The Donore Project

Energy and Sustainability Strategy

The Land Development Agency

Project number: 60648061
STG-AEC-S1b-00-XX-RE-ME-0000002

November 2022

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			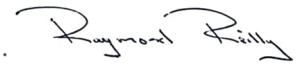
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Revision History

Revision	Revision date	Details	Authorized	Name	Position
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Table of Contents

Figures

1. Introduction

The Land Development Agency intend to apply to An Bord Pleanála for a ten-year permission under Part X (Section 175) of the Planning & Development Act 2000, as amended, for a residential development at a site located on the former St. Teresa's Gardens, Donore Avenue, Dublin 8. The site is bound by Donore Avenue to the north-east, Margaret Kennedy Road to the north-west, The Coombe Women & Infants University Hospital to the west, the former Bailey Gibson factory buildings to the south-west, and the former Player Wills factory to the south-east. The development will consist of the construction of a residential scheme of 543 no. apartments on an overall site of 3.26 ha.

The development (GFA of c. 53,234 sqm) contains the following mix of apartments: 225 No. 1 bedroom apartments (36 no. 1-person & 189 no. 2-person), 274 No. 2 bedroom apartments (including 52 No. 2 bed 3 person apartments and 222 No. 2 bed 4 person apartments), 44 No. 3 bedroom 5-person apartments, together with retail/café unit (168 sq.m.), mobility hub (52 sq.m.) and 952 sq.m. of community, artist workspace, arts and cultural space, including a creche, set out in 4 No. blocks.

The breakdown of each block will contain the following apartments:

- Block DCC1 comprises 111 No. apartments in a block of 6-7 storeys;
- Block DCC 3 comprises 247 No. apartments in a block of 6-15 storeys;
- Block DCC5 comprises 132 No. apartments in a block of 2-7 storeys;
- Block DCC6 comprises 53 No. apartments in a block of 7 storeys;

The proposed development will also provide for public open space of 3,408 sqm, communal amenity space of 4,417 sqm and an outdoor play space associated with the creche. Provision of private open space in the form of balconies or terraces is provided to all individual apartments.

The proposed development will provide 906 no. residential bicycle parking spaces which are located within secure bicycle stores. 5% of these are over-sized spaces which are for large bicycles, cargo bicycles and other non-standard bicycles. In addition, 138 spaces for visitors are distributed throughout the site.

A total of 79 no. car parking spaces are provided at undercroft level. Six of these are mobility impaired spaces (2 in each of DCC1, DCC3 & DCC5). 50% of standard spaces will be EV fitted. Up to 30 of the spaces will be reserved for car sharing (resident use only). A further 15 no. on-street spaces are proposed consisting of:

- 1 no. accessible bay (between DCC5 & DCC6)
- 1 no. short stay bay (between DCC5 & DCC6)
- 1 no. crèche set-down / loading bay (between DCC5 & DCC6)
- 1 no. set-down / loading bay (northern side of DCC5)
- 1 no. set-down/loading bay (northern side of DCC 3)
- 10 no. short stay spaces (north-east of DCC1)

In addition, 4 no. motorcycle spaces are also to be provided.

Vehicular, pedestrian and cyclist access routes are provided from a new entrance to the north-west from Margaret Kennedy Road. Provision for further vehicular, pedestrian and cyclist access points have been made to facilitate connections to the planned residential schemes on the Bailey Gibson & Player Wills sites for which there are extant permissions (Ref. No.'s ABP-307221-20 & ABP-308917-20).

The development will also provide for all associated ancillary site development infrastructure including site clearance & demolition of boundary wall along Margaret Kennedy Road and playing pitch on eastern side of site and associated fencing/lighting, the construction of foundations, ESB substations, switch room, water tank rooms, storage room, meter room, sprinkler tank room, comms room, bin storage, bicycle stores, green roofs, hard and soft landscaping, play equipment, boundary walls, attenuation area and all associated works and infrastructure to facilitate the development including connection to foul and surface water drainage and water supply.

2. Executive Summary

This report outlines the proposed energy & sustainability strategy for the proposed Donore Project.

The design will be heavily influenced by the sustainability principles of reduce, reuse, renewables and continual improvement (renewal) of the approach. The energy design will also be heavily influenced by Part L of the Building Regulations - Conservation of Fuel and Energy (Dwellings) 2021 and Part L of the Building Regulations – Conservation of Fuel and Energy (Buildings other than Dwellings) 2021.

Passive energy reductions will be maximised through the specification of a high performing building fabric. Active energy reductions include the provision of a high efficiency air to water heat pump systems for space heating & domestic hot water, provision of mechanical heat recovery ventilation, specification of high efficiency lighting & controls and other discrete energy measures.

Embodied carbon will be a key consideration in the design. Materials of low embodied carbon, including recycled materials, will be preferred. Where possible locally sourced materials will be used to reduce the embodied carbon associated with transport.

A number of sustainable urban drainage systems (SuDS) are to be used to effectively intercept and treat water leaving the site including green roof and permeable paving at roof level, as well as swales, bio-retention, tree pits and porous asphalt at ground level. The green roof will provide matters that will allow local birds and insects to thrive. Native planting will be used to integrate with the local habitat.

