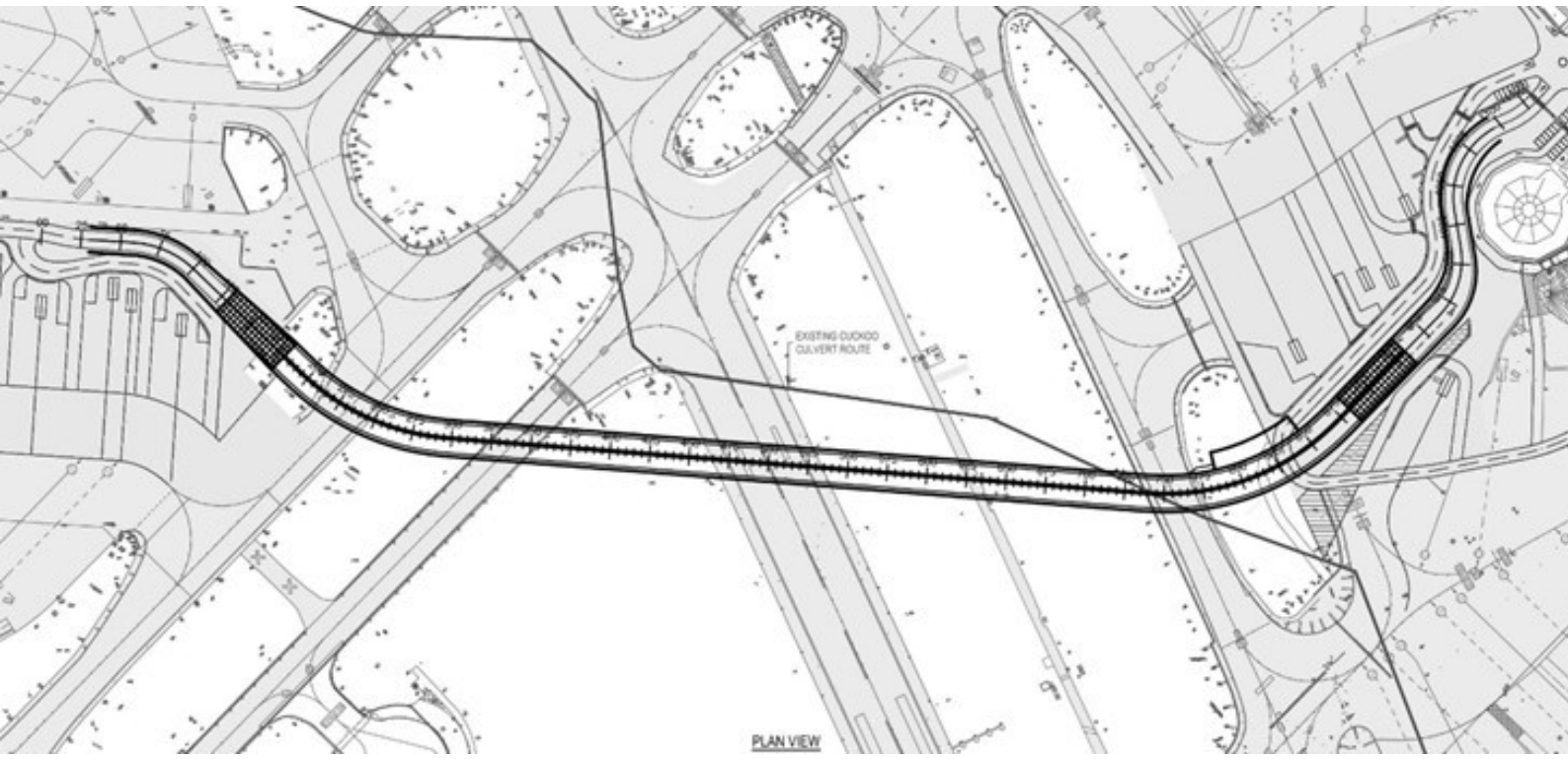
Appendix 7-1. Water Framework Directive Assessment



Dublin Airport Underpass

Water Framework Directive Assessment Report

August 2022

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DublinAirport

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Glossary

Abbreviation / Term	Definition
%	Percentage
µg/m^3	Microgram per cubic meter
µm	Micro-metre. A measure of length equalling 1x10^{-6} of a metre
AA	Appropriate Assessment
ABP	An Bord Pleanála
Abstraction	Groundwater abstraction is the process of taking water from a ground source, either temporarily or permanently. In many aquifers the groundwater has to be pumped out through boreholes or wells. As water is abstracted the water table is lowered around the borehole. If rates of abstraction exceed rates of groundwater recharge within an aquifer, the water table can fall across a wide area.
ACA	Architectural Conservation Area
ANCA	Aircraft Noise Competent Authority
ANPR	Automatic Number Plate Registration
APU	Auxiliary Power Units
AQLV	Air Quality Limit Values
ATM	Air Traffic Movement
ASI	Archaeological Survey of Ireland
ACDM	Airport Collaborative Decision Making
Baseflow	Groundwater flow to a surface water body (lake, swamp, or stream); i.e., that portion of stream discharge that is derived from groundwater flow or the draining of large lakes swamps or other sources outside the net rainfall that creates surface runoff/overland flow.
BCT	Bat Conservation Trust
BGL	Below Ground Level
BNL	Basic Noise Level
BSI	British Standards Institute
CAR	Commission for Aviation Regulation
CAFE	Cleaner Air for Europe
CCD	Climb, Cruise and Descent
CCR	Climate Change Resilience
CEMP	Construction Environmental Management Plan
CFRAM	Catchment Flood Risk Assessment and Management
CGI	Computer Generated Imagery
CHD	Coronary Heart Disease
CH_4	Methane
CIEEM	Chartered Institute of Ecology and Environmental Management
CIRIA	Construction Industry Research and Information Association
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
CODA	Central Office of Delay Analysis
CO_2	Carbon Dioxide

Abbreviation / Term	Definition
COMAR	Control of Major Accident Hazard
CSO	Central Statistics Office
CD	Cardiovascular Disease
C_6H_6	Benzene
DAA	Dublin Airport Authority
dB	The unit of noise measurement that expresses the loudness in terms of decibels (dB) based on a weighting factor for humans sensitivity to sound (A)
dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies
DBA	Desk-Based Assessment
DCHG	Department of Culture, Heritage and the Gaeltacht
DCLG	Department od Communities and Local Government
DECC	Department of Energy and Climate Change (UK)
Defra	Department for Environment, Food and Rural Affairs (UK)
DfT	Department for Transport (UK)
DoEHLG	Department of Transport and the Department of Environment, Heritage and Local Government
DRAQMP	Dublin Regional Air Quality Management Plan
DTTAS	Department of Transport, Tourism and Sport
DUB	Dublin
EASA	European Aviation Safety Agency
EC	European Commission
ED	Electoral Divisions
EIA	Environmental Impact Assessment.
EIAR	Environmental Impact Assessment Report
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EPS	European Protected Species
EPUK	Environmental Protection UK
ETS	Emission Trading Scheme
EU	European Union
FAA	Federal Aviation Administration (US)
FDI	Foreign Direct Investment
FEGP	Fixed Electrical Ground Power
FCC	Fingal County Council
FRA	Flood Risk Assessment
Fracture	A fracture is any separation in a geologic formation, such as a joint or a fault that divides the rock into two or more pieces. A fracture will sometimes form a deep fissure or crevice in the rock.
NFTMS	Flight Track Monitoring System
GDP	Gross Domestic Product

