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Hydrological and Hydrogeological Qualitative Risk Assessment

Large-Scale Residential Development at Milltown Park, Sandford Road, Dublin 6, D06 V9K7

CLIENT
Sandford Living
Limited

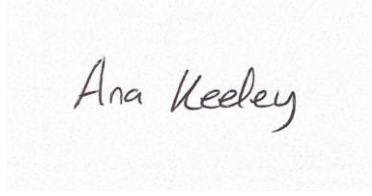

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1. INTRODUCTION

1.1 Background

AWN have been requested by Sandford Living Limited to carry out a Hydrological and Hydrogeological Qualitative Risk Assessment for a proposed new Large-Scale Residential Development located at the corner of Sandford Road and Milltown Road within Milltown Park, Sandford Road, Dublin 6. The site is bound by Sandford Road along the site's north-eastern boundary and Milltown Road is located along the site's south-eastern boundary. The site covers a total area of approximately 4.26 Ha.

Access to the site will be provided via Milltown Road and Sandford Road to facilitate access to the development including improvements to pedestrian facilities.

The River Dodder is located 0.5 km southeast of the site, flowing in a northwestern direction before discharging to Liffey Estuary Lower which eventually outfalls to Dublin Bay.

The potential impacts on the receiving water environment considered are:

- ▶ The management of surface water run-off and accidental leaks during construction phase.
- ▶ Connection to stormwater sewer during operation. Due to the nature of the Proposed Development, it has been assumed that there will be no bulk oil storage during the operational phase.

1.2 Objective of the Report

The scope of this desktop review is to assess the potential for any likely significant impacts on receiving waters and protected areas during construction or post development once operational/occupied, in the absence of taking account of any measures intended to avoid or reduce harmful effects of the proposed project (i.e. standard control measures).

In particular, this review considers the likely impact of construction and operation impacts (construction run-off and domestic sewage) from the Proposed Development on water quality and overall water body status within the Southwestern Irish Sea coastal waterbody (where the relevant European Sites are located), including bathing water locations. The assessment relies on information regarding construction and design provided by DBFL Consulting Engineers as follows:

- ▶ Site Specific Flood Risk Assessment- DBFL Consulting (July 2025).
- ▶ Infrastructure Design Report- DBFL Consulting (July 2025).

This report was prepared by Marcelo Allende and Ana Keeley. Marcelo Allende (BSc, BEng) 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. Marcelo holds a degree in Water Resource Civil Engineering (BEng, Hons) from the University of Chile and a Bachelor of Science in Engineering (BSc, Hons). He has worked on a wide of range of projects including multi-aspect environmental investigations, geo-environmental impact assessments, surface and groundwater resource management, hydrological and hydrogeological conceptual and numerical modelling, strategic and site specific flood risk assessments (Stage 1,2 and 3), Due Diligence reporting, baselines studies, soils, surface water and groundwater monitoring and field sampling programmes on a variety of brownfield and greenfield sites throughout Ireland as well as overseas in Chile, Argentina, Peru and Panama. 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).

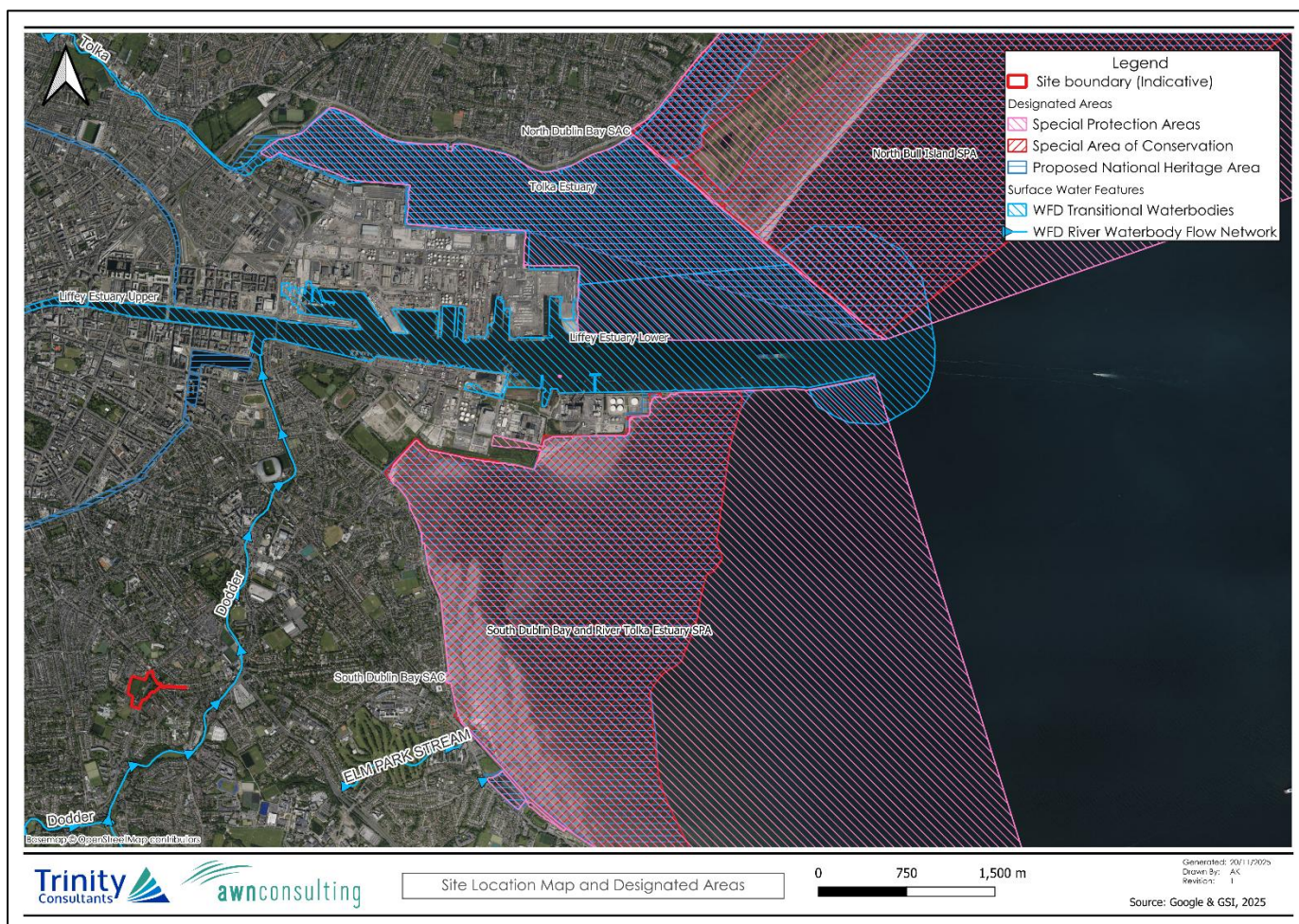
Ana is an Environmental Consultant with Awn Consulting with ongoing roles within the water department. Ana has a BSc in GeoScience from Trinity College Dublin. Ana has worked on a range of projects including environmental investigations, environmental impact assessment reports, hydrological risk assessments and ArcGIS mapping. Ana is a member of the International Association of Hydrogeologists (Irish Group).

