11.0 WATER & HYDROLOGY

11.1 Introduction

The Water and Hydrology Chapter of this EIAR has been prepared by Emma Daly (BEng MSc CEng MIEI) of DBFL Consulting Engineers. Emma Daly is a Chartered Professional Engineer with over 10 years' experience in the design and construction of civil engineering projects. Projects have included works associated with the commercial, industrial, energy, residential and public infrastructure sectors.

Marcelo Allende (BSc, BEng) and Ana Keeley (BSc) of AWN Consulting also contributed to preparation of this chapter. Marcelo is a Water Resources Engineer with over 15 years of experience in environmental consultancy and water resources studies. Marcelo is a Principal Environmental Consultant (Hydrologist) with AWN Consulting with over 20 years of experience in water resources technical studies, conceptual and numerical hydrological/hydrogeological modelling and environmental consultancy. He also has detailed knowledge of environmental guidance, legislation, regulations & standards and expertise in GIS (expert level) and MATTE studies at COMAH establishments. He is currently a member of the International Association of Hydrogeologists (IAH, Irish Group) and a member of Engineers Ireland (MIEI). Ana is an Environmental Consultant with AWN Consulting with ongoing roles within the water department. Ana has worked on a range of projects including environmental investigations, environmental impact assessment reports, hydrological risk assessments and ArcGIS mapping. Ana is a member of the International Association of Hydrogeologists (Irish Group).

This chapter of the EIAR comprises of an assessment of the likely impact of the proposed development on the surrounding surface water and hydrogeological environments (including flood risk, surface water drainage, foul drainage and water supply) as well as identifying proposed mitigation measures to minimise any impacts.

The development will principally consist of: the demolition of c. 4,847.5 sq. m of existing structures on site including Milltown Park House (880 sq. m), Milltown Park House Rear Extension (2,031 sq. m), the Finlay Wing (622 sq. m), the Archive (1,240 sq. m) and the Link Building between Tabor House and Milltown Park House Rear Extension to the front of the Chapel (74.5 sq. m); the refurbishment and reuse of Tabor House (1,575 sq. m) and the Chapel (768 sq. m) and the provision of a single storey glass entrance lobby to the front and side of the Chapel (52 sq. m); and the provision of 562 No. residential units comprising 6 No. three-bed courtyard houses and 556 No. apartment units (70 No. studios, 176 No. one-bed units, 267 No. two-bed units and 43 No. three-bed units).

The development also includes the provision of: cultural/community space within Tabor House (4 No. storeys including lower ground floor level) and the Chapel (2 No. storeys including lower ground floor level and mezzanine level) (1,698 sq. m) with associated outdoor space (248 sq. m); a café/restaurant (179 sq. m) and a creche (375 sq. m) within Block F with associated outdoor creche play area; ancillary residents' amenities and facilities (324 sq. m) within Blocks B & C; and a single storey bin store and substation adjacent to Block F (101 sq. m).

The proposed development will also include the following associated engineering infrastructure:

- Provision of a new vehicle access off Milltown Road (primary vehicle access to the proposed development facilitating access to the basement car park as well as serving pedestrians and cyclists). This new site access shall be a priority junction. A Toucan Crossing is also proposed in the vicinity of Milltown Road access to improve facilities for vulnerable road users.

- Retain existing entrance on Sandford Road (facilitates pedestrian and cycle access as well as limited vehicle access to the northern end of the site). Improvements to existing pedestrian crossing point in the vicinity of the Sandford Road entrance are also proposed. There is no vehicular access from Sandford Road to the basement car park, the forecourt area adjacent to Tabor House or the courtyard houses along the western boundary (which are all served exclusively from Milltown Road).

- Provision of an additional access point for pedestrians adjacent to the junction of Sandford Road / Milltown Road.

- Provision of internal site roads including associated footpaths.

- Provision of on-site surface water drainage infrastructure which will discharge from the site along its south-eastern boundary via Milltown Road and the junction of Milltown Road / Sandford Road prior to discharging to the existing public surface water drainage network in Eglinton Road (proposed 300mm diameter pipe extending approximately 300m from the proposed development site boundary to the outfall location which includes replacement of approx. 160m of the existing 225mm diameter drainage network along Eglinton Road.).

- Provision of foul drainage and water supply infrastructure and connections.

The proposed surface water drainage network accords with SuDS (Sustainable Drainage Systems) principles, divides the site into four drainage catchments and discharges to an existing 300mm diameter public surface water drain on Eglinton Road (east of the site) at a controlled greenfield runoff rate of 9.1 l/sec.

The proposed development's foul drainage network discharges to an existing 600mm diameter combined sewer located on the Sandford Road northeast of the site and an existing 375mm diameter combined sewer on the Milltown Road south of the site.

An existing 9" diameter cast iron watermain runs along the Sandford Road to the north-east and along the Milltown Road to the south-east which will be used to service the development.

Refer to Irish Water's Network Plan included in Appendix 11.1 of this EIAR.

11.2 Methodology

Assessment of the likely impact of the proposed development on the surrounding surface water and hydrogeological environments included the following activities and has been informed by the EPA *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*, 2022:

- Site inspection / walkover.
- Review of topographic and GPR survey information.
- Review of Irish Water utility plans (surface water drainage, foul drainage and water supply). Refer to Appendix 11.1.
- Ground investigations including trial pits, groundwater monitoring, infiltration testing and environmental testing.
- Review of information available on the Environmental Protection Agency (EPA) online mapping service.
- Review of information available on the Geological Survey of Ireland (GSI) online mapping service.
- Review of Office of Public Works (OPW) National Flood Hazard Mapping and CFRAM Studies (Catchment Flood Risk Assessment and Management Studies).
- Consultation with Dublin City Council's Water Services Section.
- Consultation with Irish Water.
- Submission of a Pre-Connection Enquiry Application to Irish Water.
- Obtaining a Statement of Design Acceptance from Irish Water.

As part of assessing the likely impact of the proposed development on, surface water runoff, foul drainage and water usage calculations were carried out in accordance with the following guidelines:

- Greater Dublin Strategic Drainage Study (GDSDS).
- Method outlined in Irish Water's Code of Practice for Wastewater Infrastructure.
- Method outlined in Irish Water's Code of Practice for Water Infrastructure.
- CIRIA SuDS Manual

11.3 Receiving Environment

11.3.1 Hydrology

The proposed development site lies within the Liffey and Dublin Bay Catchment (Hydrometric Area 09) and Dodder River sub-catchment (WFD name: Dodder_SC_010, Id 09_16) (EPA,2025). The Dodder River is located approx. 500m southeast of the subject development site. From here the Dodder River flows for approx. 3.0km before discharging into the Liffey Estuary lower transitional waterbody which in turn discharges into Dublin Bay coastal waterbody which includes Special Area of Conservation (SAC)/ proposed Natural Heritage Area (pNHA).

The EPA on-line mapping presents the available water quality status information for water bodies in Ireland. The Dodder River has a Water Framework Directive (WFD) status (2019-2024) of 'Moderate' and a WFD risk score of 'At risk of not achieving good status'. This moderate status is related to its biological status (invertebrate and fish) and dissolved oxygen conditions (which fails in relation to its percentage saturation); all remaining chemical condition have been classified as 'good'. The most recent quality data (2019) for the Dodder River also indicate that it is 'Slightly polluted'.

The Dodder catchment discharges to the Liffey Estuary Lower which has a WFD status (2019-2024) of 'Moderate', and Dublin Bay has a WFD status of 'Good'. The Liffey Estuary Lower waterbody has a WFD risk score of 'At risk of not achieving good status' while the Dublin Bay waterbody has a WFD risk score of 'Not at risk'. The ecological status (which comprises biological and chemical status) and biological status or potential of Liffey Estuary Lower transitional waterbody during 2019-2024 is classed as 'Moderate'. The ecological status (which comprises biological and chemical status) of Dublin Bay water body during 2019-2024 is classed as 'Good'.

