



ANNEX 3.1

Constraints Report

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Abbreviations

Abbreviation	Definition
ACA	Architectural Conservation Area
AEP	Annual exceedance probability
BCI	Bat Conservation Ireland
CGS	County Geological Sites
DDLETB	Dublin and Dún Laoghaire Education and Training Board
DCIHR	Dublin City Council Industrial Heritage Record
DHLGH	Department of Housing, Local Government and Heritage
EIAR	Environmental Impact Assessment Report
EC	European Commission
END	Environmental Noise Directive
EPA	Environmental Protection Agency
ESB	Electricity Supply Board
EU	European Union
FIHS	Fingal Industrial Heritage Survey
GAA	Gaelic Athletic Association
GDA	Greater Dublin Area
GNI	Gas Networks Ireland
GNR(I)	Great Northern Railway of Ireland
GSI	Geological Survey Ireland
HA	High Amenity
HSA	Health and Safety Authority
IÉ	Iarnród Éireann
IED	Industrial Emissions Directive
IPC	Integrated Pollution Control
IPPC	Integrated Pollution Prevention Control
NBDC	National Biodiversity Data Centre
NHA	Natural Heritage Area
NIAH	National Inventory of Architectural Heritage
NMI	National Museum of Ireland
NMS	National Monuments Service
NPWS	National Parks and Wildlife Service
NTA	National Transport Authority
OLE	Overhead Line Electrical
OPW	Office of Public Works
OSI	Ordnance Survey Ireland
PAG	Project Appraisal Guidelines
pNHA	Proposed Natural Heritage Area

Abbreviation	Definition
PO	Preservation Order
PRAI	Property Registration Authority of Ireland
QI	Qualifying Interest
RMP	Record of Monuments & Places
RPS	Record of Protected Structures
SAC	Special Area of Conservation
SCI	Site of Community Importance
SHD	Strategic Housing Development
SID	Strategic Infrastructure Development
SMR	Sites and Monuments Record
SPA	Special Protection Area
TII	Transport Infrastructure Ireland
WFD	Water Framework Directive
ZoI	Zone of Influence

1 Introduction

1.1 Purpose of the Report

This report provides an overview of the environmental constraints identified at the outset of the options assessment phase of the DART+ Coastal North project.

The aim of the report is to provide a general overview of the key constraints which occur along the route and its associated study area at this early stage of the project. This information will also inform the options assessment process and the identification of the emerging preferred options for the scheme.

As the options assessment and scheme development progresses, more detailed information in respect of constraints will become available and will further inform the environmental assessment process.

1.2 DART+ Programme Overview

DART+ is a transformative programme of projects that aims to modernise and improve existing rail services in the Greater Dublin Area (GDA). It will provide a sustainable, electrified, reliable and more frequent rail service, improving capacity on rail corridors serving Dublin.

The scope of works for the programme is summarised in **Figure 1-1**.



DART+ Programme Scope 2018 - 2027

Figure 1-1: DART+ programme of works overview

The current DART network is 50km long, extending from Malahide/Howth to Greystones. The DART+ programme will increase the length of the DART network to 150km of railway corridor through the electrification and upgrade of existing lines transforming commuter train travel in the Greater Dublin Area (GDA).

The DART+ Programme is required to facilitate increased train capacity to meet current and future demands which will be achieved through a modernisation of the existing railway corridors. It will also contribute to Ireland’s transition to a low carbon and climate resilient society. The DART+ Programme comprises the following improvement projects across the four main rail corridors:

- DART+ West - Maynooth and M3 Parkway to the City Centre;
- DART+ South West - Hazelhatch & Celbridge to the City Centre;
- DART+ Coastal North - Drogheda to the City Centre;
- DART+ Coastal South - Greystones to the City Centre;
- DART+ Fleet - purchase of new train fleet to increase train services.

The DART+ Programme is a key element of the national public transportation network as it will provide a high-capacity transit system for the Greater Dublin Area

and better connectivity to outer regional cities and towns. This will benefit all public transport users.

Delivery of the DART+ Programme will promote transport migration away from the private car and to public transport. This transition will be achieved through a more frequent and accessible electrified service, which will result in reduced road congestion, especially during peak commuter periods.

