

2 NON-TECHNICAL SUMMARY

This Environmental Impact Assessment Report (EIAR) has been prepared to support the proposed Kilcarbery Strategic Housing Development (SHD) application for residential development and associated infrastructure on a site generally bounded by the Outer Ring Road / Grange Castle Road (R136) to the west, the Old Nangor Road (L5254) and Scoil Mochua and Spina Bilfida Hydrocephalus Ireland immediately to the north, the New Nangor Road (R134) beyond to the north, existing residential estate development to the north east and east of the PPP site, and Corkagh Demesne (public park) to the south.

The EU Directive requires the production of a Non-Technical Summary as part of the production of an EIAR. The Non-Technical Summary ensures that the public is made aware of the environmental implications of any decisions about whether to allow new developments to take place. The Non-Technical Summary is laid out in a similar, but summarised format to the main EIAR, describing the project, existing environment, impacts and mitigation measures.

Assessments have been conducted in an integrated, collaborative and analytical process in accordance with the Guidelines on the environmental topics to be examined. This seeks to identify the potential for significant adverse environmental impacts arising from the proposed project. The overall finding of these studies is that, subject to the specified ameliorative, remedial or reductive measures being implemented, the likely effects of the proposed development on the environment during both the construction and operational stages will not be significant.

2.1 Purpose of the EIAR

The objective of this EIAR is to identify and predict the likely environmental impacts of the proposed development as well as to describe the means and extent by which they can be reduced or ameliorated, to interpret and communicate information about the likely impacts; and to provide an input into the decision making and planning process.

2.2 A Note on Quotations

Environmental Impact Assessment Reports by their nature contain statements about the proposed development, some of which are positive and some less positive. Selective quotation or quotations out of context can give a misleading impression of the findings of the study.

Therefore, the study team urge that quotations should, where reasonably possible, be taken from the overall conclusions of specialists' section or from the non-technical summary, and not selectively from the body of the individual chapters.

2.3 The Requirement for an EIAR

The process to determine whether an EIA is required for a proposed development is called Screening. This is dependent on the mandatory legislative threshold requirements or the type and scale of proposed development and significance or environmental sensitivity of the receiving environment.

Annex I of the EIA Directive 85/337/EC requires as mandatory the preparation of an EIA for all development projects listed therein. Schedule 5 (Part 1) of the Planning & Development Regulations 2001-2018 brought Annex 1 of the EIA Directive directly into Irish planning legislation. The Directive prescribes mandatory thresholds in respect to Annex 1 projects. Annex II of the EIA Directive provides EU Member States discretion in determining the need for an EIA on a case-by-case basis for certain classes of project having regard to the overriding consideration that projects likely to have significant effects on the environment should be subject to EIA.

Schedule 5 (Part 2) of the Planning & Development Regulations 2001 – 2018 set mandatory thresholds for each project class. Sub-section 10(b)(iii) and (iv) addresses 'Infrastructure Projects' and requires that the following class of project be subject to EIA: (b)(i) **Construction of more than 500 dwelling units**. Category 10(b)(iv) refers to 'Urban development which would involve an area greater than 2 hectares in the case of business district, 10 hectares in the case of other parts of a built-up area and **20 hectares elsewhere**.'

The proposed development comprises a new residential neighbourhood, including 1,034no. residential units and ancillary supporting facilities, on a site of c. 28.6 hectares. The project exceeds the 500 no. dwelling units and 20 hectare site area thresholds requiring mandatory EIA.

2.4 Description of Proposed Development

The subject site is contained within a larger land parcel subject of South Dublin County Council's Kilcarbery-Grange Masterplan (c. 35 Ha). The lands are located approximately 2km west of Clondalkin village, and approximately 11km south west of Dublin City Centre.

The application site comprises greenfield agricultural lands, with field boundaries defined by existing hedgerows and trees. The wider landscape opens towards Corkagh Park to the south.

The proposed land use is primarily residential. Ancillary retail and community uses are proposed in the north eastern part of the site, near to the future neighbourhood centre and education campus sites. Significant areas of public open space, green infrastructure networks and supporting physical infrastructure works are also proposed.

The proposed development subject of this SHD Planning Application will generally comprise 1,034no. units (578 no. houses, 154 no. duplex / apartments and 302 no. apartments) ranging from 2 to 6 storeys.

Ancillary uses including the provision of 1 no. retail unit (c. 178 sq. m) and community building (c. 785 sq. m), 1no. temporary creche (c. 557 sq. m gross floor area in lieu of 7no. ground floor apartment units in Block 7 pending construction of permanent creche at Grange Square) and 1no. permanent creche building at Grange Square (c. 909 sq. m gross floor area) are also proposed.

In terms of land use planning, under the South Dublin County Council Development Plan 2016 – 2022 the subject site has primarily been zoned Objective 'RES-N', the objective of which is "*To provide new residential communities in accordance with approved area plans.*" The type of uses proposed (residential, childcare, ground floor commercial or community uses and amenity spaces) are either 'Permitted in Principle' or 'Open for Consideration' under the 'RES-N' zoning objective. The residential and ancillary uses proposed are fully compliant with the over-arching zoning objective for the subject lands.

The design proposes the integration of the South Dublin County Council's Kilcarbery – Grange Masterplan structure of open spaces and green loops into a hierarchy of streetscapes: formal avenues, side-streets and biophilic streets, expanding on the network of existing hedgerows, tree lines and water courses.

The net residential density of the proposed development will be 42no. units per Ha, based on a net developable site area of 24.4 Ha, and a total of 1,034no. residential units to be provided in the scheme.

