybatter, to places of employment and education (e.g. Grangegorman) and to the wider city centre, and well served by bus, Luas and rail services, would encourage sustainable mobility. This would have positive effects on the health of the large new resident population and on the city's contribution to green house gas reduction.

Biodiversity

In its current condition the site has limited biodiversity value. The only significant landscape/ habitat feature is the belt of trees in the south eastern part of the site (along the former boundary with St Bricin's). This would be removed. However, the new quarter would include several large areas of open space with substantial areas of soft surface (amenity lawn areas and ornamental planting), numerous trees and SUDS features, as well as extensive green roofs on the buildings. The proposed streets are tree-lined, and there are pedestrian/ green streets featuring trees and low planting. As a result of these landscaped spaces there would be a net gain is biodiversity on the site.

Cultural Heritage

The site contains no cultural heritage features but there are elements/ areas of cultural value in the immediate environs including several historic residential estates zoned Residential Conservation Areas and St Bricin's Military Hospital. The development would cause significant change to the townscape setting of these elements. Such change is effectively prescribed in the DCDP – by the site's zoning and designation as a Strategic Development and Regeneration Area. The townscape and visual impact assessment found that the proposal responds appropriately to these elements/ areas, and that their value as townscape resources would not be diminished by the development. Nor would any views of or from these areas be negatively affected despite the high magnitude of change in the view compositions. They would rather benefit from juxtaposition with the development. This assessment takes account of the site's city centre location and compact growth policy.

REFERENCE LIST

- *Dublin City Development Plan 2016-2022*, Dublin City Council.
- *Guidelines for Landscape and Visual Impact Assessment*, 3rd edition, 2013, Landscape Institute and Institute of Environmental Management and Assessment.
- *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*, 2017, Environmental Protection Agency.
- *Managing Intensification and Change – A Strategy for Dublin Building Height*, DEGW, 2000.
- *Townscape Character Assessment*, Technical Information Note 05/2017, Landscape Institute.
- *Urban Design Manual – A Best Practice Guide*, Department of Environment, Heritage and Local Government, 2009.
- *Urban Development and Building Height Guidelines for Planning Authorities*, December 2018, Department of Housing, Planning and Local Government.

15. SUMMARY OF SIGNIFICANT EFFECTS, INTERACTIONS AND MITIGATION/ MONITORING MEASURES

15.1 INTRODUCTION

Schedule 6 of the Planning and Development Regulations, 2001, As Amended details the information to be contained in an Environmental Impact Assessment Report, all of which have been complied with, where appropriate, in the relevant Chapter of this EIAR.

This Chapter of the EIAR identifies the significant effects of the project. It also summarises the interactions between impacts by different environmental factors previously discussed in the assessment chapters.

From the description of the project and assessment of effects outlined in the previous chapters, the significant effects of the project are considered under the following Chapter headings:

- Population and Human Health
- Biodiversity / Species and Habitats
- Land and Soils
- Water
- Air and Climate
- Noise and Vibration
- Material Assets: Built Services
- Material Assets: Transportation
- Material Assets: Resource and Waste Management
- Cultural Heritage
- Landscape

Where appropriate, the relevant impact areas are considered in grouped form, as set out below.

15.2 SUMMARY OF PRINCIPAL INTERACTIONS OF EFFECTS

Schedule 6 Item 2(d) of the Planning and Development Regulations, 2001 as amended requires that projects are examined with regard to the inter-relationship of aspects referred to in Item 2(d) of Schedule 6.

The matrix incorporated in Table 15.1 inter-relates the various Chapters of the EIAR to the various impact headings referred to in Schedule 6 Item 2(d) of the Planning and Development Regulations, 2001, As Amended. This matrix does not represent a form of relative assessment of impacts, but merely identifies and amalgamates areas of principal interaction.

15.3 SIGNIFICANT EFFECTS AND PRINCIPAL INTERACTIONS

The likely significant adverse effects of the project are summarised below on a Chapter by Chapter basis taking into consideration the principal interactions between the environmental factors.

The assessment on significant effects includes, where relevant, cumulative effects i.e. the addition of many minor or significant effects and the effects of other projects.

Population and Human Health

All environmental factors interact with Population and Human Health (Chapter 4). The key areas of interactions are:-

- Air and Climate
- Noise and Vibration
- Material Assets: Transportation
- Landscape

There are no significant adverse effects for Population and Human Health.

Biodiversity / Species and Habitats

Impacts to biodiversity are addressed in Biodiversity (Chapter 5) and are strongly related to water quality and impacts which may affect the aquatic environment during both the construction and operation phases. Interactions with the following chapters are therefore relevant:

- Noise and Vibration
- Water
- Landscape

Subject to the adherence to the recommended mitigation measures, no significant adverse impacts are anticipated.

Land and Soils

Effects to land and soils are related to water quality, dust and waste. Interactions with the following chapters are therefore relevant:

- Water
- Air and Climate
- Material Assets: Resource and Waste Management

Subject to the adherence to the recommended mitigation measures, no significant adverse impacts are anticipated.

Water

Effects on Water (Chapter 7) interact particularly with the following Chapters:-

- Biodiversity
- Land and Soils
- Material Assets: Built Services

Subject to the adherence to the recommended mitigation measures, no significant adverse impacts are anticipated.

Air and Climate

The main interaction with respect to Air Quality And Climate (Chapter 8) is with respect to traffic and transportation (used as an input for the air quality and climate assessment of the operational phase). Other key interactions relate to health impacts, dust nuisance and atmospheric emissions (which have the potential to impact on biodiversity). These impacts

are considered in the following chapters :
- Material Assets: Transportation
- Population and Human Health
- Biodiversity

Subject to the adherence to the recommended mitigation measures, no significant adverse impacts are anticipated.

Noise and Vibration

The effects associated with Noise and Vibration (Chapter 9) interact with the following Chapters:-
- Population and Human Health
- Biodiversity
- Material Assets: Transportation

Subject to the adherence to the recommended mitigation measures, no significant adverse impacts are anticipated.

Material Assets: Built Services

The impacts of Built Services (Chapter 10) interacts with the following Chapters:
- Population and Human Health
- Land and Soils
- Water

Subject to the adherence to the recommended mitigation measures, no significant adverse impacts are anticipated.

Material Assets: Transportation (Chapter 11)

The impacts of Transportation interact with the following Chapters:-
- Population and Human Health
- Air and Climate
- Noise and Vibration

Subject to the adherence to the recommended mitigation measures, no significant adverse impacts are anticipated.

Material Assets: Resource and Waste Management (Chapter 12)

The effects of the use of resources and waste management interact with the following Chapters:-
- Population and Human Health
- Land and Soils
- Water
- Material Assets: Transportation

Subject to the adherence to the recommended mitigation measures, no significant adverse impacts are anticipated.

Cultural Heritage (Chapter 13)

The impact on cultural heritage interacts with the impacts on the Landscape (Chapter 14)
Subject to the adherence to the recommended mitigation measures, no significant adverse impacts are anticipated.

Landscape (Chapter 14)

In terms of interactions, the impact on the landscape relates to many of the impact areas considered. In the current context, the most significant interactions are considered in the following Chapters:

- Population and Human Health
- Biodiversity
- Land and Soils
- Water
- Cultural Heritage

The impact on landscape is significant but consistent with the prevailing planning policy context and sustainable development objectives enunciated in international, national, regional and local policy.

15.4 OTHER EFFECTS

Schedule 6 Item 2(e) of the Planning and Development Regulations, 2001 As Amended requires that an EIAR contains a description of the likely significant effects (including direct, indirect, secondary, cumulative, transboundary, short, medium and long-term, permanent and temporary, positive and negative) of the project on the environment resulting from the following:-

- *the Use of Natural Resources*
  No likely significant effects on the environment are expected to arise from the use of natural resources in the construction / operation of the project

- *the emission of pollutants, the creation of nuisances and the disposal and recovery of waste.*
  No likely significant effects on the environment are expected to arise from the emission of pollutants, the creation of nuisances or the elimination of waste associated with this project.

- *the risks to human health, cultural heritage or the environment (for example due to accidents or disasters)*
  The likely significant effects of risks due to major accidents or disasters are described in Section 1.5 of this EIAR and in the Assessment Chapters, where relevant.

- *The technologies and the substances used.*
  This is an urban residential development and there are no technologies or substances associated with the project which would adversely affect the environment.

Table 15.1 Summary of Interactions

√ Area of Principal Interaction	Population and Human Health	Biodiversity	Land and Soils	Water	Air and Climate	Noise and Vibration	Material Assets: Built Services	Material Assets: Transportation	Material Assets: Resource and Waste Management	Cultural Heritage	Landscape	Major Accidents / Disasters	Use of Natural Resources	Emission of Pollutants	Technologies and Substances Used
Population and Human Health					√	√	√	√	√		√	√			
Biodiversity				√	√	√					√				
Land and Soils				√			√		√		√				
Water		√	√				√		√		√				
Air and Climate	√		√					√						√	
Noise and Vibration	√	√						√							
Material Assets: Built Services				√											
Material Assets: Transportation	√				√	√			√					√	
Material Assets: Resource and Waste Management			√										√		
Cultural Heritage											√				
Landscape	√	√								√					

15.5 ENVIRONMENTAL COMMITMENTS - MITIGATION AND MONTORING MEASURES

These measures should be implemented through planning conditions imposed by the planning authority.

Mitigation and monitoring measures will be managed by the contractor(s) during the Construction Phase and by the developer/ landowners thereafter.

An objective of EIA is to identify likely significant adverse impacts at the pre-consent stage and, where necessary, to propose measures to mitigate or ameliorate such impacts.

The 2018 EIA Guidelines published by the Department of Housing, Planning and Local Government state:

> *'While not a mandatory requirement an EIAR can very usefully include a summary table of features and/or measures envisaged to avoid, prevent or reduce and, if possible, offset likely significant adverse effects of the proposed development, and a timescale for the implementation of proposed mitigation measures.'*

Therefore, mitigation and monitoring measures to be adopted during the construction and operational phases of the project are detailed within each chapter and collated in Tables 15.1 and 15.2 below under each chapter heading.

EIA related conditions may be imposed by as part of conditions of planning permission and this Chapter brings these together the key mitigation measures arising from the EIA process for this project to facilitate the competent/consent authority in this respect.

It is intended that mitigation and monitoring measures proposed in each of the Chapters by the individual specialists will be incorporated into the Construction and Environmental Management Plan (CEMP) prior to works commencing on site.

15.5.1 Construction Phase - Mitigation

Population & Human Health	
PPH-C1	**Construction and Environmental Management Plan (CEMP)-** In order to mitigate potential temporary community disturbance during construction, a Construction Management Plan (OCMP) has been prepared and is included with the application. If the project is approved and implemented, the appointed contractor will incorporate the environmental commitments contained in this EIAR and prepare a Construction and Environment Management Plan (CEMP) for the agreement of the Planning Authority prior to development commencing on site.
PPH-C2	**Liaison Officer** - The contractor(s) will appoint a liaison officer to ensure that any issues from the local community are dealt with

	promptly and efficiently during construction. These details will be included in the Contractor(s) CEMP prepared prior to construction commencing.
PPH-C3	**Working Hours -** Typically, construction working hours will be limited to 7am – 6pm Monday to Friday and 8am to 2pm on Saturday. It is anticipated that there will be times, due to exceptional circumstances, that construction work will be necessary outside these standard hours i.e. large concrete pours. Deviations from these standard times will be agreed in advance with the Planning Authority.
PPH-C4	Prior to the erection of cranes on the site the developer shall notify the Irish Aviation Authority.
Biodiversity	
B-C1	**Disturbance of birds' nests -** Removal of trees and other nesting vegetation should be undertaken outside the bird nesting season. Where a bird has is found to be nesting during the construction phase, and disturbance of same is required, a licence must first be procured from the NPWS. Site clearance should proceed outside the nesting season, i.e. from September to February inclusive. If a nest is encountered then works must stop, until such time as nesting has ceased. Otherwise, a derogation licence must be sought from the NPWS to allow the destruction of the nest.
B-C2	**Loss of high value treeline habitat -** The landscaping scheme includes substantial addition of semi-mature trees which will be native where possible.
B-C3	**Japanese Knotweed -** These areas have been identified and marked on the ground indicating a 7m buffer zone from visible plant parts. In advance of works, this soil is to be excavated and disposed of off-site by a suitably qualified contractor. This is a proven and established technique which is suitable for the conditions on this development site.
Land And Soils	
LS-C1	The excavated material will be monitored and assessed to determine the most suitable disposal outlet. Material will be categorised according to the Landfill Directive and will be sent to appropriately licensed facilities for treatment/disposal. This will entail carrying out soil analysis to determine the appropriate waste facility for disposal. Where applicable, material on site will be segregated and divided into material re-use, material re-cycling and waste material streams in accordance with current guidelines and best practice.
LS-C2	Dust suppression measures will be implemented to minimise dust generation during extended dry periods. Dust monitoring will be conducted through the excavation period. The provision of vehicle wheel wash facilities at site exits and implementation of a road sweeping programme will reduce effect on surrounding road network.
LS-C3	Excavation work for the construction of the basement could act as a barrier to the groundwater flow and the potential for ground water levels to rise on the up-stream side of the site. And as such mitigation measures to ensure that the existing flow paths are

	maintained will be incorporated into the construction phase if required.
LS-C4	Inherent in any redevelopment is the potential for groundwater from the demolition and construction phase of the project to contribute to contamination of the local groundwater. By developing a detailed construction methodology and strict adherence to this policy by vigilant site management, these potential risks can be mitigated to acceptable levels.
LS-C5	During the demolition and excavating phase of the works monitoring will be ongoing for noise, vibration, settlement, gas and water levels as well as ground contamination as described in the section below on Monitoring
Water	
W-C1	Prior to construction the Contractor will be required to develop an Construction Environmental Management Plan which will incorporate mitigation measures such as containment procedures, audit and review schedules and an Emergency Response Plan in the event of spills, flooding or other incidents that may contribute to pollution to water during construction.
W-C2	All batching and mixing activities will be located in areas away from watercourses and drains.
W-C3	Protection measures will be put in place to ensure that all materials used during the construction phase are appropriately handled, stored and disposed of in accordance with recognized standards and manufacturer's guidance.
W-C4	Surface water drainage around the batching plant will be controlled and washout from mixing plant will be carried out in a designated, contained impermeable area.
W-C5	Spills of concrete, cement, grout or similar materials will not be hosed into drains.
W-C6	Rainwater that accumulates on site will be discharged to the DCC sewer system.
W-C7	The Contractor will comply with the following guidance documents: i)CIRIA – Guideline Document C532 Control of Water Pollution from Construction Sites (CIRIA, 2001) ii)CIRIA – Guideline Document C624 Development and Flood Risk - guidance for the construction industry (CIRIA, 2004).
W-C8	Dewatering and surface water discharges on the site, during construction and prior to completion will be controlled. All necessary facilities will be incorporated such as settlement ponds/tanks, oil/grit interceptors with shut down valves, bunded oil storage tanks adjacent to a petrol interceptor for storage of any recovered oil. A monitoring programme including sampling for water quality before discharge to the Council sewer during construction will be carried out to ensure that only clean surface water is discharged to the receiving systems.
Air And Climate	
AC-C1	**Construction Management** • During dry periods, dust emissions from heavily trafficked locations will be controlled by spraying surfaces with water • Hard surface roads will be mechanically swept to remove mud

	and dust as required. • Re-suspension in the air of spillages material from trucks entering or leaving the site will be prevented by limiting the speed of vehicles within the site to 20kmh and by use of a mechanical road sweeper. • The overloading of tipper trucks exiting the site will not be permitted. • Where the likelihood of windblown fugitive dust emissions is high and during dry weather conditions, dusty site surfaces will be sprayed by a mobile tanker bowser. • Wetting agents will be utilised to provide a more effective surface wetting procedure. • Exhaust emissions from vehicles operating within the construction site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor by ensuring that emissions from vehicles are minimised by routine servicing of vehicles and plant • Soil stockpiles will be wetted down in dry and windy conditions. • Material stockpiles containing fine or dusty elements including top soils will be covered with tarpaulins. • Where drilling or pavement cutting, grinding or similar types of stone finishing operations are taking place, measures to control dust emissions will be used to prevent unnecessary dust emissions by the erection of wind breaks or barriers. All concrete cutting equipment will be fitted with a water dampening system. •
Noise And Vibration	
NV-C1	The following noise and vibration mitigation measures shall be implemented at the site from the outset of site activities to control and manage noise and vibration levels in accordance with Best Practice during the construction phase of the proposed development: • no plant used on-site will be permitted to cause an ongoing public nuisance due to noise; • the best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on-site operations; • all vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract; • compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers; • machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use; • during construction, the appointed Contractor will manage the works to comply with noise limits outlined in *BS 5228-1:2009+A1 2014. Part 1 – Noise;*

	• all items of plant will be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures; • limiting the hours during which Site activities which are likely to create high levels of noise or vibration are permitted; and • monitoring levels of noise and vibration during critical periods and at sensitive locations. Furthermore, it is envisaged that a variety of practicable noise control measures will be employed. These may include: • selection of plant with low inherent potential for generation of noise and/or vibration; • erection of good quality site hoarding to the site perimeters which will act as a noise barrier to general construction activity at ground level; • erection of barriers as necessary around items such as generators or high duty compressors; and • situate any noisy plant as far away from sensitive properties as permitted by site constraints.
NV-C2	**Vibration Mitigation Measures** The following specific vibration mitigation and control measures shall be considered during the construction phase: • Breaking out concrete elements using low vibration tools • Choosing alternative, lower-impact equipment or methods wherever possible • Scheduling the use of vibration-causing equipment, such as jackhammers, at the least sensitive time of day • Routing, operating or locating high vibration sources as far away from sensitive areas as possible • Sequencing operations so that vibration causing activities do not occur simultaneously • Isolating the equipment causing the vibration on resilient mounts • Keeping equipment well maintained. • Confining vibration-generating operations to the least vibration-sensitive part of the day which could be when the background disturbance is highest
Material Assets: Built Services	
MA:BS-C1	**Foul Drainage** Effluent generated on site from the contractors sanitary facilities will be discharged to a holding tank and removed off site by a licenced removal contractor in accordance with Dublin City Council requirements. Temporary discharge utilising the existing, or permitted sewerage network will be in agreement with Dublin City Council and Irish Water. All necessary health and safety measures will be undertaken to ensure the safety and welfare of construction personnel, the public and road users during construction of the foul infrastructure.
MA:BS-C2	**Water Supply** The contractor will make all necessary arrangements for a

	temporary water supply in agreement with Irish Water and Dublin City Council. A water meter will be installed to monitor water consumption on the site and to enable early detection of any potential leaks.
Material Assets: Transportation	
MA:T-C1	The lead contractor appointed for the construction of the development will be required to prepare a Construction and Environmental Management Plan (CEMP) that will include a plan for the scheduling and management of construction traffic. This CEMP will outline measures to be taken to mitigate the impact of construction traffic on the surrounding road network. Such measures are expected to include: • Prohibition of haulage vehicles parking at the entrance to the site or stopping along their access routes. • Limiting the number of haulage vehicles travelling in convoy to a maximum of two vehicles at any time. • Maintaining a minimum separation of 250m at all times between haulage vehicles travelling to and from site. • Conducting all loading of excess material within the site boundary. In addition, it is expected that construction-related vehicle movements will be minimised through: • Consolidation of delivery loads to/from the site. • Scheduling large deliveries to occur outside of peak periods. • Use of precast/prefabricated materials where possible. • Reuse on site wherever possible of 'cut' material generated by the construction works. • Provision of adequate storage space on site for material and plant. • Promoting the use of public transport by construction personnel.
Material Assets: Res & Waste Mgt	
MA:RWM-C1	Waste materials generated by construction activities will be managed according to the Department of the Environment, Heritage and Local Government's 2006 Publication - Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects • Analysis of waste arisings / material surpluses • Specific Waste Management objectives for the Project including the potential to re-use existing on-site materials for further use in the construction phase. • Methods proposed for Prevention, Reuse and Recycling • Waste Handling Procedures • Waste Storage Procedures • Waste Disposal Procedures • Record Keeping
MA:RWM-C2	Waste minimisation and prevention shall be the primary responsibilities of the Construction Project Manager who shall ensure the following:

	• Materials will be ordered on an "as needed" basis to prevent over supply • Materials shall be correctly stored and handled to minimise the generation of damaged materials • Materials shall be ordered in appropriate sequence to minimise materials stored on site • Sub contractors will be responsible for similarly managing their wastes
MA:RWM-C3	The Construction Project Manager shall maintain a register of all construction wastes generated and shall compile a monthly report detailing the types and quantities of construction wastes generated at the site and the destinations that the wastes were exported to.
Cultural Heritage	
CH-C1	An archaeological assessment, including test trenching, be carried out on that strip of land formerly owned by St Bricin's prior to commencement of development (proposed blocks 6 and 10). Full excavation may subsequently be necessary, depending on the recommendations of the planning authority and the Department of the Environment, Heritage and Local Government.
CH-C2	An archaeological assessment, including test trenching, be carried out on the former football pitch (proposed block 7) prior to commencement of development. Full excavation may subsequently be necessary, depending on the recommendations of the planning authority and the Department of the Environment, Heritage and Local Government.
Landscape	
L-C1	Construction during normal construction hours only to avoid negative visual effects of construction activity outside of these hours.
L-C2	Regular check of boundary hoarding to ensure effectiveness in screening ground level construction activity.

15.5.2 Operational Phase - Mitigation

Population And Human Health	
Not applicable	
Biodiversity	
Not applicable	
Land And Soils	
Not applicable	
Water	
W-O1	**Outline Construction Management Plan -** In order to mitigate potential temporary community disturbance during construction, a Construction Management Plan (OCMP) has been prepared and is included with the application. If the project is approved and implemented, the appointed contractor will prepare an updated CEMP for the agreement of the Planning Authority prior to development commencing on site.

W-O2	Incidental surface run-off from underground basement car parks, compactor units and waste / service yard areas will be discharged into the foul drainage system. Grit / petrol / oil separators will be provided in all of the above areas to improve the quality of water discharging.
W-O3	The provision of flow control with storm-water attenuation will ensure the rate of discharge of surface water is limited to greenfield run-off rates of 5 litres/second/hectare with a total allowable surface water discharge of 29.0 litres/second in line with the recommendations of the Greater Dublin Regional Code of Practice for Drainage Works and the Greater Dublin Strategic Drainage Study.
W-O4	SuDS proposals will improve the quality and reduce the quantity of surface water discharging into the receiving system.
W-O5	Removal of the surface water from the existing combined sewers will reduce the hydraulic loading on the existing sewerage network and Waste Water Treatment Plant (WWTP) at Ringsend.
Air And Climate	
AC-O1	**Climate Impact Mitigation Measures by Design** • Energy Efficiency – All residential units shall be designed and constructed in accordance with The Irish Building Regulations Technical Guidance Document L – Conservation of Fuel and Energy – Dwellings amended in 2017 includes requirements for all residential dwellings to be "Nearly Zero Energy Buildings" (NZEB's) by 31st December 2020. • Energy Consumption - The following mitigation by design features have been integrated into the design and construction of the residential units to reduce energy consumption: − Photovoltaic Cells will be installed on all roofs − The use of green building materials: low embodied energy and recycled materials will be utilised where possible − Energy efficient window units and frames with certified thermal performance shall be used − Building envelope air tightness will reduce the loss of warm air to the external environment − Installation of Exhaust Air Heat Pump systems in all units which operate by extracting warm air from kitchens and bathrooms, cleaning it and distributing it to other rooms in the unit. − Thermal insulation of walls and roof voids of all units
AC-O2	**Air Quality Mitigation Measures** • Natural Gas heating in all units • Inclusion of electric car charging points to encourage electric vehicle ownership • Proximity of Public Transport including LUAS, Dublin Bus and Iarnrod Eireann services will reduce private vehicle use • Provision of open landscaped areas, to encourage residents to avail of active lifestyle options and which will contribute albeit in a minor way to the adsorption of Carbon Dioxide from the atmosphere and the release of Oxygen into the atmosphere.

Noise And Vibration	
NV-O1	**Acoustic Design requirements for residential buildings** External noise can enter rooms within dwellings through windows, ventilators, walls, roof and doors. In most cases, however, windows provide the main path and therefore, mitigation by design has focussed on this building element to ensure that their insulation is adequate. Windows In order to ensure a sufficient level of sound insulation is provided for all dwellings within the development, the following lists the minimum sound insulation performance of windows and window frame sets in terms of the in-situ weighted sound reduction index (Rw): 40dB Rw for Living rooms and Bedrooms 37dB Rw for Kitchen – Dining Rooms. The acoustic performance specifications detailed are the minimum requirements which shall apply to the overall glazing system when installed on site. In the context of the acoustic performance specification the 'glazing system' is understood to include any and all of the component parts that form part of the glazing element of the façade, i.e. glass, frames, seals, openable elements etc. All exterior wall and door frames should be sealed tight to the exterior wall construction.
NV-O2	**Internal Noise Control – Apartments and Semi-detached houses** At the earliest stage during the construction phase, test apartment units and semi-detached houses shall be constructed to their finished level and shall be tested by a suitably qualified independent Acoustic Engineer to ensure that they comply with Department of the Environment, Building Regulations 2014, Technical Guidance Document E – Sound. Table 9.15 provides detail on the recommended sound insulation values that shall be achieved to ensure acoustic privacy between adjoin apartment units.
NV-O3	**Ventilation Systems** The ventilation strategy for the development will be in accordance with Part F of the Building Regulations. The apartment units shall include mechanical heat recovery ventilation systems which will negate the requirement for passive wall vents in bedrooms and living spaces which would otherwise allow the transfer of external noise into the building through the air gaps in the passive vents. However, windows may remain openable for rapid or purge ventilation, or at the occupant's choice.
NV-O4	**Wall Construction -** The wall construction typically provides the highest level of sound insulation performance to a residential building. The residential dwellings will be built using either masonry or a timber framed construction. The minimum sound insulation performance of the chosen wall construction will be 55dB Rw.

NV O5	**Roof Construction -** The insulated roof constructions proposed across the site will provide an adequate level of sound insulation to the properties within the development site. A minimum sound insulation value of 40dB Rw should be used for roof spaces.
Material Assets: Built Services	
MA:BS-O1	Foul Drainage - The proposed foul network when completed will be vested to Irish Water whom will have responsibility for the on-going maintenance and operation of the service. Private drainage areas, such as the various apartment blocks, will be maintained by the units maintenance company. Any issues going forward will there for be addressed and mitigation against.
MA:BS-O2	Water Supply – The proposed potable water network when completed will be vested to Irish Water who will have responsibility for the on-going maintenance and operation of the service. Private drainage areas, such as the various apartment blocks, will be maintained by the unit's maintenance company. Any issues going forward will there for be addressed and mitigation against.
Material Assets: Transportation	
MA:T-O1	Residential Travel Plan Framework As described in the accompanying Residential Travel Plan Framework (RTPF) document, a Residential Travel Plan (RTP) Coordinator shall be appointed for the proposed development, with the remit to implement and oversee Residential Travel Plan Framework (RTPF). This will assist residents and their visitors in making the most of sustainable transport opportunities and in avoiding single-occupant car journeys where possible. Briefly, the following measures are proposed under the Residential Travel Plan Framework: Creation of an Access Map. Provision of travel information to development occupants, in the form of Sustainable Travel Welcome Packs and a travel hub website. Identification of safe walking and cycling routes. Provision of secure and attractive cycle parking and ancillary facilities for cyclists and pedestrians. Provision of information on locations of public transport stops, routes, timetables, walking times to main public transport facilities, etc. Provision of specific advice to development occupants on multi-modal trip planning.
Material Assets: Res & Waste Mgt	
MA:RWM-O1	The proposed development shall be designed and managed to provide residents with the required waste management infrastructure to minimise the generation of un-segregated domestic waste and maximise the potential for segregating and recycling domestic waste fractions.
MA:RWM-O2	The Objective of the OWMP is to maximise the quantity of waste recycled by residents by providing sufficient waste recycling

	infrastructure, waste reduction initiatives and waste collection and waste management information services to the residents of the development.
MA:RWM-O3	The Goal of the OWMP is to achieve a residential recycling rate of 50% of managed municipal waste by 2020 (and future targets in subsequent Eastern-Midlands Regional Waste Management Plans).
MA:RWM-O4	All apartments, duplex units and houses will have a 3-bin system (non-recyclable, organic and recyclable) in each kitchen to encourage residents to segregate waste at source.
MA:RWM-O5	Apartment residents will be provided with waste recycling and waste disposal information by the development's Facility Management Company who will be responsible for providing clean, safe and mobility impaired accessible communal waste storage areas for the apartment blocks.
MA:RWM-O6	The Facility Management Company shall maintain a register of all waste volumes and types collected from the development each year including a break-down of recyclable waste and where necessary, shall introduce initiatives to further encourage residents to maximise waste segregation at source and recycling. They shall also provide an annual bulky waste and WEEE collection service for all residents. The development shall be designed to provide adequate domestic waste storage areas for each apartment blocks. This will promote the appropriate segregation at source of domestic generated waste from all residential units at the development. Communal waste bin storage areas shall be designed in a manner to ensure that appropriate signage for the correct disposal and recycling of waste is available for residents.
MA:RWM-07	The Facility Management Company shall prepare an annual report for DCC and residents of the development on the quantities of waste generated within the development to demonstrate how waste reduction and recycling targets are being achieved with regard to the targets defined in The *Eastern-Midlands Region Waste Management Plan 2015-2021* (and subsequent revisions).
Cultural Heritage	
Not applicable	
Landscape	
Not applicable	

15.5.3 Monitoring

Population And Human Health	
Not applicable	
Biodiversity	
B-C4	Japanese Knotweed **-** Monitoring is required to ensure that Japanese Knotweed is eradicated and is not spread during the construction phase and this should be addressed as part of the Contractor's Construction and Environmental Management Plan (CEMP).
Land And Soils	
LS-M1	It is recommended that the following are monitored in relation to the soil and geological environments during the demolition and construction stage: • Testing and monitoring of soil and made ground that will be excavated for any potentially contaminated material to ensure adequate classification and disposal. • Monitoring of the retaining wall using for example, inclinometers and monitoring of water movements either seepages or through control points. • Monitoring of neighbouring structures immediate to the development site for the effects of any vibration, movement and settlement arising from the excavation works based on condition surveys carried out by the Contractor prior to the works. • Monitoring of interrelated impacts such as noise and vibration levels, groundwater levels, dust emissions etc. are dealt with in their other chapters in this EIAR. • Testing and monitoring of water and gas during excavation works. • Monitoring of water movements either seepages or through control points.
Water	
Not applicable	
Air And Climate	