The site benefits from local transport links including bus & cycle lanes which will encourage sustainable transport to and from the development. Cycle parking will be provided to encourage cycling. Limited parking is provided to discourage car use. Electric vehicle charging will be provided in line with the requirements of Part L of the Building Regulations - Conservation of Fuel and Energy (Dwellings) 2021 and Part L of the Building Regulations – Conservation of Fuel and Energy (Buildings other than Dwellings) 2021.

3. Design Basis & Approach

Building energy efficiency and sustainability involves all designers and stakeholders from the start of the design process. The most successful sustainable sites are those which keep energy efficiency and sustainability at the core of project from design through to construction.

The 4 main principles to achieve energy efficient buildings are:

Reduce: Reduce energy consumption by passive and active means, for example improving building fabric and utilising low energy equipment.

Reuse: Reuse energy & materials where possible by recovering waste energy where possible.

Renewables: Utilise renewable technologies to offset energy from fossil fuel technologies.

Rethink: Constantly rethink and refine the energy & sustainability strategy and approach.

The potential strategies outlined in this report are based around these principles.

As noted above the development will be designed to meet Part L of the Building Regulations – Conservation of Fuel and Energy (Buildings other than Dwellings) 2021 incorporating Nearly Zero Energy Building (NZEB) standards.

3.1 Part L of the Building Regulations

The EU Energy Performance of Buildings Directive (EPBD), transposed into Irish Law from 2006 onwards, contains a range of provisions to improve the energy performance of new buildings. It is the main European legislative instrument to improve energy performance of buildings within the EU. In 2010 the EPBD was recast to include the requirement that member states should ensure that all new buildings are ‘Nearly Zero- Energy Buildings’ by the 31st December 2020.

‘Nearly Zero-Energy Buildings’, or NZEB, means a building that has a very high energy performance, as determined in accordance with Annex I of the EPBD. The nearly zero or very low amount of energy required should be covered

to a very significant extent by energy from renewable sources, including energy from renewable sources produced on site or nearby. The actual energy performance to meet NZEB standards are set by the member states using cost optimal analyses and guidelines set by the EU Commission.

To meet these requirements the Department of Housing, Planning and Local Government (DHPLG) issued a revised Part L of the Building Regulations (to incorporate S.I. No. 292/2019 and S.I. No. 393/2021 – European Union Energy Performance of Buildings) for Dwellings in 2021. Some of the improvements over previous Part L Regulations include:

- A reduction in the Energy Performance Coefficient (EPC) from 0.4 to 0.3 (an improvement in performance of 25%)
- Amendments to the renewable energy provisions
- Increased thermal performance of the building fabric (lower U values and air permeability)
- Changes in the Dwelling Energy Assessment Procedure (DEAP) including more emphasis on hot water efficiency
- More emphasis on energy efficient lighting design
- Increased requirements for renovation projects
- Improved Mechanical & Electrical Services and Lighting specifications.

The regulations represent a marked improvement in building standards with respect to energy efficiency. The Part L Regulations will heavily influence the design of the The Donore Project and will form the main design basis for the project.

4. Compliance with Dublin City Development Plan

Chapter 3 of the recently adopted Dublin City Development Plan 2022-2028 outlines a strategic approach to climate action. It states that all developments will need to *'demonstrate how low carbon energy and heating solutions, have been considered as part of the overall design and planning of the proposed development'* as well as explaining how renewable energy sources (e.g. solar, wind, geothermal and ambient heat pumps etc.) and district heating / waste heat recovery can be used to serve future developments. This report outlines describes how this objective of the Dublin City Development Plan 2022 – 2028 has been met, and this section sets out how other relevant policies have been met.

4.1 Policy CA9 Climate Action Energy Statement

Policy CA9 (Climate Action Energy Statement) states that:

All new developments involving 30 residential units and/ or more than 1,000 sq. m. of commercial floor space, or as otherwise required by the Planning Authority, will be required to submit a Climate Action Energy Statement as part of the overall Design Statement to demonstrate how low carbon energy and heating solutions, have been considered as part of the overall design and planning of the proposed development.

An extensive feasibility study has been completed to select the optimum heating solution for The Donore Project. Further details of this feasibility study are outlined in section 5.2.

4.2 Policy CA7 Climate Mitigation Actions in the Built Environment

Policy CA7 states:

To require low carbon development in the city which will seek to reduce carbon dioxide emissions and which will meet the highest feasible environmental standards during construction and occupation. New development should generally demonstrate/provide for:

a. building layout and design which maximises daylight, natural ventilation, active transport and public transport use;
b. sustainable building/services/site design to maximise energy efficiency;
c. sensitive energy efficiency improvements to existing buildings;
d. energy efficiency, energy conservation, and the increased use of renewable energy in existing and new developments;
e. on-site renewable energy infrastructure and renewable energy;
f. minimising the generation of site and construction waste and maximising reuse or recycling;
g. the use of construction materials that have low to zero embodied energy and CO2 emissions; and
h. connection to (existing and planned) decentralised energy networks including the Dublin District Heating System where feasible.

The development has been extensively designed to maximise daylight, for further details refer to the Architects design report.

For details of the active and public transport availability refer to section 8 of this report and the Traffic & Transport Assessment.

For details of the various energy efficiency measures, including the use of low embodied carbon materials, refer to sections 5 & 6 of this report.