Abbreviation / Term	Definition
GHG	Greenhouse Gas
GLVIA	Guidelines for Landscape and Visual Impact Assessment
Groundwater ingress (infiltration)	The process of seeping rainwater and water from other sources into the ground to form groundwater is called infiltration. Infiltration refills the groundwater. Aquifer: Rainwater and water from rivers, ponds seep through the soil and fill the gaps between particles of soil and rocks.
Groundwater flow path	Groundwater flow means the volume and direction of groundwater through an aquifer. Groundwater flows from regions of higher hydraulic level to regions of lower hydraulic level.
Groundwater recharge	The process by which water enters the groundwater system or, more precisely, enters the phreatic zone.
GSE	Ground Support Equipment
ha	Hectare
HFCs	Hydrofluorocarbons
HIA	Health Impact Assessment
HSA	Health and Safety Authority
HSE	Health and Safety Executive
HT	High Technology
Hydraulic continuity	The relationship between ground water (within the superficial deposits or bedrock aquifer) and surface water (Rivers, lakes and streams). The relationship depends on whether groundwater discharges to surface water (referred to as baseflow); or where surface water discharges to ground water, such as from riverbed seepage to an adjacent aquifer.
IAA	Irish Aviation Authority
IAI	Institute of Archaeologists Ireland
IAQM	Institute of Air Quality Management
ICAO	International Civil Aviation Organisation
ICE	Inventory of Carbon and Energy
ICCI	In-combination Climate Change Impact Assessment
IEMA	Institute of Environmental Management and Assessment
IFC	International Finance Corporation
IFI	Inland Fisheries Ireland
IGI	Institute of Geologists of Ireland
IHD	Ischaemic Heart Disease
IHT	Institution of Highways and Transportation
IPC	Integrated Pollution Control
IPPC	Intergovernmental Panel on Climate Change
ISO	International Organisation for Standardisation
IW	Irish Water
JA	Jobseekers Allowance
JB	Jobseekers Benefit
km	Kilometres
LAP	Local Area Plan

Abbreviation / Term	Definition
LAQM	Local Air Quality Management.
Ltd.	Limited
LTO	Landing and Take-off
mppa	Million Passengers Per Anum
NAP	National Aviation Policy
N/A	'Not applicable' or 'Not appropriate'
NDP	The National Development Plan 2018 – 2027
NF_3	Nitrogen Trifluoride
NIAH	National Inventory of Architectural Heritage
NIS	Natura Impact Statement
NLS	National Landscape Strategy
NMS	National Monument Service
NMTs	Noise Monitoring Terminals
NO_2	Nitrogen Dioxide
NOEL	No Observed Effect Level
NO_x	Nitrogen Oxides
NPPF	National Planning Policy Framework. (UK)
NPF	National Planning Framework
NPPG	National Planning Policy Guidance (UK)
NPWS	National Parks and Wildlife Services
NQP	Night Quota Period
NRA	National Roads Authority
NSO	National Strategic Outcomes
NSS	National Spatial Strategy
NTA	National Transport Authority
NTS	Non-Technical Summary
N_2O	Nitrous Oxide
O-D	Origin-Destination
OPW	Office of Public Works
OS	Ordnance Survey
OSI	Ordnance Survey Ireland
Outcrop	Where a bedrock formation is present at the surface.
Overburden	Any material that lies above bedrock geology commonly referred to as superficial deposits.
PAX	Annual Passengers
PDA	Planning and Development Acts
Permeability	The ease with which a porous medium can transmit water or other fluids.
PFCs	Perfluorocarbons
PM_{10}	Particulate Matter
$PM_{2.5}$	Particulate Matter

Abbreviation / Term	Definition
PWHT	Polluted Water Holding Tank
QC	Quota Count
QI	Qualifying Interest
RMP	Record of Monument and Places
RMSE	Root Mean Square Error
RoI	Republic of Ireland
RPS	Record of Protected Structures
RSES	Regional Spatial and Economic Strategy
PSZ	Public Safety Zones
SA	Small Areas
SAC	Special Area of Conservation
SCI	Special Conservation Interests
SEAI	Sustainable Energy Authority of Ireland
SF_6	Sulphur Hexafluoride
SI	Statutory Instrument
SID	Standard Instrument Departure
SO_2	Sulphur Dioxide
SPA	Special Protected Area
SRI	Societal Risk Index
SSSI	Site of Special Scientific Interest
TFS	Trans Frontier Shipping
TII	Transport Infrastructure Ireland
Till deposits	Till is an unsorted sediment derived from the transportation and deposition of by or from a glacier. Glacial till is composed of a heterogeneous mixture of clay, sand, gravel and boulders.
TOC	Total Organic Carbon
TTA	Traffic and Transport Assessment
UK	United Kingdom
UV	Ultraviolet
VOC	Volatile Organic Compounds
Weathering	Weathering is the breaking down or dissolving of rocks in surface
WFD	Water Framework Directive
WHO	World Health Organisation
ZOI	Zone of Influence

1. Introduction

Background

1.1 AECOM Limited (AECOM) has been commissioned by the Applicant to undertake a Water Framework Directive (WFD) Assessment in support of the planning application for the Dublin Airport Underpass Project, hereafter referred to as "the Proposed Development". The underpass will be composed of a twin-cell enclosed subterranean tunnel measuring approximately 0.8 km long that is linked to the surface by two ramps, one at each end.

1.2 The Application Site relative to WFD water bodies is shown in Appendix A.

1.3 The relevant main elements of the Proposed Development comprise of the following:

- A subterranean Underpass of Runway 16/34 including ramps and portals, plantroom, and all attendant access roads at surface level to tie in with the existing airside road network.
- Temporary diversion of existing Cuckoo Stream to avoid proposed Underpass excavations. Diversions will be designed so flow rates and capacity of existing system is maintained.
- New surface water drainage system for the Underpass to be installed and connected to Airfield Trunk Culvert.
- Installation of a fuel retention interceptor to control fuel/oil.
- Inclusion of a fire suppression system composed of attenuation valve and shut off valve.
- Provision of attenuation to control the outfall flow rate.
- Relocation of aircraft stands/apron at either end of the Underpass (to the west, at the West Apron and to the east, at Pier 3 to accommodate the portals/development footprint where it interacts within existing apron and aircraft stands.
- Upgrade of Pier 3 to include modifications to accommodate fixed links and airbridges, to ensure safe and efficient passenger access to aircraft stands.
- Decommissioning and removal of existing infrastructure

  Temporary compounds to accommodate welfare facilities, plant and materials storage etc.

1.4 To facilitate these main elements of the Proposed Development, there are several activities that have the potential to affect the water environment and WFD objectives:

- Installation of a twin-cell Underpass.
- Treated runoff discharges to surface waters.
- Contaminated flow from fuel spillage or use of fire suppression system.
- Decommissioning and removal of existing infrastructure.
- Temporary diversion of Cuckoo Stream during construction.
- Surface water monitoring programme of the Cuckoo Stream prior to the start of works, during works and upon completion.

Aim

1.5 This report summarises an assessment of whether the Proposed Development has the potential to affect the WFD status or objectives of any local water bodies.

1.6 The Environmental Impact Assessment Report (EIAR) to which this report is appended provides an assessment of water impacts beyond those required by the WFD in EIAR Chapter 7: Water.

Study Area

1.7 The study area is Dublin Airport and surroundings, covering c. 580 ha in total. The Application Site is mainly within the airfield, although the two associated construction compounds are landside.

1.8 WFD hydrological features are organised into a spatial hierarchy of management units. For rivers, as opposed to groundwater bodies, lakes or transitional waters, these units in decreasing order of size and increasing local environmental detail are WFD Catchments, WFD Sub Catchments, and River Sub Basins. A River Waterbody is the water channel of a River Sub Basin. A River Waterbody may comprise a network of several individual rivers or streams, which may have local watercourse names that are different to the WFD Waterbody name.

1.9 Appendix A shows that the majority of the airport lies within the WFD sub-catchment named “Mayne_SC_010” (WFD sub-catchment ID number 09_17) of the Liffey and Dublin Bay catchment (WFD Catchment ID 09). The north-eastern extent of the airport lies within the “Broadmeadow_SC_010” sub-catchment of the Nanny-Delvin catchment (WFD Catchment 09).

1.10 Water bodies are shown in Appendix A. The Mayne sub-catchment is comprised of three waterbodies. The majority of the airfield lies within the Mayne water body (Mayne_010), which has an estimated basin area of 20.3 km^2 that incorporates the Mayne and Cuckoo streams. Both the Mayne and Cuckoo streams flow from west-north-west to east-south-east.

1.11 The Sluice (Sluice_010) River Waterbody also lies within the Mayne sub-catchment. The Sluice River Waterbody has an estimated catchment of 26 km^2 and incorporates the Forest Little Stream in the very north of the airfield, which flows from west-north-west to east-south-east and discharges to the north of Baldoyle Estuary, approximately 7.5 km downstream of the airport. Kealy’s Stream is also within the Sluice River Waterbody and like the Forrest Little Stream, flows into the Sluice River.