AC-C2	**Dust Deposition Monitoring Methodology** Dust deposition levels will be monitored to assess the impact that site construction site activities may have on the local ambient air quality and to demonstrate that the environmental control measures in place at the site are effective in minimising the impact of construction site activities on the local receiving environment including existing residential developments and lands bordering the site. The following procedure shall be implemented at the site on commencement of site activities: • The dust deposition rate will be measured by positioning Bergerhoff Dust Deposit Gauges at strategic locations near the boundaries of the site for a period of 30 +-2 days. Monitoring shall be conducted on a monthly basis during the construction phase. The proposed monitoring locations (D1 – D5) are presented below in Figure 7.3. • The selection of sampling point locations will be completed after consideration of the requirements of Method VDI 2119 with respect to the location of the samplers relative to obstructions, height above ground and sample collection and analysis procedures. The optimum locations will be determined by a suitably qualified air quality expert to ensure that the dust gauge locations are positioned in order to best determine potential dust deposition in the vicinity of the site boundaries and existing on-site buildings. • After each (30 +-2 days) exposure period, the gauges will be removed from the sampling location, sealed and the dust deposits in each gauge will be determined gravimetrically by an accredited laboratory and expressed as a dust deposition rate in mg/m2-day in accordance with the relevant standards. • Technical monitoring reports detailing all measurement results, methodologies and assessment of results shall be subsequently prepared and maintained by the Site Manager. Monitoring reports shall be made available to the Local Authority as requested. • A dust deposition limit value of 350 mg/m2-day (measured as per German Standard Method VDI 2119 – Measurement of Particulate Precipitations – Determination of Dust Precipitation with Collecting Pots Made of Glass (Bergerhoff Method) or Plastic. is commonly specified by Local Authorities and by the EPA to ensure that no nuisance effects will result from specified activities and it is to this Best Practice standard method that this programme of dust monitoring and control has been prepared. • The German Federal Government Technical Instructions on Air Quality Control - TA Luft specifies an emission value for the protection against significant nuisances or significant disadvantages due to dustfall. This limit value is 350 mg/m2-day and it is to this limit value that all measured dust deposition levels shall be assessed. This limit value is commonly specified by Local Authorities at construction sites

AC-C3	**NO_2 Monitoring Methodology** In order to assess the impact on existing air quality that vehicle and plant exhaust emissions associated with the construction phase of the development may have, it is proposed that a programme of Nitrogen Dioxide monitoring shall be undertaken for a 2 year period at the baseline air quality locations, A1 and A2. The purpose of this monitoring programme will be to verify the effectiveness of the various construction phase mitigation measures and to quantify by measurement, the concentration of NO2 in the ambient air to allow for the assessment of measured NO2 levels against levels measured in EPA Zone A areas over a similar period. NO2 levels shall also be assessed against the annual limit value NO2 as defined in National Air Quality Standards Regulations 2011 (S.I No. 180 of 2011) which specify an annual limit value of 40 µg/m3, for the protection of human health, over a calendar year.
AC-C4	**PM_{10} and $PM_{2.5}$ Monitoring Methodology** Fine particulate matter as PM_{10} and $PM_{2.5}$ shall be monitored using continuous data logging air quality monitoring instruments during the stripping and excavation of soils at the site. The monitoring systems shall be located along the western and eastern site boundaries adjacent to sensitive receptors.
Noise And Vibration	
NV-C3	**Proposed Noise Monitoring Programme During Site Construction** Prior to the commencement of the site construction activities, a programme of continuous noise monitoring at site boundary locations shall be undertaken to assess and manage the impact that site activities may have on ambient noise levels at local receptors. these surveys will establish the noise impacts of site activities at the closest receptors to the site, to assess compliance with the specified construction noise limit criteria and to ensure that mitigation and control measures are being implemented as required. All noise monitoring data will be compiled into a monthly technical monitoring report which will include a full assessment of the potential noise impacts arising from site construction activities. The environmental noise measurements will be completed in accordance with the requirements of *ISO 1996-1: 2017: Acoustics – Description, measurement and assessment of environmental noise* and with regard to the *EPA's 2016 Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4).* The measurement parameters to be recorded include wind speed, temperature, L_{Aeq}, L_{A90}, L_{A10} and L_{Amax} , 1/3 Octave Frequency analysis and impact noise analysis. **Noise Monitoring Locations -** The monitoring locations selected for the noise monitoring survey will be at site boundary locations adjacent to noise sensitive receptors N1 – N5 as per Figure 9.1 above.
NV-C4	**Proposed Vibration Monitoring Programme During Site Construction**

	In order to ensure that site construction activities are conducted to minimise the vibration impacts on the receiving environment, it is proposed that structural vibration monitoring may be implemented during the course of the construction phase as required. It is proposed that vibration monitoring will be conducted at adjacent properties opposite the site boundaries as required using calibrated vibration monitors and geophones with live text and email alert functionality to ensure that if vibration levels approach or exceed specified warning and limit values, site personnel will be alerted to cease at the earliest instance and appropriate mitigation measures may then be implemented to minimise the vibrational impacts of protected structures. **Vibration Monitoring Locations** The monitoring points chosen for locating the geophone of the vibration measuring instrument will be chosen according to the guidelines in *British Standard BS 7385:, Evaluation and measurement for vibration in buildings, Part1 1990 Guide for measurement of vibrations and evaluation of their effects on buildings and Part 2 1993 Guide to damage levels arising from groundborne vibration.*
Material Assets: Built Services	
Not applicable	
Material Assets: Transportation	
MA:T-C2	A Visual Condition Survey (VCS) will be carried out of all surrounding streets prior to any site works commencing. During the development's construction phase, the lead contractor will liaise with the Roads and Transportation Department of Dublin City Council to agree any changes to load restrictions and construction access routes for the site. Measures will be put in place as required to facilitate construction traffic whilst simultaneously protecting the built environment.
Material Assets: Res & Waste Mgt	
MA:RWM-C3	The Construction Project Manager shall maintain a register of all construction wastes generated and shall compile a monthly report detailing the types and quantities of construction wastes generated at the site and the destinations that the wastes were exported to.
MA:RWM-O7	The Facility Management Company shall prepare an annual report for DCC and residents of the development on the quantities of waste generated within the development to demonstrate how waste reduction and recycling targets are being achieved with regard to the targets defined in The *Eastern-Midlands Region Waste Management Plan 2015-2021* (and subsequent revisions).
Cultural Heritage	
N/A	
Landscape	
L-C2	Regular check of boundary hoarding to ensure effectiveness in screening ground level construction activity.

15.7 CONCLUSION

The EIAR has considered the likely, significant, adverse effects of the proposed project on the receiving environment.

Mitigation measures (see Chapter 16) are included, to avoid and / or reduce impacts on the environment where considered necessary. This includes mitigation measures incorporated into the design of the proposed development.

The EIAR concludes that there are no material or significant environmental issues arising from the project which would prohibit the competent authority from issuing consent for the development.

APPENDICES

APPENDIX 5A : Bat Fauna Impact Assessment

ALTEMAR
Marine & Environmental Consultancy

Bat Fauna Impact Assessment

Re: Strategic Housing Development at former O'Devaney Gardens Site, Dublin 7.

Applicant: Bartra ODG Limited

13th November 2020

Prepared by: Bryan Deegan (MCIEEM) of Altemar Ltd.
On behalf of: BARTRA ODG LIMITED

Altemar Ltd., 50 Templecarrig Upper, Delgany, Co. Wicklow. 00-353-1-2010713. info@altemar.ie
Directors: Bryan Deegan and Sara Corcoran
Company No.427560 VAT No. 9649832U
www.altemar.ie

Document Control Sheet			
Client	BARTRA ODG LIMITED		
Project	Bat fauna impact assessment for a Strategic Housing Development at O'Devaney Gardens Site, Dublin 7.		
Report	Bat Fauna Impact Assessment		
Date	13th November 2020		
Project No:		Document Reference: ODBA-2001	
Version	Author	Reviewed	Date
Draft 01	Bryan Deegan	Sara Corcoran	8th November 2020
Draft 02	Bryan Deegan		13th November 2020
Draft 03			

SUMMARY

Structure:	A small building (approx. $9m^2$) is located on site proximate to the entrance of St Bricins Hospital and the treeline on site.
Bat species present:	None Roosting or foraging
Proposed work:	Redevelopment of site
Impact on bats:	None
Survey by:	Bryan Deegan MCIEEM
Survey date:	24th September 2020 and 12th October 2020

CONTENTS

INTRODUCTION

Bartra ODG Limited is proposing the following works: ‘A Strategic Housing Development application is being prepared for the former O’Devaney Gardens Site, Dublin 7. The site includes lands previously part of St Bricin’s Military Hospital.

The application site is bounded to the north by housing on Ross Street, Ashford Place, Ashford Cottages and Ashford Street; to the east by Thor Place and St. Bricin’s Military Hospital; to the south by Montpellier Gardens and Montpelier Park residential developments; to the west by Montpellier Gardens and dwellings on Findlater Street, Kinahan Street, Aberdeen Street, Black Street and Sullivan Street, and a housing development (56 units) under construction by Dublin City Council; and to the north west by North Circular Road and the rear of properties fronting North Circular Road.

The proposed development will consist of c.1,000 residential units including a mix of one, two and three bed apartments, three bed duplex and three bed dwellings and all associated ancillary accommodation. Non-residential uses at ground floor level will include retail units, a café, creche and a community facility. As part of the public realm and landscaping proposals, a large central neighbourhood park with MUGA and a secondary park with a community garden to the north will be provided. Vehicular access will be provided via the existing entrances to the site from North Circular Road, Montpellier Gardens and Thor Place, with an upgrade to the existing internal roads comprising a central boulevard between North Circular Road and Montpellier Gardens and a new street to Thor Place.

The development will also include all associated site and development works. The development will also include all associated site and development works.

Site Location

The proposed development site is located at the former O’ Devaney Gardens Site, Dublin 7. The site includes lands previously part of St Bricin’s Military Hospital.

Bat Survey

This report presents the results of site visits by Bryan Deegan (MCIEEM) on the 24th September 2020 and 12th October 2020.

Survey Methodology

At dusk, a bat detector survey was carried out onsite using a *Batbox Duet* heterodyne/frequency division detector to determine bat activity. Bats were identified by their ultrasonic calls coupled with behavioural and flight observations. Surveys were carried out having regard to the following guidelines:

- Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016);
- Bat Mitigation Guidelines for Ireland (NPWS, 2006); and,
- Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (NRA, 2006).

Figure 1: Site outline with buildings on site that are proposed to be demolished (No foraging was noted).

Survey Constraints

The detector survey was undertaken during the active bat season in September and October 2020. Weather conditions were good with mild temperatures of greater than 10°C after sunset.

Description Of The Buildings From The Perspective Of Bat Habitat

All structures are in relatively good condition with intact roofing and little or no water ingress into the structures (Plates 1 and 2). Potential bat roosting opportunities exist beneath slates, within decayed eaves, behind shuttering and lead flashing and within darkened roof spaces. Onsite vegetation (Plate 1) may also be of interest as roosting sites for bats.

BAT ASSESSMENT FINDINGS

Review Of Local Bat Records

The review of existing bat records (sourced from *Bat Conservation Ireland's* National Bat Records Database) within a 1km radius of the study area reveals that four of the nine known Irish species have been observed locally. These include common (*Pipistrellus pipistrellus sensu lato)* and soprano pipistrelle (*P. pygmaeus)*, Daubenton's Bat (Myotis daubentoniid) and Lesser Noctule (Leisler's) (*Nyctalus leisleri)* bats as shown in Table 1 below.

A data search of the National Biodiversity Data Centre online data revealed four bat species within the 2km grid (O13Q). These were Daubenton's Bat (*Myotis daubentonii*), Lesser Noctule (*Nyctalus leisleri*), Pipistrelle (*Pipistrellus pipistrellus sensu lato*) and Soprano Pipistrelle (*Pipistrellus pygmaeus*).

Table 1: Status of bat species within a 2km radius of the study location

Species name	Date of last record	Title of dataset
Daubenton's Bat (*Myotis daubentonii*)	19/05/2012	Ireland's BioBlitz
Lesser Noctule (*Nyctalus leisleri*)	19/05/2012	Ireland's BioBlitz
Nathusius's Pipistrelle (*Pipistrellus nathusii)*	13/08/2007	National Bat Database of Ireland
Pipistrelle (*Pipistrellus pipistrellus sensu lato)*	19/05/2012	Ireland's BioBlitz
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	19/05/2012	Ireland's BioBlitz
Whiskered Bat (*Myotis mystacinus*)	13/08/2007	National Bat Database of Ireland

Location of nearest records

Species name	Date of record	Location
Daubenton's Bat (*Myotis daubentonii*)	30/09/2008	1km NW
Lesser Noctule (*Nyctalus leisleri*)	01/07/1997	Roost in $1km^2$ grid to north.
Nathusius's Pipistrelle (*Pipistrellus nathusii)*	13/08/2007	Phoenix Park 1km NW
Pipistrelle (*Pipistrellus pipistrellus sensu lato)*	19/05/2012	Phoenix Park 1km NW
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	19/05/2012 and 13/08/2007	Phoenix Park 1km NW
Whiskered Bat (*Myotis mystacinus*)	25/07/1997	Present in $1km^2$ grid to north.

Ecological Assessment of the Site

An Environmental Impact Assessment Report (EIAR) has been prepared for the proposed application. The biodiversity chapter was prepared by Pádraic Fogarty of OPENFIELD Ecological Services. As outlined in the Biodiversity Chapter of the EIAR "*The development lands include areas of buildings and artificial surfaces – BL3, recolonising bare ground – ED3 and dry meadow – GS2. Species here are ruderal or associated with managed grassland including Thistles Cirsium sp., Docks Rumex sp., Clovers Trifolium sp., Willowherbs Epilobium sp., and grasses such as Common Couch Elytrigia repens, Creeping Bent Agrostis stolonifera and Cock's-foot Dactylis glomerata. Some Brambles Rubus fruticosus agg. and the non-native Butterfly-bush Buddleja davidii are emergent in some locations.*

A tall treeline – WL2 runs from north to south to the south-east of the development site. This is made up of Alder Alnus glutinosa, Ivy Hedera helix, Elder Sambucus nigra and non-native, horticultural species such as Pyracantha sp. To the east of this treeline there is an expanse of dry meadow while a small patch of scrub – WS2 can be found to the north of this. This is predominantly Brambles. Using methodology from the Heritage Council this treeline can be assessed as 'lower significance' due to the relatively poor species diversity and lack of connectivity to other ecological features. Nevertheless, mature native trees are uncommon in this urbanised setting and for this reason they can be considered to be high local value to biodiversity.

There are no surface water courses on the development site. There are no bodies of open water or habitats which could be classified as wetlands. Japanese Knotweed Fallopia japonica has previously been recorded on the lands and has been subject to a control programme by Dublin City Council. Japanese Knotweed is listed as an alien invasive species under S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011." The habitats are outlines in Figure 2.

Structure survey

Bats would potentially have good access to the building on site. However, no access points or evidence of bat activity were noted. No evidence indicated that activity by bats had or was occurring in the vicinity of the building.

Detector Survey

No bats were detected on site or emerging from the onsite structure.

POTENTIAL IMPACTS OF PROPOSED REDEVELOPMENT ON BATS

Unused buildings often harbour bats and, if present, the animals are vulnerable to roost loss, injury and death if such buildings are renovated or demolished. No roosts or bats emerging from the onsite building was observed. The trees on and adjacent to the site have no features that would act as potential roosting areas. The proposed development would have no significant effects on the local bat population.

MITIGATION MEASURES

As no evidence of a bat roost or bat foraging on site were noted on site, no mitigation measures in regard to 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.

PREDICTED AND RESIDUAL IMPACT OF THE PROPOSAL

There is no evidence of a current or past bat roost therefore no negative impacts on these animals are expected to result from the proposed redevelopment. The proposed development is within a built-up area with existing lighting. The likelihood bat collision is not significant as the materials proposed for the apartment blocks are generally solid and would have good acoustic properties to reflect echolocation signals. As a result the buildings would be clearly visible to bat species. No roosts are present. The impact of the proposed development on bats will be negligible in the short and long term.

LEGAL STATUS AND CONSERVATION ISSUES – BATS

All Irish bat species are protected under the Wildlife Act (1976) and Wildlife Amendment Acts (2000 and 2010). Also, the EC Directive on The Conservation of Natural habitats and of Wild Fauna and Flora (Habitats Directive 1992), seeks to protect rare species, including bats, and their habitats and requires that appropriate monitoring of populations be undertaken. All Irish bats are listed in Annex IV of the Habitats Directive and the lesser horseshoe bat *Rhinolophus hipposideros* is further listed under Annex II. Across Europe, they are further protected under the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982), which, in relation to bats, exists to conserve all species and their habitats. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) was instigated to protect migrant species across all European boundaries. The Irish government has ratified both these conventions.

All Irish bats are listed in Annex IV of the Habitats Directive and the lesser horseshoe bat is further listed under Annex II.

The current status and legal protection of the known bat species occurring in Ireland is given in the following table.

Common and scientific name	**Wildlife Act 1976 and Wildlife (Amendment) Acts 2000/2010**	**Irish Red List status**	**Habitats Directive**	**Bern and Bonn Conventions**
Common pipistrelle *Pipistrellus pipistrellus*	Yes	Least Concern	Annex IV	Appendix II
Soprano pipistrelle *P. pygmaeus*	Yes	Least Concern	Annex IV	Appendix II
Nathusius pipistrelle *P. nathusii*	Yes	Not referenced	Annex IV	Appendix II
Leisler's bat *Nyctalus leisleri*	Yes	Near Threatened	Annex IV	Appendix II
Brown long-eared bat *Plecotus auritus*	Yes	Least Concern	Annex IV	Appendix II
Lesser horseshoe bat *Rhinolophus hipposideros*	Yes	Least Concern	Annex II Annex IV	Appendix II
Daubenton's bat *Myotis daubentonii*	Yes	Least Concern	Annex IV	Appendix II
Natterer's bat *M. nattereri*	Yes	Least Concern	Annex IV	Appendix II
Whiskered bat *M. mystacinus*	Yes	Least Concern	Annex IV	Appendix II
Brandt's bat *M. brandtii*	Yes	Data Deficient	Annex IV	Appendix II

Also, under existing legislation, the destruction, alteration or evacuation of a known bat roost is a notifiable action and a derogation licence has to be obtained from the *National Parks and Wildlife Service* before works can commence.

It should also be noted that any works interfering with bats and especially their roosts, including for instance, the installation of lighting in the vicinity of the latter, may only be carried out under a licence to derogate from Regulation 23 of the Habitats Regulations 1997, (which transposed the EU Habitats Directive into Irish law) issued by NPWS. The details with regards to appropriate assessments, the strict parameters within which derogation licences may be issued and the procedures by which and the order in relation to the planning and development regulations such licences should be obtained, are set out in Circular Letter NPWS 2/07 "*Guidance on Compliance with Regulation 23 of the Habitats Regulations 1997 - strict protection of certain species/applications for derogation licences*" issued on behalf of the Minister of the Environment, Heritage and Local Government on the 16th of May 2007.

Furthermore, on 21st September 2011, the Irish Government published the European Communities (Birds and Natural Habitats) Regulations 2011 which include the protection of the Irish bat fauna and further outline derogation licensing requirements re: European Protected Species.

REFERENCES

- Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) 1982
- Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) 1979
- EC Directive on The Conservation of Natural habitats and of Wild Fauna and Flora (Habitats Directive) 1992
- European Communities (Birds and Natural Habitats) Regulations 2011 Government of Ireland, Dublin
- Kelleher, C. and Marnell, F. 2007 *Bat Mitigation Guidelines for Ireland – Irish Wildlife Manuals No. 25*. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin
- Marnell, F., Kingston, N. and Looney, D. 2009 *Ireland Red List No. 3: Terrestrial Mammals.* National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin
- Wildlife Act 1976 and Wildlife Amendment Acts 2000 and 2010. Government of Ireland
- Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016) https://cdn.bats.org.uk/pdf/Resources/Bat_Survey_Guidelines_2016_NON_PRINTABLE.pdf?mtime=20181115113931&focal=none
- Bat Mitigation Guidelines for Ireland (NPWS, 2006) https://www.npws.ie/sites/default/files/publications/pdf/IWM25.pdf
- Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (NRA, 2006).
- https://www.tii.ie/technical-services/environment/planning/Best_Practice_Guidelines_for_the_Conservation_of_Bats_in_the_Planning_of_National_Road_Schemes.pdf

APPENDIX 6A: Ground Investigation Report (IGSL)

IGSL Limited

Cronin and Sutton
Consulting Engineers

O'Devaney Gardens
Dublin

Ground Investigation Report

Report No. 22682

October 2020

Report

M7 Business Park
Naas
Co. Kildare
Ireland

T: +353 (45) 846176
E: info @igsl.ie
W: www.igsl.ie

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Separate Cover

Environmental Site Assessment and Waste Characterisation Assessment (O'Callaghan Moran)

FOREWORD

The following conditions and notes on the geotechnical site investigation procedures should be read in conjunction with this report.

Standards

The ground investigation works for this project have been carried out by IGSL in accordance with Eurocode 7 - Part 2: Ground Investigation & Testing (EN 1997-2:2007). This has been used together with complementary documents such as BS 5930:2015 and BS 1377 (Parts 1 to 9) and the following European Norms:

- EN 1997-2 Eurocode 7: 2007 – Geotechnical Design – Part 2: Ground Investigation & Testing
- EN ISO 22475-1:2006 Geotechnical Investigation and Sampling – Sampling Methods & Groundwater Measurements
- EN ISO 14688-1:2018 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 1: Identification and Description
- EN ISO 14688-2:2018 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 2: Classification Principles
- EN ISO 14689-1:2018 Geotechnical Investigation and Testing - Identification & Classification of Rock, Part 1: Identification & Description

Reporting

This report has been prepared for Cronin and Sutton and the information should not be used without prior written permission of either party. IGSL Ltd accepts no responsibility or liability for this document being used other than for the purposes for which it was intended. No responsibility can be held by IGSL Ltd for ground conditions between exploratory hole locations.

The engineering logs provide ground profiles and configuration of strata relevant to the investigation depths achieved and caution should be taken when extrapolating between exploratory points. No liability is accepted for ground conditions extraneous to the investigation points. Unless specifically stated, no account has been taken of possible subsidence due to mineral extraction, mining works or karstification below or close to the site.

Boring Procedures

Unless otherwise stated, 'shell and auger' or cable percussive boring technique has been employed as defined by Section 6.3 of IS EN ISO 22475-1:2006. The boring operations, sampling and in-situ testing complies with the recommendations of IS EN 1997-2:2007 and BS 1377:1990 and EN ISO 22476-3:2005+A1:2011. The shell and auger boring technique allows for continuous sampling in clay and silt above the water table and sand and gravel below the water table (Table 2 of IS EN ISO 22475-1:2006).

It is highlighted that some disturbance and variations is unavoidable in particular ground (e.g. blowing sands, gravel / cobble dominant glacial deposits etc). Attention is drawn to this condition, whenever it is suspected. Where cobbles and boulders are recorded, no conclusion should be drawn concerning the size, presence, lithological nature, or numbers per unit volume of ground.

Rotary Drilling Procedures

Rotary drilling methods are used to recover very heavily over-consolidated glacial till and bedrock samples in line with Section 3.5 of IS EN 1997-2:2007 and IS EN ISO 22475-1. Open hole drilling methods (odex or symmetrix) are utilized to advance the drillholes through granular dominant superficial deposits, with coring in hard ('cemented') fine grained or cohesive glacial deposits and bedrock.

In-Situ Testing
Standard penetration tests are conducted by IGSL strictly in accordance with Section 4.6 of IS EN 1997-2:2007. The SPT equipment (hammer energy test) has been calibrated in accordance with EN ISO 22476-3:2005+A1:2011 and the Energy Ratio (E_r) is defined as the ratio of the actual energy E_{meas} (measured energy during calibration) delivered to the drive weight assembly into the drive rod below the anvil, to the theoretical energy (E_{theor}) as calculated from the drive weight assembly. The measured number of blows (N) reported on the engineering logs are uncorrected. In sands, the energy losses due to rod length and the effect of the overburden pressure should be taken into account (see IS EN ISO 22476-3:2005+A1:2011).

Groundwater
The depth of entry of any influx of groundwater is recorded during the course of boring or drilling operations. However, the normal rate of boring does not usually permit the recording of an equilibrium level for any one water strike. Where possible drilling is suspended for a period of twenty minutes to monitor the subsequent rise in water level. Groundwater conditions observed in the borings or pits are those appertaining to the period of investigation. It should be noted however, that groundwater levels are subject to diurnal, seasonal and climatic variations and can also be affected by drainage conditions, tidal variations etc.

Soil Sampling
Three categories of sampling methods are outlined in EN ISO 22475-1:2006. The categories are referenced A, B and C for any given ground conditions and are shown in Tables 1 and 2 of EN ISO 22475-1:2006. Reference should be made to EN 1997-2:2007 for guidelines on sample class and quality for strength and compressibility testing. Samples of quality classes 1 or 2 can only be obtained by using Category A sampling methods.

Where appropriate Class 1 thin wall undisturbed tube samples (UT100) are obtained in fine grained soils and strictly meet the requirements of EN 1997-2:2007 and EN ISO 22475-1:2006. Soil samples for laboratory tests are divided into five classes with respect to the soil properties that are assumed to remain unchanged during sampling, handling transport and storage. The minimum sample quality required for testing purposes to Eurocode 7 compatibility (EN 1997-2:2007) is shown in Table A.

Table A – Details of Sample Quality Requirements

EN 1997 Clause	Test	Minimum Sample Quality Class
5.5.3	Water Content	3
5.5.4	Bulk Density	2
5.5.5	Particle Density	N/S
5.5.6	Particle Size Analysis	N/S
5.5.7	Consistency Limits	4
5.5.8	Density Index	N/S
5.5.9	Soil Dispersivity	N/S
5.5.10	Frost Susceptibility	N/S
5.6.2	Organic Content	4
5.6.3	Carbonate Content	3
5.6.4	Sulphate Content	3
5.6.5	pH	3
5.6.6	Chloride Content	3
5.7	Strength Index	1
5.8	Strength Tests	1
5.9	Compressibility Tests	1
5.10	Compaction Tests	N/S
5.11	Permeability	2

N/S – not stated. Presume a representative sample of appropriate size.

Samples recovered from trial pits or trenches meet the requirements of IS EN ISO 22475-1. It is highlighted that unforeseen circumstances such as variations in geological strata may lead to lower quality sample classes being obtained.

Engineering Logging
Soil and rock identification is based on the examination of the samples recovered and conforms with IS EN ISO 14688-1:2018 and IS EN ISO 14689-1:2018. Rock weathering classification conforms to IS EN ISO 14689-1:2018 while discontinuities (bedding planes, joints, cleavages, faults etc) are classified in accordance with 4.3.3 of IS EN ISO 14689-1:2018. Rock mechanical indices (TCR, SCR, RQD) are defined in accordance with IS EN ISO 22475-1:2006.

Retention of Samples
After satisfactory completion of all the scheduled laboratory tests on any sample, the remaining material will be discarded. Unless a period of retention of samples is agreed, it is company policy to discard soil samples one month after submission of our final report.

1.0 Introduction and Objectives

It is proposed to construct a residential development at O'Devaney Gardens in Dublin's North Inner City.

The site location is as shown on Figure 1 with the approximate site outline shown in red.

Figure 1 – Site Location (Base Mapping – Google Earth Professional)

IGSL Limited were appointed by Cronin and Sutton Consulting Engineers to conduct a geo-environmental investigation at the site.

The objectives of the investigation were to ascertain the ground and groundwater conditions, and to produce a report which will assist in the geotechnical design of the new development. Also required was an Environmental Site Assessment (including a Waste Characterisation Assessment).

Fieldworks were undertaken during the period July to September 2020.

2.0 Scope of Works

The programme of works included the following:

- 11 no. cable percussive boreholes
- 9 no. rotary coreholes
- 32 no. mechanically excavated trial pits
- 74 no. window samples
- 8 no. foundation inspection pits
- A programme of geotechnical, chemical and environmental laboratory testing
- Environmental Site Assessment and Waste Characterisation Assessment Report (produced on behalf of IGSL by O'Callaghan Moran)

The exploratory hole locations are shown on the as-surveyed aerial plan in Appendix 9.

2.1 Cable Percussive Boreholes

Boreholes were constructed in eleven locations (BH01 to BH11) using a Dando 2000 rig equipped with 200 mm casing. The bored depths ranged from 5.6 to 10.2 metres below existing ground level (m BGL).

A hand dug inspection pit was excavated at each location prior to commencing drilling works and the locations were scanned for services using a CAT detection tool.

During the course of boring, in-situ Standard Penetration Tests (SPT) were undertaken at regular intervals. Samples were also recovered to assist in the visual description of recovered soils and to provide specimens for laboratory testing. For his project, environmental samples (tubs, jars and vials) were also recovered.

Instances of groundwater ingress were recorded and monitored for a further 20 minutes to permit the water to rise.

The borehole records are presented in Appendix 1 of this report.

2.2 Rotary Coreholes

Rotary coreholes RC01, 02, 03, 05, 07, 08, 09, 10 and 11 were drilled at corresponding boreholes to investigate for the presence of bedrock. A Geo 405 tracked coring rig was used.

Symmetrix "open hole" techniques were used to advance through the upper deposits, reverting to rotary coring techniques on the first indications of bedrock. It is noted that Symmetrix drilling produces highly pulverised drill returns and therefore, soil descriptions based on these returns are very approximate. Reference should instead be made to the corresponding cable percussive borehole record for detailed soil descriptions.

Rotary coring of rock was carried out using an air/mist flush to maximise recovery. Cores of 78 mm diameter were recovered to the drilled depths of between 15.3 and 22.0 m BGL and these were placed securely in wooden storage boxes.

Standard Penetration Tests (SPT) were undertaken in overburden soils to provide an indication of soil strength below the borehole refusal depths.

The recovered core was inspected by a qualified engineering geologist and logged in detail at IGSL's laboratory. Records detailing the Total Core Recovery (TCR), Solid Core Recovery (SCR) and Rock Quality Designation (RQD) were produced. Core records also include a fracture log (spacing between successive core joints measured from the cores).

All cores were labelled and photographed for inclusion in the report. Photographs are presented digitally for ease of browsing and to permit close examination at high resolution. Corehole records and photographs are included in Appendix 2 of this report.

2.3 Trial Pits

Trial pitting was performed at thirty-two locations (TP01 to TP32) using a JCB excavator. The trial pits were logged and sampled by an IGSL geotechnical engineer in accordance with BS 5930 (2015).

Pit sidewalls were assessed in terms of their short term stability and any instances of groundwater ingress were recorded. Bulk soil samples were also recovered to provide specimens for laboratory testing.

The samples were placed in heavy duty polyethene bags and sealed before being transported to Naas for laboratory testing. For this project, environmental samples were obtained and placed in appropriate containers.

The trial pits were backfilled with the as-dug arisings and reinstated to the satisfaction of IGSL's site geotechnical engineer. The trial pit logs in Appendix 3 include descriptions of the soils encountered, groundwater conditions and stability of the pit sidewalls.