Connection to future energy networks is allowed for as described in section 4.6 to 4.8.

4.3 Policy CA10 Energy from Renewable Sources

Policy CA10 states:

To support, encourage and facilitate the production of energy from renewable sources, such as from solar energy, hydro energy, wave/tidal energy, geothermal, wind energy, combined heat and power (CHP), heat energy distribution such as district heating/cooling systems, and any other renewable energy sources, subject to normal planning and environmental considerations.

As per section 5.2 a centralised district heating system, using a renewable energy heat source in the form of air to water heat pumps as the primary heat source, is being provided. Provision is also made for the future installation of photovoltaic panels of the roofs of each block.

4.4 Policy CA11 Micro-Renewable Energy Production

Policy CA11 states:

To support, encourage and facilitate the development of small scale wind renewable facilities / micro-renewable energy production.

Small scale wind energy was considered as part of the design however given the location of the site and given that large amounts of roof space have been allocated to communal amenity areas small scale wind micro generation was not considered suitable for the site.

4.5 Policy CA13 Geothermal Energy

Policy CA13 states:

To support, encourage and facilitate the exploration for, and development of, geothermal energy resources having regard to emerging government policy on geothermal energy.

Geothermal energy was considered for the site however given the scale of the development and the available area for geothermal collectors it was not considered suitable for the development.

4.6 Policy CA14 Waste Heat, District Heating and Decentralised Energy

Policy CA14 states:

To actively encourage the development of low carbon and highly efficient district heating and decentralised energy systems across the city utilising low carbon heat sources such as renewable energy and waste heat recovery and to promote the connection of new developments to district heating networks where such systems exist/can be developed in a given area.

The centralised heating system will allow future connection to district and/or waste heat networks.

4.7 Policy CA15 The Dublin District Heating System (DDHS)

Policy CA15 states:

To support, encourage and facilitate the development and expansion of any necessary energy infrastructure which will deliver the low carbon Docklands and Poolbeg catchment of the Dublin District Heating System (DDHS) project including, its pipeline infrastructure and its energy centre with energy storage and back-up heat production.

The centralised heating system will be able to connect to future district and/or waste heat networks via plate heat exchangers, including the above Dublin District Heating System (DDHS) network if it becomes available to subject site.

4.8 Policy CA16 Supporting the Potential of District Heating in Dublin City

Policy CA16 states:

To support, encourage and facilitate the potential of district heating in Dublin City, all Climate Action Energy Statements submitted to the Council (see Policy CA9) shall include an assessment of the technical, environmental and economic feasibility of district or block heating or cooling, particularly where it is based entirely, or partially on energy from renewable and waste heat sources. In addition:

(a) Climate Action Energy Statements for significant new residential and commercial developments in Strategic Development and Regeneration Areas (SDRAs), will assess the feasibility of making the development 'district heating enabled' in order to facilitate a connection to an available or developing district heating network in the area.
(b) Climate Action Energy Statements for significant new residential and commercial developments in the Docklands SDRA will assess the feasibility of making the development 'district heating enabled' in order to facilitate a connection to the Dublin District Heating System.

As per section 5.2 a centralised district heating system has been selected as the preferred heating option for the development.

4.9 Appendix 3 – Objective 7 – To ensure high quality and environmentally sustainable buildings

Objective 7: Enhanced density and scale should;

- *(a) Be modulated and orientated so as to maximise access to natural daylight, ventilation, privacy, and views to minimise overshadowing and loss of light – see Appendix 16*
- *(b) not compromise the ability of existing or proposed buildings and nearby buildings to achieve passive solar gain*
- *(c) ensure a degree of physical building adaptability as well as internal flexibility in design and layout*
- *(d) ensure that the scale of plant at roof level is minimised and have suitable finish or screening so that it is discreet and unobtrusive*
- *(e) maximise the number of homes enjoying dual aspect, to optimise passive solar gain, achieve cross ventilation and for reasons of good street frontage*
- *(f) be constructed of the highest quality materials and robust construction methodologies*
- *(g) incorporate appropriate sustainable technologies, be energy efficient and climate resilient*
- *(h) have appropriate and reasonable regard to quantitative approaches to assessing daylighting and sun lighting proposals*
- *(i) Where appropriate, satisfactory, alternative compensatory design solutions should be provided for a failure to meet reasonable daylighting provisions, in the context of a constrained site or securing wider objectives such as comprehensive urban regeneration or an effective urban design and streetscape solution – see Appendix 16.*
- *(j) incorporate an Integrated Surface Water Management Strategy to ensure necessary public surface water infrastructure and nature based SuDS solutions are in place – see Appendix 13,*
- *(k) include a flood risk assessment - see SFRA Volume 7.*

Regarding ventilation, heat Recovery ventilation is the preferred form of ventilation for the project.

Regarding daylight, privacy and overshadowing please refer to report STG-3DDB-S1b-00-XX-RE-0-001.

Regarding SuDS please refer to section 7 of this report.

Regarding Flood Risk Assessment please refer to report STG-AEC-S1b-00-00-RE-C-0000002.