1.3 Hydrological Setting

The Proposed Development is located c. 0.5 km northwest of the River Dodder. The surrounding environment can be described as a mainly residential setting. The nearest surface water body is the River Dodder. There is a hydrological linkage between the site and this water body through the existing surface water drainage.

The nearest surface water receptors to the proposed sites are South Dublin Bay and River Tolka Estuary SPA [site code: 004024], South Dublin Bay SAC [site code: 000210], North Dublin Bay SAC [site code: 000206], North Bull Island SPA [site code: 004006] which are located c. 2.5 km east of the Proposed Development site (refer to Figure 1-1 below). The nearest waterbody to the site is River Dodder (WFD Code: IE_EA_09D010900). The Dodder_050 originates in Ticknock Wood within the townland of Woodside, County Dublin. The river system comprises two headwater streams that flow in a northern direction, before converging at Dunderum. From this confluence, the River Dodder continues northward, passing c. 0.5 km east of the proposed development before discharging to Liffey Estuary Lower which eventually outfalls to Dublin Bay which is hydrologically connected to South Dublin Bay and River Tolka Estuary SPA, South Dublin Bay SAC, North Dublin Bay SAC, North Bull Island SPA. This waterbody (River Dodder) is not directly hydrologically connected to any SAC and SPA habitats, as there is adequate assimilation and dilution between the waterbody and the nearby Natura 2000 sites which are located 2.5km east.

Figure 1-1. Site Location Map and Designated Areas



1.4 Description of Current and Proposed Drainage

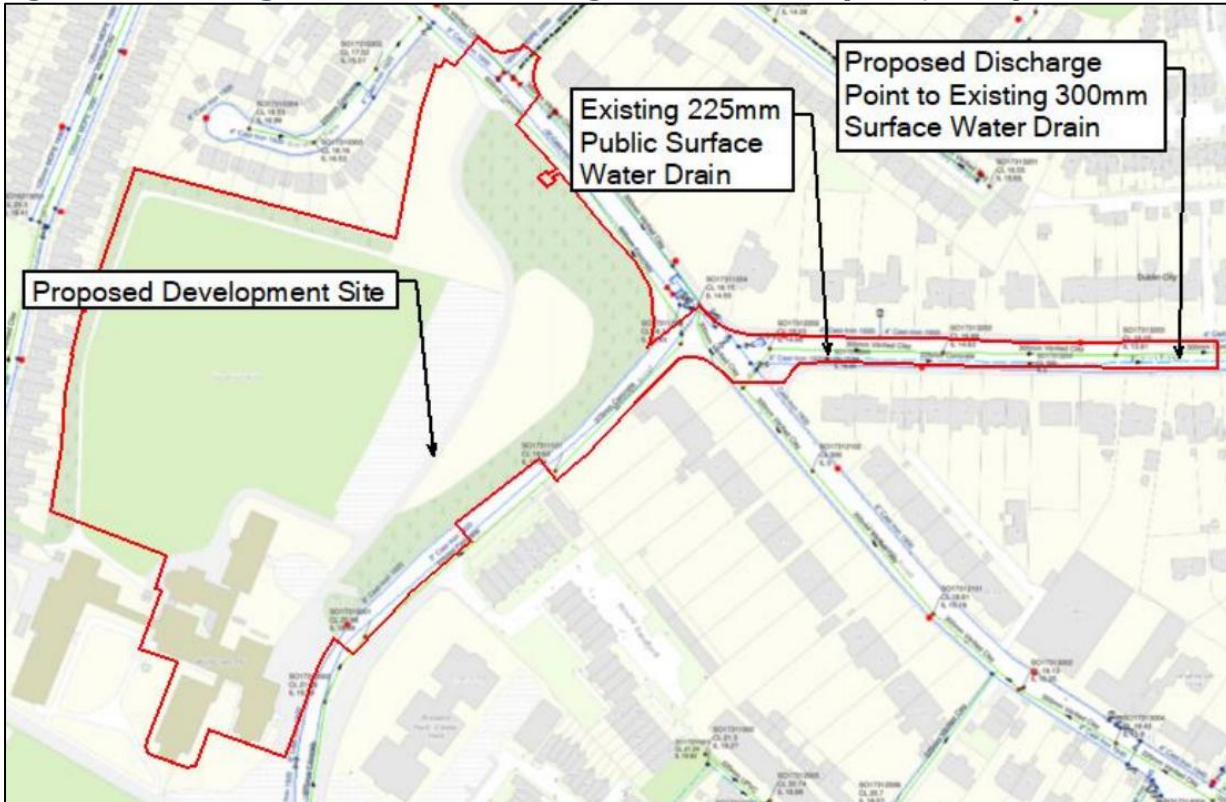
Existing and Proposed Surface Water Drainage