2.4 Window Samples

Window samples were undertaken in 74 locations (WS01 to WS74) in order to obtain undisturbed samples of the upper soils and facilitate accurate sub-sampling for environmental analysis.

Window samples are advanced by driving a steel sampling tube under constant percussive effort. The soils enter the tube within a protective plastic liner, which is withdrawn after every metre of progress. The liners are then placed in wooden channel boxes and transported to the IGSL offices where they are logged and sub-sampled as required.

For this project, environmental sub-samples were extracted from the soil recovery and placed in appropriate containers (amber glass jars and vials).

The window sample records are presented in Appendix 4 of this report.

2.5 Foundation Inspection Pits

Trial pits TP22 to TP24 and TP28 to TP32 were located adjacent to existing walls along the north-western and north-eastern boundaries. These pits were initially opened by hand-digging to facilitate close inspection of the existing foundation construction.

The foundation inspection records in Appendix 5 contain photographs of the open pits and dimensioned sketches of the foundation details. Also shown are details of encountered utilities / services, water ingress and a geological description of the soils encountered. Where possible, the pit was extended below the founding depth in order to ascertain the composition and condition of the underlying bearing stratum.

2.6 Groundwater Monitoring

Standpipes were installed in rotary coreholes RC02, 08 and 11 in order to permit long term monitoring of groundwater levels.

The site was revisited post-fieldwork in order to take readings from the standpipes. The groundwater readings are presented in Appendix 6.

2.7 As-Built Survey

On completion of fieldworks, the location (x,y) and elevation (z) of each exploratory location was determined by detailed survey using GPS Realtime Kinetic survey instrument.

The National Grid survey co-ordinates and ground levels related to Malin Head Datum are presented on the exploratory hole records and these were used to plot the as-built locations on the aerial site plan in Appendix 9 of this report.

2.8 Environmental Site Assessment

With the approval of the client, IGSL Limited appointed environmental consultants O'Callaghan Moran (OCM) to undertake a comprehensive environmental assessment of the site with particular focus on the in-situ contamination levels and landfill acceptability of potentially excavated soils.

The IGSL exploratory hole records and the results of laboratory testing were made available to OCM for reference in their *Environmental Site Assessment and Waste Characterisation Assessment* report, which is presented under separate cover.

3.0 Laboratory Testing

Laboratory test results are segregated and presented as follows:

- Appendix 7 – Geotechnical (Soil and Rock) Laboratory Testing
- Appendix 8 – Chemical and Environmental Testing

Geotechnical and chemical testing of soils comprised:

- Moisture Content
- Atterberg Limits (Plasticity Index)
- Particle Size Distribution (PSD)
- Acid Soluble Sulphate, Water Soluble Sulphate and Total Sulphur
- pH Analysis

Rock testing comprised:

- Point Load Strength Index

Environmental testing was undertaken by Eurofins Chemtest on a total of 225 samples.

Samples were tested in accordance with the RILTA Suite, which is used to determine the suitability of soils for disposal to a landfill. The RILTA suite includes Heavy Metals, Polycyclic Aromatic Hydrocarbons (PAH), TPH-CWG, BTEX, PCB and Total Organic Carbon (TOC) carried out on dry soil samples. Also included are leachate analyses, whereby leachate is generated in accordance with CEN 10:1 specification and this is tested for the presence of recognised contaminants including Heavy Metals, Dissolved Organic Carbon (DOC) and Total Dissolved Solids (TDS). An Asbestos Screen is also included in the RILTA Suite.

The WAC results have been utilised by environmental specialists, O'Callaghan Moran (OCM) in their production of an Environmental Assessment Report, in which various options for landfill disposal are discussed.

4.0 Desk Study

The site consists mostly of open grassland, with local hardstanding areas, the largest of which is located central to the site.

The site was formerly occupied by eleven apartment blocks, as shown on an aerial photo dated 2008 (Figure 2). Seven of these were located within the northern portion of the site, and four within the southern section. A hard-standing open space separated the inhabited northern and southern portions of the site. All apartment blocks have since been demolished, with only the hard-standing area remaining.

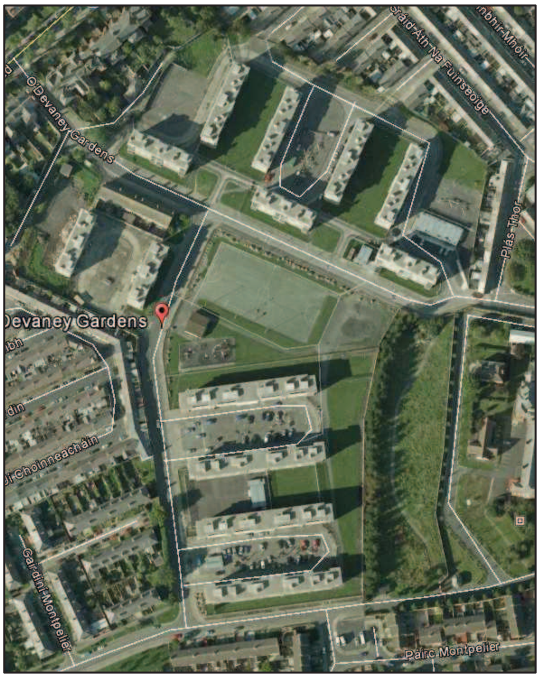

Figure 2(a) – Aerial Image of Site in 2008
(Source: Google Earth Professional)

Figure 2(b) Aerial Image of Site in 2020

In light of the extensive demolition works that were undertaken in recent years, there is an expectancy that Construction and Demolition (C&D) waste would be encountered in the vicinity of the former structures.

The indigenous soil deposits in this part of Dublin would be expected to comprise glacial till, or "boulder clay".

5.0 Ground Conditions

The general soil stratigraphy comprised:

- MADE GROUND
- Firm / stiff brown sandy gravelly CLAY
- Very stiff grey/black sandy gravelly CLAY
- LIMESTONE bedrock

5.1 MADE GROUND

The exploratory holes penetrated a surfacing of Topsoil, which was typically 0.1 to 0.2 m in thickness. Made Ground deposits were then present, the thickness of which varied within the site, sometimes over relatively short distances.

Within the northern portion of the site, and in the location of the former apartment blocks, the thickness of Made Ground was mostly in the range 1.5 to 2.5 metres. However, at window samples WS08 and WS09 and borehole BH09, this deepened to 3.2 metres. East of the former apartment blocks, the Made Ground was less extensive, typically 0.8 to 1.2 m in thickness, with the notable exception of BH08, where the Made Ground thickened to 2.1 metres.

Within the central portion of the site (predominately hard standing open space), the Made Ground ranged between 1 and 2 metres in thickness, thinning to approximately 1 metre beneath former paved areas. East of the former apartment blocks, the area is landscaped (possibly a recreational walkway) and the Made Ground here was limited to between 1.0 and 1.5 metres in thickness.

Within the southern portion of the site, the Made Ground again varied in thickness, but generally ranged between 1.5 and 2.5 metres in thickness. The deepest Made Ground deposits were within the footprint of former structures, reaching up to 3 metres in places.

The Made Ground comprised mainly brown sandy gravelly clay intermixed with extraneous (non-natural) material. This included fragments of Construction and Demolition (C&D) waste such as concrete, brick, metal, plastic, glass and timber at upper levels. In places (e.g. TP07 and TP08), the C&D fragments included sizeable pieces of concrete. At trial pits TP09 (northern portion of site) and TP15 (southern portion), excavation was halted at depths of 2.4 and 2.5 m BGL respectively on horizontal concrete exposures, which had the appearance of possible former structural foundations.

In some locations (e.g. TP04 and TP05), deeper Made Ground deposits of soft grey/brown clay were present, which were notably devoid of any extraneous (non-natural) materials.

Trial pit TP26 was excavated through an existing road, which forms the northern boundary of the site. Although the Made Ground was limited to 0.4 m in thickness, hydrocarbons odours were detected within the underlying natural clay soils at a depth of approximately 1.0 m BGL. The odours were thought to be related to fuel or oil leakage from previous vehicular activity on this road.

Standard Penetration Tests (SPTs) undertaken within the Made Ground revealed highly variable, but predominately low, "N" values, mostly in the range 4 to 7, thereby indicating the deposits to be soft, loose or poorly compacted.

5.2 Firm / stiff brown sandy gravelly CLAY

The Made Ground was underlain by natural deposits of firm to stiff brown sandy gravelly CLAY (glacial till). Cobbles were occasionally present within the clay matrix.

With the exception of trial pits TP25, 26 and 27 along the northern road, almost all trial pits terminated within or just below the Made Ground. Therefore, reference is made to the boreholes and window samples when establishing the depth to the firm/stiff gravelly clay stratum.

The depth to the firm/stiff deposits was largely dictated by the thickness of Made Ground. While the boreholes indicated a transition to this material at depths in the range 1.0 to 2.5 m BGL, notable exceptions to this include BH08 and BH09, where low strength clays persisted to a depth of 3.7 m BGL in both boreholes. The window samples also revealed Made Ground to depths of up to 3 metres throughout the site, thereby increasing the depths to the underlying virgin soils.

SPT "N" values within the firm / stiff gravelly clay were variable, mostly ranging between 11 and 25. Therefore, the estimated shear strengths are also widely ranging (c. 55 to 125 kPa) and vary without any discernible pattern across the site.

Laboratory tests (Atterberg Limits and Particle Size Distribution) classified the firm/stiff glacial till as CLAY of low plasticity (CL). Moisture contents typically ranged between 15 and 17%.

5.3 Very stiff grey/black sandy gravelly CLAY

All boreholes encountered basal deposits of dark grey/black sandy gravelly CLAY (glacial till). The depth to this material was relatively consistent across the site, mostly ranging between 3.1 and 3.8 m BGL. The material was observed to be of very high strength (very stiff) and cobbles were present within the soil matrix.

SPT "N" values were mostly in the range 35 to 45, thereby indicative of undrained shear strengths (Cu) in the range 175 to 225 kPa.

Laboratory testing has demonstrated that this very high strength material is generally well graded, producing typical "straight line" particle size distribution curves. The fines (SILT/CLAY) fractions typically ranged between 35 and 45%. Occasionally, the presence of cobbles reduced the proportion of fines and caused the sample to grade as a granular soil (gravel). Moisture contents were also relatively consistent, typically ranging between 13 and 15%.

All boreholes met with obstructions within this material at depths in the range 5.6 to 10.2 m BGL.

5.4 LIMESTONE Bedrock

Coreholes were drilled adjacent to corresponding boreholes to determine the depth to bedrock and to recover core samples for visual examination and laboratory testing. It is noted that coring was not undertaken at BH04 or BH06.

Below the refusal depths of the boreholes, rotary drilling advanced through further deposits of very high strength glacial till. SPT "N" values were typically in excess of 50, with some exceeding 100.

While the pulverised drill returns were mostly assessed as gravelly clay soils, coarser returns were recovered at depth in some coreholes, including RC02, 07, 08 and 09. However, these were localised and underlain by further deposits of cohesive till.

The first indications of weathered rock were identified at depths in the range 12 to 15 m BGL. The notable exception to this occurred at RC08 (north-eastern boundary of the site) where very high strength glacial till persisted to a depth of 22 m BGL without reaching bedrock.

The bedrock was identified as predominately medium strong to very strong grey/black argillaceous LIMESTONE, which graded regularly to calci-siltite limestone with subordinate mudstone. The limestone was predominately slightly weathered, locally moderately to highly weathered within mudstone / shale zones. Pyrite was also evident within the limestone.

At RC05, the upper bedrock (present at 13.50 m BGL) was particularly highly fractured and was described as “highly faulted, brecciated and re-cemented”. Clay and gravel filled fractures were also present. Similar to the aforementioned RC08, this corehole was also located along the eastern site boundary, suggesting that there may be a fault or irregularity in the bedrock formation along the eastern boundary of the site.

Total Core Recovery (TCR) within bedrock was 100% in all cases. Solid Core Recovery (SCR) mostly ranged between 60 and 80%, reducing to between 30 and 40% within the upper more highly weathered limestone in some coreholes. Rock Quality Designation (RQD) values were lower, typically ranging between 20 and 40%, reducing to a lowerbound value of 11% within the upper highly fractured bedrock.

Photo 1 shows the core recovery of the upper Limestone at RC01 (12.3 - 15.3 m BGL).

Photo 1 – Core recovery at RC01 (12.3 to 15.3 m BGL)

Photo 2 shows the core recovery at RC05. In comparison to RC01, it can be seen that the core recovery is more heavily fractured. In addition, the abundant calcite veining (white staining) is clearly evident.

Photo 2 – Core recovery at RC05 (13.5 – 16.0 m BGL)

Photo 3 shows the core recovery at RC09. Also shown in this photograph are intact core samples of the overlying glacial till ("Black Boulder Clay"), which were recovered between 12.0 and 13.5 m BGL.

Photo 3 – Core recovery of glacial till and bedrock at RC09 (12.0 to 16.5 m BGL)

The results of rock strength testing showed Is_{50} values in the range 1 to 4 MPa, correlating to equivalent UCS values in the range 20 to 80 MPa. In accordance with Table 5 of EN ISO 14869-1, these strengths would confirm the rock to be predominately Medium Strong to Strong.

5.5 Groundwater

Groundwater ingress was observed in boreholes BH04, 06, 07, 08, 10 and 11 during the period of drilling.

Water strikes were also recorded in several coreholes, although it is noted that the air/mist flush utilised during rotary drilling can mask or obscure the depth of groundwater ingress.

The majority of trial pits recorded water ingress during the period of excavation (typically 45 minutes). Most strikes occurred within Made Ground, and caused instability of the pit sidewalls.

The water strikes observed in the boreholes and coreholes are summarised on Table 1.

Hole No.	Water Strike Depth (m BGL)	Rate of Ingress	Depth to which water subsequently rose during drilling (m BGL)
BH01	No ingress observed		
BH02	No ingress observed		
BH03	No ingress observed		
BH04	3.00 / 6.50	Moderate / Rapid	2.00
BH05	No ingress observed		
BH06	3.80	Slow	No
BH07	5.80	Moderate	5.40
BH08	2.80 / 5.70	Slow / Moderate	4.70
BH09	No ingress observed		
BH10	2.10 / 5.30	Moderate / Moderate	1.50
BH11	8.30	Rapid	5.40
RC01	5.40 / 12.00	Slow / Slow	6.10
RC02	12.00	Slow	7.40
RC03	No ingress observed		2.40
RC05	No ingress observed		12.30
RC07	9.60	Slow	7.30
RC08	8.50 / 13.20	Slow / Slow	7.20
RC09	8.70 / 14.70	Slow / Slow	6.40
RC10	2.10	Slow	1.70
RC11	8.70	Slow	4.30

Table 1 – Summary of Groundwater Ingress (Boreholes and Coreholes)

The water strikes observed in the trial pits are summarised on Table 2.

Trial Pit	Water Strike Depth (m BGL)	Ingress Rate	Water Remarks	Pit Stability
TP01	2.0	Seepage	Ingress at base of Made Ground	Unstable
TP02	1.0 / 1.5	Seepage / Slow	Ingress through Made Ground	Unstable
TP03	Dry			Unstable
TP04	1.5 / 2.2	Slow / Rapid	Ingress through Made Ground	Stable
TP05	2.1	Rapid	Ingress through Made Ground	Unstable
TP06	2.6	Slow	Ingress through Made Ground	Stable
TP07	2.3	Rapid	Ingress through Made Ground	Unstable
TP08	Dry			Stable
TP09	Dry			Stable
TP10	2.0	Seepage		Stable
TP11	1.5 / 2.2	Seepage / Slow	Ingress through Made Ground	Unstable
TP12	1.9	Rapid	Ingress through Made Ground	Stable
TP13	1.5	Rapid	Ingress through Made Ground	Unstable
TP14	Dry			Stable
TP15	Dry			Stable
TP16	Dry			Stable
TP17	Dry			Stable
TP18	Dry			Unstable
TP19	Dry			Unstable
TP20	Dry			Stable
TP21	Dry			Stable
TP22	Dry			Stable
TP23	Dry			Stable
TP24	Dry			Stable
TP25	1.4 / 1.9	Seepage / Seepage		Stable
TP26	1.6	Moderate	Hydrocarbon odour	Stable
TP27	1.8	Slow		Stable
TP28	Dry			Stable
TP29	Dry			Stable
TP30	Dry			Stable
TP31	Dry			Stable
TP32	Dry			Stable

Table 2 – Summary of Groundwater Ingress (Trial Pits)

The results of groundwater monitoring undertaken to date are summarised on Table 3.

Location	Hole Depth (m BGL)	Top of Response Zone (m BGL)	Base of Response Zone (m BGL)	Groundwater Depth 25/09/2020 (m BGL)	Groundwater Depth 15/10/2020 (m BGL)
RC02	15.50	1.00	15.50	3.18	2.65
RC08	22.00	1.00	18.50	2.24	1.86
RC11	20.00	1.00	20.00	0.95	0.60

Table 3 – Summary of Groundwater Monitoring

6.0 Discussion and Recommendations

6.1 Proposed Development

The site, formerly occupied by apartment blocks, has undergone substantial demolition in preparation for future development and is now a largely vacant site. The topography slopes gradually downwards in an approximate north-south direction, with ground levels falling from c.27 to 22 m OD.

The proposed structural layout is shown on Figure 3. The proposed apartment blocks are numbered as shown and distributed across the site as follows:

Northern Portion – Blocks B02, B04 and B05
Central Portion – Blocks B06 and B07
Southern Portion – Blocks B09 and B10

Blocks 2, 4 and 5 will mostly extend to 5 and 6 storeys in height. Blocks B07 and B08 will be mostly 6 and 8 storeys, with a portion of Block B08 reaching 12 storeys. Similarly, in the southern portion of the site, Blocks B09 and B10 will mostly range from 3 to 8 storeys, with a portion of B10 extending to 12 storeys.

While not confirmed, it is also understood that one or more structures may incorporate a basement.

6.2 Summary of Ground Conditions

The site is mantled by Made Ground, present mostly to depths in the range 1.5 to 2.5 m BGL, but deepening to c. 3.0 to 3.5 metres within the footprints of the demolished structures. The Made Ground thins to approximately 1 metre within hard standing areas and within the heavily planted area on the eastern side of the site.

The Made Ground comprises mainly brown sandy gravelly clay containing Construction and Demolition waste, which is likely to have arisen from the demolition of the former structures.

While brown sandy gravelly clay underlies the Made Ground, the consistency of this material is highly variable, as shown by SPTs, which revealed widely varying "N" values. In some locations, these deposits are stiff from shallow depth, while in others, the material was firm to depths of up to 3 metres.

The basal deposits comprise very stiff grey/black sandy gravelly CLAY (glacial till or "boulder clay"), which was present within a relatively consistent depth range of 3 to 4 m BGL.

The underlying bedrock consisted of medium strong to strong argillaceous LIMESTONE, which was encountered at depths of between 12 and 15 m BGL and proven to a maximum depth of 21.5 m BGL in the coreholes. A notable exception to this occurred near the north-eastern boundary of the site (RC08), where overburden soils persisted to the drilled depth of 22 metres.

Groundwater strikes were recorded in the majority of boreholes and coreholes. The shallowest observed water levels during the fieldwork period were 1.50 m at BH10, 2.0 m at BH04 and 2.40 m at RC03.

Thirteen of the thirty-two trial pits encountered water ingress during the period of excavation. The depth of ingress was mostly between 1.5 and 2.5 m BGL and predominately within Made Ground. The rates of ingress ranged from seepage to rapid inflow. Water ingress was a prime cause of instability of the pit sidewalls, although sidewall instability was also recorded in some trial pits where no water ingress was observed.

Subsequent groundwater monitoring has revealed standing water levels of 0.60, 1.86 and 2.65 m BGL in three standpipes.

Figure 3 – Proposed Structural Layout (Source: C&S Engineers)

6.3 Structural Foundations

The results of SPTs have been plotted on Figure 4. The wide variation in SPT "N" values within the upper 2 to 3 metres is clearly evident, and this is mostly attributed to the heterogeneous composition and condition of the Made Ground soils. However, some of this scatter can also be attributed to variations in the strength of the upper brown sandy gravelly clay soils.

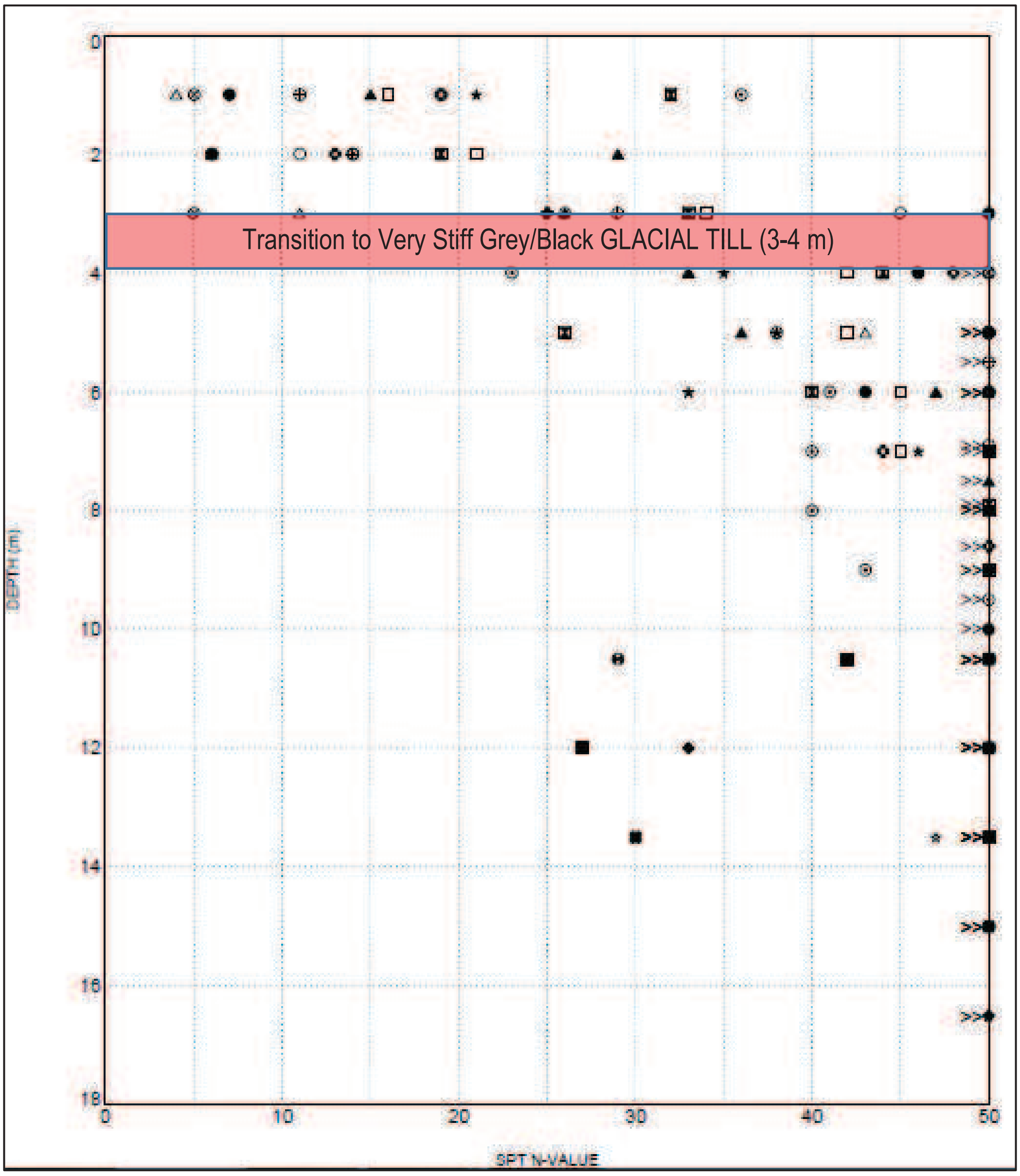

Figure 4 – SPT vs Depth Plot

The proposed development will comprise multi-storey apartment blocks. Within each of the three principle zones of development (i.e. northern, central, southern), building heights of between 6 and 12 storeys are anticipated. The foundation pressures arising from structures of this scale are likely to be substantial.

With regard to structural foundations, it is strongly advised that the Made Ground and underlying brown sandy gravelly clay soils are precluded as suitable foundation bearing strata for the multi-storey structures. While stiff brown gravelly clay soils could support pressures of the order of 150 kPa, adhering to this bearing pressure range is likely to result in excessive pad dimensions. In addition, the presence of lower strength (firm) zones within these predominately stiff deposits may lead to difficulties in identifying the appropriate bearing stratum on site.

The underlying grey/black sandy gravelly clay soils (glacial till) have been shown by in-situ testing to be in a predominately very stiff condition, and would be expected to support bearing pressures of the order of 300 to 350 kPa. It is recommended that this stratum is adopted as a founding medium.

Where single level basements are proposed, the depth of the mass excavation will likely coincide with the transition to very high strength glacial till, which will provide a stable and relatively incompressible medium for the basement foundations and slabs.

Where no basement is proposed, excavations of between 3 and 4 metres would be required to reach the grey/black gravelly clay soils across most of the site.

It has been shown that temporary trenches in Made Ground are prone to water ingress and trench instability. In addition, based on the results of groundwater monitoring, excavations to the very stiff gravelly clay soils are likely to intercept the groundwater table.

It is also noted that the construction of conventional foundations would generate significant surplus material, the majority of which will comprise Made Ground. While the handling and disposal of surplus soils is discussed in greater detail in the Environmental Report, it is understood that careful management of this material would be required.

In light of the above, it is highly likely that the construction of conventional foundations for non-basement structures will be deemed impractical due to the required excavation depths, trench control and dewatering measures and the management / disposal of surplus soils.

Consideration should instead be given to the use of piled foundations to transfer the structural loads to the very stiff deposits or underlying limestone bedrock.

Consultation with a specialist piling contractor would be recommended with regard to selecting the appropriate pile type and installation method that are most suited to the ground conditions. However, it is envisaged that augured (CFA or bored) piles embedded at sufficient depth within the very high strength glacial till could be designed to support the required column loads.

The piling contractor should be made aware of the presence of C&D waste within the Made Ground. Assistance from heavy duty “odex” drilling may be required to penetrate coarse obstructions within Made Ground and any large boulders encountered within the glacial till. Odex drilling should also be employed if piles are required to form a rock socket within the limestone bedrock,

It is noted that the installation of augured piles will generate surplus spoil, which will require careful management. Soils requiring disposal to landfill should be dealt with in accordance with the recommendations provided in the Environmental Report.

6.4 Groundwater and Trench Stability

Groundwater was observed at shallowest depths of 1.5 to 2.5 m BGL during the fieldwork period, although the most recent groundwater monitoring has revealed water levels in the range 0.6 to 2.6 m BGL.

Temporary trenches (trial pits) have also shown that the Made Ground soils are prone to instability within a short period of time (typically 45 minutes).

Water ingress (potentially rapid) should therefore be expected within temporary trenches below 1 m BGL, although this may manifest in places as a release of surface water confined within the Made Ground. Adopting the results of standpipe monitoring as a guide, a standing water level of c.1 m BGL should be assumed.

Periodic monitoring of groundwater standpipes should continue until the construction period in order to provide a better understanding of the true groundwater level, and its variations due to seasonal change or prolonged periods of heavy rainfall.

It is important to note that water ingress through trench sidewalls will accelerate destabilisation due to wash-out of material and subsequent undermining. This particularly true for Made Ground soils, which have been shown to be in a loose or uncompact condition on this site.

Where excavations are left open for extended periods (e.g. drainage trenches), instability is likely to occur as the sidewalls relax, in which case trench control measures (e.g. trench box) will be required.

6.5 Floor Slabs

While no plate bearing tests have been undertaken for this project, Made Ground mantles the majority of this site and has been shown to be in a soft, loose or uncompact condition. In addition, this material is extremely heterogeneous in composition and contains a variety of extraneous matter, most of which is C&D waste. No reliance should be placed on this material to provide uniform support to a ground bearing slab.

Since the structures are likely to be constructed on piles, consideration should be given to supporting the floors on piles, using additional piles as required to reduce the slab spans.

Sub-floor granular fill should comprise T0 Struc hardcore in conjunction with T1 hardcore and these should meet the requirements of Annex E SR21:2014+A1:2016.

Imported granular fill 'hardcore' used in any foundation application or under concrete floor slabs should meet the requirements of Annex E of SR 21:2014+A1:2016. Both T0 and T1 hardcore fills should be rigorously tested (independent of the quarry source) to ensure that they meet the physical, durability, chemical and mineralogical characteristics as set out in the aforementioned Annex E of SR 21:2014+A1:2016. Independent testing on samples of the proposed source hardcore is strongly recommended in advance of the material being used on the site. As a minimum, particle size gradings, chemical tests (total sulphur and acid soluble sulphate) and geological classification / simplified petrology are advised to screen the material and independently assess compliance with Annex E, SR21;2014+A1;2016.

6.6 Chemical Attack on Buried Concrete

Determination of pH values and Sulphate content were conducted on six samples by a nominated accredited environmental laboratory (Chemtest). Results are presented in reports prepared by the laboratory.

The results of water soluble (water/soil extract) Sulphate and pH analyses revealed SO_4 levels in the range <0.010 to 0.75 g/l and pH levels in the range 8.0 to 8.9. Significantly, three results showed SO_4 levels in the range 0.51 to 0.75 g/l.

With reference to Table C1 of BRE Special Digest 1: 2005, the levels of Water Soluble Sulphate suggests a design Sulphate Class of DS-2 (SO_4 of 500 – 1500 mg/l). Assuming a static groundwater table, an ACEC (Aggressive Chemical Environment for Concrete) Classification of AC-1s is applicable, since the pH levels are greater than 5.5.

Similarly, a Sulphate Design Class of DS-2 should also be assumed for concrete used to construct piled foundations.