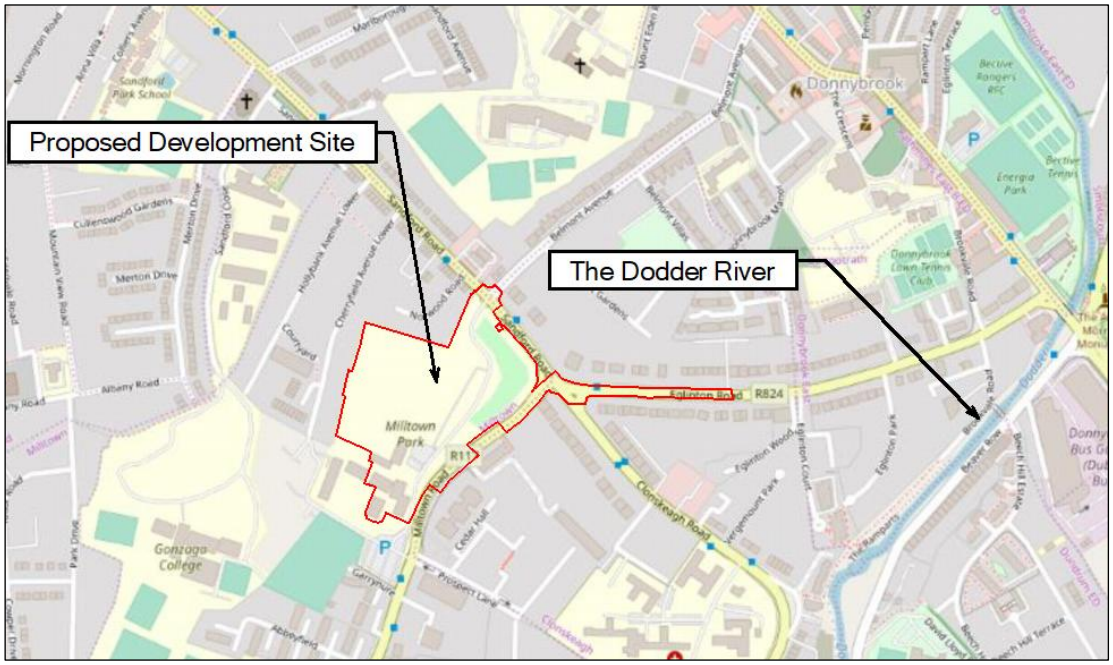

Figure 11.1: Extract from EPA Online Mapping Service (Site Boundary Indicative)

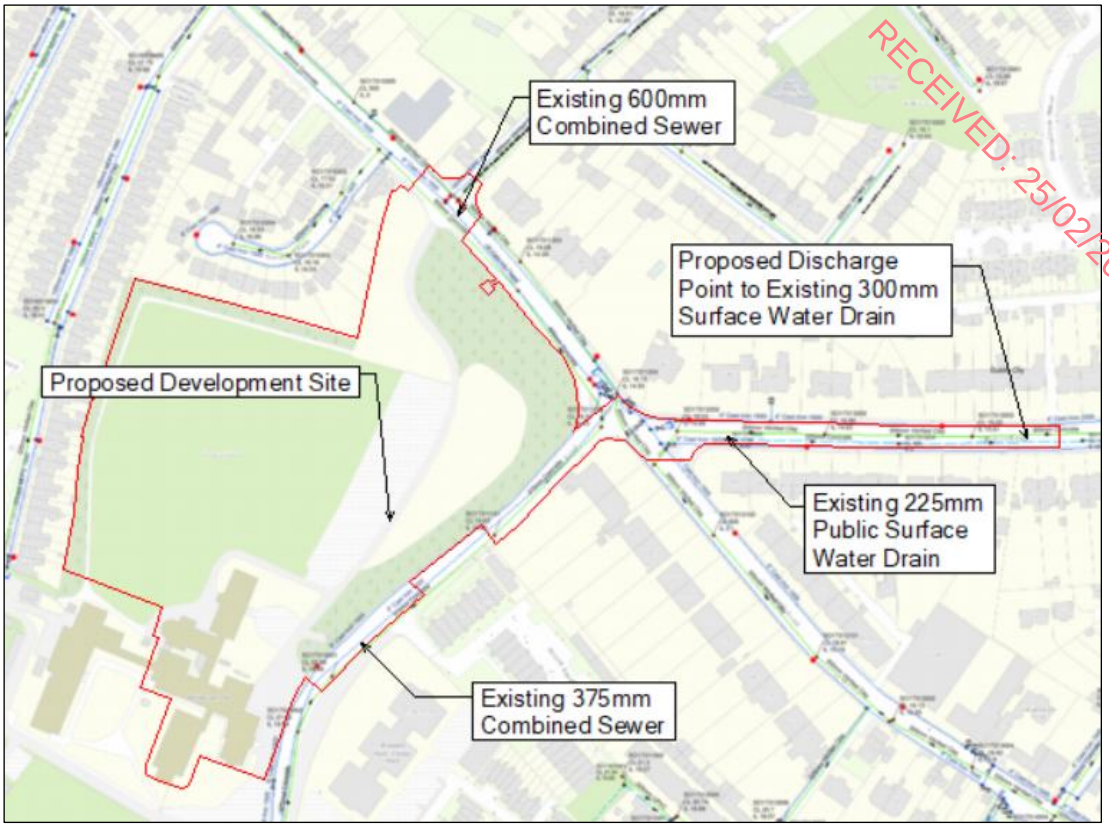

Figure 11.2: Extract from Irish Water Network Plan (Site Boundary Indicative)

11.3.2 Hydrogeology

Mapping from the Geological Society of Ireland (GSI maps, http://www.gsi.ie accessed on 14-11-2025) indicates the bedrock underlying the site is part of the Lucan Formation (code CDLUCN) and made up of dark limestone and shale (Calp). The lithological description comprises dark-grey to black, fine-grained, occasionally cherty, micritic limestones that weather paler, usually to pale grey. There are rare dark coarser grained calcarenitic limestones, sometimes graded, and interbedded dark-grey calcar. The beds are predominantly fine-grained distal turbidites in the north Dublin Basin. The formation is intermittently exposed on the coast between Rush and Drumanagh Head. The formation ranges from 300m to 800m in thickness.

The GSI also classifies the principal aquifer types in Ireland as:

- Lk - Locally Important Aquifer - Karstified
- Ll - Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
- Lm - Locally Important Aquifer - Bedrock which is Generally Moderately Productive
- Pl - Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones
- Pu - Poor Aquifer - Bedrock which is Generally Unproductive
- Rkd - Regionally Important Aquifer (karstified diffuse)

Presently, from the GSI (2025) National Bedrock Aquifer Map, the GSI classifies the bedrock aquifer beneath the subject site as a 'Locally Important Aquifer – Bedrock which is Moderately Productive only in Local Zones'. The proposed development is within the 'Dublin'

groundwater body and is classified as 'Poorly productive bedrock'. The most recent WFD groundwater status for this water body (2019-2024) is 'Good' with a current WFD risk score 'Under Review'.

Aquifer vulnerability is a term used to represent the intrinsic geological and hydrological characteristics that determine the ease with which groundwater may be contaminated generally by human activities. The GSI (2025) guidance presently classifies the bedrock aquifer vulnerability in the region of the subject site as 'Low' which indicates a general overburden depth potential of >10m. This shows that the aquifer is naturally protected by low permeability glacial clays. The aquifer vulnerability class in the region of the site is presented in Figure 11.4.