The proposed landscape scheme is a key component of the integration of the new building environment with the existing and proposed landscape conditions. The design concept for proposed development is to create a 'biophilic' urban form, where buildings are carefully fitted into the existing landscape, promoting a sense of health and well-being. The design of the proposed development is arranged as a series of distinct character areas, which will be defined by variations in unit types and design, road layout and hierarchy and related open spaces.

The proposed development includes the provision of c. 4.5 Ha of public open space. At a basic level, in compliance with the Kilcarbery – Grange Masterplan (2017) three focal green spaces are provided, one serving each of the three residential character areas – Lime, Sycamore and Oak. A landscaped space is also proposed at the interface with the Neighbourhood Centre site to the north east (noting that the Neighbourhood Centre is outside the red line area and not part of this application).

Connectivity within the site and to the wider surrounding areas is catered for through a series of 'green loops' within the proposed development as well as a number of new connections with Corkagh Park to the south.

In terms of wastewater provision, as part of the enabling phase of the development and in advance of any housing construction the core wastewater infrastructure will be installed. This will include the following main elements: -

- The sewer connection with the exiting Irish Water Sewer and Gravity section up to lowest outfall point.
- The Rising Main and Discharge Manholes including connection to the gravity section.
- The Pumping Station and inlet pipes.

The developing network will then be taken from these key points ensuring that all elements are maintained to accommodate the short to medium term reduced flow levels.

In terms of surface water management, there are two proposed surface water discharge points from the site. Lands to the north eastern corner of the site, together with the run-off from the main spine road, will be directed to an existing 450mm diameter drain within the Old Nangor Road at the junction of Kilcarbery Avenue. The remainder of the site will be directed through green infrastructure to the holding ponds in Corkagh Park that ultimately discharge to the Camac River. The surface water strategy is managed through a number of catchment areas as detailed in the Infrastructure Design Report, prepared by DBFL Consulting Engineers.

New vehicular access from Outer Ring Road / Grange castle Road (R136) (left in left out arrangement) to the west and 2no. new vehicular access points onto Old Nangor Road (L5254) to the north and associated works to existing adjoining roads. In total, 1,510no. car parking spaces are proposed as part of the overall development. We refer to the Traffic and Transport Assessment Report, prepared by DBFL Consulting Engineers which sets out the rationale for the proposed quantum of car parking. In total, 1,105no. bicycle parking spaces are proposed as part of the overall development to serve apartments / duplexes. Bicycle parking for house can be readily accommodated in the associated private gardens.

It is proposed that the development will be delivered in 4no. phases, which have been set out on the accompanying phasing drawing (Dwg. No. 6168-003 'Phasing & Tenure Mix Plan') prepared by Burke Kennedy Doyle Architects.

- **Phase 1** – The first phase of development provides for the delivery of 289no. residential units comprising a mix of houses, apartments and duplex units, along with the largest area of open space in the east of the site (Oak Green space), other associated liner green spaces and a temporary creche facility in Apartment Block 7. This first phase of development will also provide the 'Spine Road' and the foul pumping station and the associated surface water management network.
- **Phase 2** – The second phase of development provides for 246no. residential units, which also includes a broad range of dwelling sizes and typologies. This phase will also include associated liner green spaces between Oak Green space and Lime Green space.
- **Phase 3** – The third phase of development provides for 291no. residential units, which also includes a broad range of dwelling sizes and typologies. This phase will also include the community building, and permanent purpose built creche and the second largest open space (Lime Green space).
- **Phase 4** – The final phase of development provides for 208no. residential units, which also includes a broad range of dwelling sizes and typologies. This phase will also include the retail units on the ground floor of Apartment Block 2 and final remaining linear green areas.

2.5 Alternatives Considered

Potential alternatives to the proposed development were considered as the scheme progressed and are summarised below.

A number of site layout and alternative designs were considered during the iterative design process in consultation with South Dublin County Council. Further design alterations were informed at planning design stage by the Opinion of An Bord Pleanála on foot of Pre-Application Consultation held on 11 February 2019.

No particular further alternatives to the nature, design and layout of this project have been identified in the preparation of this EIAR, as a result of potential significant adverse impacts on the environment arising at planning design stage. The mitigation measures do not call for changes to the design and layout of the proposed residential scheme.

Kilcarbery – Grange Masterplan Layout

The proposed layout subject of Pre-Planning Consultation with South Dublin County Council was subject of significant design alteration in order to avoid the removal of significant landscape buffers (existing hedgerow and tree lines along field boundaries) within the application site. The alternative layout seeks to deliver a landscape led scheme, incorporating found landscape with green infrastructure links as part of the 'biophilic' concept for the proposed scheme.

Road layout and drainage strategy (including SuDs) were evolved through consultation between the Design Team and the Planning Authority. Also, sustainable integration of the new residential neighbourhood with the biodiversity, landscape and drainage attributes of Corkagh Park were subject of consultation with the Planning Authority and an iterative design process, to arrive at an optimal scheme in respect of landscape and environmental impacts.

An Bord Pleanála Pre-Planning Consultation

The proposed development comprising 978no. dwellings in a mix of 624no. houses and 354no. duplexes and apartments with a height range of 2 to 6 storeys, was submitted to An Bord Pleanála for formal consultation at Pre-Planning Consultation stage.

The Board, in its assessment of the key issues to be further examined by the Applicant to support a reasonable basis for an application for strategic housing, identified the following issues for further consideration and/or justification in relation to sustainable residential density that results in acceptable efficiency in use of serviceable land, balance with site context, design, layout & unit mix to (in particular the creation of distinct character areas, sufficiently robust urban edge to the west and south, connections to existing and proposed residential development and public open spaces) and surface water management and maximisation of SuDs measures.