1.12 The Santry (Santry_010) River Waterbody lies at the western end of Runway 10/28 and has an estimated basin area of 9.7 km^2. The Santry River flows from north-west to south-east a distance of 10 km discharging to Dublin Bay at Raheny, on the northern side of Causeway Road to Bull Island.

1.13 The Ward River (Ward_010) drains a minor proportion of the Northern Runway whilst Kealy’s stream drains the majority of the hangars, the North Apron and a significant proportion of the developed landside area of the campus. A portion of the Southern Runway drains to the Mayne River whilst another portion drains to the Santry River.

1.14 The Proposed Development and Southern Compound is entirely underlain by the Dublin WFD Groundwater body (IE_EA_G_008). It is bordered by the swords Groundwater Body (IE_EA_G_011) to the north which contains the Western compound and the Industrial Facility Groundwater body (IE_EA_G_86) to the east, but there is no groundwater connectivity from the Proposed Development to either of these bodies.

1.15 The existing drainage system within the Application Site currently conveys run-off to an underground network of pipes via heavy duty slot drains, fluted channels/carrier drains and gullies prior to discharging towards the Airfield Trunk Culvert (1200 mm diameter) which conveys the Cuckoo Stream from north of the airport through to the south. A Pollution Control Facility (PCF) operates on Cuckoo Stream which diverts the entire upper catchment to sewer when activated. The PCF aims to ensure a balance between ensuring sufficient flows in the stream for ecological purposes and ensuring in so far as is practicable that the minimum amount of organic pollution attributable to airfield de-icing operations is released downstream. The PCF can also be controlled to segregate contaminated runoff in the event of an emergency spill of oils, fuel and other pollutants. Additional PCFs are present on Forest Little and Kealy Stream, which divert runoff from the Northern Runway and North Apron development to sewer when activated.

Overview of the Water Framework Directive

1.16 The European Union Water Framework Directive (WFD) (2000/60/EC), commonly referred to as the Water Framework Directive (WFD), aims to protect and enhance the water environment. The Environmental Protection Agency (EPA) is the competent authority for implementing the WFD in Ireland.

1.17 The EPA broadly describes its role with regard to the WFD as: to "*Engage with national and regional governance and operational structures to implement the Water Framework Directive"; and to "Monitor, assess and report on the quality of rivers, lakes, transitional and coastal waters, bathing waters and groundwaters, and measurement of water levels and river flows"*.

1.18 The WFD takes a holistic approach to sustainable management of the water environment by considering interactions between surface water, groundwater and water-dependent ecosystems. Ecosystem conditions are evaluated according to interactions between classes of biological, chemical, physico-chemical and hydromorphological elements known as 'Quality Elements'.

1.19 Under the WFD, 'water bodies' are the basic management units, defined as all or part of a river system or aquifer. Water bodies form part of a larger 'river basin district' (RBD), for which 'River Basin Management Plans' (RBMPs) are used to summarise baseline conditions and set broad improvement objectives. The Irish River Basin District (RBD) covers an area of 70,273 km^2, with 46 catchment management units — consisting of 583 sub-catchments, with 4,829 water bodies.

1.20 The WFD applies to all water bodies. Not all components of every waterbody are mapped or monitored, but in these cases 'non-designated' water features are considered as tributary components of the 'designated' water bodies to which they connect. This was asserted in Ireland by the 'Sweetman Case'.

1.21 In Ireland, the WFD has been given legal effect under the European Communities (Water Policy) Regulations, 2003 (S.I. No. 722 of 2003) and European Communities Environmental Objectives (Surface Water) Regulations, 2009 ('S.I. No. 272 of 2009) as amended in 2012 (by S.I. No. 327/2012), 2015 (by S.I. No. 386/2015) and 2019 (by S.I. No. 77/2019).

1.22 Developers and planning authorities must consider whether proposals for new developments have the potential to:

- Cause a deterioration of any quality element of a water body from its current status or potential; and / or
- Prevent future attainment of good status or potential where not already achieved.

1.23 In determining whether a development is compliant or non-compliant with the WFD objectives for a water body, the EPA and partnering organisations must also consider the conservation objectives of any WFD Protected Areas (i.e., Natura 2000 sites or water dependent Special Areas of Conservation (SACs) or Special Protection Areas (SPAs) and adjacent WFD water bodies, where relevant.

2. Methodology

2.1 There are no fixed methods for WFD assessment. The nature of the water environment and the breadth of the legislation mean that assessments are tailored to proposals on a case-by-case basis. The process adopted here is to rationalise which Proposed Development elements could affect which water bodies, and then review risks to all WFD elements for the activities 'Screened In'. This approach follows UK and EU guidance, namely:

- EU-level guidance document "Water Framework Directive Project assessment checklist tool" (2018), published by the Joint Assistance to Support Projects in European Regions (JASPERS).
- Planning Inspectorate Advice Note 18: The WFD (PINS, 2017), which provides an overview of the WFD and provides an outline methodology for considering the WFD.

2.2 This WFD assessment identifies risks to WFD objectives and requirements (if any) for WFD impact mitigation commitment.

2.3 The WFD applies to all water bodies, but not all individual watercourses are monitored or have individual WFD classifications. Local 'non-designated' water features are therefore considered as tributary components of the 'designated' water bodies to which they connect.

2.4 The Environmental Protection Agency (EPA) publishes WFD data online at EPA Maps[1]. To date, the EPA has assessed approximately 98% of 3,120 river water bodies in Ireland for WFD status classifications and objectives based on the results of monitoring (74% of the total number of river water bodies), water body grouping (17%) or expert judgement (7%)[2]. All of the water bodies within 1km of the airport have been assessed by the EPA by one of these means. The most up to date WFD status data published at EPA Maps is for the period 2013-2018.

Screening

2.5 Screening identifies if the Proposed Development activities pose a risk to the water environment. It is used to identify if there are activities that do not require further consideration for WFD objectives, for example activities which have been ongoing since before the current RBMP plan cycle and which have thus formed part of the baseline.

Impact Assessment

2.6 This involves rationalised assessment of water bodies and quality elements that could be affected by proposed activities, in order to identify any risks of WFD non-compliance. Proposed activities are reviewed in terms of both positive and negative impacts, and the baseline mitigation measures, enhancements, and contributions to the WFD objectives described in the RBMP. Any proposed activities with potentially deleterious impacts are reviewed simultaneously with their corresponding mitigation proposals, to determine a net effect on WFD objectives.

Mitigation Commitments

2.7 Proposed mitigation activities relied upon to demonstrate compliance at any of the stages referred to above must be appropriately defined and sufficiently secured.

Article 4.7 Derogation

2.8 Where the potential for deterioration of water bodies is identified, and it is not possible to mitigate the impacts to a level where deterioration can be avoided, additional assessment is needed in the context of WFD Article 4.7, which covers procedures for WFD derogation.

2.9 Article 4.7 is a 'last resort' planning and legal process, and it is a matter for the competent authority to consider whether derogation under Article 4.7 is justified. An applicant would be required to provide detailed and often complex evidence to justify its case that the following four stringent tests have been met:

[1] EPA Maps https://gis.epa.ie/EPAMaps/default. Last accessed August 2022.
[2] WFD update - assigning status to all unmonitored identified waterbodies - Catchments.ie - Catchments.ie. Retrieved August 2022.

- Test (a): All practicable steps are to be taken to mitigate the adverse impacts on the water body concerned.
- Test (b): the reasons for modifications or alterations are specifically set out and explained in the RBMP.
- Test (c)(1): There is an overriding public interest in the Development and/or Test (c)(2): its benefits outweigh the benefits of the WFD objectives (i.e. that the benefits of the project to human health, human safety or sustainable development outweigh the benefits of achieving the WFD objectives).
- Test (d): The benefits of the project cannot be achieved by a significantly better environmental option (that are technically feasible and do not lead to disproportionate cost.

2.10 In addition, the Proposed Development must not permanently exclude or compromise achievement of the WFD objectives in other bodies of water within the same RBD and must be consistent with the implementation of other environmental legislation (Article 4.8). In applying Article 4.7, steps must also be taken to make sure that the new provisions guarantee at least the same level of protection as the existing legislation (Article 4.9).