5. Energy Conservation Approach

5.1 Passive Energy Reduction

The first step to implementing a low energy design for The Donore Project will be to reduce the energy required to heat the apartments and communal areas using passive means. This will include the specification of a high-performance building fabric with u values equal to or exceeding that of the backstop values in Part L of the Building Regulations - Conservation of Fuel and Energy (Dwellings) 2021 and Part L of the Building Regulations – Conservation of Fuel and Energy (Buildings other than Dwellings) 2021. Air tightness and thermal bridge details will be carefully designed to limit heat loss. Glazing will be specified to reduce solar gain while still providing adequate daylight. In certain areas blinds (automatic or manual) will be provided to reduce solar gain. The buildings will also be constructed with a high thermal mass to reduce the incidence of overheating throughout the day and maximise the effectiveness of night-time ventilation / cooling.

5.2 Heating & Renewable Strategy

An extensive feasibility study including detailed DEAP assessments has been completed to select the optimum heating solution for The Donore Project, to meet the sustainability objectives & operational requirements of the development and to meet the requirements of Part L of the Building Regulations (Conservation of Fuel & Energy – Dwellings);

A number of heating solutions were considered as part of this process including:

Decentralised Systems (per apartment):

1. **Option D1:** Electric Space Heating, Domestic Hot Water Packaged Air to Water Heat Pump and Photovoltaics. Ventilation provided by CME system. MVHR could also be utilised.
2. **Option D2:** Heat Pump providing CME ventilation with inlet air via trickle vents *(standard exhaust air heat pump arrangement)*. See figure 1 below.

Figure 1: Heat Pump with CME

3. **Option D3:** Heat Pump using exhaust air and inlet air provided by a supplementary ventilation unit with fan and hot water coil. Outside air is heated up by the ventilation unit and supplied to living spaces (similar to and MVHR) and extracted from wet rooms by the heat pump.

The centralised system which was considered was:

4. **Option C1:** A central plant room serving the development with a primary heating source of heat pumps and if required supported by fossil fuel (gas/oil) heat sources e.g. boilers or CHP. The system would include central support plant (pumps, buffer vessels etc.) as well as apartment HIUs and MVHR. See figure 2 below for HIU and MVHR in a typical prefabricated cupboard assembly.

Figure 2: HIU for Centralised Heating System

The feasibility study demonstrated that, given all options are designed to meet the requirements Part L of the Building Regulations – Conservation of Fuel & energy (Dwellings), the carbon dioxide emissions of each option are similar. However, the centralised option has significantly lower capital costs and running costs. The main advantage of a centralised system is that all of the main heat generation plant is located centrally, which significantly reduces the quantity of plant that requires maintenance. It also facilitates the integration of future low carbon technologies across the development.

Following this feasibility study a centralised (district) heating system using Air to Water Heat Pumps as the primary heating source (Option C1), was selected as the preferred option to serve the development. The primary plant for the centralised heating network will be housed in the Block DCC5 plantroom and roof space.

In order to generate domestic hot water, the LTHW circulation temperatures in the district heating network typically need to be minimum of 70ºC to eliminate the risk of legionnaires disease in domestic hot water systems. In this situation standard heat pumps on their own are not a viable heating source and less efficient high temperature heat pumps or fossil fuel heating sources (e.g. gas boilers or CHP) are required. However, CIBSE have recently updated CP1: Heat Networks: Code of Practice for the UK (2020) which permits lower LTHW circulation temperatures in centralised systems while safely minimising the risk of Legionnaires disease in domestic hot water systems. The current space allocation is based on the use of a fossil fuel heat source, however the use of a lower temperature heat network in line with the revised CIBSE CP1 standard will be considered at the next stage of the design. This would further improve the efficiency and reduce the carbon dioxide emissions of the development.

Figure 3: Example Centralised Plantroom

5.2.1 Centralised Systems

For centralised heating systems a single energy source will be provided for the blocks of apartments. Low Temperature Hot Water (LTHW) is provided to each apartment to distribute heat for space heating and domestic hot water generation.

The Low Temperature Hot Water (LTHW) is to be generated by a centralised system incorporating air to water heat pumps and a gas fired boiler system. The air to water heat pumps will operate as the lead heat generator producing LTHW at circa 50degC. The gas fired boiler will be used to raise the water temperature to circa 70degC for circulation to each residential unit. A heat interface unit (HIU) will be provided in each apartment to distribute the LTHW and domestic hot water. Heating will be provided via wall mounted radiators. A single centralised system is to be provided to serve the entire development. The heat supplied to each apartment and commercial unit will be metered and billed accordingly.