7.0 References

1. BS 5930:2015 Code of Practice for Site Investigations; British Standards Institute
2. Manual of Contract Documents for Highway Works, Volume 5, Section 3, Ground Investigation, Part 4: Specification
3. BRE Special Digest 1: 2005 – Concrete in aggressive ground
4. EN 1997-3; Eurocode 7: Geotechnical Design – Part 3: Design assisted by field testing; 1997
5. BS1377; British Standard Methods of Test for Soils for Civil Engineering Purposes; British Standards Institute;1990.
6. BRE Digest 365, September 1991, British Research Establishment
7. Manual of Contract Documents for Road Works, Volume 1: Specification for Road Works (March 2007)
8. Manual of Soil Laboratory Testing, Volume 3; K.H. Head
9. ISRM – Suggested Methods for Determining Point Load Strength
10. ISRM – Suggested Methods for Determining the Uniaxial Compressive Strength and Deformability of Rock Materials
11. TRL Report 447- Sulfate specification for structural backfills
12. CIRIA C580
13. Specification for Roadworks Series 600 – Specification for Roadworks

Unit 15
Melbourne Business Park
Model Farm Road
Cork T12 WR89

T: 021 434 5366
E:admin@ocallaghanmoran.com
www.ocallaghanmoran.com

Environmental Site Assessment and

Waste Characterisation Assessment

O'Devaney Gardens,

Stoneybatter,

Co. Dublin

Prepared For: -

IGSL Limited
Unit F
M7 Business Park
Naas
County Kildare

Prepared By: -

O' Callaghan Moran & Associates
Unit 15 Melbourne Business Park
Model Farm Road
Cork

September 2020

Project	Environmental Assessment Waste Characterisation **:** O'Devaney Gardens, Stoneybatter, Co. Dublin			
Client	IGSL Limited			
Report No	Date	Status	Prepared By	Reviewed By
20011801	11/09/20	Final	Austin Hynes MSc	Sean Moran MSc
	27/11/20	Rev A Final		

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APPENDICES

1 INTRODUCTION

Irish Geotechnical Services Ltd (IGSL) requested O'Callaghan Moran & Associates (OCM) to undertake an Environmental Assessment and Waste Classification based on the findings of a site investigation completed by IGSL at a proposed development site at O'Devaney Gardens, Stoneybatter, Dublin 7.

1.1 Methodology

IGSL provided a description of the ground conditions, collected soil samples and monitored ground gas levels.

The Environmental Assessment comprised a desk study review of background information sources, including Ordnance Survey of Ireland (OSI) maps; databases maintained by the Environmental Protection Agency (EPA), Teagasc the Geological Survey of Ireland (GSI), the National Parks and Wildlife Service (NPWS) and the Office of Public Works (OPW): the Eastern River Basin District (ERBD) Management Plan and the findings of the IGSL site investigation.

The soil samples collected by IGSL were analysed at an accredited laboratory and the results formed the basis for the waste classification which was undertaken by OCM in accordance with the Environmental Protection Agency (EPA) Guidelines on the Classification of Waste (2015).

The Land Quality Management/Chartered Institute of Environmental Health (LQM/CIEH) S4ULs Human Health Risk Assessment-Risk Levels (S4ULs) were used to establish the risk posed to construction workers or future users of the developed site.

1.2 Limitations

The environmental assessment is based on a desk study and site investigation information provided by IGSL. The conclusions and recommendations contained in this report are based in part upon information provided by others and the assumption that all relevant information has been provided by those bodies from whom it has been requested. Information obtained from third parties has not been independently verified by OCM, unless otherwise stated in the Report.

2 SITE DESCRIPTION

2.1 **Site Location**

The site is located in O'Devaney Gardens in Stoneybatter, Dublin 7 (Figure 2.1).

2.2 **Site Layout**

The site layout is shown on Figure 2.2. It covers c.4.9 hectares (ha) and comprises a former residential housing estate.

2.3 **Site History**

The site history was established from a review of historical maps and aerial photographs which are included in Appendix 1. The OSI historic 6" inch maps from 1837 – 1842 shows that the lands were undeveloped farm land. The 6" Cassini and Historical 25" (1888-1913) maps shows the site as part of St Brickins Military Hospital. O'Devaney Gardens was constructed as residential housing in the early 1950s. The flats complex was demolished between 2006 -2008 and is currently undeveloped land.

2.4 **Geology, Hydrogeology and Hydrology**

2.4.1 *Geology*

The Teagasc maps indicates the subsoil beneath the site comprises Made Ground (Figure 2.3). The IGLS site investigation confirms this. The GSI bedrock geology map shows the site is underlain by the Calp Formation comprising Dark Grey to Black Limestone and shale (Figure 2.4).

2.5 **Hydrogeology**

The majority of the site lies within the Dublin Urban (IE_EA_G_005) Ground Water Body (GWB) as designated in the ERBD Management Plan. The groundwater body chemical and quantitative status of both of these groundwater bodies is 'Good'.

The GSI has developed a classification system for aquifers based on the value of the resource and their hydrogeological characteristics. The bedrock aquifer is classified as a Locally Important Aquifer (Li) Aquifer which is designated as a productive aquifer in local zones (Figure 2.5). The GSI aquifer vulnerability rating for pollution from the ground surface is Low (Figure 2.6).

A review of the GSI groundwater well database indicates that the closest recorded well to the site is at 0.9 km to the east. It is an industrial well and the depth to bedrock is 2.5 mbgl. The yield is 393 m^3/day and is classified as good (Figure 2.7).

2.6 Hydrology

The regional hydrology is shown on Figure 2.8. The site is in the catchment of the River Liffey, which is c600m to the south of the site and flows to the east.

2.7 Flood Risk

The National Preliminary Flood Risk Assessment (PFRA) was reviewed to determine the risk of flooding of the site. The flood extent maps were produced for various flood events of a given probability of occurrence. These are the 10%, 1% and 0.1% annual exceedance probability (AEP) events for fluvial flooding, which are equivalent to the 1 in 10, 1 in 100 and 1 in 1,000 year flood events respectively. The site is not located on or near a flood risk zone.

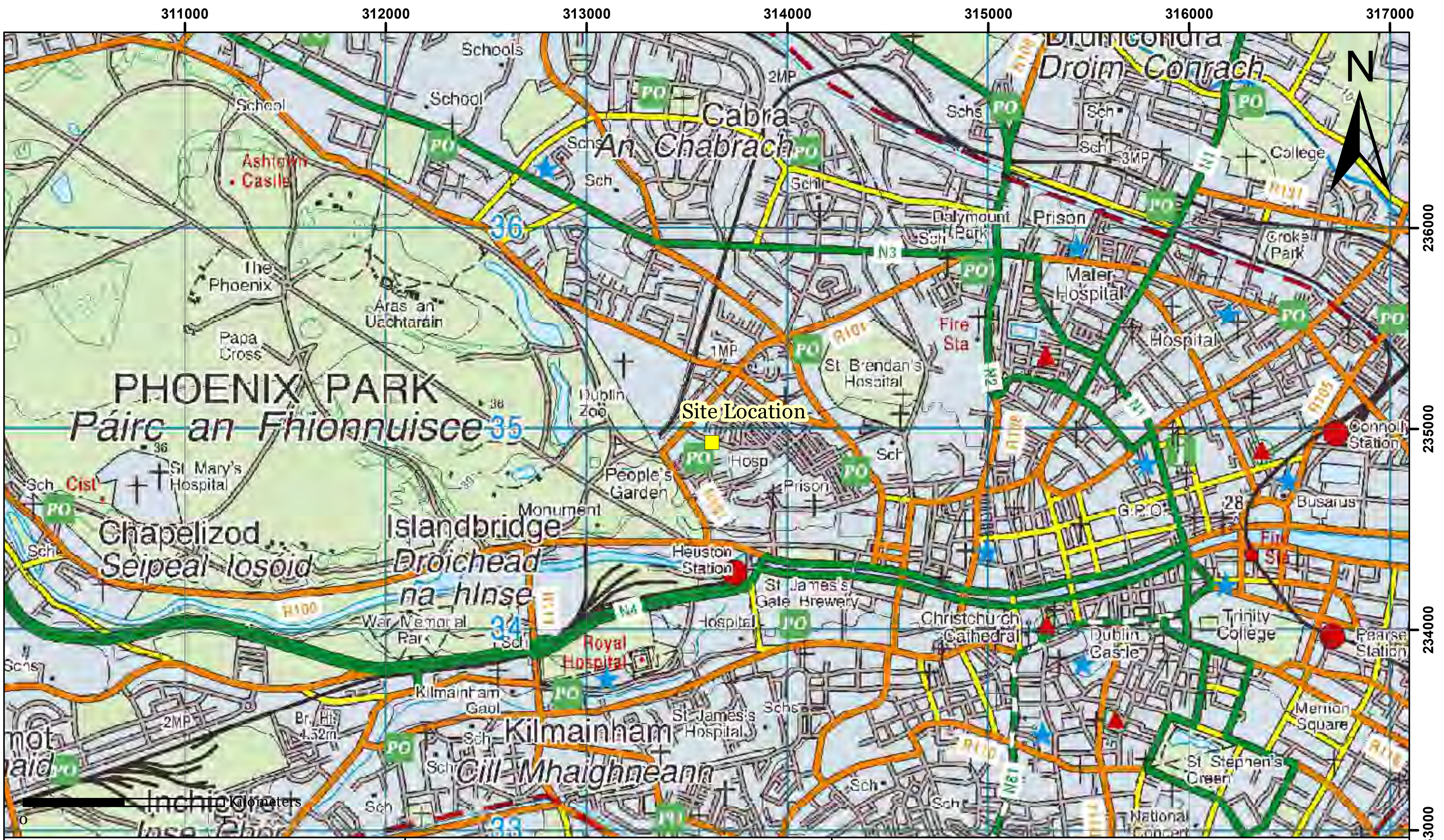
2.8 Ecologically Sensitive/Designated Areas

The closest Natura 2000 sites are South Dublin Bay and River Tolka Estuary Special Protection Area (SPA) c4.4km to the northeast and the South Dublin Bay Special Area of Conservation (SAC) c5.6km to the southeast (Figure 2.9).

2.9 Radon Risk

A High Radon Area is one where it is predicted that between 1 and 5 % or more of homes will exceed the Reference Level of 200 Becquerel per cubic metre (Bq/m3). The EPA have prepared a Radon Risk Map in 10km2 blocks nationally. Radon risk is mapped based on the estimated percentage of homes above the reference level ranging from <1%, 1% - 5%, 5% - 10%, 10% - 20%, and >20%.

The site is in a Low Radon Risk area, where the reference level is 1-5%; however the EPA caution that high radon levels can occur in any home in any part of the country, but such homes are more likely to be located in High Radon Areas.



O'Callaghan Moran & Associates,
Unit 15 Melbourne Business Park,
Model Farm Road, Cork.
Tel. (021) 4345366
email: info@ocallaghanmoran.com

CLIENT
IGSL Limited

TITLE
Site Location

Details:
Site Location

Figure 2.1

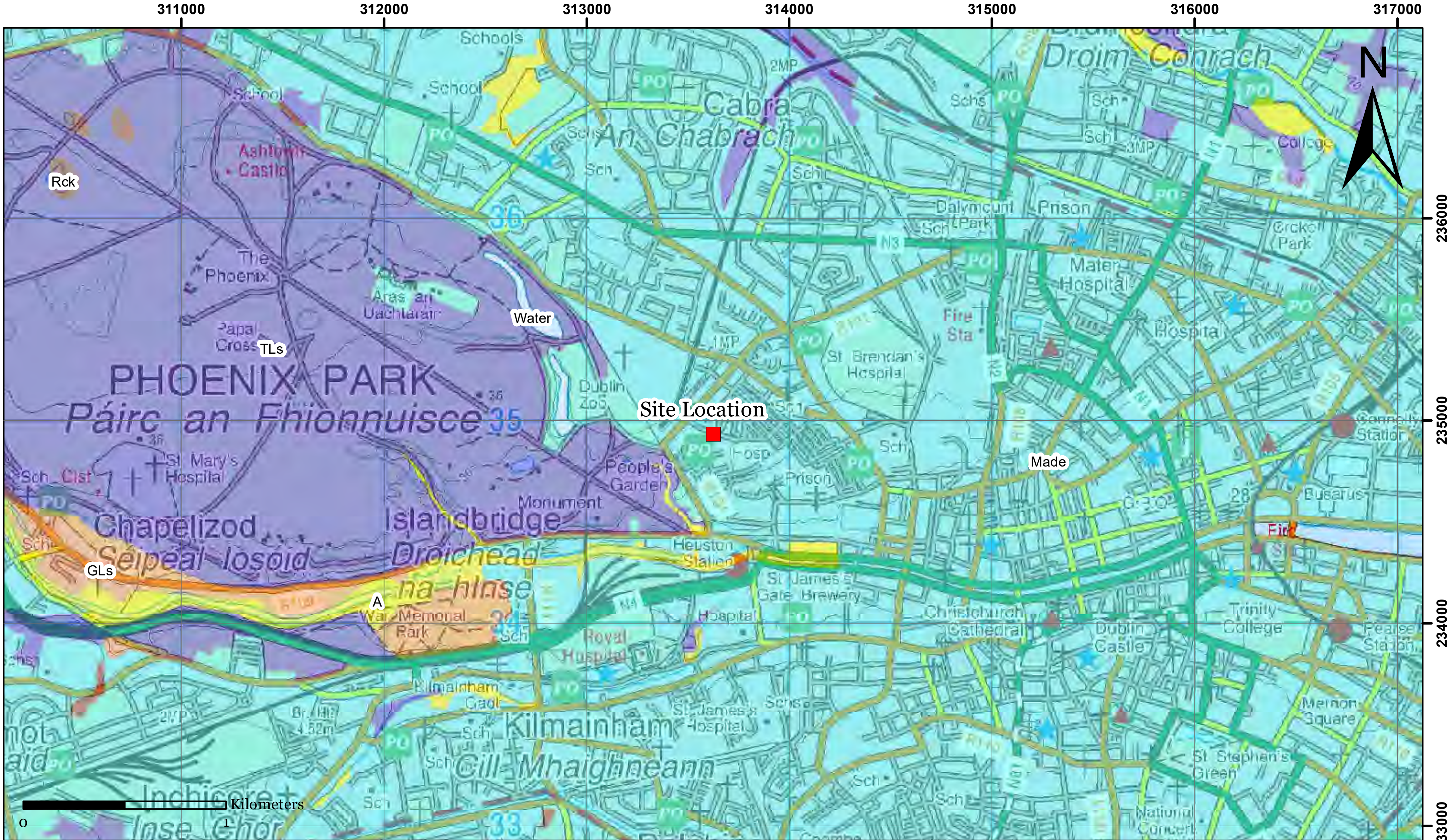
O'Callaghan Moran & Associates,
Unit 15 Melbourne Business Park,
Model Farm Road, Cork.
Tel. (021) 4345366
Email: info@ocallaghanmoran.com

Title: Figure 2.2 Site Layout Plan

Legend

-Site Layout

Client: IGSL Limited



O'Callaghan Moran & Associates,
Unit 15 Melbourne Business Park,
Model Farm Road, Cork.
Tel. (021) 4345366
email: info@ocallaghanmoran.com

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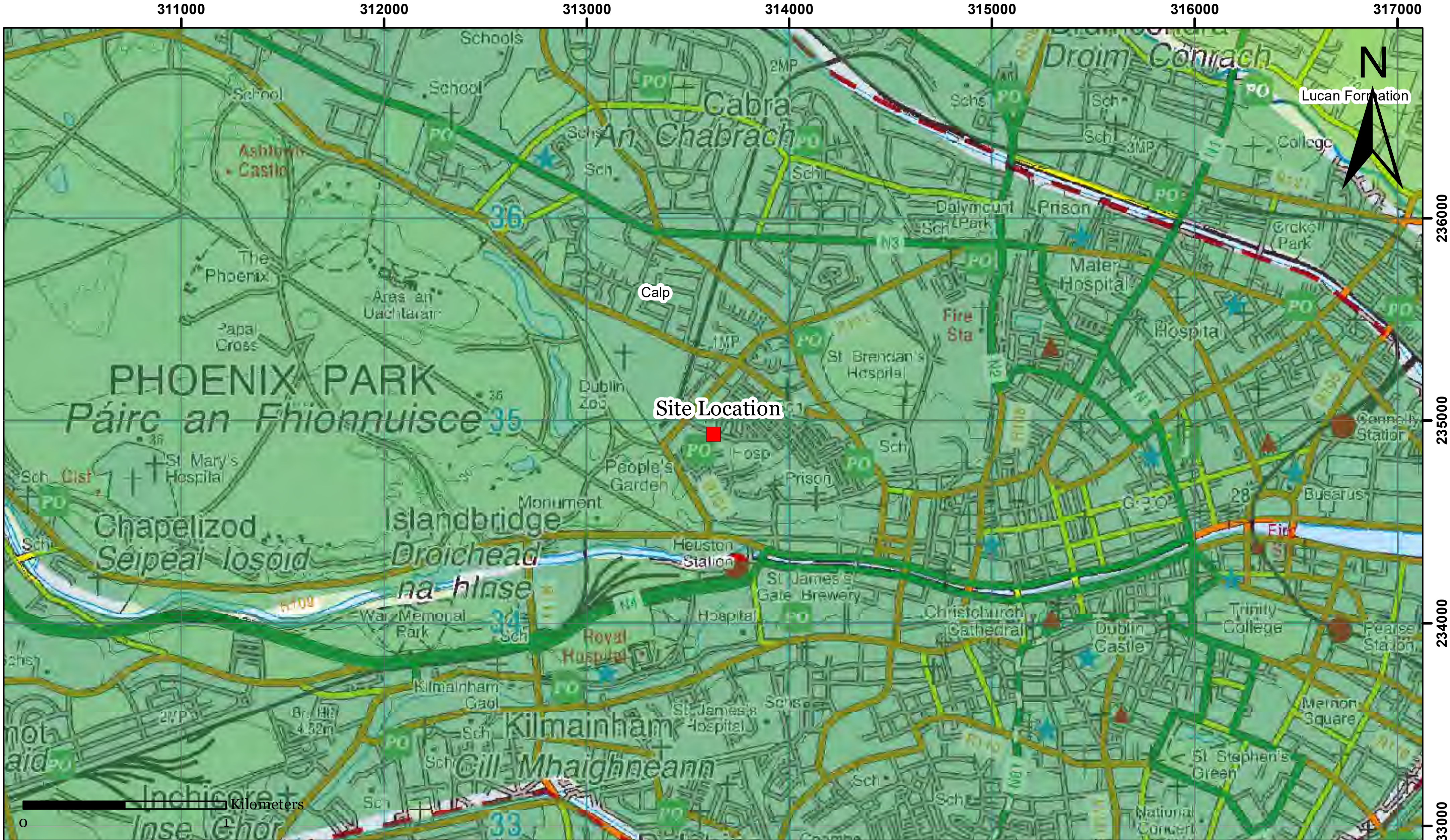
IGSL Limited

TITLE
Subsoils

Details:
- Site Location
- A - Alluvium undifferentiated
- GLs - Limestone sands and gravels (Carboniferous)
- Made - Made Ground
- Rck - Bedrock at surface
- TLs - Limestone till (Carboniferous)

Figure 2.3



O'Callaghan Moran & Associates,
Unit 15 Melbourne Business Park,
Model Farm Road, Cork.
Tel. (021) 4345366
email: info@ocallaghanmoran.com

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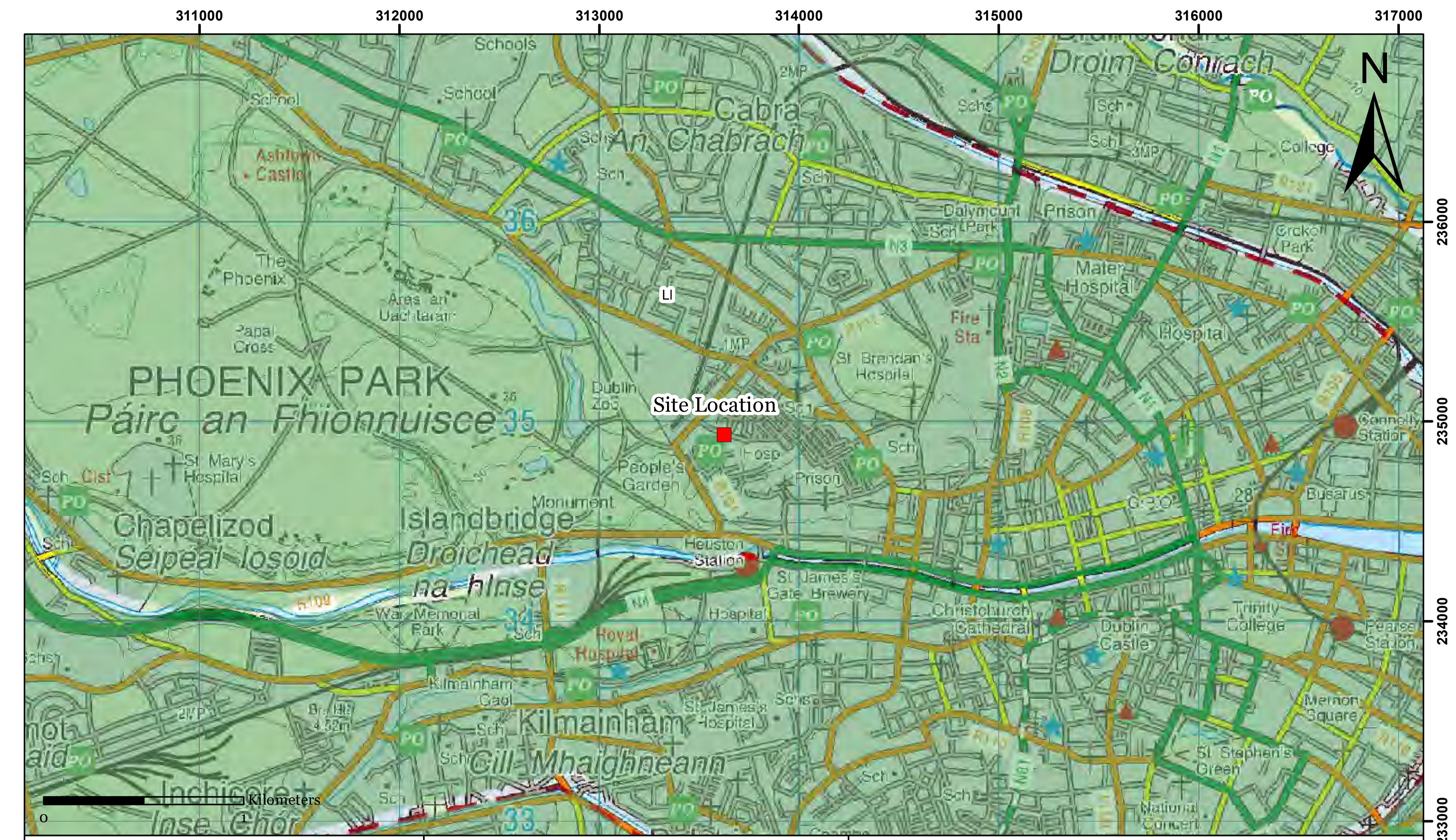
TITLE

Bedrock Geology

Details:

- Site Location
- Calp - Dark Grey to Black, Limestone and Shale
- Lucan Formation - Dark Limestone and Shale

Figure 2.4



O'Callaghan Moran & Associates,
Unit 15 Melbourne Business Park,
Model Farm Road, Cork.
Tel. (021) 4345366
email: info@ocallaghanmoran.com

CLIENT

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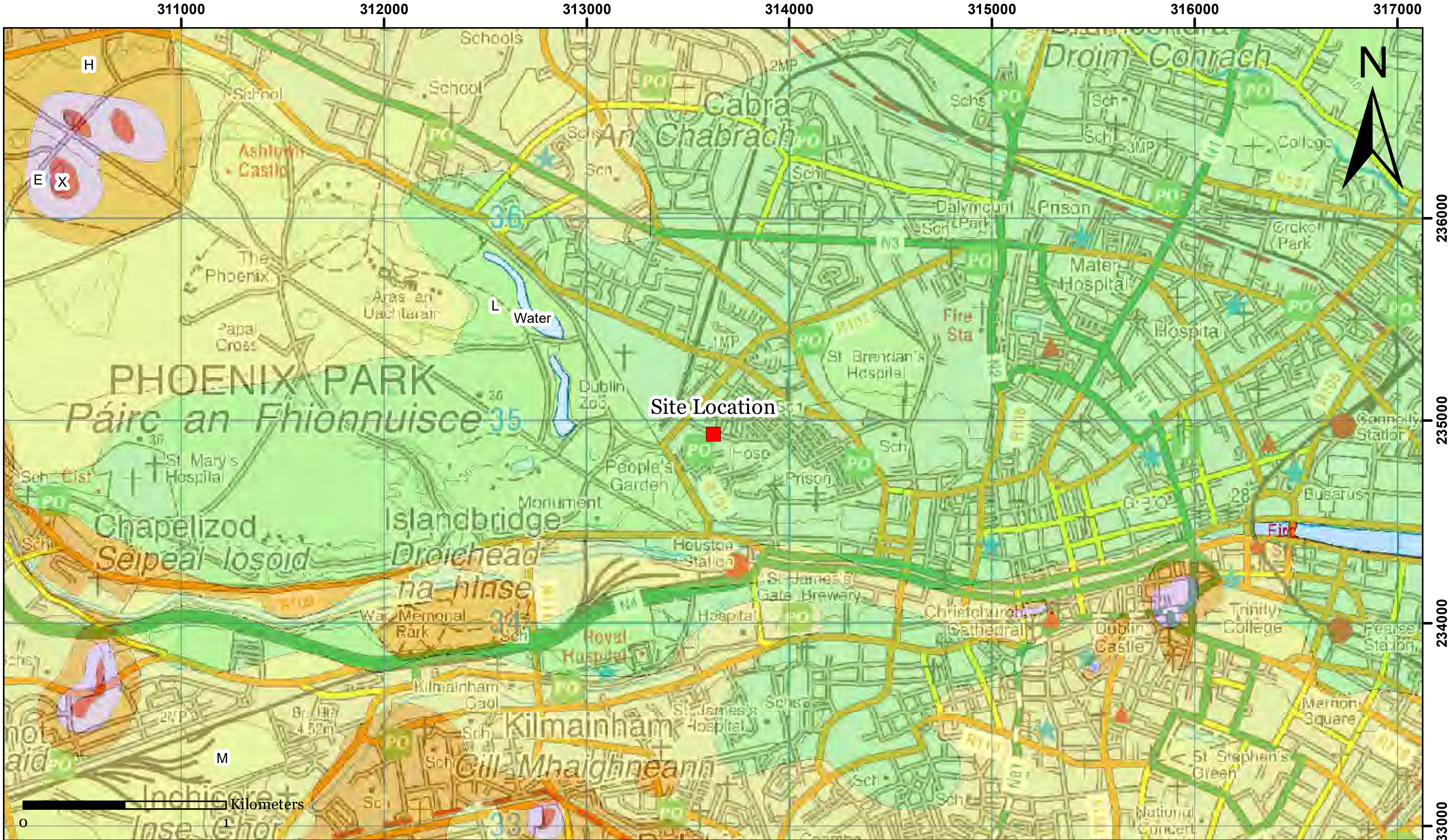
TITLE

Aquifer Classification

Details:

- Site Location
- LI - Locally Important Aquifer. Mod. Productive only in Local Zones

Figure 2.5



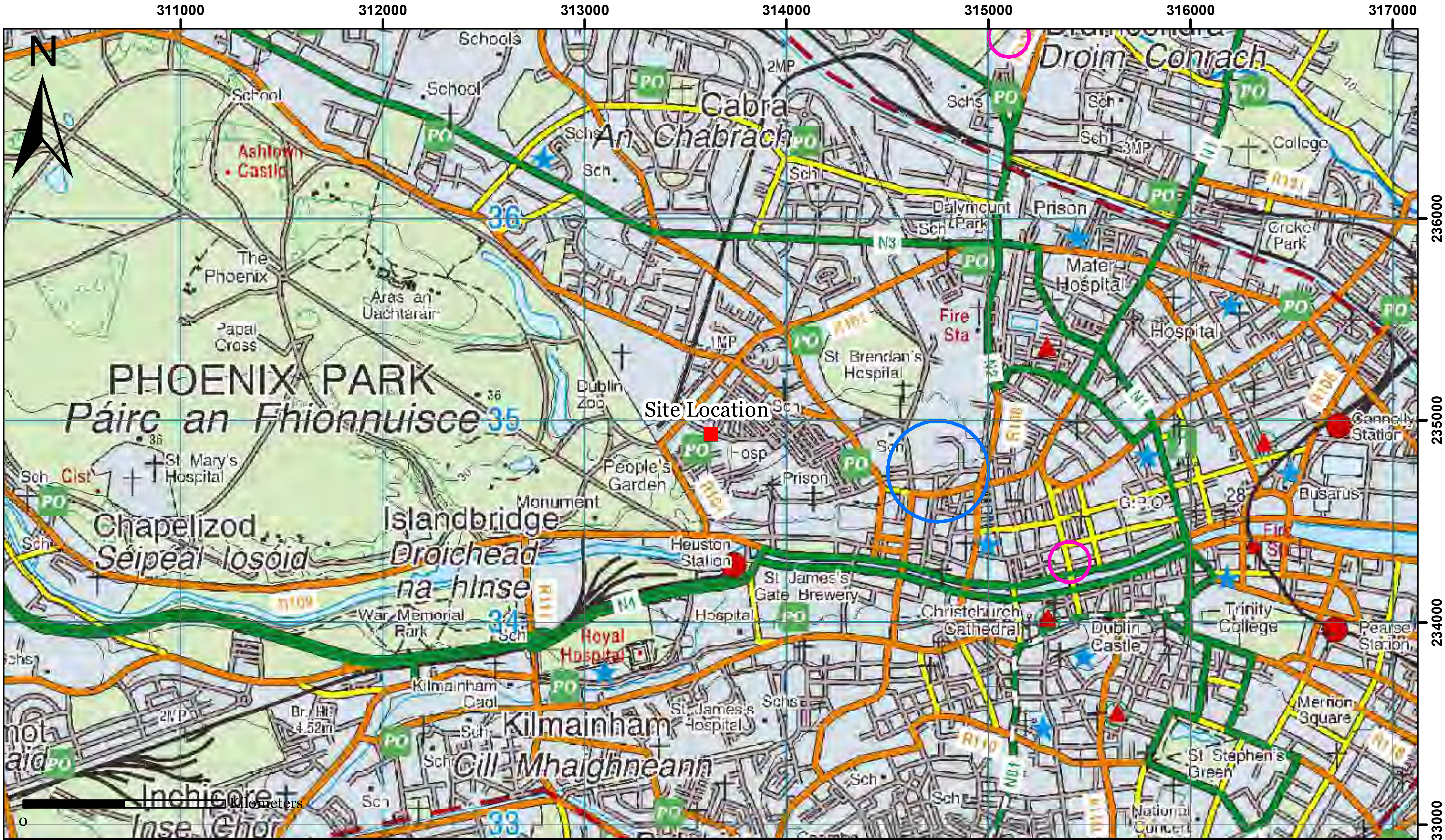
O'Callaghan Moran & Associates,
Unit 15 Melbourne Business Park,
Model Farm Road, Cork.
Tel. (021) 4345366
email: info@ocallaghanmoran.com

CLIENT
IGSL Limited

TITLE
Groundwater Vulnerability

Details:
- Site Location
- X - Bedrock near Surface
- E - Extreme
- H - High
- M - Moderate
- L - Low

Figure 2.6



O'Callaghan Moran & Associates,
Unit 15 Melbourne Business Park,
Model Farm Road, Cork.
Tel. (021) 4345366
email: info@ocallaghanmoran.com

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TITLE

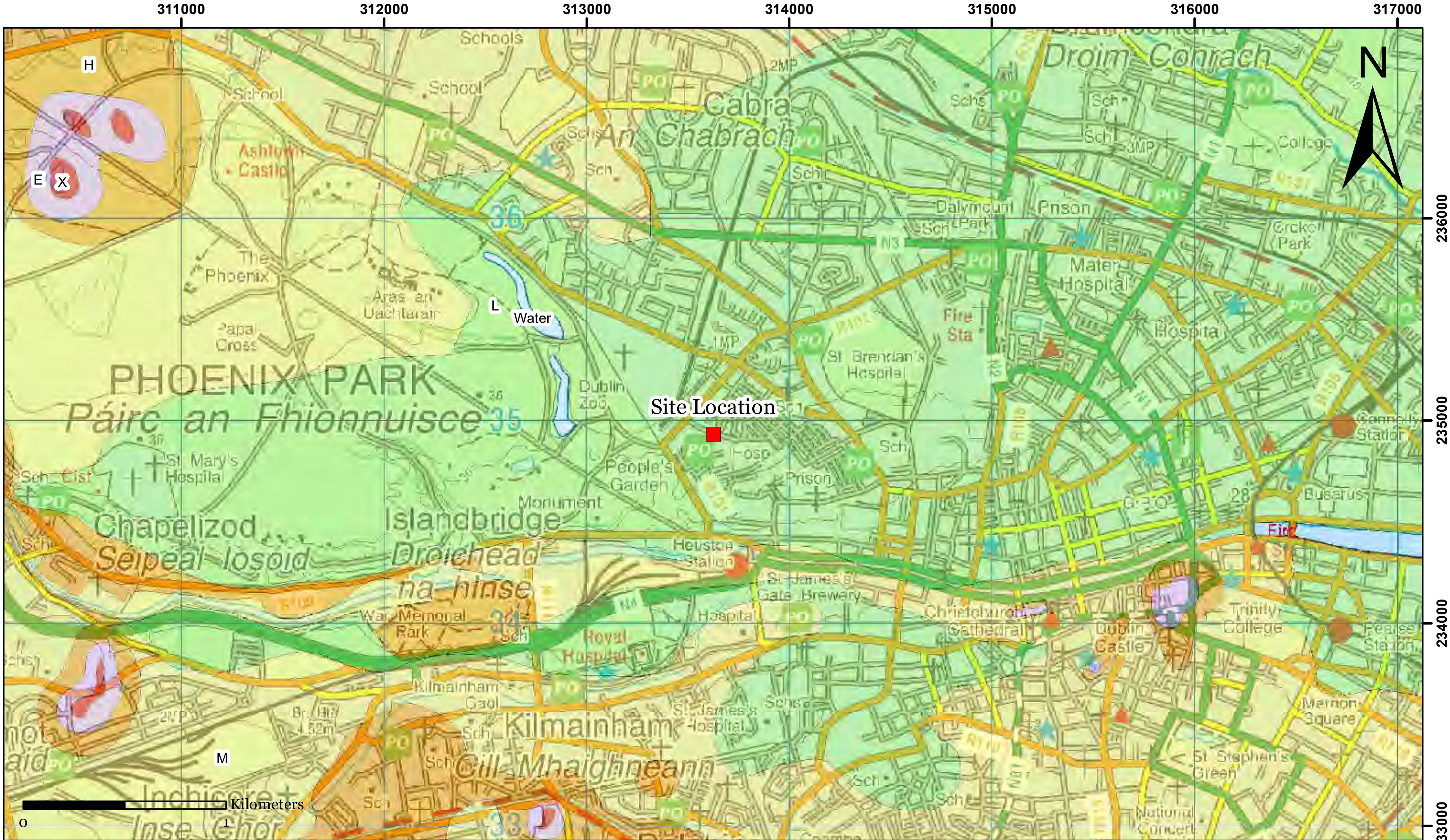
GSI Well Location Data

Details:

Unfortunately many of the borehole logs in the GSI database do not contain accurate location information. The size of the circles shown above is inversely proportional to the accuracy of the well location (i.e. small circles represent high accuracy, where relatively larger circles represent lower accuracy).