The DART+ Programme will provide enhanced, greener public transport to communities along the DART+ Programme routes delivering economic and societal benefits for current and future generations.

1.3 DART+ Coastal North Project

1.3.1 Project Overview

The delivery of the DART+ Coastal North project will form the third infrastructural project of the DART+ Programme.

DART+ Coastal North is seeking to extend the existing electrified rail network from Malahide to Drogheda as well as significantly increasing rail capacity on the Coastal Railway Line between Dublin City Centre and Drogheda MacBride Station, including the Howth Branch. This can be achieved by implementing an extended electrified railway network with high-capacity DART trains and an increased frequency of trains. The project extents are displayed in **Figure 1-2**.

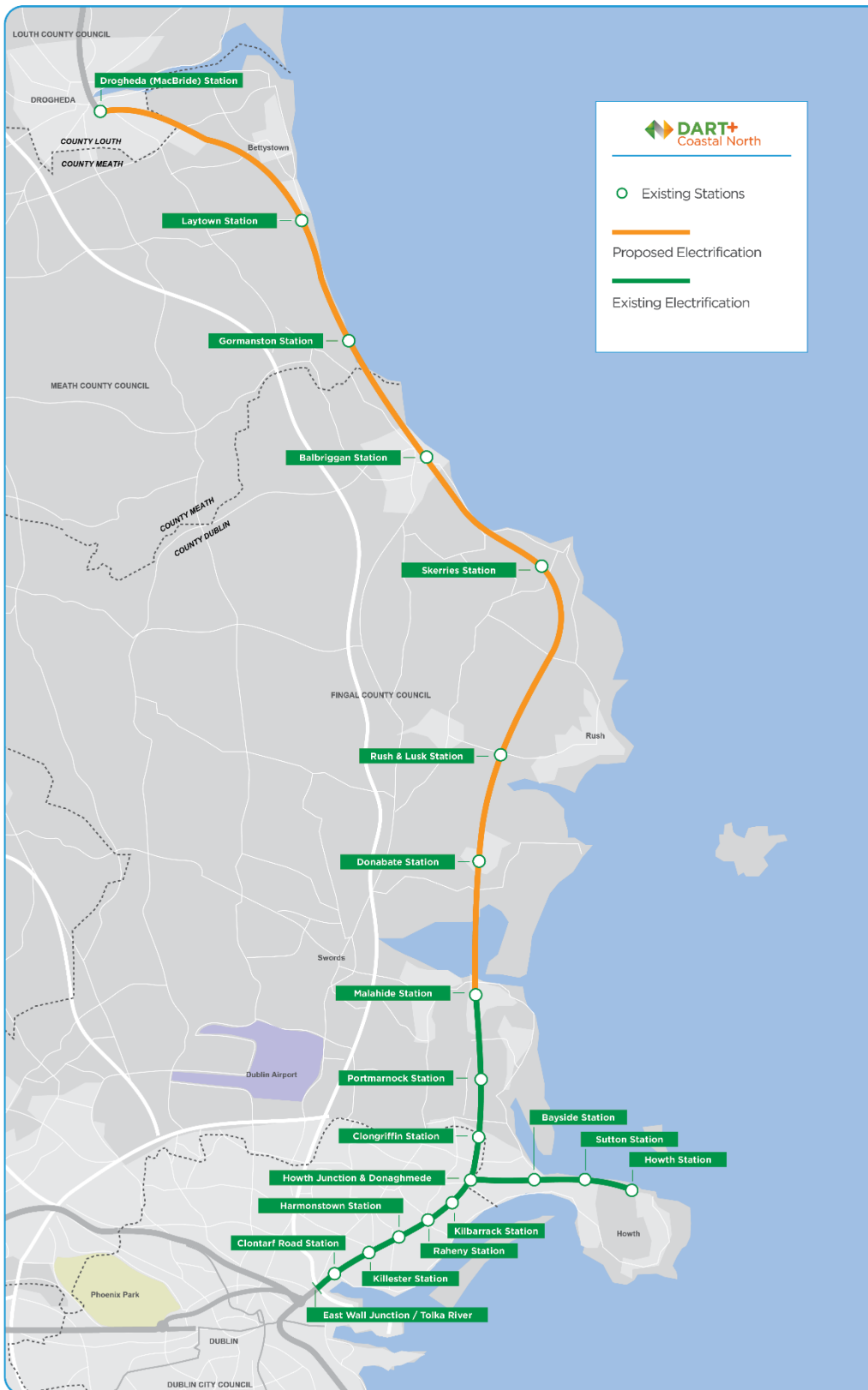


Figure 1-2: DART+ Coastal North Project Extents

Delivery of this project will support existing communities along the railway and support future sustainable development. It will serve all existing stations along the