There is limited surface water drainage infrastructure on site at present, given that is mainly undeveloped. An existing 225mm diameter surface water drain is located approximately 80m from the eastern corner of the site on Eglington Road (refer to Figure 1-2). However, existing surface water drains on site discharge to the existing combined sewer network along Sandford Road and Milltown Road rather than the existing surface water drain in Eglington Road.

During the operational phase, it is proposed to discharge attenuated flows from the site to the existing drainage network on Eglington Road (approximately 200m from the Sandford Road / Eglington Road junction where the public line increases to a 300mm diameter pipe).

The existing surface water drain in Eglington Road ultimately discharges to the Dodder River.

Figure 1-2. Existing Surface Water Drainage Infrastructure (DFBL, 2025)



A series of SuDS elements are incorporated in the design, which will comprise treatment via the use of a green roofs, blue roofs and permeable paving with petrol interceptors, as well as tree pits, rain gardens, a detention basin, flow control (via vortex flow control device) and bioretention areas. This will result in improvement in the rate of and quality of stormwater discharging from the site compared to current.

Runoff will be attenuated throughout the site as it passes through or is stored in SuDS components which have been chosen to collect, convey and store water based on site and hydraulic requirements. In line with GSDS requirements, attenuation storage will be sized for the 1% AEP (with 20% allowance for climate change) critical rainfall event while limiting the 1-year and 100-year events to the rates.

Refer to the Infrastructure Design Report prepared by DBFL Consulting Engineers (2025) for further details.

Existing and Proposed Wastewater Drainage

There is an existing 600mm diameter combined sewer which is located adjacent to the site's north-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 on Sandford Road. 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.

Two foul drainage discharge points are proposed for the site (into the Milltown Road and Sandford Road sewers aforementioned). The proposed foul drainage network within the site comprises of a series of 225mm diameter pipes. Courtyard houses (located along the western boundary) will be serviced by individual 100mm diameter connections.

A revised pre-connection enquiry was submitted in May 2025 (ref. no. CDS25004037) for the proposed foul drainage layout. A confirmation of feasibility for this revised application is yet to be received. These foul sewers eventually discharge to the Ringsend Waste Water Treatment Plant (WWTP) where it is treated and ultimately discharges to Dublin Bay. This WWTP operates under the EPA licence D0034-02.

Flood Risk

According to the Flood Risk Assessment carried out by DBFL (2025), the site is within Flood Zone C, i.e., outside of the 1:1000-year flood plain and the sites level is well above flood levels there is therefore an extremely low risk and no flood mitigation. The design strategy and the incorporation of the SuDS measures mentioned above will take care of the residual pluvial risk of flooding.

The OPW Floodinfo.ie website was consulted for this report, the nearest flood event occurred c. 0.4 km northeast of the proposed site. This was a reoccurring flood event the flood source being the River Dodder. The report is dated to 24th of October 2011 at Anglesea Road, Ballsbridge, Dublin 4.

2. ASSESSMENT OF BASELINE WATER QUALITY, RIVER FLOW AND WATER BODY STATUS

A reliable Conceptual Site Model (CSM) requires an understanding of the existing hydrological and hydrogeological setting. This is described below for the Proposed Development site and surrounding hydrological and hydrogeological environs.

2.1 Hydrological Catchment Description

The Proposed Development site lies within the Liffey and Dublin Bay Catchment (Hydrometric Area 09) and Dodder sub-catchment (WFD name: Dodder_SC_010) (EPA, 2025) which is managed by the Dublin City Council (DCC).

The nearest waterbody is the River Dodder (DODDER_050, European Code: IE_EA_09D010900) which is where the surface water from the subject site currently runs off into which in turn outfalls into Liffey Estuary Lower Transitional Waterbody (European Code: IE_EA_090_0300) and eventually reaches Dublin Bay Coastal Waterbody (WFD code: IE_EA_090_0000).

The Environmental Protection Agency (EPA, 2025) on-line mapping presents the available water quality status information for water bodies in Ireland. The River Dodder has a WFD status (2019-2024) of 'Moderate' and a WFD risk score of 'At risk'. The ecological status (which comprises biological and chemical status) of the River Dodder water body during 2019-2024 is classed as 'Moderate'.