- Site Location
- Well Accuracy 10m to 50m
- Well Accuracy 250m to 500m
- Well Accuracy 100m to 200m

Figure 2.7



O'Callaghan Moran & Associates,
Unit 15 Melbourne Business Park,
Model Farm Road, Cork.
Tel. (021) 4345366
email: info@ocallaghanmoran.com

CLIENT

IGSL Limited

TITLE

Groundwater Vulnerability

Details:

- Site Location
- X - Bedrock near Surface
- E - Extreme
- H - High
- M - Moderate
- L - Low

Figure 2.6

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Model Farm Road, Cork.
Tel. (021) 4345366
email: info@ocallaghanmoran.com

CLIENT

IGSL Limited

TITLE

NPWS

Details:

Site Location

SPAs

SACs

Figure 2.9

3 ENVIRONMENTAL SITE ASSESSMENT

3.1 Site Investigation

The site investigation was completed by IGSL Limited in July 2020 and included the collection of 219 composite samples from seventy five (75 No.) window samples and five (5 No.) boreholes. The locations are shown on Figure 3.1. The borehole and window sample logs are in Appendix 1.

3.2 Ground Conditions

The window sample and borehole logs indicate that the subsurface comprises MADE GROUND underlain by Natural Ground. There is topsoil at the surface of the majority of the locations. There is tarmacadam at the surfaces of WS19, WS20, WS25, WS31, WS32, WS33A and BH08. Concrete was encountered at the surface of WS40 and WS70-73. The subsurface is composed of Made Ground ranging from circa. 1.5-2.5 mbgl and is mainly composed of grey/brown, sandy gravelly CLAY with some lenses of brown, clayey gravelly SAND.

The Made Ground contained man-made material composed red brick pieces, timber and concrete which was generally <2% at most locations. At WS12-13, WS15, WS22, WS24, WS27A, WS29, WS37-38, WS43-44, WS47-48, WS50-51, WS57, WS59, WS61-61, WS66 and BH04 the Made Ground contained >2% man-made material.

The underlying natural ground is composed of firm to stiff, grey, sandy gravelly CLAY with some cobble content.

3.3 Sample Collection & Analysis

3.3.1 *Sample Collection*

The samples were collected by IGSL and were placed in laboratory prepared containers and stored in coolers prior to shipment to ChemTest Laboratories.

3.3.2 *Laboratory Analysis*

The samples were tested for metals (arsenic, barium, cadmium, chromium, copper, mercury, molybdenum, nickel, lead, antimony, selenium and zinc), total organic carbon (TOC), BTEX (benzene, toluene, ethylbenzene and xylene) aliphatic and aromatic hydrocarbons, polychlorinated biphenyls (PCB), polyaromatic hydrocarbons

(PAH) and asbestos. Leachate generated from the samples was tested for metals, chloride, fluoride, soluble sulphate, phenols, dissolved organic carbon (DOC), total dissolved solids (TDS).

This parameter range facilitates an assessment of the hazardous properties of the waste, and also allows a determination of appropriate off-site management options based on the Waste Acceptance Criteria (WAC) applied by landfill operators.

The analytical methods were all ISO/CEN approved and the method detection limits were below the relevant guidance/threshold values. The full laboratory report is in Appendix 3.

3.4 **Baseline Soil Conditions**

The results are presented in Tables 3.1-3.3. Only those samples where the S4ULs were exceeded are shown on the summary table. For comparison purposes the Tables include the Land Quality Management/Chartered Institute of Environmental Health (LQM/CIEH) S4ULs Human Health Risk Assessment-Risk Levels (S4ULs). The selected S4ULs are for residential end use with home grown produce. WS06 (0.5-1.0m), WS43 (0.3-0.5m) and WS51 (0.4-0.7m) exceeds the S4UL for Arsenic. WS14 (1.5-1.8m), WS17 (0.7-1.0m), WS18 (0.4-0.7m), WS21 (0.5-0.8m), WS26 (2.2-2.5m), WS27A (0.4-0.7m and 1.1-1.5m), WS42 (0.5-0.8m), WS46 (0.5-0.8m), WS49 (0.5-0.8m and 1.4-1.7m), WS57 (0.5-0.8m) and BH8 (1.0m) exceed the S4UL for various PAH’s. WS09 (1.5-1.8m), WS27A (2.1-3.0m), WS28 (0.3-0.5m), WS31 (2.2-2.6m), WS49 (0.5-0.8m) and WS57 (0.5-0.8m) exceed the S4UL for Aliphatic and Aromatic Hydrocarbons.

3.4.1 *Risk Mitigation Measures*

The redeveloped site will comprise residential dwellings and it has been assumed this will include gardens. To mitigate the human health risk the soils where the S4ULs were exceeded should be excavated and removed from the site for appropriate disposal. Should removal not be feasible the soils will need to be covered by a physical barrier layer to isolate then future site use.

Such a barrier layer could include a c400mm compacted granular fill layer. If the locations are beneath roads or buildings the soils should present no risk to future site users and can remain in situ.

To mitigate potential risk to construction works prior to excavation all made and natural ground should be dampened to minimise dust generation and standard Personal Protective Equipment should be worn by construction site personnel.

O'Callaghan Moran & Associates

O'Callaghan Moran & Associates, Unit 15 Melbourne Business Park, Model Farm Road, Cork. Tel. (021) 4345366 Email: info@ocallaghanmoran.com	**Title:** Figure 3.1 Sample Location Plan	**Legend**
This drawing is the property of O'Callaghan Moran & Associates and shall not be used, reproduced or disclosed to anyone without the prior written permission of O'Callaghan Moran & Associates and shall be returned upon request.	**Client:** IGSL Limited	

Table 3.1- Metals

Parameter	Units	WS06	WS09	WS14	WS17	WS18	WS21	WS26	WS27A	WS27A	WS27A	WS28	WS31	WS42	WS43	WS46	WS49	WS49	WS51	WS57	BH8	Residential with homegrown produce LQM/CIEH Suitable 4 Use Levels (S4ULs) [mg/kg DW]		
		0.5-1.0	1.5-1.8	1.5-1.8	0.7-1.0	0.4-0.7	0.5-0.8	2.2-2.5	0.4-0.7	1.1-1.5	2.1-3.0	0.3-0.5	2.2-2.6	0.5-0.8	0.3-0.5	0.5-0.8	0.5-0.8	1.4-1.7	0.4-0.7	0.5-0.8	1.0	1 % SOM	2.5% SOM	6 % SOM
Metals																								
Antimony	mg/kg	2.3	2.1	< 2.0	4.5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	2.4	< 2.0	2.5	2.5	2.0	2.9	< 2.0	< 2.0	2.3	< 2.0	NE	NE	NE
Inorganic Arsenic	mg/kg	44	18	22	33	17	22	15	20	20	16	23	22	32	57	19	26	20	44	17	17	NE	NE	37
Barium	mg/kg	65	89	87	180	78	100	61	76	83	83	100	100	88	120	97	200	92	54	110	100	NE	NE	NE
Cadmium	mg/kg	2.8	2.0	1.9	1.8	2.0	2.6	1.3	1.8	1.9	1.7	2.3	2.0	2.1	2.3	1.7	2.1	2.0	0.97	1.4	2.0	NE	NE	11
Chromium III	mg/kg	20	14	15	19	17	17	12	16	14	14	23	14	22	31	25	19	15	29	19	14	NE	NE	910
Copper	mg/kg	36	34	24	93	41	31	22	30	32	38	47	23	39	87	34	55	26	25	60	38	NE	NE	2,400
Hexavalent Chromium	mg/kg	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NE	NE	6*
Lead	mg/kg	26	50	25	340	56	32	29	39	32	35	80	17	53	78	44	170	19	28	110	100	NE	NE	NE
Inorganicmercury	mg/kg	< 0.10	0.12	< 0.10	0.78	0.19	0.11	< 0.10	0.11	< 0.10	0.10	0.21	< 0.10	0.19	0.13	0.15	0.76	< 0.10	< 0.10	0.43	0.22	NE	NE	40
Molybdenum	mg/kg	4.3	3.4	3.1	3.3	3.6	4.2	< 2.0	2.8	3.4	3.3	3.9	5.8	3.8	4.0	3.4	4.3	3.8	< 2.0	2.9	2.6	NE	NE	NE
Nickel	mg/kg	75	43	37	48	46	47	29	37	38	38	54	41	48	60	48	45	37	38	42	36	NE	NE	180*
Selenium	mg/kg	0.34	0.49	0.43	0.85	1.3	0.71	0.40	0.52	0.56	0.82	0.90	4.2	0.77	0.68	0.68	1.0	0.55	0.54	1.3	0.77	NE	NE	250
Zinc	mg/kg	92	97	78	370	110	86	72	100	81	92	140	88	110	140	82	190	81	83	160	170	NE	NE	3,700
Non-Metallic elements																								
Boron	mg/kg	< 0.40	0.88	0.41	1.3	0.89	< 0.40	0.74	0.61	0.75	0.69	0.70	< 0.40	0.56	0.48	0.45	1.3	0.88	< 0.40	1.3	1.1	NE	NE	290

NE denotes Not established

Table 3.2- PAHs

Parameter	Units	WS06	WS09	WS14	WS17	WS18	WS21	WS26	WS27A	WS27A	WS27A	WS28	WS31	WS42	WS43	WS46	WS49	WS49	WS51	WS57	BH8	Residential with homegrown produce LQM/CIEH Suitable 4 Use Levels (S4ULs) [mg/kg DW]		
		0.5-1.0	1.5-1.8	1.5-1.8	0.7-1.0	0.4-0.7	0.5-0.8	2.2-2.5	0.4-0.7	1.1-1.5	2.1-3.0	0.3-0.5	2.2-2.6	0.5-0.8	0.3-0.5	0.5-0.8	0.5-0.8	1.4-1.7	0.4-0.7	0.5-0.8	1.0	1 % SOM	2.5% SOM	6 % SOM
PAH MS																								
Naphthalene	mg/kg	< 0.010	< 0.010	3.3	3.7	0.66	< 0.010	0.62	0.38	0.51	< 0.010	< 0.010	< 0.010	1.6	< 0.010	2.5	10	0.85	< 0.010	0.47	0.50	2.3*	5.6*	13*
Acenaphthylene	mg/kg	< 0.010	< 0.010	0.35	1.1	0.15	< 0.010	0.46	0.26	0.19	< 0.010	< 0.010	< 0.010	0.53	< 0.010	0.40	17	1.6	< 0.010	0.46	0.11	170	420	920
Acenaphthene	mg/kg	< 0.010	< 0.010	2.4	1.7	2.8	< 0.010	3.2	0.42	0.79	< 0.010	< 0.010	< 0.010	0.74	< 0.010	0.98	8.2	0.98	< 0.010	1.3	0.58	210	510	1,100
Fluorene	mg/kg	< 0.010	< 0.010	2.4	2.6	2.2	< 0.010	2.5	0.72	0.87	< 0.010	< 0.010	< 0.010	1.1	< 0.010	1.4	19	1.7	< 0.010	1.2	0.50	170	400	860
Phenanthrene	mg/kg	< 0.010	0.59	17	21	15	2.4	21	3.0	5.8	1.6	< 0.010	< 0.010	5.9	0.30	8.0	150	12	< 0.010	15	3.3	95	220	440
Anthracene	mg/kg	< 0.010	0.16	3.4	5.0	2.4	0.13	5.9	0.81	1.9	0.39	< 0.010	< 0.010	1.5	< 0.010	1.7	15	1.5	< 0.010	3.3	0.89	2,400	5,400	11,000
Fluoranthene	mg/kg	< 0.010	1.4	17	24	10	3.5	35	4.4	8.3	2.5	0.72	< 0.010	8.4	0.40	9.6	150	10	< 0.010	39	4.6	280	560	890
Pyrene	mg/kg	< 0.010	1.2	13	20	9.3	1.8	28	3.8	8.5	2.1	0.59	< 0.010	6.7	0.34	7.6	110	7.6	< 0.010	31	3.8	620	1,200	2,000
Benzo(a)anthracene	mg/kg	< 0.010	0.82	6.4	12	3.6	1.3	16	2.2	3.8	1.3	< 0.010	< 0.010	3.0	< 0.010	3.3	45	3.2	< 0.010	19	2.2	7.2	11	13
Chrysene	mg/kg	< 0.010	0.75	6.2	10	4.4	1.6	14	2.3	3.3	1.2	< 0.010	< 0.010	3.3	< 0.010	3.2	53	3.1	< 0.010	22	2.1	15	22	27
Benzo(a)pyrene (only)	mg/kg	< 0.010	0.90	5.8	13	3.2	1.6	16	2.6	3.7	1.4	< 0.010	< 0.010	2.5	< 0.010	3.3	49	3.2	< 0.010	19	2.3	2.2	2.7	3.0
Indeno(123cd)pyrene	mg/kg	< 0.010	0.74	3.6	8.6	1.9	1.6	11	1.6	2.2	0.77	< 0.010	< 0.010	1.5	< 0.010	1.8	30	1.7	< 0.010	12	1.7	27	36	41
Dibenzo(ah)anthracene	mg/kg	< 0.010	< 0.010	0.77	1.5	< 0.010	0.31	2.0	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.34	< 0.010	0.33	6.5	0.39	< 0.010	2.4	0.29	0.24	0.28	0.3
Benzo(ghi)perylene	mg/kg	< 0.010	0.62	3.5	6.9	2.0	1.4	7.7	1.8	2.3	0.85	< 0.010	< 0.010	1.4	< 0.010	2.0	28	1.7	< 0.010	11	1.3	320	340	350
Coronene	mg/kg	< 0.010	< 0.010	< 0.010	1.0	< 0.010	< 0.010	1.5	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	5.1	< 0.010	< 0.010	< 0.010	< 0.010	NE	NE	NE
PAH 17 Total	mg/kg	< 0.20	8.7	95	150	63	19	190	29	48	14	1.3	< 0.20	43	1.0	51	780	54	< 0.20	210	28	NE	NE	NE
Benzo(b)fluoranthene	mg/kg	< 0.010	1.2	7.4	15	4.5	2.4	19	3.4	4.8	1.4	< 0.010	< 0.010	3.4	< 0.010	3.9	60	3.4	< 0.010	25	2.8	2.6	3.3	3.7
Benzo(k)fluoranthene	mg/kg	< 0.010	0.34	2.6	5.0	1.2	0.75	6.8	0.98	1.4	0.65	< 0.010	< 0.010	1.3	< 0.010	1.4	21	1.4	< 0.010	10	1.1	77	93	100
Mineral Oil (C10-C40)	mg/kg	< 10	45000	< 10	< 10	< 10	< 10	< 10	120	2900	4800	910	95	40	190	< 10	300	< 10	< 10	290	< 10	NE	NE	NE
Phenol	mg/kg	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	280	550	1,100

NE denotes Not established

Table 3.3 Hydrocarbons and VOC's

Parameter	Units	WS06	WS09	WS14	WS17	WS18	WS21	WS26	WS27A	WS27A	WS27A	WS28	WS31	WS42	WS43	WS46	WS49	WS49	WS51	WS57	BH8	Residential with homegrown produce LQM/CIEH Suitable 4 Use Levels (S4ULs) [mg/kg DW]		
		0.5-1.0	1.5-1.8	1.5-1.8	0.7-1.0	0.4-0.7	0.5-0.8	2.2-2.5	0.4-0.7	1.1-1.5	2.1-3.0	0.3-0.5	2.2-2.6	0.5-0.8	0.3-0.5	0.5-0.8	0.5-0.8	1.4-1.7	0.4-0.7	0.5-0.8	1.0	1 % SOM	2.5% SOM	6 % SOM
Aliphatics																								
EC 5-6	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	42	78	160
EC >6-8	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	100	230	530
EC >8-10	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	12	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	27	65	150
EC >10-12	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	16	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	130	330	770
EC >12-16	mg/kg	< 1.0	1600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	40	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	6.0	< 1.0	< 1.0	2.2	< 1.0	1,100	2,400	4,300
EC >16-35	mg/kg	< 1.0	44000	< 1.0	< 1.0	< 1.0	110	< 1.0	120	2800	4510	650	95	40	140	< 1.0	174	< 1.0	< 1.0	219	< 1.0	65,000	92,000	110,000
EC >35-44	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	87	250	270	< 1.0	< 1.0	17	< 1.0	110	< 1.0	< 1.0	70	< 1.0	65,000	92,000	110,000
Total aliphatics C5-40	mg/kg	< 5.0	45000	< 5.0	< 5.0	< 5.0	110	< 5.0	120	2900	4800	910	95	40	190	< 5.0	300	< 5.0	< 5.0	290	< 5.0	NE	NE	NE
Aromatics																								
EC 5-7	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	70	140	300
EC >7-8	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	130	290	660
EC >8-10	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	34	83	190
EC >10-12	mg/kg	< 1.0	< 1.0	2.7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	3.7	< 1.0	15	< 1.0	< 1.0	< 1.0	< 1.0	74	180	380
EC >12-16	mg/kg	< 1.0	3700	5.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	150	< 1.0	< 1.0	19	< 1.0	140	330	660
EC >16-21	mg/kg	< 1.0	290	7.9	< 1.0	< 1.0	7.1	28	15	< 1.0	15	< 1.0	< 1.0	5.0	< 1.0	< 1.0	660	< 1.0	< 1.0	200	< 1.0	260	540	930
EC >21-35	mg/kg	< 1.0	280	7.8	95	< 1.0	16	51	680	890	1200	2300	1200	170	430	< 1.0	2000	< 1.0	< 1.0	1300	< 1.0	1,100	1,500	1,700
EC >35-44	mg/kg	< 1.0	< 1.0	6.6	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	450	130	< 1.0	< 1.0	< 1.0	< 1.0	92	< 1.0	< 1.0	70	< 1.0	1,100	1,500	1,700
Total aromatics C5-40	mg/kg	< 5.0	4200	30	95	< 5.0	23	78	700	890	1700	2500	1200	170	440	< 5.0	2900	< 5.0	< 5.0	1600	< 5.0	NE	NE	NE
VOCs																								
MTBE	mg/kg	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	NE	NE	NE
Benzene	mg/kg	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.087	0.17	0.37
Toluene	mg/kg	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	130	290	660
Ethylbenzene	mg/kg	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	47	110	260
p-Xylene	mg/kg	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	56	130	310
m-Xylene	mg/kg	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	59	140	320
o-Xylene	mg/kg	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	60	140	330

NE denotes Not established

4 WASTE CLASSIFICATION ASSESSMENT

4.1 Waste Classification

The Haz Waste Online Classification Engine, developed in the UK by One Touch Data Ltd, was used to determine the waste classification. This tool was developed specifically to establish whether waste is non-hazardous or hazardous and has been approved for use in Ireland by the Environmental Protection Agency. The full Waste Classification Report is in Appendix 4 and the results are summarised in Table 4.1-4.3.

Table 4.1 Waste Classification – Hazardous Samples

Sample No.	Depth	Classification	LoW Code	Determinand
WS09	1.5-1.8	Hazardous	17 05 03	TPH
WS19	0.5-0.8	Hazardous	17 05 03	TPH
WS19	2.7-3.0	Hazardous	17 05 03	TPH
WS25	0.4-0.7	Hazardous	17 05 03	TPH
WS27A	1.1-1.5	Hazardous	17 05 03	TPH
WS27A	2.1-3.0	Hazardous	17 05 03	TPH
WS28	0.3-0.5	Hazardous	17 05 03	TPH
WS31	2.2-2.6	Hazardous	17 05 03	TPH
WS49	0.5-0.8	Hazardous	17 05 03	TPH

Table 4.2 Waste Classification – Non-Hazardous 17 09 04

Sample No.	Depth	Classification	LoW Code
WS12	0.6-0.8	Non-Hazardous	17 09 04
WS12	1.5-2.8	Non-Hazardous	17 09 04
WS13	0.4-0.7	Non-Hazardous	17 09 04
WS15	0.5-0.8	Non-Hazardous	17 09 04
WS22	0.5-0.8	Non-Hazardous	17 09 04
WS24	0.5-0.8	Non-Hazardous	17 09 04
WS27A	0.4-0.7	Non-Hazardous	17 09 04
WS29	0.04-0.7	Non-Hazardous	17 09 04
WS37	0.3-0.6	Non-Hazardous	17 09 04
WS38	0.5-0.8	Non-Hazardous	17 09 04
WS43	1.0-1.3	Non-Hazardous	17 09 04
WS44	0.3-0.5	Non-Hazardous	17 09 04
WS47	0.7-1.0	Non-Hazardous	17 09 04
WS48	0.4-0.7	Non-Hazardous	17 09 04
WS50	0.7-1.0	Non-Hazardous	17 09 04
WS51	0.4-0.7	Non-Hazardous	17 09 04
WS51	1.0-1.3	Non-Hazardous	17 09 04
WS57	0.5-0.8	Non-Hazardous	17 09 04
WS59	0.5-0.8	Non-Hazardous	17 09 04
WS61	0.5-0.8	Non-Hazardous	17 09 04
WS61	1.2-1.5	Non-Hazardous	17 09 04

Table 4.2 continued

Sample No.	Depth	Classification	LoW Code
WS62	0.3-0.6	Non-Hazardous	17 09 04
WS66	0.5-0.8	Non-Hazardous	17 09 04
BH03	1.00	Non-Hazardous	17 09 04
BH05	1.00	Non-Hazardous	17 09 04

Table 4.3 Waste Classification – Non-Hazardous 17 05 04

Sample No.	Depth	Classification	LoW Code	Sample No.	Depth	Classification	LoW Code
WS01	0.3-1.0	Non-Hazardous	17 05 04	WS16	0.5-0.8	Non-Hazardous	17 05 04
WS01	1.4-1.9	Non-Hazardous	17 05 04	WS16	1.5-1.8	Non-Hazardous	17 05 04
WS02	0.5-0.8	Non-Hazardous	17 05 04	WS16	2.5-2.8	Non-Hazardous	17 05 04
WS02	1.5-1.8	Non-Hazardous	17 05 04	WS17	0.7-1.0	Non-Hazardous	17 05 04
WS02	2.7-3.0	Non-Hazardous	17 05 04	WS17	1.4-1.8	Non-Hazardous	17 05 04
WS03	0.5-0.8	Non-Hazardous	17 05 04	WS17	2.5-3.0	Non-Hazardous	17 05 04
WS03	1.5-1.8	Non-Hazardous	17 05 04	WS18	0.4-0.7	Non-Hazardous	17 05 04
WS03	2.2-2.5	Non-Hazardous	17 05 04	WS18	1.5-1.8	Non-Hazardous	17 05 04
WS04	0.5-0.8	Non-Hazardous	17 05 04	WS18	2.5-2.9	Non-Hazardous	17 05 04
WS04	1.2-1.5	Non-Hazardous	17 05 04	WS19	1.3-1.6	Non-Hazardous	17 05 04
WS4	2.3-2.5	Non-Hazardous	17 05 04	WS20	0.3-0.5	Non-Hazardous	17 05 04
WS05	0.5-0.8	Non-Hazardous	17 05 04	WS20	1.4-1.7	Non-Hazardous	17 05 04
WS05	1.5-1.8	Non-Hazardous	17 05 04	WS20	2.0-2.4	Non-Hazardous	17 05 04
WS05	2.2-2.5	Non-Hazardous	17 05 04	WS21	0.5-0.8	Non-Hazardous	17 05 04
WS06	0.5-1.0	Non-Hazardous	17 05 04	WS21	1.3-1.7	Non-Hazardous	17 05 04
WS06	1.2-1.5	Non-Hazardous	17 05 04	WS21	2.1-2.4	Non-Hazardous	17 05 04
WS06	2.5-2.8	Non-Hazardous	17 05 04	WS22	1.4-1.7	Non-Hazardous	17 05 04
WS07	0.5-0.8	Non-Hazardous	17 05 04	WS22	2.0-2.3	Non-Hazardous	17 05 04
WS07	1.5-1.8	Non-Hazardous	17 05 04	WS23	0.6-1.0	Non-Hazardous	17 05 04
WS07	2.5-2.7	Non-Hazardous	17 05 04	WS23	1.3-1.6	Non-Hazardous	17 05 04
WS08	0.5-0.8	Non-Hazardous	17 05 04	WS23	2.3-2.6	Non-Hazardous	17 05 04
WS08	1.0-1.3	Non-Hazardous	17 05 04	WS24	1.3-1.8	Non-Hazardous	17 05 04
WS08	2.5-2.8	Non-Hazardous	17 05 04	WS24	2.3-2.6	Non-Hazardous	17 05 04
WS09	0.5-0.8	Non-Hazardous	17 05 04	WS25	1.0-1.3	Non-Hazardous	17 05 04
WS09	2.4-2.8	Non-Hazardous	17 05 04	WS25	2.5-2.8	Non-Hazardous	17 05 04
WS10	0.5-0.8	Non-Hazardous	17 05 04	WS26	0.6-1.0	Non-Hazardous	17 05 04
WS10	1.2-1.5	Non-Hazardous	17 05 04	WS26	1.4-1.6	Non-Hazardous	17 05 04
WS10	2.5-2.8	Non-Hazardous	17 05 04	WS26	2.2-2.5	Non-Hazardous	17 05 04
WS11	0.5-0.7	Non-Hazardous	17 05 04	WS28	1.5-1.8	Non-Hazardous	17 05 04
WS11	1.5-1.7	Non-Hazardous	17 05 04	WS28	2.3-2.6	Non-Hazardous	17 05 04
WS11	2.4-2.5	Non-Hazardous	17 05 04	WS29	1.5-1.8	Non-Hazardous	17 05 04
WS13	1.4-1.7	Non-Hazardous	17 05 04	WS29	2.4-2.8	Non-Hazardous	17 05 04
WS13	2.1-2.4	Non-Hazardous	17 05 04	WS30	0.2-0.4	Non-Hazardous	17 05 04
WS14	0.6-0.9	Non-Hazardous	17 05 04	WS30	1.5-1.8	Non-Hazardous	17 05 04
WS14	1.5-1.8	Non-Hazardous	17 05 04	WS31	0.5-0.8	Non-Hazardous	17 05 04
WS14	2.3-2.6	Non-Hazardous	17 05 04	WS31	1.4-1.7	Non-Hazardous	17 05 04
WS15	1.5-1.8	Non-Hazardous	17 05 04	WS32	1.4-1.7	Non-Hazardous	17 05 04
WS15	2.5-2.8	Non-Hazardous	17 05 04	WS32	2.5-2.9	Non-Hazardous	17 05 04