Figure 4: Apartment Heat Meter & Heat Interface Unit

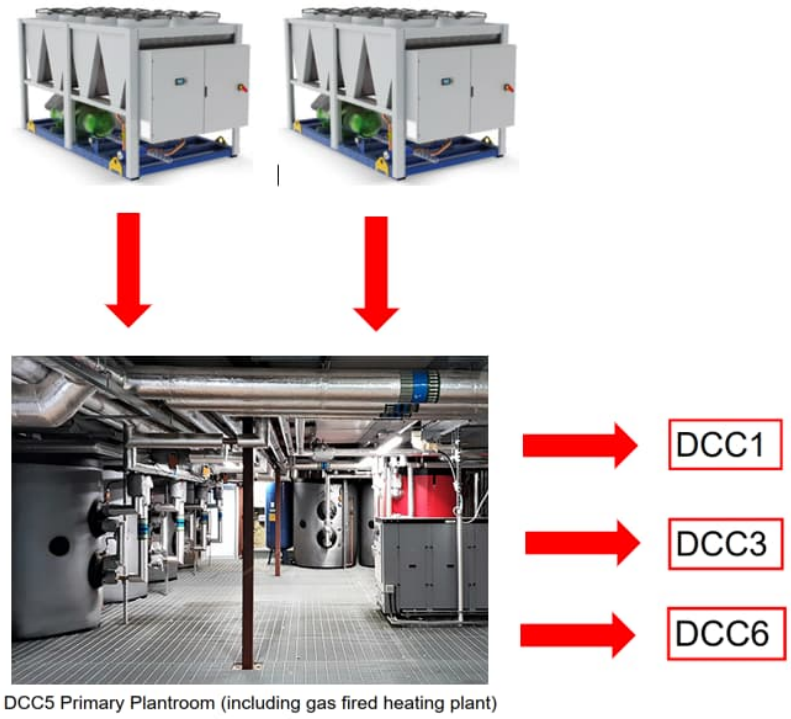

Figure 5: Donore Centralised Heating System Diagram

Figure 6: Prefabricated Utility Cupboard – MVHR & HIU

5.3 Ventilation

The objectives of the ventilation strategy for The Donore Project are:

1. To maintain good air quality levels at all times of the year.
2. To minimise energy consumption and associated carbon emissions associated with ventilation plant.

The following ventilation options were examined for their application to The Donore Project.

5.3.1 Mechanical Ventilation with Heat Recovery (MVHR)

Mechanical ventilation with heat recovery (MVHR) utilises a high efficiency heat exchanger to recover heat from extract air and heat the incoming ventilation air. As the incoming air is heated, it reduces the overall heating load in the space. MVHR works best in airtight buildings. Supply air is ducted to each habitable room (e.g. bedroom, living area) and extract air is ducted from each wet room (e.g. bathroom, kitchen). In summer months the system is used to 'dump' warm air.

5.3.2 Continuous Mechanical Systems Extract (CME)

A continuous mechanical extract (CME) system continuously extracts air from wet rooms (e.g. bathroom, kitchen) via a single extract unit. The extract unit could be installed in a high-level cupboard in each residential unit. Each wet room is ducted to the extract unit and a single extract duct discharges air to outside via a wall mounted grille. The unit generally operates at low speed and uses integrated humidistats to 'Boost' ventilate when required.

For the system to be compliant with Part F of the Building Regulations (Ventilation), permanent background ventilation (e.g. wall or trickle vents) would be required. Automatic demand control humidity sensitive inlets could also be used.

5.3.3 Commentary on Ventilation Systems

Following the feasibility study and further analysis it is proposed that localised MVHR (mechanical ventilation with heat recovery) systems serve the majority of occupied areas.

5.4 Lighting

Lighting will account for a significant proportion of the energy consumption for the development. The strategies that will be employed in the design to reduce the energy consumption from lighting will be:

- Careful lighting design in all areas to provide adequate lux levels while eliminating over provision / over design of lighting
- Selection and specification of low energy use light fittings through including LED's where practical
- Careful specification of lighting controls which may include occupancy sensing, daylight sense and smart lighting control systems.

5.5 Controls

A fully automated Building Management System (BMS) will be provided to control all Centralised HVAC systems. The BMS will incorporate fully automated temperature control systems and will include automated optimisation strategies to minimise energy consumption. Energy metering will also be provided, allowing main plant energy consumption to be accurately monitored as well as helping to identify high energy users. This data can in turn be used to fine tune the control strategies to improve efficiency. The BMS will also facilitate the energy metering of each apartment and commercial unit.

The use of smart building technologies can significantly reduce the energy consumption of buildings. The latest proposals from the EU for the revised Energy Performance of Buildings Directive (EPBD) recognise this and the revised EPBD will place much more emphasis on smart building technologies into the future. The use of smart building technologies will be considered where practical for the The Donore Project.

5.6 Other Measures

Other energy conservation measures that will be employed on The Donore Project include:

- Variable speed drives will be provided on all motors greater than 1kW.
- Variable flow water flow heating systems will be used throughout.
- EC fans will be used on all ventilation systems.
- Low / zero Global Warming Potential (GWP) refrigerants will be used on split and multi-split cooling systems.
- Lifts with regenerative drives will be used where feasible.
- Materials with low or zero volatile organic compound (VOC) content will be used to maximise Indoor Air Quality (IAQ).

5.7 Home Performance Index

The development is to be monitored and assessed with a HPI award issued on completion.

6. Embodied Carbon & Materials

The use of construction products leads to a wide range of environmental and social impacts across the life cycle through initial procurement, wastage, maintenance and replacement. Taken together, construction products make a highly significant contribution to the overall life cycle impacts of a building. In some cases, they may even outweigh operational impacts (such as energy consumption). The introduction and development of Part L into the building regulations has led to significant reductions in the operational energy consumption of buildings and these regulations are being progressively tightened. As a result, greenhouse gas emissions from other aspects of buildings, such as embodied emissions, are becoming increasingly important in terms of reducing the overall emissions that lead to climate change and arise from the procurement, maintenance and replacement of construction products over the building's lifetime. In addition to climate change, there are several other embodied environmental impacts associated with construction products and the processes that occur during and after construction that should be considered during design, for example corporate social responsibility and other regulatory obligations.