The final iteration of the proposed development comprises 1,034no. units. Design changes to the built edge were made along the western boundary with the R136 to increase building height and strengthen the visual presence of the scheme from the orbital road. Design changes to the southern edge with Corkagh Park sought to deliver an appropriately robust urban edge, that also is sensitive to the natural boundaries, biodiversity and relative tranquillity of the parkland. Green linkages, incorporating natural landscape features and providing enhanced connections were provided. An appropriate SUDS treatment train was agreed with South Dublin County Council, integrating also with Corkagh Park to the south. The final iteration of the scheme is not considered to give rise to any significant adverse environmental impacts.

2.6 Population and Human Health

This chapter evaluates the impacts, of the proposed development on human health of the population surrounding the proposed residential development at Kilcarbery Grange, Clondalkin, Dublin 22. According to the 2016 census results there are 20,411 people living within the study area. National health trends were consulted to give an overall indication of the general wellbeing of the population. In the 2 surrounding District Electoral Divisions (DED) the percentage of people who stated their health was “bad or very bad” based on questioning in the 2016 census was 1.5% in Clondalkin – Village and 2.1% in the Clondalkin – Dunawley. Studies have shown that well designed developments such as the one proposed (Residential with designed landscape aspects) have an overall positive effect on the overall mental and physical health of the local population.

Issues examined as part of the possible impact on human health from the proposed development including Air Quality, Noise and Vibration, Traffic, Visual and Health and Safety. These chapters should be consulted in relation to specific impacts and mitigation measures.

In relation to air quality the impact of construction of the proposed development is likely to be negative, short-term and imperceptible with respect to human health. The mitigation measures that will be put in place during construction of the proposed development will ensure best dust mitigation practice based on the Institute of Air Quality Management (IAQM) Guidance. Furthermore, mitigation 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. During the operational phase of the project the pollutants of most concern are NO₂ and PM₁₀, as these pollutants are generated as a direct result of vehicles and have the greatest potential to exceed the air quality standards. There are no other impacts on air quality associated with the operational phase of the proposed development. Air dispersion modelling of operational traffic emissions was undertaken. Modelling results show emissions as a result of the proposed development are compliant with all National and EU ambient air quality limit values and, therefore, will not result in a significant impact on human health.

As detailed in chapter 5.9 Air – Noise & Vibration it is believed noise and vibration impact of the construction phase of the proposed development will not be significant. No predicted significant adverse impact arising from vibration during construction provided works are carried out so as to fall under the relevant vibration criteria.

Due to the type of proposed development (Residential) the predicted increase in noise level at the nearest noise sensitive locations conclude that the associated impact is neutral, long term and imperceptible to minor during operation. The proposed development will not generate any perceptible levels of vibration during operation and therefore there will be no impact from vibrations on human health.

The impact of traffic generated by the proposed development on human health during both the construction and demolition phases of the proposed development dealt with in sections 5.1.5.2 & 5.1.5.3 and Chapters 5.9 & 5.10 of this EIAR.

There will be moderate to significant negative townscape impacts during the construction stage of the proposed development, however these will be short term in duration. Once operational Once operational, the new development will contribute positively to the form and function of the local area. The improved town scape and visual settings will result in a positive impact on population and human health in the area.

The proposed development has the potential for an impact on the health and safety of workers employed on the site, particularly during the construction phase. The activities of contractors during the construction phase will be carried out in accordance with the Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013) to minimize the likelihood of any impacts on worker’s health and safety.

During the operational phase of the development, the operator will implement an Environmental Safety and Health (EH&S) Management System and associated procedures at the facility. Full training in the EH&S Management System and relevant procedures will be provided to all employees.

2.7 Biodiversity

The assessment considered the potential direct, indirect and cumulative impacts on biodiversity within the zone of influence of the proposed development. The assessment was undertaken in line with a number of guidance documents including the *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine* (CIEEM, 2018).

Detailed surveys carried out in 2017 by Doherty Environmental to inform the Kilcarbery/Grange Masterplan, and update surveys in 2018 carried out by Scott Cawley recorded baseline ecological conditions at the site. The proposed site comprises of the following habitats; dry meadows and grassy verges, spoil and bare ground, drainage ditches, treelines, hedgerows, and scrub. Red Fox are likely to use the site and evidence of Rabbits was recorded along field boundaries. Habitats within the site are suitable for Pygmy Shrew and Hedgehog. No evidence of badger was recorded. Six species of bat were recorded during bat activity surveys in 2017 carried out by Doherty Environment, however overall activity with the site was considered to be very low and 2017 surveys did not identify any confirmed bat roosts. In 2018, 17 trees/treelines were identified as having potential features to accommodate small number of roosting bats. Four birds listed on the red or amber Birds of Conservation Concern list are considered to possibly breed within grassland habitat within the site, Meadow Pipit, and within hedgerow/treeline habitat, Robin, Starling and Mistle Thrush. The Camac River located c. 100m to the south of the proposed development is known to hold populations of Brown Trout, Three-spined Stickleback, Eel, Minnow and White-clawed Crayfish.

