



Hibernating mammals (e.g., Hedgehog)	<u>Mammal hibernation season.</u> No clearance of vegetation unless confirmed to be devoid of hibernating mammals by an ecologist. (Jan - Mar)	Vegetation clearance permissible (Apr - Oct)	<u>Mammal hibernation season.</u> No clearance of vegetation unless confirmed to be devoid of hibernating mammals by an ecologist. (Nov - Dec)
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Table 5-20. Seasonal restrictions on habitat/vegetation removal for relevant KER species. Red boxes indicate periods when clearance/works are not permissible

5.7.2.2.3 Mitigation 8: Construction Site Management for Fauna

As best-practice all construction-related rubbish on Site e.g., plastic sheeting, netting etc. will be kept in a designated area and kept off ground level so as to prevent small mammals such as hedgehogs from entrapment and death.

Trenches/pits must be either covered at the end of each working day or include a means of escape for any animal falling in e.g., a plank or objects placed in the corner of an excavation (Species such as badgers will continue to use established paths across a site even when construction work has started).

Any temporarily exposed open pipe system will be capped in such a way as to prevent animals gaining access as may happen when contractors are off Site.

5.7.3 Operational Phase Mitigation

5.7.3.1 Protection of Habitats and Flora

5.7.3.2 Protection of Fauna

No specific mitigation measures for potential impacts on fauna were identified in addition to the embedded design features such as the Landscape Plan providing continuous green corridors through the Site and the public lighting plan.

5.7.4 Biodiversity Enhancement Measures

5.7.3.3 Enhancement 1: Landscape Management

Soft landscaping will be managed in such a way as to promote pollinators (e.g., pollinator friendly mowing regime, planting of native wildflower meadows and native tree species), please see Landscape Plan and Landscape Rationale Report (Gannon and Associates, 2024).

5.7.3.4 Enhancement 2: Bat Boxes

By way of enhancement, bat boxes will be erected at the Site, on suitably mature trees located along the main park and wetland area, under the guidance of the Project Ecologist. The bat box type installed will be the 2F Schwegler Bat Box or a similar durable woodcrete make. Additional bat boxes may also be installed along any linear vegetated features that have no night-time lighting.

The bat boxes will be located in locations unlit by night-time lighting and ca.4m above the ground to prevent



disturbance. The linear features at the Site were noted to support bat foraging activity and so the provision of new roosting opportunities will act to enhance bat usage of the Site.

5.7.3.5 Enhancement 3: Swift Bricks

It is proposed to include swift bricks or external swift boxes on the facades of the 3 & 4 storey buildings. The Swift bricks/boxes will be installed side by side in sets of up to 10, as swifts are a social nesting species. The bricks/boxes will be installed a minimum of 5m off the ground, and care will be taken to ensure no obstacles or plate glass windows are located below the bricks/boxes.

Guidelines for the bird box scheme should also follow guidelines published by Swift Conservation Ireland, and those published by Birdwatch Ireland entitle "Saving Swifts" (2009/2010). The incorporation of swift bricks/boxes will help recover the declining swift population, which are now Red Listed in Ireland (Gilbert et al., 2021).

Swifts are a "clean" bird species which remove their own wastes from their nests periodically. As such, swift bricks/boxes do not require any cleaning by the management company.

It is advised to install a swift calling system to attract Swifts and encourage them to take up residence at a new site. A swift calling system is a small speaker set-up that plays swift calls during the summer. It should be located close to the brick entrances and has been seen to greatly increase the chances of swifts using the swift boxes/bricks. Solar powered options are possible.

An Ecologist will be instructed to set up the swift calling system once the construction of the Proposed Development is complete. This can be with the help of active local Swift groups as required (e.g., Dublin Swift Conservation Group), who can help and advise as to the best set-up etc.

5.7.3.6 Enhancement 4: Bird Boxes

A minimum of 5 no. bird boxes are proposed to be installed within the main park area of the Site. Bird boxes should be installed prior to the breeding bird season to ensure their presence at the Site from February onwards, when birds begin seeking out new nest locations. Installation will be overseen by an Ecologist, and management will be taken in charge by the landscape management team of the Proposed Development during its Operational lifetime.

A range of different bird boxes are available that meet the specific need of the species of birds. The variety of options suitable for installation at the Site and information on the positioning of each type of box are outlined briefly below. A minimum of three boxes should be installed, with preference given to boxes suitable for amber- and red-listed species such as House Sparrow and Starling. Such boxes are described as follows:

- Sparrow Nest Box: For example, the Sparrow Nest Box System, which can be found at the following link: <https://www.nhbs.com/sparrow-nest-box-system> or the Sparrow Terrace, which can be found at the following link: <https://www.nhbs.com/sparrow-terrace-nest-box>.
- Starling Nest Box: This box type can be found at the following link: <https://www.nhbs.com/woodpeckerstarling-nest-box>

Sparrow nest boxes should be placed 2-4m off the ground with a clear flight path to the entrance. Starling nest boxes 3-4 metres above ground level where there is easy flight access and where it cannot be reached by cats or other potential predators.

Other appropriate bird box types are as follows:

- 'Hole type' bird boxes (28 mm hole): For example, the Eco Small Bird Box, which can be found at the following link: <https://www.nhbs.com/eco-small-bird-box>.
- Open fronted bird boxes for blackbirds: For example, the Blackbird FSC Nest Box, which can be



found at the following link: <https://www.nhbs.com/blackbird-fsc-nest-box>.

- Open fronted bird boxes for wrens and robins: For example, the Eco Robin (Open-Fronted) Nest Box, which can be found at the following link: <https://www.nhbs.com/eco-robin-open-fronted-nest-box>.

Hole type bird boxes should be positioned 2-4m off the ground, with good-visibility, a clear flight line, and away from the prevailing wind direction. The open-fronted boxes for robins, wrens and blackbirds should be installed lower than 2m but amongst dense vegetation, or newly planted vegetation that will grow to become dense upon establishment, and somewhere cats and other predators won't easily see or access them. Boxes will not be drilled or nailed to trees to avoid damage, but instead be attached via a wire strap wrapped around the tree. Boxes will be located in areas away from direct exposure to public lighting to increase chances of uptake.

5.7.3.7 Enhancement 5: Ground nesting pollinator habitat

To enhance the Site's value to pollinating species that inhabit nests on the ground, such as mining bees, bare earth banks will be included in suitable areas within the main park, where the potential for damage from humans is limited (i.e., away from main pathways, suitably fenced, etc). These banks will be maintained as bare ground with minimal vegetation to allow for mining bees and other ground nesting insects easy access. These banks should be formed by sandy soils, and faced south/southeast.

5.8. Cumulative Impacts

Cumulative Impacts can be defined as "impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project". Effects which are caused by the interaction of effects, or by associated or off-site projects, are classed as indirect effects. Cumulative effects are often indirect, arising from the accumulation of different effects that are individually minor. Such effects are not caused or controlled by the project developer.

A review of other off-site developments and proposed developments was completed as part of this assessment. The following projects and plans were reviewed and considered for possible cumulative effects with the proposed development.

5.8.1 Relevant Plans and Policies

The following plans and policies were reviewed and considered for possible in-combination effects with the Proposed Development.

- South Dublin County Development Plan 2022-2028 (SDCDP 2022-2028).
- Dublin City Biodiversity Action Plan 2021-2025 (DCBAP 2021-2025).

No specific projects or plans within SDCDP 2022-2028 were identified that could act in-combination with the Proposed Development and cause adverse effects on the KERs identified in this Chapter. Additionally, the SDCDP has directly addressed the protection, enhancement and incorporation of biodiversity through specific Policies and Objectives. The DCBAP 2021-2025 is set out to protect and improve biodiversity in the Dublin area, and as such will not result in negative in-combination effects with the Proposed Development.

Therefore, on examination of the above it is considered that there are no means for the Proposed Development to act in-combination with any plans or projects that would cause any likely significant effects to nearby ecological sensitivities.



5.8.2 Existing planning permissions

There are several existing planning permissions on record in the area ranging from small scale extensions and alterations to existing residential properties to some larger-scale developments. The larger granted developments identified within 500m of the Site are identified below in Table 5-21 and the potential for possible in-combination effects with the Proposed Development are assessed.

Planning Reference	Planning Authority	Status	Location
SD20A/0177	SDCC	Granted	Approx. 250m SW
Development Description Importation and spreading of topsoil and subsoil of approximately 24,888 tonnes (to be < 25,000 tonnes) on agricultural lands measuring circa 2.6 hectares for the purposes of improving the quality of land for agricultural activity; surface water management controls comprising a swale and land drain and all ancillary site works; intention to apply for a waste licence for the development works.			
Potential for In-combination effects The granted development was subject to AA Screening which concluded no potential for significant impacts on any European sites from the granted development, alone or in combination with other projects and plans. The granted development is only for importation of clean soils, and the site is also removed from any notable watercourses with links to European sites. The mitigation measures for the development included a 15m buffer from any drainage ditches and watercourses, and the applicant was to install a defender against spread of silt downstream of the landfill. Provided the mitigation measures were implemented in full, no potential significant impacts that could act in-combination with the Proposed Development are anticipated.			

SD19A/0104 ABP-305800-19	SDCC / ABP	Granted	Adjacent to the north
Development Description 24 dwellings on a site of 0.76 hectares comprising: 8 two storey, four bed semi-detached houses, 12 two storey, three bed semi-detached and terraced houses, 4 two bed apartments in 1 two storey apartment block; all associated site development works, car parking, open spaces and landscaping including modification to an extant permission under Ref. SD14A/0180; permission is also sought for the demolition of a detached dwelling on site. Access to the development will be via an adjoining development known as Dodderbrook (permitted under Ref. SD14A/0180)			
Potential for In-combination effects The granted development was subject to AA Screening which concluded no potential for significant impacts on any European sites from the granted development, alone or in combination with other projects and plans. No specific reference is made to potential surface water discharges during construction, however, the development is required to comply with best practice development standards that will ensure no significant discharges of polluted surface waters are made into the surface water network that could link to European sites downstream. The site is not yet built on and is currently serving as a compound for the construction of SD17A/0468. Considering the above, and the lack of impact pathways concerning the Proposed Development identified in this report, no significant in-combination effects with the Proposed Development are anticipated.			

Table 5-21. Granted and Pending Development applications within 500m of the Proposed Development. Location and distance given is relative to the Proposed Development

5.8.6 Operation of Ringsend WWTP

This section addresses in more detail the general issue of potential in-combination effects with Ringsend WwTP arising from the Operational Phase of the Proposed Development and other Developments, including future developments.

In summary, the impact of the Proposed Development and any future development has already been appropriately considered and assessed as part of the application process for the existing planning permissions pertaining to Ringsend WwTP.

The 2012 Ringsend WwTP application for planning permission (Ref. PL.29N.YA0010) was for a PE of 2.4 million and was predicated on the findings of the 2005 GDSDS. The GDSDS set out the drainage requirements for the Greater Dublin Area (GDA) up to 2031. The GDSDS relied on the Regional Planning Guidelines (RPGs) and the National Spatial Strategy (NSS) in order to estimate the future projected population increases for the GDA. The studies indicated a predicted growth in population from 1.2 million in 2002 to just over 2 million in 2031 for the GDA region.

In June 2018 Irish Water applied for and subsequently received planning permission in 2019 for upgrade works to the Ringsend WwTP facility. The first phase of upgrade works to Ringsend WwTP was completed in December 2021, which increased the capacity of the plant by 400,000 P.E. These works, together with the future works permitted will ultimately increase the capacity of the facility from 1.6 million P.E. to 2.4 million P.E. by 2025 (Irish Water website: <https://www.water.ie/projects/local-projects/ringsend/>). Therefore, both the initially permitted 2012 upgrade and the permitted 2019 revised upgrade (Ref. ABP-301798-18) for Ringsend WWTP take account of population growth up to 2.4 million PE. Both applications were subject to EIA and therefore an EIAR, and accompanied by an AA screening report and NIS.

Under the heading of *“Potential impact – Discharge of treated effluent, impacts on water quality, effects on qualifying interests”*, the NIS (Irish Water, 2018b) for the Ringsend WwTP 2019 revised upgrade provides as follows: *“In the operational phase, the proposed upgrade of the Ringsend WwTP Component will result in an increase in the plant capacity and also an improvement in the final effluent quality. This will result in a reduction in the licensed parameters discharged into the receiving water, with significantly reduced quantities in respect of ammonia and phosphorous.”*⁵

This NIS goes on to state as follows: *“Overall, no significant adverse effects on are foreseen and indeed, a slight positive effect is possible. Effects of discharge during the operational phase of the project from the upgrade project will therefore have imperceptible impact on habitats listed within these European sites.”*⁶

In respect of this issue, the NIS concludes as follows: *“Thus, there is no potential for in-combination impacts of any other plan and project with the Ringsend WwTP Component of the proposed Upgrade Project.”*⁷

The EIAR for the ongoing upgrade at Ringsend WwTP (Irish Water, 2018a) also details the lack of any significant impacts to European sites observed as a result of the current stormwater overflow discharge levels at the WwTP. During storm events, once the capacities of the holding tanks are surpassed, the WwTP releases overflow via an outfall at Pigeon House Rd into the lower Liffey estuary.

The EIAR carried out in relation to said upgrade concluded that in the ‘do nothing’ scenario, i.e., wherein the upgrade is not carried out; the current existing levels of nutrient input to Dublin Bay as a result of stormwater overflow from the WwTP, are not deemed to pose significant threats to the integrity of European sites located within or adjacent to Dublin Bay, or any of their Conservation Objectives regardless of said upgrade.

The EIAR report acknowledges that under the do-nothing scenario “the areas in the Tolka Estuary and North Bull Island channel will continue to be affected by the cumulative nutrient loads from the river Liffey and Tolka and the effluent from the Ringsend WwTP”, which could result in a decline in biodiversity and

⁵ Section 4.5.1 at page 32

⁶ Section 4.5.1 at page 33

⁷ Section 4.5.1 at page 34



the deterioration of the biological status of Dublin Bay (Irish Water, 2018a). Nevertheless, these negative impacts of nutrient over-enrichment are considered “unlikely”. This is because historical data suggests that pollution in Dublin Bay has had little or no effect on the composition and richness of the benthic macroinvertebrate fauna. The EIAR notes that “although a localised decline could occur, it is not envisaged to be to a scale that could pose a threat to the shellfish, fish, bird or marine mammal populations that occur in the area.” Furthermore, the EIAR notes that significant impacts on waterbird populations foraging on invertebrates in Dublin Bay due to nutrient over-enrichment are “unlikely” to occur. What is important to note is that the do-nothing scenario predicts that nutrient and suspended solid loads from the WwTP will “continue at the same levels and the impact of these loadings should maintain the same level of effects on marine biodiversity” and that “if the status quo is maintained there will be little or no change in the majority of the intertidal faunal assemblages found in Dublin Bay which would likely continue to be relatively diverse and rich across the bay.”

Therefore, it can be concluded that likely significant effects on marine biodiversity and the European sites within Dublin Bay from the current operation of Ringsend WwTP are unlikely. Importantly, this conclusion is not dependent upon any future works to be undertaken at Ringsend. Thus, in the absence of any upgrading works, significant in-combination effects to European sites in this regard are not deemed likely to arise, and therefore likely significant effects involving foul waters produced by the Proposed Development also do not have the potential to occur.

5.9. Residual Impacts

Residual impacts are defined as ‘*effects that are predicted to remain after all assessments and mitigation measures*’. They are the remaining ‘environmental costs’ of a project and are the final or intended effects of a development after mitigation measures have been applied to avoid or reduce adverse impacts. Potential residual impacts from the proposed development were considered as part of this environmental assessment. Table 5-22 below provides a summary of the impact assessment for the identified Key Ecological Resources (KERs) and details the nature of the impacts identified, mitigation proposed and the classification of any residual impacts.

All mitigation measures detailed in this Chapter will be implemented in full and will remain effective throughout the lifetime of the facility. Therefore, no significant negative residual impacts on the local ecology or on any designated nature conservation sites will result from the Proposed Development.



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Key Ecological Resource	Level of Significance	Potential Impact	Impact Without Mitigation				Proposed Mitigation/ Compensation/ Enhancement measures; Mitigating Factors	Residual Impact
			Quality	Magnitude / Extent	Duration	Significance		
Designated Sites								
Dodder Valley pNHA	National importance	Construction Phase: Potential for surface water run-off containing silt and/or pollutants from the site to negatively impact this pNHA.	Negative	Local	Short-term	Slight	Construction Phase: Mitigation 1: Site-specific Surface Water Mitigation Measures Operational Phase: No specific mitigation required. Embedded SUDS design.	Overall: Imperceptible
Habitats								
Scrub, Hedgerows, Treelines	Local importance (Higher value)	Construction Phase: Loss of some sections of this habitat as a result of the Proposed Works.	Negative	Local	Permanent	Slight	Construction Phase: Mitigation 2: Biosecurity Measures Mitigation 3: Tree Protection Measures Mitigation 5: Preparation of an Invasive Species Management Plan Operational Phase: No specific mitigation required. Increased habitat diversity provided via Landscape Plan Design. Enhancements: Enhancement 1: Landscape Management	Overall: Imperceptible.
		Construction Phase: Damage to retained habitats via physical damage and/or inadvertent introduction of invasive species.	Negative	Local	Long-term	Moderate		



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Key Ecological Resource	Level of Significance	Potential Impact	Impact Without Mitigation				Proposed Mitigation/ Compensation/ Enhancement measures; Mitigating Factors	Residual Impact
			Quality	Magnitude / Extent	Duration	Significance		
Linked Habitats – The Dodder River	County importance	Construction Phase: Potential for surface water run-off containing silt and/or pollutants from the site to negatively impact the Dodder River.	Negative	Local	Short-term	Slight	Construction Phase: Mitigation 1: Surface water protection Mitigation 5: Preparation of an Invasive Species Management Plan Operational Phase: SUDS measures as embedded in the design.	Overall: Imperceptible
Fauna								
Bat assemblage	Local importance (Higher value)	Construction Phase: Lighting could disturb bat foraging and commuting through Site.	Negative	Local	Short-term	Moderate	Construction Phase: Mitigation 4: Construction Phase Lighting Mitigation 6: Bat Precautions when Felling Trees Mitigation 7: Vegetation Clearance Operational Phase: None required; lighting design cognisant of bats. Enhancements: Enhancement 2: Bat boxes	Construction Phase: Imperceptible Operational Phase: Negative, Local, Permanent, Slight
		Construction Phase: Risk of injury/death from tree-felling if bats present.	Negative	Local	Short-term	Significant		
		Operational Phase: Disturbance from public lighting.	Negative	Local	Permanent	Slight		



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Key Ecological Resource	Level of Significance	Potential Impact	Impact Without Mitigation				Proposed Mitigation/ Compensation/ Enhancement measures; Mitigating Factors	Residual Impact
			Quality	Magnitude / Extent	Duration	Significance		
Breeding Bird Assemblage	Local importance (Higher value)	Construction Phase: Loss of nests during demolition/ clearance carried out during nesting season.	Negative	Local	Short-term	Significant	Construction Phase: Mitigation 7: Vegetation Clearance Noise management measures as identified in CEMP (Enviroguide 2024) Operational Phase: None required. Enhancements: Enhancement 3: Swift Bricks Enhancement 4: Bird Boxes	Construction Phase: Negative, Local, Short-term, Slight Operational Phase: Positive, Local, Long-term, Slight (after a period of establishment)
		Construction Phase: Noise Disturbance as a result of the works.	Negative	Local	Short-term	Slight		
		Operational Phase: Increased breeding habitat diversity across the Site.	Positive	Local	Long-term	Slight		
Badger	Local Importance (higher value)	Construction Phase: Potential disturbance if badger takes residence prior to commencement of works.	Negative	Local	Short-term	Significant	Construction Phase: Mitigation 7: Vegetation Clearance Operational Phase: No specific mitigation required. Road design incorporates mammal ledges on all culverts.	Construction Phase: Imperceptible Operational Phase: Negative, Local, Long-term, Slight
		Operational Phase: Potential risk of injury/death from vehicular collisions	Negative	Local	Long-term	Moderate		



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Key Ecological Resource	Level of Significance	Potential Impact	Impact Without Mitigation				Proposed Mitigation/ Compensation/ Enhancement measures; Mitigating Factors	Residual Impact
			Quality	Magnitude / Extent	Duration	Significance		
Small mammals (hedgehog, pygmy shrew, Irish stoat, pine marten)	Local Importance (higher value)	Construction Phase: Potential injury/death during vegetation clearance.	Negative	Local	Short-term	Significant	Construction Phase: Mitigation 7: Vegetation Clearance Mitigation 8: Construction Site Management for Fauna Operational Phase: No specific mitigation required. Road design incorporates mammal ledges on all culverts.	Construction Phase: Imperceptible Operational Phase: Negative, Local, Long-term, Slight
		Construction Phase: Potential injury/death from entrapment on Site during works.	Negative	Local	Short-term	Significant		
		Operational Phase: Potential risk of injury/death from vehicular collisions	Negative	Local	Long-term	Moderate		
Otter	Local importance (higher value)	Construction Phase: Pollution of the Dodder River could impact otter prey availability.	Negative	Local	Short-term	Slight	Construction Phase: Mitigation 1: Site-specific Surface Water Mitigation Measures Operational Phase: SUDS measures as embedded in the design.	Overall: Imperceptible
		Operational Phase: Potential increase in recreational pressures along River Dodder.	Neutral	Local	Long-term	Imperceptible		



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Key Ecological Resource	Level of Significance	Potential Impact	Impact Without Mitigation				Proposed Mitigation/ Compensation/ Enhancement measures; Mitigating Factors	Residual Impact
			Quality	Magnitude / Extent	Duration	Significance		
Amphibians	Local importance (higher value)	Construction Phase: Potential disturbance, injury or death from water quality impacts, construction traffic, and/or vegetation clearance.	Negative	Local	Short-term	Slight	Construction Phase: Mitigation 1: Site-specific Surface Water Mitigation Measures	Construction Phase: Imperceptible
		Operational Phase: Suitable habitat provided within wetland areas of main park	Positive	Local	Long-term	Significant	Operational Phase: SUDS measures as embedded in the design. Wetland areas included as part of Landscape Design.	Operational Phase: Positive, Local, Long-term, Significant
Common lizard	Local Importance (higher value)	Construction Phase: Potential disturbance, injury or death due to vegetation clearance and/or entrapment in construction wastes (e.g., plastic sheeting).	Negative	Local	Short-term	Slight	Construction Phase: Mitigation 8: Construction Site Management for Fauna Operational Phase: None required.	Overall: Imperceptible



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Key Ecological Resource	Level of Significance	Potential Impact	Impact Without Mitigation				Proposed Mitigation/ Compensation/ Enhancement measures; Mitigating Factors	Residual Impact
			Quality	Magnitude / Extent	Duration	Significance		
Dodder fish assemblage	Local Importance (higher value)	Construction Phase: Potential for surface water run-off containing silt and/or pollutants from the site to negatively impact the Dodder River.	Negative	Local	Short-term	Slight	Construction Phase: Mitigation 1: Site-specific Surface Water Mitigation Measures Operational Phase: SUDS measures as embedded in the design.	Overall: Imperceptible

Table 5-22. Summary of potential impacts on KER(s), mitigation measures/mitigating factors and residual impacts



5.10. Monitoring

5.10.1 Construction Phase Monitoring

5.10.1.1 Ecological Clerk of Works (ECoW)

A suitably qualified ECoW will be employed before commencement and for the duration of the Construction Phase; to provide ecological advice and input to the construction team. The ECoW will carry out the monitoring activities listed below for the duration of the Construction Phase of the Proposed Development.

NOTE: The ECoW will be employed several weeks before commencement of works on Site; to allow time for the scope of ECoW works to be reviewed by the ecologist and any necessary pre-construction surveys to be carried out.

- The ECoW will work with the Site manager and review the **surface water protection and tree protection measures** put in place to ensure their appropriateness and effectiveness. The Site Manager will be responsible for maintaining these measures throughout the Construction Phase, however the ECoW will review these during periodic visits to the Site.
- The ECoW will also prepare an **Invasive Species Management Plan** for the Site prior to commencement of works to remove and manage the existing Japanese knotweed and butterfly bush infestations at the Site.
- The ECoW will visit the Site and **assess the night-time lighting measures in place for the Construction Phase**; to ensure that they will not cause any impacts to local bats during the nighttime. The ECoW will consult this Biodiversity Chapter to understand the priority areas for bat commuting/foraging at the Site and make recommendations where required.
- The ECoW will be required to work closely with the Site Manager and Arborist; to arrange to carry out **pre-clearance surveys** of any vegetation present on Site, especially if clearance during the period March 1st – August 31st (i.e., the breeding bird nesting season) is required. It is noted that clearance will be avoided during this period wherever possible through good management of the construction timeline. **Pre-felling checks of trees for bats** will also be conducted by the ECoW. This will include a **pre-commencement badger survey** of the Site for evidence of badger usage to ensure no badgers are impacted by the construction works.
- As part of the mitigation recommended in relation to mammals and other small fauna e.g., hedgehogs and common lizard, the ECoW will liaise with the Site Manager to ensure that an adequate level of **site tidiness** is being maintained, i.e., that construction materials such as netting, plastic sheeting etc., are being stored securely and above ground.
- The ECoW will also liaise with the Site Manager to ensure that **mammal escape measures** are in place across the construction site in terms of excavations such as trenches, basements, foundations i.e., that planks or objects are being left in place at a suitable corner of any excavations each night.

5.10.1.2 Project Arborist

The project Arborist will be instructed **prior to commencement on Site**; to ensure that appropriate tree protection measures are in place. The hedgerows and treelines retained will be sufficiently protected for the duration of the Construction Phase to maximise their ecological value in the final landscape plan. The ECoW will report any issues relating to failure in the tree protection measures on Site to the project Arborist and the Site Manager throughout the Construction Phase to ensure these sections of habitat are protected for the duration of the works.



5.10.2 Operational Phase Monitoring

5.10.2.1 Ecologist

The ECoW will visit the Site post-construction to check the following are in place:

- **Swift and Bird Boxes** – A suitably qualified Ecologist/Ornithologist will liaise with the Site Manager to ensure that these measures are in place and appropriately installed.
- **Bat Boxes** – A suitably qualified Ecologist will liaise with the Site Manager to ensure that these measures are in place.

5.9.3 Summary of Mitigation and Monitoring

The following Table 5-23 summarises the mitigation and monitoring measures recommended for the Proposed Development.

Ecological Receptor	Relevant stage of the Proposed Development	Mitigation Measure	Monitoring Type	Details
Dodder Valley pNHA Linked Habitats – Dodder River Otter Dodder Fish Assemblage	Construction Phase	Mitigation 1: Surface Water Protection	ECoW Site Manager	The ECoW will be required to review and sign off on the surface water protection measures prior to commencement of works near any drainage ditches and watercourses. The surface water protection measures will remain in place and be maintained by the contractor for the duration of the Construction Phase .



Scrub, Hedgerows and Treelines	Construction Phase	<p>Mitigation 2: Biosecurity</p> <p>Mitigation 3: Tree Protection Measures</p>	ECoW Site Manager	<p>Biosecurity measures will be implemented at the Construction Site by the Contractor.</p> <p>The ECoW will prepare an Invasive Species Management Plan (ISMP) prior to commencement of works on Site. This will include an updated botanical survey during the botanical growing season to map the current extent of any invasive species on Site.</p> <p>The project Arborist will be instructed prior to commencement on Site; to ensure that appropriate tree protection measures are in place to protect the hedgerow and treeline habitat being retained on Site. These measures will entail robust fencing around the root protection zones of all trees and hedgerows being retained on Site. An adequate level of signage will also be provided to highlight 'no work zones' and ensure that Site creep and</p>
Ecological Receptor	Relevant stage of the Proposed Development	Mitigation Measure	Monitoring Type	Details
				<p>damage to retained habitats does not occur.</p> <p>The project Arborist, the project Ecologist and the Site Manager will work together to ensure these sections of hedgerow/treelines are protected for the duration of the works.</p>
Bats	Construction Phase	<p>Mitigation 4: Construction Phase Lighting</p> <p>Mitigation 5: Bat Precautions when Felling Trees.</p>	ECoW	<p>The ECoW will be required to check all trees to be felled for bats prior to felling. In the event that a roosting bat is found, no felling of the tree in question will take place and a derogation licence will be obtained from the NPWS to proceed. The Area around the tree will be protected with an appropriate buffer to prevent disturbance of the bat.</p> <p>The ECoW will assess the lighting measures in place for the Construction Phase; to ensure that they will not cause any impacts to local bats during the night time. The ECoW will consult this Biodiversity Chapter to understand the priority areas for bat commuting/foraging at the Site and make recommendations where required.</p>



Birds, mammals (excl. bats), common lizard	Construction Phase	Mitigation 6: Vegetation Clearance Mitigation 7: Construction Site Management for Fauna	ECoW	<p>Pre-clearance survey for badgers by a suitably qualified Ecologist.</p> <p>The ECoW will be required to work closely with the Site Manager; to arrange to carry out pre-clearance surveys of any vegetation present on Site, especially if clearance during the period March 1st – August 1st (i.e., the breeding bird nesting season) is required. It is noted that clearance <u>will be avoided</u> during this period wherever possible through good management of the construction timeline.</p> <p>The ECoW will also liaise with the Site Manager to ensure that mammal escape measures are in place across the construction site in terms of excavations such as trenches, basements, foundations i.e., that planks or objects are being left in place at a suitable corner of any excavations each night.</p>
Bats	Operational Phase	Enhancement 2: Bat Boxes	Ecologist	Bat Boxes – A suitably qualified Ecologist will oversee installation of bat boxes and liaise with the Site Manager to ensure that these enhancement measures are functional.
Swifts	Operational Phase	Enhancement 3: Swift Bricks	Ecologist	Swift-Bricks – A suitably qualified Ecologist will oversee installation of swift calling system and liaise with the Site Manager to ensure that swift box enhancement measures are functional.
Breeding Bird Assemblage	Operational Phase	Enhancement 4: Bird Boxes	Ecologist	Bird Boxes – A suitably qualified Ecologist will oversee installation of the bird boxes and liaise with the Site Manager to ensure that these measures are functional.
Pollinators	Operational Phase	Enhancement 5: Ground nesting pollinator habitat	Ecologist	Bare Earth Banks – A suitably qualified Ecologist will review the locations of the bare earth banks and their management to ensure they are effective and functional.

Table 5-23. Summary of Construction and Operational Phase Mitigation and Monitoring

5.11. “Worst Case” Scenario

With regard to the ‘worst-case’ scenario, it is considered relevant only to potential for hydrological or water quality impacts such as nutrient release, siltation and/or contaminated run-off from the development works footprint. Potential hydrological or water quality impacts apply to the Dodder River. In the unlikely event that the proposed mitigation measures in relation to water management markedly fail then it is possible that there could be impacts to water quality in the Dodder River, and subsequently the species that reside



within these waterbodies. However, even in this scenario, irreversible significant impacts are not deemed likely to occur.

5.12. Difficulties Encountered

No difficulties were encountered while preparing this Chapter.

5.13. Conclusions

It is considered that, provided the mitigation measures proposed within this Chapter together with all best practice development standards as outlined in the CEMP are carried out in full, there will be no significant negative impact to any KER habitat, species group or biodiversity as a result of the Proposed Development.

The targeted ecological surveys allowed for the identification of the relevant KERs at the Site, and through careful evaluation of the potential impacts it is considered that a proportionate and effective solution to mitigate the negative impacts for each has been achieved.

Additionally, the landscaping plan for the Proposed Development will inherently offset any loss of the existing habitats that will result from the Proposed Development, and will provide a net increase in biodiversity value at the Site; through the provision of an increased variety of native and non-native vegetation planting at the Site, along with specific enhancement measures such as the Swift bricks included along the elevations of some of the blocks.

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Appendix 5.1 – Legislation and Policy

International Legislation

EU Birds Directive

The Birds Directive constitutes a level of general protection for all wild birds throughout the European Union. Annex I of the Birds Directive includes a total of 194 bird species that are considered rare, vulnerable to habitat changes or in danger of extinction within the European Union. Article 4 establishes that there should be a sustainable management of hunting of listed species, and that any large scale non-selective killing of birds must be outlawed. The Directive requires the designation of Special Protection Areas (SPAs) for: listed and rare species, regularly occurring migratory species and for wetlands which attract large numbers of birds. There are 25 Annex I species that regularly occur in Ireland.

EU Habitats Directive

The Habitats Directive aims to protect some 220 habitats and approx. 1000 species through-out Europe. The habitats and species are listed in the Directives annexes where Annex I covers habitats and Annex II, IV and V cover species. There are 59 Annex I habitats in Ireland and 33 Annex IV species which require strict protection wherever they occur. The Directive requires the designation of Special Areas of Conservation (SACs) for areas of habitat deemed to be of European interest. The SACs together with the SPAs from the Birds Directive form a network of protected sites called Natura 2000.