Desk Study

2.11 Desk-based studies were carried out as designs were developed between February and August 2022 to capture information pertaining the Proposed Development that is not attainable through site survey. Reviewal of relevant information relating to the study area was undertaken to develop a baseline for WFD catchments, watercourses and surrounding areas. The following data sources were used for the desk study:

- Aquatic & Hydrological studies undertaken to establish a baseline for the Applicant's Infrastructure Application and monitoring conducted in 2020 and 2021
- Ramboll (2022) Drainage Design Report Dublin Airport – Western Apron vehicle Underpass.
- Ordnance Survey Ireland (OSI) website for OSI discovery series of 1:50,000 scale maps, and historical maps of 1:2,500 scale and 1:10,560 scale and aerial photographs[3].
- GSI website for public viewer and groundwater maps[4].
- EPA website Geo Portal for Flood information mapping[5].

[3] GeoHive Map Viewer. Last accessed August 2022.
[4] Groundwater (gsi.ie). Last accessed August 2022.
[5] Environmental Protection Agency, Ireland (EPA) Geoportal. Last accessed August 2022.

3. Desk Study

Catchment Characteristics

3.1 There are a number of water bodies which drain the Applicant site which comprises four river catchments, the Ward River, the Sluice River, the Mayne River and the Santry River. The Ward River enters the sea at the Broadmeadow Estuary at Swords while the Sluice and Mayne Rivers enters the sea at Baldoyle Bay in Portmarnock. The Santry River enters Dublin Bay at Raheny. The Applicant site is further divided into sub-catchments which drain specific areas of the Airport through a network of streams, culverts and surface water drains. These sub-catchments include the Cuckoo, Kealy's, St. Margaret's, Forest Little and Ward Streams.

3.2 The proposed development is within the Mayne River sub-basin. The area has only one surface water bodies in close proximity which is a culverted stream referred to as the Cuckoo Stream.

3.3 There are a number of bedrock aquifers that underlay the Applicant site which are comprised of Limestone and Shale aquifer. These aquifers are designated as limited productivity aquifers by the GSI. The proposed development is within the superficial deposits which is comprised of low permeability boulder clays with limited productivity.

General Characteristics and Water Bodies

3.4 Dublin Airport comprises hardstanding runways, other highways and large industrial units, and managed grassland. Other land-uses within the Study Area include arable and grassland to the west and north of the airfield and industrial and residential areas to the south and east.

3.5 Relevant WFD water bodies and environmental conditions have been assessed using EPA Maps, as reproduced in Appendix A. Local watercourse names are also shown where these are different to WFD water body names.

3.6 The Application Site boundary, as shown in Appendix A, does not overlie any open watercourse, so there are no direct impacts on aquatic habitats.

Forest Little / Sluice sub-basin

3.7 The Sluice River catchment is approximately 10 km^2 in area, with approximately 2.4 km^2 falling within the northern and eastern extent of the airport boundary, draining buildings, roads, several large car parks, aircraft stands, the Northern Runway, and associated taxiways. Forrest Little Stream, Kealy's Stream and the Wad Stream all drain the Sluice River Sub-Basin. The Forest Little / Sluice River flows from west-north-west to east-south-east, discharging to the north of Baldoyle Estuary SAC at Portmarnock Bridge, approximately 7 km east-south-east from the Study Area, the final 2 km of the channel being under tidal influence.

3.8 Neither the Sluice River nor its tributaries are monitored for water quality status by the EPA as part of their various river monitoring programmes, nor do they monitor water quality in the Baldoyle Estuary SAC itself.

The Ward sub-basin

3.9 The western end of the North Runway is within the Ward sub-basin (WFD Sub-basin Ward_030), a subdivision of the Broadmeadow sub-catchment. The Ward River sub-basin is approximately 32.9 km^2 in area; approximately 1 km^2 of the airport is shown to be within the Ward River catchment. However, the stormwater drainage does not discharge from hardstanding areas into this catchment, as it diverted to the existing drainage system onsite.

3.10 Two tributaries of the Ward are located to the north and west of the Proposed Development; these are named St. Margaret's Stream and Barberstown Stream and flow in westerly and northerly directions respectively. The tributaries confluence approximately 1.1 km north-west of the Airport's North Runway, prior to flowing into the Ward River immediately upstream of Toberburr Road, approximately 1 km further downstream. The Ward River discharges to Malahide Estuary SAC 7 km downstream of the confluence.

Catchment Geology and Soils

3.11 The geology beneath Dublin Airport comprises of four different units. The Malahide Formation, compromising of argillaceous limestone and shale underlays the majority of Dublin Airport to the north-west and centre. The Tober Colleen Formation, comprising of calcareous shale and limestone conglomerate is located in the south-west of the airport whilst Waulsortian Limestones, comprising of un-bedded lime-mudstone, is located in a small outcrop towards the north-east of the airport. The Lucan Formation, comprising dark limestone and shale, is located in a small area to the south-east of the airport. The approximate composition of each water body of these four bedrocks is shown in Table 3-1.

3.12 Some limited outcrop of bedrock is mapped within the airport, with limestone till forming the overburden across most of the area. Site investigation information[6] from July 2018 shows that the overburden cover is deep in the area of the Proposed Development, with logs showing depth to bedrock ranging between 17.35 m and 28.70 m bgl.

3.13 Soil composition varies across the four water bodies. In the River Sluice water body and Santry water body, the dominant soil is alluvium whilst in the Mayne water body the soil composition is more varied, with a mixture of alluvium, limestone till and manmade. In the River Ward soil composition is also varied, with alluvium, limestone till and surface bedrock.

Table 3-1 Bedrock geology across the four WFD river water bodies[7]

Bedrock	Malahide Formation	Tober Colleen Formation	Waulsortian Limestones	Lucan Formation
Mayne River	50%	10%	0%	40%
River Sluice	50%	45%	5%	0%
Santry	50%	25%	0%	25%
Ward River	50%	50%	0%	0%

Water Quality

3.14 The Q-value system is used to assess the quality of Irish Rivers In terms of organic and inorganic pollutants. It has a nine-point scale ranging from Q5 indicating high quality and an unpolluted watercourse, to Q1 which indicates bad quality and a seriously polluted watercourse. The values are summarised in Table 3-2.

Table 3- 2: EPA River Quality Q Indices Summary[8]

Q Values	WFD Status	Pollution Status	Condition
Q5, Q4-5	High	Unpolluted	Satisfactory
Q4	Good	Unpolluted	Satisfactory
Q3-4	Moderate	Slightly Polluted	Unsatisfactory
Q3, Q2-3	Poor	Moderately Polluted	Unsatisfactory
Q2, Q1-2, Q1	Bad	Seriously Polluted	Unsatisfactory

3.15 The Cuckoo Stream branch of the Mayne is not monitored for water quality by the EPA. However, a site downstream of the confluence of the Cuckoo Stream with the southern branch of the Mayne River is monitored by the EPA at Wellfield Bridge (station code RS09M030500, approximately 5.5 km east-south-east of the airport). In 2019 the water quality was classified as Poor with a Q value of 2-3, i.e., moderately polluted.

[6] Ground Investigations Ireland Limited, Additional Airfield Boreholes Ground Investigation Report, reference: 7687-04-18, dated: 17 July 201

[7] Source: https://gis.epa.ie/EPAMaps/default Last accessed August 2022.

[8] Source: https://epawebapp.epa.ie/qvalue/webusers/ Last Accessed August 2022

3.16 Dublin Airport undertakes bi-annual biological and regular water chemistry analysis of the Cuckoo Stream, near the outfall from the airport. The most recently published monitoring data for the Cuckoo Stream (up to May 2019) report[9] Q values of 1-2, which shows the stream to be seriously polluted and therefore having Bad Ecological Status under the Water Framework Directive. This has more or less been the situation since 2006 (varying between Q1-2 and Q1 during that period). The Mayne River monitoring had reported Q values of 3 in May 2019, indicating the river is moderately polluted and has a Poor Ecological Status under the WFD.

3.17 Further monitoring was undertaken by a Fitz Scientific between March 2020 and February 2021 at three locations along the Cuckoo Stream and Mayne River. The results are summarised in Table 3- 3 and indicate that the watercourses do not meet the standard for Good status.