In this context, the selection of materials for the The Donore Project will aim to reduce the burden on the environment from construction products by recognising and encouraging measures to optimise construction product consumption efficiency and the selection of products with a low environmental impact (including embodied carbon), over the life cycle of the building.

Where possible locally produced products will be used thus minimising the embodied carbon associated with transport. Where timber products are specified only products with the Forest Stewardship Council's (FSC) Trademark or other label from an equivalent internationally recognised, globally applicable, independent certification system for good forest management will be used. Metrics for recycling waste during construction will also be set.

7. Sustainable Drainage (SUDS)

The proposed drainage design will include a number of Sustainable urban Drainage System (SuDS) measures which will intercept and treat runoff prior to entering the positive drainage network. The current proposals include the use of green roof, permeable paving and bio-retention to effectively intercept and reduce the quantity of runoff leaving the site. An oil interceptors will be provided upstream of the proposed outfall to the existing positive drainage networks. The proposed SuDS design has been prepared in accordance with the Greater Dublin Strategic drainage Study (GDSDS) Volume 2 New Development and relevant best practice guidance in order to ensure that the measures proposed are sufficient to reduce the quantity and improve the quality of runoff entering receiving watercourses from the proposed site.

8. Sustainable Transport Infrastructure

The purpose of this section is to outline the sustainable transport infrastructure that exists and that will be provided as part of the project to facilitate sustainable transport to and from The Donore Project.

8.1 Bus

As graphically illustrated below in figure 7.1 below, the site is situated to benefit from multiple bus transport connections allowing all site users to travel by this sustainable mode. There are approximately 25no. bus stops located within a 1km walking catchment of the site. These bus stops are operated by Dublin Bus and Go Ahead Ireland.

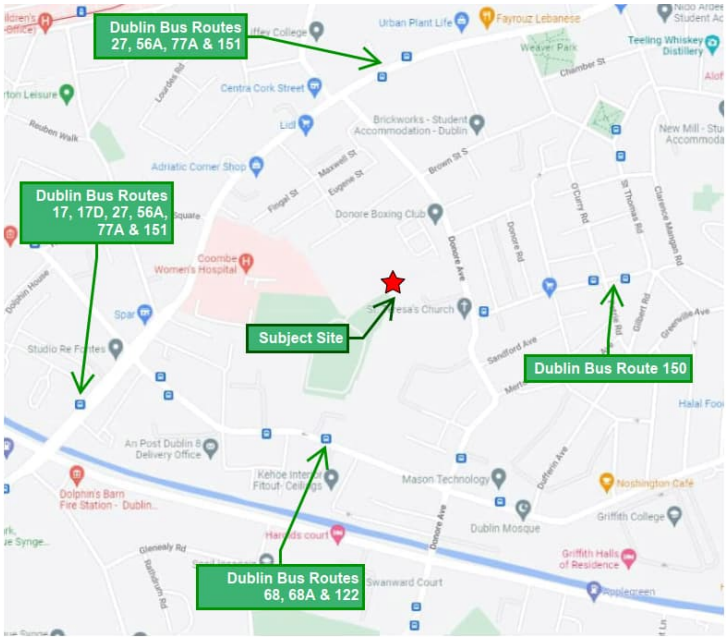

Figure 7: Existing Bus Stops

8.2 Rail

The closest railway station to the site is Dublin Heuston located 1.8 km (22 min walk) north of the subject site. Dublin Heuston, which forms part of the Southwestern Commuter service provides rail services west to Galway, Limerick and Cork. Figure 9 below illustrates the site location in relation to Dublin Heuston Train Station.

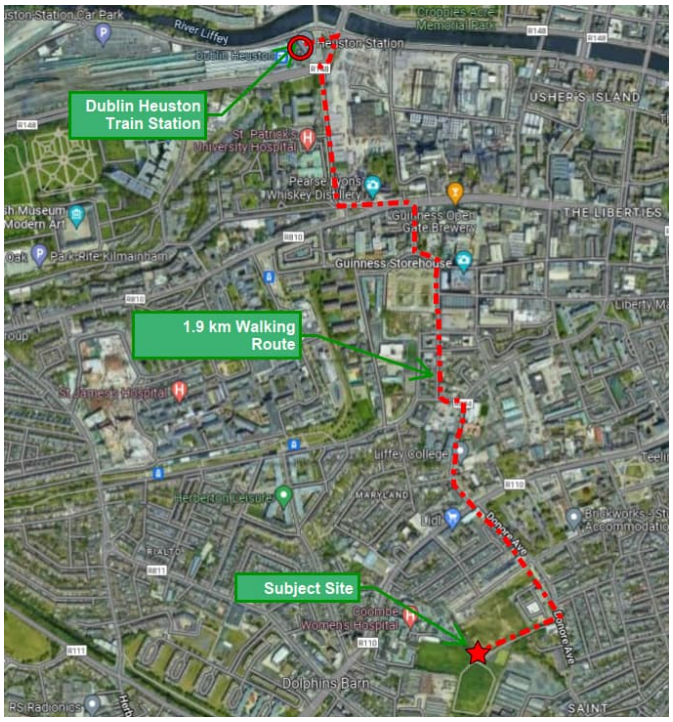

Figure 8:Train Station Proximity (Source: Google Maps)

8.3 Luas

Luas is Dublin city's Light Rail Transit System (tram).