Liffey Estuary Lower has a WFD status (2019-2024) of 'Moderate' and a WFD risk score of 'At risk'. The ecological status (which comprises biological and chemical status) and biological status or potential of this transitional waterbody during 2019-2024 is classed as 'Moderate'.

Dublin Bay has a WFD status (2019-2024) of 'Good' and a WFD risk score of 'Not at risk'. The ecological status (which comprises biological and chemical status) of Dublin Bay water body during 2019-2024 is classed as 'Good'.

It should be noted that the bathing status has no direct relevance to the water quality status of the Natura 2000 sites due to rapid mixing and dilution resulting in no measurable change in water quality within the overall water body.

2.2 Aquifer Description & Superficial Deposits

Inspection of mapping from the Geological Society of Ireland (GSI, 2025 <http://www.gsi.ie>, accessed on 17-11-2025) indicates the bedrock underlying the Proposed Development site is part of the Lucan Formation (Code CDLUCN) and made up of Dark limestone & 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.

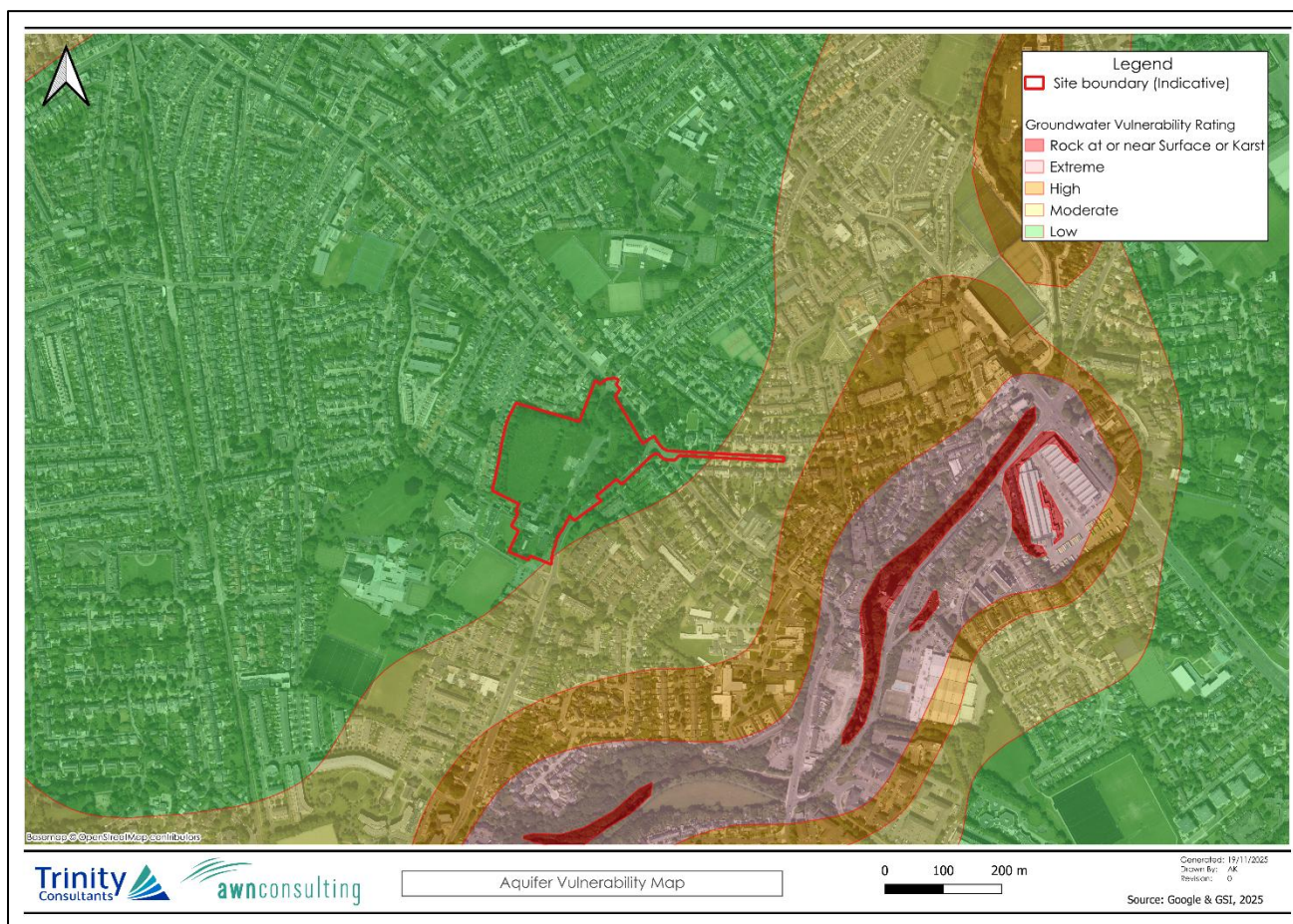
The GSI also classifies the principal aquifer types in Ireland as:

- ▶ Lk - Locally Important Aquifer – Karstified.
- ▶ LI - 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 Proposed Development site as a 'Locally Important Aquifer- Bedrock which is Generally Moderately Productive'. The Proposed Development is within the 'Dublin' groundwater body and is classified as 'moderately productive bedrock'. The most recent WFD groundwater status for this water body (2019-2024) is 'Good' with a current WFD risk score is 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' vulnerability indicates general overburden depth potential of >10 m. 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 as Figure 2-1 below.