Table 3- 3: Monitoring Data for Cuckoo / Mayne, 2020 – 2021

Monitoring Point	S.I. No. 77/2019 Criteria for Good Status*	Cuckoo Mayne 1	Cuckoo Mayne 2	Cuckoo Mayne 3	Cuckoo Mayne 4
Location	NA	53.4117, -6.2391	53.4206, -6.2329	53.4091, -6.1635	53.4097, -61565
Detergents as Methylene blue active substances (MBAS) – average concentration	NC	101 µg/L	86 µg/L	175 µg/L	136 µg/L
Propylene glycol – average concentration	NC	Below detection	Below detection	4.5 mg/L	Below detection
Total Petroleum Hydrocarbons (TPH, carbon band C10-C40) – average concentration	NC	Below detection	Below detection	Below detection	47 µg/L
Ammonia as nitrogen (N) – average concentration	0.065 mg/L as N	0.11 mg/L as N	0.10 mg/L as N	0.78 mg/L as N	0.85 mg/L as N
Phosphate (P) (Ortho) – average concentration	0.035 mg/L	0.051 mg/L as P	0.056 mg/L as P	0.193 mg/L as P	0.042 mg/L as P
Biological Oxygen Demand – average concentration	1.5 mg/L	Below detection	3.1 mg/L	13.6 mg/L	5.9 mg/L
Chemical Oxygen Demand – average concentration	NC	23.3 mg/L	8.8 mg/L	30.1 mg/L	24.8 mg/L
pH – average reading	NC	7.82	8.01	7.70	8.09
Dissolved Oxygen – average concentration	NC	10.6 mg/L	9.6 mg/L	7.8 mg/L	7.4 mg/L

* NA – Not Applicable, NC – No Criteria for good status, µg/L – micrograms per litre, mg/L – milligrams per litre.

3.18 Neither the Sluice River nor its tributaries are monitored for water quality status by the EPA as part of their various river monitoring programmes, neither do they monitor water quality in the Baldoyle Estuary SAC itself.

3.19 Dublin Airport conducts biannual biological sampling and water quality assessment of three monitoring points along the Forest Little / Sluice downstream of the airport. Available monitoring data (up to May 2019) report[10] Q values of 3 for each of the three monitoring points in May 2019, indicating a pollution status of Moderate.

3.20 Over time at the two monitoring points closest to the airport (F4A/B and F5) Q values had improved from 1-2 in 2006 and 2007 to 3 from September 2017 onwards. The most downstream of the three monitoring

[9] Conservation Services, Biological Monitoring of Surface Water Quality in the Vicinity of Dublin Airport, report reference: 19112/DS19/F, dated 06 June 2019.
[10] Conservation Services, Biological Monitoring of Surface Water Quality in the Vicinity of Dublin Airport, report reference: 19112/DS19/F, dated 06 June 2019.

points (F6) has been monitored since September 2013, and Q values of 3 were predominantly reported up to May 2019. This indicates improving water quality over time.

3.21 Further monitoring was undertaken within the Forest Little / Sluice water body collected by a Fitz Scientific between March 2020 and February 2021. Results are summarised in Table 3-4. Results of surface water monitoring at three locations along the Forest Little / Sluice indicate that the watercourse does not meet the standard for Good status.

Table 3-4: Monitoring Data for Forest Little / Sluice, 2020-2021

Monitoring Point	S.I. No. 77/2019 Criteria for Good Status*	Forest Little 1	Forest Little 2	Forest Little 3
Location	NA	53.4386, -6.2280	53.4268, -6.1772	53.4228, -6.1565
Detergents as MBAS – average concentration	NC	94 mg/L	92 mg/L	109 mg/L
Propylene glycol – average concentration	NC	Below detection	Below detection	Below detection
TPH C10-C40 – average concentration	NC	Below detection	22.5 mg/L	Below detection
Ammonia as nitrogen (N) – average concentration	0.065 mg/L as N	0.07 mg/L as N	0.06 mg/L as N	0.06 mg/L as N
Phosphate (P) (Ortho) – average concentration	0.035 mg/L	0.06 mg/L as P	0.05 mg/L as P	0.05 mg/L as P
Biological Oxygen Demand – average concentration	1.5 mg/L	3.8 mg/L	2.1 mg/L	Below detection
Chemical Oxygen Demand – average concentration	NC	13 mg/L	10.7 mg/L	9.5 mg/L
pH – average reading	NC	7.54	7.53	7.85
Dissolved Oxygen – average concentration	NC	9.0 mg/L	9.6 mg/L	9.6 mg/L

* NA – Not Applicable, NC – No Criteria for good status, □g/L – micrograms per litre, mg/L – milligrams per litre.

3.22 The EPA monitor the Ward River and tributaries in multiple locations downstream of the airport. The nearest downstream EPA surface water quality monitoring point within the Ward water body that was monitored in 2020 is the bridge north of Killeek (station code RS08W010300), located 1.8 km north of the North Runway. At this monitoring point the surface water quality is classified by the EPA as Moderate with a Q value of 3-4 in 2020. River water quality upstream of this was also classified by the EPA as Moderate (Q value of 3-4) in 2020 at Coolatrath Bridge (station code RS08W010070, located 4.6 km upstream), indicating that there is no deterioration in the Q value of watercourses within the Ward water body downstream of the airport.

3.23 Dublin Airport conducted their own monitoring of Ward River between March 2020 – February 2021[11] with the results summarised in Table 3-5.

3.24 There are multiple monitoring points on Santry River, downstream of the airport. The nearest downstream EPA surface water quality monitoring point within the Santry water body that was monitored in 2020, is the at Clonshaugh Road Bridge (station code RS09S010300), located 6 km downstream of the airport. At this monitoring point the surface water quality is classified by the EPA as Poor with a Q value of 2-3 in 2020. Dublin Airport have also undertaken their own monitoring within the Santry water body, and the results are summarised in Table 3-6.

[11] Conservation Services, *Biological Monitoring of Surface Water Quality in the Vicinity of Dublin Airport*, report reference: 19112/DS19/F, dated 06 June 2019.

Table 3-5: Monitoring Data for Ward, March 2020 - February 2021

Monitoring Point	S.I. No. 77/2019 Criteria for Good Status*	Ward 1	Ward 2	Ward 3	Ward 4
Location	NA	53.4356, -6.3013	53.4553, -6.2764	53.4640, -6.2188	53.4426, -6.2678
Detergents as MBAS – average concentration	NC	95.4 µg/L	74.3 µg/L	116 µg/L	74.4 µg/L
Propylene glycol – average concentration	NC	Below detection	Below detection	Below detection	Below detection
TPH C10-C40 – average concentration	NC	Below detection	Below detection	Below detection	Below detection
Ammonia as nitrogen (N) – average concentration	0.065 mg/L as N	0.25 mg/L as N	0.09 mg/L as N	1.03 mg/L as N	0.10 mg/L as N
Phosphate (P) (Ortho) – average concentration	0.035 mg/L	0.08 mg/L as P	0.08 mg/L as P	0.08 mg/L as P	0.07 mg/L
Biological Oxygen Demand – average concentration	1.5 mg/L	4.6 mg/L	Below detection	2.6 mg/L	3.4 mg/L
Chemical Oxygen Demand – average concentration	NC	19 mg/L	16.3 mg/L	12.6 mg/L	10.1 mg/L
pH – average reading	NC	7.87	7.86	7.93	7.69
Dissolved Oxygen – average concentration	NC	8.8 mg/L	9.7 mg/L	9.7 mg/L	8.3 mg/L

*NA – Not Applicable, NC – No Criteria for good status, µg/L – micrograms per litre, mg/L – milligrams per litre.

Table 3-6: Monitoring Data for Santry, 2020- 2021

Monitoring Point	S.I. No. 77/2019 Criteria for Good Status*	Santry 1	Santry 2	Santry 3
Location	NA	53.4098, -6.2706	53.3966, -6.2055	53.3802, -6.1767
Detergents as MBAS – average concentration	NC	99.7 mg/L	76 mg/L	76.3 mg/L
Propylene glycol – average concentration	NC	Below detection	Below detection	Below detection
TPH C10-C40 – average concentration	NC	Below detection	Below detection	Below detection
Ammonia as nitrogen (N) – average concentration	0.065 mg/L as N	0.04 mg/L as N	0.11 mg/L as N	0.05 mg/L as N
Phosphate (P) (Ortho) – average concentration	0.035 mg/L	0.034 mg/L as P	0.056 mg/L as P	0.056 mg/L as P
Biological Oxygen Demand – average concentration	1.5 mg/L	Below detection	Below detection	Below detection
Chemical Oxygen Demand – average concentration	NC	14.7 mg/L	15.0 mg/L	11.0 mg/L
pH – average reading	NC	7.78	7.84	7.93
Dissolved Oxygen – average concentration	NC	9.1 mg/L	9.2 mg/L	9.6 mg/L

* NA – Not Applicable, NC – No Criteria for good status, □g/L – micrograms per litre, mg/L – milligrams per litre.

WFD Status

WFD Status – Surface Water

River Mayne /Cuckoo Stream (Mayne_010)

3.25 The Mayne water body is classified as an At Risk water body that incorporates River Mayne and Cuckoo Stream. According to the EPA Data Explorer, it is unknown whether the water body has been heavily modified[12]. The Mayne river is classified as at risk due to Poor ecological status, with nutrients and diffuse urban sources of pollution causing significant pressures[13]. A summary of the current WFD status for the Mayne water body is provided in Table 3 7.

Table 3-6: WFD potential summary for Mayne water body (Mayne_010)[14]

WFD Parameter	Status / Summary 2013-2018 monitoring data
Water Body ID	Mayne 010
Water Body Name	Mayne
Water Body Type	River
Water Body Length (m)	16.52 km
Hydromorphological Designation	Unknown
Overall Ecological Potential	Poor
Current Overall Potential	Poor
Supporting Chemistry Conditions	Moderate
General Conditions	Moderate
Oxygenation Conditions	Pass
Dissolved Oxygen (% Sat)	Pass
Other determinand for oxygenation conditions	High
Acidification Conditions	Pass
pH	Pass
Nutrient Conditions	Fail
Nitrogen Conditions	Moderate
Nitrate	Moderate
Ammonium	Good
Phosphorous Conditions	Moderate
Orthophosphate	Moderate

Sluice River/Little Forest Stream (Sluice_010)

3.26 No confirmed WFD status or WFD element details had been assigned for the Sluice (Sluice_010) water body on the EPA data explorer[15] at the time of reporting, but the indicative[16] WFD status is Poor. It is not known whether this water body is heavily modified however, it is noted that the water body is under significant pressures from anthropogenic sources.

[12] Water bodies can be classified as heavily modified when their natural conditions are substantially altered, for example for land uses including urbanisation and/or flood defences, or water uses such as drinking water supplies. The WFD aims to restore and enhance the natural environment, but it also recognises that sometimes there can be overriding public interests and that anthropogenic water body uses may need to be sustained. In these cases, WFD objectives are to improve heavily modified water bodies as far as possible, accepting that anthropogenic uses will constrain ecological potential.
[13] WFD Cycle 2. Catchment Liffey and Dublin Bay. Sub-catchment Mayne_SC_010. Available online: https://www.catchments.ie/wp-content/files/subcatchmentassessments/09_17%20Mayne_SC_010%20Subcatchment%20Assessment%20WFD%20Cycle%202.pdf
[14] Source https://www.catchments.ie/data/#/water body/IE_EA_09M030500?_k=th7jyf. Last accessed August 2022
[15] Source https://www.catchments.ie/data/#/waterbody/IE_EA_09S071100?_k=oinuy9. Last accessed August 2022
[16] Indicative statuses are assigned by EPA (usually by EPA by expert judgement), when monitoring data are not available, and/or when full assessments of a water body have not yet been undertaken.

Ward River (Ward_030)

3.27 The current ecological potential status of the Ward (Ward_030) water body is Moderate. The Ward is classified as at risk, with significant anthropogenic and urban waste water pressures operating within the catchment[17]. The EPA data explorer states that it is not currently known whether the water body is heavily modified.

Santry River (Santry_010)

3.28 The WFD status of the Santry is classified as Poor for the period 2013 - 2018 and At Risk. The Santry river is at risk due to Poor ecological status, and diffuse urban sources of pollution causing significant pressures[18].

3.29 According to IFI the Santry River is currently non-salmonid due to the presence of a number of impassable features to fish located towards the lower end of the system.

WFD Status – Groundwater

Swords Groundwater Body (IE_EA_G_011)

3.30 A summary of the current WFD status for the Swords Groundwater Body (IE_EA_G_011) groundwater body is provided in Table 3-7. This groundwater body was classified as not at risk for the period 2013-2018 and as having Good Overall Groundwater Status. The area of the groundwater body as a whole is estimated at 199 km^2, with the airport located in the south-east of the groundwater body. Groundwater flow paths are expected to be on a local scale (~1 km) from recharge to discharge points, with groundwater discharge occurring to rivers (baseflow) where they are in hydraulic continuity with the aquifer, to springs and to the coast in the east[19].

Table 3-7 WFD status summary for Swords groundwater body (IE_EA_G_011)[20]

WFD Parameter	Status / Summary
Water Body ID	IE_EA_G_011
Water Body Name	Swords
Water Body Type	Groundwater Body
Quantitative Groundwater Status	Good
Saline (or Other) Intrusions Test	Good
Impact of Groundwater on Surface Water Ecological/Quantitative Status Test	Good
Groundwater Dependent Ecosystems (GWDTE) - Quantitative Assessment Test	Good
Water Balance Test	Good
Chemical Groundwater Status	Good
Saline (or Other) Intrusions Test	Good
Impact of Groundwater on Surface Water Ecological/Chemical Status Test	Good
Groundwater Dependent Ecosystems (GWDTE) - Chemical Assessment Test	Good
Drinking Water Protected Area Test	Good
General Chemical Assessment Test	Good

Industrial Facility Groundwater Body

3.31 The Industrial Facility Groundwater Body, (IE_EA_G_086) is a small groundwater body which is classified as having 'Poor' status for the period 2013-2018 and as being 'At Risk'. This groundwater body was

[17] https://catchments.ie/wp-content/files/subcatchmentassessments/08_3%20Broadmeadow_SC_010%20Subcatchment%20Assessment%20WFD%20Cycle%202.pdf
[18] WFD Cycle 2. Catchment Liffey and Dublin Bay. Sub-catchment Mayne_SC_010. Available online: https://www.catchments.ie/wp-content/files/subcatchmentassessments/09_17%20Mayne_SC_010%20Subcatchment%20Assessment%20WFD%20Cycle%202.pdf
[19] AECOM (2019) Capacity Increse Planning Application Traffic & Transport Baseline.
[20] Source https://www.catchments.ie/data/#/water body/IE_EA_G_011?_k=1l2vz0 Last accessed August 2022

reported as failing due to the presence of Trichloroethene (all isomers). A summary of this groundwater body's status is provided in Table 3-8.

3.32 This groundwater body is approximately 3.25 km^2 in area, extending from the hangars northwards to the Naul Road (L2040); south across the short-term car parks, office developments and onto the junction between the R132 and Corballis Road South near the Red Long-Term Car Park; and eastwards to the M1 motorway.

Table 3-8 WFD status summary for Industrial Facility groundwater body (IE_EA_G_086)[21]

WFD Parameter	Status / Summary
Water Body ID	IE_EA_G_086
Water Body Name	Industrial Facility
Water Body Type	Groundwater Body
Overall Groundwater Status	Poor (GW)
Quantitative Groundwater Status	Good
Saline (or Other) Intrusions Test	Good
Impact of Groundwater on Surface Water Ecological/Quantitative Status Test	Good
Groundwater Dependent Ecosystems (GWDTE) - Quantitative Assessment Test	Good
Water Balance Test	Good
Chemical Groundwater Status	Poor
Saline (or Other) Intrusions Test	Good
Impact of Groundwater on Surface Water Ecological/Chemical Status Test	Good
Groundwater Dependent Ecosystems (GWDTE) - Chemical Assessment Test	Good
Drinking Water Protected Area Test	Good
General Chemical Assessment Test	Poor (GW)

Dublin Groundwater Body (IE_EA_G_008)

3.33 The Dublin groundwater body (IE_EA_G_008) is classified as having Good status for the period 2015-2018 and as not being at risk. A summary of the current WFD status for this groundwater body is provided in Table 3-9.