Bern and Bonn Convention

The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982) was enacted to conserve all species and their habitats. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) was introduced in order to give protection to migratory species across borders in Europe.

Ramsar Convention

The Ramsar Convention on Wetlands is an intergovernmental treaty signed in Ramsar, Iran, in 1971. The treaty is a commitment for national action and international cooperation for the conservation of wetlands and their resources. In Ireland there are currently 45 Ramsar sites which cover a total area of 66,994ha.

Water Framework Directive

The EU Water Framework Directive (WFD) 2000/60/EC is an important piece of environmental legislation which aims to protect and improve water quality. It applies to rivers, lakes, groundwater, estuaries, and coastal waters. The Water Framework Directive was agreed by all individual EU member states in 2000, and its first cycle ran from 2009 – 2015. The Directive runs in 6-year cycles; the second cycle ran from 2016 – 2021, and the current (third) cycle runs from 2022-2027. The aim of the WFD is to prevent any deterioration in the existing status of water quality, including the protection of good and high-water quality status where it exists. The WFD requires member states to manage their water resources on an integrated basis to achieve at least 'good' ecological status, through River Basin Management Plans (RBMP), by 2027.

National Legislation

Wildlife Act 1976 and amendments

The Wildlife Act 1976 was enacted to provide protection to birds, animals, and plants in Ireland and to control activities which may have an adverse impact on the conservation of wildlife. With regard to the listed species, it is an offence to disturb, injure or damage their breeding or resting place wherever these occur



without an appropriate licence from the National Parks and Wildlife Service (NPWS). This list includes all wild birds along with their nests and eggs. Intentional destruction of an active nest from the building stage up until the chicks have fledged is an offence. This includes the cutting of hedgerows from the 1st of March to the 31st of August. The act also provides a mechanism to give statutory protection to Natural Heritage Areas (NHAs). The Wildlife Amendment Act 2000 widened the scope of the Act to include most species, including the majority of fish and aquatic invertebrate species which were excluded from the 1976 Act.

The current list of plant species protected by Section 21 of the Wildlife Act, 1976 (and amendments) is set out in the Flora (Protection) Order, 2015 (S.I. No. 356/2015). The Flora (Protection) Order affords protection to several species of plant in Ireland, including 68 vascular plants, 40 mosses, 25 liverworts, 1 stonewort and 1 lichen. This Act makes it illegal for anyone to uproot, cut or damage any of the listed plant species and it also forbids anyone from altering, interfering, or damaging their habitats. This protection is not confined to within designated conservation sites and applies wherever the plants are found.

EU Habitats Directive 1992 and EC (Birds and Natural Habitats) Regulations 2011

The EU Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive 1992) provides protection to particular species and habitats throughout Europe. The Habitats Directive has been transposed into Irish law through the EC (Birds and Natural Habitats) Regulations 2011.

Annex IV of the EU Habitats Directive provides protection to a number of listed species, wherever they occur. Under Regulation 23 of the Habitats Directive, any person who, in regard to the listed species, “Deliberately captures or kills any specimen of these species in the wild, deliberately disturbs these species particularly during the period of breeding, rearing, hibernation and migration, deliberately takes or destroys eggs from the wild or damages or destroys a breeding site or resting place of such an animal shall be guilty of an offence.”

Invasive Species Legislation

Certain plant species and their hybrids are listed as Invasive Alien Plant Species in Part 1 of the Third Schedule of the *European Communities (Birds and Natural Habitats) Regulations 2011* (SI 477 of 2011, as amended). In addition, soils and other material containing such invasive plant material, are classified in Part 3 of the Third Schedule as vector materials and are subject to the same strict legal controls.

Failure to comply with the legal requirements set down in this legislation can result in either civil or criminal prosecution, or both, with very severe penalties accruing. Convicted parties under the Act can be fined up to €500,000.00, jailed for up to 3 years, or both.

Extracts from the relevant sections of the regulations are reproduced below.

“49(2) Save in accordance with a licence granted [by the Department of Arts, Heritage and the Gaeltacht], any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow in anyplace [a restricted non-native plant], shall be guilty of an offence.

49(3) ... it shall be a defence to a charge of committing an offence under paragraph (1) or (2) to prove that the accused took all reasonable steps and exercised all due diligence to avoid committing the offence.

50(1) Save in accordance with a licence, a person shall be guilty of an offence if he or she [...] offers or exposes for sale, transportation, distribution, introduction, or release—

(a) an animal or plant listed in Part 1 or Part 2 of the Third Schedule,

(b) anything from which an animal or plant referred to in subparagraph (a) can be reproduced or propagated, or

(c) a vector material listed in the Third Schedule, in any place in the State specified in the third column of the Third Schedule in relation to such an animal, plant or vector material.”

National Biodiversity Action Plan 2023-2030

The National Biodiversity Plan (NBAP) 2023-2030, the fourth such plan for Ireland, captures the objectives,

targets and actions for biodiversity that will be undertaken by a wide range of government, civil society and private sectors. Actions required to achieve the strategic objectives as well as the lead and key partners responsible for their implementation are set out for each of the objectives and their outcomes (Table A1).

Objective	Outcome
1: Adopt a Whole-of-Government, Whole-of-Society Approach to Biodiversity	1A: Governance structures and reporting outputs have improved.
	1B: Organisational capacity and resources for biodiversity have increased at all levels of Government.
	1C: Responsibility for biodiversity is shared across the whole of government.
	1D: Biodiversity initiatives are supported across the whole of society.
	1E: The legislative framework for biodiversity conservation is robust, clear and enforceable.
2: Meet Urgent Conservation and Restoration Needs	2A: The protection of existing designated areas and protected species is strengthened and conservation and restoration within the existing protected area network are enhanced.
	2B: Biodiversity and ecosystem services in the wider countryside are conserved and restored – agriculture & forestry.
	2C: Biodiversity and ecosystem services in the wider countryside are conserved and restored – peatlands & climate action.
	2D: Biodiversity and ecosystem services in the marine and freshwater environment are conserved and restored.
	2E: Genetic diversity of wild and domesticated species is safeguarded.
	2F: A National Restoration Plan is in place to contribute to the ambition of the EU Biodiversity Strategy 2030 and global restoration targets.
	2H: Invasive alien species (IAS) are controlled and managed on an all-island basis to reduce the harmful impact they have on biodiversity and measures are undertaken to tackle the introduction and spread of new IAS to the environment.
3: Secure Nature's Contribution to People	3A: Ireland's natural heritage and biocultural diversity is recognised, valued, enhanced and promoted in policy and practice.
	3B: The role of biodiversity in supporting wellbeing, livelihoods, enterprise and employment is recognised and enhanced.
	3C: Planning and development will facilitate and secure biodiversity's contributions to people.
4: Enhance the Evidence Base for Action on Biodiversity	4A: Research funding bodies will have an improved understanding of the research and skills required to address biodiversity research gaps.
	4B: Data relevant to biodiversity and ecosystems, including conservation needs, is widely accessible and standardised.
	4C: Long-term monitoring programmes are in place to guide conservation and restoration goals.
	4D: Ireland has prepared national assessments of ecosystem services.
5: Strengthen Ireland's Contribution to International Biodiversity Initiatives	5A: Science, policy and action on biodiversity conservation and restoration is effectively coordinated in an all-island approach.
	5B: Ireland takes action internationally to cooperate with other countries, sectors, disciplines and communities to address the biodiversity crisis.
	5C: Ireland enhances its contributions to the international biodiversity data drive.

TABLE A1: OBJECTIVES AND OUTCOMES OF THE NATIONAL BIODIVERSITY ACTION PLAN 2023-2030.



South Dublin County Development Plan (2022-2028)

Chapter 3 of the South Dublin County Development Plan 2022 – 2028 (SDCDP) 2022-2028 outlines the policies and objectives for Natural, Cultural and Built Heritage, including a number of policies addressing the importance of protecting biodiversity and ecological corridors within Dublin City. The policies relevant to this Chapter are outlined below:

Policy NCBH2: “Protect, conserve, and enhance the County’s biodiversity and ecological connectivity having regard to national and EU legislation and Strategies.”

NCBH2 Objective 1: “To support the implementation of the National Biodiversity Action Plan (2017- 2021) and the All-Ireland Pollinator Plan (2021-2025) and to support the adoption and implementation of the South Dublin County Biodiversity Action Plan (2020-2026) and Pollinator Action Plan (2021- 2025) and any superseding plans.”

NCBH2 Objective 2: “To ensure the protection of designated sites in compliance with relevant EU Directives and applicable national legislation.”

NCBH2 Objective 3: “To protect and conserve the natural heritage of the County, and to conserve and manage EU and nationally designated sites and non-designated locally important areas which act as ‘stepping stones’ for the purposes of green infrastructure and Article 10 of the Habitats Directive.”

NCBH2 Objective 4: “To protect our rivers and in particular to avoid overdevelopment which could have an adverse effect on the biodiversity and ecosystems of the river.”

Policy NCBH4: Proposed Natural Heritage Areas: “Protect the ecological, visual, recreational, environmental and amenity value of the County’s proposed Natural Heritage Areas and associated habitats and species.”

NCBH4 Objective 1: “To ensure that any proposal for development within or adjacent to a proposed Natural Heritage Area (pNHA) is designed and sited to minimise its impact on the biodiversity, ecological, geological and landscape value of the pNHA particularly plant and animal species listed under the Wildlife Acts and the Habitats and Birds Directive including their habitats.”

NCBH4 Objective 2: “To restrict development within or adjacent to a proposed Natural Heritage Area to development that is directly related to the area’s amenity potential subject to the protection and enhancement of natural heritage and visual amenities including biodiversity and landscapes. Such developments will be required to submit an Ecological Impact Assessment prepared by a suitably qualified professional.”

NCBH4 SLO1: “To promote opportunities to improve the habitat relating to the Lugmore Glen pNHA and to ensure that any proposals for development have full regard to the sensitivities of the area within the pNHA and along the Tallaght Stream.”

Policy NCBH5: Protection of Habitats and Species Outside of Designated Areas: “Protect and promote the conservation of biodiversity outside of designated areas and ensure that species and habitats that are protected under the Wildlife Acts 1976 to 2018, the Birds Directive 1979 and the Habitats Directive 1992, the Flora (Protection) Order 2015, and wildlife corridors are adequately protected.”

NCBH5 Objective 1: “To ensure that development does not have a significant adverse impact on



biodiversity, including known rare and threatened species, and that biodiversity enhancement measures are included in all development proposals.”

NCBH5 Objective 2: “To ensure that an Ecological Impact Assessment is undertaken for developments proposed in areas that support, or have the potential to support, protected species or features of biodiversity importance, and that appropriate avoidance and mitigation measures are incorporated into all development proposals.”

South Dublin County Biodiversity Action Plan 2020 – 2026

South Dublin County Biodiversity Action Plan 2020 – 2026 is set out to protect and improve biodiversity through specific actions:

- Collate ecological data and survey and map the County, to provide an evidence base for informed biodiversity decision-making and to form the basis for a Green Infrastructure network, key projects to include:
 - i. Map the distribution of the habitats and species in the County.
 - ii. Map and manage the spread of non-native invasive species.
 - iii. Survey and monitor biodiversity at identified pollinator sites.
 - iv. Survey and map wetlands in the County.
 - v. Map the tree canopy cover in the County and quantify its carbon capture.
 - vi. Map the County’s hedgerow network and identify key Green Infrastructure links.
- Develop a Biodiversity Communications Strategy, to celebrate and promote the enjoyment and protection of nature in South Dublin County, promoting engagement with national initiatives and events such as Biodiversity Week, Tree Week, Heritage Week, Pure Mile etc.,.
- Support rural and urban communities to undertake local biodiversity projects, training, and citizen science, encouraging appropriate initiatives that protect biodiversity while benefiting local economies.
- Quantify and promote the economic benefits (the natural capital) provided by the County’s ecological landscapes (ecosystem services).
- Devise and implement good governance strategies to ensure the smooth integration of national and EU biodiversity legislation and policy requirements into all Council plans, projects, and services.
- Develop and implement best practice biodiversity protection guidelines and maintenance plans for the County’s habitats and species, for use on Council lands and as guidance to assist local communities, developers, businesses, farming community, schools, etc.
- In the preparation process for the SDCC Development Plan, innovative approaches to promote strategic biodiversity policies and objectives will be developed.
- Coordinate with the Council’s Climate Change Action Plan 2019-2024 to identify impacts on biodiversity arising from climate change, targeting and implementing necessary measures to assist biodiversity adapt to changing conditions.

Ballycullen – Oldcourt Local Area Plan (LAP) 2014

The overall objective of the LAP is to provide a development framework with residential densities appropriate to the unique location of the lands on the suburban edge of the Dublin Mountain foothills (Figure 0-1). The Plan provides for the construction of approximately 1,600 additional dwellings (about 4,600

persons) at a range of densities appropriate to the area. The strategy complies with the requirements of the Core Strategy of the County Development Plan 2010 – 2016 and that of the Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas (2009).

The LAP lands include areas that are potentially sensitive in terms of biodiversity and conservation. The Planning Authority is of the opinion that this LAP would be likely to have significant effects on the environment. An Environmental Report and AA Screening have therefore been undertaken as part of the production of the LAP and the assessment and mitigation measures have been assimilated.

The LAP was subject to a Strategic Environmental Assessment (SEA) and an AA and includes lands on which the current Proposed Development is located.



Figure 1. Extent of LAP lands (Source Ballycullen-Oldcourt LAP 2009).

The LAP identifies a number of objective themes for the protection of biodiversity under the Green Infrastructure Strategy, including:

- SUDS measures and efficient use of surface water (e.g., collection and reuse of grey water)
- Flood Risk Management
- Groundwater Vulnerability and Protection
- Protection and Incorporation of Natural Heritage
- Biodiversity Networks – Hedgerows and Streams
- Topography and Contours
- Protected Species
- Tracks and Trails

The above themes provide for a comprehensive approach to the protection and enhancement of local biodiversity and sensitive ecological features via the implementation of the LAP.



Appendix 5.2 – National Biodiversity Data Centre records of rare, invasive and protected species.

Species Group	Name	Grid square	Date of last record	Database	Legal Status	Conservation status ⁵
Invasive Flora	American Skunk-cabbage <i>Lysichiton americanus</i>	O02 O12	06/04/2021 23/04/2021	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Medium Impact Invasive Species EU Regulation No 1143/2014 Regulation S.I. 477 (Ireland)	-
	Black Currant <i>Ribes nigrum</i>	O02 O12	19/04/2005 24/05/2015	Species Data from the National Vegetation Database	Medium Impact Invasive Species	-
	Butterfly-bush <i>Buddleja davidii</i>	O02 O12 O02X	29/07/2019 25/03/2023 24/03/2019	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Medium Impact Invasive Species	-
	Cherry Laurel <i>Prunus laurocerasus</i>	O02 O12	30/03/2024 01/06/2023	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	High Impact Invasive Species	-
	Curly Waterweed <i>Lagarosiphon major</i>	O02	31/12/2001	National Invasive Species Database	High Impact Invasive Species EU Regulation No 1143/2014 Regulation S.I. 477 (Ireland)	-
	<i>Fallopia japonica</i> x <i>sachalinensis</i> = <i>F. x bohemica</i>	O12	23/06/2012	National Invasive Species Database	High Impact Invasive Species Regulation S.I. 477 (Ireland)	-
	Fringed Water-lily <i>Nymphoides peltate</i>	O02	15/06/2016	National Invasive Species Database	High Impact Invasive Species	-

⁵ IUCN status of native species or status of bird species in the Birds of Conservation Concern Ireland 4 (Gilbert et al. 2021)



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Species Group	Name	Grid square	Date of last record	Database	Legal Status	Conservation status ⁵
	Giant Hogweed <i>Heracleum mantegazzianum</i>	O02 O12	22/06/2021 04/06/2020	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	High Impact Invasive Species Regulation S.I. 477 (Ireland)	-
	Giant Knotweed <i>Fallopia sachalinensis</i>	O02	06/06/2021	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	High Impact Invasive Species Regulation S.I. 477 (Ireland)	-
	Giant-rhubarb <i>Gunnera tinctoria</i>	O12	30/05/2020	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	High Impact Invasive Species Regulation S.I. 477 (Ireland)	-
	Himalayan Honeysuckle <i>Leycesteria Formosa</i>	O12 O12C	15/12/2023 28/08/2021	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Medium Impact Invasive Species	-
	Himalayan Knotweed <i>Persicaria wallichii</i>	O12	23/06/2012	National Invasive Species Database	Medium Impact Invasive Species Regulation S.I. 477 (Ireland)	-
	Indian Balsam <i>Impatiens glandulifera</i>	O02 O12 O02X	31/12/2017 20/04/2023 31/12/2017	National Invasive Species Database	High Impact Invasive Species Regulation S.I. 477 (Ireland)	-
	Japanese Knotweed <i>Fallopia japonica</i>	O02 O12	01/05/2023 29/08/2023	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	High Impact Invasive Species Regulation S.I. 477 (Ireland)	-
	Japanese Rose <i>Rosa rugosa</i>	O12	27/04/2022	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Medium Impact Invasive Species	-
	New Zealand Pigmyweed <i>Crassula helmsii</i>	O02	31/12/2001	National Invasive Species Database	High Impact Invasive Regulation S.I. 477 (Ireland)	-
	Nuttall's Waterweed <i>Elodea nuttallii</i>	O12	31/12/1994	National Invasive Species Database	High Impact Invasive Regulation S.I. 477 (Ireland)	-
	Parrot's-feather <i>Myriophyllum aquaticum</i>	O12	26/06/2008	National Invasive Species Database	High Impact Invasive Species EU Regulation No 1143/2014 Regulation S.I. 477 (Ireland)	-



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Species Group	Name	Grid square	Date of last record	Database	Legal Status	Conservation status ⁵
	Rhododendron ponticum	O02 O12	17/04/2022 28/05/2023	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	High Impact Invasive Regulation S.I. 477 (Ireland)	-
	Spanish Bluebell Hyacinthoides hispanica	O12	16/04/2022	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Regulation S.I. 477 (Ireland)	-
	Sycamore Acer pseudoplatanus	O02 O12 O02X	23/04/2023 24/04/2023 15/05/2020	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Medium Impact Invasive Species	-
	Three-cornered Garlic <i>Allium triquetrum</i>	O02 O12	19/05/2023 05/01/2024	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Medium Impact Invasive Species Regulation S.I. 477 (Ireland)	-
	Traveller's-joy <i>Clematis vitalba</i>	O12	28/04/2023	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Medium Impact Invasive Species	-
	Turkey Oak Quercus cerris	O02	11/04/2005	Species Data from the National Vegetation Database	High Impact Invasive Species Regulation S.I. 477 (Ireland)	-
	Wall Cotoneaster Cotoneaster horizontalis	O12	31/03/2014	Discrete vascular plant surveys	Medium Impact Invasive Species	-
	Wild Parsnip Pastinaca sativa	O02	11/07/2015	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Medium Impact Invasive Species	-
Terrestrial Mammals (Native)	Eurasian Badger <i>Meles meles</i>	O02 O12 O02X	14/05/2018 06/03/2023 12/11/2015	Mammals of Ireland 2016- 2025 Atlas of Mammals in Ireland 2010-2015	Wildlife (Amendment) Act 2000	Least Concern
	Eurasian Pygmy Shrew <i>Sorex minutus</i>	O02 O12	25/04/2010 12/07/2018	Atlas of Mammals in Ireland 2010-2015 Mammals of Ireland 2016- 2025	Wildlife (Amendment) Act 2000	Least Concern
	Eurasian Red Squirrel <i>Sciurus vulgaris</i>	O02 O12 O02X O12C	19/02/2023 16/02/2023 14/10/2017 28/09/2017	Mammals of Ireland 2016- 2025	Wildlife (Amendment) Act, 2000	Least Concern



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Species Group	Name	Grid square	Date of last record	Database	Legal Status	Conservation status ⁵
	European Otter <i>Lutra lutra</i>	O02 O12 O02X	24/08/2014 05/12/2022 05/05/1980	Atlas of Mammals in Ireland 2010-2015 Mammals of Ireland 2016-2025 Otter Survey of Ireland 1982	EU Habitats Directive – Annex II & IV Wildlife (Amendment) Act 2000	Least Concern
	Irish Hare <i>Lepus timidus</i> subsp. <i>hibernicus</i>	O02 O12 O12C	22/01/2023 02/06/2021 17/03/2017	Mammals of Ireland 2016-2025	Wildlife (Amendment) Act 2000	Least Concern
	Irish Stoat <i>Mustela erminea</i> subsp. <i>hibernica</i>	O02 O12 O02X	09/09/2018 31/05/2018 09/09/2018	Mammals of Ireland 2016-2025	Wildlife (Amendment) Act, 2000	Least Concern
	Pine Marten <i>Martes martes</i>	O02 O12	07/03/2023 17/08/2021	Mammals of Ireland 2016-2025	EU Habitats Directive – Annex V Wildlife (Amendment) Act 2000	Least Concern
	Red Deer <i>Cervus elaphus</i>	O02 O12	09/11/2015 15/11/2016	Atlas of Mammals in Ireland 2010-2015 Mammals of Ireland 2016-2025	Wildlife (Amendment) Act, 2000	Least Concern
	Red Fox <i>Vulpes vulpes</i>	O02 O12 O12C	19/10/2018 28/04/2023 16/05/2017	Mammals of Ireland 2016-2025		Least Concern
	West European Hedgehog <i>Erinaceus europaeus</i>	O02 O12 O02X O12C	03/12/2022 13/10/2022 08/11/2021 24/03/2021	Hedgehogs of Ireland	Wildlife (Amendment) Act 2000	Least Concern
	Wood Mouse <i>Apodemus sylvaticus</i>	O02 O12	05/03/2023 05/03/2023	Mammals of Ireland 2016-2025		Least Concern
Terrestrial Mammals (non-native)	American Mink <i>Mustela vison</i>	O02 O12	06/05/1980 23/03/2014	Otter Survey of Ireland 1982 Atlas of Mammals in Ireland 2010-2015	High Impact Invasive Species Regulation S.I. 477 (Ireland)	-
	Brown Rat <i>Rattus norvegicus</i>	O02 O12 O12C	09/10/2015 24/08/2018 21/02/2015	Atlas of Mammals in Ireland 2010-2015 Mammals of Ireland 2016-2025	High Impact Invasive Species Regulation S.I. 477 (Ireland)	-



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Species Group	Name	Grid square	Date of last record	Database	Legal Status	Conservation status ⁵
	Eastern Grey Squirrel <i>Sciurus carolinensis</i>	O02 O12 O02X	07/09/2022 05/02/2023 31/12/2017	Mammals of Ireland 2016-2025 National Invasive Species Database	High Impact Invasive Species EU Regulation No. 1143/2014 & Regulation S.I. 477 (Ireland)	-
	European Rabbit <i>Oryctolagus cuniculus</i>	O02 O12 O02X	28/02/2023 26/04/2023 23/03/2016	Mammals of Ireland 2016-2025	Medium Impact Invasive Species	-
	Fallow Deer <i>Dama dama</i>	O02 O12	20/12/2016 26/06/2018	Mammals of Ireland 2016-2025	High Impact Invasive Species Regulation S.I. 477 (Ireland)	-
	Greater White-tooth Shrew <i>Crocidura russula</i>	O02	26/03/2020	Mammals of Ireland 2016- 2025	Medium Impact Invasive Species	-
	House Mouse <i>Mus musculus</i>	O02 O12	21/01/1969 01/12/2014	Northern Ireland Mammal Database Atlas of Mammals in Ireland 2010-2015	High Impact Invasive Species	-
	Sika Deer <i>Cervus nippon</i>	O02 O12	02/11/2016 13/10/2018	Mammals of Ireland 2016- 2025	High Impact Invasive Species Regulation S.I. 477 (Ireland)	-
Bats	Brown Long-eared Bat <i>Plecotus auritus</i>	O02 O12	05/07/2012 09/08/2021	National Bat Database of Ireland	EU Habitats Directive Annex IV Wildlife (Amendment) Acts 2000	Least Concern
	Common Pipistrelle <i>Pipistrellus pipistrellus sensu stricto</i>	O02 O12 O02X O12C	14/05/2018 11/05/2022 07/07/2017 23/05/2017	National Bat Database of Ireland	EU Habitats Directive Annex IV Wildlife (Amendment) Acts 2000	Least Concern
	Daubenton's Bat <i>Myotis daubentonii</i>	O02 O12 O02X	27/08/2021 20/08/2021 07/07/2017	National Bat Database of Ireland	EU Habitats Directive Annex IV Wildlife (Amendment) Acts 2000	Least Concern
	Leisler's bat <i>Nyctalus leisleri</i>	O02 O12 O02X O12C	14/05/2018 11/05/2022 23/05/2017 23/05/2017	National Bat Database of Ireland	EU Habitats Directive Annex IV Wildlife (Amendment) Acts 2000	Least Concern
	Nathusius's Pipistrelle <i>Pipistrellus nathusii</i>	O12	06/08/2021	National Bat Database of Ireland	EU Habitats Directive Annex IV Wildlife (Amendment) Acts 2000	Least Concern



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	Natterer's Bat <i>Myotis nattereri</i>	O02 O12	14/05/2018 28/07/2016	National Bat Database of Ireland	EU Habitats Directive Annex IV Wildlife (Amendment) Acts 2000	Least Concern
	Pipistrelle <i>Pipistrellus pipistrellus sensu lato</i>	O02 O12 O12C	18/09/2012 21/08/2021 23/07/2021	National Bat Database of Ireland	EU Habitats Directive Annex IV Wildlife (Amendment) Acts 2000	Least Concern
	Soprano Pipistrelle <i>Pipistrellus pygmaeus</i>	O02 O12 O02X O12C	14/05/2018 11/05/2022 07/07/2017 23/05/2017	National Bat Database of Ireland	EU Habitats Directive Annex IV Wildlife (Amendment) Acts 2000	Least Concern
	Whiskered Bat <i>Myotis mystacinus</i>	O12	01/09/2016	National Bat Database of Ireland	EU Habitats Directive Annex IV Wildlife (Amendment) Acts 2000	Least Concern
Birds						
	Barn Owl <i>Tyto alba</i>	O02 O12 O12C	19/04/2023 21/07/2021 20/07/2021	Birds of Ireland	Wildlife (Amendment) Acts 2000	Red
	Barn Swallow <i>Hirundo rustica</i>	O02 O12 O02X O12C	20/04/2023 24/04/2023 07/05/2020 31/12/2011	Birds of Ireland Bird Atlas 2007 - 2011	Wildlife (Amendment) Acts 2000	Amber
	Black Redstart <i>Phoenicurus ochruros</i>	O12	08/04/2023	Birds of Ireland		Green
	Black-billed Magpie <i>Pica pica</i>	O02 O12 O02X O12C	12/01/2019 31/05/2023 31/12/2011 31/12/2011	Birds of Ireland Bird Atlas 2007 - 2011		Green
	Blackcap <i>Sylvia atricapilla</i>	O02 O12 O02X O12C	09/01/2023 31/05/2023 15/05/2020 31/12/2011	Birds of Ireland Bird Atlas 2007 - 2011		Green
	Black-headed Gull <i>Larus ridibundus</i>	O02 O12	06/11/2022 07/03/2023	Birds of Ireland	Wildlife (Amendment) Acts 2000	Amber
	Blue Tit <i>Cyanistes caeruleus</i>	O02 O12 O02X	01/04/2023 26/05/2023 31/12/2011	Birds of Ireland Bird Atlas 2007 - 2011		Green



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		O12C	31/12/2011			
	Bohemian Waxwing <i>Bombycilla garrulus</i>	O02 O12 O12C	31/12/2011 31/12/2011 31/12/2011	Bird Atlas 2007 - 2011		Green
	Brambling <i>Fringilla montifringilla</i>	O02 O12	23/11/2020 31/12/2011	Birds of Ireland Bird Atlas 2007 - 2011		Amber
	<i>Branta bernicla</i> subsp. <i>hrota</i>	O12	31/12/2011	Bird Atlas 2007 - 2011		Amber
	Carrion Crow <i>Corvus corone</i>	O12	20/11/2022	Birds of Ireland		N/A
	Chaffinch <i>Fringilla coelebs</i>	O02 O12 O02X O12C	24/05/2023 06/05/2023 09/04/2023 31/12/2011	Birds of Ireland Bird Atlas 2007 - 2011		Green
	Coal Tit <i>Parus ater</i>	O02 O12 O02X O12C	05/03/2023 23/02/2023 31/12/2011 31/12/2011	Birds of Ireland Bird Atlas 2007 - 2011		Green
	Common Blackbird <i>Turdus merula</i>	O02 O12 O02X O12C	18/04/2023 31/05/2023 15/05/2020 31/12/2011	Birds of Ireland Bird Atlas 2007 - 2011		Green
	Common Bullfinch <i>Pyrrhula pyrrhula</i>	O02 O12 O02X O12C	27/04/2023 25/04/2023 19/02/2023 31/12/2011	Birds of Ireland Bird Atlas 2007 - 2011		Green
	Common Buzzard <i>Buteo buteo</i>	O02 O12 O02X O12C	23/04/2023 24/04/2023 16/01/2021 21/03/2021	Birds of Ireland		Green
	Common Chiffchaff <i>Phylloscopus collybita</i>	O02 O12 O02X	02/05/2023 16/04/2023 09/04/2023	Birds of Ireland		Green



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Species Group	Name	Grid square	Date of last record	Database	Legal Status	Conservation status ⁵
	Common Coot <i>Fulica atra</i>	O02 O12	17/04/2023 08/04/2023	Birds of Ireland	Wildlife (Amendment) Acts 2000 EU Birds Directive Annex II	Amber
	Common Crane <i>Grus grus</i>	O02	20/12/2014	Rare birds of Ireland		N/A
	Common Crossbill <i>Loxia curvirostra</i>	O02 O12	23/04/2023 05/03/2023	Birds of Ireland		Green
	Common Cuckoo <i>Cuculus canorus</i>	O02 O12	26/05/2020 06/05/2023	Birds of Ireland		Green
	Common Eider <i>Somateria mollissima</i>	O12	18/05/2015	Birds of Ireland	Wildlife (Amendment) Acts 2000 EU Birds Directive Annex II, Annex III	Red
	Common Goldeneye <i>Bucephala clangula</i>	O02 O12	31/12/2011 18/05/2015	Bird Atlas 2007 – 2011 Birds of Ireland	Wildlife (Amendment) Acts 2000 EU Birds Directive Annex II	Red
	Common Grasshopper Warbler <i>Locustella naevia</i>	O02 O12	24/04/2019 20/08/2012	Birds of Ireland	Wildlife (Amendment) Acts 2000	Green
	Common Greenshank <i>Tringa nebularia</i>	O12	31/12/2011	Bird Atlas 2007 - 2011	Wildlife (Amendment) Acts 2000	Green
	Common Kestrel <i>Falco tinnunculus</i>	O02 O12	11/12/2020 09/08/2021	Birds of Ireland	Wildlife (Amendment) Acts 2000	Red
	Common Kingfisher <i>Alcedo atthis</i>	O02 O12	10/02/2023 12/04/2023	Birds of Ireland	Wildlife (Amendment) Acts 2000 EU Birds Directive Annex I	Amber
	Common Linnet <i>Carduelis cannabina</i>	O02 O12 O02X	16/01/2021 10/03/2023 16/01/2021	Birds of Ireland	Wildlife (Amendment) Acts 2000	Amber
	Common Moorhen <i>Gallinula chloropus</i>	O02 O12	03/02/2023 25/04/2023	Birds of Ireland		Green
	Common Pheasant <i>Phasianus colchicus</i>	O02 O12 O02X O12C	09/05/2020 09/01/2021 31/12/2011 31/12/2011	Birds of Ireland Bird Atlas 2007 - 2011	Wildlife (Amendment) Acts 2000 EU Birds Directive Annex II, Annex III	N/A
	Common Pochard <i>Aythya ferina</i>	O12	22/12/2018	Birds of Ireland	Wildlife (Amendment) Acts 2000 EU Birds Directive Annex II	Red



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Species Group	Name	Grid square	Date of last record	Database	Legal Status	Conservation status ⁵
	Common Raven <i>Corvus corax</i>	O02 O12	05/03/2023 06/05/2023	Birds of Ireland		Green
	Common Redshank <i>Tringa totanus</i>	O12	29/12/2022		Wildlife (Amendment) Acts 2000	Red
	Common Sandpiper <i>Actitis hypoleucos</i>	O02 O12	31/12/2011 31/12/2011	Bird Atlas 2007 - 2011	Wildlife (Amendment) Acts 2000	Amber
	Common Snipe <i>Gallinago gallinago</i>	O02 O12	31/12/2011 27/01/2021	Bird Atlas 2007 - 2011	Wildlife (Amendment) Acts 2000 EU Birds Directive Annex II, Annex III	Red
	Common Starling <i>Sturnus vulgaris</i>	O02 O12 O02X	29/05/2021 18/05/2023 07/05/2020	Birds of Ireland	Wildlife (Amendment) Acts 2000	Amber
	Common Swift <i>Apus apus</i>	O02 O12 O02X O12C	04/05/2020 27/08/2023 31/12/2011 05/07/2023	Birds of Ireland Swifts of Ireland Bird Atlas 2007 - 2011	Wildlife (Amendment) Acts 2000	Red
	Common Whitethroat <i>Sylvia communis</i>	O02 O12 O02X O12C	06/05/2023 28/04/2020 06/05/2023 31/12/2011	Birds of Ireland Bird Atlas 2007 - 2011		Green
	Common Wood Pigeon <i>Columba palumbus</i>	O02 O12 O02X O12C	25/03/2023 06/05/2023 25/03/2023 31/12/2011	Birds of Ireland Bird Atlas 2007 - 2011	Wildlife (Amendment) Acts 2000 EU Birds Directive Annex II, Annex III	Green
	Eurasian Collared Dove <i>Streptopelia decaocto</i>	O02 O12 O02X	06/03/2023 16/02/2023 10/04/2020	Birds of Ireland		Green
	Eurasian Curlew <i>Numenius arquata</i>	O02 O12	26/12/2016 08/12/2018	Birds of Ireland	Wildlife (Amendment) Acts 2000 EU Birds Directive Annex II	Red
	Eurasian Jackdaw <i>Corvus monedula</i>	O02 O12 O02X O12C	30/01/2023 20/04/2023 31/12/2011 31/12/2011	Birds of Ireland Bird Atlas 2007 - 2011		Green
	Eurasian Jay <i>Garrulus glandarius</i>	O02 O12	06/05/2023 20/04/2023	Birds of Ireland		Green



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Species Group	Name	Grid square	Date of last record	Database	Legal Status	Conservation status ⁵
	Eurasian Oystercatcher <i>Haematopus ostralegus</i>	O12	29/12/2022	Birds of Ireland	Wildlife (Amendment) Acts 2000	Red
	Eurasian Siskin <i>Carduelis spinus</i>	O02 O12	06/05/2023 23/04/2023	Birds of Ireland		Green
	Eurasian Sparrowhawk <i>Accipiter nisus</i>	O02 O12 O02X O12C	28/03/2023 01/04/2023 10/06/2020 08/06/2022	Birds of Ireland		Green
	Eurasian Teal <i>Anas crecca</i>	O02 O12	31/12/2011 11/03/2023	Bird Atlas 2007 – 2011 Birds of Ireland	Wildlife (Amendment) Acts 2000 EU Birds Directive Annex II, Annex III	Amber
	Eurasian Tree Sparrow <i>Passer montanus</i>	O02 O12	31/12/2011 31/12/2011	Bird Atlas 2007 - 2011	Wildlife (Amendment) Acts 2000	Amber
	Eurasian Treecreeper <i>Certhia familiaris</i>	O02 O12	19/02/2023 30/11/2022	Birds of Ireland		Green
	Eurasian Woodcock <i>Scolopax rusticola</i>	O02 O12	31/12/2011 31/12/2011	Bird Atlas 2007 - 2011	Wildlife (Amendment) Acts 2000 EU Birds Directive Annex II, Annex III	Red
	European Golden Plover <i>Pluvialis apricaria</i>	O12	31/12/2011	Bird Atlas 2007 - 2011	Wildlife (Amendment) Acts 2000 EU Birds Directive Annex II, Annex III	Red
	European Goldfinch <i>Carduelis carduelis</i>	O02 O12 O02X O12C	06/01/2023 02/05/2023 11/11/2012 31/12/2011	Birds of Ireland Bird Atlas 2007 - 2011		Green
	European Greenfinch <i>Carduelis chloris</i>	O02 O12 O12C	10/04/2023 21/04/2023 31/12/2011	Birds of Ireland Bird Atlas 2007 - 2011		Amber
	European Robin <i>Erithacus rubecula</i>	O02 O12 O02X O12C	25/04/2023 02/05/2023 25/03/2023 31/12/2011	Birds of Ireland Bird Atlas 2007 - 2011		Green
	Fieldfare <i>Turdus pilaris</i>	O02 O12	31/12/2011 02/12/2022	Bird Atlas 2007 – 2011 Birds of Ireland		Green



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Species Group	Name	Grid square	Date of last record	Database	Legal Status	Conservation status ⁵
	Gadwall <i>Anas strepera</i>	O12	20/04/2023	Birds of Ireland	Wildlife (Amendment) Acts 2000 EU Birds Directive Annex II	Amber
	Goldcrest <i>Regulus regulus</i>	O02 O12	05/03/2023 02/05/2023	Birds of Ireland		Amber
	Great Black-backed Gull <i>Larus marinus</i>	O02 O12	25/03/2023 05/03/2014	Birds of Ireland	Wildlife (Amendment) Acts 2000	Green
	Great Cormorant <i>Phalacrocorax carbo</i>	O02 O12	25/03/2023 27/03/2023	Birds of Ireland	Wildlife (Amendment) Acts 2000	Amber
	Great Crested Grebe <i>Podiceps cristatus</i>	O02	31/12/2011	Bird Atlas 2007 - 2011	Wildlife (Amendment) Acts 2000	Amber
	Great Spotted Woodpecker <i>Dendrocopos major</i>	O02 O12	30/05/2023 29/05/2023	Birds of Ireland		Green
	Great Tit <i>Parus major</i>	O02 O12 O02X O12C	24/05/2023 20/04/2023 31/12/2011 31/12/2011	Birds of Ireland Bird Atlas 2007 - 2011		Green
	Grey Heron <i>Ardea cinerea</i>	O02 O12	24/04/2023 20/04/2023	Birds of Ireland		Green
	Grey Wagtail <i>Motacilla cinerea</i>	O02 O12	11/01/2023 03/05/2023	Birds of Ireland		Red
	Greylag Goose <i>Anser anser</i>	O02 O12	31/12/2011 18/04/2023	Bird Atlas 2007 – 2011 Birds of Ireland	Regulation S.I. 477 (Ireland) Wildlife (Amendment) Acts 2000 EU Birds Directive Annex II, Annex III	Amber
	Hedge Accentor <i>Prunella modularis</i>	O02 O12 O02X O12C	06/05/2023 19/05/2023 07/05/2020 31/12/2011	Birds of Ireland Bird Atlas 2007 - 2011		Green
	Hen Harrier <i>Circus cyaneus</i>	O02 O02X	22/03/2019 22/03/2019	Birds of Ireland	Wildlife (Amendment) Acts 2000 EU Birds Directive Annex I	Amber
	Herring Gull <i>Larus argentatus</i>	O02 O12	26/12/2020 20/04/2023	Birds of Ireland	Wildlife (Amendment) Acts 2000	Amber



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	Hooded Crow <i>Corvus cornix</i>	O02 O12 O02X O12C	21/05/2020 20/04/2023 31/12/2011 31/12/2011	Birds of Ireland Bird Atlas 2007 - 2011		Green
	House Martin <i>Delichon urbicum</i>	O02 O12 O02X	09/05/2020 25/04/2023 07/05/2020	Birds of Ireland	Wildlife (Amendment) Acts 2000	Amber
	House Sparrow <i>Passer domesticus</i>	O02 O12 O02X	25/04/2023 26/05/2023 31/12/2011	Birds of Ireland Bird Atlas 2007 – 2011	Wildlife (Amendment) Acts 2000	Amber
	Iceland Gull <i>Larus glaucoideus</i>	O02	31/12/2011	Bird Atlas 2007 - 2011		Green
	Lesser Black-backed Gull <i>Larus fuscus</i>	O02 O12	18/04/2023 08/04/2023	Birds of Ireland	Wildlife (Amendment) Acts 2000	Amber
	Lesser Redpoll <i>Carduelis cabaret</i>	O02 O12	08/03/2022 25/01/2023	Birds of Ireland		N/A
	Little Egret <i>Egretta garzetta</i>	O02 O12	02/01/2023 24/03/2023	Birds of Ireland	Wildlife (Amendment) Acts 2000 EU Birds Directive Annex I	Green
	Little Grebe <i>Tachybaptus ruficollis</i>	O02 O12	14/03/2023 06/04/2023	Birds of Ireland	Wildlife (Amendment) Acts 2000	Green
	Long-eared Owl <i>Asio otus</i>	O02 O12	04/08/2021 23/05/2019	Birds of Ireland		Green
	Long-tailed Tit <i>Aegithalos caudatus</i>	O02 O12 O02X	24/04/2023 02/05/2023 11/11/2012	Birds of Ireland		Green
	Mallard <i>Anas platyrhynchos</i>	O02 O12 O02X	06/05/2023 20/04/2023 31/12/2011	Birds of Ireland Bird Atlas 2007 - 2011	Wildlife (Amendment) Acts 2000 EU Birds Directive Annex II, Annex III	Amber
	Mandarin Duck <i>Aix galericulata</i>	O12	22/04/2016	Birds of Ireland		N/A
	Meadow Pipit <i>Anthus pratensis</i>	O02 O12 O02X	20/03/2022 04/06/2022 10/04/2020	Birds of Ireland	Wildlife (Amendment) Acts 2000	Red



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		O12C	13/08/2021			
	Mealy Redpoll <i>Carduelis flammea</i> subsp. <i>Flammea</i>	O02 O12	19/02/2023 23/02/2019	Birds of Ireland		N/A
	Merlin <i>Falco columbarius</i>	O02	31/12/2011	Bird Atlas 2007 – 2011	Wildlife (Amendment) Acts 2000 EU Birds Directive Annex I	Amber
	Common Gull <i>Larus canus</i>	O02 O12	06/11/2022 14/03/2023	Birds of Ireland	Wildlife (Amendment) Acts 2000	Amber
	Mistle Thrush <i>Turdus viscivorus</i>	O02 O12 O02X O12C	05/03/2023 06/05/2023 31/12/2011 31/12/2011	Birds of Ireland Bird Atlas 2007 - 2011		Green
	Mute Swan <i>Cygnus olor</i>	O02 O12	25/04/2023 20/05/2023	Birds of Ireland	Wildlife (Amendment) Acts 2000	Amber
	Northern Lapwing <i>Vanellus vanellus</i>	O02 O12	31/12/2011 31/12/2011	Bird Atlas 2007 - 2011	Wildlife (Amendment) Acts 2000 EU Birds Directive Annex II	Red
	Northern Shoveler <i>Anas clypeata</i>	O12	31/12/2011	Bird Atlas 2007 - 2011	Wildlife (Amendment) Acts 2000 EU Birds Directive Annex II, Annex III	N/A
	Northern Wheatear <i>Oenanthe Oenanthe</i>	O02 O12	09/05/2020 11/08/2021	Birds of Ireland	Wildlife (Amendment) Acts 2000	Amber
	Peregrine Falcon <i>Falco peregrinus</i>	O02 O12	04/02/2023 06/06/2014	Birds of Ireland	Wildlife (Amendment) Acts 2000 EU Birds Directive Annex I	Green
	Pied Wagtail <i>Motacilla alba</i> subsp. <i>Yarrellii</i>	O02 O12	18/04/2023 01/03/2023	Birds of Ireland		Green
	Red Grouse <i>Lagopus lagopus</i>	O02 O12	31/12/2011 25/03/2023	Bird Atlas 2007 – 2011 Birds of Ireland	Wildlife (Amendment) Acts 2000 EU Birds Directive Annex II	Red
	Redwing <i>Turdus iliacus</i>	O02 O12	04/03/2023 13/03/2023	Birds of Ireland		Red



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Species Group	Name	Grid square	Date of last record	Database	Legal Status	Conservation status ⁵
	Reed Bunting <i>Emberiza schoeniclus</i>	O02 O12 O02X	19/01/2023 08/05/2020 07/05/2020	Birds of Ireland		Green
	Rock Pigeon <i>Columba livia</i>	O02 O12	31/12/2011 30/04/2023	Bird Atlas 2007 – 2011 Birds of Ireland	Wildlife (Amendment) Acts 2000 EU Birds Directive Annex II	Green
	Rook <i>Corvus frugilegus</i>	O02 O12 O02X	21/01/2023 01/03/2023 21/01/2023	Birds of Ireland The Second Atlas of		Green
	Ruff <i>Calidris pugnax</i>	O02	16/08/2022	Birds of Ireland	Wildlife (Amendment) Acts 2000 EU Birds Directive Annex I	Amber
	Sand Martin <i>Riparia riparia</i>	O02 O12 O02X	24/04/2023 25/04/2023 31/12/2011	Birds of Ireland Bird Atlas 2007 - 2011	Wildlife (Amendment) Acts 2000	Amber
	Sedge Warbler <i>Acrocephalus schoenobaenus</i>	O02 O12	09/05/2023 18/04/2023	Birds of Ireland		Green
	Sky Lark <i>Alauda arvensis</i>	O02 O12 O02X	25/03/2023 27/06/2020 25/03/2023	Birds of Ireland	Wildlife (Amendment) Acts 2000	Amber
	Snowy Owl <i>Bubo scandiaca</i>	O12	08/04/2016	Birds of Ireland	Wildlife (Amendment) Acts 2000 EU Birds Directive Annex I	Red
	Song Thrush <i>Turdus philomelos</i>	O02 O12 O02X O12C	24/05/2023 19/05/2023 31/12/2011 31/12/2011	Birds of Ireland Bird Atlas 2007 - 2011		Green
	Spotted Flycatcher <i>Muscicapa striata</i>	O02 O12	11/06/2022 31/05/2023	Birds of Ireland	Wildlife (Amendment) Acts 2000	Amber
	Stock Pigeon <i>Columba oenas</i>	O12	31/12/2011	Bird Atlas 2007 - 2011	Wildlife (Amendment) Acts 2000	Red
	Stonechat <i>Saxicola torquatus</i>	O02 O12 O02X	25/03/2023 25/02/2021 25/03/2023	Birds of Ireland		Green



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Species Group	Name	Grid square	Date of last record	Database	Legal Status	Conservation status ⁵
	Tree Pipit <i>Anthus trivialis</i>	O12	20/04/2019	Birds of Ireland		Amber
	Tufted Duck <i>Aythya fuligula</i>	O02 O12	18/04/2023 08/04/2023	Birds of Ireland	Wildlife (Amendment) Acts 2000 EU Birds Directive Annex II, Annex III	Amber
	Whimbrel <i>Numenius phaeopus</i>	O12	16/04/2023	Birds of Ireland		Green
	Whinchat <i>Saxicola rubetra</i>	O12	06/06/2016	Birds of Ireland	Wildlife (Amendment) Acts 2000	Red
	White Stork <i>Ciconia ciconia</i>	O12	28/04/2006	Rare birds of Ireland		N/A
	White Wagtail <i>Motacilla alba</i>	O02 O12	31/12/2011 31/12/2011	Bird Atlas 2007 - 2011		Green
	White-throated Dipper <i>Cinclus cinclus</i>	O02 O12 O02X	22/01/2023 19/05/2023 15/05/2020	Birds of Ireland		Green
	Whooper Swan <i>Cygnus cygnus</i>	O02 O12	31/12/2011 27/02/2018	Bird Atlas 2007 – 2011 Birds of Ireland	Wildlife (Amendment) Acts 2000 EU Birds Directive Annex I	Amber
	Willow Warbler <i>Phylloscopus trochilus</i>	O02 O12 O02X O12C	06/05/2023 19/04/2023 07/05/2020 31/12/2011	Birds of Ireland Bird Atlas 2007 - 2011		Amber
	Winter Wren <i>Troglodytes troglodytes</i>	O02 O12 O02X O12C	23/04/2023 31/05/2023 09/04/2023 31/12/2011	Birds of Ireland Bird Atlas 2007 - 2011		Green
	Yellowhammer <i>Emberiza citrinella</i>	O02	10/06/2021	Birds of Ireland	Wildlife (Amendment) Acts 2000	Red
Amphibian	Common Frog <i>Rana temporaria</i>	O02	25/03/2023	Amphibians and reptiles of Ireland	EU Habitats Directive Annex V Wildlife (Amendment) Acts 2000	Least Concern
		O12	08/04/2023			
		O02X	02/03/2003	Irish National Frog Database		
		O12C	17/02/2019			

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Species Group	Name	Grid square	Date of last record	Database	Legal Status	Conservation status ⁵
	Smooth Newt <i>Lissotriton vulgaris</i>	O02 O12 O12C	29/06/2020 06/10/2020 08/02/2020	Amphibians and reptiles of Ireland	Wildlife (Amendment) Acts 2000	Least Concern
Fish	Brown/Sea Trout <i>Salmo trutta</i>	O02	31/12/1972	Freshwater Fish in Irish Lakes/rivers		
Invertebrates	Freshwater White-clawed Crayfish <i>Austropotamobius pallipes</i>	O02	19/08/2013	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	EU Habitats Directive Annex II EU Habitats Directive Annex V Wildlife (Amendment) Acts 2000	

6.0. Land, Soil & Geology

6.1. Introduction

This section of the Environmental Impact Assessment Report (EIAR) has been prepared by Pinnacle Consulting Engineers and provides an assessment of the impact that the proposed LRD development at Oldcourt, Ballycullen, Dublin 24, will have on the surrounding land, soil and geology within the vicinity of the site. It also sets out mitigation and remedial measures and methods of monitoring once the development is operational. This chapter of the EIAR has been prepared by Shaun O'Reilly, Pr Tech Civ Eng, with 40 years civils experience and over 16 years with Pinnacle Engineering Consultants.

6.2. Assessment Methodology

This assessment has been carried out generally in accordance with the following guidelines:

- Guidelines on the Information to be contained in Environmental Impact Assessment reports (EPA) (2022).
- Guidelines for Planning Authorities & An Bord Pleanála on carrying out an Environmental Impact Assessment (2018).
- Advice notes for preparing Environmental Impact Statements (EPA – DRAFT – 2015).
- Advice notes on Current Practice in the preparation of Environmental Impact Statements (EPA – 2023).
- Guidelines for the preparation of Soils Geology & Hydrogeology Chapters of Environmental Impact Statements (IGI – 2013).
- Geology in Environmental Impact Statements, A Guide (IGI – 2002).
- Control of water pollution from sites (CIRIA – 2001).
- Environmental Handbook for Building and Civil Engineering Projects (CIRIA – 2000).

The **first phase** of this assessment determines the type, scale, and location of the proposed development as well as establishing the baseline conditions via a desktop study to classify the geological features related to the site. The Geological Survey of Ireland (GSI) was consulted, and the following maps reviewed:

- National Irish Historic Maps produced by Ordnance Survey Ireland (OSI)
- Bedrock Geology Map
- Bedrock Aquifer Map
- Groundwater Vulnerability Map

The information obtained was utilised to establish the baseline conditions on site.

The **second phase** of this assessment was the incorporation of direct and indirect investigations and studies. This information was primarily provided by geotechnical site investigations carried out by Causeway Geotech in October 2015 for the LAP lands. There was also an Infiltration Test report carried out by IGSL in July 2024.

Phase 2(a) of the assessment includes the refinement of the design layout to mitigate by elimination and replacement, any items that would have the potential to negatively impact the environment by their design, material components, or method of construction/installation.

Phase 2(b) of the assessment includes a detailed review of the proposed design and a study to determine the potential risks and impacts of the design and strategies.

Phase 3 includes the continuation of the Phase 2(b) works whereby the identified risks and impacts were then further assessed against mitigation measures which provided a residual risk. Where a residual risk was determined to be high, the item was isolated and returned to Phase 2(a) to repeat the process of identifying alternatives methods and measures to reduce the residual risk.

Phase 4 includes the completion of this EIAR chapter based on a full understanding of the baseline, proposed development design layout, and construction strategies, incorporation of the mitigation measures, identified risks and residual risks.

6.3. Baseline Environment

The subject LAP lands comprise of a total of 523 No. Units. The development site is located to the east of Bohernabreena Road, north and east of Bohernabreena cemetery, south and south-east of St. Anne's GAA club, south and south-west of the Dodderbrook residential estate, west of the Ballycullen Gate residential development (currently under construction) and west of Oldcourt Road (the R113).

The area of the subject application is indicated by the red boundary line shown in

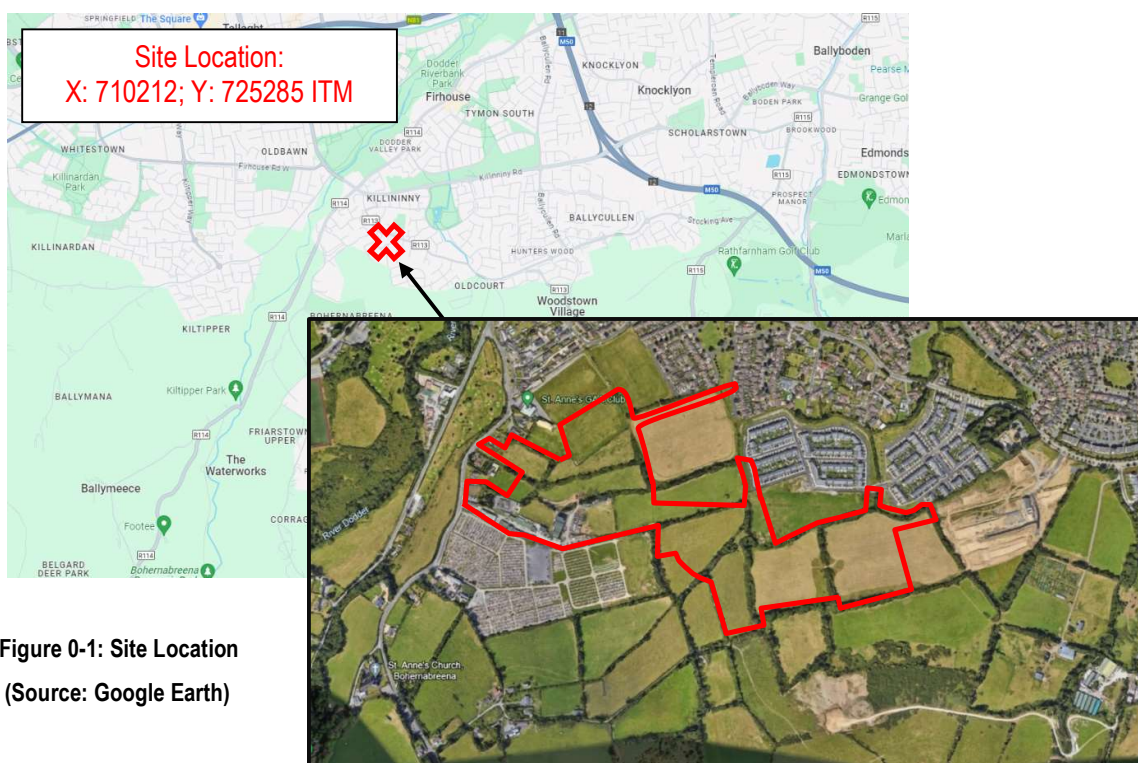


Figure 0-1: Site Location
(Source: Google Earth)

The Site Investigation Report undertaken by Causeway Geotech and is produced under a separate cover, has described the sequence of strata encountered on the LAP lands as generally comprising of topsoil, and glacial till.

The site, which has an overall area of c.20.4 ha, is currently predominantly greenfield. The site falls from South to North with a gradient of c. 1 in 16. There is a high point of 119.78m OD to the south and a low point of 98.12m OD to the north.

Vehicular access to the development will be via 4 no. access points, as follows: (i) from the west of the site via 2 no. accesses located off Bohernabreena Road, (ii) from the north of the site via 1 no. access at Dodderbrook Place, and (iii) from Oldcourt Road (the R113) to the east, via adjoining residential development. Refer to Figure 0-2: LAP Lands for a map of the development lands and proposed site boundaries.

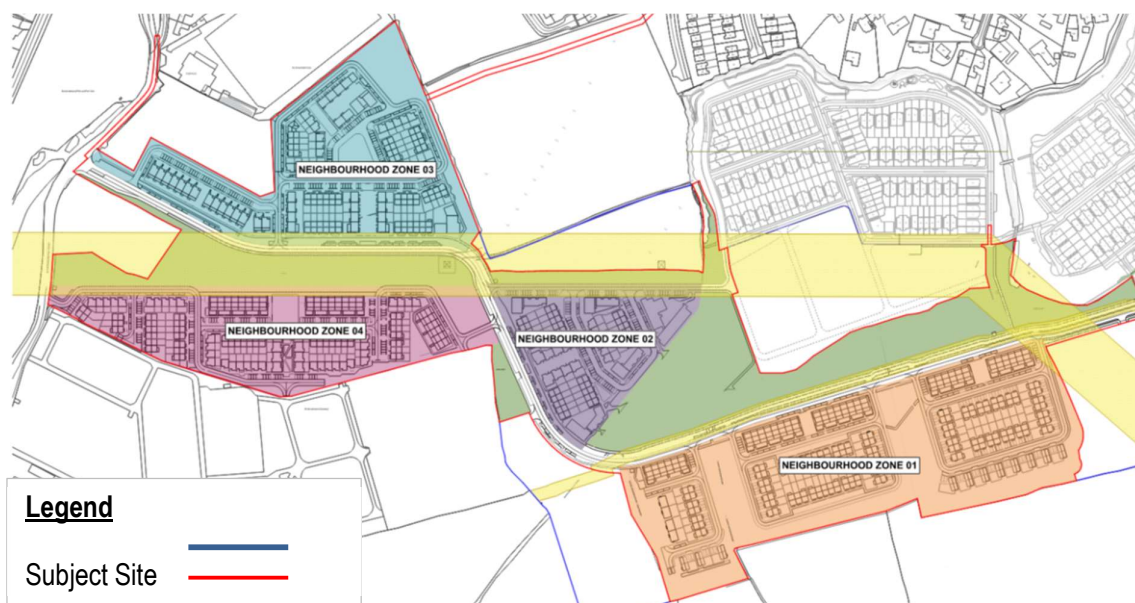


Figure 0-2: LAP Lands

The development site is located to the east of Bohernabreena Road, north and east of Bohernabreena cemetery, south and south-east of St. Anne's GAA club, south and south-west of the Dodderbrook residential estate, west of the Ballycullen Gate residential development (currently under construction) and west of Oldcourt Road (the R113).

6.3.1 Site Development

Currently, the site is predominantly greenfield and this is confirmed by the Site Investigation Report.

6.3.2 Historic Land Use

Historic maps for the locality have been reviewed. These do not record any previous settlement or development on the site.

Refer to Figure 0-3: Site Location (Source: OSI Viewer Historic Maps) below for an extract of the historic maps retrieved from the Irish Townland and Historical Map Viewer (OSI Maps).

Please refer to the archaeological chapter of this report for details related to records of historical or ancient land

uses on or near the subject site.

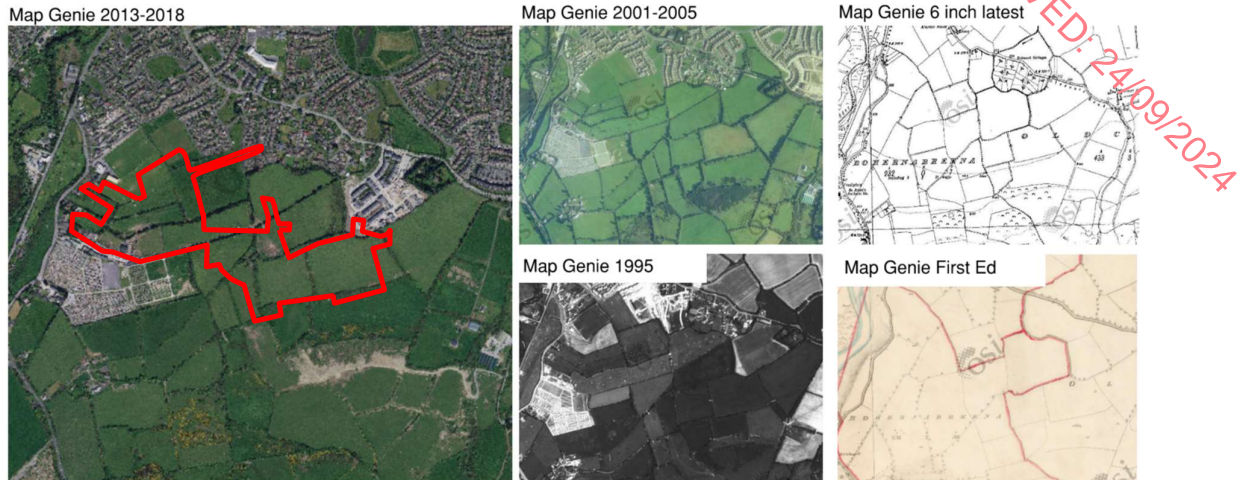


Figure 0-3: Site Location (Source: OSI Viewer Historic Maps)

6.3.3 Ground Investigation

The Site Investigation Report undertaken by Causeway Geotech, has described the sequence of strata encountered on the masterplan lands as generally comprising of topsoil and glacial till.

According to the Causeway Geotech Investigation, the development lands are considered predominantly greenfield with only 1 no. isolated area containing MADE GROUND deposits at trial pit No. (TP) 11, located at the south-east extremity of the lands and falls under the portion of development currently under construction, i.e. Ballycullen Gate.

The results of the site investigations on the subsoil indicated topsoil in all the exploratory holes within the subject lands and was present to a maximum depth of 0.3m below ground level (BGL). Cohesive deposits were encountered beneath the topsoil layer and are described as typically stiff brown sandy gravelly CLAY overlying firm to stiff grey or brown sandy gravelly CLAY with occasional cobbles and boulders. Granular deposits were encountered within the cohesive deposits and are typically described as grey, brown clayey/gravelly subangular to subrounded fine to coarse SAND/GRAVEL with occasional cobbles and rare boulders.

The Site Investigation report further advises that any groundwater encountered consisted of localised seepages within the lenses of sands and gravels within the glacial till.

It is noted that infiltration tests were completed by IGSL in July 2024 within the subject lands. The details of these tests, 33 No. are included below, for sake of completeness, taken from the subsurface exploration details given in the Infiltration Test Report.

6.3.3.1 Trial Pits

The trial pits were excavated using a JCB 3CX excavator fitted with a 600mm wide bucket, at the locations shown in the exploratory hole location plan in Appendix A of the Site Investigation Report. The locations were checked using a CAT scan to minimise the potential for encountering services during the excavation. The trial pits were sampled, logged and photographed by a Geotechnical Engineer/Engineering Geologist prior to backfilling with arisings. Notes were made of any services, inclusions, pit stability, groundwater encountered, and the characteristics of the strata encountered and are presented on the trial pit logs which are provided in Appendix C



of the Site Investigation Report. **Note:** The Site Investigation Report (prepared by Causeway Geotech) is submitted as a separate standalone report – please refer to same.

6.3.3.2 Soakaway Testing

The soakaway testing was carried out in a selected trial pit. This pit was carefully excavated and filled with water to assess the infiltration characteristics of the proposed site. The pit was allowed to drain and the drop in water level was recorded over time as required by BRE Digest 365. The pit was logged prior to completing the soakaway test and were backfilled with arising's upon completion. The soakaway test results are provided in Table 1 / Appendix 2 of the Infiltration Test Report – to view same, refer to Appendix C of the submitted Engineering Planning Report Part 2 – Appendices, prepared by Pinnacle Consulting Engineers.

6.3.3.3. Cable Percussion Boreholes

The Cable Percussion Boreholes were drilled using a Dando Terrier drilling rig with regular in-situ testing and sampling undertaken to facilitate the production of geotechnical logs and laboratory testing. The standard method of boring in soil for site investigation is known as the Cable Percussion method. It consists of using a Shell in non-cohesive soils and a clay cutter in cohesive soils, both operated on a wire cable. Very hard soils, boulders and other hard obstructions are broken up by chiselling and the fragments removed with the Shell. While the use of the Cable Percussion method of boring gives the maximum data on soil conditions, some mixing of laminated soil is inevitable. For this reason, thin lenses of granular material may not be noticed. Disturbed samples were taken from the boring tools at suitable depths, so that there is a representative sample at the top of each change in stratum and thereafter at regular intervals down the borehole until the next stratum was encountered. The disturbed samples were then sealed and sent to the laboratory where they were visually examined to confirm the description of the relevant strata. Standard Penetration Tests were carried out in the boreholes. The results of these tests, together with the depths at which the tests were taken are shown on the accompanying borehole records within the Site Investigation Report. The test consists of a split spoon sampler tube (SPT) or solid cone attachment (SPTc), 52mm external diameter, being driven into the soil by a monkey weighing 63.5kg and with a free drop of 760mm. For gravels and glacial till the driving shoe was replaced by a solid 60° cone. The Standard Penetration Test number referred to as the 'N' value is the number of blows required to drive the tube 300mm, after an initial penetration of 150mm. The number gives a guide to the consistency of the soil and can also be used to estimate the relative strength/density at the depth of the test and also to estimate the bearing capacity and compressibility of the soil. The cable percussion borehole logs are provided in Appendix B of the Site Investigation Report.

Laboratory Testing

Samples were selected from the exploratory holes for a range of geotechnical testing to assist in the classification of soils and to provide information for the proposed design. Geotechnical testing consisting of moisture content, Atterberg limits, Particle Size Distribution (PSD) and California Bearing Ratio (CBR) tests were carried out in the Causeway laboratory in Ballymoney, Co, Antrim in October 2015. The results of the laboratory testing are included in Appendix F of the Site Investigation Report. **Note:** The Site Investigation Report (prepared by Causeway Geotech) is submitted as a separate standalone report – please refer to same.

6.3.4 Geology

Geological Survey Ireland (GSI) produces a wide range of datasets, including bedrock geology mapping. The mapping indicates that the site lies within the Till type Formation - Sandstone and shale till (Lower Paleozoic).

The Aquifer mapping indicates the location as having a designation of PI, which represents a poor aquifer, where the bedrock which is generally unproductive except for Local Zones. Refer to Figure 0-4: GSI Bedrock Aquifer Map for an extract of the GSI Bedrock Aquifer Map.

The same map viewer series did not indicate the presence of any groundwater wells or springs in the immediate vicinity of the site.

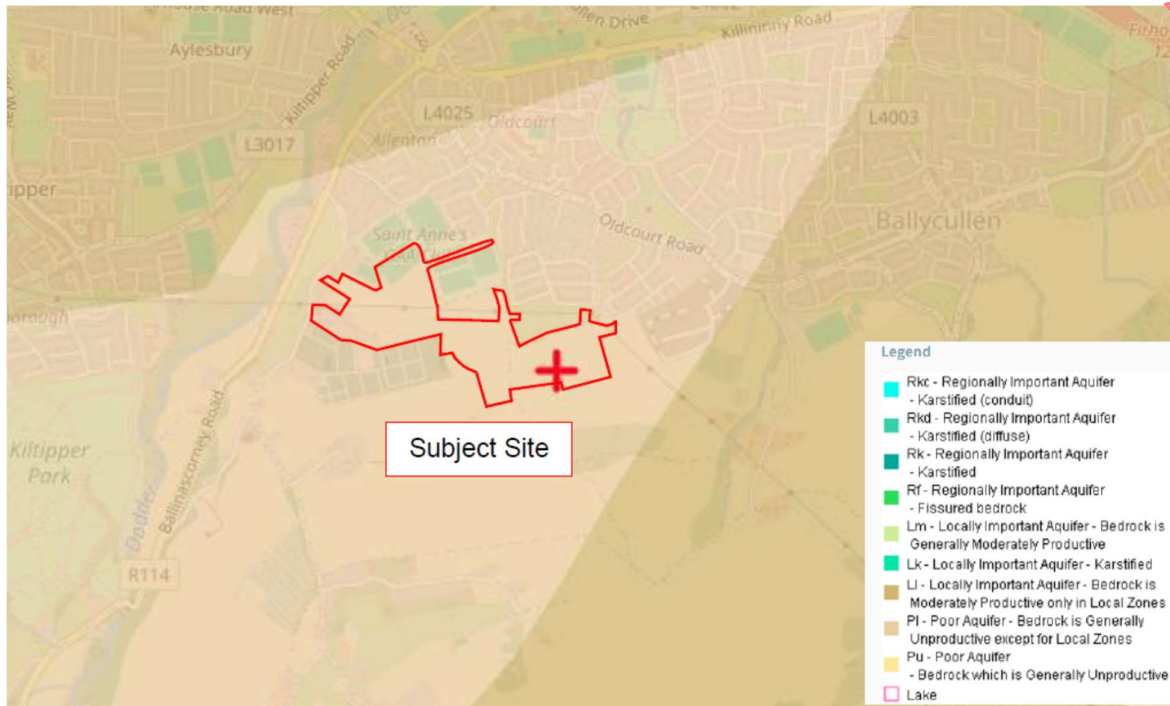


Figure 0-4: GSI Bedrock Aquifer Map

The groundwater vulnerability in the vicinity of the proposed sites was also examined by referencing the Geological Survey of Ireland. From the GSI groundwater vulnerability map, the site lies within an area ranging from low groundwater vulnerability on the northern portion of the site, tending towards high groundwater vulnerability on the southern boundary of the site.

Refer to Figure 0-5: GSI Groundwater Vulnerability Map for an extract of the GSI Groundwater Vulnerability Map.

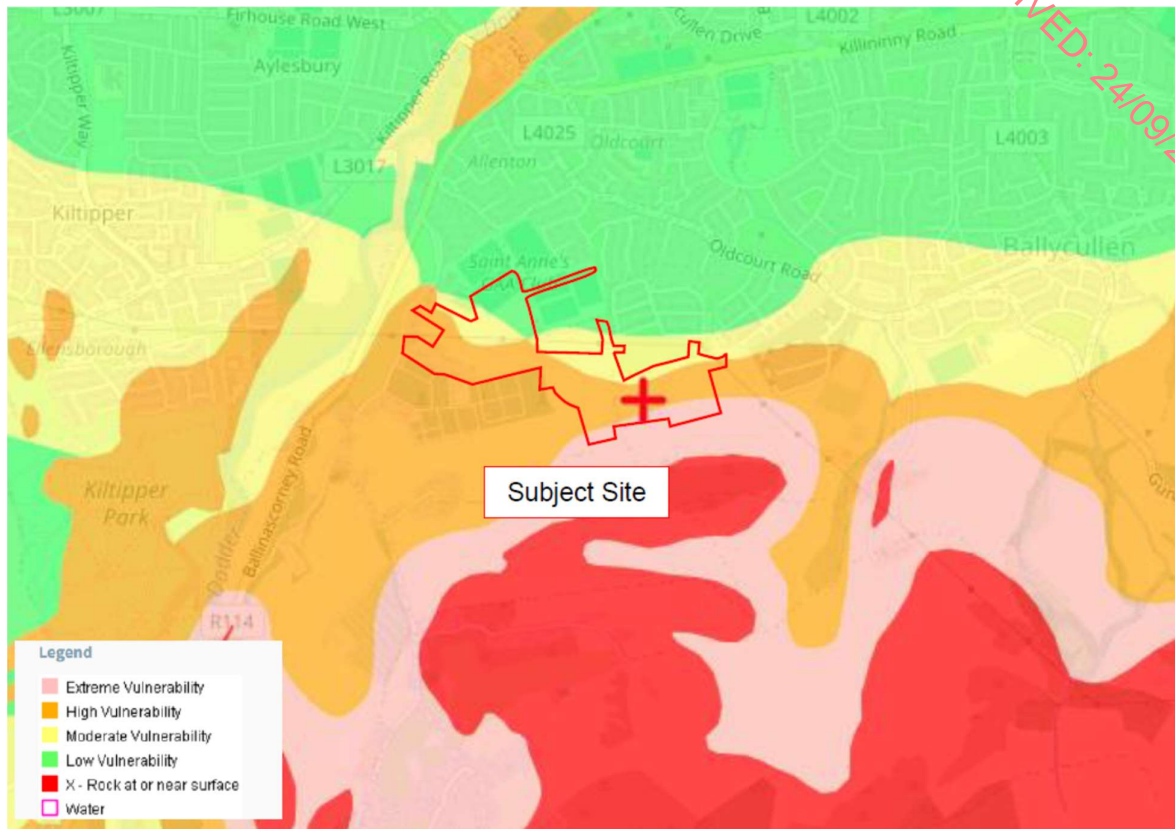


Figure 0-5: GSI Groundwater Vulnerability Map

6.3.5 Soils

The results of the site investigations are summarised as follows:

6.3.5.1 Topsoil

The results of the site investigations on the subsoil indicated topsoil in all the exploratory holes within the subject site and was present to a maximum depth of 0.3m below ground level (BGL).

6.3.5.2 Made Ground

A single trial pit (TP11) on the LAP lands encountered MADE GROUND deposits at the surface of the pit area to a depth of 1.7m. The MADE GROUND deposit is described as soft to firm brown sandy gravelly silty CLAY (FILL) with occasional cobbles.

Cohesive deposits were encountered beneath the topsoil layer and are described as typically stiff brown sandy gravelly CLAY overlying firm to stiff grey or brown sandy gravelly CLAY with occasional cobbles and boulders. Granular deposits were encountered within the cohesive deposits and are typically described as grey brown clayey/gravelly subangular to subrounded fine to coarse SAND/GRAVEL with occasional cobbles and rare boulders.

The strength of the cohesive deposits typically increased from soft at shallow depths to firm, firm to stiff or stiff below 1.0m to 1.5m BGL in the majority of the exploratory holes. These deposits had some, occasional or frequent



cobble and boulder content where noted on the exploratory hole logs.

6.3.5.4 Granular Deposits

The granular deposits were encountered within the cohesive deposits and were typically described as Grey brown clayey/gravelly subangular to subrounded fine to coarse SAND/GRAVEL with occasional cobbles and rare boulders. The secondary sand/gravel and silt/clay constituents varied across the site and with depth while occasional, some or many cobble and boulder content also present where noted on the exploratory hole logs.

6.3.5.5 Groundwater

Groundwater strikes are noted on the exploratory hole logs where they were encountered. We would point out that these exploratory holes did not remain open for sufficiently long periods of time to establish the hydrogeological regime and groundwater levels would be expected to vary with the tide, time of year, rainfall, nearby construction and other factors.

6.3.5.6 Geotechnical Laboratory testing

The geotechnical testing carried out on soil samples recovered generally confirm the descriptions on the logs with the primary constituent of the cohesive deposits found to be a CLAY of low plasticity. The Particle size Distribution tests confirm that generally the cohesive deposits are well-graded with percentages of sands and gravels ranging between 10% and 68% generally with fines contents of 17% to 43%.

6.3.5.7 Chemical Laboratory Testing

The pH and sulphate testing carried out indicate that pH results are near neutral and that the water soluble sulphate results is low when compared to the guideline values from BRE Special Digest 1:2005. The samples tested classify the soil as a Design Sulphate Class DS-1 & ACEC Class AC-1.

6.3.5.8 Landfill Waste Acceptance Criteria (WAC)

WAC have been agreed by the EU (Council Decision 2003/33/EC) and are only applicable to material if it is to be disposed of as a waste to a landfill facility. Each individual member state and licensed landfill operator may apply more stringent WAC. The data obtained from laboratory testing has been compared to the WAC limits set out in the Council Decision as well as the specific WAC which the EPA had applied to the Walshestown and Integrated Materials Solutions (IMS) landfills. These landfills have a higher limit for a range of parameters while still operating under an inert landfill license. The potentially applicable waste categories are summarised as follows:

The waste category sections are divided in 4, lettered A-D, with numbered subcategories, A being suitable for disposal at an unlined soil recovery facility, B an inert landfill, C a non-hazardous landfill, and D a hazardous waste treatment facility.

Category A waste is briefly described as: Soil and stone only which are free from anthropogenic materials such as concrete, brick, timber etc. Soil must be free from contamination e.g., PAHs & hydrocarbons. Material meeting this classification may be disposed of to an unlined soil recovery facility.

Category B1 waste: Reported concentrations within inert waste limits, which are set out by the adopted EU Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive 1999/31/ EC (2002). Results also found to be non-hazardous using the HWOL

application. Material meeting this classification may be disposed of to an inert landfill.

Category B2 waste: Reported concentrations greater than Category B1 criteria, but less than IMS Hollywood Landfill acceptance criteria, as set out in their waste license W0129-02. Results also found to be non-hazardous using the HWOL application. Material meeting this classification may be disposed of to an inert landfill with a waste license suitable to accept the reported concentrations.

Category C waste: Reported concentrations greater than Category B2 criteria but within non-hazardous landfill waste acceptance limits set out by the adopted EU Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive 1993/31/EC (2002). Results also found to be non-hazardous using the HWOL application. Material meeting this classification may be disposed of to a Non-Hazardous landfill.

Note:

Category C1 is as Category C but containing <0.001% w/w asbestos fibres.

Category C2 is as Category C but containing >0.001% and <0.01% w/w asbestos fibres.

Category C3 is as Category C but containing >0.01% and <0.1% w/w asbestos fibres.

Category D – Results found to be Hazardous using HWOL Application (Hazardous Treatment required).

Category D1 – Results found to be hazardous due to the presence of asbestos (>0.1%) (Hazardous Treatment required).

6.3.6 Characteristics of the Proposed Development

The subject application is for the Oldcourt LAP Lands. The indicative site layout for the development can be seen in Figure 0-6: Indicative Layout of Proposed Development.



Figure 0-6: Indicative Layout of Proposed Development

The proposed LAP development comprises of 523 No. Units, consists of the following:-

- 255 no. 2, 3 & 4 bed detached, semi-detached and terraced houses;



- 206 no. 1, 2 & 3 bed duplex units in 20 no. 2 & 3 storey blocks; and
- 62 no. 1, 2 & 3 bed apartments in 4 no. 3 & 3-4 storey blocks; along with a 2-storey childcare facility of c. 457sq.m.

Vehicular access to the development will be via 4 no. access points, as follows: (i) from the west of the site via 2 no. accesses located off Bohernabreena Road, (ii) from the north of the site via 1 no. access at Dodderbrook Place, and (iii) from Oldcourt Road (the R113) to the east, via adjoining residential development.

The proposed development also includes for public open spaces, landscaping and boundary treatments, internal roads and footpaths, car parking, bin storage, bicycle storage, public lighting, pedestrian and vehicular connections to adjoining lands, drainage infrastructure etc. and all associated site development works etc. all on an overall site area of c. 20.26 hectares.

The utilities such as watermain, storm water and wastewater network will also be provided on the subject site.

The development includes all associated site development works, boundary treatments, drainage, and service connections.

The proposed development, with respect to soils and geology, includes the following characteristics:

- Excavation and disposal of soils unsuitable for reuse to a suitably licenced landfill.
- Stripping of topsoil.
- Excavation for roads and building foundations.
- Excavation for drainage sewers and utilities.
- Regrading and landscaping.
- Disposal of any further surplus excavated soils including any contaminated materials (if applicable).

6.3.7 Soil Stability

Significant investigations and testing has been carried out on the site to determine the underlying Geotechnical and Environmental aspects of the site soils and geology.

The details of these Investigations and Interpretive reports can be found in the Site Investigation Report included as an appendix to this document. The procedures used in the investigations were in accordance with IS EN 1997 2:2007 and BS 5930:2015.

6.3.7.1 Geotechnical Summary – Foundations

The allowable bearing capacities are outlined in Table 1 of the Site Investigation Report and the majority are recommended for conventional strip or pad foundations. Where the firm cohesive deposits or medium dense granular deposits are noted to be between 2.60m – 3.0m BGL, lean mix trench fill is recommended to achieve the recommended allowable bearing capacity. A piled solution has been proposed in 1 No. borehole, where the depth below the existing level to a suitable bearing stratum is 5.1m. Any soft spots encountered at the proposed foundation depths should be excavated and replaced with lean mix concrete.

A ground bearing floor slab is recommended to be based on the firm or firm to stiff cohesive deposits with an appropriate depth of compacted hardcore specified by the consulting engineer and in accordance with the limits and guidelines in SR21:2014 +A1:2016 and/or NRA SRW CL808 Type E granular stone fill. Where the depth of Made Grund/Soft deposits exceeds 0.9m then suspended floor slabs should be considered.



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6.3.7.2 Soil Stability and Excavations

Short term temporary excavations in the cohesive deposits will remain stable for a limited time only and will require to be appropriately battered or the sides supported if the excavation is below 1.25m BGL or is required to permit man entry.

Any excavations which penetrate the granular deposits will require to be appropriately battered or the sides supported and are likely to require dewatering due to the groundwater seepages noted in the exploratory hole logs in the Appendices of the Site Investigation Report.

The groundwater and stability noted on the trial pit logs should be consulted when determining the most appropriate construction methods for excavations. Any waste material to be removed off site should be disposed of to a suitably licenced landfill.

6.4. Predicted Impacts

6.4.1 Construction Stage

The removal of topsoil during earthworks and the construction of roads, services, and buildings, in particular roads and building foundations, will expose subsoil to weathering and may result in the erosion of soils during adverse weather conditions, which if unmitigated may have a temporary, negative, slight (non-significant) to moderate (significant) effect.

Construction traffic movements involved in the construction of the proposed development and access roads, may result in localised compaction of the subsoil along haulage routes, having a permanent, slight (non-significant), negative impact on subsoil materials.

Surface water runoff from the surface of the excavated areas, or rainfall on stockpiled material, may result in silt discharges to the local surface water network via overland flow, with the potential to have a permanent, slight, negative impact.

Where feasible, excavated subsoil will be used as part of the construction works with suitable surplus subsoil will be used in areas requiring fill where appropriate. Unsuitable and / or surplus subsoil is required to be disposed of appropriately.

Dust from the site and from soil spillages on the existing road network around the site may be problematic, especially during dry conditions, which will have a short-term, slight negative impact on the geological environment on the site.

Accidental oil or diesel spillages from the construction plant and equipment, in particular at refuelling areas, may result in oil contamination of the soils and underlying geological structures, potentially having a negative, moderate (significant), permanent impact on the geological environment.

Accidental discharges from welfare facilities during the construction stage has the potential to contaminate surface and groundwater courses. with the potential to have a permanent, slight (not significant) to moderate (significant), negative impact.

6.4.2 Operational Stage

During the operational phase of the development, it is not envisaged that there will be any ongoing impacts on the



underlying soil as a result of the proposed development. Any hydro-geological impacts are temporary and associated with the construction of the proposed development.

Surface water runoff is directed via SuDS and filtration devices proposed to be provided as part of the development. These will help to remove pollutants from rainwater runoff, ensuring the impact by run-off on the quality of the site soils and groundwater during the operational phase will be considered positive, slight, likely & permanent.

The increase in hardstanding area will result in a reduction in the infiltration potential across the site, which will be negative, slight (not significant) likely, and permanent.

6.5. Mitigation Measures

6.5.1 Construction Stage

The Site Investigation Report included as an Appendix, has shown that the lands are composed of varying sequences of strata generally comprised of topsoil and glacial till. Made ground has also been identified in a single trial pit, i.e. TP11 located at the south-east extremity of the lands and falls under the portion of development currently under construction, i.e. Ballycullen Gate. A total of 43 No. trial pits were carried out across the LAP lands.

Environmental Laboratory chemical analysis has indicated that the in-fill constituents are non-hazardous. Excavated material from this location will be continuously monitored/inspected for signs of hazardous material contamination during excavation. Should there be any indication of hazardous material contamination, it may be required to be further sampled and analysed to confirm its chemical properties and waste category classification as per the waste landfill facility requirements.

Practical measures have been implemented during the design process to ensure that cut and fill volumes generated have been kept to a minimum by ensuring proposed road and building levels match existing ground levels insofar as is possible. Surplus subsoil and rock may be relocated to approved areas of the subject site that may require in-fill, or if required to be removed from site, will be deposited in approved fill areas off-site (Article 27 notification to the EPA required), or to an approved waste disposal facility.

In the case of topsoil careful planning and on-site storage will ensure that this resource is reused on-site as much as possible. Any surplus of soil not reused on site can be sold. However, topsoil is quite sensitive and can be rendered useless if not stored and cared for properly.

- Topsoil will be kept completely separate from all other construction waste as any cross-contamination of the topsoil can render it useless for reuse.
- Topsoil will be protected from all kinds of vehicle damage and kept away from site-track, delivery vehicle turning areas, and site plant and vehicle storage areas.
- Careful separation of builder's rubble packaging and contaminated waste from re-usable material will result in the minimisation of the disposal of material to landfill.
- Spoil heap/stockpiles will not be located within 20m of the existing surface water networks.
- Spoil heaps/stockpiles will be considered for seeding if their storage is likely to be longer than a few seasons.
- Topsoil will be stored in stockpiles less than two metres in height as otherwise the soil matrix (internal structure) can be damaged beyond repair. It will also be kept as dry as possible and used as soon as possible to reduce any deterioration through lengthy storage and excess moving around the site.



In the unlikely case of a topsoil surplus the Contractor will carry out appropriate environmental chemistry testing in order to determine the waste classification of the soils that are to be excavated and that will include Waste Acceptance Criteria testing. The test regime will be agreed with the receiving landfill operator, if not suitable for an Article 27 transfer, and the testing will be carried out by an accredited laboratory.

Records of topsoil storage, movements and transfer from site will be kept by the C&D Waste Manager. It is projected that all the topsoil will be reused on-site for landscaping purposes in both private residential gardens and public green areas.

A Discharge Licence will need to be obtained from the local Authority by the Main Contractor. Untreated surface water will not be permitted to flow to any natural or piped surface water network.

Silt traps, silt fences and tailing ponds will be provided by the contractor where necessary to prevent silts and soils being washed away by heavy rains during the course of the construction phase. All surface water will be treated for silts and sediment prior to disposal to the surface water network. Any and all other conditions, restrictions, or limits associated with the discharge license shall be adhered to.

The provision of wheel wash areas at the exit/s to the development as necessary will minimise the amount of soil deposited on the surrounding road network. The adjoining road network will be cleaned on a regular basis. All trucks carrying soils on the public road will be covered and carry a maximum of 10 cubic metres of material to prevent spillage and damage to the surrounding road network.

Appropriate storage and bunding measures will be implemented throughout the construction stage to prevent contamination of the soil and groundwater from oil and petrol leakage from site plant. Refuelling will be restricted to allocated re-fuelling areas. This storage area is to be an impermeable, roofed, bunded area, designed to contain 110% of the volume of fuel stored. Emergency fuel spill kits are to be stored on-site with designated staff familiar with their usage. Spill kit facilities will be provided for across the site.

If groundwater is encountered during excavations, mechanical pumps will be required to remove that groundwater from sumps. Sumps should be carefully located and constructed to ensure that groundwater is efficiently removed from excavations and trenches.

Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility offsite.

Nuisance dust emissions from construction activities are a common and well recognised problem. Fine particles from these sources are recognised as a potential significant cause of pollution.

The main contractor will be required to demonstrate that both nuisance dust and fine particle emissions from the site are adequately controlled and are within acceptable limits.

Dust and fine particle generation from construction and demolition activities on the site can be substantially reduced through carefully selected mitigation techniques and effective management. Once particles are airborne it is very difficult to prevent them from dispersing into the surrounding area. The most effective technique is to control dust at source and prevent it from becoming airborne, since suppression is virtually impossible once it has become airborne.

The following are techniques and methods which are widely used currently throughout the construction industry, and which will be used in the development.



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1. The roads around the site are all surfaced, and no dust is anticipated arising from unsealed surfaces.
2. A regime of 'wet' road sweeping will be set up to ensure the roads around the immediate site are as clean and free from dirt / dust arising from the site, as is reasonably practicable. This cleaning will be carried out by approved mechanical sweepers.
3. Footpaths immediately around the site will be cleaned by hand regularly, with damping, as necessary.
4. High level walkways and surfaces such as scaffolding will be cleaned regularly using safe 'wet' methods, as opposed to dry methods.
5. Vehicle waiting areas or hard standings will be regularly inspected and kept clean by brushing or vacuum sweeping and will be regularly sprayed to keep moist, if necessary.
6. Vehicle and wheel washing facilities will be provided at the site exit(s). If necessary, vehicles will be washed down before exiting the site.
7. Netting will be provided to enclose scaffolding in order to mitigate escape of airborne dust from the new buildings.
8. Vehicles and equipment will not emit black smoke from exhaust system, except during ignition at start up.
9. Engines and exhaust systems will be maintained so that exhaust emissions do not breach stationary emission limits set for the vehicle / equipment type and mode of operation.
10. Servicing of vehicles and plant will be carried out regularly, rather than just following breakdowns.
11. Internal combustion plant will not be left running unnecessarily.
12. Exhaust direction and heights will be such as not to disturb dust on the ground and to ensure adequate local dispersal of emissions.
13. Fixed plant such as generators will be located away from residential areas.
14. The number of handling operations for materials will be kept to a minimum in order to ensure that dusty material is not moved or handled unnecessarily.
15. The transport of dusty materials and aggregates will be carried out using covered / sheeted lorries.
16. Material handling areas will be clean, tidy, and free from dust.
17. Vehicle loading will be dampened down and drop heights for material to be kept to a minimum.
18. Drop heights for chutes / skips will be kept to a minimum.
19. Dust dispersal over the site boundary will be minimised using static sprinklers or other watering methods, as necessary.
20. Stockpiles of materials will be kept to a minimum and if necessary, they will be kept away from sensitive receptors such as residential areas etc.
21. Stockpiles where necessary, will be sheeted or watered down.
22. Methods and equipment will be in place for immediate clean-up of spillages of dusty material.



23. No burning of materials will be permitted on site.
24. Earthworks excavations will be kept damp where necessary and where reasonably practicable.
25. Cutting on site will be avoided where possible by using pre-fabrication methods.
26. Equipment and techniques for cutting / grinding / drilling / sawing / sanding etc, which minimise dust emissions and which have the best available dust suppression measures, will be employed.
27. Where scabbling is to be employed, tools will be fitted with dust bags, residual dust will be vacuumed up rather than swept away, and areas to be scabbled will be screened off.
28. Wet processes will be used to clean building facades if possible. If dry grit blasting is unavoidable, then areas of work will be sealed off and dust extraction systems used.
29. Where possible pre-mixed plasters and masonry compounds will be used to minimise dust arising from on-site mixing.
30. Prior to commencement, the main contractor will identify the construction operations which are likely to generate dust and to draw up action plans to minimise emissions. Furthermore, the main contractor will prepare environmental risk assessments for all dust generating processes, which are envisaged.
31. The main contractor will allocate suitably qualified personnel to be responsible for ensuring the generation of dust is minimised and effectively controlled.
32. Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced road, the limit shall be 20 kph, and on surfaced roads as site management dictates.

The construction of the proposed development has potential to cause a slight, adverse, temporary, residual impact on soils in the immediate vicinity of the site.

6.5.2 Operational Stage

On completion of the construction phase and following replacement of topsoil, a planting programme will commence to prevent soil erosion.

SuDS and filtration devices are proposed to be provided as part of the development. These will help to remove pollutants from rainwater runoff. They will require periodic inspection and maintenance as per their installation manuals. These have been designed in accordance with the Greater Dublin Regional Code of Practice for Drainage Works Volume 6.0 (GDRCPDW) and the SuDS Manual CIRIA C753.

Foul drainage and watermains have been designed in accordance with their respective Codes of Practice by Uisce Éireann. A Pre-Connection Enquiry was submitted to Uisce Éireann and a Confirmation of Feasibility has been received and is included as an appendix to the Engineering Assessment Report, submitted under a separate cover.

Therefore, the risk of accidental discharge has been adequately addressed and mitigated through design.

The operation of the proposed development is not considered to have an impact on soils in the immediate vicinity of the site.



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6.6. Residual Impacts

6.6.1 Construction Stage

With the protective measures noted above in place during the excavation works and construction stage, any potential impacts on soils and geology in the area will not have significant adverse impacts, and no significant adverse impacts on the soils and geology of the subject lands are envisaged.

The residual risk associated with site clearance, excavation and construction are considered to be negative, slight (not significant) local, likely and permanent.

6.6.2 Operational Stage

There will be minor permanent regrading of the sites in line with the ground levels proposed for the buildings and roads. Open spaces will be regraded to meet these buildings and roads.

Reinstatement measures in relation to soils consist primarily of the re-soiling of open areas / landscaping and the replanting of these areas. No post development reinstatement works will be required.

On completion of the construction phase and following replacement of topsoil and implementation of a planting programme, no further impacts on the soil are envisaged.

SuDS measures, including permeable paving and infiltration drains, will assist with cleaning surface water runoff while replenishing the natural ground water table and their impact will be positive, slight (not significant) likely, and permanent.

6.7. Cumulative Effects

On completion of the construction phase and following replacement of topsoil and a planting programme, no further impacts on the soil environment are envisaged except for the possibility of contamination of soil from foul water effluent or oil/chemical spills from the site occupier (residents) operations. This is based on the current EIAR assessment of the masterplan lands as a whole rather than just the subject application site. Mitigation measures noted throughout this report apply to the full masterplan lands and their subsequent planning application and not just the subject application.

6.7.1 Other Impacts Anticipated

A potential risk to human health due to the associated works during construction is the direct contact, ingestion, or inhalation of receptors (i.e., construction workers) with any soils which may potentially contain low level hydrocarbon concentrations from site activities (potential minor leaks, oils, and paint).

No human health risks associated with long term exposure to contaminants (via direct contact, ingestion, or inhalation) resulting from the proposed development are anticipated, as the construction stage will be temporary (short-term).

6.8. Monitoring

6.8.1 Construction Stage

Monitoring during the construction phase is recommended, in particular to the following items (if applicable):

- Excavation of the historic in-fill material.

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- Adequate protection of topsoil/subsoil stockpiled for reuse.
- Adequate protection from contamination of soils for removal.
- Monitoring of surface water discharging to the existing surface water drainage system.
- Monitoring cleanliness of the adjoining road network.
- Monitoring measures for prevention of oil and petrol spillages.
- Dust control by dampening down measures, when required due to dry weather conditions.

6.8.2 Operational Stage

During the operation phase, the surface water network (drains, gullies, manholes, AJs, SuDS Devices, attenuation systems etc.) will need to be regularly maintained and where required cleaned out. A suitable maintenance regime of inspecting and cleaning will be incorporated into the safety file/maintenance manual for the development.

Surface SuDS features can typically be maintained as part of the regular maintenance of the landscape, incorporating litter picking, grass cutting, and inspections. Figure 0-4: Regular Maintenance Requirements for SuDS, is an extract from Section 12.3 of the Council's SuDS Design & Evaluation Guide, and generally describes the regular maintenance aspect for the SuDS.

Type	Activity	Normal site care (Site) or SuDS-specific maintenance (SuDS)	Suggested frequency
Regular Maintenance			
Litter	Pick up all litter in SUDS Landscape areas along with remainder of the site – remove from site	Site	1 visit monthly
Grass	Mow all grass verges, paths and amenity grass at 35-50mm with 75mm max. Leaving cuttings in situ	Site	As required or 1 visit monthly
Grass	Mow all dry swales, dry SUDS basins and margins to low flow channels and other SUDS features at 100mm with 150mm max. Cut wet swales or basins annually as wildflower areas – 1st and last cuts to be collected	Site	4-8 visits per year or as required
Grass	Wildflower areas strimmed to 100mm in Sept or at end of school holidays – all cuttings removed Or Wildflower areas strimmed to 100mm on 3 year rotation – 30% each year – all cuttings removed	Site	1 visit annually 1 visit annually
Inlets & outlets	Inspect monthly, remove silt from slab aprons and debris. Strim 1m round for access	SuDS	1 visit monthly
Permeable paving	Sweep all paving regularly to keep surface tidy	Site	1 visit annually or as required

Figure 0-4: Regular Maintenance Requirements for SuDS

There will still be a remaining requirement for more intensive maintenance tasks to be undertaken however, the severity of these tasks can be reduced by regular inspections and proactive responses being incorporated as a part of the regular maintenance regime discussed above. A table showing the typical requirements for the occasional maintenance tasks and remedial works is extracted from the Council's SuDS Design & Evaluation Guide to the figure overleaf.

Occasional Tasks			
Permeable paving	Sweep and suction brush permeable paving when ponding occurs	SuDS	As required - estimate 10-15 year intervals
Flow controls	Annual inspection of control chambers - remove silt and check free flow	SuDS	1 visit annually
Wetland & pond	Wetland vegetation to be cut at 100mm on 3 - 5 year rotation or 30% each year. All cuttings to be removed to wildlife piles or from site.	Site	As required
Silt	Inspect swales, ponds, wetlands annually for silt accumulation	Site & SuDS	1 visit annually
Silt	Excavate silt, stack and dry within 10m of the SUDS feature, but outside the design profile where water flows. Spread, rake and overseed.	Site & SuDS	As required
Native planting	Remove lower branches where necessary to ensure good ground cover to protect soil profile from erosion.	SuDS	1 visit annually
Remedial Work			
General SuDS	Inspect SuDS system to check for damage or failure when carrying out other tasks.	SuDS	Monthly
	Undertake remedial work as required.		As required

Figure 6-9 Regular Maintenance Requirements for SuDS

6.9. Difficulties Encountered

There were no difficulties encountered.

6.10. Interactions

There will be an interaction between this chapter and the following chapters:

Material Assets - Traffic. There will likely be a requirement for surplus excavated soil volumes to be transported by road for disposal or re-use. Haulage details are discussed in the Traffic and Transport Chapter of this document.

Water: Site preparation works can potentially lead to elevated silt/sediment or other contaminant loading due to



construction site runoff. Dewatering of excavations during the construction phase can result in water with elevated silt and possible chemical contaminants requiring discharge to the local drainage system. Construction stage works can potentially impact water due to the risk of accidental spills, cross-contamination due to incorrect waste soils management, use of contaminated material as fill, etc.

Air Quality and Climate: Dust generated during site clearance, reprofiling, excavation, and soil reinstatement works can lead to temporarily diminished air quality.

6.11. References

- Geological Survey of Ireland, Bedrock Maps
- Google Maps
- Ordnance Survey of Ireland Historical Maps
- Causeway Geotech Site Investigation Report
- Drainage network maps
- South Dublin County Council's SuDS Design & Evaluation Guide
- Uisce Éireann Standard Details
- Uisce Éireann Codes of Practice
- Greater Dublin Regional Code of Practice for Drainage Works



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7.0. Water

7.1. Introduction

This section of the Environmental Impact Assessment Report (EIAR) has been prepared by Pinnacle Consulting Engineers and provides an assessment of the impact that the proposed Oldcourt LAP development at Oldcourt, Ballycullen, Dublin 24, will have on the surrounding hydrological (surface water), hydrogeological (ground water), foul water, water supply, and flood risk both during the construction and operation phases. The interaction between the surface water drainage proposal as part of the masterplan development will also be assessed in this chapter. This chapter of the EIAR has been prepared by Shaun O'Reilly, Pr Tech Civ Eng, with 40 years civils experience and over 16 years with Pinnacle Engineering Consultants.

A Site Specific Flood Risk Assessment (SSFRA) has been completed by Kilgallen & Partners Consulting Engineers and forms part of the overall application under a separate document and reference should be made to the SSFRA for further detailed assessment.

AWN has also prepared the submitted Hydrological and Hydrogeological Qualitative Risk Assessment of the proposed development under a separate document, which assesses the potential for any likely significant impacts on receiving waters and protected areas during construction or post development, in the absence of taking account of any measures intended to avoid or reduce harmful effects of the proposed project (i.e. mitigation measures). This document considers the likely impact of construction and operation impacts from the proposed development on water quality and overall water body status within Dublin Bay (where the relevant European Sites are located). Please refer to same for full details.

7.2. Assessment Methodology

An initial assessment was carried out which defined the project in terms of location, type & scale, established the baseline condition, established the type of hydrological environments, established the activities associated with the project and initial assessment and impact determination. These objectives were achieved by way of a desktop study and baseline data collection.

The following information sources were used in the assessment of the proposed development site:

- Geological Survey of Ireland (GSI) Website.
- Environmental Protection Agency.
- Office of Public Works (OPW) National Flood Hazard Mapping.
- OPW Catchment Flood Risk and Management Studies.
- Drainage and watermain Records Maps.
- Ordnance Survey Mapping.
- Topographical and GPR Surveys.
- Site Investigation Report.
- Water Framework Directive (WFD) Status.

Under the Water Framework Directive (WFD) and corresponding Regulations, the water quality of Ireland's surface and groundwater is assessed biologically, physically, and chemically. Assessments are conducted by the EPA and Local Authorities and have been compiled and presented in a standardised manner for River Basin Districts. Baseline information on the local and regional surface water bodies, their status, and threats were obtained from a range of documents and online sources including the EPA's Water Quality databased, Ireland's Water Framework Directive "Water Matters" online resource and the Eastern River Basin District (ERBD) website and reports.

A site-specific Flood Risk Assessment report has been undertaken by Kilgallen & Partners and is included in this planning application under a separate cover. This assessment considered flood risk to the proposed development from all potential sources and the possible impact of the proposed development on flood risk elsewhere. Relevant sources/mechanisms of flooding include tidal/coastal, fluvial, pluvial, existing drainage and water infrastructure and proposed drainage and water infrastructure and groundwater. This assessment was undertaken in accordance with: The planning system and Flood Risk Management Guidelines for Planning Authorities (Department of Environment, Heritage and Local Governments and the office of Public Works, C624 Development and Flood Risk (Construction Industry Research and Information Association, CIRIA) & the SDCC Development Plan.

Record information on the existing infrastructure were obtained from Uisce Eireann. Information on all services is supplemented with information obtained from the site topographical survey, site inspections/investigations, and Ordnance Survey Mapping.

Assessment of existing and proposed infrastructure for wastewater drainage, water supply, and surface water drainage was conducted in accordance with I.S EN12056: 2000 "Gravity Drainage Systems inside Buildings", I.S. EN752: 2017 "Drain and Sewer Systems outside Buildings, The Greater Dublin Regional Code of Practice for Drainage Works, Uisce Eireann's Code of Practice for Wastewater infrastructure, Uisce Eireann's Code of Practice for Water Infrastructure, and the recommendations of the Greater Dublin Strategic Drainage Study (GDSDS).

Allowable surface water runoff from the proposed development site has been calculated using the GDGDS, The SuDS Manual (CIRIA), and further in accordance with South Dublin County Council requirements.

7.3. Baseline Environment

The development site is located to the east of Bohernabreena Road, north & east of Bohernabreena cemetery, south and south-east of St. Anne's GAA club, south and south-west of the Dodderbrook residential estate, west of the Ballycullen Gate residential development (currently under construction) and west of Oldcourt Road (the R113).

The subject site is generally bounded by greenfield lands; with existing housing / GAA club and other features as listed above.

The area of the subject application is indicated by the red boundary line shown in **Error! Reference source not found..**

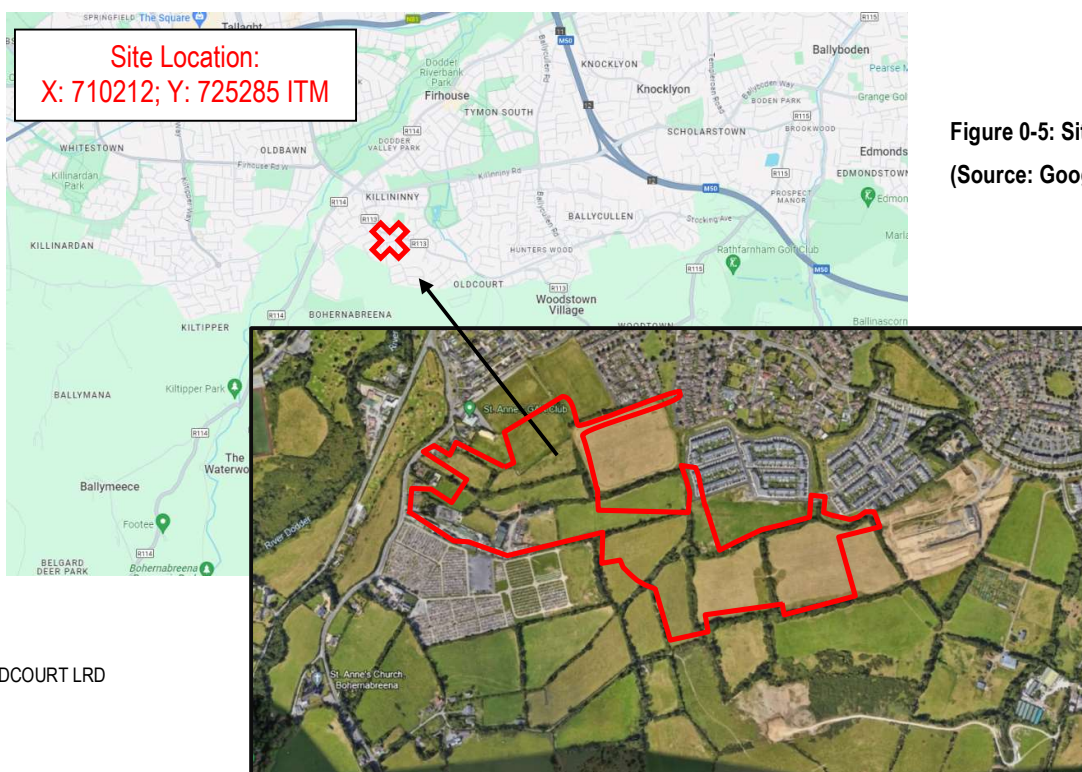


Figure 0-5: Site Location
(Source: Google Earth)

The Site Investigation Report undertaken by Causeway Geotech is included under a separate cover, has described the sequence of strata encountered on the masterplan lands as generally comprising of topsoil and glacial till.

The site, which has an overall area of circa 20.4 ha, is currently greenfield land. The subject site generally falls from south to north, with a high point of the southern boundary of Approximately 119.78m OD Malin. The lowest point along the northern boundary is approximately 98.12m OD Malin where the site connects into an existing ditch

Vehicular access to the development will be via 4 no. access points, as follows: (i) from the west of the site via 2 no. accesses located off Bohernabreena Road, (ii) from the north of the site via 1 no. access at Dodderbrook Place, and (iii) from Oldcourt Road (the R113) to the east, via adjoining residential development. Refer to Figure 0-6: Subject Site of proposed development boundaries.

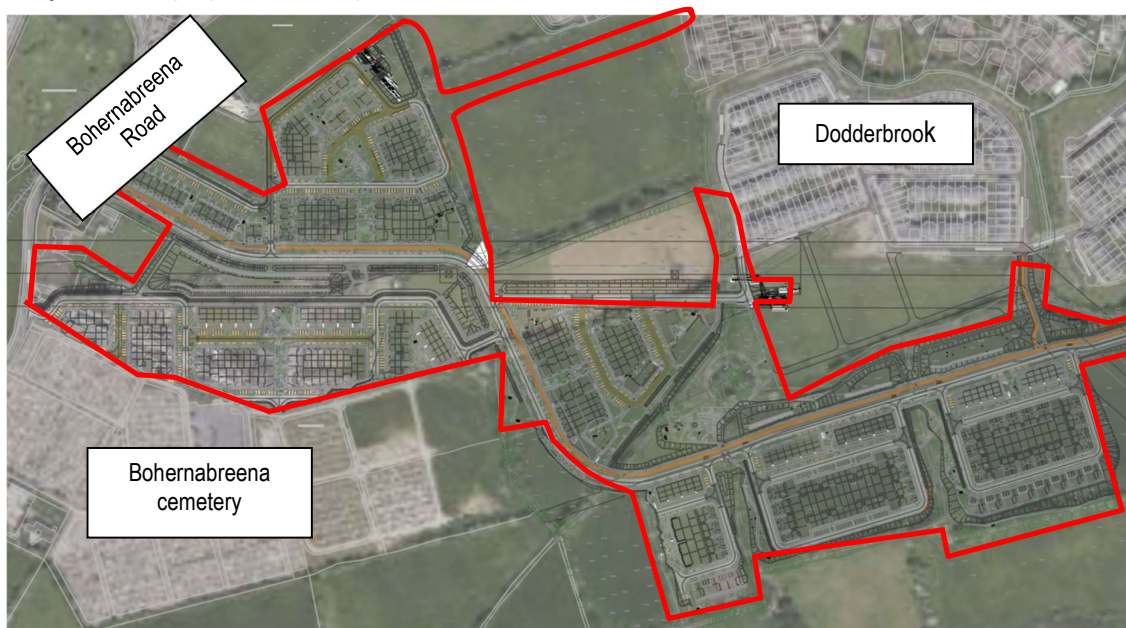


Figure 0-6: Subject Site Proposed Layout

The site is located within the River Dodder Catchment (WFD Sub-catchment Dodder_SC_010; WFD river sub basin DODDER_040) with the Bohernabreena, Oldcourt and Friarstown Upper streams located in the vicinity of the subject site. The Oldcourt stream runs along the northeastern boundary of the subject site and discharges northwards until it converges with the Ballycullen Stream at Ballycragh Park.

The Bohernabreena and Friarstown Upper streams bisect the site individually and converge at the northern boundary of the subject site. The now joined stream discharges northwards where it too converges at Ballycragh Park to form the Ballycullen Stream. The Ballycullen stream goes on to discharge in the River Dodder near Dodder Valley Park.

Refer to Figure 0-7: Existing Watercourses near the Subject Site for a map showing these watercourses in relation to the subject lands.

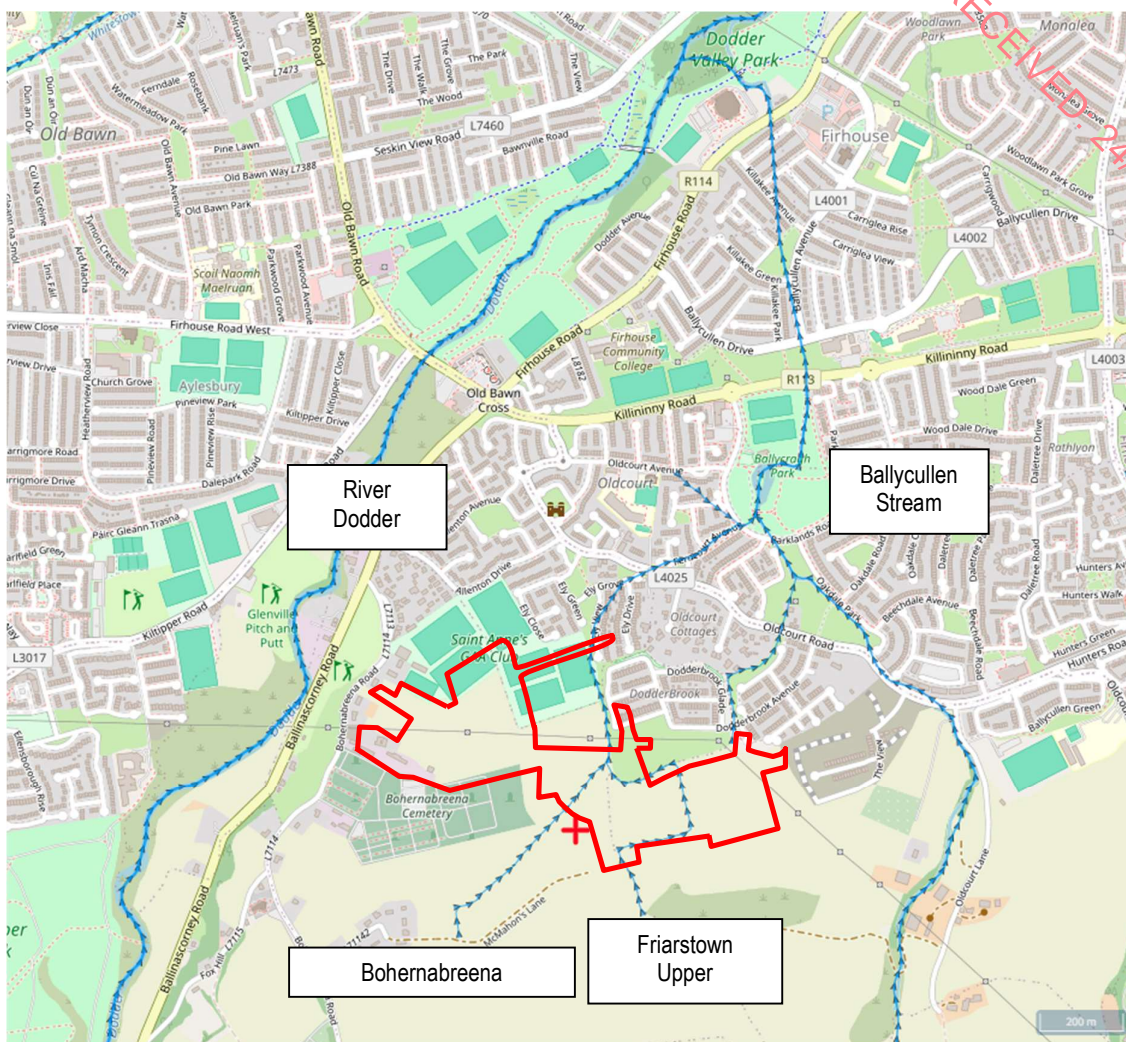


Figure 0-7: Existing Watercourses near the Subject Site

EPA mapping advises that the River Waterbody WFD status 2016-2021 for the Dodder_040, European Code: IE_EA_09D010620 has a status of “moderate”. According to the EPA’s Water Quality in Ireland 2016-2021 Summary Report, a status of “moderate” refers to an “altered ecosystem with impaired function, reduced diversity and resilience”.

7.3.1 Site Development

Currently, the sites are primarily greenfield in nature. The Site Investigation Report confirms this.

7.3.2 Hydrology (Surface Water)

Historic maps for the locality have been reviewed. The previously notes development of the southwest of the site, which has expanded over the years was present on the site prior to 1995, although the exact date of establishment is not known. This existing development (within the site development area) shall be demolished.

Refer to Figure 0-8: Site Location (Source: OSI Viewer Historic Maps) below for an extract of the historic maps retrieved from the Irish Townland and Historical Map Viewer (OSI Maps).

Please refer to the archaeological chapter of this report for details related to records of historical or ancient land uses on or near the subject site.



Figure 0-8: Site Location (Source: OSI Viewer Historic Maps)

Due to the nature and topography of the subject site, and geological conditions of the lands as discussed in Chapter 6 of this report, it is likely that rainfall from lesser events are percolated/infiltrated on-site, while heavy storm events likely flow off the surface in sheet flow conditions to the network of existing drainage ditches and streams surrounding the development.

7.3.3 Hydrogeology & Groundwater

A review of the EPA's (Environmental Protection Agency) website database classifies the ground waterbody (2016-2021) status as good, as per the extract shown in Figure 0-9: EPA's Ground Waterbody Status Map.

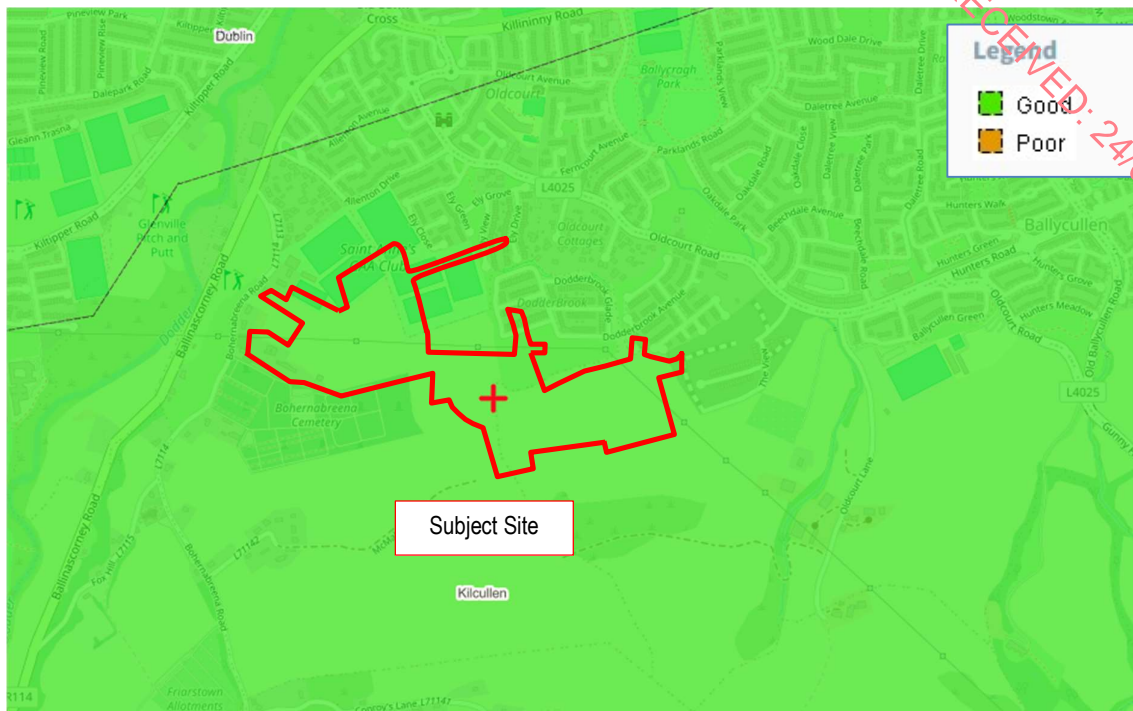


Figure 0-9: EPA's Ground Waterbody Status Map

The national Aquifer Bedrock Map prepared by the Geological Survey of Ireland, and retrieved from the EPA website, was consulted and is extracted in

Figure 0-10: Extract from GSI's Bedrock Aquifer Map.

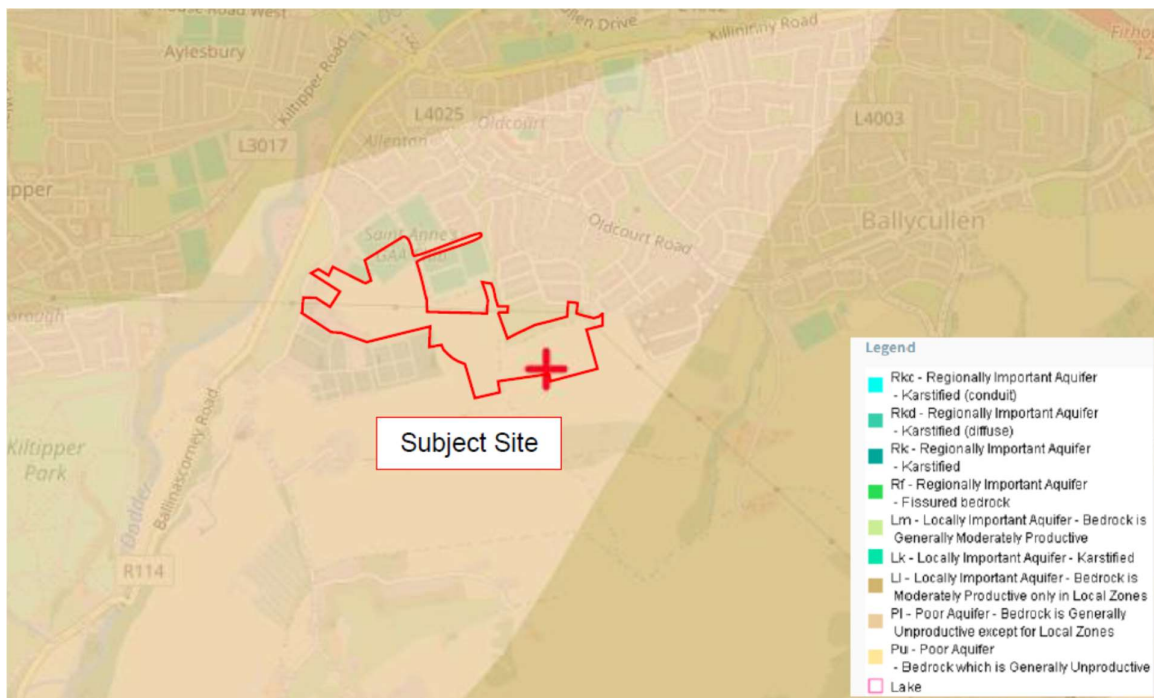


Figure 0-10: Extract from GSI's Bedrock Aquifer Map

The Aquifer mapping indicates the location as having a designation of PI, which represents a poor aquifer, where the bedrock which is generally unproductive except for Local Zones.

The same map viewer series did not indicate the presence of any groundwater wells or springs in the immediate vicinity of the site.

The groundwater vulnerability in the vicinity of the proposed sites was also examined by referencing the Geological Survey of Ireland. From the GSI groundwater vulnerability map, the sites lie within an area ranging from low groundwater vulnerability on the northern portion of the site, tending towards high groundwater vulnerability on the southern boundary of the site.

Refer to Figure 0-11: Extract from Groundwater Vulnerability Mapping for an extract of the GSI Groundwater Vulnerability Map.

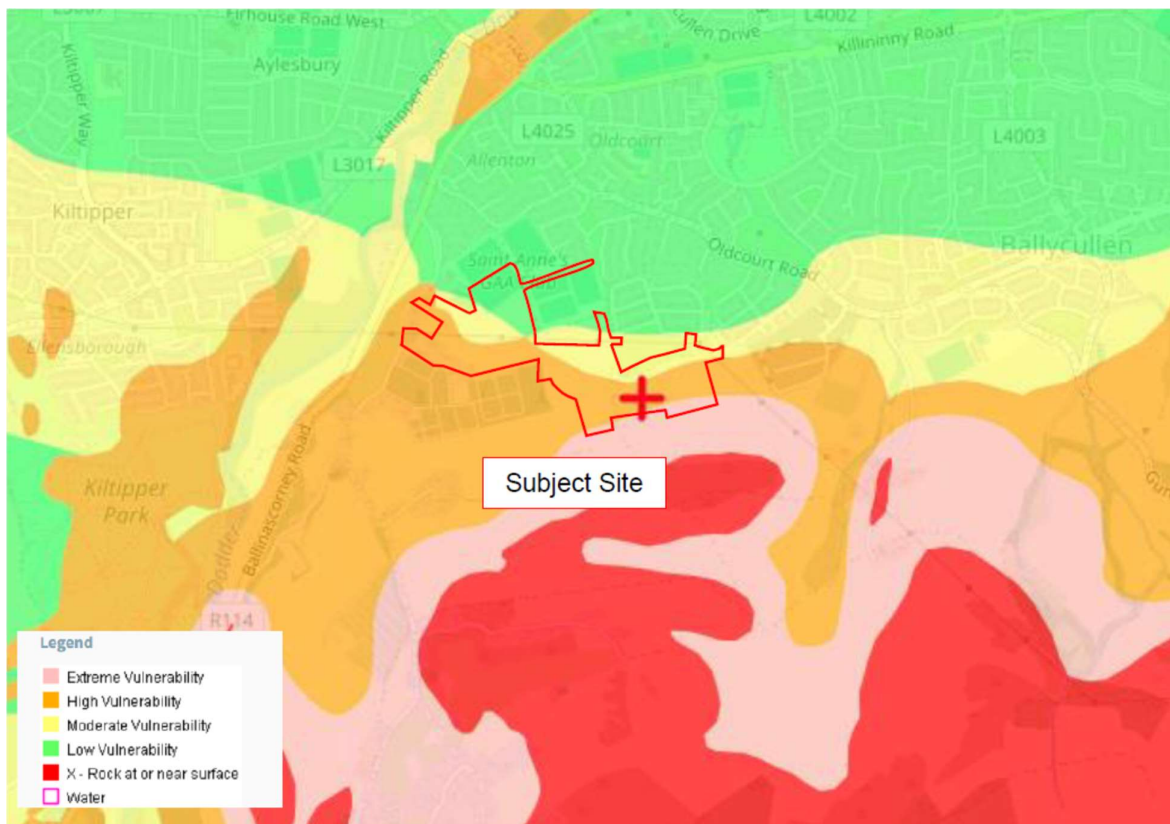


Figure 0-11: Extract from Groundwater Vulnerability Mapping

7.3.4 Flood Risk Assessment

A Site-Specific Flood Risk Assessment (SSFRA) has been prepared by Kilgallen & Partners Consulting Engineers and has been submitted under a separate cover. This section summarizes the SSFRA which should be read in detail in conjunction with the report.

The Site-Specific Flood Risk Assessment has been carried out in accordance with the DEHLG/OPW Guidelines on



the Planning Process and Flood Risk Management published in November 2009. The assessment identifies and sets out possible mitigation measures against potential risks of flooding from various sources. Sources of possible flooding include costal, fluvial (river), pluvial (direct heavy rain) and groundwater. The Office of Public Works provides flood mapping on their website floodinfo.ie.

Flood Risk = Likelihood of flooding X Consequences of flooding

Assessing Consequence

There is no defined method used to quantify a value for the consequences of a flooding event. Therefore, in order to determine a value for the consequences of a flooding event, the elements likely to be adversely affected by such flooding will be assessed, with the likely damage being stated, and professional judgement will be used to determine a value for consequences. Consequences will also be categorized as low, moderate, and high.

Assessing Risk

Based on the determined 'likelihood' and 'consequences' values of a flood event and the above equation of Flood Risk = Likelihood of flooding X Consequences of flooding, the 3x3 Risk Matrix seen in Table 0-1: Risk Matrix will then be used to determine the overall risk of a flood event.

		CONSEQUENCES		
		LOW	MODERATE	HIGH
LIKELIHOOD	LOW	Extremely Low Risk	Low Risk	Moderate Risk
	MODERATE	Low Risk	Moderate Risk	High Risk
	HIGH	Moderate Risk	High Risk	Extremely High Risk

Table 0-1: Risk Matrix

The various types of flood risk are assessed in the following sections.

7.3.4.1 Coastal Flood Risk

Given that the site is located 11.0 km inland from the Irish Sea, the site levels exceed the highest ever recorded or projected tide in the area, and that there is no coastal flooding indicated on the available OPW CFRAM maps, the risk from coastal/tidal flooding is considered extremely low and no flood mitigation measures are required to be implemented.

7.3.4.2 Fluvial Flood Risk

The source of fluvial flooding is from rivers, watercourses, or ditches overflowing.

The fluvial flood risk assessment for the site involved a thorough review of various datasets, a site walkover, and specific assessments of stream channels and proposed mitigation measures. The key findings are as follows:

Desktop Analysis:

- Strategic Flood Risk Assessment (SFRA): The SFRA for the South Dublin Development Plan (2022-2028) shows that the site is not within flood risk zones for both 1% Annual Exceedance Probability (AEP) and 0.1% AEP.



- OPW National Flood Hazard Mapping: No historical flood events are recorded at the site associated with the streams, though this absence is not definitive due to the streams' location away from public roads.
- OPW National Indicative Fluvial Mapping (NIFM): No fluvial flood risks are indicated for the site.
- OPW Catchment Flood Risk Management (CFRAM): No CFRAM maps are available for the site's immediate vicinity.
- Ordnance Survey Mapping: Historical maps do not indicate any fluvial flood risk at the site.
- Proposed Surface Water Drainage: The surface water drainage system for the proposed development is designed to comply with relevant guidelines, ensuring that the development will not cause fluvial flood risk elsewhere.

The site walkover confirmed that the streams and drainage features are consistent with historical mapping. The streams are shallow and ill-defined in some areas but deeper in others. The field culverts are undersized and often in poor condition, and both streams have heavy vegetation. Flow levels in the streams were observed to be low, and many field boundaries have drainage ditches connecting to the streams.

The stream channels may lack sufficient hydraulic capacity during extreme rainfall events, potentially leading to overtopping. Due to the site's steep gradient, overtopping water would flow downstream as overland flow rather than causing significant floodplain storage. To mitigate this risk, maintaining the existing stream channels and possibly modifying them to increase capacity is recommended.

Peak flood flows were estimated using several statistical methods, with the precautionary principle applied to use the highest estimates (IH124 method) in the assessment. The proposed culverts for the development have been designed to accommodate these peak flows.

With the implementation of the proposed mitigation measures, the development is not expected to be at risk of fluvial flooding, nor will it increase flood risk elsewhere. Therefore, the development is considered appropriate from a fluvial flood-risk perspective.

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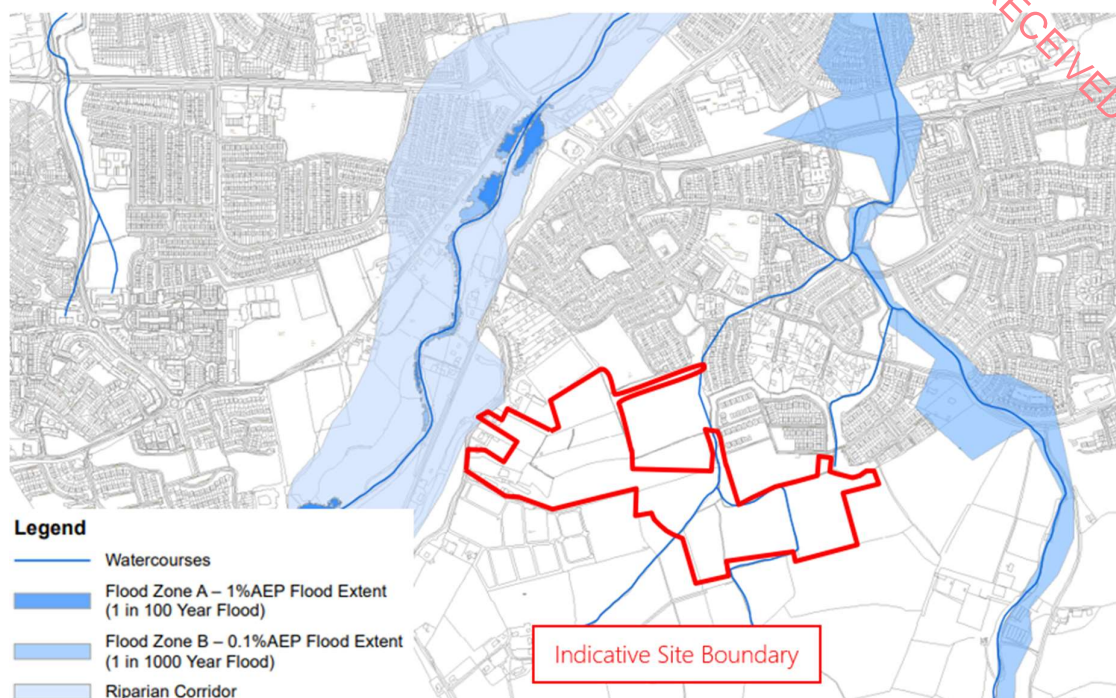


Figure 0-12: SDCC SFRA Fluvial Flood Maps and Subject Site

7.3.4.3 Pluvial Flood Risk

The pluvial flood risk assessment for the site involved reviewing various datasets, conducting a site walkover, and proposing mitigation measures. The key findings are as follows:

Desktop Analysis:

- Strategic Flood Risk Assessment (SFRA): The SFRA for the South Dublin Development Plan (2022-2028) does not indicate any pluvial flood risk at the site.
- OPW National Flood Hazard Mapping: There are no recorded pluvial flood events at the site. However, due to the site's location away from public roads, the absence of historic flood records is not a definitive indicator of no flood risk.
- Site Survey: The topographical survey reveals a steep slope from south to north, which can result in significant overland flows, increasing the potential for pluvial flooding.
- Surface Water Drainage: The surface water drainage system for the proposed development complies with relevant guidelines, ensuring that the development will not be at risk of pluvial flooding or contribute to such risks elsewhere.

The steep slope of the site makes it susceptible to overland flow from higher ground to the south. No drainage pipes entering the site were observed during the walkover.

Due to the steep terrain, the site is at risk from overland flow entering from higher ground. Although these flows are typically smaller and more dispersed than fluvial flows, several mitigation measures are recommended:

- Intercepting Drainage Paths: Where the development intercepts drainage ditches, the drainage paths should be redirected to appropriate outfalls, which will be facilitated by incorporating intercepted ditches into swales as part of the SuDS regime.



- Protection of Water-Vulnerable Areas: Drains, such as filter drains or swales, should be installed where water-vulnerable parts of the development adjoin higher ground to intercept overland flow.
- Boundary Drainage: Intercepting drains should be installed along site boundaries that adjoin higher ground, with existing drainage ditches along the southern boundary being maintained.

Provided that the recommended mitigation measures are implemented, the development will not be at risk from pluvial flooding and will not increase the pluvial flood risk to other areas. Therefore, a detailed assessment is not deemed necessary.

7.3.4.4 Groundwater Flood Risk

The flood risk assessment examined several datasets and conducted site observations to assess the potential for groundwater-related flooding at the site. The key findings are as follows:

OPW National Flood Hazard Mapping: No records of flood events linked to groundwater fluctuations were found for the site. However, the lack of public road access across much of the site means this absence is not a definitive indicator of no flood risk.

- Geological Survey of Ireland (GSI): The GSI web portal, which includes information on groundwater flooding, shows no evidence of such flooding at the site or its surrounding areas.
- Historical Ordnance Survey Mapping: These maps do not indicate any flood risk from groundwater at the site.
- Topographical Survey: The site's steep slope from south to north reduces the likelihood of localized groundwater ponding.
- Site Walkover: No signs of groundwater flood risk were observed during the on-site inspection.

The FRA concluded that the available data and observations do not suggest any significant risk of flooding from groundwater, so a detailed assessment of this flood risk mechanism is deemed unnecessary.

7.3.4.5 Residual Risk and Conclusion

The residual flood risk chapter assesses the risks that remain after implementing all mitigation measures, particularly in the context of climate change, existing drainage infrastructure, and potential failures in the surface water drainage system. The key findings are as follows:

- The assessment considered the Mid-Range Future Scenario (MRFS) for flood risk and also evaluated the High-End Future Scenario (HEFS), which represents more extreme climate conditions.
- Analyses of the stream channels and proposed culverts showed that even under the HEFS, with a 30% climate change factor applied, the channels and culverts have sufficient capacity to convey peak flows during a 1% Annual Exceedance Probability (AEP) event.
- Due to the site's steep terrain, it is not at risk of flooding even if downstream watercourses become obstructed (e.g., due to a blocked culvert). In such cases, any overflow would continue downstream without affecting the proposed development.
- The surface water drainage system is designed to handle runoff from rainfall events up to a 100-year return period, with a climate change allowance.
- In the unlikely event of a blockage causing overflow from upstream manholes, the site layout ensures that the overflow would be directed away from buildings, preventing flood risk to the structures.

The proposed development passed the Development Management Justification Test, indicating that it meets the necessary criteria to be considered appropriate despite any residual flood risks.



The proposed development is not at risk of flooding, nor will it increase flood risk elsewhere, making it suitable from a flood risk perspective.

7.3.5 Characteristics of the Proposed Development

7.3.5.1 Proposed Development

The proposed development consists of 523 no. residential units comprised of 253 no. 2, 3 & 4 bed detached, semi-detached and terraced houses, 208 no. 1, 2 & 3 bed duplex units in 20 no. 2 & 3 storey blocks, and 62 no. 1, 2 & 3 bed apartments in 4 no. 3 & 3-4 storey blocks, along with a 2-storey childcare facility of c. 457sq.m.

Private amenity space for the residential units is provided in the form of rear gardens for houses and ground floor terraces / upper floor balconies for apartments and duplex units. The proposed development provides for c. 7.38Ha of public open space and c. 5,545sq.m of communal open space associated with proposed residential units.

Vehicular access to the development will be via 4 no. access points, as follows:

- (i) from the west of the site via 2 no. accesses located off Bohernabreena Road,
- (ii) from the north of the site via 1 no. access at Dodderbrook Place,
- (iii) from Oldcourt Road (the R113) to the east, via the adjoining residential development.

The proposed development includes for pedestrian and cyclist connections and accesses to adjoining lands to the north, east and west, and includes for cycling and pedestrian routes and infrastructure throughout the development.

The proposed development includes a total of 700 no. car parking spaces, provided in the form of on-street and on-curtilage parking, and a total of 1268 no. bicycle parking spaces, provided in designated bicycle storage areas and in the form of short-term visitor spaces.

The proposed development also includes all associated site development works, demolition of existing buildings/structures, landscaping works, boundary treatments, SuDS features, drainage infrastructure, services infrastructure, bin stores, bicycle stores, car parking areas (including EV parking facilities), public lighting etc.

The subject site has been broken down into 4 No. neighbourhood zones. Neighbourhood Zone 01 is located to the southeast of the site, Neighbourhood Zone 02 is central to the site, Neighbourhood Zone 03 is to the northwest of the development and Neighbourhood Zone 04 is located to the southwest of -the site. Refer to Figure 7-10.

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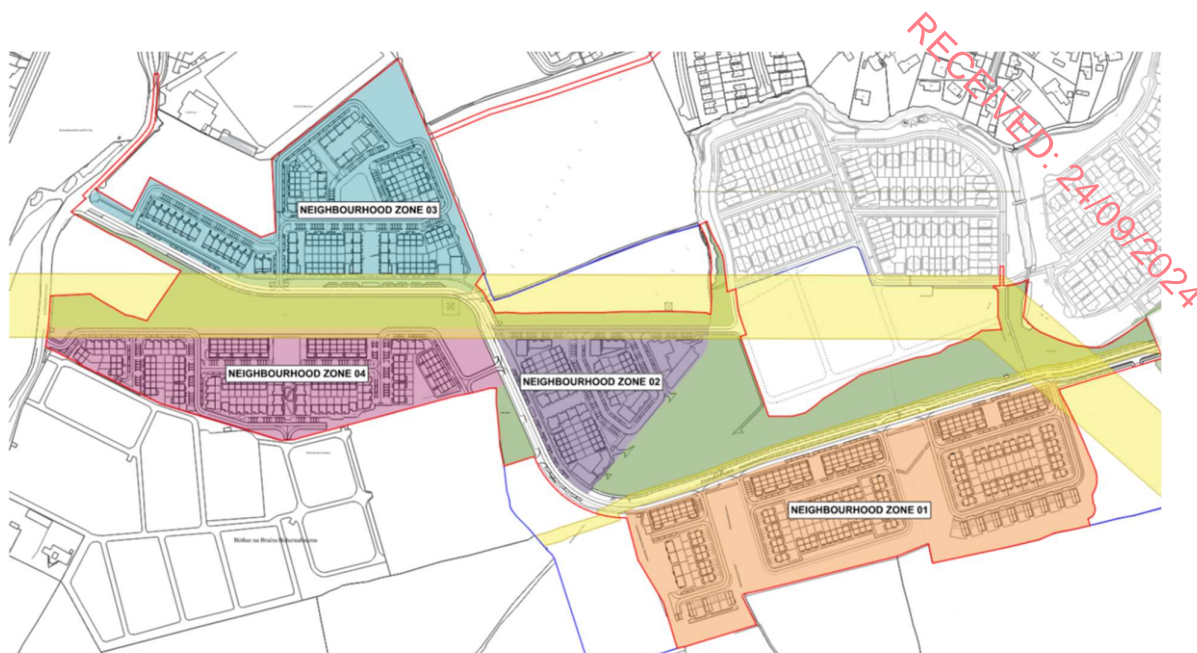


Figure 0-13: Indicative Layout of Proposed Development

7.3.5.2 Water Supply

A detailed Engineering assessment/planning report has been produced under a separate cover which would be read in conjunction with the below summary. The water supply chapter outlines the existing water infrastructure, proposed connections, network layout, water demand calculations, and necessary diversions for the development. The key points are as follows:

The site is served by two main watermain: a Ø160mm HPPE watermain along Oldcourt Road to the east and a Ø100mm uPVC watermain along Bohernabreena Road to the west. Additionally, two raw water mains (Ø375mm and Ø475mm cast iron pipes) cross the site in an east-west direction.

These two existing pipes are proposed to be diverted into a dedicated roadside servitude along the central spine road of the development. Confirmation of feasibility for this diversion was received from Irish Water under application DIV23291, with preliminary discussions held with Irish Water and the DCC drainage department.

A Pre-Connection Enquiry (PCE) issued to Uisce Éireann (Irish Water) confirmed that water connection is feasible under reference CDS23009245, subject to specific conditions. The primary connection will be from the east, linked to a future 150mm watermain provided by an adjacent development, and a secondary connection from the west, linked to the existing 4" uPVC distribution main, to be used in emergencies.

Once the Western connection becomes a primary source, the existing 100mm watermain on Bohernabreena Road will need to be upgraded to a 150mm pipe, a cost that will be borne by the developer.

The two existing raw water mains (Ø375mm and Ø475mm cast iron pipes) will be diverted along the central spine road of the development. This diversion has been approved in principle by Irish Water under application DIV23291, subject to final agreements. Figure 0-14: Uisce Éireann Existing Water Supply Infrastructure.

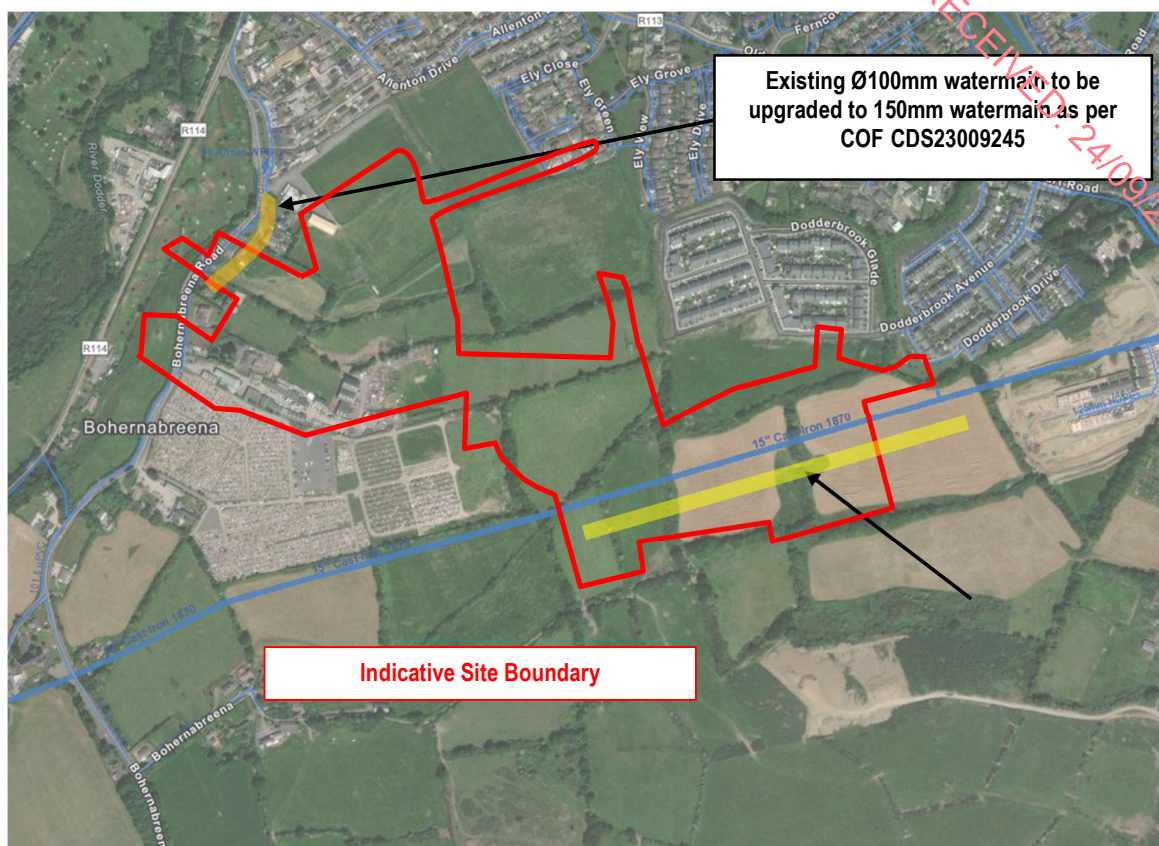


Figure 0-14: Uisce Éireann Existing Water Supply Infrastructure

The internal water supply network will consist of Ø100mm and Ø150mm HDPE pipes. Water meters, sluice valves, and hydrants will be installed according to Uisce Éireann (Irish Water) specifications and building regulations for fire safety.

The total daily water demand for the development is estimated at 223,155 liters/day, with a peak flow rate of 16.14 litres/second. This includes both residential and non-residential (creche) demand.

Overall, the water supply for the proposed development has been carefully planned, ensuring adequate capacity and compliance with regulatory requirements, with necessary infrastructure upgrades and diversions referenced under COF CDS23009245 and diversion application DIV23291 to support the development.

7.3.5.3 Foul Water Network

A detailed Engineering assessment/planning report has been produced under a separate cover which would be read in conjunction with the below summary. The foul water chapter details the existing foul sewer infrastructure, proposed drainage systems, required upgrades, and the design of temporary pumping stations for the development.

The site is currently served by an existing Ø225mm foul sewer on the west side, which drains northwards and connects to the broader network. This existing sewer will be integrated into the proposed foul network and will discharge into the public foul sewer system to the northeast, ultimately reaching the Ringsend Wastewater Treatment Works (WWTW).

The surrounding developments also have foul water networks, although the northern development is not yet reflected in Uisce Éireann (Irish Water) GIS records. Refer to Figure 0-15: Uisce Éireann Existing Foul Water Infrastructure.

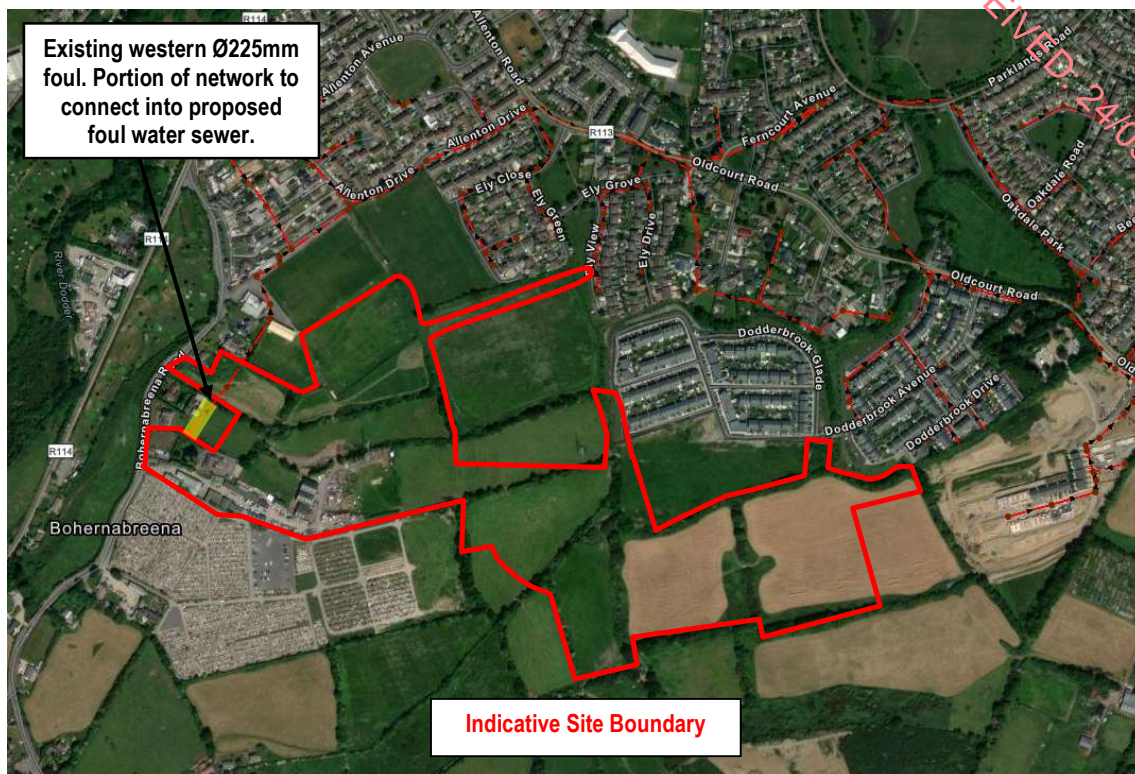


Figure 0-15: Uisce Éireann Existing Foul Water Infrastructure

A Pre-Connection Enquiry (PCE) was submitted to Uisce Éireann, resulting in a Confirmation of Feasibility (COF) under reference CDS23009245. The COF indicates that the wastewater connection is feasible but subject to upgrades:

- Initially, only Phase 1 (130 units) can connect directly to the existing network via gravity.
- The remaining units (393 units, creche, and 3 external units) will require temporary foul water pumping stations due to current capacity limitations in the downstream network.
- These temporary stations will include storage facilities and will be designed to pump effluent during off-peak times. They will be decommissioned once network upgrades by Uisce Éireann allow for a permanent gravity connection.

The development will have three main outfall connections:

- Connection 1: A gravity connection to the northeast, discharging into an existing Ø225mm public sewer.
- Connections 2 and 3: Temporarily pumped connections to the north, each discharging into existing Ø225mm sewers in adjacent residential developments.
- Refer to Figure 0-16: Masterplan Lands - Foul Water Network Connection.

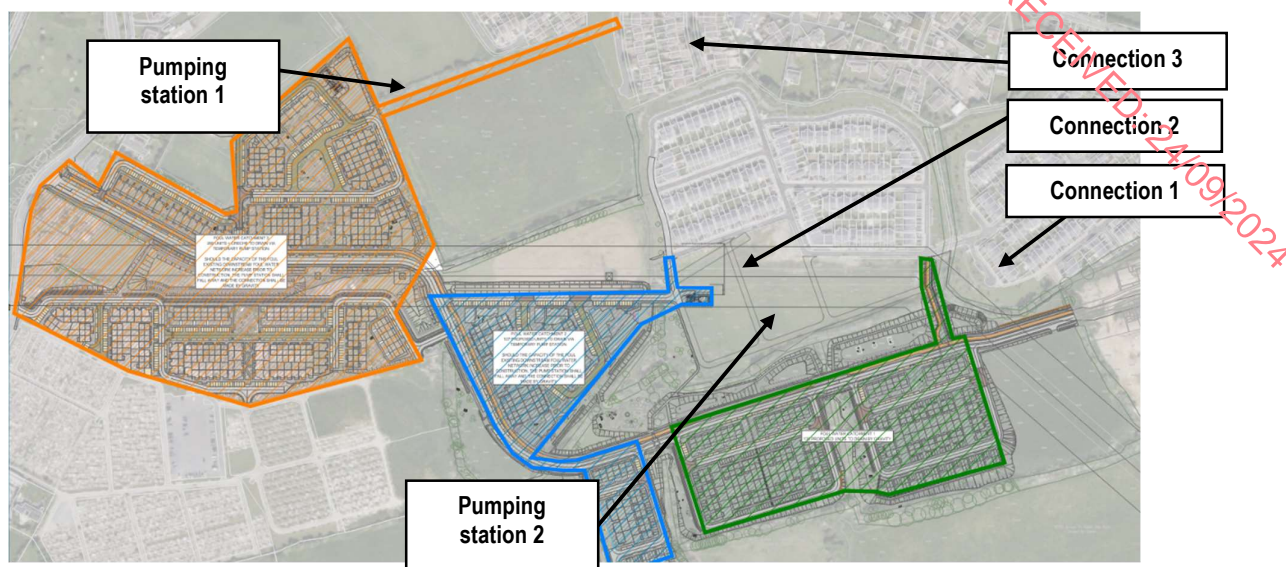


Figure 0-16: Masterplan Lands - Foul Water Network Connection

The internal foul drainage network will consist of 150/225mm diameter pipes, with each residential unit connected via individual 100mm diameter pipes. All pipes will be uPVC Class SN8, designed to meet Uisce Éireann's standards for self-cleansing velocities and compliance with the Irish Water Code of Practice for Wastewater.

The total foul water discharge for the development is estimated at 243,000 liters/day, with a peak flow rate of 18.28 litres/second. These calculations consider both residential and non-residential (creche) components.

Two temporary pumping stations will be installed, designed with holding tanks to store effluent for off-peak pumping, minimizing pressure on the downstream network. These stations will be located at the lowest points of the catchments and will be designed to be taken offline once the downstream network capacity is increased.

The stations will adhere to Uisce Éireann's Code of Practice (Part 5), ensuring compliance with all relevant standards, including safe access, flood resistance, and minimizing the risk of odour, noise, and vibration.

All proposed foul water infrastructure, including manholes, pipes, and connections, will be constructed in line with Uisce Éireann's Code of Practice for Wastewater Infrastructure and Building Regulations. Strict separation between surface water and foul sewerage will be maintained to prevent inadvertent connections.

The foul water strategy for the proposed development has been carefully planned, ensuring compliance with all relevant regulations and standards, and includes necessary temporary measures to manage capacity constraints in the existing network as outlined in the COF CDS23009245.

7.3.5.4 Surface Water Network

A detailed Engineering assessment/planning report has been produced under a separate cover which would be read in conjunction with the below summary. The surface water chapter provides a comprehensive overview of the existing drainage networks, the proposed surface water management systems, and the Sustainable Urban Drainage Systems (SuDS) designed to effectively manage runoff for the development.

The site currently features several agricultural ditches that direct surface water runoff from the south toward the north, ultimately discharging into the Dodder River. According to South Dublin County Council (SDCC) GIS records and site-

specific topographical surveys, a Ø450mm surface water sewer is located on the western edge of the site, conveying runoff from the Bohernabreena cemetery northward through the proposed development.

A provisional review of the SDCC Strategic Flood Risk Assessment (SFRA) indicated that the entire site is within Flood Zone C. A Site-Specific Flood Risk Assessment (SSFRA) by Kilgallen and Partners concluded that the proposed development is not at risk of flooding and will not increase flood risk elsewhere, making it appropriate from a flood risk perspective. Refer to Figure 0-17: Existing Surface Water GIS Information.

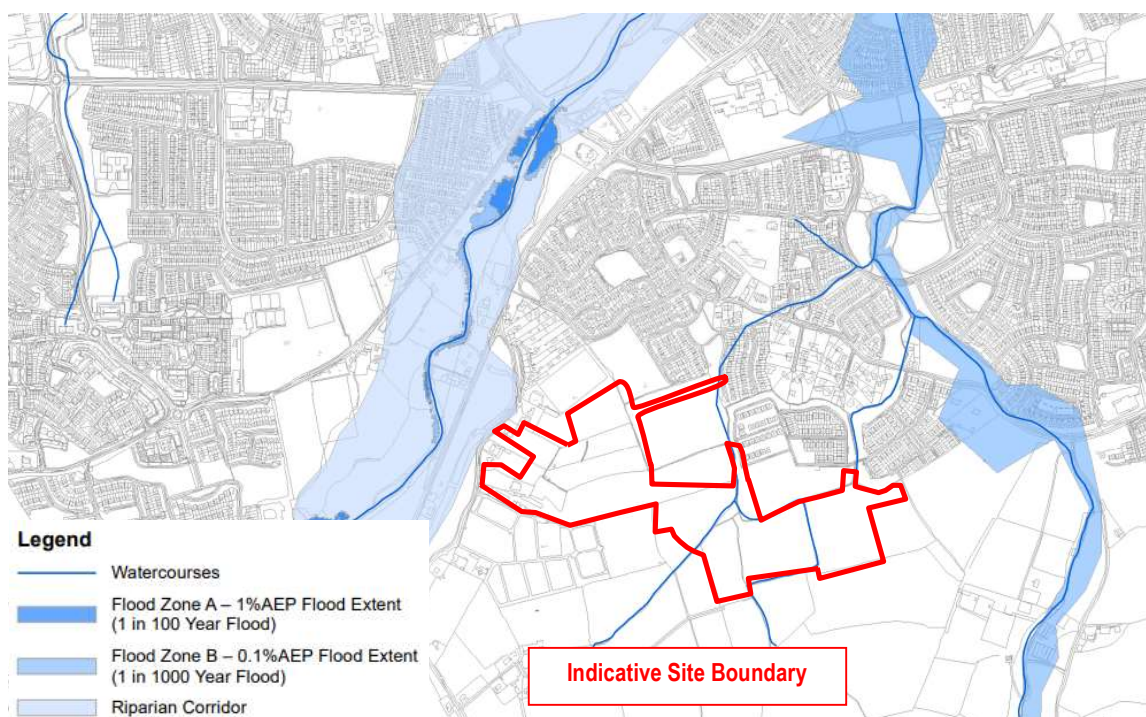


Figure 0-17: Existing Surface Water GIS Information

The topographical analysis of the site reveals that it slopes from south to north, with a high point at the southern boundary around 119.78m OD Malin. Surface water runoff currently drains freely across agricultural fields toward the north in sheet flow conditions, eventually entering a network of existing drainage ditches. These ditches capture and convey surface water from higher ground south of the site, preventing external runoff from entering the fields designated for development.

Infiltration testing conducted in July 2024 showed that the site's substrate has an adequate infiltration rate (1.4×10^{-5} m/s), which will be integrated into the SuDS design. The tests also noted groundwater presence at depths of 1.5 to 1.7 meters, and the proposed design accounts for this to avoid any impact on the groundwater table.

The existing Ø450mm surface water sewer on the site will be diverted along a new route within the proposed development. This diversion has been discussed and agreed in principle with SDCC's Water Services division to ensure it maintains the same capacity as the current system. The diversion will remain a piped system rather than an open ditch to prevent potential surface water flood risks associated with upstream discharge. The diverted pipeline will be setback a minimum of 5 meters from all proposed structures, ensuring that both the foul and surface water systems within the development remain completely isolated from this diversion. Refer to Figure 0-18: Existing Surface 450mm Pipeline to be Diverted.

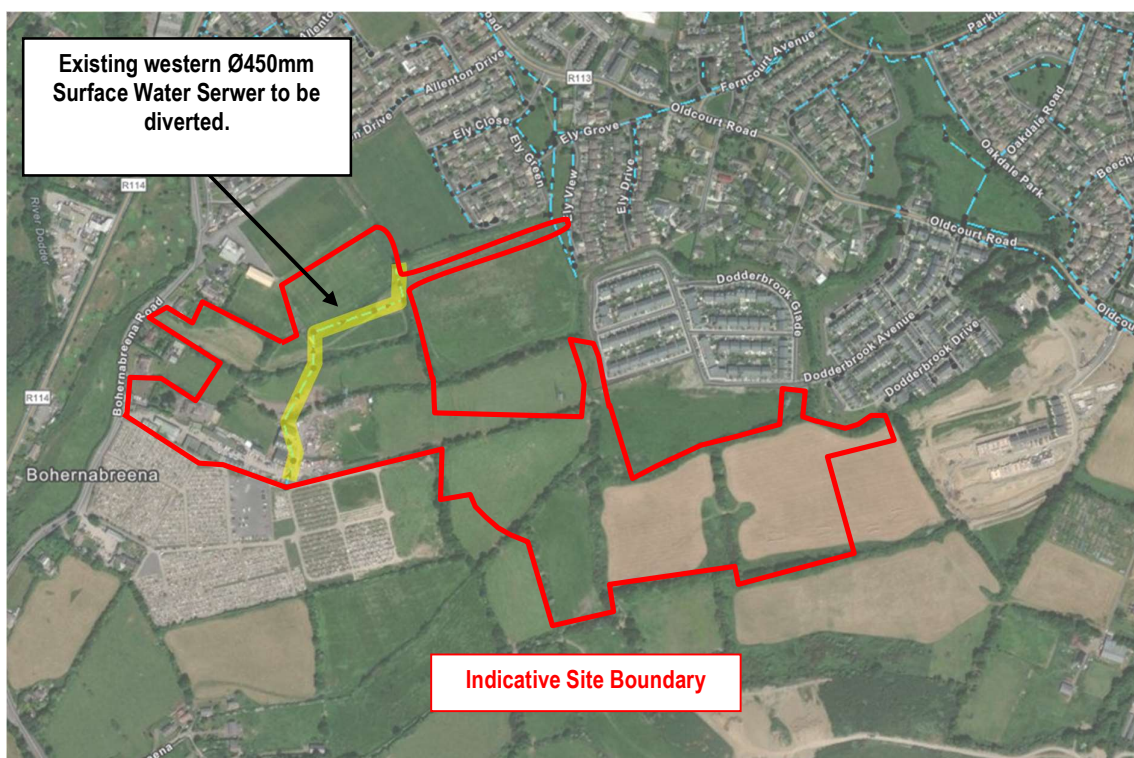


Figure 0-18: Existing Surface 450mm Pipeline to be Diverted.

The design of the surface water drainage system and SuDS measures for the site follows the guidelines set by the SDCC County Development Plan, the Greater Dublin Strategic Drainage Study (GDSDS), and the CIRIA SuDS Manual. The design aims to replicate natural drainage processes as closely as possible, minimizing the impact on the downstream environment. Given the steep nature of the site, a piped conveyance system has been incorporated as a redundancy measure. This system will engage only if upstream SuDS features are bypassed or overtopped, capturing any excess surface water and discharging it safely through attenuation basins. Roads within the development are also designed to function as overland flow routes during exceedance events, directing surface water to the attenuation basins. Refer to Figure 0-19: Post-Development Flow Route Analysis.

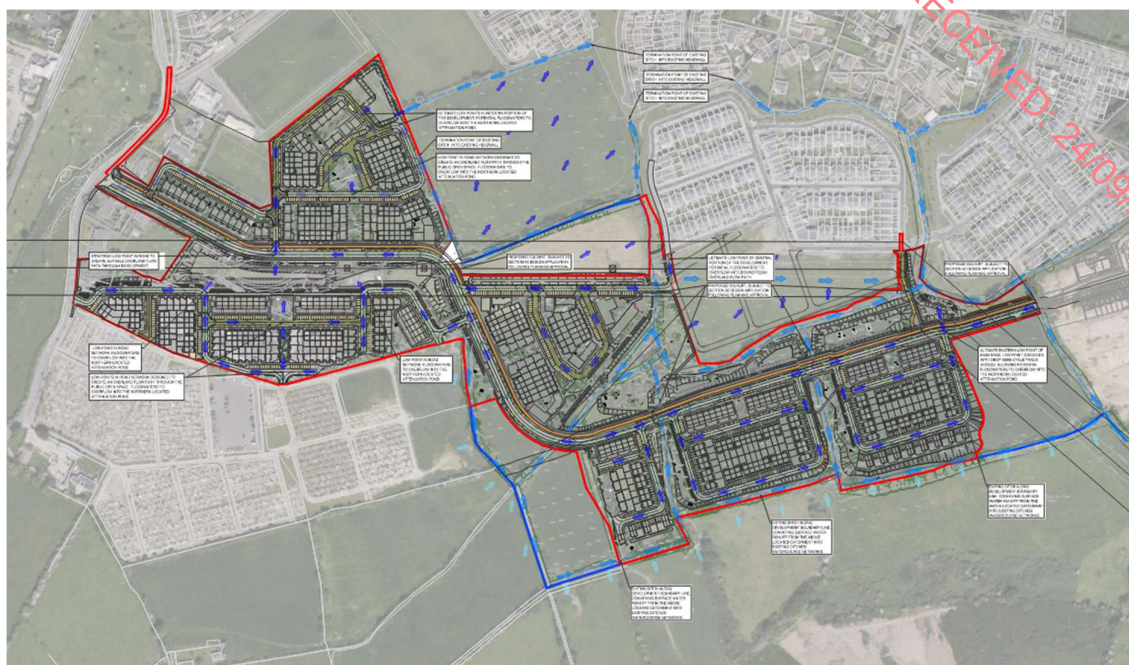


Figure 0-19: Post-Development Flow Route Analysis

All existing ditches that serve the broader surface water network in the region will be maintained across the site, with culverts installed at road crossings to preserve their function. Post-development, the surface water design will continue to capture, treat, and convey runoff northward, discharging into the existing ditches in a manner consistent with pre-development conditions.

The development site, currently in greenfield condition with some hardstanding areas, will manage surface water runoff by limiting it to the greenfield runoff rate (Q_{bar}). Attenuated runoff will discharge into the existing ditches at a controlled rate proportional to each sub-catchment area. The system will use vortex flow control devices, SuDS features, and overland nature-based solutions like basins, swales, and bio-retention infrastructure. Additionally, runoff will pass through full retention fuel/oil separators before being discharged, ensuring compliance with environmental standards. The overall estimated runoff coefficient for the development area is approximately 0.62, typical for developments of this nature. Refer to Table 0-2: Summary of Proposed Attenuation

Summary of Surface Water Discharge Rates				
Catchment 1				
	Greenfields/Pre-development (l/s)	Post-development (attenuated) (l/s)	Attenuation required (m ³)	Attenuation Provided (m ³)
Q _{bar}	20.1	-	-	-
1:10	33.5	16.2	-	-
1:30	42.1	16.4	-	-
1:100+20%CC	52.2	17.2	5003	5337
Catchment 2				
	Greenfields/Pre-development (l/s)	Post-development (attenuated) (l/s)	Attenuation required (m ³)	Attenuation Provided (m ³)
Q _{bar}	8	-	-	-
1:10	13.4	5.4	-	-
1:30	16.9	5.5	-	-
1:100+20%CC	20.9	6.2	2011	2416
Catchment 3				
	Greenfields/Pre-development (l/s)	Post-development (attenuated) (l/s)	Attenuation required (m ³)	Attenuation Provided (m ³)
Q _{bar}	23.6	-	-	-
1:10	39.4	23.3	-	-
1:30	49.6	23.6	-	-
1:100+20%CC	61.4	23.6	5893	8024

Table 0-2: Summary of Proposed Attenuation

The SuDS strategy for the development adheres to the principles outlined in the SDCC Development Management Plan and the Sustainable Drainage Explanatory Design & Evaluation Guide 2022. The strategy emphasizes managing surface water runoff as close to its source as possible, incorporating nature-based solutions like green roofs, permeable paving, swales, bio-retention tree pits, rain gardens, and detention basins. These measures not only control runoff quantity and quality but also enhance the site's biodiversity and aesthetic appeal. The SuDS features are designed to meet the requirements of the GDSDS, ensuring that post-development runoff does not exceed pre-development levels.

The conventional surface water drainage network will consist of PVC or concrete pipes, laid to comply with the Building Regulations and SDCC standards. The design includes strict separation of surface water and foul sewerage systems to prevent contamination. Road gullies will be precast trapped gullies to minimize the risk of floating contamination, and concrete bedding will be used where necessary to protect pipes from damage.

During construction, water pollution will be minimized through good practices such as bunding for oil containers, wheel washers, and dust suppression on site roads. A contingency plan for pollution emergencies will be developed, addressing containment measures, emergency discharge routes, and clean-up procedures. The proximity of the site to watercourses and aquifers has been considered in the planning stages to ensure that appropriate mitigation measures are in place.



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7.3.6 Construction Stage

The construction phase of the development will involve site stripping and excavation, exposing sub-soil layers to weathering and increasing the risk of soil erosion due to rainfall and runoff. This could result in sediments being washed into receiving watercourses or sewers, potentially causing slight to moderate negative impacts in the short to medium term if no mitigation measures are implemented.

There is also a risk during construction that contaminants from cement or concrete could be washed into the sewers, posing a similar level of potential impact on watercourses and groundwater. Additionally, accidental spills of oils or diesel from temporary storage or equipment maintenance could lead to pollution, further risking slight to moderate negative impacts.

Another concern is the possibility of foul water being incorrectly connected to the surface water drainage network or damage to foul pipes, which could result in contaminants seeping into groundwater. This could cause a moderate and permanent negative impact on watercourses and groundwater if not properly mitigated.

Overall, the construction activities have the potential to cause significant negative impacts on receiving watercourses and groundwater, ranging from short-term to permanent effects, if appropriate mitigation measures are not implemented.

7.3.7 Operational Stage

The proposed development will increase impermeable surfaces, potentially leading to higher rates of surface water runoff and increased downstream flooding. Without mitigation, this could result in a negative, slight to moderate, and short-term impact on receiving watercourses and groundwater.

The discharge of contaminants from the development, including particulates, oil, and soluble extracts from road surfaces, poses a potential risk to surrounding drainage systems. The quality of runoff is influenced by factors such as the time of year, weather conditions, and maintenance activities like gritting or salting. The first rains after a dry period, in particular, could wash accumulated pollutants into the drainage system, causing a negative, slight to moderate, and short to medium-term impact on receiving watercourses and groundwater if unmitigated.

Leaks in the foul network could lead to groundwater contamination, potentially causing a negative, slight to moderate, and short-term to permanent impact on watercourses and groundwater.

Accidental spills of fuels or hydrocarbons, along with their washdown into the drainage system, could adversely affect the receiving hydrogeology, with the potential for a negative, slight to moderate, and short to medium-term impact if not properly managed.

Watermain leaks could increase water infiltration into the underground soil strata, potentially causing a negative, slight, and short-term to permanent impact on receiving watercourses and groundwater.

Overall, the operation of the proposed development has the potential to cause a negative, slight to moderate, and short-term to permanent impact on receiving watercourses and groundwater if appropriate mitigation measures are not implemented.



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7.4. Mitigation Measures

7.4.1 Construction Stage

The following mitigation measures are to address potential impacts to water quality and are required to protect the onsite and downstream receiving surface water networks and natural environment. All works will be undertaken with reference to the following guidelines:

- CIRIA C532: Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (Masters-Williams et al., 2001);
- CIRIA C692: Environmental Good Practice on Site, (Audus et al., 2010)
- BPGCS005: Oil Storage Guidelines;
- CIRIA C648: Control of Water Pollution from Linear Construction Projects: Technical Guidance (Murnane et al., 2006a)
- CIRIA C648: Control of Water Pollution from Linear Construction Projects: Site Guide (Murnane et al., 2006a)
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI 2016)
- Guidelines for Planning Authorities – Architectural Heritage Protection – Guidance on Part IV of the Planning and Development Act 2000. (Part 2, Chapter 7) and ICOMOS Principles.
- Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (C650), 2005.
- Eastern Regional Fisheries Board, (2006), Fisheries Protection Guidelines: Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites.
- CIRIA 697, The SUDS Manual, 2007; and
- UK pollution Prevention Guidelines (PPG) UK Environment Agency, 2004

The schedule of mitigation presented within the following table summarises measures that will be undertaken in order to reduce impacts on ecological receptors within the zone of influence of the proposed development.



No.	Risk	Possible Impact	Mitigation	Result of Mitigation
1	Hydrocarbons from carparking area entering the drainage network.	Water quality impacts.	Petrol interceptor to be installed on drainage network prior to outfall to public surface water network.	Prevents hydrocarbons from entering the public surface water network.
2	Pollutants from site compound areas entering the drainage network or contaminating soils.	Water quality impacts. Soil quality impacts. Groundwater impacts.	Materials to be stored appropriately in designated areas (discussed below). Temporary foul water connection to be obtained from Uisce Éireann to serve site compound welfare facilities.	Prevents contamination of public surface water network, soil, and groundwater.
3	Pollutants from material storage areas entering the watercourse or contaminating soils.	Water quality impacts. Soil quality impacts. Groundwater impacts.	Fuels, oils, greases, and other potentially polluting chemicals will be stored in roofed and bunded compounds at the Contractor's compound. Storage area to be located over 50m away to ensure no direct pathway to the surface water network. Bunds are to be provided with 110% capacity of storage container. Spill kits will be kept on site at all times and all staff trained in their appropriate use. Method statements for dealing with accidental spillages will be provided the Contractor for review by the Employer's Representative.	Prevents contamination of public surface water network, soil, and groundwater.
4	Concrete/ cementitious materials entering the drainage network.	Water quality impacts	A designated wash down area within the Contractor's compound will be used for cleaning of any equipment or plant, with the safe disposal of any contaminated water.	Prevents contamination of public surface water network. Ensures invasive species material is not transported off site as muck.
5	Leaching of contaminated soil into groundwater.	Groundwater quality impacts	Spill kits will contain 10 hr terrestrial oil booms (80mm diameter x 1000mm) and a plastic sheet, upon which contaminated soil can be placed to prevent leaching to ground water.	Prevents contamination of groundwater.
6	Pollutants from equipment storage/ refuelling area entering the drainage network.	Water quality impacts	Any refuelling and maintenance of equipment will be done at designated bunded areas with full attendance of plant operative(s) within contained areas. Discharge licence (where required) pollutant limits to be monitored and adhered to. The site is located at least 50m from any direct pathway to the surface water drainage network.	Prevents contamination of public surface water network.
7	Runoff from exposed work areas and excavated material storage areas entering the drainage network.	Water quality impacts due to silt entering the network.	Provision of silt entrapment facilities such as; straw bales, silt fencing, silt barriers, diversion drains, settlement tank(s), & settlement pond(s), as appropriate and as outlined below.	Prevents contamination of public surface water network.

Table 0-3: Schedule of Surface Water Mitigation Measures



The most significant potential sources of contamination to the local surface water network during construction are silt, suspended particles, and chemical compounds carried by surface water runoff. Silt and suspended particles may originate from runoff over stockpiled materials or from water pumped out of excavations. To mitigate these risks, sediment entrapment facilities are essential to reduce sediment discharge into downstream properties and receiving waters. All runoff from disturbed areas will pass through these facilities before leaving the site to prevent sedimentation in downstream areas. Site stripping will be minimized to reduce erosion.

Several methods will be employed to manage sediment and silt. Straw bales can be placed at the base of slopes as temporary sediment barriers, though they are not recommended for use in swales or channels. Proper installation and maintenance are crucial as their effectiveness typically lasts only a few weeks or months. Silt fencing, made from woven synthetic geotextile material, will act as a temporary barrier along disturbed areas' contours. These fences are durable, lasting more than one season with proper maintenance, but are unsuitable for areas of concentrated flow, where more robust filtration would be necessary. Silt barriers will also be temporarily installed in road gullies on partially constructed roads to prevent sediment from entering downstream drainage systems or SuDS components. Where larger catchment areas are involved, diversion drains—simple ditches often supported by earth bunds—will channel runoff to sediment basins, which can be lined with geotextiles or stones if erosion occurs.

Settlement tanks, commercially available for this purpose, will also be used to allow suspended solids like sand and silt to settle out before runoff is discharged. Spoil heaps and stockpiles will be kept at least 20 meters away from existing surface water networks, and drainage diversion ditches will be constructed between stockpile areas and surface water networks, directing runoff to sedimentation ponds. If gravity outfall is not feasible, modular settlement tanks will be used, or outfall volumes may be pumped. No untreated surface water will be allowed to flow into natural or piped surface water networks.

During construction, the site will include compounds for offices and welfare facilities, with sanitary connections arranged with Uisce Éireann via a Temporary Connection Application. The contractor will manage daily material deliveries and ensure secure storage on-site. Measures will also be taken to prevent chemical contamination from fuel or chemical spills, which could impact soil, groundwater, and surface water. Method statements and mitigation measures will be put in place to prevent leaks and spills, including the installation of bunded and roofed storage areas for oil and petrol, designated fueling points with interceptors, and spill kits.

Where feasible, and subject to licensing, temporary connections to the public foul sewer will be used during construction for vehicle washdown water, treated via appropriate pollution control and attenuation measures. If this connection is not possible, wastewater will be stored and treated off-site at a licensed facility.

Surface water runoff from the site will be treated before discharge using settlement tanks or ponds in conjunction with proprietary treatment systems like full retention petrol interceptors and spill protection measures. Water quality will be monitored at a sampling chamber downstream of the settlement pond or tank, with regular testing as required by the discharge license. The project ecologist and site foreman will establish trigger levels for halting works if water quality standards are not met, and alternative pollution control measures will be implemented if necessary.

The discharge of surface water, post-treatment, to the public surface water network will be confirmed with the Local Authority, along with the required levels of contamination and testing frequency as part of the discharge license application. All water pumped from excavations will be treated for silt and other contaminants, with regular monitoring for hydrocarbon sheen and suspended solids, and periodic laboratory testing as specified by the Local Authority.

In addition to daily visual inspections, a comprehensive surface water monitoring program will be implemented throughout construction to ensure the protection of water quality, following the guidelines from Transport Infrastructure Ireland (TII). The parameter limit values defined in the Fresh Water Quality Regulations (EU Directive 2006/44/EEC) will serve as trigger values for surface water monitoring.



Parameter	Limit		Frequency and Manner of Samplings
	Limit Value	Guide/Mandatory	
Temperature	1.5°C	Mandatory Limit	Weekly, and at appropriate intervals where the works activities associated with the scheme have the potential to alter the temperature of the waters.
Dissolved oxygen	50% of Samples ≥ 9 (mg/l O ₂) 100% of Samples ≥ 7 (mg/l O ₂)	Guide Limit	Weekly, minimum one sample representative of flow oxygen conditions of the day of sampling
pH	6 to 9	Mandatory Limit	Weekly
Nitrites	≤ 0.01 (mg/l NO ₂)	Guide Limit	Monthly
Suspended Solids	≤ 25 (mg/l)	Guide Limit	Monthly
BOD5	≤ 3 (mg/l)	Guide Limit	Monthly
Phenolic Compounds	-	-	Monthly where the presence of phenolic compounds is presumed (An examination by test)
Petroleum Hydrocarbons	5 (mg/l)	Guide Limit	Monthly (visual)
Non-Ionized Ammonia	≤ 0.005 (mg/l NH ₃)	Guide Limit	Monthly
Total Ammonium	≤ 0.004 (mg/l NH ₄)	Guide Limit	Monthly
Total Residual Chlorine	≤ 0.005 (mg/l HOCl)	Mandatory Limit	At appropriate intervals where works activities associated with the scheme have the potential to alter the Total residual Chlorine of the waters
Electrical Conductivity	-	-	Weekly

Table 0-4: Monitoring Guidelines (Fresh Water Quality Regulations)

The Main Contractor will hold overall responsibility for implementing the Construction Surface Water Management Plan (CSWMP) during the construction phase. A designated member of the Main Contractor's team, who is appropriately trained, will be assigned the authority to ensure all site personnel comply with the CSWMP. Additionally, each sub-contractor will designate a representative responsible for the ongoing execution of the CSWMP within their respective operations.

Copies of the CSWMP will be distributed to all relevant personnel on-site. Both site personnel and sub-contractors will be briefed on the CSWMP's objectives and their specific responsibilities under the plan.

The appointed person's responsibilities will include:

- Updating the CSWMP as needed to reflect on-site activities.
- Advising site management on environmental matters, including pre-construction checks for protected species.
- Reviewing sub-contractors' method statements to ensure they incorporate all aspects of the CSWMP.
- Providing training, including toolbox talks, to ensure all personnel understand and can implement mitigation measures.



- Assessing the effectiveness of mitigation measures and monitoring weather forecasts and site conditions where trigger levels are required.
- Ensuring adherence to specific measures outlined in the Planning Conditions.
- Advising on the production of method statements and site environmental rules, and ensuring these are communicated to the workforce.
- Investigating environmental incidents, ensuring corrective actions are taken, and recommending measures to prevent recurrence.
- Maintaining all environmental documentation and ensuring that the plant used is environmentally suited to the tasks.
- Coordinating environmental planning of construction activities to meet environmental authority requirements, while minimizing environmental risks.
- To minimize adverse effects, the timing of site stripping will consider prevailing weather conditions and the time of year. Precast concrete units will be used where possible to reduce on-site “wet” concrete mixing, and in-situ concrete pours will be managed according to best practices to prevent overspills. Wheel wash and washdown facilities will be provided in designated areas, with discharge directed into settlement ponds or silt traps.
- For any construction near existing watermains, the contractor will produce a detailed method statement outlining procedures. All watermains will be cleaned and tested according to Uisce Éireann guidelines before connection to the public watermain, with connections performed under Uisce Éireann’s supervision.
- To mitigate the risk of defective or leaking foul and surface sewers, several measures will be implemented:
 - New foul sewers will undergo air testing during construction, in line with Uisce Éireann’s Code of Practice.
 - Private drainage systems will be inspected and signed off by the Design Engineer, complying with Building Regulations Part H and BCAR requirements.
 - Foul sewers will be surveyed by CCTV before connection to identify potential defects.
 - Connections to the public sewer will be carried out under Uisce Éireann’s supervision and checked before commissioning.
 - Utilities and public services will be identified and protected before any excavation in public areas begins.
 - Surface water networks will be constructed and tested according to Local Authority requirements for Taking in Charge.
- These measures will ensure that construction activities comply with environmental standards, minimizing the risk of water contamination and infrastructure defects.

7.4.2 Operational Stage

The implementation of the following operation stage mitigation measures will minimise the impact on the hydrology and hydrogeology aspects of the development lands:

The surface water drainage network has been designed in accordance with the CIRIA SUDS Manual and the Greater Dublin Strategic Drainage Scheme. The appropriate interception mechanisms and treatment train process has been incorporated into the design. A detailed SUDS maintenance manual has been provided under a sperate cover.

Surface water outflow will be restricted to or below the equivalent greenfield runoff rate from the proposed detention basin as per the drainage design, in accordance with South Dublin County Council requirements.

Sustainable urban drainage measures, including permeable paving, swales, and rain gardens will be provided to improve water quality.

A petrol interceptor will be installed to prevent hydrocarbons entering the local drainage system at the outfall.



A maintenance regime for the SuDS features will be incorporated to the Operation and Maintenance manual for the development. Surface SuDS features can typically be maintained as part of the regular maintenance of the landscape, incorporating litter picking, grass cutting, and inspections. Table 0-5: Regular Maintenance Requirements for SuDS is an extract from Section 12.3 of the SuDS Design & Evaluation Guide, and generally describes the regular maintenance aspect for the SuDS.

Type	Activity	Normal site care (Site) or SuDS-specific maintenance (SuDS)	Suggested frequency
Regular Maintenance			
Litter	Pick up all litter in SUDS Landscape areas along with remainder of the site – remove from site	Site	1 visit monthly
Grass	Mow all grass verges, paths and amenity grass at 35-50mm with 75mm max. Leaving cuttings in situ	Site	As required or 1 visit monthly
Grass	Mow all dry swales, dry SUDS basins and margins to low flow channels and other SUDS features at 100mm with 150mm max. Cut wet swales or basins annually as wildflower areas – 1st and last cuts to be collected	Site	4-8 visits per year or as required
Grass	Wildflower areas strimmed to 100mm in Sept or at end of school holidays – all cuttings removed Or Wildflower areas strimmed to 100mm on 3 year rotation – 30% each year – all cuttings removed	Site	1 visit annually 1 visit annually
Inlets & outlets	Inspect monthly, remove silt from slab aprons and debris. Strim 1m round for access	SuDS	1 visit monthly
Permeable paving	Sweep all paving regularly to keep surface tidy	Site	1 visit annually or as required

Table 0-5: Regular Maintenance Requirements for SuDS

There will still be a remaining requirement for more intensive maintenance tasks to be undertaken however, the severity of these tasks can be reduced by regular inspections and proactive responses being incorporated as a part of the regular maintenance regime discussed above. Table 0-3: Further Maintenance Requirements for SuDS shows the typical requirements for the occasional maintenance tasks and remedial works, extracted from the SuDS Design & Evaluation Guide.

Occasional Tasks			
Permeable paving	Sweep and suction brush permeable paving when ponding occurs	SuDS	As required – estimate 10-15 year intervals
Flow controls	Annual inspection of control chambers - remove silt and check free flow	SuDS	1 visit annually
Wetland & pond	Wetland vegetation to be cut at 100mm on 3 – 5 year rotation or 30% each year. All cuttings to be removed to wildlife piles or from site.	Site	As required
Silt	Inspect swales, ponds, wetlands annually for silt accumulation.	Site & SuDS	1 visit annually
Silt	Excavate silt, stack and dry within 10m of the SuDS feature, but outside the design profile where water flows. Spread, rake and overseed.	Site & SuDS	As required
Native planting	Remove lower branches where necessary to ensure good ground cover to protect soil profile from erosion.	SuDS	1 visit annually
Remedial Work			
General SuDS	Inspect SuDS system to check for damage or failure when carrying out other tasks.	SuDS	Monthly
	Undertake remedial work as required.		As required

Table 0-3: Further Maintenance Requirements for SuDS

Surface water sewers will generally consist of PVC (to IS 123) or concrete socket and spigot pipes (to IS 6) and laid strictly in accordance with Dublin City Council requirements for taking in charge. It is intended that all sewers within the public domain will be handed over to South Dublin County Council for taking in charge.

All private outfall manholes will be built in accordance with the Greater Dublin Regional Code of Practice for Drainage Works. No private drainage will be located within public areas.

Drains will be laid in accordance with the requirements of the Building Regulations, Technical Guidance Document H.

All SuDS and surface water drainage networks proposed in the public domain will be constructed to the standards required for Taking in Charge.

Water metering via district meters will be installed to Uisce Éireann requirements. Monitoring of the telemetry data will indicate any excessive water usage which may indicate the potential for a leak in the watermain network. Early identification of potential leaks will lead a faster response in determining the exact location of leaks and completion of remedial works.

It is not envisaged that any further remedial or reductive measures will be necessary upon completion.



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7.5. Residual Impacts

7.5.1 Construction Stage

Due to the proposed remedial measures outlined above no significant adverse impacts are expected to arise during the construction phase of the proposed development. There will be a minor increase in water demand and foul water outflow during the period of construction. This increase in water demand and foul flows generated will be negative, slight (not significant), likely and short-term in nature.

7.5.2 Operational Stage

Due to the proposed mitigation measures outlined above no significant, adverse impacts are expected as many of the potential impacts will not arise during the operational phase of the proposed development on surface water and groundwater quality.

Surface water discharge from the site will be restricted by means of attenuation to or below the current greenfield runoff rate, therefore, no adverse impact in respect of flooding downstream will arise from the proposed development. The impact will be positive, slight (not significant), & permanent.

The installation of a Sustainable Urban Drainage System will ensure surface water runoff will be of high quality before discharge to the local surface water network and will not have an impact on the receiving waters downstream of the development. The impact will be positive, slight (not significant), & permanent.

There will be an increased water demand, and an increased foul flow volume generated for the proposed development. A pre-connection enquiry for the development has been submitted to Uisce Éireann with a confirmation of feasibility awaited. The impact will be negative, slight (not significant) and permanent.

7.6. Water Framework Directive Status

There is no potential for adverse or minor temporary, or localised effects on the surrounding groundwater body as a result of the proposed development. Therefore, it has been assessed that it is unlikely that the proposed development will cause any significant deterioration on its water body status or prevent attainment or potential to achieve the WFD objectives.

There are appropriately designed mitigation and design measures which will be implemented during the construction phase to protect the hydrogeological environment. There is a potential of accidental discharges during the construction and operational phases however, these are temporary, short-term events that will not impact on the water status of the underlying aquifer long-term and as such will not impact on trends in water quality and overall status assessments.

7.7. Cumulative Impacts

7.7.1 Interactions

The main interactions relating to this EIAR Chapter are Land & Soils, Biodiversity, and Utilities.

During construction stage, the connection of wastewater services has the potential to impact groundwater and soils if wastewater were to leak from the network during the construction process. There are potential implications for the local populations if there is a disruption to utility services during the connection of the new services to the proposed development. The construction of the various services will also interact with construction traffic as outlined in the Traffic and Transport Chapter.

During the operation stage, the water supply and foul drainage services have a potential interaction with the available water supply and with potential pollution to natural water bodies.



In respect of Land & Soils, interaction between surface and ground water and the bedrock geology is feasible. The implementation of the mitigation measures outlined in this chapter will reduce the potential of surface contaminants leaking into the underlying geology.

In respect of Biodiversity, there is interaction between hydrology and the downstream habitats present as the public surface water network outfalls volume and water quality to the natural watercourse. The mitigation measures ensure that surface water runoff is treated to the required standards so that downstream habitats are not negatively impacted.

7.7.2 Potential Cumulative Impacts

7.7.2.1 Construction Stage

There are no anticipated construction stage cumulative impacts arising from the proposed development, or any further development in the locality in relation to water, other than a neutral, imperceptible, and temporary increase in water supply demand and increase to foul flows generated.

7.7.2.2 Operational Stage

There are no anticipated cumulative impacts arising from the proposed development, or any further development in the locality in relation to water, other than a neutral, imperceptible, and permanent increased water supply demand and increase to foul flows generated.

This is based on the current EIAR assessment of the masterplan lands as a whole rather than just the subject application site. Mitigation measures noted throughout this report apply to the full masterplan lands and their subsequent planning application and not just the subject application.

7.8. Risks to Human Health

There is a risk to Human Health should the ground water or the existing water supply become contaminated during the construction or operational stages, and the water is consumed. In order to mitigate these risks, the measures outlined previously will be adopted.

7.9. Monitoring

7.9.1. Construction Stage

Implementation of the Construction Management Plan is required to protect the hydrology and groundwater elements of the subject lands during construction stage. Maintenance of the mitigation measures and monitoring of the management processed is required to ensure best practice.

The monitoring measures to be implemented include:

- Monitoring of the management and storage of dangerous chemicals and fuel.
- Monitoring and maintenance of the wash and wheel wash facilities.
- Regular maintenance and monitoring of the sediment control measures.
- Monitoring and maintenance of the SUDS features, road gullies and, attenuation ponds and or sedimentation facilities during the construction phase of the development.

7.9.2 Operation Stage

Monitoring and maintenance of the water metering telemetry, SUDS features, road gullies, attenuation, and flow control devices are imperative during the operation phase of the development.



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7.10. Difficulties Encountered

There were no difficulties encountered compiling the Water chapter of the EIAR.

7.11. Reinstatement

No reinstatement is anticipated on site with respect to the Water environment.

7.12. References

- Environmental Impact Assessment Reports – Guidelines, (2022), Environmental Protection Agency
- Environmental Protection Agency mapping available at <http://gis.epa.ie/EPAMaps/>
- Geological datasets available at www.gsi.ie
- Greater Dublin Strategic Drainage Study (GDSDS), (2015), Dublin Drainage
- OPW Eastern CFRAM study



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8.0. Air Quality

8.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects on air quality associated with the proposed development in the townlands of Bohernabreena, Oldcourt, and Killinenny, Dublin 24.

8.2. Expertise & Qualifications

This chapter was completed by Ciara Nolan. Ciara is a Senior Environmental Consultant in the Air Quality & Climate section of AWN Consulting. She holds a BSc in Energy Systems Engineering from University College Dublin and has also completed an MSc in Applied Environmental Science at UCD. She is a Member of the Institute of Air Quality Management (MIAQM) and the Institute of Environmental Science (MIEnvSc). She has over 7 years of experience in undertaking air quality and climate assessments. She has prepared air quality and climate impact assessments as part of EIARs for residential developments including Woodbrook, Shankill (Planning Application Ref. ABP30584419), Ballygossan Park, Skerries (Planning Application Ref. LRD0010/S3), SHD Ratoath (Planning Application Ref. SH305196), SHD Rathmullen, Drogheda (Planning Application Ref. SH305552), commercial and industrial developments by Dublin Airport Authority, Abbvie, Mountpark, Pfizer, Takeda, as well as renewable energy developments such as Crockahenny Windfarm, Upperchurch Windfarm, Knocknamona Windfarm and Keerglen Windfarm. She also specialises in conducting air dispersion modelling assessments of emissions from data centres, energy centres and the chemical industry as part of EPA Industrial Emissions Licences for Echelon DC, AWS, Takea, MSD and Regeneron. She has undertaken air quality and climate impact assessments for transportation schemes, primarily regional and national road schemes, from constraints, through to route selection and EIAR stage.

8.3. Description of the Proposed Development

The proposed development is located in the townlands of Bohernabreena, Oldcourt, and Killinenny, Dublin 24. The proposed development will consist of a mix of residential units and all associated site works. A full description of the proposed development is outlined in Chapter 3 (Description of Development & Alternatives) of this EIAR.

8.3.1 Aspects Relevant to this Assessment

During the construction phase construction dust emission have the potential to impact air quality. Dust emissions will primarily occur as a result of site preparation works, earthworks and the movement of trucks on site and exiting the site. There is also the potential for engine emissions from site vehicles and machinery to impact air quality. Construction phase impacts will be short-term in duration.

Engine emissions from vehicles accessing the site have the potential to impact air quality during the operational phase of the development through the release of NO₂, PM₁₀ and PM_{2.5}. Operational phase impacts will be long-term in duration.



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8.4. Methodology

8.4.1 Relevant Legislation & Guidance

The principal guidance and best practice documents used to inform the assessment of potential impacts on Air Quality is summarised below.

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018);
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022);
- Guidance on the Assessment of Dust from Demolition and Construction Version 2.2 (Institute of Air Quality Management (IAQM), 2024);
- Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106 (TII, 2022) and TII Road Emissions Model (REM) online calculator tool (TII, 2024).

8.4.1.1 Ambient Air Quality Standards

In order to reduce the risk to health from poor air quality, National and European statutory bodies, the Department of the Environment, Heritage and Local Government (DEHLG) in Ireland and the European Parliament and Council of the European Union, have set limit values in ambient air for a range of air pollutants. These limit values or “Air Quality Standards” are health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set.

Air quality significance criteria are assessed based on compliance with the appropriate standards or limit values. The applicable standards in Ireland include the Air Quality Standards Regulations 2022, which incorporate European Commission Directive 2008/50/EC, which has set limit values for numerous pollutants. The limit values for NO₂, PM₁₀, and PM_{2.5} are relevant to this assessment. Council Directive 2008/50/EC combines the previous Air Quality Framework Directive (96/62/EC) and its subsequent daughter directives (including 1999/30/EC and 2000/69/EC) and includes ambient limit values relating to PM_{2.5}. The applicable limit values for NO₂, PM₁₀, and PM_{2.5} are set out in Table 0.4.



Pollutant	Regulation ^{Note 1}	Limit Type	Value
Dust Deposition	TA Luft (German VDI, 2002)	Annual average limit for nuisance dust	350 mg/m ² /day
Nitrogen Dioxide	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m ³
		Annual limit for protection of human health	40 µg/m ³
Particulate Matter (as PM ₁₀)	2008/50/EC	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m ³ PM ₁₀
		Annual limit for protection of human health	40 µg/m ³ PM ₁₀
Particulate Matter (as PM _{2.5}) – Stage 1	2008/50/EC	Annual limit for protection of human health	25 µg/m ³ PM _{2.5}
Particulate Matter (as PM _{2.5}) – Stage 2 ^{Note 2}	2008/50/EC	Annual limit for protection of human health	20 µg/m ³ PM _{2.5}

Table 0.4 Ambient Air Quality Standards & TA Luft

Note 1 EU 2008/50/EC – Clean Air For Europe (CAFÉ) Directive replaces the previous Air Framework Directive (1996/30/EC) and daughter directives 1999/30/EC and 2000/69/EC

Note 2 Stage 2 indicative limit value for PM_{2.5} to be applied from 1 January 2020 after review by the European Commission. However, no update has yet been published.

In April 2023, the Government of Ireland published the Clean Air Strategy for Ireland (Government of Ireland, 2023), which provides a high-level strategic policy framework needed to reduce air pollution. The strategy commits Ireland to achieving the 2021 WHO Air Quality Guidelines Interim Target 3 (IT3) by 2026, the IT4 targets by 2030 and the final targets by 2040 (shown in Table 0.5). The strategy notes that a significant number of EPA monitoring stations observed air pollution levels in 2021 above the WHO targets; 80% of these stations would fail to meet the final PM_{2.5} target of 5 µg/m³ (WHO, 2021). The strategy also acknowledges that “*meeting the WHO targets will be challenging and will require legislative and societal change, especially with regard to both PM_{2.5} and NO₂*”. Ireland will revise its air quality legislation in line with the proposed EU revisions to the CAFE Directive, which will set interim 2030 air quality standards and align the EU more closely with the WHO targets.

At present, the applicable standards for assessing compliance in relation to air quality are those outlined in Table 0.4.



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Pollutant	Regulation	Limit Type	IT3 (2026)	IT4 (2030)	Final Target (2040)
NO ₂	WHO Air Quality Guidelines	24-hour limit for protection of human health	50 µg/m³	50 µg/m³	25 µg/m³
		Annual limit for protection of human health	30 µg/m³	20 µg/m³	10 µg/m³
PM (as PM ₁₀)		24-hour limit for protection of human health	75 µg/m³	50 µg/m³	45 µg/m³
		Annual limit for protection of human health	30 µg/m³	20 µg/m³	15 µg/m³
PM (as PM _{2.5})		24-hour limit for protection of human health	37.5 µg/m³	25 µg/m³	15 µg/m³
		Annual limit for protection of human health	15 µg/m³	10 µg/m³	5 µg/m³

Table 0.5 WHO Air Quality Guidelines

8.4.1.2 Dust Deposition Guidelines

The concern from a health perspective is focused on particles of dust, which are less than 10 microns, and the EU ambient air quality standards outlined in Section 0 have set ambient air quality limit values for PM₁₀ and PM_{2.5}.

With regard to larger dust particles that can give rise to nuisance dust, there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland.

However, guidelines for dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (German VDI, 2002) sets a maximum permissible emission level for dust deposition of 350 mg/m²/day averaged over a one-year period at any receptors outside the site boundary. The TA-Luft standard has been applied for the purpose of this assessment based on recommendations from the EPA in Ireland in the document titled *Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals)* (EPA, 2006). The document recommends that the TA-Luft limit of 350 mg/m²/day be applied to the site boundary of quarries. This limit value can be implemented with regard to dust impacts from construction of the proposed development.

8.4.1.3 Air Quality and Traffic Impact Significance Criteria

The TII document *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022) details a methodology for determining air quality impact significance criteria for road schemes which can be applied to any project that causes a change in traffic. The degree of impact is determined based on the percentage change in pollutant concentrations relative to the Do Nothing scenario. The TII significance criteria are outlined in Table 4.9 of *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022) and reproduced in Table 0.6 below. These criteria have been adopted for the proposed development to predict the impact of NO₂, PM₁₀ and PM_{2.5} emissions as a result of the proposed development.



Long Term Average Concentration at Receptor in Assessment Year	% Change in Concentration Relative to Air Quality Limit Value (AQLV)			
	1%	2-5%	6-10%	>10%
75% or less of AQLV	Neutral	Neutral	Slight	Moderate
76 – 94% of AQLV	Neutral	Slight	Moderate	Moderate
95 – 102% of AQLV	Slight	Moderate	Moderate	Substantial
103 – 109% of AQLV	Moderate	Moderate	Substantial	Substantial
110% or more of AQLV	Moderate	Substantial	Substantial	Substantial

Source

Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106 (TII, 2022)

Table 0.6 Air Quality Significance Criteria

8.4.2 Site Surveys/Investigations

No on-site surveys were required for the air quality assessment. The baseline air quality environment was established using available long-term EPA monitoring data for representative locations (see Section 0).

8.4.3 Construction Phase Methodology

8.4.3.1 Construction Dust Assessment

The Institute of Air Quality Management in the UK (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction*' (IAQM, 2024) outlines an assessment method for predicting the impact of dust emissions from construction activities based on the scale and nature of the works and the sensitivity of the area to dust impacts. The IAQM methodology has been applied to the construction phase of this development in order to predict the likely risk of dust impacts in the absence of mitigation measures and to determine the level of site-specific mitigation required. The use of UK guidance is recommended by Transport Infrastructure Ireland in their guidance document *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022).

The major dust generating activities are divided into four types within the IAQM guidance (IAQM, 2024) to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout (transport of dust and dirt from the construction site onto the public road network).

The magnitude of each of the four categories is divided into Large, Medium or Small scale depending on the nature of the activities involved. The magnitude of each activity is combined with the overall sensitivity of the area to determine the risk of dust impacts from site activities. This allows the level of site-specific mitigation to be determined.

8.4.3.2 Construction Phase Traffic Assessment

Construction phase traffic has the potential to impact air quality. The TII guidance *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022), states that road links meeting one or more of the following criteria can be defined as being 'affected' by a proposed development and should be included in the local air quality assessment. While the guidance is specific to infrastructure projects the approach can be applied to any



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development that causes a change in traffic.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- Daily average speed change by 10 kph or more;
- Peak hour speed change by 20 kph or more;
- A change in road alignment by 5m or greater.

The construction stage traffic will not increase by 1,000 AADT or 200 HDV AADT and therefore does not meet the above scoping criteria. In addition, there are no proposed changes to the traffic speeds or road alignment. As a result a detailed air assessment of construction stage traffic emissions has been scoped out from any further assessment as there is no potential for significant impacts to air quality.

8.4.4 Operational Phase Methodology

8.4.4.1 Operational Phase Traffic Assessment

Operational phase traffic has the potential to affect local air quality as a result of increased vehicle movements associated with the proposed development. The TII scoping criteria detailed in Section 0 were used to determine if any road links are affected by the proposed development and require inclusion in a detailed air quality modelling assessment. The proposed development will result in the operational phase traffic increasing by more than 1,000 AADT on 2 no. road links. Therefore, a detailed air quality modelling assessment of operational phase traffic emissions was conducted.

The impact to air quality due to changes in traffic is assessed at sensitive receptors in the vicinity of affected roads. The receptor locations are discussed in further detail within Section 0 and shown graphically in Figure 0.22.

The TII guidance (TII, 2022) states that modelling should be conducted for NO₂, PM₁₀ and PM_{2.5} for the Base, Opening and Design Years for both the Do Minimum (Do Nothing) and Do Something scenarios. Modelling of operational NO₂, PM₁₀ and PM_{2.5} concentrations has been conducted for the Do Nothing and Do Something scenarios using the TII Road Emissions Model (REM) online calculator tool (TII, 2024).

The following inputs are required for the REM tool: receptor locations, light duty vehicle (LDV) annual average daily traffic movements (AADT), annual average daily heavy duty vehicles (HDV AADT), annual average traffic speeds, road link lengths, road type, project county location and pollutant background concentrations. The *Default* fleet mix option was selected along with the *Intermediate Case* fleet data base selection, as per TII Guidance (TII, 2024). The *Intermediate Case* assumes a linear interpolation between the *Business as Usual* case – where current trends in vehicle ownership continue and the *Climate Action Plan (CAP)* case – where adoption of low emission light duty vehicles occurs.

Using this input data, the model predicts the road traffic contribution to ambient ground level concentrations at the identified sensitive receptors using generic meteorological data. The TII REM uses county-based Irish fleet composition for different road types, for different European emission standards from pre-Euro to Euro 6/VI with scaling factors to reflect improvements in fuel quality, retrofitting, and technology conversions. The TII REM also includes emission factors for PM₁₀ emissions associated with brake and tire wear (TII, 2024). The predicted road contributions are then added to the existing background concentrations to give the predicted ambient concentrations. The ambient concentrations are then compared with the relevant ambient air quality standards to assess the compliance of the proposed development with these ambient air quality standards.



The TII document *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022) states that impacts to sensitive ecology as a result of traffic emissions should be considered. Consideration should be given to designated sites within 2 km of the proposed development; however, a detailed assessment is only required at a local level, where there is a designated site within 200 m of affected road links. The Glenasmole Valley SAC and proposed NHA (site code 001209) is a European sensitive designated site within 2 km of the proposed development. However, this is not within 200m of any impacted road links and therefore an assessment of air quality impacts from traffic emissions on ecology was not required and there is no potential for significant effects.

8.4.4.2 Traffic Data used in Modelling Assessment

Traffic flow information was obtained from Pinnacle Consulting Engineers for the purposes of this assessment. Data for the Base Year 2024 and the Do Nothing and Do Something scenarios for the Opening Year 2030 and Design Year 2045 were provided. In order to assess the full cumulative impact of the development, the traffic data has included specific cumulative developments within the wider area, specifically SD23A/0083, SD22A/0356, SD23A/0149 and SHD3-ABP-310578-21 (see Chapter 12 (Material Assets: Transportation) and Traffic and Transportation Assessment for further details).

The traffic data are detailed in Table 0.7. Only road links that met the TII scoping criteria and that were within 200 m of receptors were included in the modelling assessment. Background concentrations have been included as per Section 8.5 of this chapter based on available EPA background monitoring data (EPA, 2023). Figure 0.22 shows the location of sensitive receptors and modelled road links used in the operational phase air quality assessment.

Road Name	Speed (kph)	Base Year 2024	Opening Year 2030		Design Year 2045	
			Do Nothing	Do Something	Do Nothing	Do Something
		LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)
3A – R113	50	5,182 (61)	5,712 (5645)	7,010 (83)	6,065 (72)	7,429 (88)
3B – R113	50	5,100 (59)	5,620 (5556)	6,899 (80)	5,969 (69)	7,312 (85)

Table 0.7 Traffic Data Used in Operational Phase Air Quality Modelling Assessment

8.5. Baseline Environment

8.5.1 Meteorological Data

A key factor in assessing temporal and spatial variations in air quality is the prevailing meteorological conditions. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutant levels under the same source strength (i.e. traffic levels) (WHO, 2006). Wind is of key importance in dispersing air pollutants and for ground level sources, such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Thus, concentrations of pollutants derived from traffic sources will generally be greatest under very calm conditions and low wind speeds when the movement of air is restricted. In relation to PM₁₀, the situation is more complex due to the range of sources of this pollutant. Smaller particles (less than PM_{2.5}) from traffic sources will be dispersed more rapidly at higher wind speeds. However, fugitive emissions of coarse particles (PM_{2.5} - PM₁₀) will actually increase at higher wind speeds. Thus, measured levels of PM₁₀ will be a non-linear function of wind speed.

The nearest representative weather station collating detailed weather records is Casement Aerodrome meteorological station, which is located approximately 7.3 km north-west of the site. Casement Aerodrome meteorological data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (see Source: Met Éireann, 2024)

Figure 0.20). For data collated during five representative years (2019 – 2023), the predominant wind direction is westerly to south-westerly with a mean wind speed of 5.4 m/s over the 30-year period 1991 – 2020 (Met Éireann, 2024).

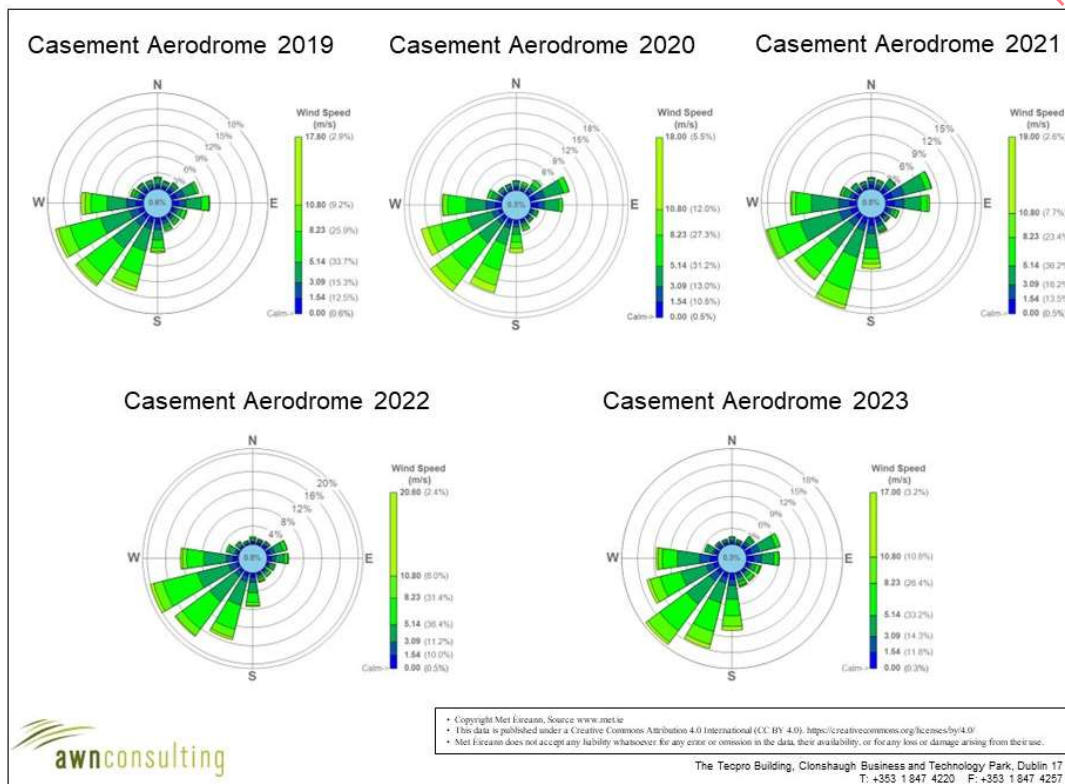


Figure 0.20 Casement Aerodrome Windrose 2019-2023

8.5.2 Baseline Air Quality

Air quality monitoring programs have been undertaken in recent years by the EPA. The most recent annual report on air quality in Ireland is “Air Quality In Ireland 2022” (EPA, 2023). The EPA website details the range and scope of monitoring undertaken throughout Ireland and provides both monitoring data and the results of previous air quality assessments (EPA, 2023).

As part of the implementation of the Framework Directive on Air Quality (1996/62/EC), four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2023). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000, is defined as Zone D.

In terms of air monitoring and assessment, the proposed development site is within Zone A (EPA, 2023). The long-term monitoring data has been used to determine background concentrations for the key pollutants in the region of the proposed development. The background concentration accounts for all non-traffic derived emissions (e.g. natural sources, industry, home heating etc.).

8.5.2.1 NO₂

Long-term NO₂ monitoring was carried out at the representative Zone A suburban locations of Rathmines, Ballyfermot, Dun Laoghaire and Swords for the period 2018 – 2022 (EPA, 2023). Long term average concentrations are significantly below the annual average limit of 40 µg/m³ for these suburban locations (see Table 0.8). Average results range from 12 – 22 µg/m³. The 5-year average NO₂ concentration across the monitoring sites suggests an upper average limit of no more than 17 µg/m³ as a background concentration for the suburban locations. Based on the above information, an estimate of the current background NO₂ concentration for the region of the proposed development is 17 µg/m³.

Station	Station Classification	Averaging Period ^{Note 1}	Year				
			2018	2019	2020	2021	2022
Rathmines	Suburban Background	Annual Mean NO ₂ (µg/m ³)	20	22	13	14	14
		99.8 th %ile 1-hr NO ₂ (µg/m ³)	87	102	81	69	73
Ballyfermot	Suburban Background	Annual Mean NO ₂ (µg/m ³)	17	20	12	13	13
		99.8 th %ile 1-hr NO ₂ (µg/m ³)	101	101	83	73	81
Dun Laoghaire	Suburban Background	Annual Mean NO ₂ (µg/m ³)	19	15	13	16	16
		99.8 th %ile 1-hr NO ₂ (µg/m ³)	91	91	78	73	77
Swords	Suburban Background	Annual Mean NO ₂ (µg/m ³)	16	15	11	11	12
		99.8 th %ile 1-hr NO ₂ (µg/m ³)	85	80	65	63	70

^{Note 1} Annual average limit value – 40 µg/m³ and 1-hour limit value – 200 µg/m³ as a 99.8th%ile, i.e. not to be exceeded >18 times per year (EU Council Directive 2008/50/EC & S.I. No. 739 of 2022).

Table 0.8 Trends in Zone A Air Quality – Nitrogen Dioxide (NO₂)

8.5.2.2. PM₁₀

Continuous PM₁₀ monitoring was carried out at the representative Zone A locations of Rathmines, Dun Laoghaire, Ballyfermot and Phoenix Park from 2018 – 2022 (EPA, 2023). PM₁₀ concentrations range from 10 – 16 µg/m³ over the five year period (see Table 0.9) with at most 9 exceedances of the 24-hour limit value of 50 µg/m³ in Rathmines and in 2019 (35 exceedances are permitted per year) (EPA, 2023). The 5-year average PM₁₀ concentration across the monitoring sites suggests an upper average limit of no more than 14 µg/m³ as a background concentration for the suburban



locations. Based on the EPA data, an estimate of the current background PM₁₀ concentration in the region of the proposed development is 14 µg/m³.

Station	Station Classification	Averaging Period ^{Note 1}	Year				
			2018	2019	2020	2021	2022
Ballyfermot	Suburban Background	Annual Mean PM ₁₀ (µg/m ³)	16	14	12	12	13
		24-hr Mean > 50 µg/m ³ (days)	0	7	2	0	1
Dún Laoghaire	Suburban Background	Annual Mean PM ₁₀ (µg/m ³)	13	12	12	11	12
		24-hr Mean > 50 µg/m ³ (days)	0	2	0	0	1
Rathmines	Suburban Background	Annual Mean PM ₁₀ (µg/m ³)	15	15	11	12	15
		24-hr Mean > 50 µg/m ³ (days)	2	9	2	0	4
Phoenix Park	Urban Background	Annual Mean PM ₁₀ (µg/m ³)	11	11	10	10	11
		24-hr Mean > 50 µg/m ³ (days)	0	2	0	0	0

^{Note 1} Annual average limit value - 40 µg/m³ and Daily limit value - 50 µg/m³ (EU Council Directive 2008/50/EC & S.I. No. 739 of 2022).

Table 0.9 Trends in Zone A Air Quality – PM₁₀

8.5.2.3 PM_{2.5}

Annual mean concentrations of PM_{2.5} at the representative Zone A locations of Ballyfermot, Dún Laoghaire, Rathmines and Phoenix Park over the period 2018 – 2022, ranged from 6 – 10 µg/m³ (EPA, 2023) (see Table 0.10). Based on this information a background PM_{2.5} concentration of 10 µg/m³ has been used in this assessment.

Station	Averaging Period ^{Note 1}	Year				
		2018	2019	2020	2021	2022
Ballyfermot	Annual Mean PM _{2.5} (µg/m ³)	7.0	10.0	8.0	7.8	7.5
Dún Laoghaire	Annual Mean PM _{2.5} (µg/m ³)	-	10.0	8.0	7.5	7.8
Rathmines	Annual Mean PM _{2.5} (µg/m ³)	9.0	8.0	8.0	9.3	7.5
Phoenix Park	Annual Mean PM _{2.5} (µg/m ³)	6.0	8.0	7.0	6.4	6.3

^{Note 1} Annual average limit value - 25 µg/m³ (EU Council Directive 2008/50/EC & S.I. No. 739 of 2022).

Table 0.10 Trends in Zone A Air Quality – PM_{2.5}

8.5.2.4 Summary

Based on the above information the air quality in Zone A locations, is generally good, with concentrations of the key pollutants generally well below the relevant limit values. However, the EPA have indicated that road transport emissions are contributing to increased levels of NO₂ with the potential for breaches in the annual NO₂ limit value in future years at locations within urban centres and roadside locations. In addition, burning of solid fuels for home heating is contributing to increased levels of particulate matter (PM₁₀ and PM_{2.5}). The EPA predict that exceedances in the particulate matter limit values are likely in future years if burning of solid fuels for residential heating continues (EPA, 2023).

The current background concentrations have been used in the operational phase air quality assessment for both the Opening Year and Design Year as a conservative approach in order to predict pollutant concentrations in future years. This is in line with the TII methodology (TII, 2022).



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8.5.3 Sensitivity of the Receiving Environment

8.5.3.1 Construction Phase

In line with the UK Institute of Air Quality Management (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction*' (IAQM, 2024) prior to assessing the impact of dust from a proposed development the sensitivity of the area must first be assessed as outlined below. Both receptor sensitivity and proximity to proposed works areas are taken into consideration. For the purposes of this assessment, high sensitivity receptors are regarded as residential properties (where people are likely to spend the majority of their time), schools and hospitals. Commercial premises and places of work are regarded as medium sensitivity and places where people are present for short periods, or do not expect a high level of amenity, are regarded as low sensitivity.

The sensitivity of the area to dust soiling effects and dust-related human health effects are first considered. The IAQM guidance (2024) states that where there are no sensitive human receptors present within 250 m of the site, then no assessment of dust impacts is required.

In terms of receptor sensitivity to dust soiling, there are 8 no. high sensitivity residential properties within 0 m – 20 m of the proposed development boundary (see Figure 0.21). Based on these receptor numbers and using the IAQM criteria in Table 0.11, the overall sensitivity of the area to dust soiling impacts is considered medium.

Receptor Sensitivity	Number of Receptors	Distance from Source (m)			
		<20	<50	<100	<250
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Source (IAQM, 2024) Guidance on the Assessment of Dust from Demolition and Construction

Table 0.11 Sensitivity of the Area to Dust Soiling Effects on People and Property

In addition to sensitivity to dust soiling, the IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to human health impacts. The criteria take into consideration the current annual mean PM₁₀ concentration, receptor sensitivity based on type (residential receptors are classified as high sensitivity) and the number of receptors affected within various distance bands from the construction works. A conservative estimate of the current annual mean PM₁₀ concentration in the vicinity of the proposed development is 14 µg/m³ and there are 8 no. high sensitivity receptors within 20 m of the proposed development boundary (see Figure 0.21). Based on the IAQM criteria outlined in Table 0.12, the worst-case sensitivity of the area to human health is considered low.



Receptor Sensitivity	Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from Source (m)				
			<20	<50	<100	<200	<250
High	< 24 µg/m ³	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	< 24 µg/m ³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	< 24 µg/m ³	>1	Low	Low	Low	Low	Low

Source (IAQM, 2024) Guidance on the Assessment of Dust from Demolition and Construction

Table 0.12 Sensitivity of the Area to Dust Related Human Health Impacts

The IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to dust-related ecological impacts. Dust emissions can coat vegetation leading to a reduction in the photosynthesising ability of the plant as well as other effects. The guidance states that dust impacts to vegetation can occur up to 50 m from the site, and 50 m from site access roads, up to 250 m for the site entrance. The sensitivity of the area is determined based on the distance to the source, the designation of the site, (European, National or local designation) and the potential dust sensitivity of the ecologically important species present. There are no designated ecological sites within 50 m of the proposed development therefore, there is no potential for significant impacts to vegetation from construction dust emissions.

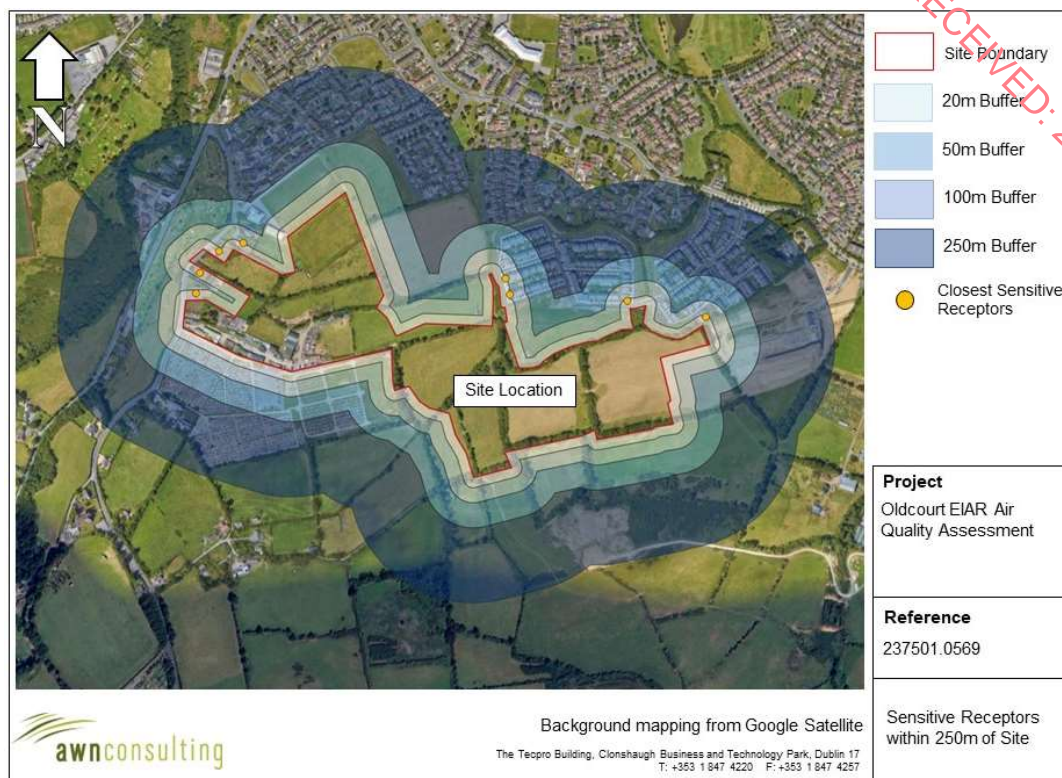


Figure 0.21 Sensitive Receptors within 20m, 50m and 100m of Site Boundary

8.5.3.2 Operational Phase

The impact to air quality as a result of changes in traffic is assessed at sensitive receptors in the vicinity of affected roads. The TII guidance (TII, 2022) states a proportionate number of representative receptors which are located in areas which will experience the highest concentrations or greatest improvements as a result of the proposed development are to be included in the modelling. The TII criteria state that receptors within 200 m of affected road links should be assessed; roads which are greater than 200 m from receptors will not affect pollutant concentrations at that receptor. The TII guidance (TII, 2022) defines sensitive receptor locations for the purposes of modelling annual mean pollutant concentrations as: residential housing, schools, hospitals, care homes and short term-accommodation such as hotels, i.e. locations where members of the public are likely to be regularly present for 24 hours. A total of 2 no. high sensitivity residential receptors (R1 and R2) were included in the modelling assessment (see Figure 0.22).

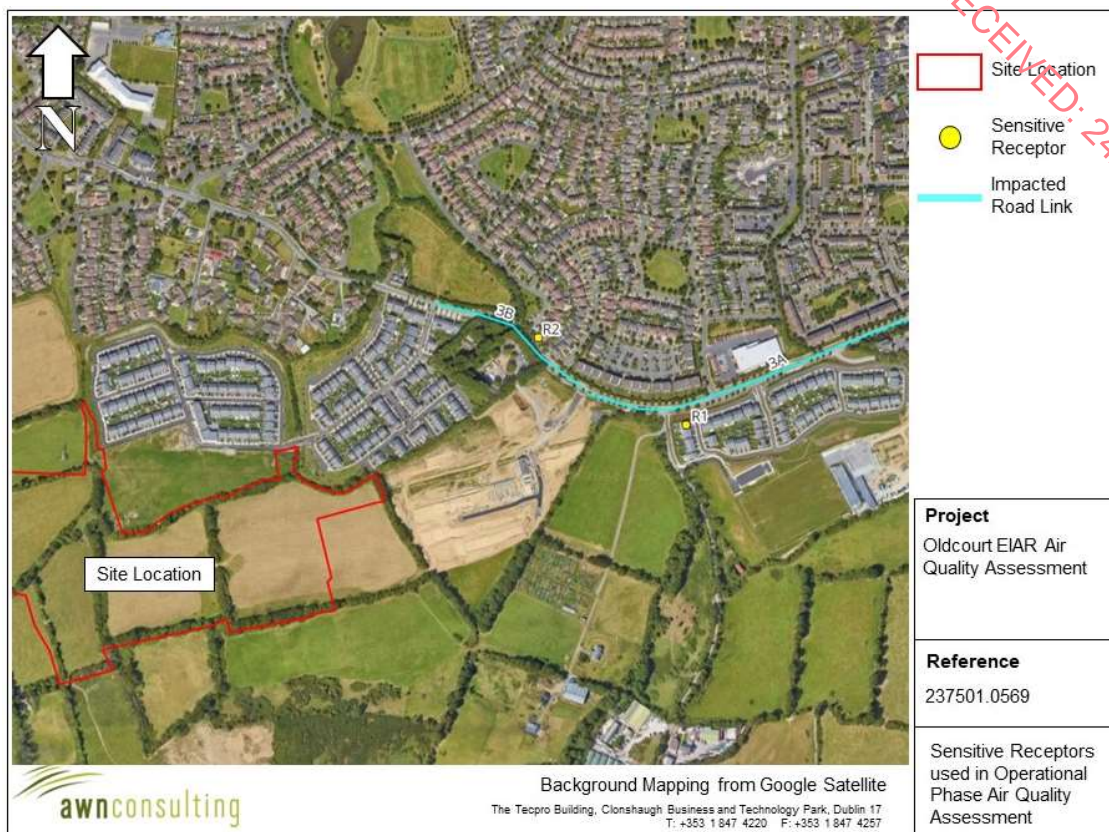


Figure 0.22 Approximate Location of Receptors used in Operational Phase Air Quality Assessment

8.6. The 'Do Nothing' Scenario

In the 'Do Nothing' scenario the proposed development will not be constructed, no construction works associated with the proposed development will take place and the previously identified effects of fugitive dust and particulate matter emissions and emissions from equipment and machinery will not occur. This can be considered neutral in relation to air quality.

The Do Nothing scenario associated with the operational phase of the development is assessed within Section 0 and it was found to be direct, long-term, negative, and imperceptible.

8.7. Potential Significant Effects

8.7.1 Construction Phase

8.7.1.1 Construction Dust Assessment

The greatest potential impact on air quality during the construction phase of the proposed development is from construction dust emissions and the potential for nuisance dust. While construction dust tends to be deposited within 250 m of a construction site, the majority of the deposition occurs within the first 50 m. The extent of any dust generation depends on the nature of the dust (soils, peat, sands, gravels, silts etc.) and the nature of the construction activity. In addition, the potential for dust dispersion and deposition depends on local meteorological



factors such as rainfall, wind speed and wind direction. A review of Casement Aerodrome meteorological data indicates that the prevailing wind direction is westerly to south-westerly in direction and wind speeds are generally moderate in nature (see Section 0). In addition, dust generation is considered negligible on days where rainfall is greater than 0.2 mm. A review of historical 30 year average data for Casement Aerodrome meteorological station indicates that on average 194 days per year have rainfall over 0.2 mm (Met Éireann, 2024) and therefore it can be determined that over 53% of the time dust generation will be reduced due to natural meteorological conditions.

In order to determine the level of dust mitigation required during the proposed works, the potential dust emission magnitude for each dust generating activity needs to be taken into account, in conjunction with the previously established sensitivity of the area (see Section 0). As per Section 0, the major dust generating activities are divided into four types within the IAQM guidance to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout (transport of dust and dirt from the construction site onto the public road network).

8.7.1.1.1 Demolition

There are demolition works associated with the proposed development, comprising of the demolition of existing buildings, i.e. 2 no. dwellings and outbuildings / sheds in the south-western part of the application site. Dust emission magnitude from demolition can be classified as small, medium, or large based on the definitions from the IAQM guidance as transcribed below:

- **Large** Total building volume >75,000 m³ potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >12 m above ground level;
- **Medium** Total building volume 12,000 m³ – 75,000 m³ potentially dusty construction material, demolition activities 6-12 m above ground level; and
- **Small** Total building volume <12,000 m³ construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <6 m above ground, demolition during wetter months.

The dust emission magnitude for the proposed demolition activities can be classified as small as the total building volume is likely to be less than 12,000 m³. The sensitivity of the area, is combined with the dust emission magnitude for each dust generating activity to define the risk of dust impacts in the absence of mitigation. As outlined in Table 8.10 and in Table 8.11, this results in an overall low risk of dust soiling impacts and dust-related human health impacts and a medium risk of dust-related ecological impacts.

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

Source: (IAQM, Guidance on the Assessment of Dust from Demolition & Construction, 2024)

Table 8.10: Criteria for Rating Risk of Dust Impacts: Demolition



Receptor	Receptor Sensitivity	Dust Emission Magnitude – Earthworks	Risk of Dust-Related Impacts
Dust Soiling	Low	Low	Low Risk
Human Health	Low		Low Risk
Ecology	Medium		Medium Risk

Table 8.11: Risk of Dust Impacts: Demolition

8.7.1.1.2 Earthworks

Earthworks primarily involve excavating material, loading and unloading of materials, tipping and stockpiling activities. Activities such as levelling the site and landscaping works are also considered under this category. The dust emission magnitude from earthworks can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- **Large** Total site area > 110,000 m², potentially dusty soil type (e.g. clay which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds > 6m in height;
- **Medium** Total site area 18,000 m² – 110,000 m², moderately dusty soil type (e.g. silt), 5 - 10 heavy earth moving vehicles active at any one time, formation of bunds 3m – 6m in height;
- **Small** Total site area < 18,000 m², soil type with large grain size (e.g. sand), < 5 heavy earth moving vehicles active at any one time, formation of bunds < 3m in height.

The dust emission magnitude for the proposed earthwork activities can be classified as **large** as the total site area will be greater than 110,000 m².

The sensitivity of the area, as determined in Section 0, is combined with the dust emission magnitude for each dust generating activity to define the risk of dust impacts in the absence of mitigation. Using the assessment criteria from the IAQM (2024) in Table 0. and combining the large dust emission magnitude with a medium sensitivity to dust soiling and low sensitivity to human health impacts results in a medium risk of dust soiling impacts and a low risk of dust-related human health impacts (Table 0.) from the proposed earthworks activities.

Table 0.12 Criteria for Rating Risk of Dust Impacts – Earthworks (IAQM, 2024)

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

Table 0.13 Risk of Dust Impacts – Earthworks

Receptor	Receptor Sensitivity	Dust Emission Magnitude – Earthworks	Risk of Dust-Related Impacts
Dust Soiling	Medium	Large	Medium Risk
Human Health	Low		Low Risk