The closet red line Luas stop to the site is Fatima Luas Stop and is located 1km (12 min walk) north west of the subject site. Fatima is a red line stop. Luas Red Line is 20kms in length and has 32 Stops. It runs from Tallaght to The Point and from Saggart to Connolly.

Figure 9: Red Line Luas Stop Proximity (Source: Google Maps)

The closet green line Luas stop to the site is Harcourt Street and is located 1.8 km (23 min walk) east of the subject

site. Harcourt Street is a green line stop. Luas Green Line is 24.5km in length and has 35 Stops. It runs from Brides Glen to Broombridge via the City centre.

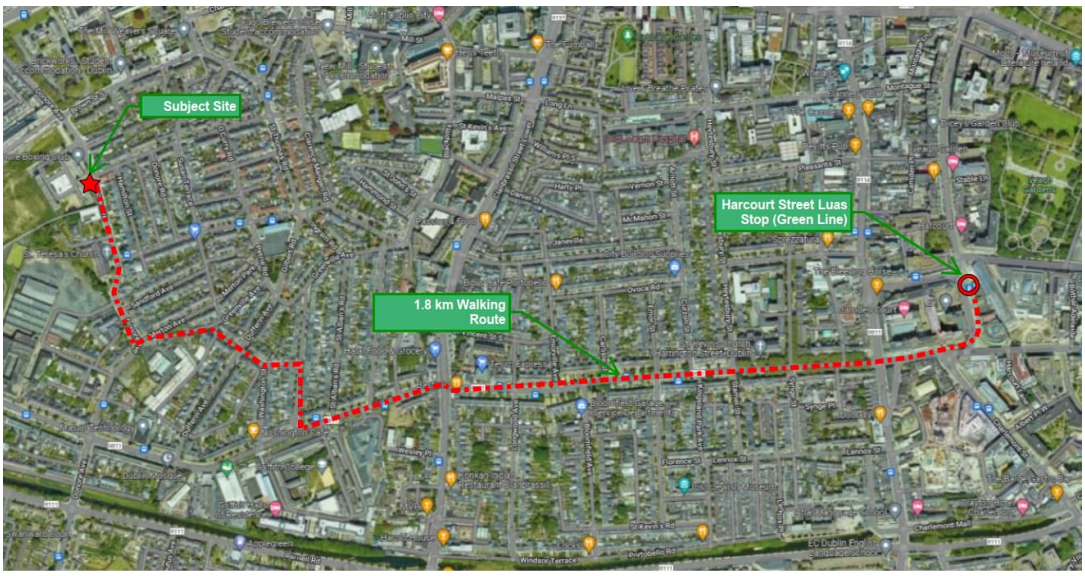

Figure 10: Green Line Luas Stop Proximity (Source: Google Maps)

8.4 Car Club

There is 1no. GoCar hire station located within a 600m walking distance of the subject site and another within 1.2km. GoCar members can book cars online or via the app for durations of as little as an hour. They then unlock the car with their phone or a GoCard; the keys are in the car, with fuel, insurance and city parking all included. The benefits of such car sharing services include:

- The reduction of cars on the road and therefore traffic congestion, noise and air pollution;
- Frees up land traditionally used for private parking spaces;
- Encourages and potentially increases use of public transport, walking and cycling as the need for car ownership is reduced;
- Car sharing allows those who cannot afford a car the opportunity to drive, encouraging social inclusivity; and
- Car share replaces approximately 20 private car parking spaces.

The location of the GoCar GoBase is illustrated in figure 11 below.