Table 3-9 WFD status summary for Dublin Groundwater body (IE_EA_G_008)[22]

WFD Parameter	Status / Summary
Water Body ID	IE_EA_G_008
Water Body Name	Dublin
Water Body Type	Groundwater Body
Overall Groundwater Status	Good
Quantitative Groundwater Status	Good
Saline (or Other) Intrusions Test	Good
Impact of Groundwater on Surface Water Ecological/Quantitative Status Test	Good
Groundwater Dependent Ecosystems (GWDTE) - Quantitative Assessment Test	Good
Water Balance Test	Good
Chemical Groundwater Status	Good
Saline (or Other) Intrusions Test	Good
Impact of Groundwater on Surface Water Ecological/Chemical Status Test	Good

[21] Source https://www.catchments.ie/data/#/water body/IE_EA_G_086?_k=a9fa9u Last accessed August 2022
[22] Source https://www.catchments.ie/data/#/water body/IE_EA_G_008?_k=fq9uyw Last accessed August 2022

Groundwater Dependent Ecosystems (GWDTE) - Chemical Assessment Test	Good
Drinking Water Protected Area Test	Good
General Chemical Assessment Test	Good

Protected Areas

Special Area of Conservation

3.34 The WFD requires particular assessment of risks to protected habitats. There are no Special Areas of Conservation (SAC) within the study area. The closest SAC is Baldoyle Estuary SAC, which is located 7.4 km east of the airport. This area's qualifying interests include; mudflats and sandflats not covered by seawater at low tide, Salicornia and other annuals colonising mud and sand, Atlantic salt meadows and Mediterranean salt meadows.

3.35 The Cuckoo Stream ultimately drains to Baldoyle Estuary, but because any water environment risks from the Proposed Development will be managed on site by connecting to the existing drainage system (including water quality treatment facilities), the Proposed Development has no risk of impact to the SAC.

Drinking Water – Groundwater

3.36 The study area lies within three Drinking water groundwater bodies; Dublin (IEPA1_EA_G_008), Swords (IE_EA_G_011) and Industrial Facility (IE_EA_G_086). These are areas where abstractions are undertaken for the purpose of supplying drinking water.

4. WFD Screening

WFD Screening

4.1 The purpose of WFD screening is to identify a zone of influence of a proposed development and to determine whether that influence has the potential to adversely impact upon WFD water body receptors. The screening stage also identifies specific activities of the proposed development that could affect receptor water bodies' WFD status and carries them forward to subsequent stages of the assessment process. Water body receptors that are screened out are not carried forward, and justification is provided.

Screening of WFD Water Bodies

4.2 The Proposed Development has the potential to interact with a number of WFD surface water and groundwater bodies.

4.3 WFD Screening of these water bodies is provided in Table 4-1.

Table 4-1 Screening of WFD Water Bodies Potentially Impacted by the Proposed Development

Water Body ID	Screening Outcome	Justification
Mayne (Mayne_010)	In	The majority of the Dublin Airport currently drains to Cuckoo Stream of the Mayne River water body. The Mayne River itself also drains portions of runway.
Sluice (Sluice_010)	Out	Forrest Little stream only drains the northern section of the airport, including the central apron, portions of Pier 1, and Hangars 1 to 4 (primarily airside operations). The Proposed Development will not drain to the Sluice, so it is screened out of further assessment.
Ward (Ward_030)	Out	This watercourse no longer receives drainage from the airport, since under the North Runway development, runoff is now diverted away from the Ward Catchment. The Proposed Development will not drain to the Ward, so it is screened out of further assessment.
Santry (Santry_010)	Out	A minor portion of the South Runway drains to the Santry River, but airport drainage systems and treatment trains intercept and mitigate this drainage before it reaches the river. As such, drainage is managed before it reaches the Santry, it is screened out of further assessment.
Dublin Groundwater Body (IE_EA_G_008)	In	Excavations are being undertaken within this catchment to accommodate the installation of the twin-cell tunnel. The Southern compound is located within this catchment.
Sword Groundwater Body (IE_EA_G_011)	In	The Western compound is located within this catchment.
Industrial Facility Groundwater Body (IE_EA_G_086)		The proposed excavations and works associated with installation of the tunnel do not interact with any of these groundwater bodies.

Screening of Activities

4.4 The Proposed Development comprises construction (temporary) and operational (non-temporary) phases. Temporary WFD impacts are discussed below. The Proposed Development also has a number of non-temporary activities that present a potential risk to the local WFD conditions, which are reviewed in

4.5 Table 4-2.

Table 4-2 Screening of the Proposed Development's activities

Activity	Description	Screening Outcome	Justification
Twin cell underpass installation	Civil works related to construction of the underpass, ramps, portals and the plantroom.	In	Potential impact to groundwater resources in terms of quality and quantity.
Temporary diversion of Cuckoo Stream	Proposed diversion of the Airfield Trunk Culvert that carries Cuckoo Stream requires temporary pipework and short term over-pumping during construction so that there is a dry working area.	In	Potential for hydromorphological and ecological impacts downstream because pumping will change natural flow patterns.
Surface water drainage network	The Proposed Development will drain to the existing airport drainage system once construction is completed. The existing drainage system includes water treatment features that minimise or eliminate impacts to the surrounding environment. As described in EIAR Chapter 3 Proposed Development, these include below ground attenuation tanks and flow restrictions to control discharge to natural runoff rates, and fuel interceptors to treat any pollutants.	Out	The Proposed Development will drain to the existing airport drainage system when it is operational, which adequately controls airport impacts to the local water environment. Drainage during the construction phase will be managed using a Construction Environment Management Plan. When pumping is needed for dry working areas, the pump will encompass emergency storage to ensure protection against failure of the pump system.
Contaminated flows	In the event of a major spillage or fire, contaminated flow is to be diverted to the contaminated storage tank and later emptied by a tanker.	Out	A fire suppression system will be installed as described in EIA Chapter 3 Proposed Report. The system includes an automated valve system and separate contaminated storage tank to capture pollutants before they can discharge to receiving water bodies. This would reduce risks to local water quality to an acceptable, or negligible, level.
Site compounds	Temporary work area to accommodate welfare facilities, plant and materials storage etc.	Out	The site compound would be a temporary activity. In addition, runoff of potentially harmful compounds (fuel, dust, chemicals etc.) would be managed through a CEMP developed by the contractor (see Section 5).

5. WFD Impact Assessment

5.1 The WFD requires assessment of the aquatic environment according to biological, chemical and physical (hydromorphological) quality elements. Site-specific impacts of the Proposed Development upon the quality elements of Mayne WFD water body, and the mitigation measures to neutralise those impacts, are summarised in Table 5-1.

Table 5-1 Impacts on the WFD quality elements on the Mayne water body.

Quality Element	Sources of Potential Impact	Mitigation	WFD compliant
Water body ID	Mayne_010		
Water body name	Mayne		
Biological Quality Elements			
Invertebrate Status or Potential	Pollution from spillages during operation or general construction activities and mobilisation of contaminates during excavations or earthworks may adversely affect invertebrates present. A change to channel hydraulics, depth and velocity as a result of diverting Cuckoo Stream could lead to changes in macroinvertebrate communities.	Water pollution will be prevented on site through the specific controls detailed in the Construction Environmental Management Plan (CEMP). Diverted flow will be pumped at a rate that flow rates changes are minimal. Drainage proposals (EIA Chapter Proposed Development) to include a fuel interceptor within the drainage strategy as well as emergency storage to deal with contaminated flows mean no changes in water quality are anticipated.	Yes
Supporting Chemical Conditions			
Dissolved Oxygen	Pollution from spillages or construction site or mobilisation of contaminates during excavations and earthworks resulting in temporary adverse changes to water quality. Risk during both construction and operational phases. Cuckoo Stream will be particularly exposed during works to divert the stream.	Water pollution will be prevented on site through the specific controls detailed in the CEMP. Drainage proposals (EIA Chapter 3 Proposed Development) to include a fuel interceptor within the drainage strategy as well as emergency storage to deal with contaminated flows mean no changes in water quality are anticipated. No change in status is anticipated.	Yes
pH			
Nitrate			
Ammonium			
Orthophosphate			
Hydromorphological Quality Elements			
Quantity and Dynamics of Water Flow			Yes

Quality Element	Sources of Potential Impact	Mitigation	WFD compliant
Connection to Groundwater Bodies	No direct impacts or risks during operational phases.	The Cuckoo Stream is already culverted and has non-natural flow patterns, so the impacts of temporary pumping would not be significant.	
River Continuity	Temporary impacts are anticipated during construction as a result of the temporary diversion of Cuckoo Stream and over pumping, because pumping would transfer water in a different way to natural stream flow. Changes in velocity as a result of pumping could lead to accretion where velocity is decreased,		
River Depth and Width Variation			
Structure and Substrate of the River Bed			
Structure of the Riparian Zone			

5.2 Site-specific impacts of the Proposed Development upon Water Framework Directive quality elements of the WFD Dublin Groundwater body, and the mitigation measures to neutralise those impacts, are provided in Table 5-2.