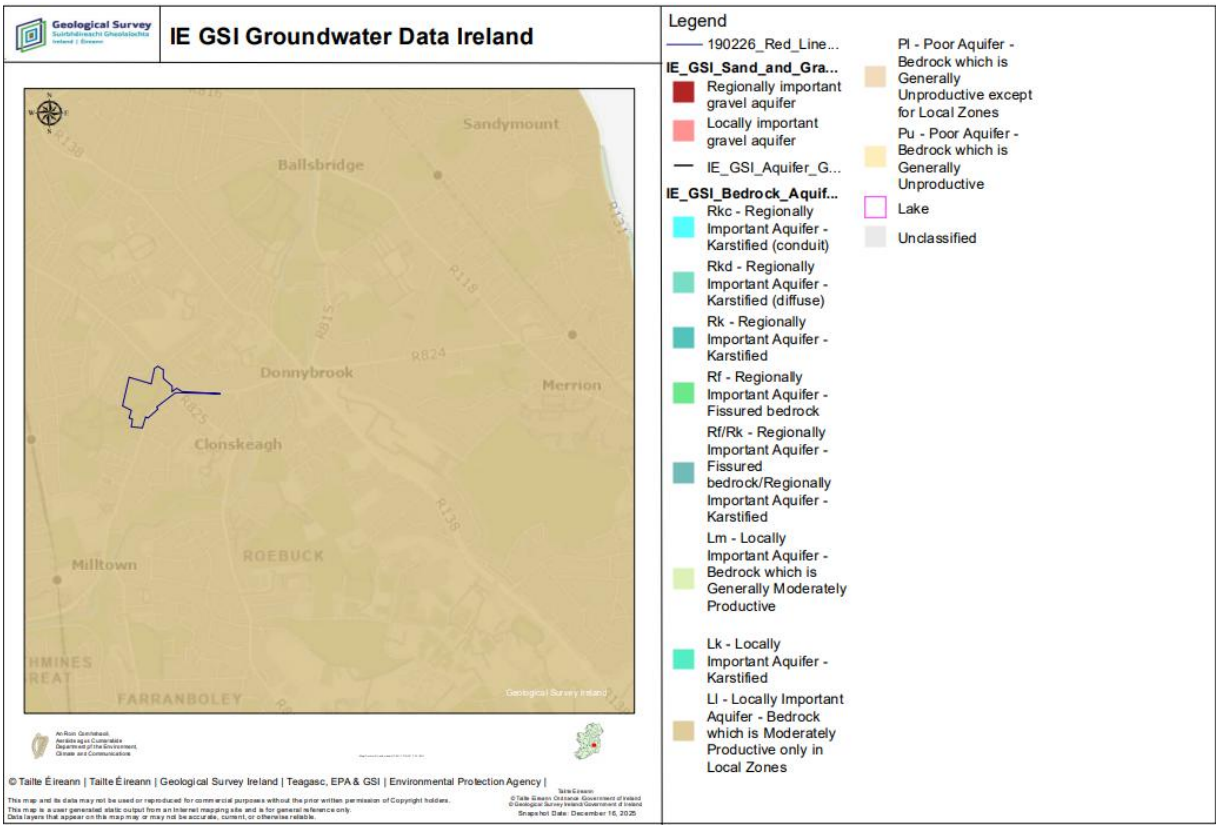

Figure 11.3: Extract from GSI Online Mapping Service – Groundwater Aquifers (Site Boundary Indicative).

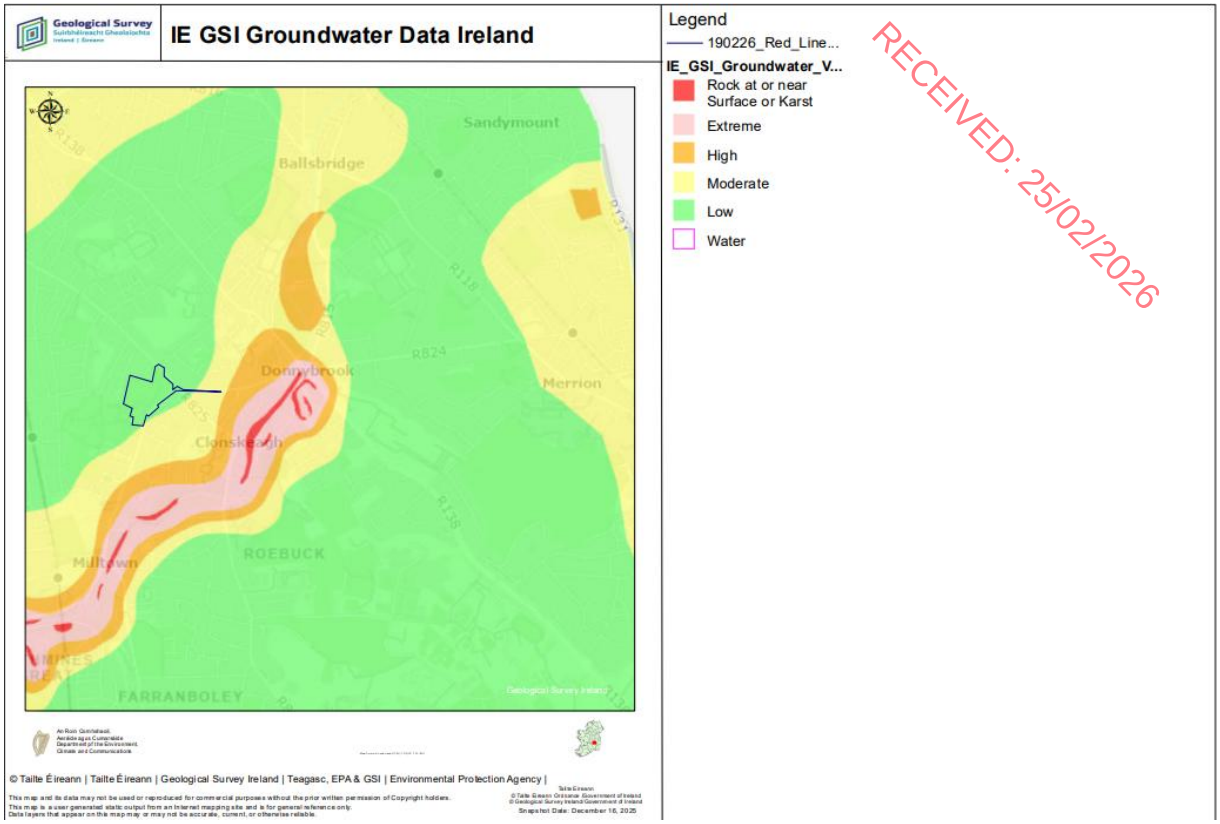

Figure 11.4: Extract from GSI Online Mapping Service – Groundwater Vulnerability (Site Boundary Indicative).

11.3.3 Flood Risk

A flood hazard assessment has been undertaken by reviewing information from the Office of Public Works (OPW) National Flood Hazard Mapping (www.floods.ie) and the Dodder CFRAM Study.

This assessment has been carried out in accordance with the procedures for a "Flood Risk Assessment" as outlined in the OPW's Guidelines for Planning Authorities – The Planning System and Flood Management (November 2009).

OPW Flood Hazard Mapping

OPW's Summary Local Area Report is included in Appendix 11.2 (Flood Hazard Information).

This report is sourced from the OPW website (www.floodmaps.ie) and summarises all flood events within 2.5 km of the site. No flood events are noted in the immediate vicinity of the site.

Also, no benefitting lands are identified in the vicinity of the site. Benefiting lands are lands that might benefit from implementation of a major drainage scheme or lands subject to flooding or poor drainage.

Eastern CFRAM Study

Extracts from the Dodder Catchment Flood Risk Assessment and Management Study are included in Appendix 11.2 (Flood Hazard Information) which indicates the extent of fluvial flooding in the vicinity of the site.

The closest modelled node to the site is located on the Dodder River (approx. 500m south-east of the site). No fluvial flooding is indicated in the vicinity of the site.

11.3.4 Foul Drainage

An existing 600mm diameter combined sewer is located adjacent to the site's northern-eastern boundary (Sandford Road). An existing 375mm diameter combined sewer is also located adjacent to the site's south-eastern boundary (Milltown Road) which outfalls to the 600mm diameter combined sewer in Sandford Road. Refer to Figure 11.2 and the Irish Water Network Plan included in Appendix 11.1. The existing combined sewer network described above ultimately discharges to Ringsend Waste Water Treatment Plant (also refer to AWN Consulting's accompanying *Hydrological Qualitative Risk Assessment*).

An existing private foul drainage network is located within the site (typically 150mm diameter) which outfalls to the combined sewer on the Sandford Road via a combined connection with the private surface water drainage network. No active foul drains discharge to the existing private foul drainage network within the site which will become redundant upon commencement of site development works.

Pre-connection enquiry feedback has been received from Irish Water which confirms that discharge of foul drainage flows to existing combined sewers adjacent to the site is feasible without infrastructure upgrades by Irish Water.

11.3.5 Surface Water Drainage

Existing surface water drains onsite currently discharge to the existing combined sewer network along Sandford Road and Milltown Road rather than the existing surface water drain in Eglinton Road. These will be decommissioned and will not form part of the proposed drainage network.

As noted previously, an existing surface water drain runs along Eglinton Road east of the site (currently 225mm diameter pipe, to be reconstructed with a 300mm diameter pipe). Refer to Figure 11.2 and the Irish Water Network Plan included in Appendix 11.1. The existing surface water drain in Eglinton Road ultimately discharges to the Dodder River.

It is proposed to discharge attenuated flows from the site to the existing drainage network noted above.

11.3.7 Water Supply

The locations of the existing public water mains are shown on Irish Water's Service Plan (refer to Appendix 11.1 and Figure 11.5).

An existing 9" cast iron watermain runs along the Sandford Road (north of the development) and Milltown Road (south-east of the development).

Irish Water have confirmed that new connections to the existing water supply network are feasible without infrastructure upgrades by Irish Water.

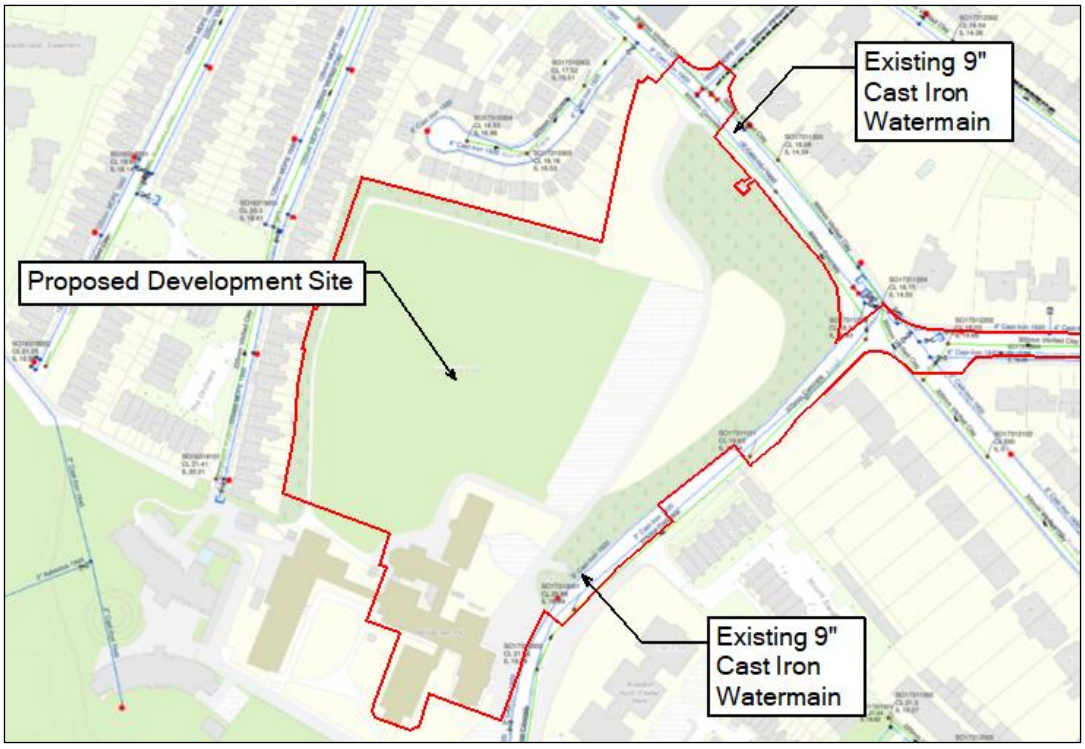

Figure 11.5: Extract from Irish Water Network Plan (Site Boundary Indicative)

11.4 Characteristics of the Proposed Development

11.4.1 Hydrology

The proposed development is located approximately 500m from the primary hydrological feature in the vicinity of the site (i.e. the Dodder River).

No adverse effect on surrounding hydrology is anticipated as surface water flows are attenuated to greenfield runoff rates in conjunction with the implementation of SUDS strategies such as permeable paving, green roofs, tree pits, drainage board over podium and installation of a Class 1 full retention fuel / oil separator. Refer to DBFL's Infrastructure Design Report (190226-DBFL-XX-XX-RP-C-0002) for full details of the proposed SUDS methodologies.

11.4.2 Hydrogeology

Standpipes have been installed at 7 No. boreholes locations to determine the equilibrium groundwater level over time. Ground water measurements taken in June 2020 and October 2020 indicated ground water depths of 1.0m to 7.5m BGL. Also refer to Chapter 10, Appendix 10.1, Ground Investigation Reports (GII, Project No. 9338-12-19, Issue Date 29 October 2020).

Due to relatively high level of groundwater encountered in some boreholes there may be a need to dewater excavations during construction.

The need to excavate existing subsoil layers has been minimised as the proposed, ground floor levels and external pavement levels have been designed to follow the natural topography of the site (by extension the basement dig level has been minimised). As such, the deepest excavations are expected to be required for basement construction (up to approximately 5.0m below existing ground level).

It is not envisaged that the proposed development works will have any direct impact on the underlying hydrogeology (as noted in the Ayesa's Basement Impact Assessment "The method of basement construction in conjunction with the geology within which it is to be founded indicate that the impact on groundwater will be negligible.").

11.4.3 Flood Risk

A Site-Specific Flood Risk Assessment for proposed development was undertaken in accordance with the requirements of *The Planning System and Flood Risk Management, Guidelines for Planning Authorities* and its Technical Appendices (refer to DBFL Site Specific Flood Risk Assessment, 190226- DBFL-XX-XX-RP-C-0003).

Following the Flood Risk Assessment, it was determined that the site is located in Flood Zone C as defined by the Guidelines. It concluded that:

- The proposed development is appropriate for the site's flood zone category.
- The sequential approach outlined in the Guidelines has been adhered to and that the 'Avoid' principle has been achieved.

The proposed development is considered to have the required level of flood protection up to and including the 1% AEP flood event. Overland flow paths have been identified for pluvial flooding exceeding the capacity of the surface water drainage network.

11.4.4 Foul Drainage

An existing 600mm diameter combined sewer is located adjacent to the site's northern-eastern boundary (Sandford Road). An existing 375mm diameter combined sewer is also located adjacent to the site's south-eastern boundary (Milltown Road) which outfalls to the 600mm diameter combined sewer in Sandford Road. The existing combined sewer network described above ultimately discharges to Ringsend Waste Water Treatment Plant (also refer to AWN Consulting's accompanying *Hydrological Qualitative Risk Assessment*).

Two foul drainage discharge points are proposed for the site (in the vicinity of the proposed access off Milltown Road and the existing access of Sandford Road). See Figure 11.6 below.

The topography and existing combined sewers described above facilitate a gravity drainage solution for the site at the proposed connection points (Milltown Road / Sandford Road).

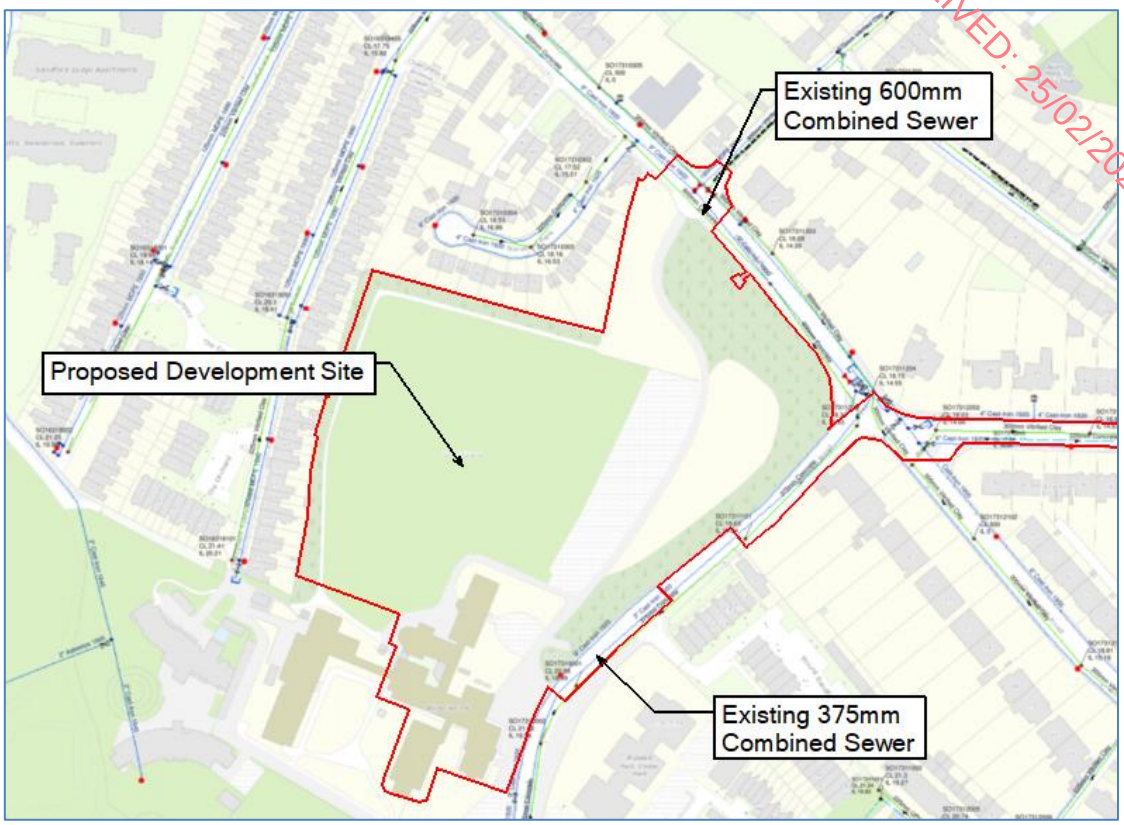

Figure 11.6: Extract from Irish Water Network Plans – Site Boundary Indicative Only

The proposed foul drainage network comprises of a network of 225mm diameter pipes. The courtyard houses located along the site's western boundary will be serviced by individual 100mm diameter connections.

The foul drainage network for the proposed development has been designed in accordance with Irish Water's Code of Practice for Wastewater Infrastructure and associated standard details.

A daily foul discharge volume of approx. 264.4m³ has been calculated as outlined in Irish Water's Code of Practice for Wastewater Infrastructure (refer to DBFL Infrastructure Design Report, 190226- DBFL-XX-XX-RP-C-0002).

11.4.5 Surface Water Drainage

The public surface water network on Eglinton Road (as described above in Section 11.3.5 and Figure 11.7 below) is expected to provide a suitable surface water discharge point for the proposed development. However, in order to achieve the required drainage invert levels on site, approximately 160m of the existing 225mm diameter drainage network along Eglinton Road will need to be replaced with a 300mm pipe running at a flatter gradient.

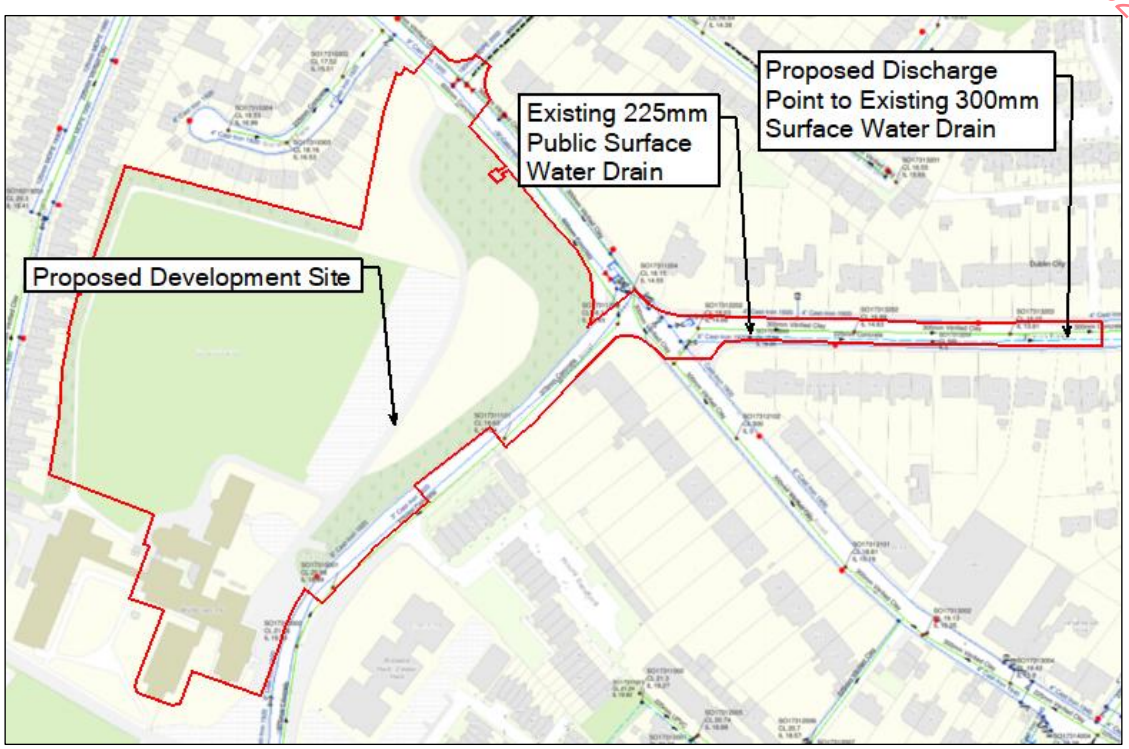

Figure 11.7: Extract from Irish Water Network Plans – Site Boundary Indicative Only

The proposed surface water drainage network will collect surface water runoff from the site via a piped network. Surface water runoff from apartment roofs, terrace and podium areas will be captured and initially attenuated by green and blue roof systems (sedum blanket/ drainage board or equivalent) prior to being discharged at a controlled rate to the piped surface water drainage network.

Surface water runoff from the roofs of the courtyard houses located along the western boundary will be routed to the proposed surface water pipe network via porous aggregates beneath permeable paved driveways and soakaways placed in the backgardens (providing an additional element of attenuation).

Surface water runoff from the majority of the proposed development site's internal street network will be directed to the proposed pipe network via tree pits or other SUDS features (with overflows to the main drainage system). Part of the site's internal street network (adjacent to Block E) drains via 2 No. bio-retention areas. In limited instances, surface water runoff from paved areas will be directed to the proposed pipe network via conventional road gullies.

Surface water runoff from in curtilage parking spaces associated with the courtyard houses located along the western boundary will be captured by permeable paving.

Any incidental surface water runoff generated from the basement carpark would drain through a separate system beneath the basement slab (out falling to the proposed foul drainage network via a petrol interceptor).

While the site does represent a single surface water catchment, for internal management of the surface water, it has been split into four sub-catchments. Each sub-catchment has been assessed separately in relation to surface water attenuation.

Surface water discharge rates from the proposed surface water drainage network will be controlled by a vortex flow control device (Hydrobrake or equivalent) and associated attenuation systems (Stormtech chambers /attenuation basin at ground level, blue /green roofs on apartment roofs and podium). Surface water discharge will also pass via a full retention fuel / oil separator (sized in accordance with permitted discharge rate from the site). Refer to DBFL's Infrastructure Design Report (190226-DBFL-XX-XX-RP-C-0002) for full details of the proposed SUDS methodologies.

Surface water calculations are based on an allowable outflow / greenfield runoff rate for all positively drained areas resulting in a total site wide attenuation volume of 2, 090.4m³ with 1,045.2m³ provided by the green / blue systems, 274.6m³ at ground level and 770.6m³ below ground level (refer to DBFL Infrastructure Design Report, 190226 DBFL-XX-XX-RP-C-0002).

Proposed surface water drains have been designed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS) and the Department of the Environment's Building Regulations Technical Guidance Document Part H Drainage.

11.4.6 Water Supply

It is proposed to take 2 No. 200mm diameter connections off the existing 9" water mains located along Sandford Road and Milltown Road. These connections will link within the site.

All connections, valves, hydrants, meters etc. have been designed and are to be installed in accordance with Irish Water's Code of Practice for Water Infrastructure (and associated standard details) and the Department of the Environment's Building Regulations Technical Guidance Document Part B Fire Safety.

An average daily domestic demand of approx. 227.2m³ and a non-residential daily demand of approx. 12.9m³, have been calculated as outlined in Irish Water's Code of Practice for Water Supply (refer to DBFL Infrastructure Design Report, 190226- DBFL-XX-XX-RP-C-0002).

11.5 Identification of Potential Impacts

11.5.1 Construction Phase

Potential negative / significant / short-term impacts that may arise during the construction phase resulting in impact on the surrounding surface water and hydrogeological environments are noted below:

- Contamination of surface water runoff due to construction activities.
- Discharge of rainwater pumped from excavations may also contain increased silt levels (potential impact on existing hydrology e.g. discharge to existing surface water drainage network).
- Accidental spills and leaks associated with storage of oils and fuels, leaks from construction machinery and spillage during refuelling and maintenance.
- Concrete runoff, particularly discharge of wash water from concrete trucks. (potential impact on existing hydrology e.g. infiltration to ground).
- Due to relatively high level of groundwater encountered in some boreholes there may be a need to dewater excavations during basement construction. Although it should be noted that the new basement shall not have an adverse effect on the existing ground water regime as the basement extends into the low porosity boulder clays (refer to Ayesa's Basement Impact Assessment for the proposed development).
- Improper discharge of foul drainage from contractor's compound (impact on existing hydrology e.g. cross-contamination of existing surface water drainage.).
- Cross contamination of potable water supply to construction compound.

11.5.2 Operational Phase

Potential operational phase impacts are noted below:

- Increased impermeable surface area will reduce local ground water recharge and potentially increase surface water runoff (if not attenuated to greenfield runoff rate).
- Pollutants from residential activities, including hydrocarbons and sediments (e.g., along roads and in driveway areas)., may enter the surface water system, affecting water quality.
- Increased discharge to foul drainage network (Daily Foul Discharge Vol. – Approx.264.4 m^3).
- Increased potable water consumption (Average Daily Domestic Demand – Approx. 240.1m^3).
- Potential contamination of surface water runoff from foul sewer leaks.

- Failure of surface water drainage could cause stagnant water to accumulate, posing a hazard with regards to drowning and biohazards.

11.5.3 'Do Nothing' Scenario

There are no predicted impacts should the proposed development not proceed.

11.5.4 Unplanned Events

The following accidents & disasters involving built services during the construction phase could potentially give rise to a serious incident putting people at risk:

- Excavation works encountering existing watermains.
- Flooding due to high groundwater levels after inclement weather.

A *Preliminary Construction Management Plan* and *Construction Environmental Management Plan* have been prepared as part of this planning application and will be implemented during the construction phase to mitigate the risks associated with accidents and disasters.

The following accidents & disasters involving built services during the operation phase could potentially give rise to a serious incident putting end users at risk:

- Pluvial flooding caused by severe storms overloading the surface water network.
- Potential contamination of potable water supply if there are leakages in the foul network.

11.5.5 Cumulative Impacts

The proposed surface water drainage infrastructure has been designed in accordance with the relevant guidelines. Any other future development in the vicinity of the site would have to be similarly designed in relation to permitted surface water discharge, surface water attenuation and SuDS, therefore, no potential cumulative impacts are anticipated in relation to surface water drainage and flooding.

No potential cumulative impacts are anticipated in relation to wastewater as the proposed sewer design has been designed in accordance with the requirements of Uisce Éireann's Code of Practice for Wastewater Infrastructure.

No potential cumulative impacts are anticipated in relation to water supply as the proposed watermain network has been designed in accordance with the requirements of Uisce Éireann's Code of Practice for Water Infrastructure.

Without the consideration of mitigation measures the construction phase of the proposed development will likely have a negative, significant and short-term impact.

Without the consideration of mitigation measures, the operational phase of the proposed development will likely have a neutral, moderate and permanent impact.

11.6 Ameliorative, Remedial or Reductive Measures

11.6.1 Construction Phase

The following measures are proposed during the construction phase to mitigate against risks to the surrounding hydrological environment while carrying out road works along Sandford Road and Milltown Road and while constructing the surface water drainage outfall (Milltown Road, the junction of Milltown Road / Sandford Road and Eglinton Road). When mitigated, construction phase impacts are considered to be to be neutral / non-significant / short-term.

Table 1: Mitigation Measures for Potential Impacts at Construction Phase

Character of potential impact	Mitigation measure
Construction Phase	
Damage to existing underground and overground infrastructure and possible contamination of the existing systems with construction related materials.	A *Preliminary Construction Management Plan* and *Construction Environmental Management Plan* have been prepared as part of this planning application and will be implemented during the construction phase. Site inductions will include reference to the procedures and best practice as outlined in the *Preliminary Construction Management Plan* and *Construction Environmental Management Plan*.
Contamination of surface water runoff due to construction activities.	Surface water runoff from areas stripped of topsoil and surface water collected in excavations will be directed to on-site settlement ponds where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate. Concrete batching (for use in in situ concrete pours) will take place off site and wash down and wash out of concrete trucks will take place off site (at authorized concrete batching plant in full compliance with relevant planning and environmental consents). In order to mitigate against spillages contaminating the surrounding surface water and hydrogeological environments, all oils, fuels, paints and other chemicals will be stored in a secure bunded hardstand area. Refuelling and servicing of construction machinery will take place in a designated hardstand area (where not possible to carry out such activities off site).
Improper discharge of foul drainage from contractor's compound.	The construction compound will include adequate staff welfare facilities including foul drainage and potable water supply. Foul drainage discharge from the construction compound will be tankered off site to a licensed facility until a connection to the public foul drainage network has been established.
Cross contamination of potable water supply to	The construction compound's potable water supply shall be protected from contamination by any construction activities or materials. The contractor shall obtain a temporary connection from

construction compound.	the existing water supply network along Milltown Road / Sandford Road in accordance with Irish water requirements for same.
Meteorological impacts due to seasonal weather variations	Weather conditions and typical seasonal weather variations will also be taken account of when planning stripping of topsoil and excavations with an objective of minimizing soil erosion.
Damage to existing utilities.	Contractor to prepare Method Statement detailing the proposals for works in the vicinity of existing utilities (method statement to be agreed with Project Supervisor Design Process (PSDP)). Contractor to locate and record all services on site prior to commencement of excavations. A GPR utility survey has been carried out along Sandford Road, Milltown Road and Eglinton Road to confirm the location of power, gas and telecommunications infrastructure. This survey is to be supplemented with slit trench investigation as required by the contractor in advance of commencing works along Sandford Road, Milltown Road and Eglington Road. Contractor to obtain utility company network plans and arrange observation as required.
Potential loss of connection to the existing utility infrastructure while carrying out works to provide service connections.	Connections to the existing surface water, foul sewer and water supply networks will be coordinated with the relevant utility provider and carried out by approved contractors. Contractor to comply with HSA Code of Practice for Avoiding Danger from Underground Services.
Unsafe working conditions due to untrained personnel.	All personnel using machinery/plant to have undergone training on the use of said machinery/plant. Ongoing site supervision to be undertaken to ensure all use of machinery/plant is in accordance with the training undertaken.
Unsafe conditions (for site personnel and the public) due to improper site traffic management.	Contractor to prepare and implement a Construction Traffic Management Plan that will be agreed with the Design Team and local authority, and which will ensure the safety of the public during construction (note, an outline TMP is included in the *Preliminary Construction Management Plan*).

11.6.2 Operational Phase

The following measures are proposed during the operational phase to mitigate against risks to the surrounding hydrological environment. When mitigated, operational phase impacts are considered to be to be neutral / non-significant / short-term.

Table 2: Mitigation Measures for Potential Impacts at Operational Phase

Character of potential impact	Mitigation measure
Operational Phase	
Pluvial flood risk due to climate change, causing severe inclement weather conditions.	• Attenuation storage design allows for a 20% increase in rainfall intensities. • Drainage system design allows for a 20% increase in flows. • Provision of min. freeboard (500mm) from 1% AEP as required by GDSDS (mitigation against impact of climate change). • The design of proposed site levels (roads, FFL etc.) has been carried out to ensure the proposed development is elevated and set in such a way as to avoid concentrating additional surface water flow in any location. Following the Site-Specific Flood Risk Assessment, it has been determined that the proposed development is located in Flood Zone C as defined by the Guidelines i.e. proposed development is considered to have the required level of flood protection up to and including the 1% AEP flood event. • Overland flow routes, directed towards open space areas, are identified / established in the event of storms exceeding the 1% AEP design capacity of the attenuation system (also refer to DBFL Report 190226-DBFL-XX-XX-RP-C-0003, Site Specific Flood Risk Assessment).
Reduced local ground water recharge due to increase in impermeable surfaces, potentially increasing surface water runoff.	35.3% of the proposed development is landscaped green area that is permeable. Groundwater recharge is still possible after the construction of the proposed development, although at a slower rate than when it was predominantly a greenfield site with minimal development.
Interference with existing groundwater regime.	The development's basement shall not have an adverse effect on the existing ground water regime as the basement extends into the low porosity boulder clays (refer to Ayesa's Basement Impact Assessment for the proposed development). In areas of high groundwater levels where SuDS are proposed, the SuDS features will be lined to avoid infiltration and prevent groundwater flooding.
Accidental hydrocarbon leaks and subsequent discharge into piped surface water drainage network (e.g. along	All surface water runoff draining to the piped network will pass through a petrol interceptor (Klargester or equivalent), before discharging into the existing public surface water network along Eglinton Road.

Character of potential impact	Mitigation measure
roads and in driveway areas).	
Contamination of surface water runoff from foul sewer leaks.	All new foul drainage lines will be pressure tested and will be subject to a CCTV survey in order to identify any possible defects prior to being made operational (in accordance with Irish Water's QA Field Inspection Requirement Manual).
Contamination of potable water from foul sewer leaks.	No additional mitigation measures are proposed in relation to water supply; however, water conservation measures such as dual flush water cisterns and low flow taps will be included in the design.
Blockages in surface water drainage network causing flooding	A contract will be entered into with a suitably qualified contractor for maintenance of the attenuation system, green roof installations, Hydrobrake and full retention fuel / oil separator noted above.
Increased demand on existing foul network.	Irish Water have confirmed that based on the capacity currently available in the foul drainage and water supply networks and subject to a valid connection agreement being put in place the proposed connections can be facilitated (refer to Irish water correspondence in Appendix 11.3).

Surface water runoff from the site will be attenuated to the greenfield runoff rate as outlined in the Greater Dublin Strategic Drainage Study (GDSDS). Surface water discharge rates will be controlled by a Hydrobrake type vortex control device in conjunction with below ground attenuation storage.

The following methodologies are being implemented as part of a SuDS surface water treatment train approach:

- Permeable paving in surface level parking areas.
- Surface water runoff from roofs of courtyard houses will be routed to the proposed surface water pipe network via the porous aggregates beneath permeable paved driveways.
- Surface water runoff from apartment roofs and podium areas will be captured by green/blue roofs (sedum blanket/drainage board) prior to being routed to the piped surface water drainage network.
- Surface water runoff from the majority of site's internal street network will be directed to the proposed pipe network via tree pits or other SUDS features (with overflows to conventional road gullies). Part of the site's internal street network (adjacent to Block E) drains via 2 No. bio-retention areas. In limited instances, surface water runoff from paved areas will be directed to the proposed pipe network via conventional road gullies.

- Attenuation of the 30 and 100-year return period storms (refer to DBFL Report 190226- DBFL-XX-XX-RP-C-0002, Infrastructure Design Report).
- Installation of a Hydrobrake (limiting surface water discharge to greenfield runoff rate).
- Surface water discharge will also pass via a fuel / oil separator (sized in accordance with permitted discharge from the site)

11.6.3 'Do Nothing' Scenario

No mitigation measures are proposed in relation to water and the hydrological environment if the development does not proceed.

11.7 Predicted Impact of the Proposed Development

11.7.1 Assessment of Source Pathway Receptor Linkages

The potential for impact on the aquifer is low based on the low chemical storage on site during construction phase and post development. The overburden thickness and low permeability nature of till and a lack of fracture connectivity within the limestone will minimise the rate of off-site migration for any indirect discharges to ground at the site. As such there is no potential for a change in the groundwater body status or significant source pathway linkage through the aquifer to any Natura 2000 site.

Should any silt-laden stormwater from construction or hydrocarbon-contaminated water from a construction vehicle leak manage to enter the public stormwater sewer, the suspended solids will naturally settle within the drainage pipes and hydrocarbons will dilute to background levels (water quality objectives as outlined in S.I. No. 272 of 2009, S.I. No. 386 of 2015 and S.I. No. 77 of 2019); by the time the stormwater reaches any open water based on the distance to waterways. Similarly, during operation, should any leak of hydrocarbon occur from a vehicle, the volume of contaminant release is low and combined with the significant attenuation within in the public stormwater sewers, hydrocarbons will dilute to background levels with no likely impact above water quality objectives as outlined in S.I. No. 272 of 2009, S.I. No. 386 of 2015 and S.I. No. 77 of 2019.

The post development peak wastewater discharge is calculated as 17.91 litres/sec. The sewage discharge will be licensed by Irish Water, collected in the public sewer and treated at Irish Water's WWTP at Ringsend prior to discharge to Dublin Bay. This WWTP is required to operate under an EPA licence (D0034-01) and to meet environmental legislative requirements. The peak foul discharge calculated for the proposed development is well within the current capacity of the WWTP.

11.7.2 Construction Phase

Implementation of the measures outlined in Section 11.6.1 will ensure that the potential impacts of the proposed development on water and the hydrogeological environment are imperceptible during the construction phase.

11.7.3 Operation Phase

As surface water drainage design has been carried out in accordance with the GDSDS and SuDS methodologies (refer to Section 11.6.2) are being implemented as part of a treatment train approach, impacts on the water and hydrogeological environment arising from the operational phase are considered imperceptible.

Irish Water have issued a Confirmation of Feasibility for the provision of foul drainage and water supply connections.

11.7.4 'Do Nothing' Scenario

There are no predicted impacts should the proposed development not proceed.