Figure 2-1. Aquifer Vulnerability Map (Source: GSI, 2025)



The GSI/ Teagasc (2025) mapping database of the quaternary sediments in the area of the subject site indicates the principal subsoil type in the area comprises Till derived from quartzites (TLs).

This information is consistent with site investigations carried out at the Milltown Park site between January and June 2020, that show the typical stratification associated with the subject site as follows:

- ▶ Topsoil: 0.2-0.4 m depth below ground level (mbgl);
- ▶ Made Ground 0.5-1.0 mbgl;
- ▶ Sandy gravelly Clay: 0.5-1.0 to 9.0-18.5 mbgl;
- ▶ Bedrock below 9.0-18.5 mbgl.

No evidence of contamination was detected during site investigations (refer to DBFL Consulting Engineers, Infrastructure Design Report Appendix F; Extracts from Site Investigation Report).

3. CONCEPTUAL SITE MODEL

A conceptual site model (CSM) is developed based on a good understanding of the hydrological and hydrogeological environment, plausible sources of impact and knowledge of receptor requirements. This in turn allows possible Source Pathway Receptor (S-P-R) linkages to be identified. If no S-P-R linkages are identified, then there is no risk to identified receptors.

3.1 Assessment of Plausible Sources

Potential sources during both the construction and operational phases are considered. For the purposes of undertaking the potential of any hydrological/ hydrogeological S-P-R linkages, all potential sources of contamination are considered without taking account of any measures intended to avoid or reduce harmful effects of the proposed project (control/design measures) i.e. a worst-case scenario. Construction sources (short-term) and operational sources (long-term) are considered below.

Construction Phase

The following potential sources are considered plausible risk scenarios for the Proposed Development construction site:

- i. Hydrocarbons or any hazardous chemicals will be stored in specific bunded areas. Refuelling of plant and machinery will also be carried out in bunded areas to minimise risk of any potential being discharged from the site. As a worst-case scenario, a rupture of a 1,000-litre tank to ground is considered in this analysis which disregards the effect of bunding. This would be a single short-term event.
- ii. Leakage may occur from construction site equipment. As a worst-case scenario an unmitigated leak of 300 litres is considered. This would be a single short-term event.
- iii. Use of wet cement is a requirement during construction. Run-off water from recent cemented areas will result in highly alkaline water with high pH. As this would only occur during particular phases of work this is again considered as a single short-term event rather than an ongoing event.
- iv. Construction requires soil excavation and removal. Unmitigated run-off could contain a high concentration of suspended solids and contaminants such as hydrocarbons during earthworks, given the presence of contamination beneath the site according to site investigations. These could be considered intermittent short-term events, i.e. on the basis that adequate control measures which will be incorporated in the Construction Environmental Management Plan (CEMP) fail.
- v. During the excavations for the development, no significant long-term dewatering is expected given the low permeability overburden underlying the site. Bedrock will not be affected by excavations work given the projected dig level (~4.8 mbgl for basements) and bedrock depth (>9.0 mbgl).

Operational Phase

The following sources are considered plausible post construction:

- i. The Proposed Development does not require any bulk chemical storage and therefore the potential for water quality impact is negligible.
- ii. Leakage of petrol/ diesel fuel may occur from individual cars in parking areas; run-off may contain a worst-case scenario of 70 litres for example.
- iii. The stormwater drainage system follows SuDS measures, which are composed of an interception storage system (green roof areas, permeable paving, road gullies, tree pits) and an attenuation

storage tank. The storage system will discharge following the characteristics of a greenfield run-off into the existing public surface water sewer located on Eglinton Road. No additional treatment measures were considered due to the expected loading and provision of the mentioned interception system. It should be noted that all these SuDS measures contribute to reduce impact on water quality.

- iv. The Proposed Development will be fully serviced with separate foul and stormwater sewers which will have adequate capacity for the facility and discharge limits as required by Uisce Éireann (Irish Water) licencing requirements. Discharge from the site to the public combined sewer will be sewage and grey water only due to the residential and commercial nature of the Proposed Development. The foul discharge from the site will join the public sewer and will be treated at the Uisce Éireann Ringsend WWTP prior to subsequent discharge to Dublin Bay. This WWTP is required to operate under an EPA licence (D0034-02) and meet environmental legislative requirements as set out in such licence. It is noted that a planning permission for a new upgrade to this facility was received in 2019 and is currently in the process of construction/ implementation.

The plant at Ringsend is currently in the process of being upgraded to a PE of 2.4 million to meet the increased demand of the wider Dublin area. The most recent Annual Environmental Report (AER 2023) shows it is currently operating for a PE peak loading of 2.36 million while originally designed for 1.64 million but currently increased up to 2.1million since 2023. However, the current maximum hydraulic load (804,220 m³/day) is less than the peak hydraulic capacity as constructed (959,040 m³/day) i.e., prior to any upgrade works.

In addition, the most recent wastewater treatment capacity register of Uisce Éireann states (as for July 2025) that the Ringsend WWTP would have capacity available. Uisce Éireann completed construction of the infrastructure to treat the wastewater for a population equivalent of 2.1million at the end of 2023, which is the current organic capacity. When all the proposed works are complete by the end of 2025, the Ringsend Wastewater Treatment Plant will be able to treat wastewater for up to 2.4 million population equivalent.

UÉ is also continuing working on the remaining project elements to deliver the capacity for a population equivalent of 2.4 million by the end of 2025.