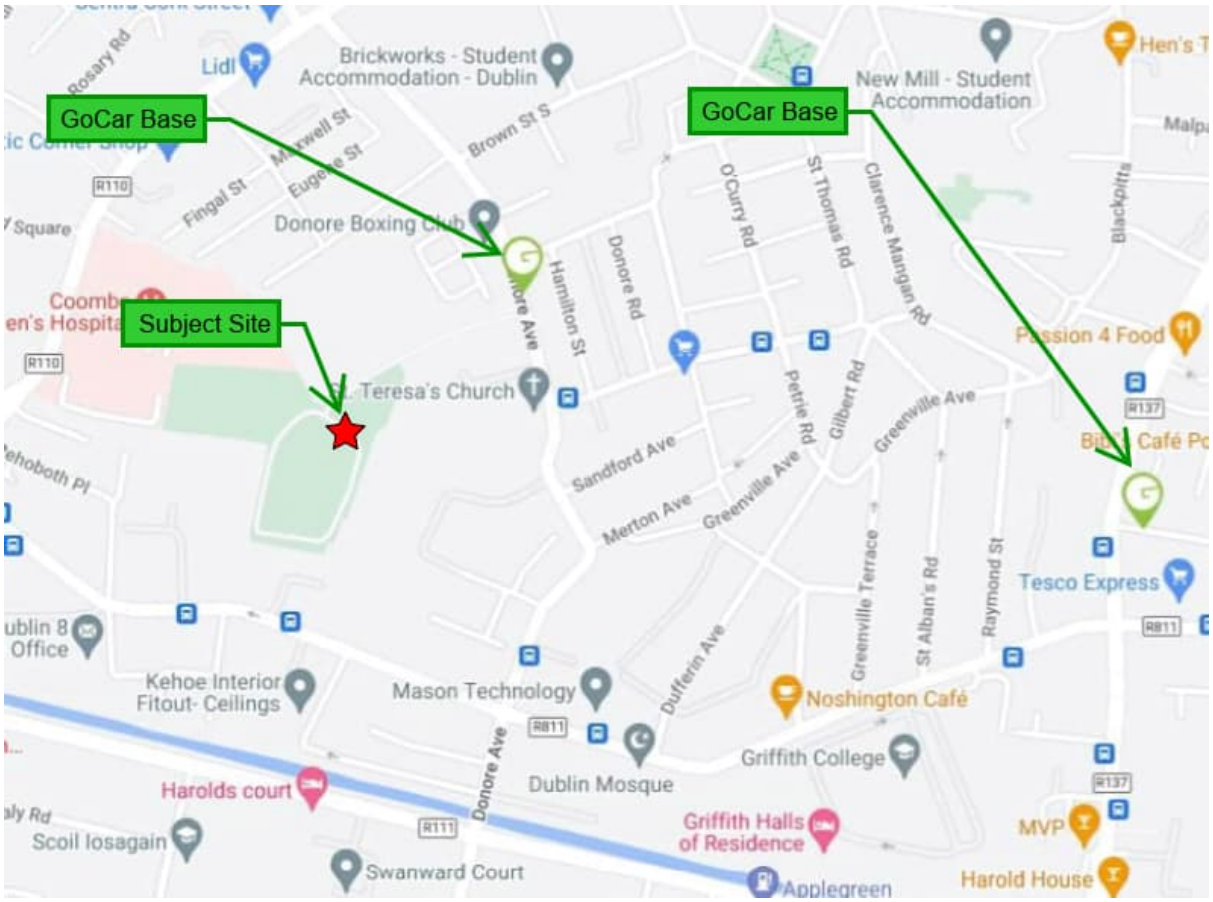

Figure 11: GoCar GoBase Locations (Source: www.gocar.ie)

8.5 Cycle Network

Figure 12 illustrates the existing cycle network and Figure 13 illustrates the proposed cycle network surrounding the Donore Development area.

Figure 12: Existing Cycle Facilities Source (National Transport Authority 2013)

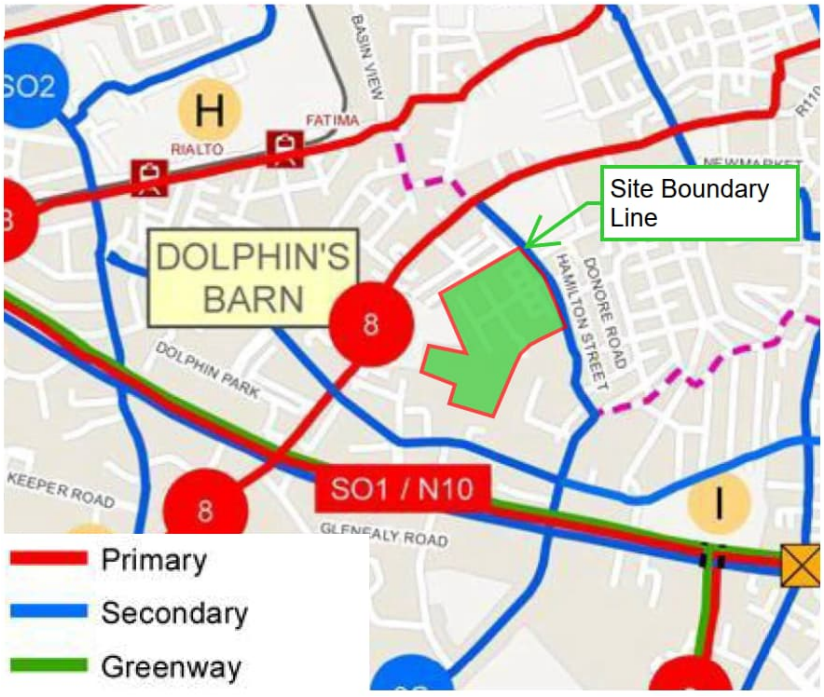

Figure 13: Greater Dublin Area Cycle Network Plan – Proposed Cycle Network

To help promote and encourage residents to cycle each block is to be fitted with bicycle stands. Block DCC1 is to have 3no. cycle park bays, DCC3 is to have 5no. cycle park bays, DCC5 is to have 6no. cycle park bays and DCC6 is to have 5no. cycle park bays.

8.6 Electric Vehicle Charging

50% of the parking bays provide with Electric Vehicle Charging (EVC) points will be provided throughout the development in line with the revised requirements of Part L of the Building Regulations (Conservation of Fuel & Energy – Buildings other than Dwellings) 2021. Wall mounted robust charging stations will be provided in within the covered car parking spaces and pole type for on-street carpark with an energy demand of 7kW single phase and 22kW three phase chargers or as agreed with the Local Authority.