The proposed site is not within any designated site. The nearest European sites are the Rye Water Valley/Carton SAC located 6.4km northwest and the Glenasmole Valley SAC located 7.1km southeast of the proposed site. No hydrological or other connectivity has been identified with this site. There is potential connectivity between the subject lands and European sites in Dublin Bay, the nearest being South Dublin Bay SAC located c. 13.6km east, through surface and foul waters arising from the proposal which will ultimately discharge to Dublin Bay. However, the Screening Statement for Appropriate Assessment assessed Qualifying Interests (QIs) and Special Conservation Interests (SCIs), their threats, and their underpinning conditions for all European sites potentially affected by the proposed development, and concluded that significant effects on European sites arising from the proposed development, either alone or in combination with other plans or projects, can be excluded (Scott Cawley, 2019). The nearest nationally designated site is the Grand Canal pNHA which is located c. 1.2km north of the subject lands. No connectivity has been identified between the site and any nationally designated site.

Key ecological receptors within the zone of influence of the proposed development were identified as; hedgerows and treelines, bats, breeding birds and the Camac River.

Potential impacts of the proposed development during the construction phase are considered to be; habitat loss, habitat fragmentation, disturbance and displacement associated with construction works, accidental mortality, accidental pollution event during construction affecting surface water quality in receiving environment, and spread of non-native invasive species. Potential impacts during the operational phase are considered to be; disturbance arising from operational artificial lighting, and operational run-off affecting surface water quality in receiving environment

Following impact assessment undertaken in line with CIEEM, 2018 guidance the following impacts on key ecological receptors were identified at construction stage: -

- Habitat loss and potential degradation of retained hedgerows and treelines arising from the development, will result in significant adverse impacts to hedgerows and treelines at a local scale;
- Impacts on the local bat population during the construction stage are expected to result in significant adverse impacts, however as low levels of bat activity were recorded using the site in 2017 (Doherty Environmental, 2017) these impacts are expected to occur at a local scale. At operational stage artificial lighting may result in a permanent significant impact on foraging and/or commuting bats at a local scale;
- Impacts on the local bird population during the construction stage are expected to result in temporary significant adverse impacts, at a local scale. At operational stage, long-term displacement of birds from the proposed development site is considered result in a significant impact at a local scale; and,

- Construction-related surface water run-off could result in adverse significant impacts on the Camac River at significant at a local to County scale. It is highly unlikely that a major pollution event will occur during the operational phase, nonetheless in the absence of mitigation it is possible that contaminated operational related surface water run-off could reach the Camac River and result in adverse significant impacts at a local to County scale.

Mitigation measures consider the above potential impacts on key ecological receptors and compliance with legislation, and reduce the magnitude of impacts. Residual impacts on hedgerows and treelines, bats and breeding birds remain due to the overall habitat loss, however at a local scale.

2.8 Land and Soils

The works, as described, will have a slight impact on the natural soils and geological resource within the site. The site at present is generally unused and historically agricultural land with a topsoil layer overlying drift deposits of gravelly clays overlying a limestone bedrock.

The impact on the geology will predominantly be limited to the excavation of upper layers of topsoil and subsoil during the construction phase with some interaction in the bedrock to accommodate deeper wastewater drainage to service the proposed development.

The excavation activities are required to provide a useable formation from which to construct the proposed residential development. It is estimated that approximately 54,318 cubic metres of topsoil and 112,136 cubic metres of subsoil will be stripped and excavated from the site. This will be set aside in stockpiles for re-use within the designed works. The topography of the site and outfall wastewater drainage networks results in excavation of the bedrock of approximately 4,076 cubic metres. This will be crushed, screened and re-used as engineered fill for construction of access roads. There is no impact on the geological resource post construction excepting for impacts on groundwater which are addressed under the heading Water & Hydrogeology.

To reduce the impact on the geology, a soil resource plan will be developed as part of the detail design process in conjunction with a fully developed cut and fill assessment. The soil resource plan will direct on material classification and location of use. It is anticipated that all excavated material will be utilised on site as part of the works with no disposal of site.

During construction, the excavated materials will be classified and segregated into individual stockpiles away from nearby watercourses and drainage ditches. All run-off from the stockpiles will be directed to temporary holding lagoons for filtration prior to entry to the receiving watercourse.

The residual impact, post development will be a slight reorientation of the material layer topography.

2.9 Water

The works, as described, will have a long term and neutral impact on the hydrological and hydrogeological resources and receptors within the subject site and surrounding environs.

In terms of hydrological impact, the main receiving surface watercourse from the proposed development is the Camac River, which runs just outside of the southern boundary to the site and ultimately discharges to the River Liffey approximately 10km north east of the site. The proposed site will pass through existing surface water networks before discharging to the Camac.

The potential impacts on the Camac River come during construction and in operation, and mainly consist of the risk of contamination of surface water runoff through accumulation of silt and debris and accidental spillages. To reduce these possible impacts, several counter measures are proposed both during the construction phase and the operational phase.

During construction, any surface water collecting in excavations will be directed to temporary sedimentation ponds in order to filter possible pollutants and provide for monitoring prior to discharge to the receiving watercourse at a controlled rate. These ponds will also act as detention ponds to provide volumetric attenuation of runoff during extreme rainfall events. All fuels and materials used in the construction of the works will be stored in secure areas away from the watercourse and adequately bunded to prevent any leaks from entering the watercourse.

In operation, runoff will be controlled and managed both quantitatively and qualitatively. Heavy use of Sustainable Drainage Systems (SuDs) features will be employed. Attenuation and treatment will be provided at source and supplemented by site wide control measures to limit the quantity and improve the quality of runoff prior to discharge from the site. These measures will include 'at source' management such as rain gardens and conveyance infiltration trenches together with strategic 'site wide' management in the form of planted attenuation depressions, swales and bioretention spaces. To limit impact further, and control flows before entry to the surface water network, vortex flow controllers will be used in combination with local attenuation to reduce peak run off rates and bypass light liquid and silt trapping interceptors will be used to provide a last line of treatment and method for monitoring.

From a hydrogeological perspective, the site at present is generally unused agricultural land with a topsoil layer overlying drift deposits of gravelly clays overlying limestone bedrock. The highest groundwater receptor is recorded within the bedrock layer at a depth of approximately 50 metres.

The potential impacts on the groundwater again stem from construction and operational activities. During construction, the impact is on the potential pollution of the underlying groundwater by fuels, oils and materials used in the construction of the development.

During operation, the impact is from first 'contaminated' flush or accidental spill. In the case of the first flush the potential contaminants will have been intercepted by rain gardens, trees pits and trapped gullies prior to discharge to the conveyance infiltration trenches which will then progressively allow for slow infiltration to the underlying geology. The slow infiltration and depth to the receptor renders this impact as negligible. With regard to accidental spills, these are unlikely as liquid carrying vehicles are heavily regulated and would not generally be using these street roads.

The mitigation of the impacts during construction is provided in a similar fashion to that outlined above for the surface water i.e. managed storage of potential pollutants and use of temporary sedimentation ponds before discharge. In operation, the use of SuDS and filtration features coupled with the depth to the receptor will reduce this risk to negligible.

The residual impact, post development with all measures in place, will therefore be long term and neutral.

2.10 Climate (Air Quality and Climate Change)

In terms of the existing air quality environment, baseline data and data available from similar environments indicates that levels of nitrogen dioxide, carbon monoxide, particulate matter less than 10 microns and less than 2.5 microns and benzene are generally well below the National and European Union (EU) ambient air quality standards.

The greatest potential impact on air quality during the construction phase is predicted to be from construction dust emissions and the potential for nuisance dust. In order to minimise dust emissions during construction, a series of mitigation measures were prepared in the form of a Dust Minimisation Plan. When the dust minimisation measures set out in the plan are implemented, fugitive emissions of dust from the site will be insignificant and pose no nuisance at nearby receptors.

The operational impact of the development was assessed based on emissions of the pollutants nitrogen dioxide, particulate matter less than 10 microns, particulate matter less than 2.5 microns, carbon monoxide and benzene using the UK Design Manual for Roads and Bridges screening model which is a recommended screening model for assessing the impact of traffic on air quality. The inputs to the air dispersion model consist of information on road layouts, receptor locations, annual average daily traffic movement's, annual average traffic speeds and background concentrations. The climatic impact based on greenhouse gas (GHG) emissions of CO₂ was also assessed using the Design Manual for Roads and Bridges screening model.

The impact of the traffic from the proposed development compared to the respective EU limit values for the pollutants was assessed. Based on the modelling results, the impact of the development in terms of ambient levels of, nitrogen dioxide, particulate matter less than 10 microns, particulate matter less than 2.5 microns, carbon monoxide and benzene are predicted to be imperceptible with respect to the operational phase air quality. The operational stage impact on climate is also considered

to be imperceptible. The cumulative impact of the development including the full buildout of the site is also predicted to have an imperceptible impact on air quality and climate.

As the National and EU standards for air quality are based on the protection of human health, and concentrations of pollutants for both the construction and operational stages of the proposed development are predicted to be significantly below these standards, the impact to human health is predicted to be imperceptible and not significant in the short and long term.

2.11 Climate (Sunlight)

The aim of the sunlight analysis is to record and analyse the following impacts: -

- Sunlight impact to proposed amenity spaces within the proposed development.
- Sunlight impact to any amenity space adjacent to the development, due to the proposed development.

In considering the development potential and the quality of amenity for the surrounding properties as well as for the new development once the scheme has been implemented, the analysis has been based on the Building Research Establishment (BRE) guidelines on Site Layout Planning for Daylight and Sunlight (the BRE Guide).

These guidelines provide the criteria and methodology for calculations pertaining to daylight and sunlight and is the primary reference for this matter. The guide gives simple rules for analysing sites where the geometry of the surroundings is straightforward, supplementing them with graphical methods for complex sites.

The analysis has shown that 82% of private amenity areas receive a minimum of 2 hours of sunlight on the 21st March on 50% of the amenity space. The slight shortfall is due to the spaces orientated to the North and the garden fencing. 100% of all communal open spaces achieve 2 hours of sunlight on March 21st.

In relation to the impact to amenity spaces adjacent to the Kilcarbery development, the analysis has shown that due to the distance or to the location of the gardens to the rear of the properties, no impact is perceived for any of the adjacent amenity spaces.

2.12 Climate (Daylight)

The aim of the daylight analysis is to record and analyse the following impacts: -

- The daylight levels within the living and bedroom areas of selected apartments, to give an indication of the expected daylight levels throughout the proposed development.
- Any potential daylight impact the proposed development may have on properties adjacent to the site.

In considering the development potential and the quality of amenity for the surrounding properties as well as for the new development once the scheme has been implemented, the analysis has been based on the Building Research Establishment (BRE) guidelines on Site Layout Planning for Daylight and Sunlight (the BRE Guide).

These guidelines provide the criteria and methodology for calculations pertaining to daylight and sunlight and is the primary reference for this matter. The guide gives simple rules for analysing sites where the geometry of the surroundings is straightforward, supplementing them with graphical methods for complex sites.

The analysis has shown that all house types and apartments not only meet but greatly exceed the minimum average daylight factor requirements resulting in excellent levels of daylight within the development.

In relation to the daylight impact to adjacent properties, the analysis has shown that there is no impact to any of the surrounding properties.

2.13 Air (Noise and Vibration)

The existing noise climate has been surveyed over the course of the daytime and night time periods and has been found to be typical of a suburban location, influenced by road traffic along the surrounding roads.