railway corridor between Dublin City Centre and Drogheda, including those located on the Howth Branch, using electrical power that has a lower carbon footprint than the existing diesel trains. The frequency and quality of service will provide a viable transport alternative for communities along the route and help encourage people to migrate from private car use. This will assist Ireland in reducing greenhouse gas emissions from transport and help combat climate change.

The project will predominantly follow the existing railway corridor and will include the overhead electrification of the existing railway line between Malahide and Drogheda, as well as some reconfiguration of existing track layout and infrastructure in the vicinity of Drogheda MacBride, Malahide, Clongriffin and Howth Junction & Donaghmede Stations. Interventions outside of the railway corridor may be required for some of the scheme elements such as level crossing improvements, improvement works to existing stations, provision of rolling stock stabling (near Drogheda), construction of substations (to facilitate the provision of power to the line), as well as all ancillary works required for the project.

1.3.2 Key infrastructural elements of DART+ Coastal North

The key infrastructural elements of DART+ Coastal North include:

Linear Works along the Northern Line to introduce electrification

- Extension of existing 1500V DC electrification, which currently terminates at Malahide, as far as Drogheda MacBride Station (approximately 37km). This entails installation of foundations, masts and overhead wires as well as installation of new traction power substations to supply the required power and modified railway boundary fences to protect the public from coming into contact with the overhead line. These works take place alongside the existing railway corridor, predominantly in Iarnród Éireann-owned land with the exception of the substations;
- Whilst the section of the Northern Line between Dublin City Centre and Malahide, inclusive of the Howth Branch, is already electrified, changes and upgrades to signalling equipment and associated power supply installations will be required in these areas to accommodate the proposed infrastructure works;
- Undertaking improvements / modifications to bridges spanning the railway arising from track reconfigurations and/or electrical clearances to achieve necessary vertical and horizontal clearances;
- Undertaking localised bridge modifications to enable OHLE to be fixed to bridges carrying the railway;
- Modifications to existing depots at Drogheda and Fairview to support the new train fleet, including the provision of additional train stabling at Drogheda;
- Drainage works, including surface water drainage and attenuation; and
- Any required landscaping in areas of intervention.

Infrastructure works to facilitate increase in service frequency and capacity

- These works will take place in specific areas of intervention as outlined below (from north to south).
 - Works around Drogheda MacBride Station;
 - Works to the existing user worked level crossing south of Donabate;
 - Works around Malahide Station;
 - Works around Clongriffin Station;
 - Works around Howth Junction & Donaghmede Station;
- The works at existing stations entail modifications to existing tracks and platforms, as well as the addition of new tracks, where required, to stable and facilitate the turn back and through running of trains. These works are primarily located within existing railway land;
- The works relating to closing the existing user worked level crossing south of Donabate, to deliver the increased level of train service and replace with appropriate relief infrastructure, if necessary.

1.4 References

This report should be read in conjunction with the following related optioneering reports:

Table 1-1: List of key documents associated with this report

Annex	Title	Description
N/A	DART+ Coastal North Preliminary Option Selection Report	The main report summaries the optioneering process and the different packages of proposed works on the DART+ Coastal North project.
N/A	DART+ Coastal North Preliminary Option Selection Report – Executive Summary	This report summarises the main Preliminary Option Selection Report.
1	Emerging Preferred Option Maps	Includes drawings for each Emerging Preferred Option to support the Preliminary Option Selection Report.
2.1	Policy Context	This presents a detailed review of the European, National, Regional and Local policy context for the DART+ Programme and the DART+ Coastal North Project.
2.2	Useful Links	Useful links to documents/websites relating to the DART+ Coastal North project.
3.1	Constraints Report	This report reviews the DART+ Coastal North constraints.
3.2	Technical Optioneering Report: Electrification of the Northern Line between Malahide and Drogheda	The Technical Optioneering Report for the Electrification of the Northern Line between Malahide and Drogheda. The report is divided into a series of sections.
3.3	Technical Optioneering Report: Works around Drogheda MacBride Station	The Technical Optioneering Report for Drogheda MacBride Station Works. The report addresses track and station modifications to allow for the increased number of DART services.