11.8 Monitoring

Proposed monitoring during the construction phase in relation to the water and hydrogeological environment are as follows:

- Implementation of measures included in the *Preliminary Construction Management Plan* and *Construction and Environment Management Plan* (included in application documents).
- Inspection of fuel / oil storage areas.
- Monitoring cleanliness of adjacent road network, implementation of dust suppression and vehicle wheel wash facilities.

During the operational phase an inspection and maintenance contract are to be implemented in relation to the proposed drainage network, Class 1 full retention fuel / oil separator, hydrobrakes and attenuation devices).

11.9 Reinstatement

Oil, fuel etc. storage areas are to be decommissioned on completion of the construction phase. Any remaining liquids are to be removed from site and disposed of at an appropriate licenced facility. Dublin City Council's Environmental Control Section will be notified of the proposed destination for disposal of any liquid fuels.

11.10 Interactions and Potential Cumulative Impacts

11.10.1 Interactions

Chapter 5: Population and Human Health

Potential impacts on human health have also been considered, particularly with regard to provision of water supply and foul drainage infrastructure.

This interaction is considered to be long-term, imperceptible and neutral.

Chapter 10: Land, Soils and Geology

In the absence of mitigation, surface water runoff during the construction phase may lead to erosion and contain increased silt levels (e.g., runoff across areas stripped of topsoil) or become polluted by construction activities. Removal of the existing topsoil layer will be required across the site as well as removal of some trees, hedgerows etc.

Increased impermeable surface area will reduce local ground water recharge and potentially increase surface water runoff (if not attenuated to greenfield runoff rate). Harmful materials on site like plastics and different types of material dust can get into a water source and cause pollution. Measures must be in place to prevent this from occurring.

This interaction is considered to be short-term, imperceptible and neutral.

Refer to the Lands and Soils Chapter (Section 10.6) for proposed mitigation measures and conclusions in relation to residual impacts.

Chapter 15: Transportation

Construction and operation stage traffic have the potential to impact water quality via hydrocarbon spills and leaks.

This interaction is considered to be short-term, imperceptible and neutral.

Chapter 16: Material Assets: Site Services

Implementation of measures included in the *Preliminary Construction Management Plan* and *Construction and Environment Management Plan* during the construction phase will manage site water and will mitigate the risk of surface contaminants infiltrating into the underlying geology and hydrogeology during slit trenching works.

This interaction is considered to be short-term, imperceptible and neutral.

Chapter 13: Noise and Vibration

Development of the site will result in a level of noise and vibration related effects on the surrounding environment during the construction phase. The interaction between Material Assets and Noise and Vibration is considered to be moderate and temporary in nature. A construction traffic management plan will be implemented in order to minimise the disturbance caused by traffic.

This interaction is considered to be short-term, imperceptible and neutral.

11.10.2 Potential Cumulative Impacts

The proposed surface water drainage infrastructure has been designed in accordance with the relevant guidelines i.e., Greater Dublin Strategic Drainage Study (GDSDS) and OPW Flood Risk Assessment Guidelines. Any other future development in the vicinity of the site would have to be similarly designed in relation to permitted surface water discharge, surface water

attenuation and SuDS, therefore, no potential cumulative impacts are anticipated in relation to surface water drainage and flooding.

No potential cumulative impacts are anticipated in relation to foul drainage and water supply. Irish Water have confirmed that the proposed foul drainage connection to the existing combined sewer and proposed connection to the existing water supply network are feasible (refer to Section 11.3.4 and Section 11.3.6).

11.11 Difficulties Encountered

There were no difficulties encountered in compiling and assessing the data for this section of the EIAR.

11.12 Conclusion

A conceptual site model (CSM) has been prepared following a desk top review of the site and surrounding environs. Based on this CSM, plausible Source-Pathway-Receptor linkages have been assessed assuming an absence of any measures intended to avoid or reduce harmful effects of the proposed project (i.e. mitigation measures) in place at the proposed development site. Refer to AWN Hydrological Risk Assessment.

There is no direct source pathway linkage between the proposed development site and open water (i.e. Dodder Catchment or Dublin Bay). It is concluded that there is also no resultant indirect source pathway linkage from the proposed development through public sewers which could result in any change to the current water regime (water quality or quantity) and open water as defined. There is an indirect connection through the foul sewer which will eventually discharge to the Ringsend WWTP and ultimately discharges to Dublin Bay. The future development has a peak foul discharge that would equate to 0.19% of the licensed discharge at Ringsend WWTP (peak hydraulic capacity).

It is concluded that there are no pollutant linkages as a result of the construction or operation (without the use of mitigation) of the proposed development which could result in a water quality impact which could alter the habitat requirements of the Natura sites within Dublin Bay.

Mitigation measures have been included during construction. During operation the potential for an impact to ground or storm water is negligible and there are measures incorporated within the proposed development to manage stormwater run-off quality. These specific measures will provide further protection to the receiving soil and water environments. However, the protection of downstream European sites is in no way reliant on any of these measures and has not been taken into account in assessing the impact on water quality for the European sites in and around Dublin Bay.

11.13 References

- Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (2022)
- Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements. Institute of Geologists of Ireland (2013).
- Environmental Protection Agency (EPA) Map Viewer (https://gis.epa.ie/EPAMaps/)
- Geological Survey Ireland Maps.
- Dublin City Council Development Plan (2022 -2028)
- 190226-X-X-X-XXX-RP-DBFL-CE-0002 Infrastructure Design Report submitted by DBFL.

Table 11.1 Water & Hydrology – Summary of Construction Phase Likely Significant Effects with and without Mitigation / Monitoring

		Impact Without Mitigation					Mitigation Measures	Monitoring	Impact With Mitigation / Monitoring				
Likely Significant Effect	**Extent**	**Quality**	**Significance**	**Duration**	**Type**	**Probability**			**Quality**	**Significance**	**Duration**	**Type**	**Probability**
Increased silt levels in surface water runoff and rainwater pumped from excavations	On-Site & Adjacent Drainage Network	Negative	Significant	Short-Term	Direct	Likely	Extent of topsoil strip (and consequent exposure of subsoil) will be limited to the immediate vicinity of active work areas. Weather conditions will also be taken account of when planning stripping of topsoil and excavations with an objective of minimizing soil erosion.	Monitor contractors' compliance with PCMP	Neutral	Not Significant	Short-Term	Direct	Un-Likely
Accidental spills and leaks	On-Site & Adjacent Drainage Network	Negative	Significant	Short-Term	Direct	Likely	Response procedure will be put in place to deal with any accidental pollution events	Monitor contractors' compliance with PCMP	Neutral	Not Significant	Short-Term	Direct	Un-Likely
Discharge of wash water from concrete trucks	On-Site & Adjacent Drainage Network	Negative	Significant	Short-Term	Direct	Likely	Concrete batching and wash down / wash out of concrete trucks will take place off site.	Monitor contractors' compliance with PCMP	Neutral	Not Significant	Short-Term	Direct	Un-Likely
Dewater excavations during	On-Site	Negative	Significant	Short-Term	Direct	Likely	Basement excavation will be coordinated with the proposed	Monitor contractors' compliance with PCMP and	Neutral	Not Significant	Short-Term	Direct	Un-Likely

basement construction							staging for the development to minimise requirement for dewatering	recommendations from the Basement Impact Assessment				
Improper discharge of foul drainage from contractor's compound	Adjacent Drainage Network	Negative	Significant	Short-Term	Direct	Likely	Foul drainage discharge from the construction compound will be tankered off site to a licensed facility until a connection to the public foul drainage network has been established	Monitor contractors' compliance with PCMP	Neutral	Not Significant	Short-Term	Direct	Un-Likely
Cross contamination of potable water supply to construction compound	Adjacent Water Supply Network	Negative	Significant	Short-Term	Direct	Likely	The contractor shall obtain a temporary connection from the existing water supply network along Milltown Road / Sandford Road in accordance with Irish water requirements for same	Monitor contractors' compliance with PCMP	Neutral	Not Significant	Short-Term	Direct	Un-Likely