3.2 Assessment of Pathways

The following pathways have been considered within this assessment with impact assessment presented in Section 3.4:

The potential for offsite migration due to any construction discharges is low as there is no significant pathway in the aquifer and all construction water is passed through treatment installed prior to discharge offsite.

- i. Vertical migration to the underlying limestone is minimised due to the recorded 'Low' vulnerability present at the site resulting in good aquifer protection from any localised diesel/ fuel oil spills during either construction or operational phases. The site is underlain by Calp limestone which is a 'Locally Important Limestone Aquifer' characterised by discrete local fracturing with little connectivity rather than large connected fractures which are more indicative of Regional Aquifers. As such, flow paths are generally local.
- ii. There is an indirect hydrological linkage for construction/operation run-off or any small hydrocarbon leaks from the site to the Dodder River which discharges into the Liffey Estuary Lower and eventually Dublin Bay through the surface water drainage.
- iii. There is no 'direct' pathway for foul sewage to any receiving water body (as identified above). There is however an 'indirect pathway' through the public sewer which ultimately discharges to

the Irish Water WWTP at Ringsend prior to discharge to Dublin Bay post treatment. This coastal waterbody hosts multiple Natura 2000 protected sites.

3.3 Assessment of Receptors

The receptors considered in this assessment include the following:

- i. Underlying 'Locally Important' Limestone aquifer.
- ii. Dodder River
- iii. South Dublin Bay and River Tolka Estuary SPA [site code: 004024], South Dublin Bay SAC [site code: 000210], North Dublin Bay SAC [site code: 000206], North Bull Island SPA [site code: 004006] are all located c. 2.5 km to the northeast of the site.

Other Natura 2000 Sites that may be hydrologically connected to Dublin Bay, but are located further away (namely North-West Irish Sea SPA (site code: 004236) and Rockabill to Dalkey Island SAC (site code: 003000)) were excluded from the assessment due to their distance from the subject site, the potential loading of contaminant from the site (risk scenarios presented in Section 3.1) and significant dilution through its pathway.

3.4 Assessment of Source-Pathway-Receptor Linkages

There is currently indirect hydrological connection to the Natura 2000 Sites downstream in the Liffey Estuary Lower through River Dodder which eventually flows into Dublin Bay. The Proposed Development would have an indirect connection through the local stormwater network and drainage albeit via an extremely lengthy distance / pathway and a significant dilution factor downstream in the estuaries.

The Proposed Development will also have an indirect hydrological connection / linkage to Dublin Bay and its associated natura 2000 sites (WFD Transitional Waterbodies) via the proposed foul water drainage that will be discharged and treated at Ringsend WWTP.

Table 3–1 below summarises the plausible pollutant linkages (S-P-R) considered as part of the assessment and a review of the assessed risk is also summarised below.

Construction Phase

The potential for impact on the aquifer is Low based on the 'Low' vulnerability underlying the site would be able to reduce the rate of off-site migration for any indirect discharges to ground at the Proposed Development site. Nevertheless, these impacts will be minimised due to the absence of any bulk chemical storage on site. As such there is potential for a change in the groundwater body status or significant source pathway linkage through the aquifer to any Natura 2000 site if not properly mitigated.

During construction phase, there is no direct open-water pathway between the site and Dublin Bay. However, there is an indirect pathway through the stormwater drainage which discharges into the adjacent River Dodder. Should any silt-laden stormwater from construction or hydrocarbon-contaminated water from a construction vehicle leak/tank leak manage to enter into the surface/combined water sewer, the suspended solids will naturally settle within the sewer; however, in the event of a worst case hydrocarbon leak of 1,000 litres this would be diluted to background levels (established as surface 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 the nearest Natura 2000 Sites (South Dublin Bay and River Tolka Estuary SPA, South Dublin Bay SAC, North Dublin Bay SAC, North Bull Island SPA, c. 2.5 km).

Operational Phase

During operation, the potential for a release is low as there is no bulk fuel/chemical storage and no silt laden run-off. Stormwater will be collected by a drainage system which includes SuDS measures, an attenuation system and oil/ petrol interceptors prior to discharge off-site (albeit these measures have been disregarded for this analysis). In addition, the potential for hydrocarbon discharge is quite minimal based on an individual vehicle (70 litres) leak being the only source for hydrocarbon release. However, even if the operation of the proposed SuDS and interceptor systems are excluded from consideration, there is 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) in the worst-case scenarios described above at section 3.2 and there will be no significant effect on any European site. The volume of contaminant release is low and combined with the significant attenuation within the stormwater drainage network, 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 at any Natura 2000 sites.

It can be concluded that the in-combination effects of surface water arising from the Proposed Development taken together with that of other permitted developments will not be significant based on the in-combination low potential chemical and sediment expected loading. Therefore, based on the loading of any hazardous material considered in the worst-case scenarios mentioned in Section 3.1 above during construction and operation phases, there is subsequently no potential for impact on downgradient Natura 2000 habitats (South Dublin Bay and River Tolka Estuary SPA, South Dublin Bay SAC, North Dublin Bay SAC, North Bull Island SPA, which is located 2.5 km from the site).

The peak wastewater discharge is calculated at 17.91 l/s (DBFL, 2025). The sewage discharge will be licensed by Uisce Éireann, collected in the public sewer to the northeast of the site, and treated ultimately Irish Water's WWTP at Ringsend prior to discharge to Dublin Bay. As outlined in section 3.1 (iv), upgrade works commenced in 2018 and are expected to be fully completed by 2025. The upgrade works will result in treatment of sewage to a higher quality than current, thereby ensuring effluent discharge to Dublin Bay will comply with the Urban Wastewater Treatment Directive by the end of the works.

Note: The following additional information is provided with regard to the Uisce Éireann WWTP at Ringsend, Dublin and in the context of the subject site calculated discharges:

The WWTP upgrade project is being progressed in stages to ensure that the plant continues to treat wastewater to the current treatment levels throughout the delivery of the upgrade. The project comprises three key elements and underpinning these is a substantial programme of ancillary works:

- Provision of additional secondary treatment capacity with nutrient reduction (400,000 population equivalent).
- Upgrade of the 24 existing secondary treatment tanks to provide additional capacity and nutrient reduction, which is essential to protect the nutrient-sensitive Dublin Bay area; and
- Provision of a new phosphorous recovery process.

In February 2018, the work commenced on the first element, the construction of a new 400,000 population equivalent extension at the Ringsend Wastewater Treatment Plant. After commissioning stages, the Capacity Upgrade facility began accepting flows for treatment in November 2021. This facility will enable current treatment levels to be maintained during the remainder of the upgrade of the existing secondary treatment tanks.

The 2019 planning permission facilitated upgrading works to meet nitrogen and phosphorus standards set out in the licence, which are temporarily exceeded currently. Uisce Éireann completed construction of the infrastructure to treat the wastewater for a population equivalent of 2.1 million at the end of 2023.

The application for the upgrade of the WWTP in 2012 and the revised upgrade in 2018 was supported by a detailed EIAR. As outlined in the EIAR, modelling of water quality in Dublin Bay has shown that the

upgrades (which are now currently underway) will result in improved water quality within Dublin Bay. The 2018 EIAR predicts that the improvement in effluent quality achieved by the upgrade will compensate for the increase in flow through the plant. The ABP inspector's report summarises the positive findings of the modelling for the post WWTP upgrade scenario on Dublin Bay water quality in sections 12.3.5 and 12.3.12 of his report and the overall positive impact for human health and the environment in his conclusions in section 12.9.1.

In addition, the 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 deterioration of the biological status of Dublin Bay (Irish Water, 2018). Nevertheless, these negative impacts of nutrient over-enrichment are considered "unlikely" (Uisce Éireann, 2018). 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. Therefore, 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". Therefore, it can be concluded that significant effects on the current status of the European sites within Dublin Bay from the current operation of Ringsend WWTP are unlikely. This conclusion is not dependent upon any future works to be undertaken at Ringsend.

Even without treatment at the Ringsend WWTP, the peak effluent discharge, calculated for the proposed development as 17.91 l/s (which would equate to 0.19% of the licensed discharge at Ringsend WWTP peak hydraulic capacity), would not have a measurable impact on the overall water quality within Dublin Bay and therefore would not have an impact on the current Water Body Status (as defined within the Water Framework Directive). This assessment is supported by hydrodynamic and chemical modelling within Dublin Bay which has shown that there is significant dilution for contaminants of concern (DIN and MRP) available quite close to the outfall for the treatment plant (Ringsend WWTP 2012 EIS, Ringsend WWTP 2018 EIAR; refer to Section 12.4.22, ABP-301798-18 Inspector's report). The most recent water quality assessment of Dublin Bay WFD Waterbody undertaken by the EPA (Water Quality in 2023: An Indicators Report, 2024) also shows that Dublin Bay on the whole, currently has an 'Unpolluted' water quality status (refer to www.catchments.ie).

With regard to bathing waters in Dublin Bay, as mentioned above the Proposed Development will have no impact on the water quality in any overflow situation apart from a minor contribution (0.19% of the peak hydraulic capacity at Ringsend WWTP) from foul sewage.

It should be noted that the Ringsend WWTP upgrade has experienced capacity issues during rainfall events and therefore overflows can occur following periods of heavy rainfall. These overflows occur as a result of the impact on treatment capacity during heavy rainfall events due to surges primarily caused by the historical combined drainage system in Dublin. As the Proposed Development will not contribute any additional stormwater drainage to the WWTP over the natural greenfield rate, the development will therefore have no measurable impact on the water quality in any overflow situation.

The assessment has also considered the effect of cumulative events, such as release of sediment laden water combined with a hydrocarbon leak on site (1,000 litres as a worst-case scenario during the construction phase). As there is adequate assimilation and dilution between the site and the Natura 2000 sites located in Dublin Bay (which is c. 2.5 km from the site), it is concluded that no perceptible impact on water quality would occur at the Natura 2000 sites as a result of the construction or operation of this Proposed Development. It can also be concluded that the cumulative or in-combination effects of effluent arising from the Proposed Development with that of other permitted proposed developments, or with development planned pursuant to statutory plans in the greater Dublin, Meath and Kildare areas, which will be discharged into Ringsend WWTP will not be significant having regard to the size of the calculated discharge from the Proposed Development and having regard to the following:

- ▶ Recent water quality assessment for Dublin Bay shows that they currently continue to meet the criteria for 'Unpolluted' water quality status (EPA, data until 2024).
- ▶ The Ringsend WWTP upgrade which is currently being constructed will result in improved water quality by Q4 2025 to ensure compliance with Water Framework Directive requirements.
- ▶ The most recent wastewater treatment capacity register of Uisce Éireann states (as for July 2025) that the Ringsend WWTP would have capacity available.
- ▶ All new developments are required to comply with SuDS which ensures management of run-off rate within the catchment of Ringsend WWTP.
- ▶ The natural characteristics of Dublin Bay result in enriched water rapidly mixing and degrading such that the plume has no appreciable effect on water quality at Natura 2000 sites.