Table 4.3 continued

Sample No.	Depth	Classification	LoW Code	Sample No.	Depth	Classification	LoW Code
WS33	1.5-1.8	Non-Hazardous	17 05 04	WS53	0.6-0.9	Non-Hazardous	17 05 04
WS33	2.5-2.8	Non-Hazardous	17 05 04	WS53	1.5-1.8	Non-Hazardous	17 05 04
WS33A	0.2-0.4	Non-Hazardous	17 05 04	WS53	2.5-2.8	Non-Hazardous	17 05 04
WS34	0.8-1.0	Non-Hazardous	17 05 04	WS54	0.6-0.9	Non-Hazardous	17 05 04
WS34	1.5-1.8	Non-Hazardous	17 05 04	WS54	1.5-1.8	Non-Hazardous	17 05 04
WS34	2.2-2.5	Non-Hazardous	17 05 04	WS54	2.5-2.8	Non-Hazardous	17 05 04
WS35	0.4-0.7	Non-Hazardous	17 05 04	WS55	0.4-0.7	Non-Hazardous	17 05 04
WS35	1.5-1.8	Non-Hazardous	17 05 04	WS55	1.5-1.8	Non-Hazardous	17 05 04
WS35	2.1-2.3	Non-Hazardous	17 05 04	WS55	2.1-2.4	Non-Hazardous	17 05 04
WS36	0.3-0.6	Non-Hazardous	17 05 04	WS56	0.5-0.8	Non-Hazardous	17 05 04
WS36	1.5-1.8	Non-Hazardous	17 05 04	WS56	1.5-1.8	Non-Hazardous	17 05 04
WS36	2.1-2.4	Non-Hazardous	17 05 04	WS56	2.2-2.5	Non-Hazardous	17 05 04
WS37	2.3-2.6	Non-Hazardous	17 05 04	WS57	1.4-1.7	Non-Hazardous	17 05 04
WS38	1.5-1.8	Non-Hazardous	17 05 04	WS57	2.3-2.6	Non-Hazardous	17 05 04
WS38	2.1-2.4	Non-Hazardous	17 05 04	WS58	0.5-0.8	Non-Hazardous	17 05 04
WS39	0.5-0.9	Non-Hazardous	17 05 04	WS58	1.4-1.7	Non-Hazardous	17 05 04
WS39	1.3-1.6	Non-Hazardous	17 05 04	WS59	1.4-1.7	Non-Hazardous	17 05 04
WS39	2.0-2.3	Non-Hazardous	17 05 04	WS59	2.5-3.0	Non-Hazardous	17 05 04
WS40	0.5-0.8	Non-Hazardous	17 05 04	WS60	0.6-0.9	Non-Hazardous	17 05 04
WS40	1.4-1.7	Non-Hazardous	17 05 04	WS60	1.5-1.8	Non-Hazardous	17 05 04
WS40	2.3-2.6	Non-Hazardous	17 05 04	WS61	2.2-2.5	Non-Hazardous	17 05 04
WS41	0.3-0.6	Non-Hazardous	17 05 04	WS62	1.5-1.8	Non-Hazardous	17 05 04
WS41	1.4-1.7	Non-Hazardous	17 05 04	WS63	0.4-0.7	Non-Hazardous	17 05 04
WS41	2.5-2.8	Non-Hazardous	17 05 04	WS63	1.5-1.8	Non-Hazardous	17 05 04
WS42	0.5-0.8	Non-Hazardous	17 05 04	WS63	2.5-2.8	Non-Hazardous	17 05 04
WS42	1.2-1.5	Non-Hazardous	17 05 04	WS64	0.6-0.9	Non-Hazardous	17 05 04
WS42	2.2-2.5	Non-Hazardous	17 05 04	WS64	1.5-1.8	Non-Hazardous	17 05 04
WS43	0.3-0.5	Non-Hazardous	17 05 04	WS64	2.2-2.5	Non-Hazardous	17 05 04
WS43	2.2-2.5	Non-Hazardous	17 05 04	WS65	0.3-0.6	Non-Hazardous	17 05 04
WS44	1.5-1.8	Non-Hazardous	17 05 04	WS65	1.5-1.8	Non-Hazardous	17 05 04
WS45	0.4-0.7	Non-Hazardous	17 05 04	WS65	2.4-2.7	Non-Hazardous	17 05 04
WS45	1.7-2.0	Non-Hazardous	17 05 04	WS66	1.7-2.0	Non-Hazardous	17 05 04
WS45	2.6-2.9	Non-Hazardous	17 05 04	WS67	0.2-0.5	Non-Hazardous	17 05 04
WS46	0.5-0.8	Non-Hazardous	17 05 04	WS67	1.3-1.6	Non-Hazardous	17 05 04
WS46	1.6-1.9	Non-Hazardous	17 05 04	WS68	0.4-0.6	Non-Hazardous	17 05 04
WS47	1.5-1.8	Non-Hazardous	17 05 04	WS68	1.4-1.7	Non-Hazardous	17 05 04
WS47	2.5-2.8	Non-Hazardous	17 05 04	WS68	2.2-2.5	Non-Hazardous	17 05 04
WS48	1.4-1.7	Non-Hazardous	17 05 04	WS69	0.4-0.7	Non-Hazardous	17 05 04
WS48	2.5-2.9	Non-Hazardous	17 05 04	WS69	1.0-1.3	Non-Hazardous	17 05 04
WS49	1.4-1.7	Non-Hazardous	17 05 04	WS69	2.2-2.5	Non-Hazardous	17 05 04
WS49	2.1-2.5	Non-Hazardous	17 05 04	WS70	0.6-0.9	Non-Hazardous	17 05 04
WS50	1.5-1.8	Non-Hazardous	17 05 04	WS70	1.7-2.0	Non-Hazardous	17 05 04
WS50	2.4-3.0	Non-Hazardous	17 05 04	WS70	2.4-2.6	Non-Hazardous	17 05 04
WS52	0.2-0.4	Non-Hazardous	17 05 04	WS71	0.6-0.9	Non-Hazardous	17 05 04
WS52	1.2-1.5	Non-Hazardous	17 05 04	WS71	1.5-1.8	Non-Hazardous	17 05 04

Table 4.3 continued

Sample No.	Depth	Classification	LoW Code
WS72	0.6-0.9	Non-Hazardous	17 05 04
WS72	1.5-1.8	Non-Hazardous	17 05 04
WS72	2.4-2.8	Non-Hazardous	17 05 04
WS73	0.4-0.7	Non-Hazardous	17 05 04
WS73	1.3-1.6	Non-Hazardous	17 05 04
WS73	2.5-2.8	Non-Hazardous	17 05 04
BH04	1.00	Non-Hazardous	17 05 04
BH04	2.00	Non-Hazardous	17 05 04
BH04	3.00	Non-Hazardous	17 05 04
BH02	1.0	Non-Hazardous	17 05 04
BH02	2.0	Non-Hazardous	17 05 04
BH02	3.0	Non-Hazardous	17 05 04
BH03	2.00	Non-Hazardous	17 05 04
BH03	3.00	Non-Hazardous	17 05 04
BH05	2.0	Non-Hazardous	17 05 04
BH05	3.0	Non-Hazardous	17 05 04
BH06	1.00	Non-Hazardous	17 05 04
BH06	2.00	Non-Hazardous	17 05 04
BH06	3.00	Non-Hazardous	17 05 04
BH07	1.00	Non-Hazardous	17 05 04
BH07	2.00	Non-Hazardous	17 05 04
BH07	3.00	Non-Hazardous	17 05 04
BH8	1.0	Non-Hazardous	17 05 04
BH8	2.0	Non-Hazardous	17 05 04
BH8	3.0	Non-Hazardous	17 05 04

Asbestos was not detected in any of the samples tested. The samples from WS09 (1.5-1.8m), WS19 (0.5-0.8m and 2.7-3.0m), WS25 (0.4-0.7m), (WS27A 1.1-1.5m and 2.1-3.0m), WS28 (0.3-0.5m), WS31 (2.2-2.6m) and WS49 (0.5-0.8m) are classified as hazardous based on the level of Total Petroleum Hydrocarbons (TPH). The appropriate LoW Code for these samples is 17 05 03* (Soil and Stone containing hazardous substances).

The samples from WS12 (0.6-0.8m and 1.5-2.8m), WS13 (0.4-0.7m), WS15 (0.5-0.8m), WS22 (0.5-0.8m), WS24 (0.5-0.8m), WS27A (0.4-0.7m), WS29 (0.04-0.7m), WS37 (0.3-0.6m), WS38 (0.5-0.8m), WS43 (1.0-1.3m), WS44 (0.3-0.5m), WS47 (0.7-1.0m), WS48 (0.4-0.7m), WS50 (0.7-1.0m), WS51 (0.4-0.7m and 1.0-1.3m), WS57 (0.5-0.8m), WS59 (0.5-0.8m), WS61 (0.5-0.8m and 1.2-1.5m), WS62 (0.3-0.6m), WS66 (0.5-0.8m) and BH03 (1.0m) are classified as non-hazardous and the appropriate List of Waste Code is 17 09 04 (Construction and Demolition Waste other than those mentioned in 17 09 03*).

All the other samples are classified as non-hazardous and the appropriate List of Waste Code is 17 05 04 (Soil and stone other than those mentioned in 17 05 03*).

4.2 Waste Acceptance Criteria

The results of the WAC testing are presented in Appendix 5, which includes for comparative purposes the WAC for Inert, Non Hazardous and Hazardous Waste Landfills pursuant to Article 16 of the EU Landfill Directive 1999/31/EC Annex II which establishes criteria and procedures for the acceptance of waste at landfills.

Antimony exceeds the inert WAC in WS25 (0.4-0.7m) and WS27A (2.1-3.0m). Antimony exceeds the inert WAC increased limits in WS60 (0.6-0.9m)

Selenium exceeds the Inert WAC in WS06 (2.5-2.8m), WS22 (2.0-2.3m), WS28 (2.3-2.6m), WS32 (2.5-2.9m), WS70 (2.4-2.6m), WS72 (1.5-1.8m), WS73 (2.5-2.8m) and BH07 (3.0m). Selenium exceeds the Inert WAC increased limits in WS 21 (2.1-2.4m).

Mercury exceeds the Inert WAC increased limits in BH07 (3.0m).

Nickel, Phenol and Dissolved Organic Carbon (DOC) exceed the Inert WAC increased limits in WS07 (1.5-1.8m).

Total Organic Carbon (TOC) exceeds the Inert WAC in WS03 (0.5-0.8m), WS17 (0.7-1.0m), WS19 (0.5-0.8m), WS35 (0.4-0.7m), WS48 (0.4-0.7m), WS49 (0.5-0.8m) and WS60 (0.6-0.9m). TOC exceeds the Inert WAC increased limits in WS57 (0.5-0.8m).

Total Polyaromatic Hydrocarbons exceeds the Inert WAC increased limits in WS17 (0.7-1.0m), WS27A (2.2-2.5m), WS49 (0.5-0.8m) and WS57 (0.5-0.8m).

Mineral Oil exceeds the Inert WAC increased limits in WS09 (1.5-1.8m), WS 19, WS25 (0.4-0.7m), WS27A (1.1-1.5m and 2.1-3.0m) and WS28 (0.3-0.5m).

4.3 Waste Management Options

The EPA has released new guidance on waste acceptance criteria for a range of parameters for soil recovery facilities. This include;

- Metals in soil and stone (including As, Cd, Cr, Cu, Hg, Ni, Pb, Zn);
- Total organic carbon in soil and stone;
- Total BTEX (benzene, toluene, ethylbenzene, xylenes) in soil and stone;
- Mineral oil in soil and stone;
- Polycyclic aromatic hydrocarbons (PAHs) in soil and stone;
- Polychlorinated Biphenyls (PCBs) in soil and stone;
- Asbestos fibres in soil and stone.

This requires that soils from brownfield sites should not exceed the limits for the parameters specified in Table 4.4 and 4.5 below. For metals the limits have been specified for a range of soil types nationally separated into six domain areas.

Table 4.4 Soil Recovery Site Criteria

Parameter	Limit for Soil Recovery Sites
Total BTEX	0.05 mg/kg
Mineral oil	50 mg/kg
Total PAHs	1 mg/kg
Total PCBs	0.05 mg/kg

The soil and stone cannot be sent for recovery if the trigger levels for a particular domain are exceeded. There is however some flexibility in applying the limits. A derogation applies where up to three parameters can exceed the limit for a sample provided the concentration in the samples is no more than 1.5 times the trigger level. The site which is subject to this investigation is located in Domain 2 and the trigger levels are listed in Table 4.5

Table 4.5

		Domain 2 Trigger Level	1.5 times Trigger Level
Arsenic	**mg/kg**	24.90	37.35
Cadmium	**mg/kg**	3.28	4.92
Chromium	**mg/kg**	50.30	75.45
Copper	**mg/kg**	63.50	95.25
Mercury	**mg/kg**	0.36	0.54
Nickel	**mg/kg**	61.90	92.85
Lead	**mg/kg**	86.10	129.15
Zinc	**mg/kg**	197.00	295.5

While samples from WS02 (0.5-0.8m), WS07 (2.5-2.7m), WS11 (0.5-0.7m) WS14, WS15 (0.5-0.8m), WS16 (0.5-0.8m and 1.5-1.8m), WS17 (1.4-1.8m), WS18 (0.4-0.7 and 1.5-18m), WS21 (0.5-0.8m), WS24 (0.5-0.8m), WS26 (0.6-1.0m and 1.4-1.6m), WS27A (0.4-0.7m), WS34 (1.5-1.8m), WS38 (0.5-0.8m and 2.1-2.4m), WS42 (0.5-0.8m and 1.2-1.5m), WS43 (0.3-0.5m), WS44 (0.3-0.5m), WS46 (0.5-0.8m), WS47 (0.7-1.0m and 1.5-1.8m), WS49 (1.4-1.7m), WS51 (1.0-1.3m), WS55 (2.1-2.4m and 0.5-0.8m), WS57 (1.4-1.7m), WS61 (0.5-0.8m), WS62 (0.3-0.6m), WS66 (0.5-0.8m and 1.7-2.0m), WS68 (0.4-0.6m and 2.2-2.5m), BH02 (1.0m), BH04 (1.0m), BH03 (1.0m), BH05 (1.0m) and BH08 (1.0m and 2.0m) meet the inert WAC they do not meet the soil recovery criteria for PAHS and/or Mineral Oil. These samples have been classified as B-1 suitable for recovery/disposal to inert waste landfill with increased limits.

The samples from WS36 (0.3-0.6m) and WS52 (0.2-0.4m) meet the inert WAC, they do not meet the soil recovery criteria for metal concentrations. WS36 (0.3-0.6m) exceeds the 1.5 times trigger level for lead. WS52 (0.2-0.4m) exceeds the 1.5 times trigger level for Arsenic and Lead. These samples have been classified as B-1 suitable for recovery/disposal to inert waste landfill with increased limits.

Waste Management Options are summarised on Table 4.6-4.8. All are subject to approval of the waste management facility operators. Class A wastes are suitable for recovery at a licensed/permitted soils recovery facility. Class B wastes are suitable for disposal to an inert landfill. Class B-1 wastes are suitable for recovery/disposal to inert waste landfill with increased limits. Class C wastes exceed the inert WAC and are suitable for recovery/disposal to a non-hazardous waste landfill site. Class D Waste must be sent for treatment/disposal at licensed hazardous waste facility.

Table 4.6 Waste Management Summary – Hazardous Samples

Sample No.	Depth	LoW Code	Category
WS09	1.5-1.8	17 05 03	D
WS19	0.5-0.8	17 05 03	D
WS19	2.7-3.0	17 05 03	D
WS25	0.4-0.7	17 05 03	D
WS27A	1.1-1.5	17 05 03	D
WS27A	2.1-3.0	17 05 03	D
WS28	0.3-0.5	17 05 03	D
WS31	2.2-2.6	17 05 03	D
WS49	0.5-0.8	17 05 03	D

Table 4.7 Waste Management Summary – Non-Hazardous Samples 17 09 04

Sample No.	Depth	LoW Code	Category
WS12	0.6-0.8	17 09 04	B
WS12	1.5-2.8	17 09 04	B
WS13	0.4-0.7	17 09 04	B
WS15	0.5-0.8	17 09 04	B-1
WS22	0.5-0.8	17 09 04	B
WS24	0.5-0.8	17 09 04	B-1
WS27A	0.4-0.7	17 09 04	B-1
WS29	0.04-0.7	17 09 04	B
WS37	0.3-0.6	17 09 04	B
WS38	0.5-0.8	17 09 04	B-1
WS43	1.0-1.3	17 09 04	B
WS44	0.3-0.5	17 09 04	B-1
WS47	0.7-1.0	17 09 04	B-1
WS48	0.4-0.7	17 09 04	B-1
WS50	0.7-1.0	17 09 04	B
WS51	0.4-0.7	17 09 04	B
WS51	1.0-1.3	17 09 04	B-1
WS57	0.5-0.8	17 09 04	C
WS59	0.5-0.8	17 09 04	B
WS61	0.5-0.8	17 09 04	B-1
WS61	1.2-1.5	17 09 04	B
WS62	0.3-0.6	17 09 04	B-1
WS66	0.5-0.8	17 09 04	B-1
BH03	1.00	17 09 04	B-1
BH05	1.00	17 09 04	B-1

Table 4.8 Waste Management Summary – Non-Hazardous Samples 17 05 04

Sample No.	Depth	LoW Code	Category	Sample No.	Depth	LoW Code	Category
WS01	0.3-1.0	17 05 04	A	WS19	1.3-1.6	17 05 04	C
WS01	1.4-1.9	17 05 04	A	WS20	0.3-0.5	17 05 04	A
WS02	0.5-0.8	17 05 04	B-1	WS20	1.4-1.7	17 05 04	A
WS02	1.5-1.8	17 05 04	A	WS20	2.0-2.4	17 05 04	A
WS02	2.7-3.0	17 05 04	A	WS21	0.5-0.8	17 05 04	B-1
WS03	0.5-0.8	17 05 04	B-1	WS21	1.3-1.7	17 05 04	A
WS03	1.5-1.8	17 05 04	A	WS21	2.1-2.4	17 05 04	C
WS03	2.2-2.5	17 05 04	A	WS22	1.4-1.7	17 05 04	A
WS04	0.5-0.8	17 05 04	A	WS22	2.0-2.3	17 05 04	B-1
WS04	1.2-1.5	17 05 04	A	WS23	0.6-1.0	17 05 04	A
WS4	2.3-2.5	17 05 04	A	WS23	1.3-1.6	17 05 04	A
WS05	0.5-0.8	17 05 04	A	WS23	2.3-2.6	17 05 04	A
WS05	1.5-1.8	17 05 04	A	WS24	1.3-1.8	17 05 04	A
WS05	2.2-2.5	17 05 04	A	WS24	2.3-2.6	17 05 04	A
WS06	0.5-1.0	17 05 04	A	WS25	1.0-1.3	17 05 04	A
WS06	1.2-1.5	17 05 04	A	WS25	2.5-2.8	17 05 04	A
WS06	2.5-2.8	17 05 04	B-1	WS26	0.6-1.0	17 05 04	B-1
WS07	0.5-0.8	17 05 04	A	WS26	1.4-1.6	17 05 04	B-1
WS07	1.5-1.8	17 05 04	C	WS26	2.2-2.5	17 05 04	C
WS07	2.5-2.7	17 05 04	B-1	WS28	1.5-1.8	17 05 04	A
WS08	0.5-0.8	17 05 04	A	WS28	2.3-2.6	17 05 04	B-1
WS08	1.0-1.3	17 05 04	A	WS29	1.5-1.8	17 05 04	A
WS08	2.5-2.8	17 05 04	A	WS29	2.4-2.8	17 05 04	A
WS09	0.5-0.8	17 05 04	A	WS30	0.2-0.4	17 05 04	A
WS09	2.4-2.8	17 05 04	A	WS30	1.5-1.8	17 05 04	A
WS10	0.5-0.8	17 05 04	A	WS31	0.5-0.8	17 05 04	A
WS10	1.2-1.5	17 05 04	A	WS31	1.4-1.7	17 05 04	A
WS10	2.5-2.8	17 05 04	A	WS32	1.4-1.7	17 05 04	A
WS11	0.5-0.7	17 05 04	B-1	WS32	2.5-2.9	17 05 04	B-1
WS11	1.5-1.7	17 05 04	A	WS33	1.5-1.8	17 05 04	A
WS11	2.4-2.5	17 05 04	A	WS33	2.5-2.8	17 05 04	A
WS13	1.4-1.7	17 05 04	A	WS33A	0.2-0.4	17 05 04	A
WS13	2.1-2.4	17 05 04	A	WS34	0.8-1.0	17 05 04	A
WS14	0.6-0.9	17 05 04	B-1	WS34	1.5-1.8	17 05 04	B-1
WS14	1.5-1.8	17 05 04	B-1	WS34	2.2-2.5	17 05 04	A
WS14	2.3-2.6	17 05 04	B-1	WS35	0.4-0.7	17 05 04	B-1
WS15	1.5-1.8	17 05 04	A	WS35	1.5-1.8	17 05 04	A
WS15	2.5-2.8	17 05 04	A	WS35	2.1-2.3	17 05 04	A
WS16	0.5-0.8	17 05 04	B-1	WS36	0.3-0.6	17 05 04	B-1
WS16	1.5-1.8	17 05 04	B-1	WS36	1.5-1.8	17 05 04	A
WS16	2.5-2.8	17 05 04	A	WS36	2.1-2.4	17 05 04	A
WS17	0.7-1.0	17 05 04	C	WS37	2.3-2.6	17 05 04	A
WS17	1.4-1.8	17 05 04	B-1	WS38	1.5-1.8	17 05 04	A
WS17	2.5-3.0	17 05 04	A	WS38	2.1-2.4	17 05 04	B-1
WS18	0.4-0.7	17 05 04	B-1	WS39	0.5-0.9	17 05 04	A
WS18	1.5-1.8	17 05 04	B-1	WS39	1.3-1.6	17 05 04	A
WS18	2.5-2.9	17 05 04	A	WS39	2.0-2.3	17 05 04	A

Table 4.8 continued

Sample No.	Depth	LoW Code	Category	Sample No.	Depth	LoW Code	Category
WS40	0.5-0.8	17 05 04	A	WS60	1.5-1.8	17 05 04	A
WS40	1.4-1.7	17 05 04	A	WS61	2.2-2.5	17 05 04	A
WS40	2.3-2.6	17 05 04	A	WS62	1.5-1.8	17 05 04	A
WS41	0.3-0.6	17 05 04	A	WS63	0.4-0.7	17 05 04	A
WS41	1.4-1.7	17 05 04	A	WS63	1.5-1.8	17 05 04	A
WS41	2.5-2.8	17 05 04	A	WS63	2.5-2.8	17 05 04	A
WS42	0.5-0.8	17 05 04	B-1	WS64	0.6-0.9	17 05 04	A
WS42	1.2-1.5	17 05 04	B-1	WS64	1.5-1.8	17 05 04	A
WS42	2.2-2.5	17 05 04	A	WS64	2.2-2.5	17 05 04	A
WS43	0.3-0.5	17 05 04	B-1	WS65	0.3-0.6	17 05 04	A
WS43	2.2-2.5	17 05 04	A	WS65	1.5-1.8	17 05 04	A
WS44	1.5-1.8	17 05 04	A	WS65	2.4-2.7	17 05 04	A
WS45	0.4-0.7	17 05 04	A	WS66	1.7-2.0	17 05 04	B-1
WS45	1.7-2.0	17 05 04	A	WS67	0.2-0.5	17 05 04	A
WS45	2.6-2.9	17 05 04	A	WS67	1.3-1.6	17 05 04	A
WS46	0.5-0.8	17 05 04	B-1	WS68	0.4-0.6	17 05 04	B-1
WS46	1.6-1.9	17 05 04	A	WS68	1.4-1.7	17 05 04	A
WS47	1.5-1.8	17 05 04	B-1	WS68	2.2-2.5	17 05 04	B-1
WS47	2.5-2.8	17 05 04	A	WS69	0.4-0.7	17 05 04	A
WS48	1.4-1.7	17 05 04	A	WS69	1.0-1.3	17 05 04	A
WS48	2.5-2.9	17 05 04	A	WS69	2.2-2.5	17 05 04	A
WS49	1.4-1.7	17 05 04	B-1	WS70	0.6-0.9	17 05 04	A
WS49	2.1-2.5	17 05 04	A	WS70	1.7-2.0	17 05 04	A
WS50	1.5-1.8	17 05 04	A	WS70	2.4-2.6	17 05 04	B-1
WS50	2.4-3.0	17 05 04	A	WS71	0.6-0.9	17 05 04	A
WS52	0.2-0.4	17 05 04	B-1	WS71	1.5-1.8	17 05 04	A
WS52	1.2-1.5	17 05 04	A	WS72	0.6-0.9	17 05 04	A
WS53	0.6-0.9	17 05 04	A	WS72	1.5-1.8	17 05 04	B-1
WS53	1.5-1.8	17 05 04	A	WS72	2.4-2.8	17 05 04	A
WS53	2.5-2.8	17 05 04	A	WS73	0.4-0.7	17 05 04	A
WS54	0.6-0.9	17 05 04	A	WS73	1.3-1.6	17 05 04	A
WS54	1.5-1.8	17 05 04	A	WS73	2.5-2.8	17 05 04	B-1
WS54	2.5-2.8	17 05 04	A	BH04	1.00	17 05 04	B-1
WS55	0.4-0.7	17 05 04	A	BH04	2.00	17 05 04	A
WS55	1.5-1.8	17 05 04	A	BH04	3.00	17 05 04	A
WS55	2.1-2.4	17 05 04	B-1	BH03	2.00	17 05 04	A
WS56	0.5-0.8	17 05 04	B-1	BH03	3.00	17 05 04	A
WS56	1.5-1.8	17 05 04	A	BH06	1.00	17 05 04	A
WS56	2.2-2.5	17 05 04	A	BH06	2.00	17 05 04	A
WS57	1.4-1.7	17 05 04	B-1	BH06	3.00	17 05 04	A
WS57	2.3-2.6	17 05 04	A	BH07	1.00	17 05 04	A
WS58	0.5-0.8	17 05 04	A	BH07	2.00	17 05 04	A
WS58	1.4-1.7	17 05 04	A	BH07	3.00	17 05 04	C
WS59	1.4-1.7	17 05 04	A	BH8	1.0	17 05 04	B-1
WS59	2.5-3.0	17 05 04	A	BH8	2.0	17 05 04	B-1
WS60	0.6-0.9	17 05 04	C	BH8	3.0	17 05 04	A

Table 4.8 continued

Sample No.	Depth	LoW Code	Category
BH02	1.0	17 05 04	B-1
BH02	2.0	17 05 04	A
BH02	3.0	17 05 04	A
BH05	2.0	17 05 04	A
BH02	3.0	17 05 04	A

A	Classified as Non-Hazardous, 17 05 04 meets inert WAC
B	Classified as Non-Hazardous, 17 09 04 meets inert WAC
B-1	Classified as Non-Hazardous, 17 05 04 or 17 09 04 meets inert WAC increased limits
C	Classified as Non-Hazardous, 17 05 04 and 17 09 04 exceeds inert WAC and increased limits
D	Classified as Hazardous

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

5.1.1 *Environmental Risk Assessment*

The S4ULs for residential end use with home grown produce were exceed at seven locations in the upper 1m of the made ground layer and measures are required to mitigate the associate human health and environmental risk posed.

5.1.2 *Waste Classification*

Asbestos was not detected in any of the samples tested.

The samples from WS09 (1.5-1.8m), WS19 (0.5-0.8m and 2.7-3.0m), WS25 (0.4-0.7m), (WS27A 1.1-1.5m and 2.1-3.0m), WS28 (0.3-0.5m), WS31 (2.2-2.6m) and WS49 (0.5-0.8m) are classified as hazardous based on the level of Total Petroleum Hydrocarbons (TPH) and the appropriate LoW Code for these samples is 17 05 03* (Soil and Stone containing hazardous substances).

The samples from WS12 (0.6-0.8m and 1.5-2.8m), WS13 (0.4-0.7m), WS15 (0.5-0.8m), WS22 (0.5-0.8m), WS24 (0.5-0.8m), WS27A (0.4-0.7m), WS29 (0.04-0.7m), WS37 (0.3-0.6m), WS38 (0.5-0.8m), WS43 (1.0-1.3m), WS44 (0.3-0.5m), WS47 (0.7-1.0m), WS48 (0.4-0.7m), WS50 (0.7-1.0m), WS51 (0.4-0.7m and 1.0-1.3m), WS57 (0.5-0.8m), WS59 (0.5-0.8m), WS61 (0.5-0.8m and 1.2-1.5m), WS62 (0.3-0.6m), WS66 (0.5-0.8m) and BH03 (1.0m) are classified as non-hazardous and the appropriate List of Waste Code is 17 09 04 (Construction and Demolition Waste other than those mentioned in 17 09 03*).

All the other samples are classified as non-hazardous and the appropriate List of Waste Code is 17 05 04 (Soil and stone other than those mentioned in 17 05 03*).

The recovery/disposal options are discussed in Section 4.3.

5.2 Recommendations

OCM recommend that a copy of this report be provided in full to the relevant waste management facilities to which the soils will be consigned to confirm its suitability for acceptance.

OCM recommend that the risk mitigation measures outlined in Section 3.4.1 be implemented during the construction works programme.

APPENDIX 13A: Archaeological monitoring of site investigations

Archaeological monitoring of site investigations licence no 20EO293

By Aisling Collins of Aisling Collins Archaeology Services (ACAS)
On behalf of Bartra ODG Ltd
September 2020

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Project Team

Archaeological director: *Aisling Collins MIAI.*
Assistant director: *Kevin Weldon*
Archaeological supervisor *Christina Hughes*
Executive Summary

This report describes the results of archaeological monitoring of pre-construction ground investigation trial trenches for a proposed residential development at the site of the former O'Devaney Gardens, Dublin 1. The cultural Heritage section of an Environmental Impact Assessment Report (EIAR) has also been completed by Aisling Collins Archaeology Services (ACAS). The results of the monitoring will be included in the EIAR which will be submitted with the planning application.

The project manager is Ian Fennell from Bartra ODG Limited, the architects are O'Mahony Pike and the engineering geologists are CS Consulting Ltd.

This archaeological monitoring report has been prepared by Aisling Collins at the request of Bartra ODG Ltd.

The monitoring of the site investigation trial trenches revealed nothing of archaeological significance. The trenches were excavated by mechanical excavator under archaeological supervision.

Area C (St Bricin's lands) and Area E (soccer pitch) did not have any site investigation trial trenches. These areas should be archaeologically tested prior to the construction phase.

Please note that the recommendations given in this report are subject to the approval of the Dublin City Archaeologist and the National Monuments Section of the Department of Culture, Heritage and the Gaeltacht

Introduction

Site location

The proposed development site is located in the area once identified as Grangegorman West townland and in the Civil Parish of Grangegorman. Grangegorman West is in the Barony of Dublin and was under the poor law union of Dublin north. The Site lies east of Infirmary Road, south-east of the North Circular Road and west of the Oxmantown complex. It is bordered on the east side by the grounds of St Bricin's Hospital and on the south side by modern housing. The proposed development site has an overall area of c.5.2 hectares and is located on the former O'Devaney Gardens residential development, built c.1954 by Dublin Corporation on a greenfield site. The site also includes a strip of land which previously formed part of St. Bricin's Military Hospital. See plates 1 and 2)

Characteristics of the development

The proposed development will consist of:
c.1,047no. residential units (Blocks 2 to 10) comprising a mix of one, two and three bed apartments, three bed duplex and three bed dwellings and all associated ancillary accommodation.