Annex	Title	Description
3.4	Technical Optioneering Report: Works around Malahide Station	The Technical Optioneering Report for Works around Malahide Station. The report addresses track modifications required to allow trains to be turned back clear of through running services.
3.5	Technical Optioneering Report: Works around Clongriffin Station	The Technical Optioneering Report for Works around Clongriffin Station. The report addresses track modifications required to allow trains to be turned back clear of through running services.
3.6	Technical Optioneering Report: Works around Howth Junction & Donaghmede Station	The Technical Optioneering Report for Works around Howth Junction & Donaghmede Station. The report addresses the addition of tracks to allow a higher frequency shuttle service.
3.7	Technical Optioneering Report: Howth Branch Level Crossings	The Technical Optioneering Report for Howth Branch Level Crossings. The report addresses the impacts of all proposed increases in train frequency on existing level crossings on the Howth Branch.

1.5 Geographic Context and Study Area

The study area is shown on the constraints maps appended to this report. The project extends from the city centre, at Connolly Station, along the existing main Dublin-Belfast railway line, northwards, as far as Drogheda. The project study area also includes the Howth Branch from Howth Junction & Donaghmede Station to Howth.

The project passes through urban, sub-urban and rural coastal environments along the route and is located within the administrative areas of Dublin City Council, Fingal, Meath and Louth County Councils.

2 Environmental Constraints

2.1 Overview

This section provides a general overview of the environmental constraints within the study corridor for the DART+ Coastal North project. More detailed, location specific information in relation to each of the proposed interventions will be provided in the individual technical optioneering reports, as listed within **Table 1-1**.

2.2 Traffic & Transportation

2.2.1 Overview

The purpose of the traffic and transportation section is to highlight the key traffic and transportation constraints within the existing study area. This will allow the design team to make informed developmental and structural decisions based on available desktop information at this stage of the project. This section identifies desktop information on traffic and transportation which will be relevant for the proposed scheme.

The study area is located within the Greater Dublin Area and is accessible by local roads. These are generally of a good standard and capable of accommodating construction vehicles. Road links of regional importance connect the sites to the M1 national motorway.

The operational rail scheme is likely to have no significant negative impacts on traffic conditions in the surrounding road network.

Construction activities are expected to generate a relatively low number of additional vehicular journeys, and therefore will, at most, have a minor temporary impact on the traffic conditions of the local road network.

The main issues to consider from an environmental impact point of view are therefore access provision for the envisaged construction traffic. In this regard the following needs to be considered:

- The width of the local access roads;
- The linkages to roads of strategic importance;
- The surrounding environment.

Most construction site options which might be considered are likely to be accessible by local roads, some with additional width for a public walkway and/or cycle lanes. In some cases, access could be provided through farmland or parks / golf courses. Narrow access roads may need to be widened temporarily to accommodate construction traffic. Alternatively, or in addition, new temporary access roads to construction sites can be constructed. There is also the potential that access to construction sites could be provided through temporary Park and Ride facilities, and in such cases, care should be taken to accommodate the need for parking and pedestrians in these areas during construction.

Given the location of the scheme, all construction sites will likely be accessible via the M1 Dublin to Belfast motorway, which will be important for the movement of construction material. Where potential construction sites are only accessible through built-up areas like villages and town centres, additional traffic management measures may be required.

2.2.2 Key Constraints

The low speed and function of the access roads through town centres will need to be considered in the context of construction traffic generated for the works at viaducts, substations and stations.

A planned walkway and cycleway across Broadmeadow Estuary has been approved by An Bord Pleanála. The Broadmeadow Way forms part of the Fingal Coastal Way, the NTA's Greater Dublin Area Cycle Network and East Coast Trail. It is funded by the NTA, and Fingal County Council and construction is set to take place between 2022 and 2023. The route will run alongside the railway line and includes a 280-metre-long bridge crossing the Broadmeadow Estuary.

The Broadmeadow Way is in proximity to the Malahide Viaduct and the Malahide Turnback and the interface between these and the watercourse to the north will need careful consideration with respect to construction and operational effects. The planned Broadmeadow Way runs adjacent to a level crossing (north of the estuary). In considering options for the level crossing, consideration needs to be given to safety risk and the risk of trespassing if the crossing remains open or accessible (for maintenance or other purposes) in any way.

The impact on residential areas and the existing wastewater treatment plant will also have to be considered during construction of the Malahide Viaduct and the Malahide Turnback.

Similarly, at the Rogerstown Viaduct the interface between the proposed development and the park and estuary to the north will need to be considered in terms of possible construction and operational effects.

At the Balbriggan Viaduct the interface with the residential areas east of the railway line will need consideration in terms of potential effects. There is also an existing OHLE structure spanning over the public walkway (potential hazard) which needs to be considered.

At the Gormanston Viaduct the access roads are narrow and may require additional traffic management measures or temporary access roads to accommodate two-way construction traffic volumes. Access to the private property to the north may also be affected.

Access to potential works at the proposed Donabate, Rush and Lusk, and Drogheda Substations may traverse existing parking, pedestrian and cyclist areas at the rail Park and Ride sites near the stations.

There are plans to construct the Southern Relief Road (near the proposed Skerries South Substation), sections of which may overlap access for the proposed scheme.

At the proposed Skerries North Substation a nearby overbridge across the railway line has a clearance of 3.12m which may constrain construction vehicle access.

At Drogheda MacBride Station, Clongriffin Station and Howth Junction & Donaghmede Station a number of car parking areas and pedestrian facilities associated with the existing station may be affected during construction.

At the Rogerstown Viaduct, Boyne Viaduct, Drogheda MacBride Station and Howth Junction & Donaghmede Station, access to the railway station by all modes of transport (including cycle lanes) may be affected during construction.

2.2.3 Summary of issues for further consideration

The proposed upgrades are part of a scheme that will increase the capacity of the rail system and consequently the attractiveness for trips to be undertaken by public transport in the Greater Dublin Area. As such, it brings about positive benefits to sustainable transportation.

The operational rail scheme is likely to have no significant negative impacts on traffic conditions in the surrounding road network.

Construction activities are expected to generate a relatively low number of additional vehicular journeys, and therefore will, at most, have a minor temporary impact on the traffic conditions of the local road network. Consideration will need to be given to the specific constraints identified in Section 2.2.2, particularly in relation to potential interfaces between the proposed development and existing walkways, roads and car parks, as well as residential areas.

The potential interface of the Broadmeadow Way with the proposed development will also need to be considered, from an access and safety point of view, at Malahide Viaduct and Malahide Turnback, and in respect of any proposed changes to the level crossing north of Malahide Estuary.

2.3 Landscape and Visual Impact

2.3.1 Overview

The purpose of the landscape and visual impact section is to highlight the key landscape and visual constraints that exist within the constraints study area. This will allow the design team to make informed developmental and structural decisions based on available desktop landscape and visual information at this stage of the project. A landscape and visual impact assessment of the potential effects of the proposed DART+ Coastal North will be undertaken to accompany the Railway Order application.

The landscape and visual impact assessment is being prepared having regard to the following legislation, policy and guidelines:

- Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment;

- Planning and Development Act 2000 – 2021
- Planning and Development Regulations 2001 – 2021;
- Dublin City Development Plan 2016-2022, Dublin City Council, 2016;
- Fingal Development Plan 2017-2023, Fingal County Council, 2017;
- Meath County Development Plan 2013-2019 & Draft Meath County Development Plan 2021-2027 (adopted September 2021), Meath County Council, 2013 & 2021;
- Louth County Development Plan 2021 – 2027 (adopted November 2021), Louth County Council 2021
- Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports, Environmental Protection Agency, 2017;
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements, Environmental Protection Agency, 2003;
- Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report, European Commission, 2017;
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, Department of Housing, Planning and Local Government, 2018;
- Guidelines for Landscape and Visual Impact Assessment, 3rd Ed., Landscape Institute and Institute of Environmental Management & Assessment, 2013.

The landscape and visual constraints are identified from a desk study of relevant planning and landscape / visual documents, including the respective development plans, local area plans and landscape character assessments for areas applicable to the study area.

2.3.2 Key Constraints

Where available, the key constraints for Landscape are presented in Annex 3.1 Appendix A – Constraints Mapping: Landscape Constraints.

The proposed development follows the corridor of the existing Coastal Railway Line between Drogheda and Dublin City Centre, passing through a range of urban, sub-urban, town centre townscapes and rural landscapes. These include the following townscape / landscape character areas:

- The Urban Townscape of Dublin City;
- The High Sensitivity Estuary Areas at Baldoyle, Swords/Malahide and Rogerstown in Fingal;
- The High Sensitivity Coastal Landscape of Fingal;

- The High Sensitivity Coastal Plains Landscape located between Gormanston and Drogheda in County Meath;
- The High Sensitivity River Nanny Valley Landscape in County Meath; and
- The Suburban / Urban Townscape of Drogheda – within the Boyne and Mattock Valley Landscape.

The study area includes the following key landscape / townscape and visual constraints (as identified on the Land Use (Zoning) Constraints Maps in Appendix D where data is available) for Dublin City, Fingal County, County Meath and County Louth):

- Community, residential, and open space land-uses and amenities:
 - Dublin City Area (Map C of Development Plan):
 - Z1 zoned lands (Residential Amenity);
 - Z9 zoned lands (Open Space and Green Networks).
 - Fingal County Area (Maps 4, 5, 6A / 6B, 7, 9 and 10 of Development Plan):
 - RA zoned lands (Residential Amenity – New Areas);
 - RS zoned lands (Residential – Existing Areas);
 - OS zoned lands (Open Space);
 - TC zoned lands (Town Centre).
 - Meath County Area (Zoning Map for Gormanston, Laytown, Bettystown, Drogheda Southern Environs)
 - A1 zoned lands (Existing Residential);
 - A2 zoned lands (New Residential);
 - F1 zoned lands (Open Space);
 - G1 zoned lands (Community Infrastructure);
 - H1 zoned lands (High Amenity).
 - Louth County Area (Zoning Map for Drogheda Town)
 - RE zoned lands (Residential Existing);
 - RN zoned lands (Residential New);
 - OS zoned lands (Open Space and Recreational Area).
- Protected townscape / landscape areas or sites and visual aspects:
 - Dublin City Area:
 - Conservation Areas;

- Protected Structures.
- Recorded Monuments
- Fingal County Area:
 - Architectural Conservation Areas (ACA);
 - HA zoned lands (High Amenity);
 - Highly Sensitive Landscapes;
 - Preserved Views;
 - Protected Trees, Woodlands and Hedgerows;
 - Nature Development Areas;
 - Protected Structures;
 - Recorded Monuments.
- Meath / Louth County Areas:
 - Architectural Conservation Areas (ACA);
 - Preserved Views;
 - Protected Trees, Woodlands and Hedgerows;
 - Protected Structures;
 - Recorded Monuments.

In addition to the above the following items are also noted as landscape and visual constraints:

- Sections of the railway are elevated / exposed (e.g. Malahide Estuary) and therefore, more visually prominent in their immediate surrounds;
- Sections of the railway corridor are bounded by mature hedgerows, some with mature trees, which are of landscape and screening value;
- Permission exists for the provision of a Greenway ('Broadmeadow Way') between Malahide Demesne and Newbridge Demesne, part of which is to be constructed immediately alongside the railway corridor across Malahide (Broadmeadow) Estuary;
- Even where they are not recorded as protected structures, many of the structures associated with the railway, including bridges and station buildings are important historical features; and
- Sections of the railway corridor are openly visible / viewed from adjoining residential and other properties and from open spaces and amenities. This is of particular note in suburban areas, town centres and villages.

2.3.3 Summary of Issues for Further Consideration

The key landscape and visual constraints for further consideration relate to:

- Potential widening of the railway corridor;
- Associated earthworks / structures;
- Impact on existing boundaries, corridor hedgerows and plantings;
- Impact on protected or historic structures, and
- Visibility of interventions / new elements including from residential, open space and / or protected landscape / visual areas.

2.4 Archaeology & Cultural Heritage

2.4.1 Overview

The purpose of the archaeology and cultural heritage section is to highlight the recorded archaeological monuments and sites, areas of archaeological potential and cultural heritage interest within the constraints study area. This will allow the design team to make informed developmental and structural decisions based on available desktop cultural heritage information at this stage of the project. This section identifies all sites of an archaeological interest within 50m (both sides) of the existing railway infrastructure and provides a historical context for the archaeological and cultural heritage potential of this landholding.

2.4.2 Key Constraints

Where available, the key constraints for archaeology, architectural and cultural heritage are presented in Annex 3.1 Appendix B – Constraints Mapping: Heritage Constraints.

Sensitive receptors identified for the purpose of this study are:

- National Monuments in State care, as listed by National Monuments Service (NMS) of the Department of Housing, Local Government and Heritage;
- Sites with Preservation Orders (PO);
- Sites listed in the Register of Historic Monuments;
- Record of Monuments and Places (RMP) and the Sites and Monuments Record (SMR) from the Archaeological Survey of Ireland;
- Designated Zones of Notification (Areas of Archaeological Potential); and
- General Areas of Archaeological Potential.

Key sources of information relating to features identified within these databases have been verified by aerial imagery, Ordnance Survey historic mapping and information contained within the relevant Development Plans, namely Dublin City,

Fingal, Meath and Louth. There are no National Monuments, sites listed with preservation orders or recorded on the register of historic monuments within the constraints study area. There are, however, a number of recorded archaeological monuments and these are listed below (section 2.4.3).

Prior to the advent of the railway, the land within the constraints area was largely open green fields set within a coastal context, with a number of inlets and rivers punctuating the coastline. All environments have an inherent archaeological potential and this potential is borne out in townlands where there are recorded archaeological sites (section 2.4.3), in addition to more recently discovered sites identified through aerial photography, geophysical survey and archaeological testing. These sites suggest that the wider area was a focus for both prehistoric and historic activity. Archaeological activity and settlement history of this coastline is well documented, and the area is known to have been occupied from the prehistoric period into the Early Medieval period and medieval period when the Anglo - Normans began asserting their claim on the land which is especially evident in the town of Drogheda.

Drogheda developed at a fording point in the River Boyne, granting the settlement the name of Droichead Átha or ‘The Bridge of the Ford’. The earliest bridge was constructed sometime after the mid-12th century, with the Anglo-Norman medieval walled town of Drogheda developing on the banks of the river. The Boyne Viaduct crosses the River Boyne 330m east of the Zone of Archaeological Potential for the historic town of Drogheda, Co. Louth (RMP LH024-041). The Delvin River forms the county boundary between Dublin and Meath on the south end of Gormanston Beach. Shell middens, a passage tomb cemetery, barrow and fulacht fiadh at Bremore townland suggest activity from the Mesolithic period to the Bronze Age in this area (RMP DU002-001001/2/3/4/5/6, DU002-013) as well as later activity in the form of field systems. According to Hartnett (1957)¹ the Bremore/Gormanston group of tombs represent the point of entry at a ‘natural landing point’ of the ‘Fourknocks Group’ and mark the western expansion of this culture along the Delvin River.

Balbriggan was a small fishing village until the 18th century, with the 1659 census showing only 30 inhabitants. It became more of an industrial centre in the 18th century, partly due to the development of the harbour in 1761. A historical assessment of an extensive area of open ground between Mill Street and George’s Hill indicated industrial activity from the late 18th century onwards (Swan 2000²; Licence 99E0727). The pier and cove at Balbriggan were important strategic locations on the coastline and this was one of a number of areas which was defended during the Napoleonic Wars of 1803-1815 with the construction of a Martello tower (RMP DU002-004). The Balbriggan Viaduct crosses the mouth of the Bracken River at Balbriggan Harbour where the site of a ford is indicated on the First Edition 6-inch Ordnance Survey map (1837).

¹ Excavation of a Passage Grave at Fourknocks, Co. