



Engineering and Environmental Consultants

Volume 1 - Non-Technical Summary

**Castlelake Strategic Housing Development
Environmental Impact Assessment Report (EIAR)**

Project No. 22461

June 2022



1 Introduction

BAM Property is applying to An Bord Pleanála for a Strategic Housing Development (SHD) at Castlelake, Terrysland, Carrigtwohill, Co. Cork. Permission is being sought for the construction of 716 No. residential units with a childcare facility, landscaped open spaces and associated works and services. The location of the proposed development site in the context of Cork City and environs is shown in **Figure 1-1**.

MWP have been engaged by BAM to prepare an Environmental Impact Assessment (EIAR) in support of a planning application. The proposed development is for the construction of a strategic housing development of 716 no. units and a 2 storey creche. The proposed development will include 224 houses, 284 duplex units and 208 apartments. It will also include hard and soft landscaping, boundary treatments, public realm works, car parking, bicycle stores and shelters, bin stores, lighting, plant rooms, and ancillary site development works both above and below ground. A detailed description of the entire project is given in Chapter 2 of Volume 2 of the EIAR. This Non-Technical Summary is the first volume of the EIAR for the proposed development. The other three volumes which comprise the EIAR are:

- Volume 2: Main EIAR;
- Volume 3: Appendices; and
- Volume 4: Photomontages.

The purpose of this Non-Technical Summary is to provide a concise overview in non-technical terms, of the project, environmental impacts and mitigation measures highlighted by the Environmental Impact Assessment and presented in detail in the main EIAR, Volume 2.

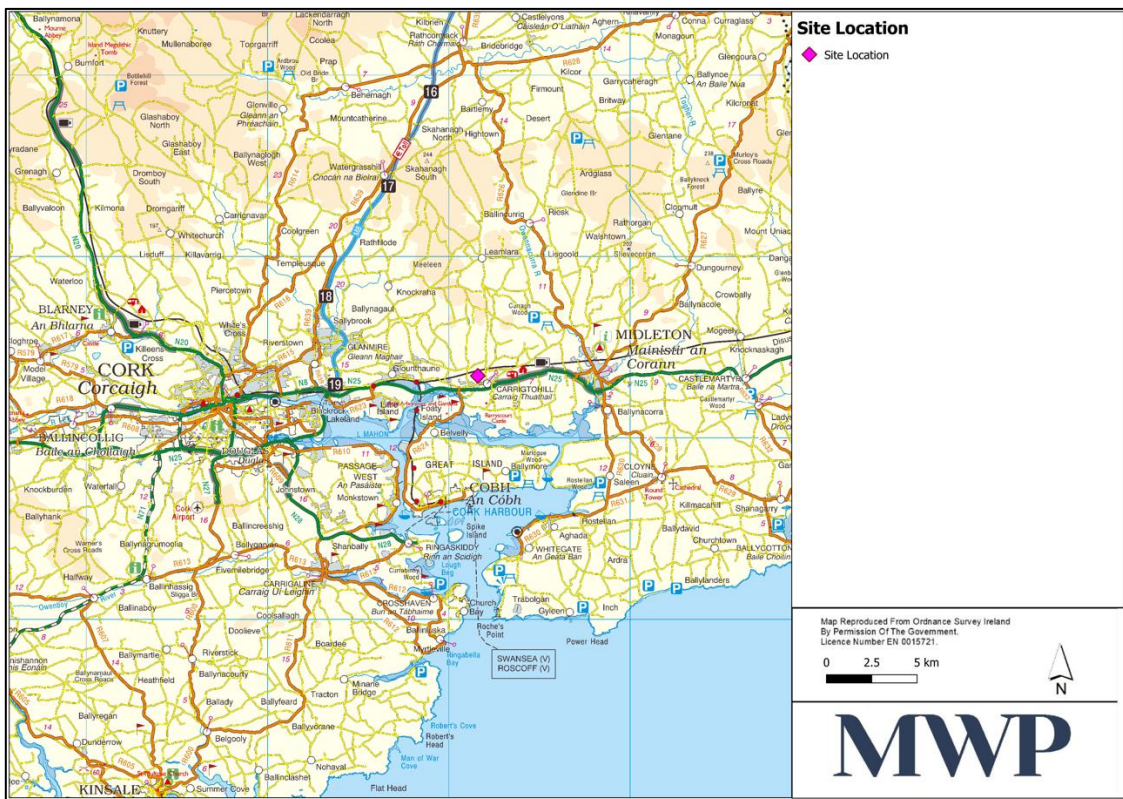


Figure 1-1 Site Location

2 Description of Existing Development

2.1 Site Location

The proposed development site is located in Carrigtwohill 16km east of Cork city and 9km east of the Jack Lynch tunnel, on the northern side of the N25 Cork to Waterford road, approximately 500m west of Carrigtwohill village. The site is bounded by agricultural lands to the north, the existing Castlelake housing estate to the west and the Cork Road/Main Street L3680 to the south. The Cork-Midleton Railway line runs along the northern boundary of the site with Carrigtwohill train within 160m of the north eastern site boundary. The train station serves Midleton and Cobh to the east and south and Cork to the west, with onward links to Dublin and the rest of the country.

The site lies north of the N25 motorway corridor and has both road frontage and main vehicular access road connections onto Station Road with two underpasses constructed along the northern boundary of the site to accommodate future development lands. An east-west link road is currently under construction along the southern boundary of the main land block associated with the development of a new schools campus which is due to commence construction shortly. The site design allows the development to connect with the new Bury's Bridge Cycleway and the Carrigtwohill–Midleton Inter-Urban Cycleway Phase 1. **Figure 2-1** places the site in local context.

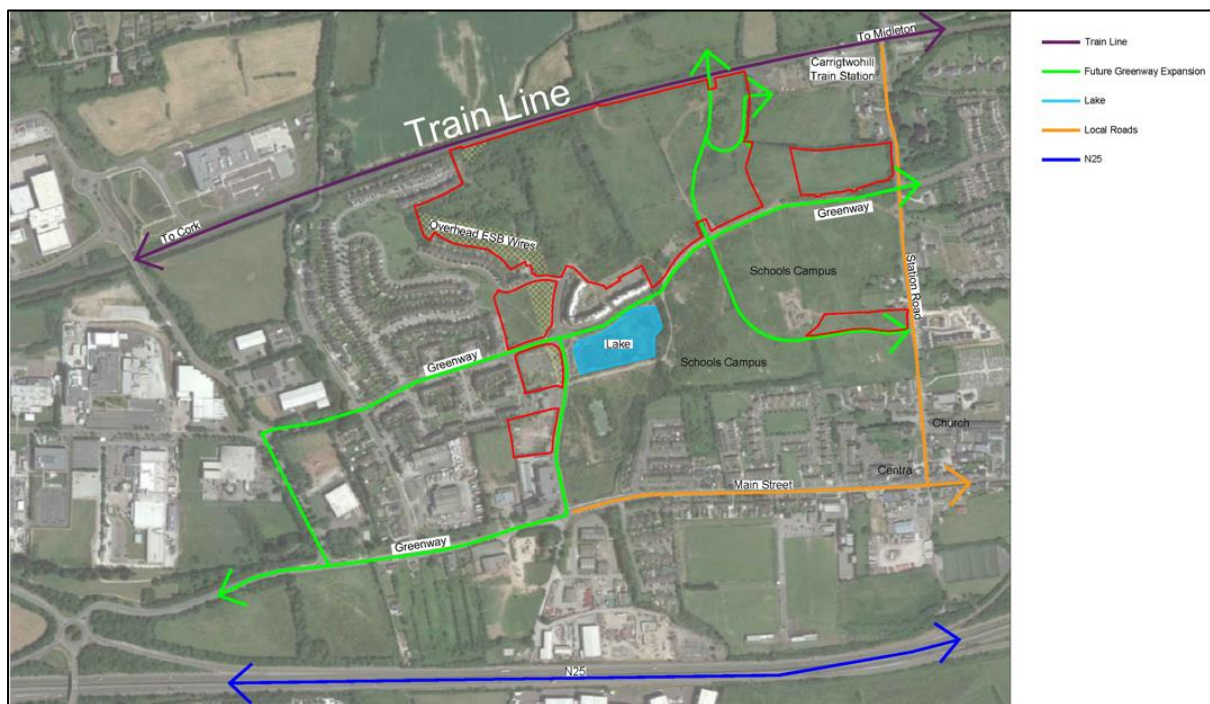


Figure 2-1 Site in Local Context

2.2 The Application Area

The application area comprises 7 parcels of land (refer to **Figure 2-2**) with a total area of 18.17 hectares of which 16.1 hectares is developable due to the presence of ESB wayleaves for existing overhead powerline along the western boundary of the site. The site is zoned for residential development.

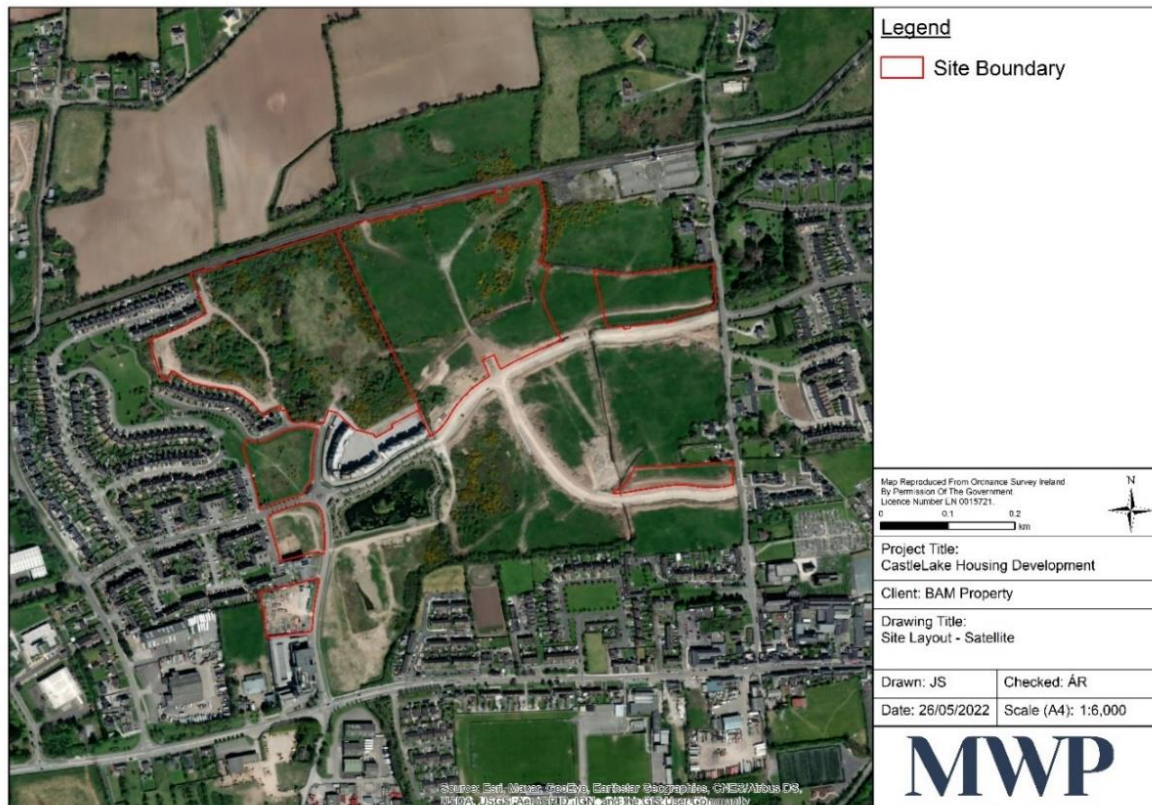


Figure 2-2 Proposed Site Layout

The existing Castlelake housing development to the west was developed in the early 2000s. In 2017 BAM Property applied for planning permission for 277 residential units, on a similar footprint to this current SHD development. That application was approved by Cork County Council but refused by An Bord Pleanála on grounds of public space, connectivity to Carrigtwohill train station and architectural design. This current SHD application has addressed these concerns.