When considering a development of this nature, the potential noise and vibration impact on the surroundings must be considered for each of two distinct stages: the short term impact of the construction phase and the longer term impact of the operational phase.

During the construction phase of the project vibration impact of the works on nearby residential buildings is not expected to pose any significance in terms of potential for cosmetic or structural damage. Noise levels will be increased during different phases of the works occurring at the development site. It is expected that construction works will generate high levels of noise in the short-term, however noise levels are predicted to be below a level whereby a significant impact would occur. Good practice measures have been recommended to minimise noise or vibration impact on sensitive receivers.

The impact of the change in traffic volumes along surrounding roads as a result of the development has been assessed. The increase in noise associated with additional traffic is negligible.

Once operational, the proposed creche building will run mechanical plant items. No vibration impacts are predicted to occur from this source. In respect of noise, mechanical plant items will be designed and located such that any noise emissions will be within the relevant noise criteria within the development, therefore at off site locations further away, no significant adverse impact is predicted.

2.14 Landscape and Visual Impact

The proposed scheme was developed in conjunction with South Dublin County Council, with many inter departmental meetings between Road, Drainage, Parks and the architectural departments in the same room. The central concept of Biophilic design demanded to get broad inter disciplinary responses to the proposed layout.

Biophilic design is a concept used within the building industry to increase occupant connectivity to the natural environment through the use of direct nature, indirect nature, and space and place conditions.

Drainage

The core strategy developed with the consulting Engineers DBFL and Architects, BKD was to provide for natural intervention for surface run off and attenuation, In this, the 2 step SUDS treatment was adhered to, cleaning of water and the temporary storage for same.

Existing ditches, open spaces, tree pits, swales and rain gardens have been developed to accommodate the surface water. The interaction between DBFL consulting engineers and RMDA landscape Architects was extensive, as both disciplines provided details that were common to both. The detention basins are proposed to be used as high amenity areas, for kick about football and for play amenity. The tree pits have been incorporated as part of a street as treatment of surface water and temporary storage. The rain gardens to the rear of the housing utilised raised planters to provide SUDS interventions for the individual houses.

The approach was approved by the departments of Drainage, Roads, Parks and Architecture of South Dublin County Council, with whom the design team liaised on a frequent basis. Kilcarbery is seen as a benchmark for integration of existing hedgerows, open space and play, and SUDS, within an urban situation and how all elements shall interact with each other.

Habitat – Biodiversity

The retention of existing hedges is a key characteristic of the project. Extensive lines of hedgerow and trees are proposed to be retained within open spaces.

The consulting arborist assessed the tree and hedge lines and provided the background information to the design team for interaction of services, roads and lighting with retained trees and hedges. The Project Architect, Landscape Architect, Consulting Engineer and Lighting Engineer all supported the retention and accommodation of the existing hedgerows and trees in their design proposals.

The resulting design ensures the survival of the hedgerows and by its nature the habitats that are contained within these hedgerows and trees.

Transport

The development of car spaces and SUDS is a feature of the proposed development. The lengths of car parking shall provide contained attenuation areas that shall utilise tree pits in the SUDS design to provide the cleansing and temporary storage of water function. The path layouts and cycle ways have been developed using hedgerows and open spaces as the best routes for the residents to use for amenity and recreation. The on street paths have been designed to access green routes and provide the safest connections to external paths and roads.

Certain temporary and localised impacts on the overall landscape character and visual appearance of the study area will occur during the construction phase. These will vary from significant negative impacts to moderate positive impacts depending on the location and the works taking place. Impacts during the operational phase will incorporate the effects of design and a number of mitigation measures, resulting in any significant impacts being reduced to moderate/slight impacts for the most part, particularly as existing and new planting matures.

A number of significant positive impacts shall emerge from the proposed scheme. These will relate to the enhancement of the visual environment, retention of existing hedgerows and trees within the public realm. The enhancement of public and residential amenity, with an ordered and varied design.

Overall the landscape is capable of accommodating the changes arising from the proposed scheme, and without adverse impacts to the elements and sensitivities in the area at local and wider scales. The core design design brief of Biophilic design, ie interaction of nature and built form is a necessary development and is required for future housing developments such as Kilcarbery, ensuring their success as places in which to reside.

2.15 Material Assets (Transportation)

This chapter of the EIAR covers transport and related sustainability issues including means of vehicular access, pedestrian, cyclist and local public transport connections. The principal objective of this chapter is to quantify any level of impact across the local road network and subsequently ascertain both the existing and future operational performance of the local road network.

The subject development site is located approximately 2km to the west of Clondalkin village centre. The subject lands are bounded to the west by R136 Outer Ring Road, and to the south by Corkagh Park. The northern boundary is formed by the Upper Nangor Road, residential dwellings fronting onto Upper Nangor Road and residential zoned land. Kilcarberry Avenue and lands with existing planning permission for 109 residential units (Ref. SD178/0002) form the eastern boundary.

The proposals seek permission for the provision of 1034-unit residential development on residential zoned lands at Kilcarbery, Clondalkin.

The north east parcel of the development site connects to an access road and junction on the Old Nangor Road (located east of the St Cuthbert's Rd junction) which have been granted planning permission as part of a third-party 109-unit residential development (Ref. SD178/0002). The aforementioned access road and junction are currently under construction. In addition to the permitted access junction referred to above, the subject site will benefit from the provision of a further three access junctions, one which will be incorporated into the Old Nangor Road/St Cuthbert's Road junction, one on the Old Nangor Road and one on the R136 Outer Ring Road .