As the Proposed Development will have no additional stormwater run-off during a stormwater event over and above the current level, surface water run-off from the development in the operational phase will therefore have no impact on the current water quality in any overflow situation at Dublin Bay.

It should also be noted that the bathing status has no direct relevance to the water quality status of the Natura sites due to rapid mixing and dilution resulting in no measurable change in water quality within the overall water body.

In addition, there is no long-term discharge planned which could have an impact on the status of the water body. In the scenario of an accidental release (unmitigated leaks mentioned above) there is potential for a temporary impact only which would not be of a sufficient magnitude to effect a change in the current water body status.

Finally, in a worst-case scenario of an unmitigated leak and not considering the operation of the SuDS and interceptor already included in the design, no perceptible risk to any Natura 2000 Sites is anticipated given the distance from source to Dublin Bay protected areas (c. 2.5 km). Potential contaminant loading will be attenuated, diluted and dispersed near source area.

Table 3–1 below presents a summary of the risk assessment undertaken.

Table 3–1. Pollutant Linkage Assessment (without control measures)

Source	Pathways	Receptors Considered	Risk of Impact
Construction Impacts			
<p>Unmitigated leak from an oil tank to ground/ unmitigated leak from construction vehicle (1,000 litres worst case scenario).</p> <p>Discharge to ground of runoff water with High pH from cement process/ hydrocarbons from construction vehicles/run-off containing a high concentration of suspended solids</p>	<p>Bedrock protected by >9.0m low permeability overburden. Migration within weathered/ less competent limestone is low (Calp limestone has discrete local fracturing rather than large connected fractures).</p> <p>Overland flow/ indirect pathway through stormwater drainage to Dodder water course eventually discharging to Dublin Bay.</p>	<p>Limestone bedrock aquifer (Locally Important Aquifer)</p> <p>Dodder River</p> <p>South Dublin Bay and River Tolka Estuary SPA, South Dublin Bay SAC, North Dublin Bay SAC, North Bull Island SPA</p>	<p>Low risk of migration through poorly connected fracturing within the limestone (Locally Important Aquifer) rock mass. No likely impact on the status of the aquifer/off site migration due to low potential loading, natural attenuation within overburden and discrete nature of fracturing reducing off site migration.</p> <p>No perceptible risk – Distance from source to Dublin Coastal Natura sites (>2.5 km approx.) Low contaminant loading will be attenuated diluted and dispersed to below statutory guidelines within c. 0.5 km of the site i.e.no potential impact to the Natura sites</p>
Operational Impacts (Summary)			
<p>Foul effluent discharge to sewer</p>	<p>Indirect pathway to Dublin Bay through public sewer and Ringsend WWTP</p>	<p>South Dublin Bay and River Tolka Estuary SPA, South Dublin Bay SAC, North Dublin Bay SAC, North Bull Island SPA</p>	<p>No perceptible risk – Even without treatment at Ringsend WWTP, the peak effluent discharge (17.91 l/s which would equate to 0.19% of the licensed discharge at Ringsend WWTP); would not impact on the overall water quality within Dublin Bay and therefore would not have an impact on the current Water Body Status (as defined within the Water Framework Directive).</p>

Source	Pathways	Receptors Considered	Risk of Impact
Discharge to ground of hydrocarbons from car leak (70 litres worst case scenario)	Indirect pathway through stormwater drainage to Dodder River water course	Dodder River and Dublin Bay	No perceptible risk – taking into account the extent of loading of contaminant, distance between the source and Dublin Bay is c. 2.5 km and significant dilution in the surface water sewer will ensure any released hydrocarbons are at background levels (i.e., 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).

4. CONCLUSIONS

A conceptual site model (CSM) has been prepared following a desk top review of the Proposed Development 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.

During construction and operation phases there will be an indirect hydrological connection to the Natura Sites (i.e., South Dublin Bay and River Tolka Estuary SPA, South Dublin Bay SAC, North Dublin Bay SAC, North Bull Island SPA) 2.5 km through River Dodder eventually into Dublin Bay. The Proposed Development would have an indirect connection through the local stormwater network and drainage albeit via an extremely lengthy distance / pathway and a significant dilution factor downstream in the estuaries.

There is also an indirect linkage from the Proposed Development through the public combined sewer that crosses the subject site 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).

Even disregarding the operation of design measures including an attenuation system and petrol interceptors on site, it is concluded that there will be imperceptible impacts from the Proposed Development to the water bodies due to emissions from the site stormwater drainage infrastructure to the wider drainage network. It should be noted the proposal also includes an attenuation system and petrol interceptors as part of best practice project design, and these features will provide additional filtration from the site to the drainage network.

It is concluded that there are no pollutant linkages as a result of the construction or operation of the Proposed Development which could result in a water quality impact which could alter the habitat requirements of the Natura 2000 sites within Dublin Bay.

Finally, and in line with good practice, appropriate and effective mitigation measures will be included in the construction design, management of construction programme and during the operational phase of the Proposed Development. With regard the construction phase, adequate mitigation measures will be incorporated in the Construction Environmental Management Plan (CEMP). 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 these measures and they have not been taken into account in this assessment.

5. REFERENCES

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