2.3 Overview of the Development

The development will consist of the construction of a strategic housing development of 716 units and a 2 storey creche. The proposed development comprises 224 houses, 284 duplex units and 208 apartments. The two storey houses comprise 48 detached, 126 semi-detached and 50 terraced Houses containing 60 two bed units, 139 three bed units and 25 four bed units. The part-one to part-three storey duplex units are contained in 122 buildings providing 82 one bed units, 142 two bed units and 60 three bed units. There are 7 apartments blocks ranging in height from part-1 to part- 5 storeys.

The proposed development also provides for: hard and soft landscaping; boundary treatments; public realm works; car parking; bicycle stores and shelters; bin stores; lighting; plant rooms; and all ancillary site development works above and below ground. Refer to **Figure 2-3** for the site layout.



Figure 2-3 Proposed Site Layout

The development will be built in 5 phases over a 10-year period. Phase 1, the largest phase, will contain 319 units including the creche and will take about 5 years to construct; Phase 2 will comprise 78 units with a 1-year construction period; Phase 3 will have a total of 116 units constructed over 20 months; Phase 4 will comprise 91 units to be constructed over 15 months and Phase 5 will involve the construction of 110 apartments over an estimated 18-month period. Refer to **Figure 2-4** for the Phasing Plan.

A detailed Construction and Environmental Management Plan (CEMP) has been prepared by BAM Property to manage the construction elements of the project and the associated environmental impacts. The CEMP includes detailed information on access, operating hours, traffic management and control of environmental emissions such as dust, noise, waste, emissions to water, and measures to protect habitats and biodiversity. The CEMP will be in place for the lifetime of the project.

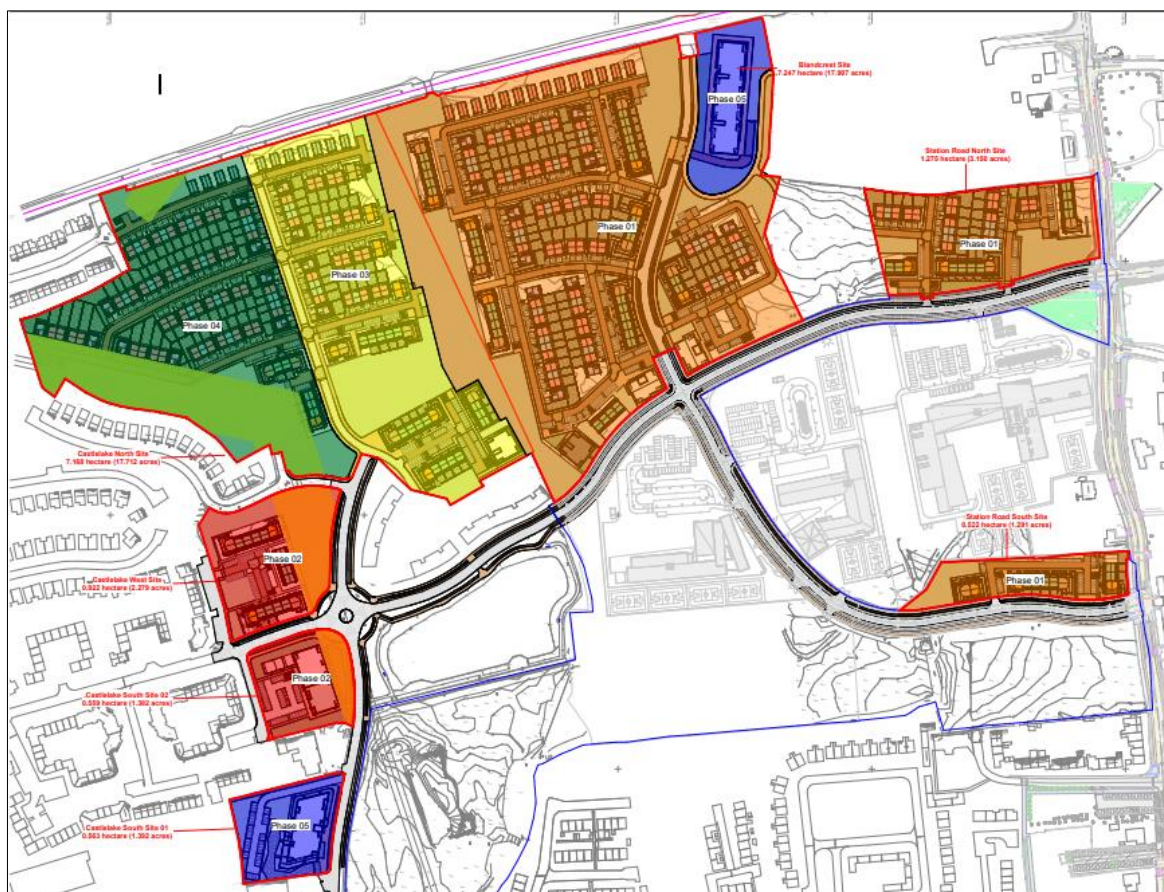


Figure 2-4 Phasing Plan

3 Alternatives

EIA requires the provision of a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment.

Following the refusal of permission by An Bord Pleanála (ABP) of the 2017 planning application (presented in **Figure 3-1**), BAM Property engaged a new design team to develop a robust Masterplan with a strong emphasis on landscape design, quality architecture and the incorporation of environmental best practice. Three main Masterplan layouts have been developed during this SHD process, the first of which was presented to Cork County Council (CCC) in July 2021. Following comments from CCC, an updated design was developed for consultation with An Bord Pleanála after which the Board issued an opinion on the design. Subsequently a third and final Masterplan layout (refer to **Figure 3-2**) was developed based on consultation with ABP, CCC and others which, amongst other things, involved the removal of a proposed central culvert from the Masterplan. The design was adjusted to incorporate the existing tree-lined drainage ditch as a feature to provide a green and blue corridor to encourage biodiversity. The retention and enhancement of this natural feature will also increase the amenity value of the central neighbourhood park whilst linking it to other green spaces throughout the proposed development.

The design was also modified in the north-eastern corner of the site to tie in with Cork County Council’s plans for the Carrigtwohill to Midleton Inter-Urban Cycleway Phase 1. The drainage arrangements were also adjusted to take account of existing CCC sewers in the vicinity.



Figure 3-1 Masterplan Layout



Figure 3-2 Final Masterplan Layout

4 Environmental Assessment

The main objective of the EIA process is to ensure that all direct, indirect and cumulative environmental effects of the project are anticipated. Where effects are identified as unacceptable, these will be avoided or reduced during the design process through the implementation of practical mitigation measures. The main chronological stages of the EIA process include:

- Carrying out baseline studies and collecting data on the existing receiving environment;
- Assessing potential for significant environmental effects (impact assessment); and
- Recommending or designing mitigation measures to avoid or minimize environmental effects.

The EIAR has been carried out in accordance with the relevant legislative requirements and guidelines, including the Environmental Protection Agency (EPA) - 'Guidelines on Information to be Contained in an Environmental Impact Statement, 2022'. Specialist guidance as required for each of the environmental topics has also been used where appropriate.

Where cumulative environmental effects of this SHD development in combination with other projects in the area have been identified they have been addressed in the various chapters of the EIAR.

4.1 Screening, Scoping & Consultation

The first step in the EIA process is 'Screening' which determines whether an EIA is required. The proposed SHD development within two mandatory categories for EIA in that it contains more than 500 dwelling units and involves an area greater than 2 hectares in the case of a business district, 10 hectares in the case of other parts of a built-up area and 20 hectares elsewhere.

As part of the coping process, both formal and informal consultation was carried out with a number of relevant parties. A formal pre-planning meeting took place with Cork County Council on 15th July 2021 in line with Section 247 of the Planning and Development Act 2000. A second pre-planning meeting took place on 3rd February 2022 between An Bord Pleanála, Cork County Council and the design team, during which the scheme was outlined. Minutes of these meetings are included in **Appendix 1.1** and **Appendix 1.2** respectively in Volume 3 of this EIAR. Additional consultations took place between the authors of some chapters of the EIAR and the organisations relevant to those chapters.

Several other stakeholders were consulted in writing including Inland Fisheries Ireland, Traffic Infrastructure Ireland and the National Parks and Wildlife Service. Copies of correspondence sent to these and other organisations, and the subsequent responses are attached in **Appendix 1.3** of Volume 3 of the EIAR. These responses have been taken into consideration when assessing the environmental impacts of the project and in the recommendation of mitigation measures to avoid or reduce environmental effects.

4.2 Population and Human Health

The 2014 EIA Directive (2014/52/EU) has updated the list of topics to be addressed in an EIAR and has replaced 'Human Beings' with 'Population and Human Health'. Population (human beings) and Human Health is a broad ranging topic and addresses the existence, activities and wellbeing of people as groups or 'populations'. This chapter focuses on the population and human health impacts that are not dealt with in the visual, noise, water,

traffic and heritage assessments (see chapters 7, 8, 10, 11, 12 and 13 of the EIAR). The socio-economic impacts examined in this chapter include:

- Effects on the existing population and human health;
- Economic impacts;
- Land Use and Housing;
- Amenity and open space effects;
- Health effects;
- Educational Impacts;
- Travel and transport Impacts;
- Tourism;
- Climate Change, and
- Major Accidents and Natural Disasters.

With respect to potential human health effects arising from drainage, re-use of brownfield land, changes in water or air quality, noise, traffic and visual changes during the construction phase, a range of mitigation measures are proposed in the CEMP that draw on the recommendations from the specialist studies that were undertaken on these kinds of impacts. These measures are expected to effectively mitigate these impacts to acceptable levels and avoid any adverse effects on human health. Readers are referred to Chapter 15 of the EIAR for a summary of mitigation measures proposed.