Table 5-2 Impacts on the WFD quality elements on the Dublin Groundwater body.

Quality Element	Sources of Potential Impact	Mitigation	WFD compliant
Water body ID	IE_EA_G_008		
Water body name	Dublin		
Quantitative and Chemical Elements			
Surface Water Ecological	Water-flows into excavations associated with the construction works generate pathways for pollution from spillages. Possibility of dewatering during construction, but this would be temporary and localised.	Water-flows into the excavation, either groundwater or rainfall, would need to be collected by temporary drainage within the excavation (e.g. at the top and base of the cutting slopes). If dewatering is needed to keep the excavations dry, it could be reinjected to the ground during construction works, but based on the 2022 Ground Investigation study, minimal dewatering is expected to be needed. Simple treatment such as sedimentation, aeration and attenuation would need to be implemented as necessary before discharge to the nearby watercourse or sewer system to ensure that no polluted water is discharged back into the environment.	Yes
Groundwater Dependent Ecosystems			

Quality Element	Sources of Potential Impact	Mitigation	WFD compliant
Water Balance	Further limit recharge rates to the underlying aquifer.	The construction of proposed infrastructure and decommissioning of existing infrastructure are phased such that there is no reduction in the total available storage volume of existing systems thereby not affecting the water balance as outlined in the Drainage Design Report[23].	Yes

[23] Ramboll Ltd, Drainage Design Report Dublin Airport – Western Apron Vehicle Underpass, dated 18 February 2022, reference: 1100040489-DIP-REP-4002.

6. Construction Risks

Potential Construction Phase Risks

6.1 The construction activities on watercourses and drainage pathways are summarised in Section 1.4. Construction can have the following typical impacts on watercourses:

- Impacts on surface water quality due to deposition or spillage of soils, sediments, oils, fuels, or other construction chemicals, or through mobilisation of contamination following disturbance of contaminated ground or groundwater, or through uncontrolled site run-off.
- Potential changes in on-site and off-site flood risk due to changes in the volume, rate and flow of surface water runoff from the construction site, which could mobilise pollutants into water bodies.
- Construction activities such as earth works, excavations, site preparation, levelling and grading operations result in the disturbance of soils. Exposed soil is more vulnerable to erosion during rainfall events due to loosening and removal of vegetation to bind it, compaction and increased runoff rates. Surface runoff from such areas can contain excessive quantities of fine sediment, which may eventually be transported to watercourses where it can result in adverse impacts on water quality, flora and fauna. Construction works within, along the banks and across watercourses can also be a direct source of fine sediment mobilisation
- Contamination of surface waters, groundwater and soil could result from leakage and spills of fuels, oils, chemicals and concrete during construction affecting watercourses indirectly via site runoff or directly where works are close to and within a water body. Contamination may reduce water quality and impact aquatic fauna and flora.
- Earthworks may also alter flow pathways and the compaction of the ground and vegetation clearance will also increase the rate and volume of runoff.

Construction Mitigation

6.2 Construction mitigation will be the responsibility of the construction contractor. The types of construction impacts summarised above should be managed in accordance with the Preliminary Construction Environmental Management Plan (CEMP). The Preliminary CEMP[24] includes a Surface Water Management Plan (WMP) that provides site specific information of how the risks to the water environment from potential pollution and the risk of physical damage will be managed in addition to the recommendations below. The Airfield Trunk Culvert Temporary Diversion Pollution Control Report[25] will also be referred to, in order to identify the appropriate pollution control measures that will be in place for the duration of the Cuckoo Stream diversion works.

6.3 Development and implementation of the final CEMP is the responsibility of the appointed Contractor, and thus the details would not be developed until the detailed design phase and pre-construction period. It is reasonable to assume for planning submission purposes and for this WFD assessment that an appropriate CEMP will be developed by the Contractor in the future and that objectives for managing temporary WFD objectives will be met.

6.4 Works will be carried out in accordance with established best practice and the CEMP would include information on:

- Permissions and Consents
- Management of Construction Site Runoff
- Management of Construction Site Spillage Risk
- Management of Flood Risks.

[24] Daa (2021) West Apron Vehicle Underpass Preliminary Construction Environmental Management Plan
[25] Ramboll (2022) Airfield Trunk Culvert Temporary Diversion Pollution Control

7. Conclusions

7.1 This WFD Assessment has been prepared by AECOM Limited (AECOM) for the competent authority to assess the potential risks to WFD water body receptors' status posed by the Proposed Development.

7.2 The Proposed Development will consist of a subterranean underpass of Runway 16/34 including ramps, portals, plantroom and attendant access roads at surface level. Surface water runoff from the underpass and access roads will be conveyed to Cuckoo Stream via attenuation tanks and pumps whilst a fuel interceptor will be installed to treat potentially polluted surface water drainage. In addition to the fuel interceptor, a fire suppression system will be installed within the covered section, so contaminated flows can be diverted away from Cuckoo Stream in the event of a major spillage event or fire.

7.3 There are four WFD monitored surface waterbodies within the boundaries of Dublin Airport and three WFD groundwater bodies. Local watercourses, i.e. 'non-designated' WFD water features, have been considered as tributary components of the 'designated' WFD water bodies to which they connect to ensure comprehensive assessment of WFD objectives. Of these waterbodies within the study area, two were deemed to be hydrologically connected to the Proposed Development; the Mayne water body and the Dublin Groundwater body and have therefore been scoped into the assessment.

7.4 The Proposed Development, when operational, will connect to the existing airport drainage network. The existing drainage network includes water quality treatment trains to ensure that runoff from the airport does not negatively impact the surrounding water environment.

7.5 Construction activities, without appropriate mitigation, could have the potential to generate temporary adverse impacts within the connecting waterbodies. However, the Preliminary Construction Environment Management Plan describes how risks to WFD water body receptors will be eliminated or mitigated.

7.6 This assessment concludes that the Proposed Development would not impact on the WFD status or objectives of any surface water or groundwater bodies in proximity of the Proposed Development. Furthermore, the Proposed Development would not prevent the achievement of the wider WFD objectives in the Ireland River Basin Management Plan and is not predicted to have an impact on any other water body within the Liffey and Dublin Bay and Nanny Delvin management catchments or mitigation measures developed to achieve good status within these catchments.

7.7 In terms of overarching WFD objectives, this WFD assessment demonstrates that the proposed scheme will NOT:

- Cause a deterioration in ecological status/potential of the water bodies.
- Prevent the water bodies from meeting their objective status.
- Prevent or compromise WFD objectives being met in other water bodies.
- Cause failure to meet good groundwater status or result in a deterioration of groundwater status.
- Prevent the implementation of mitigation measures which define the hydromorphological designation of heavily modified water bodies.

Appendix A – Application Site Boundary and WFD Water Bodies

AECOM
Adelphi Plaza
George's Street Upper
Dun Laoghaire
Co. Dublin
A96 T927
Tel +353 (1) 238 3100
Fax +353 (1) 238 3199
www.aecom.com

Project Title:

DUBLIN AIRPORT UNDERPASS

Client:

daa Dublin Airport

LEGEND

- Application Site Boundary
- Land owned by daa
- River Waterbodies

Notes:

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

AECOM Internal Project No:

60601864

Drawing Title:

WFD WATERBODIES

Scale at A3: 1:24,000

Drawing No:

FIGURE 1

Drawn:	Chk'd:	App'd:	Date:
BS	TD	CM	18/05/22

Filename: \\na.aecomnet.com\ifs\EMEA\Dublin-IEDBL2\Legacy\DU-MAN-002\Data\CoDublin-Jobs\GIS\60601864_daa_Underpass\GIS\02_Maps\Figure 1.1 WFD Waterbodies_20220518.mxd

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