The subject development proposals comply fully with the SDCC car parking standards in regard to the childcare facilities, retail unit and community centre. In regard to the development proposals for the 1034 residential units, it is noted that the car parking proposals for these units are below (approximately 14% below) the maximum and subsequently comply with the maximum standard recommended by SDCC. The provision of 1478no. residential car parking spaces equates to 1.4no. spaces per residential unit on average.

A review of the 2019 Census car ownership statistics has been undertaken at existing local residential areas that comprise a mix of apartment and housing residential units. The ratio of car ownership per residential unit in the selected residential areas reveals an existing ratio of approximately 1 (0.99) car per residential unit. Accordingly, the proposed car parking ratio of 1.4 parking spaces per residential unit is predicted to be more than sufficient car parking provision to cater for proposed developments car parking demand at the subject Kilcarbery site.

The appropriate level of mobility impaired parking provision for the proposed development will also be provided in accordance with South Dublin County Council Development Plan requirements. Similarly, the appropriate level of electric vehicle parking provision for the proposed development will be provided in accordance with South Dublin County Council Development Plan requirements.

The proposals include the provision of a total of 251 short stay and 854 long stay bicycle parking stands/opportunities (1105no. in total) on-site within the subject development site. The SDCC bicycle parking standards are considered to be 'minimum' standards, whereas the DHPLG requirements are considered to be the preferred level of provision in situations where on-site car parking has been substantially or completely removed as permitted in certain situations by the corresponding DHPLG car parking guidance. The high provision of bicycle parking proposed on-site for the apartment units has been provided even though the residential development car parking proposals are only 14% below the SDCC development plan standards (i.e. 1478 spaces opposed to 1713).

The subject development is proposed to be rolled out over a number of years with the initial 178 no. residential units and within Block 7 will be complete by the end of the adopted 2020 Opening Year. The remaining residential and non-residential units are predicted to be complete and occupied sometime before the adopted 2025 Future Design Year. During the general excavation of the foundations there will be additional HGV movements from the site. All suitable material will be used for construction and fill activities where possible and appropriate. All spoil material will be removed to a registered landfill site which will be agreed in full with the Local Authority.

The predicted peak hour AM and PM traffic generated by the proposed development for the Future Design Years with the full development in place are 264 two-way vehicle trips and 368 vehicle trips respectively. In addition to the potential subject development vehicle trip generation, the aforementioned committed development (Ref. SD178/0002), located adjacent to the subject development site, is predicted to generate an additional 43 no. vehicle trips during the AM peak hour and 53no. two-way vehicle trips in the PM peak hour.

The amount of two-way vehicle trips that are predicted to be generated to/from the proposed development site will travel through the key offsite junctions in the 2035 design year as a result of the proposed 1034no. unit residential development. The resulting percentage increase in traffic flows as a result of the traffic generated by the proposed development is established as being above the 10% threshold (5% for congested networks) at the Nangor Rd/ St Cuthbert's Rd/Upper Nangor Rd junction. Accordingly, in order to determine if this aforementioned junction (with its proposed upgraded layout), in addition to the proposed access junction on the R136 Outer Ring Road will cater for the predicted level of traffic generation, a traffic model of these junctions has been analysed for the schemes 2020 Opening Year and subsequent 2025 and 2035 Future Design Years.

The network assessment of the aforementioned junctions reveals that all junctions are predicted to operate with significant reserve capacity during all assessment scenarios.

In order to ensure satisfactory operation of the construction stage the following is proposed: -

- Provision of sufficient on-site parking and compounding to ensure no potential overflow onto the local network.

- It is likely that some numbers of the construction team will be brought to/from the site in vans/minibuses, which will serve to reduce the trip generation potential.
- Site offices and compound will be located within the site boundary. The site will be able to accommodate employee and visitor parking throughout the construction period through the construction of temporary hardstanding areas.
- Finally, truck wheel washes will be installed at construction entrances and any specific recommendations with regard to construction traffic management made by the Local Authority will be adhered to.

With the objective of mitigating the potential impact of the proposed development during its operational stage, the following initiatives and associated timescale for their implementation have been identified and subsequently form an integral part of the subject development proposals.

- Management – A Mobility Management (MMP) is to be rolled out with the aim of guiding the delivery and management of coordinated initiatives by the scheme promotor. The MMP ultimately seeks to encourage sustainable travel practices for all journeys to and from the proposed development site. This MMP will be developed in partnership with SDCC to specifically consider the opportunities of shaping all journeys and promoting sustainable transport habits at both the proposed development.
- Services – The high provision of a total of 251no. short term and 854no. long term bicycle parking stands/opportunities (1105no. in total).

In conclusion, it is considered that the impact on the surrounding road network, as a result of the proposed development on the Kilcarbery lands will be minimal. This is based on the anticipated levels of traffic generated by the proposed development, the existing and future road infrastructure and the information. It is concluded that there are no traffic or transportation related reasons that should prevent the granting of planning permission for the proposed development.

2.16 Material Assets (Waste)

The works, as described, will have a short-term and slight impact with regard to the waste generated as a result of construction and demolition activities within the site. In operation, the impact will be long term and slight drawing on national policy for residential waste management. The site at present is unused agriculturally, however, has been used for fly tipping for some time. Therefore, the development as a residential site will remove this.

Construction of the residential development will require the excavation of topsoil, sub soil and bedrock to enable delivery of the required buildings and infrastructure. A soil resource plan will be used to manage this material to ensure that no excavated natural material leaves the site as waste. All natural material will be used with the site.

Construction activities will also require materials to be imported. Materials will not be over ordered and will be delivered on 'just in time' basis. The contractor will engage only approved suppliers that minimise and segregate packaging for reuse and who, as far as possible, utilise low impact, sustainable or recycled products. All material not used as part of the works and disposed of as waste will be monitored and recorded in accordance with statutory regulation and industry best practice.

When the development is complete and occupied the wastes generated will typically be domestic waste and will be managed through the municipal waste management programme. Periodic residential waste collections will allow for the majority of domestic waste to be disposed of without significant impact. This will include management of food waste and common recyclable products aimed at minimising disposal to landfill or the need for specialist attention. Storage facilities for recycling of residual waste that cannot be managed as part of the normal programme, will be provided at strategic locations through the site in accordance with the waste management plan for the site.

The residual impact of waste disposal during construction activities will generally be slight and short term. When the housing is occupied the waste will generally be domestic and will be long term and slight. The development of the site will reduce impact from fly tipping and unsafe disposal of drug paraphernalia which will have a residual positive impact.

2.17 Cultural Heritage (Archaeology and Architectural Heritage)

Irish Archaeological Consultancy Ltd has prepared an archaeological, architectural and cultural heritage assessment, to study the impact, if any, of a proposed development located within the townlands of Kilcarbery, Nangor, Deansrath, and Corkagh Demesne in, Dublin 22 (ITM 705145/730750). The assessment was carried out by Faith Bailey of IAC Ltd.

There are a total of seven individual or groups of sites located within 500m of the site that are listed within the RMP. The nearest consists of the site of Nangor Castle (RMP DU017-037), c. 245m to the northeast.

The proposed development area has been subject to geophysical survey, archaeological testing and a programme of preservation by recorded (archaeological excavation). A number of small features dating from the Bronze Age to the post-medieval period were recorded. Previous archaeological investigations in the wider study area also uncovered evidence of medieval and post-medieval activity.

There are five individual or groups of protected structures located within 500m of the proposed development area. The closest consists of Deansrath House (RPS 142), which is situated c. 290m to the north. There are seven individual or groups of NIAH structures recorded within 500m of the proposed development area. The closest of these consists of four semi-detached 20th century cottages located within 20m of the site. The cottages are not included in the RPS for South County Dublin and whilst extant, are not in good condition.

With regards to the archaeological resource, it is possible that ground disturbances associated with the proposed development will have a negative impact on isolated archaeological features or deposits that have the potential to survive beneath the current ground level and outside of the footprint of the excavated test trenches. Potential impacts may range from moderate negative to significant negative.

In order to mitigate any potential impacts, all topsoil stripping that is associated with the proposed development will be monitored by a suitably qualified archaeologist. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation in-situ or by record. Any further mitigation will require approval from the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht (DoCHG).

It is the developer's responsibility to ensure full provision is made available for the resolution of any archaeological remains, both on site and during the post excavation process, should that be deemed the appropriate manner in which to proceed.

Please note that all recommendations are subject to approval by the National Monuments Service of the Heritage and Planning Division, DoCHG.

With regards to the architectural heritage resource, it is possible that the operation of the proposed development may result in a slight negative impact on the demesne landscape associated with Corkagh House. This will be due to visual impact of the development on the former demesne landscape, which is now in use as a park.

In order to mitigate this impact, the boundary between the south-eastern section of the proposed development and Corkagh Park will be augmented with appropriate planting in order to minimise the visual disturbance of the former demesne.

No other impacts are predicted in relation to the archaeological, architectural or cultural heritage resource.

2.18 Summary of Mitigation Measures

This chapter provides a summary of all the mitigation and monitoring measures proposed throughout the EIAR document for ease of reference for the consent authority and all other interested parties.

2.19 Summary of Cumulative Impacts & Interactions

This section describes interactions between impacts on various environmental factors. A summary matrix showing interdependencies between these environmental attributes is presented below for the proposed development.

	Population & Human Health	Biodiversity	Land, Soils & Geology	Water	Climate – Air Quality & Climate Change	Climate – Sunlight	Climate – Daylight	Air – Noise & Vibration	Landscape & Visual Impact	Material Assets – Transport	Material Assets – Waste	Archaeological, Architectural and Cultural Heritage
Population & Human Health		X	X	X	✓	X	X	✓	✓	✓	X	X
Biodiversity	X		✓	✓	✓	X	X	✓	X	X	X	X
Land, Soils & Geology	X	✓		✓	X	X	X	X	✓	X	X	X
Water	X	✓	✓		X	X	X	X	✓	X	X	X
Climate – Air Quality & Climate Change	✓	✓	X	X		X	X	X	X	✓	X	X
Climate – Sunlight	X	X	X	X	X		X	X	X	X	X	X
Climate – Daylight	X	X	X	X	X	X		X	X	X	X	X
Air – Noise & Vibration	✓	✓	X	X	X	X	X		X	✓	X	X
Landscape & Visual Impact	✓	X	✓	✓	X	X	X	X		✓	X	✓
Material Assets - Transport	✓	X	X	X	✓	X	X	✓	✓		X	X
Material Assets - Waste	X	X	X	X	X	X	X	X	X	X		X
Archaeological, Architectural and Cultural Heritage	X	X	X	X	X	X	X	X	✓	X	X	

Where there is an interaction = ✓ No Interaction = x

Figure 2.1: Matrix of Interactions between Environmental Factors (During Construction and Operational Phases) – See Chapter 19: Summary of Cumulative Impacts & Interactions.

All potential interactions have been addressed as required throughout the EIAR. During each stage of the assessment contributors have liaised with each other (where relevant) to ensure that all such potential interactions have been addressed.