The construction of the proposed development is likely to have a **positive direct effect** on local employment and economic activity, particularly in the construction sector. The construction phase will also have positive indirect effects on employment and economic activity in associated and secondary building services industries, e.g. quarrying, building supplies, retail and technical professions, as well as the local cafes, garages and shops that construction workers may make use of. These positive effects will be temporary (up to 10 years in duration) but will contribute to the overall viability of the local construction sector and associated industries and services during the period.

The proposed development will deliver 716 no. residential units of different types, a creche, a new north-south connecting road that connects to the railway underpass, a cycle way, well designed public open spaces and pedestrian pathways. The resultant increase in population will assist with the delivery of critical mass to support the growth and sustainability of a wider range of businesses, services, public transport and employment opportunities in Carrigtwohill town.

The proposed development will contribute to the delivery of 22% of the targeted and planned housing for the expansion of Carrigtwohill, and fill in some of the greenfield areas within the existing urban structure. In doing so it will contribute to the integrated and sustainable development of the town. It will expand the existing road network and provide a road link to the northern urban expansion area above the railway line and station that is included in the Cork County Council Development Plan (2022-2028).

Substantial areas of public open space are proposed within the development, which will serve the new residents and the wider community. An illustration of these proposed open and green spaces is shown in **Figure 4-1**. New residents are likely to benefit from the wide range of community facilities available within walking distance of the site, including the new education campus neighbouring the development site and the train station. Further positive cumulative socio-economic effects will result from the wider Carrigtwohill urban redevelopment and upgrading regeneration proposals which include major reorganisation and upgrading of the town centre.

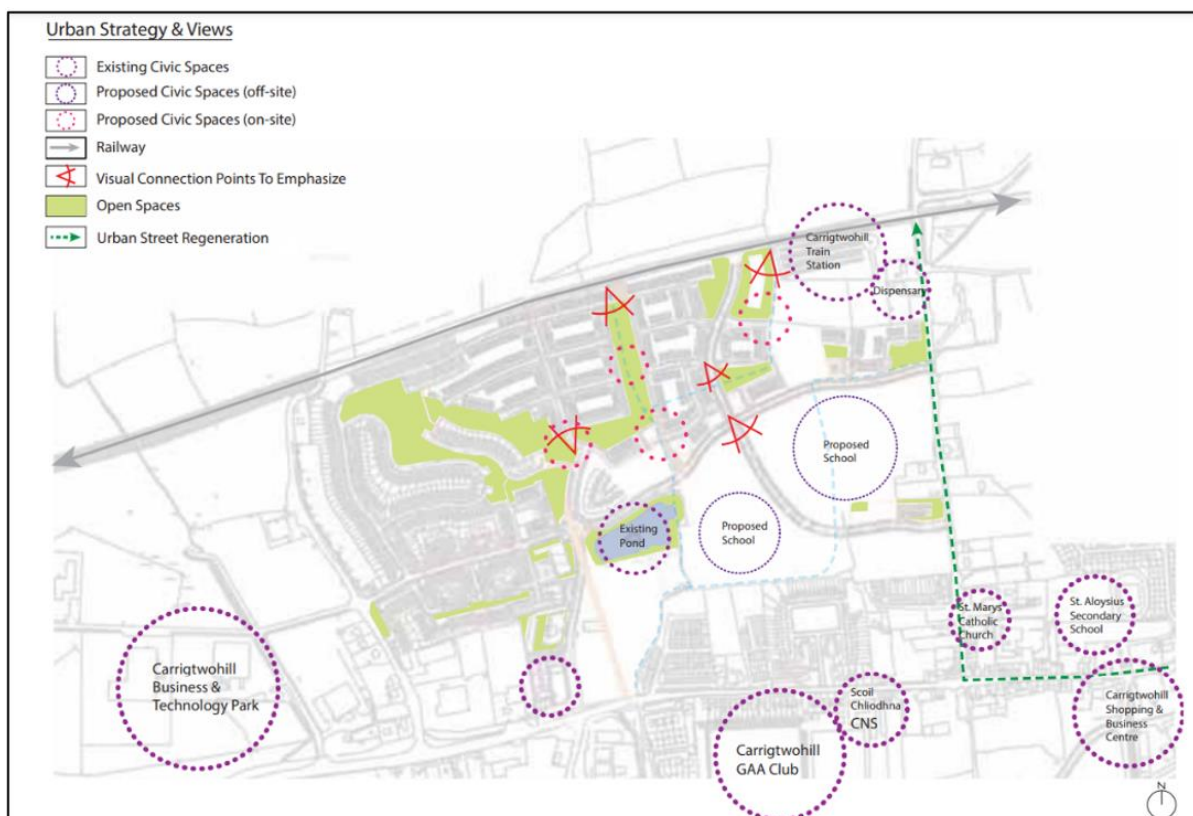


Figure 4-1 Illustration of proposed open and amenity spaces in and around the proposed development

4.3 Biodiversity

The potential effects of the proposed development on plants and animals have been assessed. Information on the receiving environment was obtained through consultation, detailed desktop reviews and field surveys. The effects of construction, operation and decommissioning have been considered. Current best practice was used in collating information and arriving at conclusions.

4.3.1 Protected Areas

The proposed development does not lie within or adjacent to any Natura 2000 site or any nationally important site. Two Natura 2000 sites are hydrologically connected to the proposed development - Great Island Channel Special Area of Conservation (SAC) and Cork Harbour Special Protection Area (SPA). These internationally important sites are linked to the proposed development via the Woodstock Stream which flows through the site and meets the Anngrove Stream, which flows downstream to Cork Harbour where these Natura 2000 sites occur. An Appropriate Assessment screening report concluded there is potential for significant effects on these two Natura 2000 sites. Consequently, a Natura Impact Statement was prepared which concluded, beyond reasonable scientific doubt, with the implementation of the prescribed mitigation measures that the proposed development will not result in any adverse effects on the Conservation Objectives of the relevant Natura 2000 sites. The Great Island Channel proposed Natural Heritage Area (pNHA) overlaps the Great Island Channel SAC and Cork Harbour SPA, so is also deemed to be in the zone of influence.

4.3.2 Habitats

The proposed development site is comprised of both semi-natural habitats and artificial surfaces. The bulk of the site is a mix of improved grassland, amenity grassland, immature woodland, scrub, recolonising bare ground, buildings and artificial surfaces, dry meadows and grassy verges. In addition the site features eroding upland and depositing lowland watercourses, drainage ditches, hedgerows and treelines. No protected habitats were recorded during surveying. The immature woodland and scrub, hedgerows/treelines, eroding upland and depositing lowland watercourses, were evaluated as being of local intrinsic ecological value. A habitat map is shown in Figure 4-2.

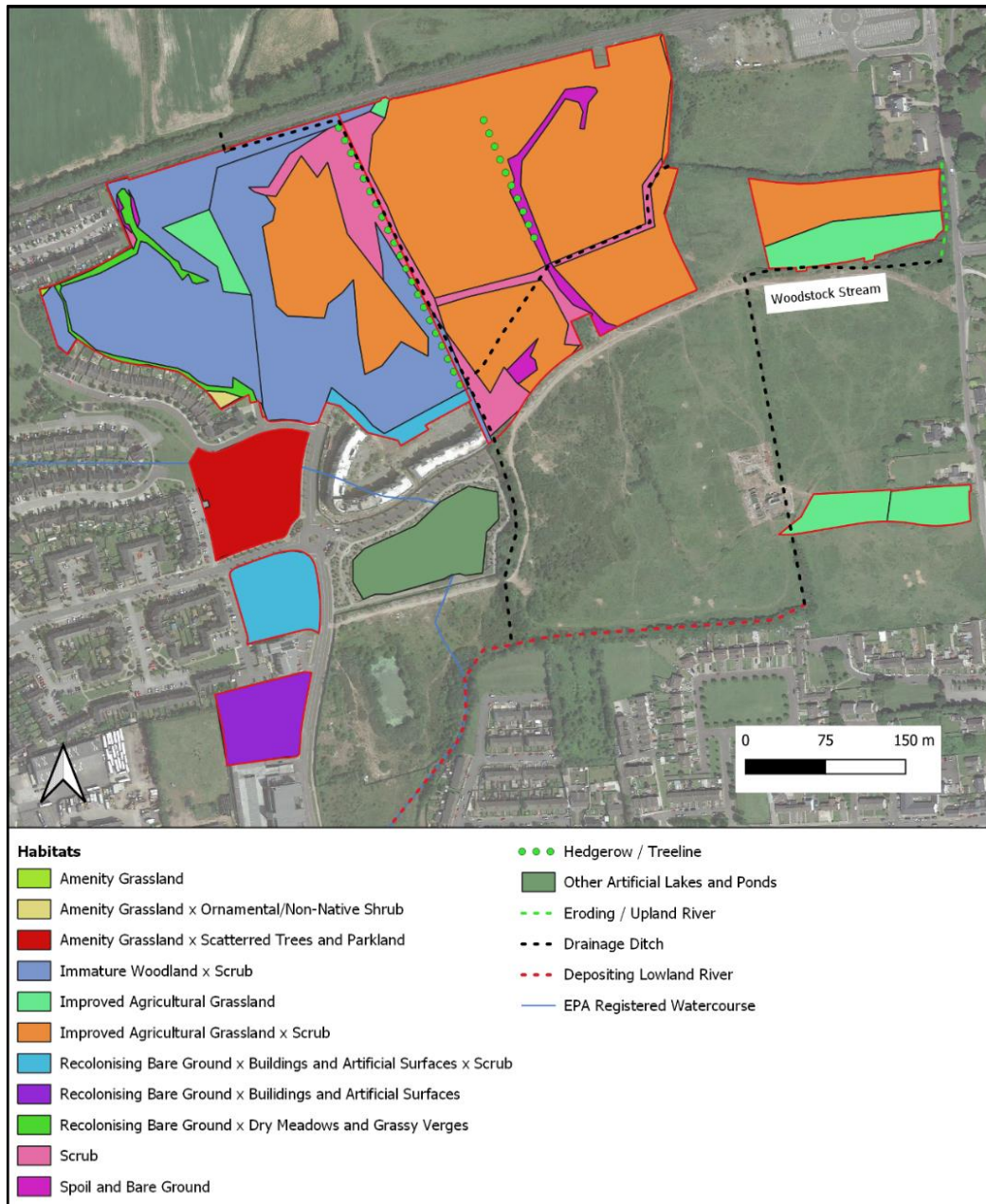


Figure 4-2 Habitat Map for the site

4.3.3 Fauna

The only protected flightless mammal recorded on-site was badger. The proposed development site has some suitable bird nesting habitat. Badger, otter, aquatic macroinvertebrates, brook lamprey, brown trout, eel, other fish species, as well as birds of high and medium conservation concern in Ireland were evaluated as being important at a local scale due to their occurrence and/or conservation status. The site is considered used by a small number of bats for feeding purposes but not for resting. The surrounding landscape is predominantly of residential use, and as such, the site is considered unlikely to be a significant resource for bat species.

4.3.4 Potential Impacts

The construction phase of the proposed development will require excavation and construction, which will bring about habitat loss. It will have a potential impact flora, fauna, water quality and fish. A potential impact during construction is disturbance of breeding, sheltering or foraging species of fauna by the operation of machinery and other human activity. The construction phase could potentially impact the Anngrove and Woodstock Streams and downstream areas through surface run-off from existing surfaces, excavated surfaces and loose soils. During operation, effluent from the housing development will be treated at the Carrigtwohill WWTP. As such, effects are considered to be permanent imperceptible negative.

4.3.5 Mitigation

General best practice construction mitigation measures will be followed, including working according to a Construction and Environmental Management Plan (CEMP). Biodiversity enhancement measures, aimed at achieving biodiversity net gain within the proposed development will be implemented onsite under the guidance of an Ecological Clerk of Works (ECOW). The ECOW will supervise tree, vegetation, scrub and hedgerow removal prior to, and during, construction. Where removal of vegetation is required, it will be done with due consideration to bats and other species which may potentially be present. Pre-construction site clearance and removal of vegetation will be minimised and, where required, only be timed to occur outside the bird breeding season (1st of March to 31st of August inclusive) and, where relevant to bats, during winter months when it is very unlikely they will be hibernating in habitat on-site.

Site design was carried out considering ecological features to avoid impacts insofar as possible to higher-value habitats on site, according to the landscape plan. Hedgerow habitat bordering the proposed development boundary will be retained. Landscaping planting will incorporate native species planting and transplanting to provide links and connectivity with existing landscape features in the surrounding environment. Topsoil will be retained and reused on site through landscaping including any wildflower areas in the landscaping plan. It can be expected that the water features that remain open during operation stage will be of greater ecological value than the existing drainage ditches as they have been designed to maximise biodiversity, as per landscaping.

4.3.6 Residual Impacts

There will be loss of habitats at the proposed development site where buildings and hard surface exist at operation stage. This unavoidable loss is independently assessed as a permanent significant permanent negative effect. Elsewhere, habitats will be preserved and/or altered, with plans to increase their biodiversity value, leading to an effect independently assessed as probably moderate positive effect. The overall effect on habitats is assessed as probably moderate negative taking account of the greater proportion of habitat converted to building and artificial surfaces.

There will be an increased human presence in the locality with an expected associated increased in noise and disturbance during construction and operation stages. The effect on red-listed birds will be probably significant negative. For other fauna, it is considered that the residual effects will be probably imperceptible negative provided the appropriate mitigation measures and best practice methodologies recommended and provided in the CEMP are implemented, and possibly trend towards probably neutral, depending on the biodiversity value of green areas and efficacy of installed features such as log piles, nest and bat boxes. The effect on aquatic features will be near certain moderate positive taking account of the current degraded state of drainage ditches and proposed improvements to these habitats.

4.4 Land and Soil

The Castlelake SHD site is described as generally low-lying with a slight gradient towards the south. The surrounding topography is similarly low lying and flat with higher ground reaching to an elevation of 140m AOD on the north of site.

The bedrock in the northern portion of the development is the Ballysteen Formation, composed of dark muddy limestone and shale. The bedrock in the southern portion of the development is the Waulsortian Limestones, and lime-mudstone. The local geology surrounding the development site is shown below in **Figure 4-3**.

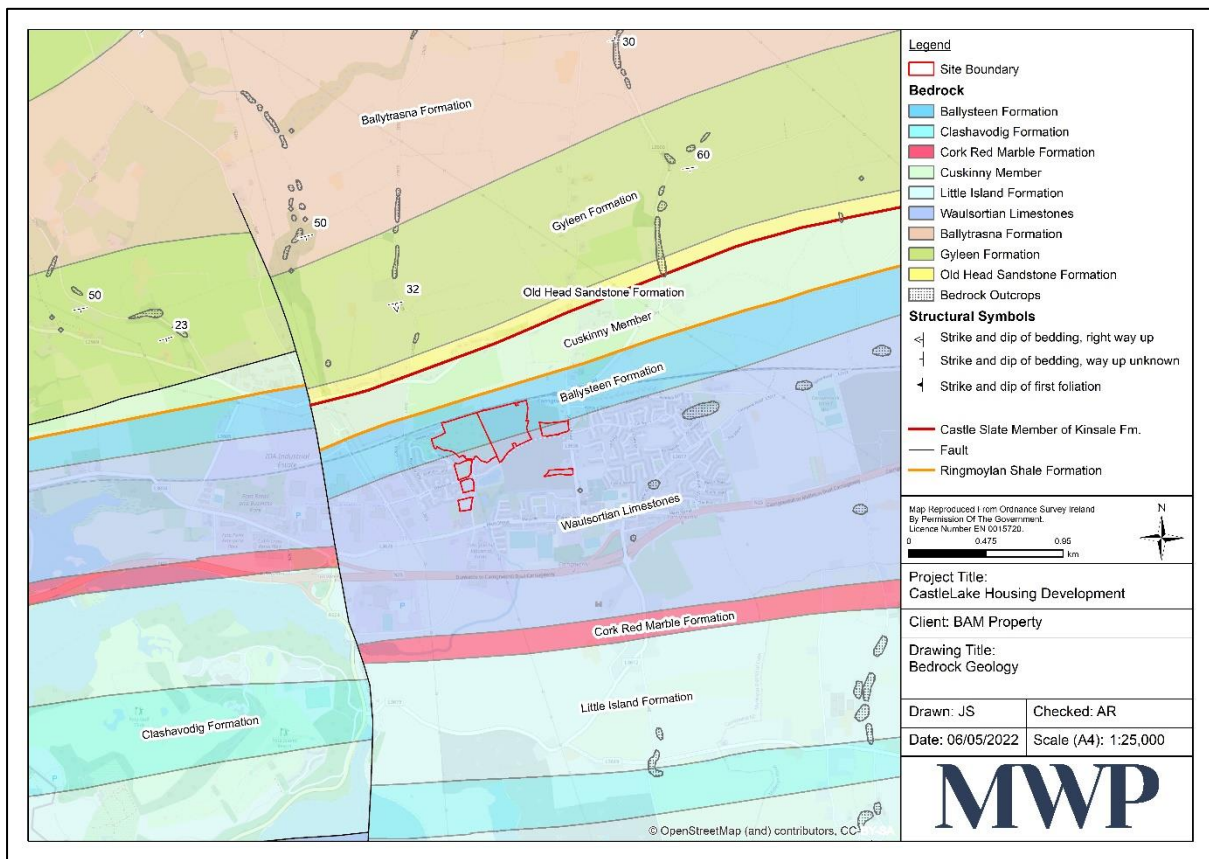


Figure 4-3 Local geology of Carrigtwohill

There are no recorded geological heritage sites within the site boundary. There are no known contamination issues in the ground.

4.4.1 Construction

As part of the construction of the new proposed development, site clearance and excavation works will be required to allow for foundations and road network. This will include soil stripping, levelling of the site and potentially some underlying soil and subsoil. The works will also require clearance and temporary stockpiling of excavated materials. This will have a moderate permanent impact on the land and soils environment.

Some rock breaking may take place if encountered during the excavation works to level the site. Soil, subsoils, and some rock will be excavated during the element of the works. Excavated material will be reused on site where feasible so the impact on land and soil will not be significant.

To avoid contamination of soils during the construction phases, all fuels, oils, and any other hazardous liquids will be stored in bunded storage areas. Spill kits should be maintained on site. Where waste is generated, it will be segregated and sent to appropriate waste recycling/ disposal facilities.

4.4.2 Mitigation

During construction, soil erosion and pollution will be minimised by the implementation of good construction practices. These are outlined in the preliminary CEMP in **Appendix 2.1** of Volume 3 of this EIAR. Standard mitigation measures will be employed to ensure any potential slight impacts are minimised or avoided. Such measures include: sustainable use of materials on site, tight control on material required to avoid waste, re-use on site of clean and inert site won material, appropriately contained facilities for the temporary storage areas for fuels and other hazardous materials required by the contractor during construction to prevent the accidental spillage of hazardous liquids. Specific drainage measures will also be put in place to prevent any suspended solids from entering the ground/groundwater during the construction phase of the firewater retention pond.

Provided all mitigation measures are in place and the project is constructed under strict controls, there will be no residual impacts on the soil and geological environment associated with the proposed development.

4.4.3 Operational Phase

The proposed development is being undertaken on land within a greenfield site which is primarily underlain by topsoil and glacial till subsoil. It is not anticipated that there will be any significant impact on the geological environment resulting from the operation of the facility going forward.

In the longer term the construction of housing, road and drainage networks will result in a slight adverse long-term impact on land and soils due to the excavation, removal, reinstitution of material and construction on site.

Overall, there will be no significant residual impacts on the soil and geological environment associated with the construction and operation of the proposed development, provided best practice and the mitigation measure outlined above are adhered to. The residual impact on land and soils will be **neutral, slight and long-term**.

4.5 Water

This chapter of the EIAR describes and assesses the potential impacts on the surface water and groundwater environment, which could occur as a result of the proposed development.

There are two drainage ditches on the development site and a stream, known as the Woodstock stream, which passes along the eastern and southern boundary in a short open culvert before flowing south through the lands south of the site. A culvert is a structure which can be either open or closed and is designed to control the flow of water often beneath a road. The stream then flows east to join the Anngrove stream which eventually flows

into the Slatty Pond and Lough Mahon. The stream has some ecological value and is classified as being of local importance.

One of the drainage ditches flows from north to south through the centre of the site before flowing into the Woodstock stream. This stream will be preserved as part of the development works and kept as a water and ecological feature. The other drainage ditch flows in a westerly direction through the site where it joins with the north-south drainage ditch. This drain will be culverted to accommodate the development. The drainage ditches are of low ecological importance.

All of these water courses ultimately flow into Lough Mahon (Harper's Island). The EPA Water Framework Directive transitional water quality status of Lough Mahon (Harper's Island) is considered 'Moderate' for the period 2013 - 2018. The WFD Risk Score for this transitional waterbody is 'At Risk'. **Figure 4-4** shows the local hydrology of the area around the development site.