In addition, the development will include retail / commercial units, a creche and a community facility.

A full description of the project is included in Section 3.4 of the EIAR.

Baseline Survey

Introduction
For the purpose of setting the proposed development within its wider archaeological and cultural heritage landscape, and to assess the archaeological potential of the site, a comprehensive paper survey of all available archaeological, historical and cartographic sources was undertaken.

Previous Excavations
A full list of archaeological excavations carried out in Appendix 3

Archaeological and Historical Background
The history of the area was summarised by Roseanne Meenan in 2010 **(**EIA O'Devaney Gardens, section 6, 2010):

> *"The site lies to the west of the core of the medieval town which was situated on the south side of the river Liffey. There is increasing evidence for settlement on the north side of the river in both the Viking and Anglo-Norman periods (www.opw.ie; Cryerhall 2006; Purcell 2005). The development site is located on land, which in medieval times was situated between the lands of the Knights Hospitallers of St John of Jerusalem at Kilmainham on the west side and the lands of St Mary's Abbey on the east side. By the seventeenth century, the lands currently occupied by the Phoenix Park had been sold to Sir Edward Fisher; the park was walled at the end of the 17th century. The present wall along Infirmary Road is on the same line as the 17th century wall and may incorporate elements of that wall. It would appear that the land on which the development site is located may have formed part of the manor of Grangegorman which in Anglo-Norman times was in the ownership of the Priory of the Holy Trinity otherwise known as Christchurch, Dublin. At the Dissolution the lands went to Sir Francis Agard; his descendant John was in ownership of the lands at the time of the rebellion in 1641. The Civil Survey of 1654-*

56 recorded that Mr Agar was the proprietor of 800 acres in Grangegorman (sic) of which 500 were in arable.

Smithfield was developed in the 17th century and development spread north-westwards into Grangegorman through the late 17th and early 18th centuries. This area became built up in the 18th and 19th centuries with construction of military barracks and hospitals, the military prison today known as Arbour Hill, the Constabulary Barracks currently known as the Garda Depot and other elements of government administration. Oxmantown as is known to day and which borders the development lands on the east side was laid out in the late 19th century although Oxmantown Green lay further to the east, marked on Rocque's map of 1756 as lying between the Royal Barracks and Smithfield and possibly extending even further at an earlier period."

Cartographic Analysis: Analysis of historic mapping can show human impact on landscape over a prolonged period. Large collections of historical maps (pre- and early Ordnance Survey maps as well as estate or private maps) are held at the Glucksman Map Library, Trinity College and other sources (UCD Library, Ordnance Survey Ireland, local libraries and published material). Relevant historical maps were consulted in the compilation of this assessment (see Table 1 below)

Table 1 Historical cartographic sources for the site

Map	Date	Description
De Gomme's map of Dublin	1673	This map shows the site well outside the city in a green field area. The nearest roads to the site are Clonee Road and Cabragh Road. The Duke of Ormonde's grounds are depicted south of the site. Seven acres were offered to the Duke of Ormonde as a site for a proposed palace that never materialised. It is drawn as an enclosure called the "Duke of Ormonde's Ground' in de Gommes map.
John Rocque's plan of the city of Dublin	1756	This shows green fields extending all the way from the rear gardens of the houses along Mountpellier Hill to 'Black Horse Lane'. The site lies within this green field area. There is a laneway/track depicted at the eastern part of the site with a pump shown on it. The Phoenix Park gate and The Royal Barracks are shown. Infirmary road is not depicted.
Ordnance Survey	1829-41	The area surrounding the site is still mostly open fields with the exception of more hospitals. Military Road is depicted and the 'Circular Road' gate. A hospital is depicted on the site of St Bricin's. There is a nameway/track shown along the eastern boundary of the site with a pump marked on it.
Ordnance Survey	1897-1913	The development site is still shown as open fields but the surrounding area is now more build up. Infirmary road is depicted and also Arbour Hill Military Hospital is located where St Bricin's Hospital stands today. An isolation hospital is depicted on Infirmary Road. The laneway/trackway in Rocque's map is still depicted along the eastern boundary of the site but stops halfway. Terraces of residential houses now surround the northern sides of the site.
Ordnance Survey	1943	The development site is still marked as open ground in the 1940's although surrounded by buildings on all sides except the south where the land is marked as Dept of Defence. The field boundaries are still marked. It appears that the construction of St Bricin's hospital in the early 20th century

		may have interfered with the line of the lane although it may have survived in the lines of Thor Place.
Record of Monuments and Places map (RMP)	current	This map shows the nearest RMP sites in red and sites on the National Inventory of Architectural Heritage marked in blue
Aerial image of former DCC flat complex O Devaney Gardens	Pre 2018	Aerial photo of O'Devaney Gardens residential complex prior to demolition
Google map (2020) with approximate location of new buildings	2020	Approximate location of proposed buildings on current aerial photo

Archaeological significance of the site

The O'Devaney Gardens estate is shown as an undeveloped greenfield site on historic maps from the seventeenth century until the middle of the twentieth century, and contains no known cultural heritage.

The site is a not within Zone of Archaeological Interest and contains no recorded archaeological monuments. The major ground disturbance which accompanied the construction of the 1950s flat complex is likely to have destroyed any archaeological material in the site. However, there are two areas within the site which have not been previously built on where archaeological material may survive below ground – the former football pitch, and a strip alongside St. Bricin's Hospital. Archaeological investigation (test trenching) should be carried out in these areas before any development to protect any archaeological heritage which may survive.

The site does not contain any Protected Structures, there are no Architectural Conservation Areas located within a reasonable distance of the site, and the site is not an example of a designed landscape. The site is surrounded by earlier developments which back onto the site, some of which are of architectural heritage significance. These include Protected Structures along the North Circular Road, single- and two-storey dwellings built by the Dublin Artisan's Dwellings Company (DADC) c.1879-1908 to the north-east and north-west of the site St. Bricin's Military Hospital complex which lies immediately to the east. The proposed development will have a neutral impact on the setting and views from the rear of Protected Structures these adjacent architectural heritage buildings. The redevelopment of the site proposes higher quality replacement buildings to the recently demolished 1950s flat complex which will have beneficial visual impacts on visual outlooks from these properties. The opening-up of views of the military hospital complex may create new visual landmarks and a new sense of 'place' within the site.

Site description

The strip of land on the eastern part of the site 'former St Bricin's lands' was not previously developed and is currently very overgrown. It is bounded with St Bricin's to the east, Montpellier Park to the south, and the rest of the development site to the north and west. There is a tarmac pathway running north-south through this narrow strip of land and there is overgrown grass, modern debris and mounds of earth throughout the site. Trees line the western boundary of this part of the site. This strip of land is enclosed by walls on three sides with a metal fence enclosing the southern side.

The remainder of the site is a wasteland following the demolition of the O'Devaney flats complex built in 1954. The last of the original 13 four-storey blocks was demolished in 2018. Most of the area is now covered with grass, weeds and modern debris. The site is bisected by a road (O'Devaney *Gardens)* running east west from North Circular Road to Thor Park. To the south of the road lies a large wasteland area with concrete blocks, broken walls and boulders along its eastern side. The tarmacadam surface of a previous playing/football pitch is visible. However, there were no previous buildings on the site of the football pitch.

The north-eastern part of the site has some concrete pathways/foundations visible. The northern part of the site shows some small allotments along the boundary. There is a residential site under construction by Dublin City Council adjacent to the site to the northwest.

No archaeological features were noted during the site visit.

Monitoring results

The geological site investigations were carried out by IGSL Ltd and comprised of trial pits, window samples and boreholes. There were overseen by the IGSL site engineer Irek Reder. The IGSL trial trenches were archaeologically monitored. This will reduce the requirement for further archaeological test trenches to be excavated in these areas. The trenches were excavated using a JCB excavator.

The areas investigated are referred to as Area A and B in this report (see Figure 7). The trial trenches were archaeologically monitored in area A and B. Trial trenching commenced on the 21st July 2020.See plates 7- 42.

Please note: This monitoring report was submitted at the start of September 2020 by ACAS to NMS. It was recommended to carry out archaeological monitoring in Area C (St Bricin's) and Area E (soccer pitch) during site clearances works prior to development commencement as these areas did not have any trial pits in them and therefore were not monitored. Following this, reports were subsequently sent by DCC to ABP in response to the Stage 2 submission Archaeology section report on the 8/9/2020 (ref ABPSHDPAC0025/20) which recommended archaeological testing be carried out.

The amended recommendations in this report are in line with DCC recommendations and are for archaeological testing in Area C and Area E prior to construction.

<u>Area A – Trial trenches 1-5</u>

The trenches were excavated using a JCB digger fitted with a toothless bucket. They averaged between 3.50m to 4m in length by 0.80m wide and up to 2.50m in depth. All trenches were backfilled immediately after recording.

Trial trench 1

Trial trench 1 was located at the south-west corner of the site close to the builder's compound area. It measured 3.50m (north-south) by 0.80m wide and 2.25m deep.

Stratigraphic profile

0.00m-0.30m Present ground level – consisting of summer meadow grass.
0.30m-1.80m Disturbed deposit of mixed brown clay with occasional lumps of modern concrete, steel bars and a beer can located at 1.70m.
1.80m-2.20m Water at this level but appears to be natural clay level consisting of hard dark grey stony clay.

Conclusion

Material in this trench all modern disturbance and in fill deposits. Clay and concrete lumps are probably derived from the demolition of the tower blocks and levelling of the area. There was nothing of archaeological significance revealed in this trench.

Trial trench 2

Trial trench 1 was located at the north-west corner of the site close to the builder's compound area. It measured 4.00m (north-south) by 0.80m wide and 3.00m deep.

Stratigraphic profile
0.00m-0.50m Present ground level – consisting of summer meadow grass and topsoil.
0.50m-2.20m Disturbed and unstratified deposit of wet of mixed brown clay with occasional small stones, steel bars - the type used to reinforce concrete, and fragments of timber planks and cardboard (at 2m).
2.20m-3.00m Water at this level but appears to be natural clay level consisting of hard dark grey stony clay.

Conclusion
Material in this trench all modern disturbance and in fill deposits. Steel and planks etc are probably derived from the demolition of the tower blocks and levelling of the area. There was nothing of archaeological significance revealed in this trench.

Trial trench 3
Trial trench 3 was located in the north-west corner of the site close. It measured 3.50m (north-south) by 0.80m wide and 2.20m deep.

Stratigraphic profile
0.00m-0.30m Present ground level – consisting of summer meadow grass and topsoil.
0.30m-1.80m Disturbed and unstratified deposit(s) consisting of mixed brown clay with stones, steel bars - the type used to reinforce concrete, and fragments of cardboard.
1.80m-2.00m appears to be natural clay consisting of hard dark grey stony clay with frequent amounts of black decayed limestone.

Conclusion
Material in this trench all modern disturbance and in fill deposits. Steel bars are probably derived from the demolition of the tower blocks and levelling of the area. There was nothing of archaeological significance revealed in this trench.

Trial trench 4
Trial trench 4 was located in the north-west corner of the area, to south of trench 3. It measured 4.00m long by 0.80m wide and 2.20m deep.

Stratigraphic profile
0.00m-0.20m Present ground level – consisting of summer meadow grass and topsoil.
0.20m-1.30m Disturbed and unstratified deposit of mixed brown clay with frequent small stones up to 0.20m in size. A large chunk of concrete measuring up to 0.40m by 0.20m was located at 1.25 deep. Occasional fragments of modern sewer and iron pipe (old water?) were also present throughout.
1.30m-2.00m Wet dark brown clay with water coming in from sides of trench. Not certain if deposit is natural or infill – probably infill.
2.00m-2.20m lots of water at base of trench, possible broken water pipe nearby – appears to be natural at this level.

Trial trench 5
Trial trench 5 was located in the west of the area, to south of trench 4. It measured 4.00m long (east-west) by 0.80m wide and 1.80m deep.

Stratigraphic profile
0.00m-0.20m Present ground level – consisting of summer meadow grass and topsoil.
0.20m-0.90m deposit of sterile mixed brown stony clay
0.90m-1.80m Medium brown clay with occasional fragments of brown ceramic sewer pipes throughout.
2.00m- Natural

Conclusion
Appears to be disturbed ground to at least 1.60m in depth with possible sewer pipe line located at 1.70m deep close to west end of trench. There was nothing of archaeological significance revealed in this trench.

Test Trench 7
Orientation: SSW-NNE
Diameter: 4.10 x 0.60m
Total depth: 2.10m
0.00-0.22m Present ground level consisting of meadow and topsoil
0.22-2.10m Light brown silty sandy modern rubble
0.22-0.84m Dark grey/black silty clay with red brick and concrete inclusions. Modern infill
0.84-2.10m Brown silty rubble clay with large pieces of concrete, rebar and plastic cables.

Conclusion
Test trench 7 consisted of concrete footing for a stepped concrete foundation. The concrete footing was dug in to the light brown silty sandy modern rubble layer extending SSW to NNE for 1.3m. A large slap of concrete footing or foundation extending north for 0.84m before stepping up to the Northern side of the trench, where, the depth reduced to 0.84m. No archaeological evidence was present.

Test Trench 8
Orientation: NNE-SSW
Dimensions: 4.0m x 0.60m
Total depth: 1.94
0.00-0.22m Present ground level consisting of meadow and topsoil
0.22-0.68m Light brown sandy clay rubble fill consisting of chunks of concrete and red brick ranging from medium (0.15 x 0.20) to large (0.60 x 0.85). Metal and plastic inclusions also present.
0.68-1.10m Light brown sandy clay, loose compaction, no inclusions.
1.10-1.94m Dark brown silty clay, no inclusions. Built up modern layer to support concrete foundation.
0.68-1.94m Northern end of trench transitioned from rubble fill to concrete foundation.

Conclusion
'Cut' for concrete foundation in southern quarter of test trench. Measurement from southern extent to concrete foundation S-N is 1.14m. Made up ground in the southern half of the test trench is divided by the physical concrete foundation. Directly over the concrete foundation in the Northern half of the trench is construction rubble made up of rebar, plastic and concrete and infrequent red brick inclusions. No archaeological significance.

Test Trench 9
Orientation: SSW-NNE
Dimensions: 2.60 x 0.60m
Total depth: 2.10m
0.00-0.22m Present ground level consisting of meadow and topsoil
0.22-1.88 Light brown silty clay with angular, fist sized stone inclusions. Modern fill.
0.22 – 0.84 Dark grey silty rubble fill with inclusions of red brick, plastic and concrete
0.84-2.10 Mid brown sandy rubble clay with large blocks of concrete, cables and rebar

Conclusion
Concrete footing for foundation at the base of light brown silty clay (0.22-1.88) at 2.10m. Concrete footing extends for 1.38m in southwest direction before gradual step up to 0.62m below current ground level. No archaeological significance.

Test Trench 10
Orientation: NNE-SSW
Dimensions: 6.50 x 0.60m
Total depth: 1.80m
0.00-0.34m Present ground level consisting of meadow and topsoil
0.34-0.84m Sandy light brown modern layer
0.84-1.05m Modern construction rubble fill
1.05-1.80m Light brown silty clay, compact

Conclusion
Deposits to at least 1.05m below PGL are modern construction infill. Trench closed at 1.80 due to water ingress. No archaeological evidence was present (drain/culvert).

Trench 11
Orientation: NNE-SSW
Dimensions: 4.10 x 0.80m
Total depth: 2.5m
0.00-0.15m Present ground level consisting of meadow and topsoil
0.15-0.76m Modern light brown silty clay consisting of modern rubble inclusions
0.76-2.50m Mid brown sandy rubble layer with large chunks of construction debris. Large piece of timber at 0.90m and slabs of tarmac at 1.14m. Large chunks of concrete and rebar throughout fill.

Conclusion
Made up ground consisting of mostly construction rubble fill. Water ingress began at 1.80m with no indication that this was archaeological. The trench walls collapsed at 2.50m and the trench was filled for safety reasons. No archaeological evidence found.

Test Trench 12
Orientation: N-S
Dimensions: 4.30 x 0.65m
Total depth: 1.9m
0.00-0.15m Present ground level – topsoil mixed with a lot of construction rubble. Inclusions of timber. Fist sized inclusions of concrete, quite compact
0.15-1.90m Construction rubble, inclusions of rebar, tarmac, small (0.05x0.10) to large (0.60x0.30) clumps of concrete
1.90-2.10m Dark brown silty rubble layer with stone and concrete inclusions and a plastic pipe at 2.00m.

Conclusion
Modern ground with construction rubble at all excavated levels. Water ingress at 2.00m and by 2,10 we had to close the trench. No archaeological evidence was present.

Test Trench 13
Orientation: SSW-NNE
Dimensions: 4.05 x 0.60m
Total depth: 1.43m
0.00-0.28m Present ground level consisting of meadow and topsoil
0.28-0.54m Light brown sandy clay modern rubble layer (northern end)
0.54-0.70m Greyey brown silty clay, few fist size angular stone inclusions (northern end)
0.28-1.43m Same as above (0.28-0.54) but extends to 1.43 on southern end. Large concrete rubble dump confined to this area with large pieces of concrete (0.60 x 0.26m) at 1.20m. Ground water ingress at 1.43m depth so the trench was closed.

Conclusion
Modern rubble dump from previous development. Forced closing of the trench due to ingress water. No visible archaeology (drain/culvert) as by way of explanation. No archaeological evidence was present.

<u>Area B – Trial trenches 14-20</u>

Test Trench 14
Orientation: E-W
Dimensions: 2.50 x 0.60m
Total depth: 2.00m
0.00-0.10 Present ground level – topsoil
0.10-1.50m Brown sandy gravelly clay with inclusions of red brick and concrete
1.50-2.00m Light brown silty clay with angular fist sized stone

Conclusion
Nothing of archaeological significance, modern infill to approx 1.50m. Stony light brown deposit at base, unsure if natural deposit. No modern interference at this level so ground crew closed the trench.

Test Trench 15
Orientation: NEE-SWW
Dimensions: 2.60 x 0.70m
Total depth: 1.90m
0.00-0.65m Present ground level. Gravel topsoil/wasteland
0.65-1.60m Modern demolition rubble with inclusions of rebar, red brick, timber, concrete and wooden fence stakes
1.60-1.90m Yellow silty clay, no inclusions. Modern fill.

Conclusion
Yellow silty clay was present on the southern half of the trench, with the northern half consisting of modern rubble. Directly under the yellow silty clay was concrete foundation from the original development. No archaeological significance.

Test Trench 16
Orientation: E-W
Dimensions: 3.00 x 0.70m
Total depth: 1.90m
0.00-0.30m Present ground level. Topsoil
0.30-0.60 Light brown sandy clay with modern construction rubble deposit with concrete and rebar inclusions.
0.60-1.40 Mid brown silty clay demolition layer with red brick and tarmac inclusions
1.40-1.90 Yellowish light brown silty clay subsoil layer

Conclusion
Modern deposits above yellowish brown subsoil layer. No archaeological significance

Test Trench 17
Orientation: E-W
Dimensions: 2.90 x 0.60m
Total depth: 2.10m
0.00-0.30m Present ground level – topsoil
0.30-1.80m Dark brown sandy clay missed with demolition material. Inclusions include rebar, regular red brick, concrete, timber and plastic piping.
1.80-2.10m Yellowish light brown silty clay subsoil

Conclusion

Nothing of archaeological significance, all modern deposits with high quantities of mixed demolition material.

Test Trench 18
Orientation: NEE-SWW
Dimensions: 2.4 x 0.90m
Total depth: 2.60m
0.00-0.10m Present ground level. Topsoil – very thin layer of sod with nettles and weeds
0.10-0.80m Modern rubble layer consisting of fist sized to small boulder sized stone and concrete, rebar and plastic at 0.68m
0.80-1.60m Light brown sandy rubble layer with small boulder sized concrete and tarmac (at 1.55m)
1.60-2.60m Dark brown greyish rubble fill with small boulder sized pieces of concrete (0.45 x 0.45m) and rebar. Other inclusions include plastic piping and red brick fragments.

Conclusion
Made up ground consisting entirely of construction rubble until 2.60m when the dark grey silty clay subsoil was reached. Entire area towards the existing housing development is uneven with a very thin layer of topsoil. No archaeological significance.

Test Trench 19
Orientation: E-W
Dimensions: 2.90 x 0.70m
Total depth: 1.35m
0.00-0.40m Present ground level. Topsoil mixed with modern debris throughout
0.40-0.60m Dark brown modern rubble layer – concrete, tarmac, modern red brick
0.60-0.80m Light brown yellowish silty clay only existing in the eastern extent of the trench. Possible subsoil where dark brown silty clay was cut in to.
0.80-1.25m Dark brown silty clay. Modern rubble layer with mixed inclusions of red brick, timber and rebar.
1.25-1.35m Possible post med layer. Dark brown sooty deposit with what appears to be lime and red brick inclusions.

Conclusion
Modern rubble fill cut in to yellow brown silty clay subsoil. Possible post med activity present at the base of the trench. What appears to be an organic deposit at the very base of the trench with a lump of hay and possible timber. Very hard to discern due to the light and safety restrictions. The ground was very unstable and both sides of the trench collapsed so the trench was backfilled at 1.35m. No finds found to indicate possible date therefore further archaeological investigation is required.

Test Trench 20
Orientation: E-W
Dimensions: 2.60 x 0.60m
Total depth: 2.30m
0.00-0.25m Present ground level. Topsoil - sod
0.25-1.25m Light brown sandy gritty rubble layer. Inclusions of tarmac, red brick and concrete
1.25-2.30m Yellowish light brown silty clay subsoil layer. Few fist sized angular rock inclusions

Conclusion
Modern rubble fill deposit directly over yellowish light brown subsoil layer. Subsoil sat directly over dark grey silty stony natural deposit. No archaeological significance.

Test Trench 21

Orientation: E-W
Dimensions: 2.70 x 0.80m
Total depth: 2.50m
0.00-0.30m Present ground level. Topsoil/sod infused with modern plastic litter
0.30-0.65m Light brown sandy clay rubble layer with modern inclusions of plastic, cobble sized broken pieces of concrete, tarmac and red brick.
0.65-1.10m Dark brown clay layer infused with modern rubble
1.10-2.50m Yellowish light brown silty clay subsoil

Conclusion
The test trench consisted only of two modern rubble deposits lying directly over the yellowish-brown silty clay present throughout the site. Modern rubble inclusions consisting mostly of concrete, plastic, tarmac and red brick. No archaeological significance.

Test trench 25
Orientation: NWW-SEE
Dimensions: 2.70 x 0.70m
Total depth: 2.10m
0.00-0.10m Present ground level. Modern concrete footpath.
0.10-0.20m Gravel rubble surface, modern
0.20-1.50m Yellowish light brown subsoil – natural
1.50-2.10m Grey silty clay, natural deposit

Conclusion
Modern concrete footpath lying directly over modern rubble surface consisting of dark angular limestone. No evidence of any activity in the area before the footpath was built. No archaeological significance.

Test Trench 26
Orientation: NWW-SEE
Dimensions: 2.70 x 0.70m
Total depth: 2.40m
0.00-0.17m Present ground level – modern concrete footpath
0.17-0.30m Modern rubble layer – dark limestone chipped stone surface for the above footpath
0.30-1.40m Yellowish light brown subsoil layer
1.40-2.40m Grey silty clay, stone inclusions. Natural deposit.

Conclusion
Modern footpath and modern rubble footpath surfacing lying directly over yellowish light brown subsoil layer. No other modern interference and no archaeological significance.

Test Trench 27
Orientation: NWW-SEE
Dimensions: 2.70 x 0.70m
Total depth: 1.80m
0.00-0.17m Present ground level – modern concrete footpath
0.17.-0.40m Modern rubble layer with inclusions of tarmac, concrete, fist sized stone, red brick and plastic.
0.40-1.30m Yellowish light brown silty clay subsoil.
1.30-1.80m Grey silty clay, stone inclusions. Natural deposit.

Conclusion

Modern deposits until approx. 0.40m and natural deposits from 0.40-1.80m. No archaeological significance.

Test Trench 29
Orientation: N-S
Dimensions: 2.00 x 0.74m
Total depth: 1.18m
0.00-0.23m Present ground level. Topsoil/sod with modern rubbish inclusions
0.23-0.30 Light brown silty stony clay. Modern rubble layer with fist sized stone inclusions
0.30-1.18 Possible disturbance of post medieval layer. Black sooty deposit with inclusions of shell, red brick, white stone wear, animal bone and modern glass.

Conclusion
Possible post medieval layer or modern disturbance of post-med layer. Mixture of both modern and possible post medieval pottery, red brick but mixed with modern glass.

Test Trench 30
Orientation: E-W
Dimensions: 2.50m x 0.70m
Total depth: 1.25m
0.00-0.22m Present ground level. Topsoil/sod
0.22-1.10m Light brown silty clay modern rubble layer. Inclusions of concrete, red brick and plastic refuse material.
0.47-1.10m Yellowish silty clay – subsoil layer.

Conclusion
Current boundary wall trench cut in to yellowish light brown silty clay subsoil. No archaeological significance.

Test Trench 31
Orientation: E-W
Dimensions: 1.78 x 0.70m
Total depth: 1.40m
0.00-0.16m Present ground level – concrete pathway
0.16-0.37m Dark grey silty modern rubble layer. Contains a lot of modern refuse, mostly plastic.
0.37-0.60m Light brown silty clay, few stone inclusions – modern layer. ESB cable found at 0.40m below PGL.
0.60-0.75m Dark brown silty clay, iron rich rubble layer
0.75-0.82m Greenish brown silty clay, possible previous occupation layer – post medieval wall cut in to this layer.
0.82-1.38m Yellow brown silty clay, natural subsoil

Conclusion
This test trench runs E-W away from the boundary wall to the very North East of the site. The present boundary wall is at the Eastern extent of the trench. An ESB cable was found at 0.40m below PGL and runs along the boundary wall. At 0.82m below PGL a post medieval red brick and limestone wall with lime mortar was found abutting the present-day boundary wall. A shard of pottery, animal bone and shell were found amongst the stone. The post medieval wall was cut in to the yellow light brown subsoil layer and the greenish brown silty clay was present on the West facing side of the stonework. This suggests in situ post medieval activity truncated by modern works to the Eastern face of the wall. Only the 2-3 courses of the post med wall remain however it extends N-S outside the confines of the trench.
Wall dimensions:
N-S: 0.70m

E-W: 0.48m
Height: 0.55m

Test Trench 32

Orientation:	E-W
Dimensions:	1.94 x 0.60m
Total depth:	1.30m
0.00-0.04m	Present ground level. Tarmac surface undisturbed
0.04-0.40m	Modern rubble layer. Silty sandy clay with small to fist sized stones
0.40-1.32m	Light brown silty clay, modern layer. Wall footing for current boundary wall at base.

Conclusion
Excavation in this trench was limited due to an ESB cable being found at 0.70m so ground investigation crew had to excavate a slot by hand. No archaeological significance.

Window samples
Window sampling was carried out using a small tracked machine called a Dando Terrier (plate). It is capable of drilling down to depths of up to 4.50m using different sizes of drill or steel casing. At O'Devaney gardens the casing used was 80mm diameter into which a transparent plastic sleeve as inserted. The soil sample was then extruded into the plastic sleeve in 1m long sections, where it was then inspected (see plates 3-6 and plates 36-42).

At least 48 window samples were monitored and nothing of archaeological significance was identified in any. The stratigraphic profiles of WS 1 and WS 2 are given below.

Window sample 1 (WS1)
Stratigraphic profile (located to north of trench 1)

0.00m-0.22m	Present ground level – consisting of summer meadow grass and topsoil.
0.22m-0.76m	deposit of sterile mixed brown stony clay
0.76m-1.00m	Medium brown clay with occasional fragments of broken limestone.
1.00m-1.70	Natural consisting of hard brown clay with sand lenses

Window sample 2 (WS#2)
Stratigraphic profile (located to east of trench 2)

0.00m-0.25m	Present ground level – consisting of summer meadow grass and topsoil.
0.25m-1.00m	deposit of mixed brown stony clay with small inclusions of concrete
1.00m-1.80m	Medium brown clay with occasional fragments of limestone.
1.80m-2.10m	Natural - consisting of stony clay and gravel lenses
2.10m-2.60m	Natural - consisting of sand and gravel lenses
2.60m-3.10m	Natural - consisting of very hard dark grey silt clay and decayed limestone rocks.

General conclusions

The archaeological monitoring of the geological site investigation trial trenches in Areas A and B did not identify any features of archaeological significance. In general, the deposits identified in the trenches consisted of dark brown clays with inclusions of modern building rubble throughout. In some trenches the inclusions identified comprised of large lumps of concrete, steel rods, plastic and fragments of cardboard. Old service routes including water and sewage pipes were also identified.

It would appear that after the flats complex was demolished, the site was cleared and levelled up with clay infill deposits.

Area C (St Bricin's lands) and **Area E** (soccer pitch) did not have any site investigation trial trenches. These areas should be archaeologically tested prior to the construction phase.

Sufficient notice should be given in order that an archaeological monitoring licence application and method statement is in place. Allow 3-6 weeks for licence to be processed.

Please note that the recommendations given here are subject to the approval of Dublin City Archaeologist and the National Monuments Section of the Department of Culture, Heritage and the Gaeltacht.

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Web References:

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Online spatial data viewer which focuses on the built, cultural and natural heritage www.heritagemaps.ie

Maintained by Library Council of *Ireland* and providing free online access to various sources including Griffith's Valuation. www.askaboutireland.ie

Online Excavations bulletin www.excavations.ie

Internet Sources:

www.archaeology.ie

www.excavations.ie

www.askaboutireland.ie

www.heritagemaps.ie

Appendix 1 RMP sites located withing 800m of the proposed development

A large part of Dublin city centre has been designated as DU018-020. This includes the medieval core of the city. This designation covers the area to the north-east, the east and the south of the proposed development. Lands south of the River Liffey extending to Kilmainham and Islandbridge also fall under this designation. However, the O'Devaney's Garden estate is outside the area covered by DU018-020.

The closest individual monument to the development site is DU018-020532 which is classified as a 'dwelling'; and located on the Georgian enclave of Montpelier Hill where houses were first constructed in the 1720s.

Table 2 RMP sites located within 800m of the proposed development

SMR	Class	Townland	Scheduled for inclusion in next RMP	Distance from development site
DU018-020532	House - indeterminate date	Dublin South City	Yes	213m south
DU018-045	Graveyard	Dublin North City	Yes	390m southeast
DU018-020306	Barracks	Dublin North City	Yes	397m southeast
DU018-020251	House - 18th/19th century	Dublin North City	No	475m northeast
DU018-007009	Megalithic structure (present location)	Dublin North City	Yes	550m west
DU018-020447-	Burial ground	Dublin North City	Yes	562m southeast
DU018-020477-	Mill - unclassified	Dublin South City	Yes	570m south
DU018-020341-	Hospital	Dublin South City	Yes	572m south
DU018-020292-	Hospital	Dublin South City	Yes	572m south
DU018-020308-	Park	Dublin North City	Yes	638m
DU018-112----	Pit-burial	Kilmainham	Yes	655m southwest
DU018-020307	Building	Dublin North City	Yes	679m
DU018-007008-	Well	Dublin North City	Yes	775m northwest

Appendix 2 Topographical files

The topographical files in the National Museum of Ireland were consulted and no finds were listed in the townland of Grangegorman West.

The National Museum of Ireland finds database (2010) is also published on heritagemaps.ie and the finds listed below in Table 3 were obtained from this source.

Please note: Re Heritage maps. This dataset has been designed to visually represent the distribution of archaeological artefact finds, based on the Irish Antiquities Division's Collections Database, at local and national coverage where possible. Find locations shown on the Heritage Map Viewer are not an accurate representation of the actual find spot. In some cases, the location symbol may only represent the townland within which the find was located. The distance from site is based on the heritage maps and is only approximate. The list of finds in Table 2 suggests a certain degree of activity in the area dating as far back as prehistoric times.

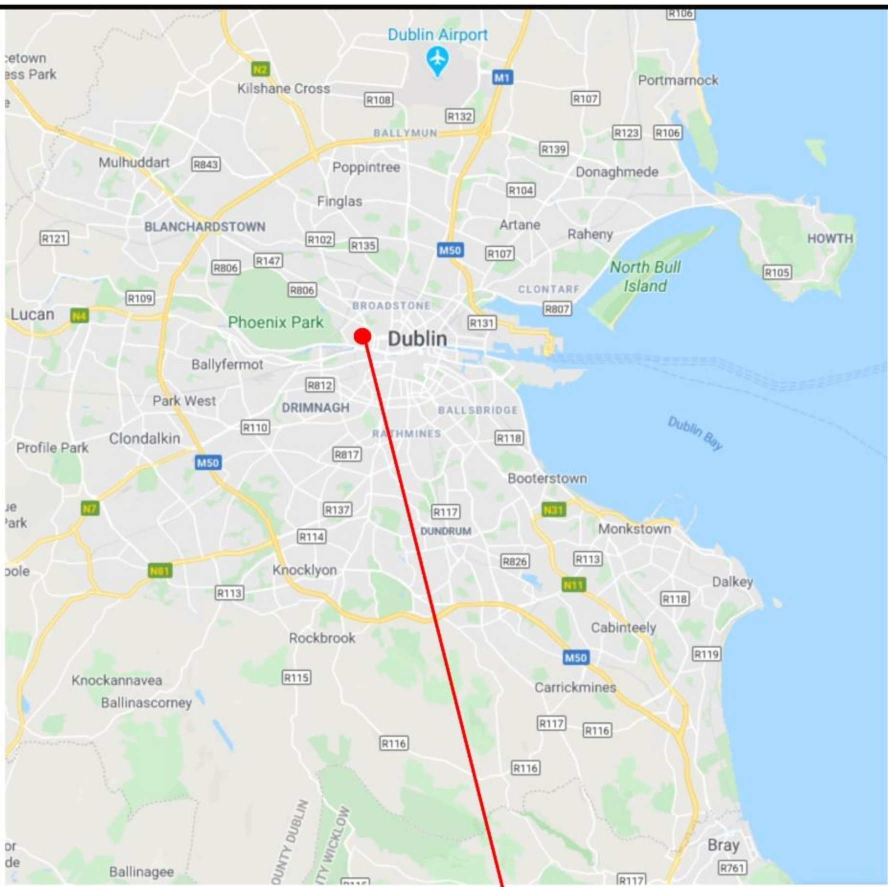
Table 3 National Museum of Ireland finds located within 800m of the proposed development

Museum Reg	Find	Location	Approximate distance from site
1955:11	2 x Boars tusk	Aughrim Street	250m north (approximate)
1984:40	Iron Dagger	Arbour court/Hill	260m south (approximate)
IA/48/52	Human remains	Disarticulated skeletons	800m southeast (approximate)
1866:Wk148 1937:3641 1995:2000 RIA1908:36 RIA1916:37 RIA1916:44	Iron mail Bronze pin Copper alloy pin Bronze pin Copper axehead Bronze axehead.	Phoenix park	Unknown

Appendix 3: Previous Excavations: The excavation bulletin is a database of over 15,000 summary accounts of all the archaeological excavations carried out in Ireland and Northern Ireland from 1970 to 2008. Reports on licensed archaeological works are also held by the Archive Unit of the National Monuments Section. There have been no excavations carried out on the site previously. Six excavations have been carried out within a distance of c. 200m from the site. Four of these had no archaeological significance, and two were of post medieval date (see Table 3).

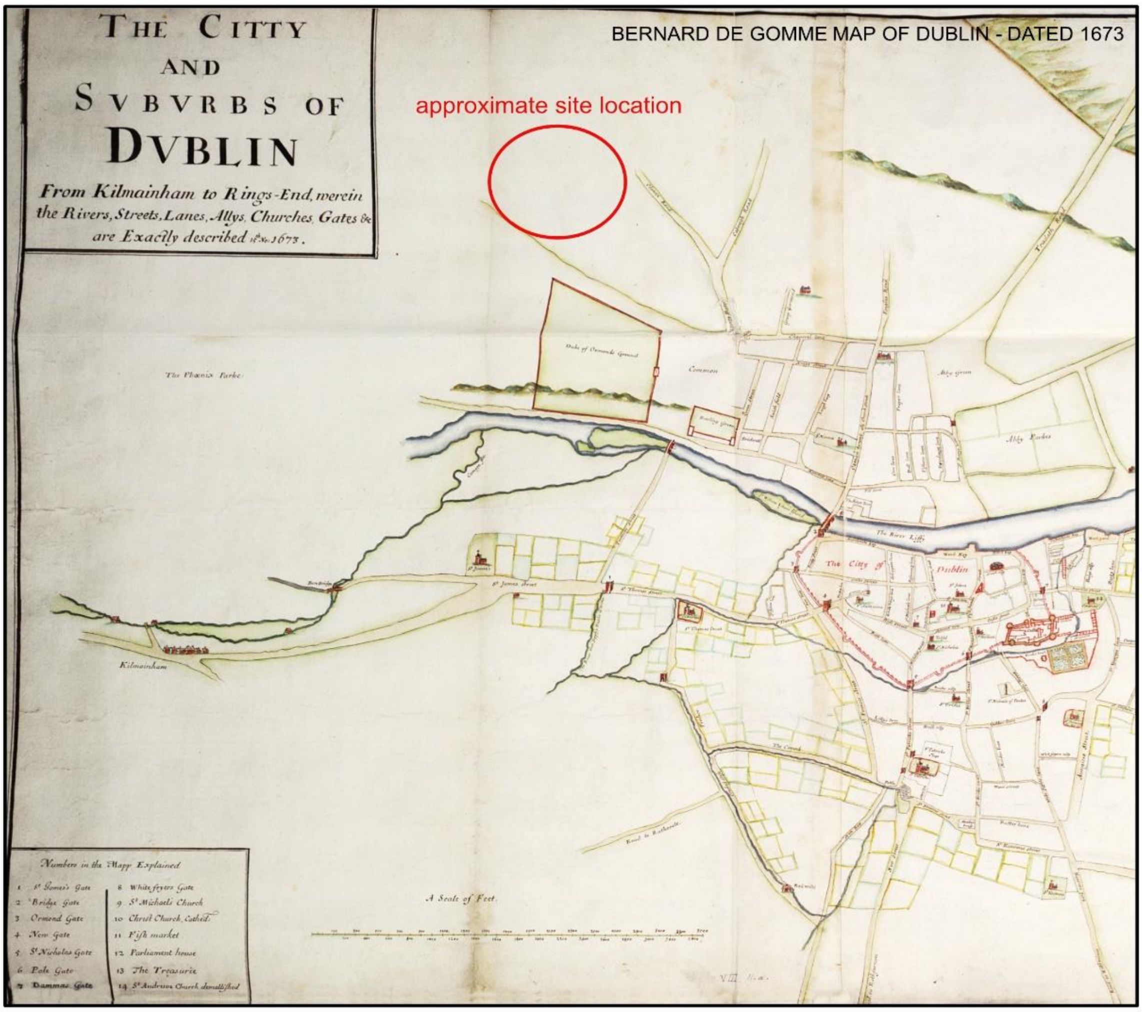
Table 4 Previous archaeological excavations in the surrounding area (within c. 200m)

Excavation number	Location	Site type	Author
97E0446	29-31 Mountpellier Hill, Dublin	No archaeological significance	Mary McMahon
07E0488	Criminal Courts Complex, Infirmary Road, Dublin	Urban, post-medieval	Franc Myles
94E0104	Salmon Pool, Islandbridge	Urban	Neil O'Flanagan
95E0197	12-24 Montpelier Hill, Dublin	No archaeological significance	Deirdre Murphy
93E0063	Junction of Infirmary Rd. and Montpelier Hill	No archaeological significance	Alan Hayden
18E0402	Former Military Barracks, Infirmary Road	18th- and 19th-century military barracks	Antoine Giacometti



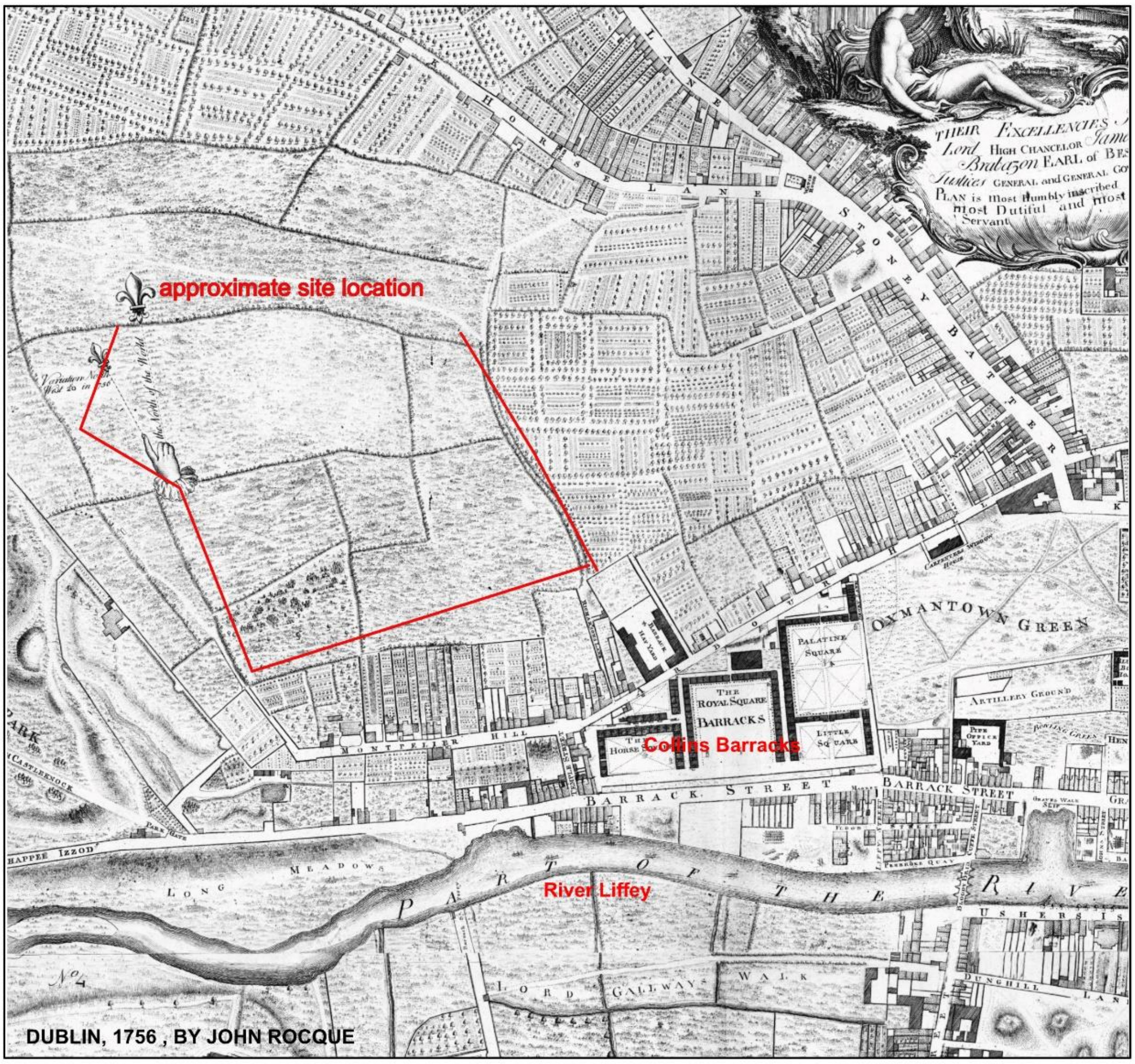
ACAS
Aisling Collins Archaeology Services

JOB	: O DEVANEY GARDENS DUBLIN
CLIENT	: BARTRA ODG LIMITED
DATE	: AUGUST 2020
FIGURE 1	: SITE LOCATION (GOOGLE MAPS)
SCALE	: AS INDICATED
DRG.BY	: KEVIN WELDON



ACAS
Aisling Collins Archaeology Services

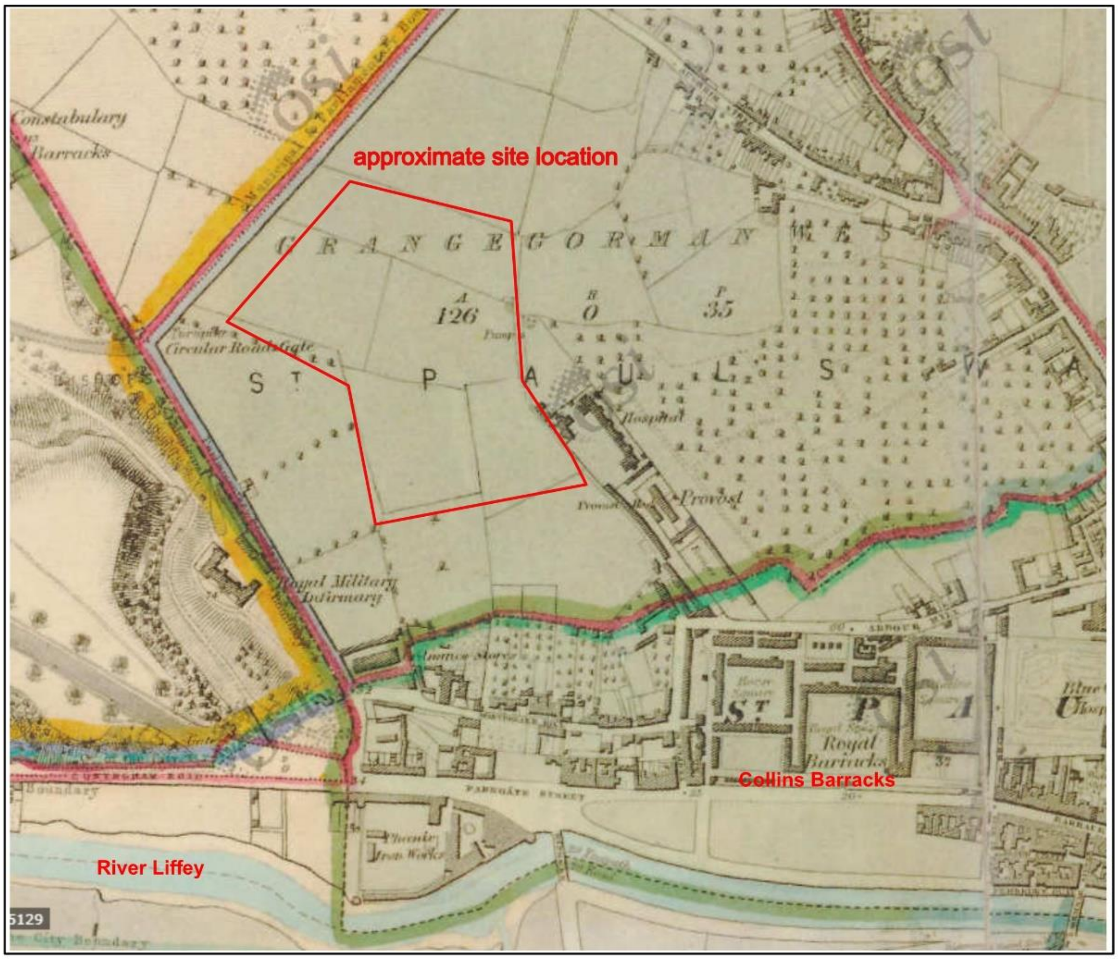
JOB	:	O DEVANEY GARDENS DUBLIN
CLIENT	:	BARTRA ODG LIMITED
DATE	:	AUGUST 2020
FIGURE 2	:	SITE - DE GOMME MAP 1673
SCALE	:	AS INDICATED
DRG.BY	:	KEVIN WELDON



ODG LIMITED

ACAS
Aisling Collins Archaeology Services

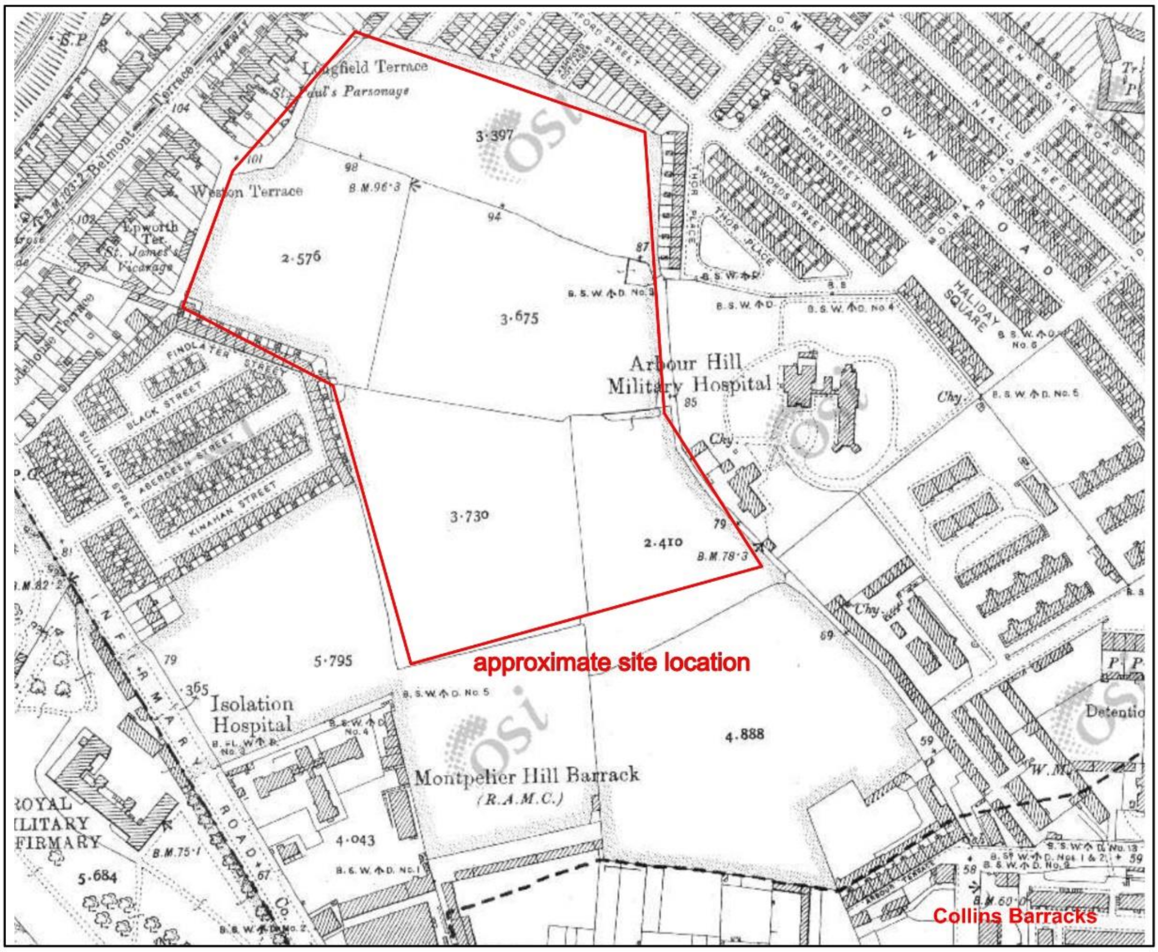
JOB	: O DEVANEY GARDENS DUBLIN
CLIENT	: BARTRA ODG LIMITED
DATE	: AUGUST 2020
FIGURE 3	: SITE - ROCQUE MAP 1756
SCALE	: AS INDICATED
DRG.BY	: KEVIN WELDON



DUBLIN, 1837-41, BY ORDNANCE SURVEY

ACAS
Aisling Collins Archaeology Services

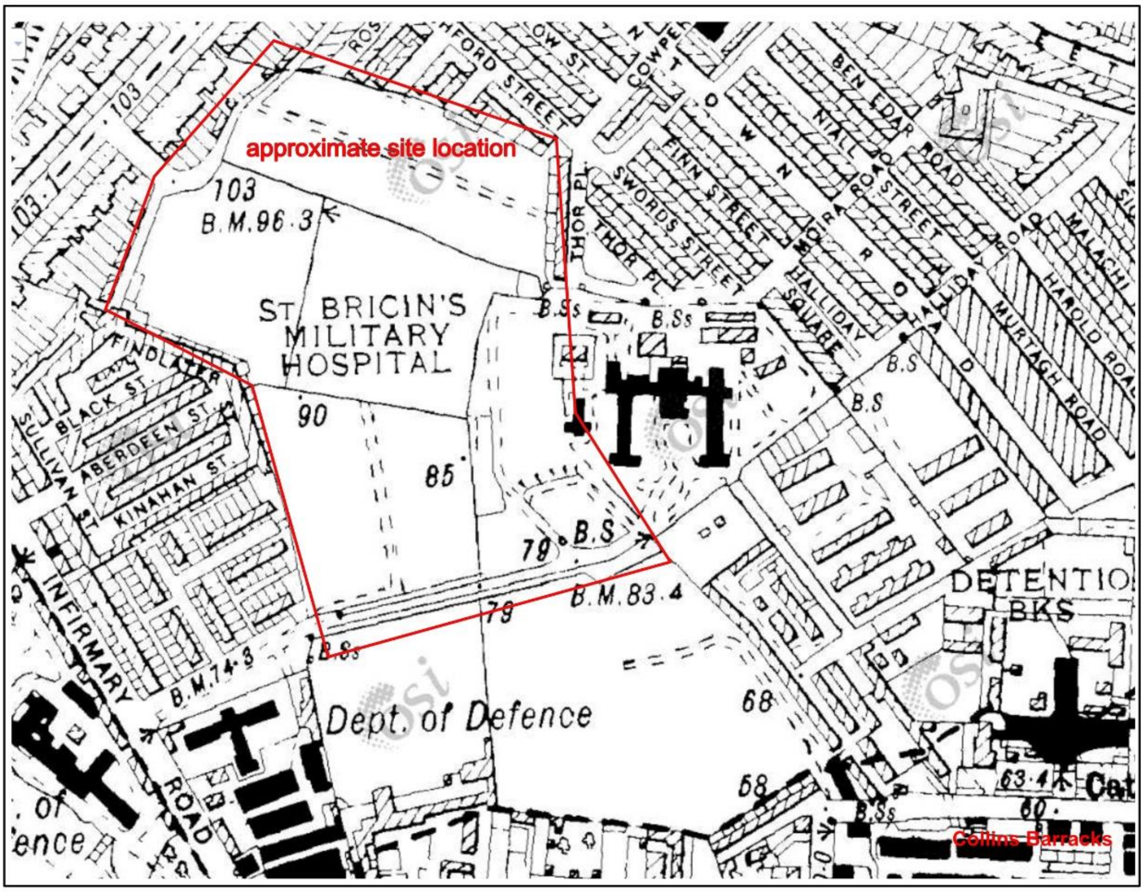
JOB	: O DEVANEY GARDENS DUBLIN
CLIENT	: BARTRA ODG LIMITED
DATE	: AUGUST 2020
FIGURE 4	: ORDNANCE SURVEY 1837
SCALE	: AS INDICATED
DRG.BY	: KEVIN WELDON



DUBLIN, 1897- 1913, BY ORDNANCE SURVEY

ACAS
Aisling Collins Archaeology Services

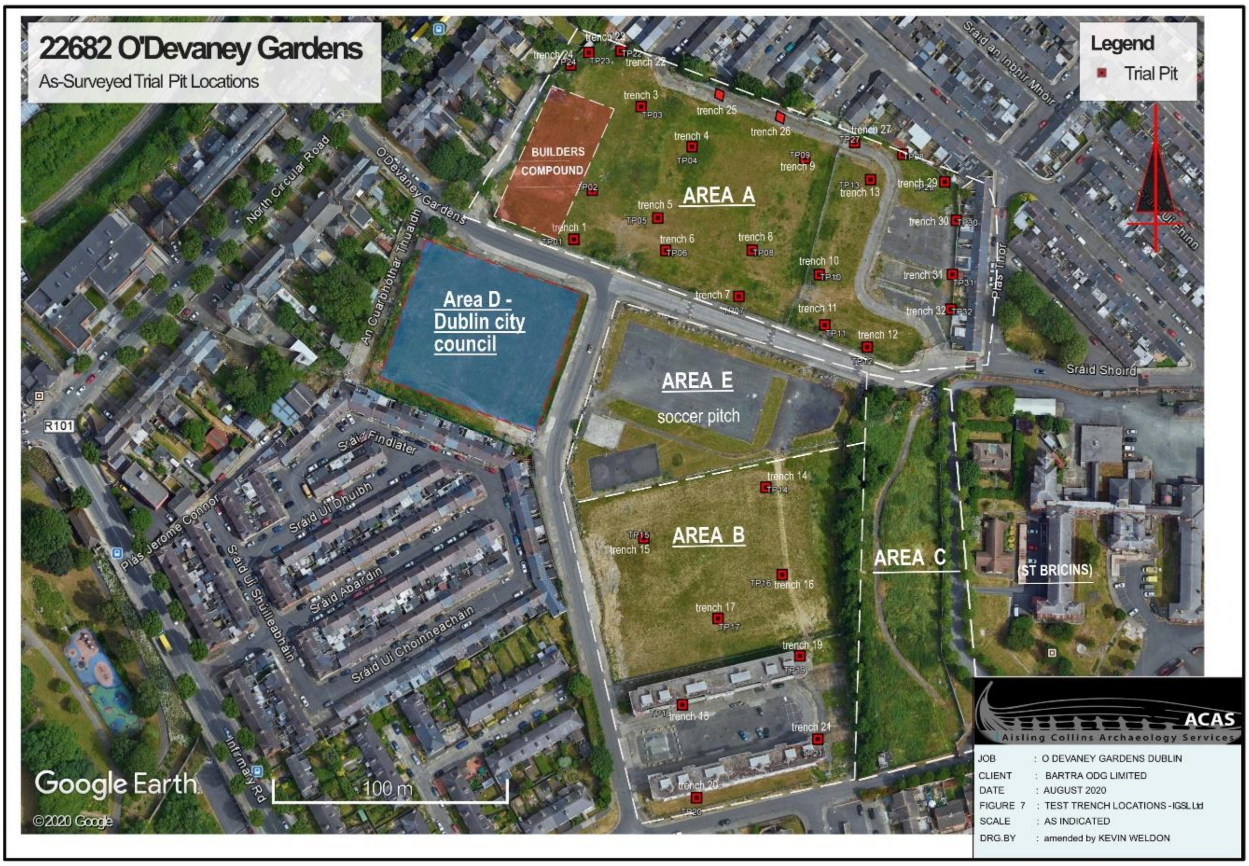
JOB	: O DEVANEY GARDENS DUBLIN
CLIENT	: BARTRA ODG LIMITED
DATE	: AUGUST 2020
FIGURE 5	: ORDNANCE SURVEY 1897
SCALE	: AS INDICATED
DRG.BY	: KEVIN WELDON



DUBLIN, c1940s, BY CASSINI (OS)

ACAS
Aisling Collins Archaeology Services

JOB	: O DEVANEY GARDENS DUBLIN
CLIENT	: BARTRA ODG LIMITED
DATE	: AUGUST 2020
FIGURE 6	: CASSINI MAP early 20th century
SCALE	: AS INDICATED
DRG.BY	: KEVIN WELDON


22682 O'Devaney Gardens
As-Surveyed Trial Pit Locations
Legend
Trial Pit
BUILDERS COMPOUND
AREA A
Area D - Dublin city council
AREA E
soccer pitch
AREA B
AREA C
(ST BRICINS)
O'Devaney Gardens
North Circular Road
Sraid Findlater
Sraid Shoird
R101
100 m
Google Earth
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JOB : O DEVANEY GARDENS DUBLIN
CLIENT : BARTRA ODG LIMITED
DATE : AUGUST 2020
FIGURE 7 : TEST TRENCH LOCATIONS - IGSL Ltd
SCALE : AS INDICATED
DRG.BY : amended by KEVIN WELDON

Plates of archaeological monitoring of site investigations of proposed development at the former O'Devaney Garden site.

Plate 1: site, area A looking north east

Plate 2: site, north perimeter area A, looking north west

Plate 3 window sampling 'the Dando terrier'

Plate 4 – window sample WS 1

Plate 5 – window sample WS 1

Plate 6 – window sample WS 2

Plate 7– Trench no 1

Plate 8 – Trench no 2

Plate 9 – Trench no 4

Plate 10 Trench no 5

Plate11: Trench no 7

Plate 12: Trench no 8


Plate 13 Trench no 9


Plate 16 Trench no 12


Plate14 Trench no 10


Plate 17 Trench no 13


Plate15 Trench no 11


Plate 18 Trench no 14


Plate 19 Trench no 15


Plate 20 Trench no 16


Plate 21 Trench no 17


Plate 22 Trench no 18


Plate 23 Trench no 19


Plate 24 Trench no 20


Plate 25 Trench no 21


Plate 26 Trench no 25


Pate 27 Trench no 26


Plate 28 Trench no 27


Plate 29 Trench no 29 – post medieval pottery sherds


Plate 30 Trench no 29 – post medieval pottery sherds

Plate 31 Trench no 29 – post medieval jug sherd

Plate 32 Trench no 29 – post medieval marmalade jar

Plate 33 Trench no 30

Plate 34 Trench no 31

Plate 35 Trench no 32

Plate 36 Window Sample 48


Plate 37 Window Sample 48


Plate 38 Window Sample 57


Plate 39 Window Sample 57


Plate 40 Window Sample 57


Plate 41 Window Sample 59


Plate 42 Window Sample 69

APPENDIX 14A: LANDSCAPE AND VISUAL IMPACT – VERIFIED VIEWS

Refer to Separate A3 Booklet (Volume II).