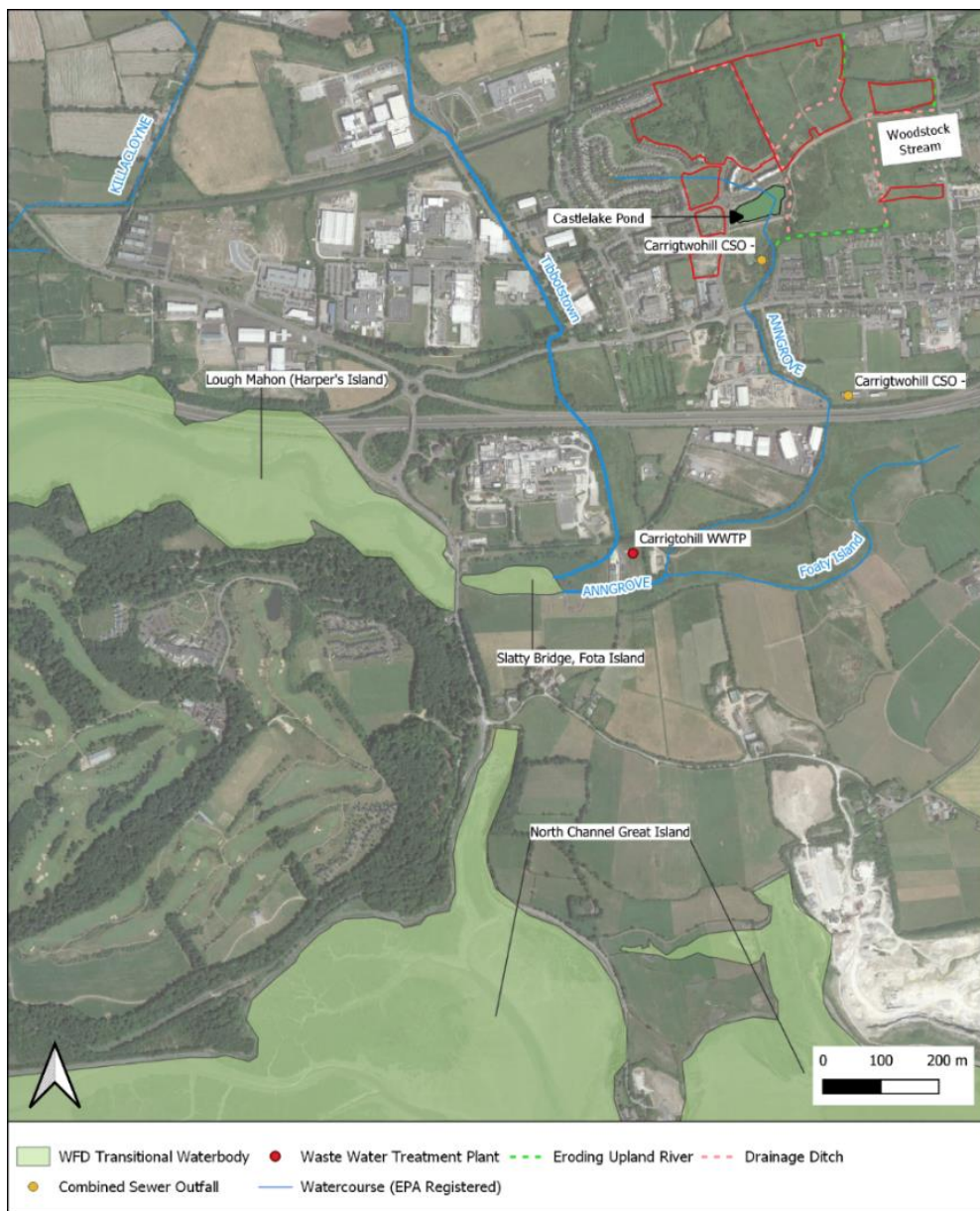


Figure 4-4 Rivers, streams and other water features

4.5.1 Surface Water

As part of the proposed works surface water will be collected by rainwater pipes and road gullies into the sewer network. From there water will either flow by gravity into the existing attenuating amenity lagoon (Plate 4-1) to the southwest or into an underground attenuation tank which will be constructed in Q3 of 2022. Attenuation is the slowing down or collection of water so that flow can be controlled.

The locations of the existing lagoon and proposed attenuation tank are shown below in Figure 4-5 and Figure 4-6.



Plate 4-1 Castlelake attenuation pond and adjacent apartments undergoing refurbishment

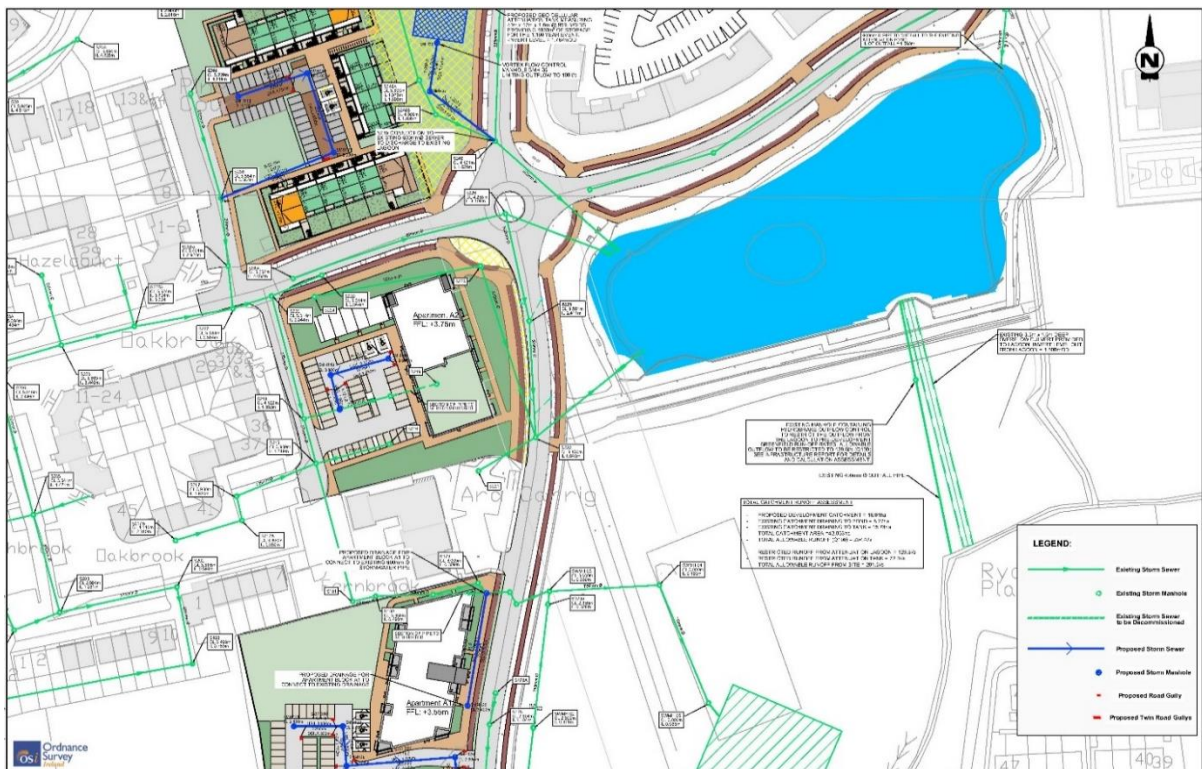


Figure 4-5 Location of the existing lagoon

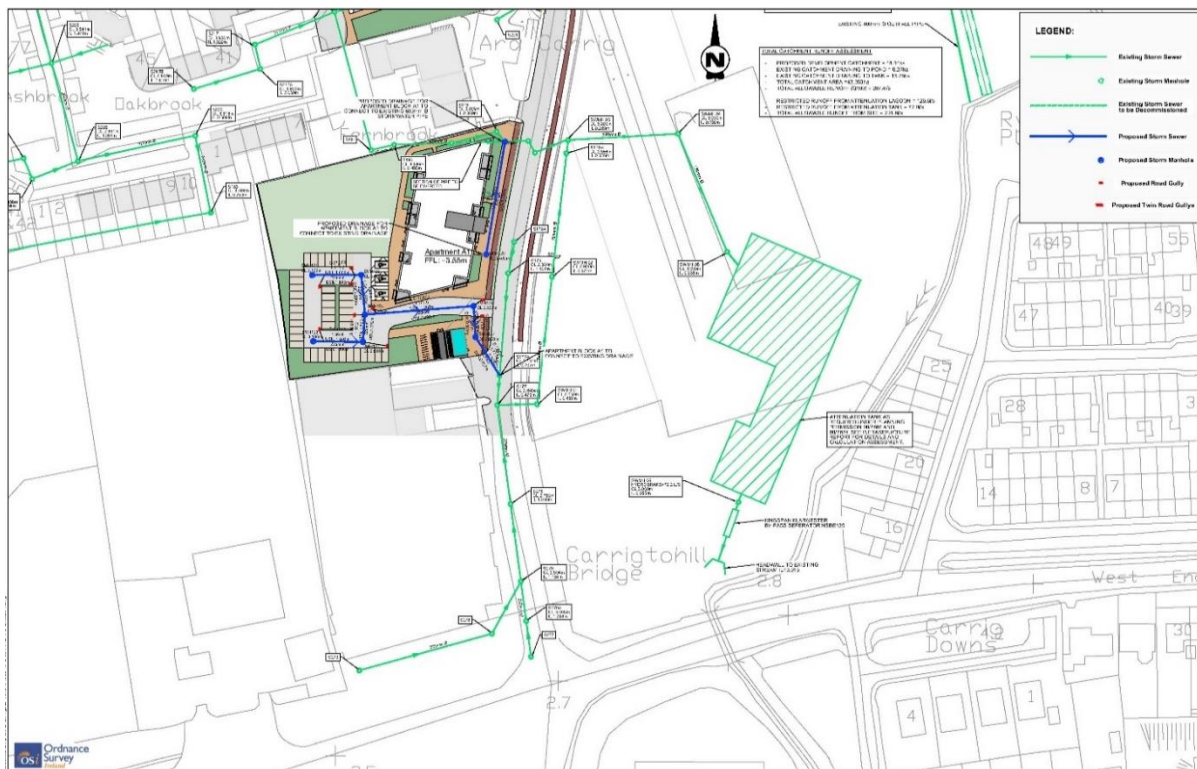


Figure 4-6 Location of the proposed underground attenuation tank

4.5.2 Flood Risk

Flood Risk Assessments (FRAs) assess the vulnerability of a site to flooding from various sources. They also give advice on how to prevent flooding, and what should be done in a flood event. A FRA was undertaken to establish the flood risk associated with the proposed development. This determined that the site is not at risk of flooding nor will the development cause additional risk of flooding.

4.5.3 Potential Impacts on Surface and Ground Water

The proposed development will be constructed on a phased basis, whereby it will be constructed in five different sections over the course of approximately 10 years. The specific nature of effects will vary slightly based on each phase. For drainage ditches that are being culverted effects will be **slight adverse permanent and likely to occur**. In the case of drainage ditches which are being retained, **slight adverse short-term effects are likely** during the construction phases. Effects on groundwater are **imperceptible short term and unlikely to occur**.

Excavations associated with construction works can potentially cause excess sediment to contaminate water courses and underlying bedrock aquifers. In some cases where subsoil depth is shallow the underlying water table can be intercepted during excavations and therefore become contaminated. In the case of this development there is a sufficient depth of sub soil to ensure that the water table is not intercepted. An average of 1m excavation depths and good construction practices will ensure that the underlying aquifer is not impacted. There is some potential for ground water levels to be affected but these will rebound following completion of the works. It is considered that potential impacts on groundwater levels and quality from excavations during the construction phase of the proposed development are **not significant short term and unlikely to occur**.

Excavation works can cause adverse effects on watercourses during construction. Good construction practice and the implementation of a plan for managing surface water during construction will ensure that the risk of

watercourses becoming contaminated due to excavation is minimised. It is considered that **not significant short-term effects** on hydrology are **unlikely** to occur as a result of excavations during construction.

There is potential for spillage of fuels and oils from construction machinery during construction to contaminate watercourses and groundwater. Good construction practice and the implementation of the measures outlined in the Construction and Environmental Management Plan (CEMP) will effectively reduce the potential for impacts on water quality on the site. It is considered that **not significant short-term effects** on surface and groundwater are **unlikely** to occur due to accidental spillages during construction.

The development site will be permanently changed following construction. One drainage ditch will be culverted permanently while the drainage ditch which flows through the centre of the site will be retained as a water feature. The flow of drainage ditches will recover following construction and be unchanged during operation. These and other adjacent watercourses will therefore be unaffected. Surface water will be managed using a dedicated water collection and sewer system and will flow to either the existing lagoon or underground attenuation tank. The attenuated flow then discharges to the Woodstock stream and ultimately to Lough Mahon.

Having considered the surface and ground water relating to the proposed development, it is **likely** that there will be a **not significant permanent effect** on surface water and a **neutral long-term effect** on ground water.

4.6 Air Quality and Climate

The potential effects of the proposed development on local air quality and climate have been assessed. The effects of the construction and operational phases of the proposed development have been considered.

4.6.1 Existing Environment

Representative Environmental Protection Agency (EPA) ambient air quality data has been used to characterise the existing air quality in the area. The nearest air quality station to the site is in Cobh Carrignafay, Co. Cork, approximately 10km southwest of the site. The air quality index characterised by this station was classified as 'Good'.

The local climate has been characterised using the 30-year averages from a representative Met Eireann Meteorological Station.

There are no major point sources of pollution at the site. Local air quality is primarily affected by traffic on the local road network and burning of fossil fuels to heat existing residential developments adjoining the site.

4.6.2 Likely Significant Effects

Do Nothing

If the proposed development were not to proceed, the site will continue to have no adverse impact on existing ambient air quality or on the local micro-climate. Based on the projected increase in traffic, the increase in traffic related emissions, based on projected Traffic and Transport Assessment without the subject development would be insignificant. This increase above the existing situation would be minor and would not result in a perceptible change in the existing local air quality environment.

Construction

During the construction phase there will be emissions from vehicle exhausts. The movement of machinery, construction vehicles and the use of generators during the construction phase will generate exhaust fumes containing predominantly carbon dioxide (CO₂), sulphur dioxide (SO₂), nitrogen oxides (NO_x), carbon monoxide (CO), and particulate matter (PM₁₀).

There will be dust generated from moving and transporting soil and materials in and around the construction site and on public roads. Weather conditions will play an important role in the quantity of dust generated. The potential for fugitive dust emissions is greatest during periods of prolonged dry weather.

Operation

Traffic movements associated with the development have been evaluated and assessed as part of the Traffic Impact Assessment in Chapter 13. The additional traffic movements will not result in an adverse impact on local air quality and it is expected that the impact of car engine exhaust emissions will have a negligible impact on local ambient air quality. The transition of the national fleet towards electric vehicles (EVs) is continuing at pace. The government has ambitious aims to have one million EVs on the road by 2030. It is expected the EVs will make up a proportion of the vehicles associated with this development and EV charging points will be provided as part of the proposed development.

The design and construction of all buildings in accordance with National Building Regulations shall ensure that modern building materials are used and that they are designed to be thermally efficient. All The Near Zero Energy Building standard will apply to all new buildings. The definition for Nearly Zero Energy Buildings in the Energy performance in Buildings Directive (EPBD) is "a very high energy performance, as determined in accordance with Annex 1, 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 proposed development will have no significant impact on Ireland's Greenhouse Gas Emissions.

Cumulative

There are a number of planning applications and planning permissions which are relevant to this proposed development are currently underway or at design stage which are all described in Chapter 1. Should the construction phase of the proposed development coincide with the construction of any other permitted developments within 500m, there is the potential for cumulative dust emissions. The dust mitigation measures outlined below should be applied throughout the construction phase of the proposed development. This combined with similar best practice mitigation measures applied to other permitted developments will avoid significant cumulative impacts on air local quality.

The traffic impact for the proposed development is predicted to have a slight impact on local air quality, it is unlikely that other future developments of similar scale would give rise to a dissimilar impact on climate or air quality during the construction and operational stages of those projects. Future projects of a large scale would need to conduct an EIAR to ensure that no significant impacts on air quality will occur as a result of those developments. It is predicted that the cumulative impact of the construction phase of the proposed development and other local development sites will be short-term and slight.

It is predicted that the cumulative impact of the operational phase of the proposed development and other local development sites will be long-term and not significant.

4.6.3 Mitigation Measures

Construction

It is recommended that standard best practice is adhered to during the construction phase in order to minimise fugitive dust emissions in particular. Mitigation measures are described in Chapter 8 of Volume 2 of the Main EIAR that will ensure dust emissions are kept to a minimum do not cause significant nuisance to neighbours.

Operation

It is not expected that any negative impacts to the climate will occur during the operational phase of the Castlelake Development, therefore no mitigation measures are required. The inherent design of the buildings will ensure no adverse impact to air quality or climate.

4.6.4 Residual Impacts

Construction and Decommissioning

The likely impact will be a slight temporary adverse effect.

Operation

This is a long term moderate positive effect. It is consistent with the objectives of the Climate Action Plan reflecting a move away from fossil fuel generated electricity in favour of renewable electricity generation and national decarbonisation.

4.7 Material Assets

Material assets are resources that are valued and that are intrinsic to specific places, they may be either of human or natural origin.

The consideration of the projects impact on material assets provided within this EIAR is discussed in the context of built services including electricity, water and wastewater infrastructure and waste management. Traffic is discussed in Chapter 13. Impacts on the natural environment are discussed in other chapters of the EIAR.

This chapter of the EIAR examines the physical resources of the environment within the proposed development of a human origin in accordance with 'Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)'. The key aspects relating to material assets of a human origin include the following.

- Electricity;
- Telecoms;
- Gas;
- Water Supply;
- Wastewater;
- Surface Water Drainage; and
- Waste Management.

Other material assets which derive from a natural origin are assessed in remaining chapters of this EIAR.

4.7.1 Electricity

There is a mix of Low Voltage and Medium Voltage overground and underground power supplies in the surrounding areas adjacent to the proposed development.

ESB ducts have been installed along the northern side of the of the North Link Road to a new transformer located at Station Road. It is envisaged that electricity supply to Castlelake SHD on a phased basis will involve a tie in with these existing ducts. Preliminary discussions are ongoing with ESB regarding the planned connections.

There are no significant impacts likely from the electricity network construction or operation phase.

4.7.2 Telecoms

A series of ducts access chambers have been installed in the footpath and cycleways as part of the Link Roads infrastructure (North and South Roads) that is currently nearing completion. As each phase of the Castlelake SHD progresses, these ducting routes will be extended to serve the residential development.

No significant impacts are likely from the proposed telecoms network construction or operation phase.

4.7.3 Gas

There is no requirement to connect to existing gas infrastructure in surrounding areas or to provide a gas network within the proposed development boundary, as part of the proposed development.

No significant impacts are likely from the proposed development construction phase or operational phase on the surrounding local gas network infrastructure.

4.7.4 Water Supply Infrastructure

There is currently a watermain serving the existing section of the Castlelake development, west of the proposed development. It is proposed to form a new connection with the existing internal watermain to the development with a new watermain to serve the proposed development.

During construction, there are no significant impacts likely from the construction phase on the water supply network.

The proposed development will result in an increase in demand on the local water supply network. Provided upgrades are carried out as per the connection agreement with Irish Water, there are no significant impacts likely on the existing public network during the operational phase of the proposed development.

4.7.5 Wastewater Infrastructure

The existing site currently has no foul water loading. The wastewater from the existing Castlelake residential development is currently discharged to the public trunk sewer network located to the Main Street.

It is proposed that a new underground cavity wastewater network will be provided to serve the proposed development. This wastewater network has been designed to fall by gravity towards the existing wastewater network as laid for the existing Castlelake development, which discharges to the public wastewater sewer network at the existing access junction into the development.

There are no significant effects to the wastewater infrastructure used to supply Carrigtwohill WWTP, likely during the construction phase. The wastewater connection has been deemed feasible, as per the confirmation of

feasibility from Irish Water, subject to upgrading the network, therefore there are no significant effects likely to the wastewater network during the operational phase.

4.7.6 Surface Water Drainage

There are two waterbodies traversing the site. Drainage ditches will be controlled using culverts in certain areas and for the safety of residents. It is proposed to retain the existing drain which currently flows in a north – south direction through the centre of the site. The stream will be retained as a water feature and as an ecological and amenity corridor to be incorporated into the proposed landscaping features of the development.

The surface water generated by the proposed development will be collected by rainwater pipes located at building perimeters and by road gullies to the roads and hardstanding areas, with the run-off directed towards the new surface water gravity sewer system to be provided for the proposed development. The stormwater will flow by gravity towards either the existing attenuation lagoon or an underground attenuation tank which will be constructed in Q3 of 2022. The lagoon has been designed to cater for this proposed development. The lagoon discharges attenuated flows to the Woodstock Stream, to the south of the site.

The underground attenuation tank will be located to the south of the Castlelake lands. The tank structure discharges to the Woodstock Stream to the south of the site and is designed to cater for the requirements of the proposed development.

The new surface water gravity systems are designed so that surface water is attenuated to pre-development greenfield rates of run-off, prior to discharge to the Woodstock Stream. No significant effects are likely on the existing surface water network during the operational phase or the construction phase of the proposed development.

4.7.7 Waste Management

During the construction phase, the proposed development will generate a range of non-hazardous and potentially hazardous waste materials. The construction employees will also generate typical municipal waste and packaging of materials will also contribute to the waste streams. A carefully planned approach to waste management and adherence to the Construction Waste Management Plan (WMP), located in Appendix B of the CEMP which is included in Appendix 2.1 of this EIAR.

During the operational phase, a variety of waste will be generated from the residents as well as at the creche. An Operational Waste Management Plan has been prepared, see Appendix 9.2 of this EIAR. The OPWM provides a strategy for segregation, storage and collection of wastes generated within the development during the operational phase including dry mixed recyclables, organic waste, mixed non-recyclable waste and glass as well as batteries, bulbs, WEEE and cooking oil if generated.

No significant effects are likely on the local environment during the proposed development operational phase or the construction phase.

4.8 Archaeology, Cultural Heritage and Architectural Heritage

Chapter 10 of the EIAR considers the potential effects on relevant cultural heritage assets arising from the Proposed Development. The phrase '*Cultural Heritage*' is a generic term covering a multitude of cultural, archaeological and architectural sites and monuments within the landscape. In Chapter 10, Cultural Heritage is divided into three sub-groups, namely Archaeology, Cultural Heritage and Architecture.

The proposed development site lies to the west of Carrigtwohill village. It comprises seven individual areas of ground (**Figure 4-7**) where development is proposed. These seven areas are as follows;

- Area 1 (Castlelake North Site) and Area 2 (Blandcrest Site) are bordered to the north by the Cork to Midleton Railway line and to the south by a newly constructed road and residential developments;
- Area 3 (Station Road North Site) and Area 4 (Station Road South Site) lie to the west of Station Road and are bordered north by a newly constructed road;
- Area 5 (Castlelake West Site), Area 6 (Castlelake South Site 02) and Area 7 (Castlelake South Site 01) lie to the west of Castlelake Avenue which provides access to a number of existing residential developments (**Figure 4-7**).

Existing Environment-Archaeology and Cultural Heritage

The proposed development site is situated in the townlands of Terry's-Land and Carrigtwohill in the parish of Carrigtwohill and Barony of Barrymore on the western outskirts of the village of Carrigtwohill. There are no recorded archaeological sites listed in the RMP or the SMR within the proposed development site. The closest recorded archaeological sites are a graveyard (CO075-017001-), situated c. 160m to the southeast of Area 4 within which lie two churches (CO075-017003- and CO075-017002-) and a redundant record (CO075-017004-) (**Figure 4-7**). One of the churches (CO075-017002-) comprises the medieval remains of the St. David's parish church of Carrigtwohill and is also a Protected Structure (PS854) included in Cork County Development Plan (2022-2028). In total, there are twenty four recorded archaeological sites within a 1.5km radius of the proposed development site. These monuments provide evidence for human settlement and activity within the study area dating back to the Bronze Age (*circa* 2200 to 700BC). Since this time, human populations have organised and altered the landscape in which they live for a diversity of purposes, be it agricultural, social, political, or religious. A notable historic landmark in the area is Barryscourt Castle, the seat of the Barry family, situated 830m to the south of the proposed development site. The castle and associated bawn (CO075-018001, CO075-018003), is a National Monument in State Ownership (Nat. Mon. No. 641). This large and complex tower house has been the focus of archaeological excavation and restoration over many decades and recent radiocarbon dating give a date of 1392 to 1420 for its construction.

The village of Carrigtwohill owes its name, *Carraig Tuathail*, meaning Toohal's Rock, to a prominent knoll of limestone situated c. 600m to the north-east of the proposed development site in the townland of Terrysland. Caves occur in the greater Midleton area where the limestone breaks the surface in a series of ridges and knolls. The prevailing limestone geology has attracted quarrying activity since at least the mid-19th century and numerous small scale quarries are depicted on historic maps within the study area and broader surrounding region. Quarrying is now at industrial extraction levels to the south of the existing N25 the townlands of Ballynabointra and Ballyvodock West, 2.5km to the southeast of the proposed development site. Limekilns dot the landscape of the early OS maps such as that in Terry's-Land (CO076-001), situated 540m to the east of the proposed development. Many of these once common features have been destroyed or have become very overgrown and dilapidated and faded into the landscape and are barely recognisable. The opening of a by-pass to Carrigtwohill village in November 1994 prompted a surge in new residential developments which now lie to the north, east and west of the village while the IDA Business Park approximately 500m to the west of the proposed development site is occupied by a number of multinational corporations such as Stryker and GE Healthcare. The once small rural village of Carrigtwohill has been transformed to a commuter area to Cork City.

Existing Environment-Architectural Heritage

There are no Protected Structures (PS) listed in the Cork CDP within the proposed development site. The closest PS's are those located along Station Road which include a former dispensary (PS1316; NIAH20907554), 50m to the north of Area 3, a parochial house (PS1315; NIAH20907555), 60m to the east of Area 3 and Rockville House

(PS1317) situated 115m to the northeast of Area 4 (**Figure 4-7**). There are seven PS within a 1km radius of the proposed development site, three of which are also listed in the National Inventory of Architectural Heritage (NIAH). In total there are sixteen structures within a 1km radius of the proposed development site, both listed as PS's and listed in the NIAH. These buildings date from approximately the 15th century (Barryscourt Castle) to the late early 20th century and reflect the residential, spiritual and social history of the area.

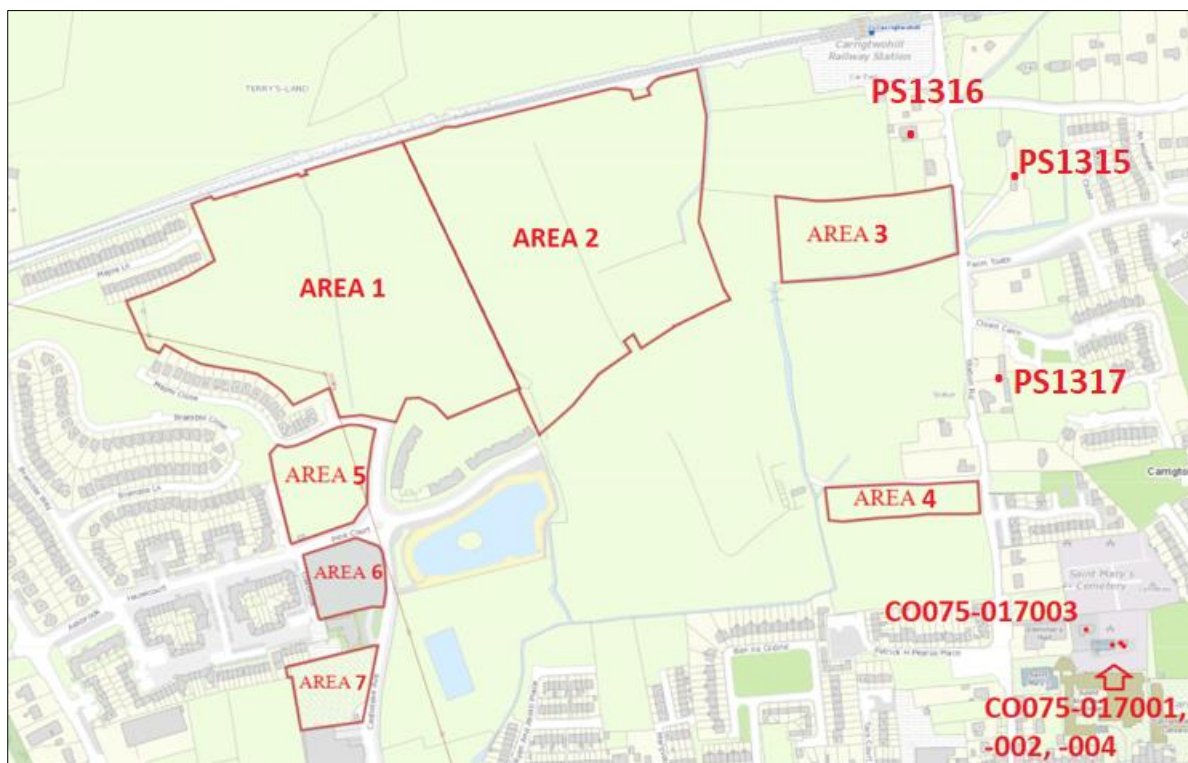


Figure 4-7 Proposed development site (AREAS 1-7) outlined on OS map with closest RMP sites and PS

Effects – Archaeology and Cultural Heritage

There are no recorded archaeological sites listed in the RMP for Cork or on the SMR database of the ASI within the proposed development site. There will be no direct or indirect effect on any known recorded archaeological site.

Areas 1, 2 3 and 4 and the eastern part of Area 5: These areas have been subjected to varying degrees of ground disturbance which was evident on both the aerial photographs and during the walkover survey. However, undisturbed ground exists in these areas where hitherto unknown subsurface archaeological remains may survive. Where extensive earthmoving is involved, there is always the possibility that archaeological material will be uncovered.

Areas 6 and 7: These are areas of hardstanding. Given the previous ground disturbance within these areas, no *in situ* archaeological deposits will have survived. No likely significant effect on the archaeological environment is foreseen during construction works in Areas 6 and 7.

No features of cultural heritage were identified within the proposed development site. There will be no direct or indirect effect on any cultural heritage feature. The area surrounding the proposed development site has been transformed from agricultural land to a highly developed landscape comprising largescale residential, industrial

and infrastructural elements. The proposed development will continue this trend and further alter this once rural hinterland to Carrigtwohill village.

Effects – Architecture

There are no Protected Structures listed in the CCDP, no structures listed in the NIAH and no built structures within the proposed development site. There will be no direct or indirect effect on any structure of architectural merit or on any upstanding structure.

Mitigation

The following mitigation measures will be undertaken;

Areas 1, 2, 3, 4 and eastern side of Area 5

Licensed archaeological monitoring of all groundworks in these areas during construction. In the event of archaeological material being uncovered such material will be preserved *in situ*, where possible or preserved by record. Preservation *in situ* will require the relocation of the element of the development beyond the area of archaeological sensitivity. Preservation by record will require the excavation of the archaeological material and such material will be fully resolved to professional standards of archaeological practice (Policy Guidelines on Archaeological Excavation – Department of Arts, Heritage, Gaeltacht and the Islands). This work will be funded by the developer.

Areas 5, 6 and 7

No archaeological mitigation is proposed for the western two thirds of Area 5 and for the entirety of Areas 6 and 7.

4.9 Landscape and Visual

4.9.1 Introduction

A Landscape and Visual Impact Assessment was carried out for the proposed Castlelake SHD 18.3 Ha Site, Carrigtwohill Co. Cork. The assessment was compiled by CSR chartered landscape architects in accordance with the methodology prescribed in the Guidelines for Landscape and Visual Impact Assessment, 3rd edition, 2013 (GLVIA) published by the UK Landscape Institute and the Institute for Environmental Management and Assessment and the relevant updates and Clarifications as issued by the Landscape Institute.

The Landscape and Visual Assessment was informed by a desktop study and a survey of the Proposed Development site and receiving environment in October 2021. The assessment identifies and discusses the landscape and visual constraints as well as landscape and visual effects and their level of significance in relation to the Proposed Development at Castlelake, Carrigtwohill, Co. Cork.

The potential landscape and visual effects of the Proposed Development and mitigation measures are briefly summarised below.

A compilation of photomontages is included in **Volume 4** of this EIAR.

4.9.2 Landscape Effects:

The Proposed Development will be located within the City Harbour and Estuary Landscape Character Type spanning across six parcels of land totalling 18.3 hectares on the urban-rural fringes of the town of Carrigtwohill.

All lands have been zoned for housing within the County Development Plan 2022-2028 and landcover consist predominantly of disused and overgrown fields with some smaller undeveloped construction sites.

The proposed design reflects a considered form and materiality of development that is sensitive to its context and although some existing rural landscape features are lost, an appropriate new urban character is created that contributes positively to local place-making. This recognises that, whilst the change in character from disused and overgrown field to urban is important, it reflects land use policy for the Proposed Development site and has been applied to the Proposed Development site as per the best practice in terms of urban design, open space development and Green Infrastructure policy i.e., the change is from disused, abandoned fields to a quality urban townscape, consolidating the urban area of Carrigtwohill. The overall landscape effect will be of **medium change and significance of effect as Moderate and beneficial qualitative**.

Cumulatively the Proposed Development will be read collectively with other developments within the immediate surroundings including the approved Carrigtwohill educational facility and pending shared cycle/footpath routes which reflect the transition of these lands including the Proposed Development site to a new urban area.

4.9.3 Visual Effects:

The visual effects assessment was aided by photomontages produced from 19 viewpoints of the Proposed Development modelled onto the captured existing view. These visuals can be found as an appendix to the LVIA assessment chapter along with details of how to view them correctly.

The predicted visual effects of the Proposed Development will have a significance ranging from Not Significant to Very Significant and neutral quality depending on location. The greatest level of visual effects is **Significant and of neutral quality for 6 of the 19 viewpoints, 2no. Significant adverse quality and 2no. Very Significant adverse quality**. The visual effects will be greatest from the nearest receptors within the adjoining Castlelake housing estate of the Proposed Development Site's A, D, E and F. While receptors located closer to Station Road will have greater views of the Proposed Development site's B and C. The Proposed Development was found to have negligible change to the existing valued views of the Cork County Council scenic route at Viewpoints 13 and 18.

Cumulatively, the Proposed Development will be viewed along with other developments within the immediate area, as noted above, which reflect the transition to a new urban area. The design of the Proposed Development seeks to incorporate the various cycle routes and complementary with the approved school buildings.

4.9.4 Mitigation and Enhancement:

Mitigation and enhancement measures have been identified within the assessment and inputted into the design process of the Landscape Masterplan which has also being completed by CSR. This will ensure that key landscape features are sensitively retained wherever possible including a hedgerow and ditch SUDS feature through the proposed central neighbourhood park. The proposed planting will include native planting using mixes of trees, shrubs and wildflower meadows. The landscaping proposals will help to soften the appearance of the new buildings and create new accessible open spaces helping to integrate the Proposed Development within the evolving new urban landscape along the northern end of the town of Carrigtwohill.

4.9.5 Residual Effects

The residual effects occurring after the mitigation measures are implemented were determined to be the same as those stated above. The landscape significance of effect as **Moderate, Beneficial qualitative Long Term** and visual significance of effects ranging from **Significant and of neutral quality to Very Significant adverse quality and**

all Long Term Where the Proposed Development will be a permanent feature within the transition landscape of Carrigtownhill town and will have varying degrees of visibility from receptors.

4.9.6 Summary

Overall, the Proposed Development is sensitively design to fit within an area of transition rural-urban landscape which is supported by existing planning policy for the sustainable expansion of Carrigtwohill town.

4.10 Noise and Vibration

Chapter 12 describes the noise and vibration impact assessment of the proposed housing development. The construction and operational phases of the development were assessed. The assessment comprised of the characterisation of the baseline noise and vibration environment, the adoption of appropriate assessment limit values, the prediction of likely significant noise and vibration effects and appropriate mitigation measures where required.

The existing noise environment is relatively quiet due to its greenfield nature. There are no existing dominant noise sources. There is a commuter train line running adjacent to the northern perimeter of the site, however it is not a major source of noise due to the infrequency of the train passes, low speed, and commuter nature. The train does run at night.

Ambient noise levels will increase in the vicinity of the construction site for the duration of the works. Noise levels will be most significant for existing properties closest to works areas. However, with best practice measures in place construction noise thresholds are not expected to be exceeded. Any impact will be temporary.

Once constructed there will be no outward noise from the development that is considered as significantly adverse. There will be no noise emission from the buildings and any ancillary noise (residents and residential services) will be typical of any housing development and will form part of the natural urban soundscape.

The units closest to the train line have been designed to ensure that the train line will not impact on internal or external residential amenity.

4.11 Transport and Traffic Infrastructure

The Traffic and Transportation impacts of the proposed development have been assessed on the basis of the expected permitted and proposed local developments, including roads and transport infrastructure. The proposed development site is part of Cork County Council's planned development for Carrigtwohill.

There will be no significant adverse construction traffic impacts. Construction traffic volumes will mostly occur during off-peak traffic periods.

The proposed residential development location will generate a high proportion of non-car, sustainable transport trips, particularly in respect of school, creche and work commuting type trips that occur during peak traffic hours. This includes travel on foot and by train, bus, and bicycle.

The proposed development would be fully sustained by the existing, permitted and proposed transport infrastructure for Carrigtwohill, including by Cork County Council.

4.12 Interaction of Effects

There is potential for interactions between one aspect of the environment and another which can result in direct or indirect impacts, and which may be positive or negative. While all environmental aspects can be inter-related to some extent, the following outlines the key interactions identified between each of the various environmental subject areas considered in this EIAR for both the construction and operational phases of the proposed development. Where relevant, interactions between specific environmental aspects and effects are already addressed within each of the individual assessment topic areas of this EIAR. The purpose of this chapter is to draw attention to significant interaction and interdependencies between one topic and another.

Interaction	Description
<p>Biodiversity;</p> <p>Land and soils;</p> <p>Water;</p> <p>Air quality and climate;</p> <p>Landscape and visual;</p> <p>Noise and vibration; and</p> <p>Traffic and transportation.</p>	<p>There are direct links between six key environmental aspects.</p> <p>The project has the potential to negatively impact and directly alter the hydrology of the surrounding area particularly during construction through means of pollution or sedimentation which in turn could impact on biodiversity. Excavation of soil introduces the risk of increased sedimentation which would impact on both surface water, ground water and biodiversity.</p> <p>The temporary and permanent changes in landscape can affect habitats and biodiversity during construction and operation.</p> <p>There is also the potential for noise to negatively impact on Biodiversity during the construction phase of the due to noise from excavations other construction activities.</p> <p>The increase in traffic and release of dust and other emission also has the potential to affect air quality during construction and operation and in turn the biodiversity of the nearby Natura 2000 sites. The interactions and suitable mitigation measures have been considered and discussed in this EIAR and the NIS and no significant residual effects will occur.</p>
<p>Noise and Vibration;</p> <p>Population and human health;</p> <p>Biodiversity;</p> <p>Land and soils; and</p> <p>Traffic and transportation.</p>	<p>Noise and vibration impacts during the construction works has the potential to cause negative impacts to local wildlife in the surrounding environment, impacting on biodiversity.</p> <p>Noise also has the potential to affect the local human population. The excavation, stockpiling and movement of soils and increased levels of traffic associated with the proposed development will cause noise and vibration emissions.</p> <p>The interactions and suitable mitigation measures have been considered and discussed in this EIAR.</p>
<p>Population and Human Health;</p> <p>Air Quality and Climate;</p> <p>Material Assets;</p>	<p>Increased noise and vibration and emissions to air will arise from the construction machinery and from traffic caused by the proposed construction works. Air emissions associated with</p>

Interaction	Description
<p>Traffic and Transportation; Noise and Vibration; and Landscape and Visual.</p>	<p>construction and increased population also have the potential to impacts on human health.</p> <p>The increased load on material assets is related to increased population.</p> <p>The changes in landscape and visual resources will have an impact on local populations.</p> <p>The interactions and suitable mitigation measures have been considered and discussed in this EIA.</p>
<p>Landscape and Visual; Population & Human Health; Land and Soils; Biodiversity; and Water.</p>	<p>The changes in landscape and visual resources will have an impact on local populations. Changes associated with biodiversity such as the removal of habitats, planting of new trees and other vegetation and landscaping works has the potential to impact on landscape and visual.</p> <p>The movement, excavation and stockpiling of material during construction and the permanent covering of soil during operation has a visual impact on the landscape.</p> <p>Surface water features will be culverted in certain locations, having a visual impact on the environment.</p> <p>The interactions and suitable mitigation measures have been considered and discussed in this EIA.</p>
<p>Land and Soils; Air quality and climate; Water; Cultural heritage/archaeology; Biodiversity; Landscape and visual; Noise and vibration; and Traffic and transportation.</p>	<p>During construction phases the excavation of soil has the potential to impact on water quality and in turn on biodiversity through the release of suspended sediment. Specific design mitigation during construction has been designed to minimize any potential impacts on water and biodiversity. Construction works have the potential to create dust, affecting air quality and thereby effect the human population.</p> <p>Excavations have the potential to create noise and vibration.</p> <p>During the construction phase, the removal of soil has the potential to interact with any archaeology on-site. Mitigation measures and the interactions between these aspects have been considered in this EIA.</p>
<p>Water; Land and soil; Landscape and visual; Traffic and transportation; Material Assets; and</p>	<p>There is potential for interactions between water and soil due to movement of sediment during construction.</p> <p>During construction increased levels of traffic increases the potential for suspended solids to enter watercourses and in turn impact on Biodiversity. The culverting of some water courses will also have a visual impact.</p>

Interaction	Description
Biodiversity.	The interactions between these aspects and related mitigation measures have been considered in this EIAR.
Air Quality and Climate; Population and human health; Biodiversity; Land and soils; and Traffic and transportation.	<p>There is potential for emissions to air during the construction phases in the forms of temporary fugitive dust and vehicle movements and emissions associated with greater population density associated with the operation phase. This has the potential to impact population and human health, biodiversity, land and soils and traffic and transportation.</p> <p>The interactions between these aspects and related mitigation measures have been considered in this EIAR.</p>
Material Assets; Population and human health; and Water.	<p>The use of services during construction and the increase in population and associated increased load on services during operation has the potential to impact on material assets. There is potential for interaction between material assets and population and human health and water from the proposed development.</p> <p>The interactions between these aspects and related mitigation measures have been considered in this EIAR.</p>
Cultural Heritage and Archaeology and; Land and Soils.	<p>The excavation of soils for the purposes of archaeology and cultural heritage has the potential to impact on land and soils during construction.</p> <p>The interactions between these aspects and related mitigation measures have been considered in this EIAR.</p>
Traffic and transportation; Air quality and climate; Water; Noise and vibration; Population and human health; Land and soils and Biodiversity.	Traffic associated with the proposed construction works has the potential to have an impact on air quality due to emissions of dust and greenhouse gases, which in turn can impact on population and human health and on water and land and soils due to increased risk of spillage of fuels and oils and movement of sediments which in turn can impact biodiversity. Traffic can cause noise and vibration causing impacts on population and human health and biodiversity. The impacts associated with each aspect are addressed individually within the preceding chapters.

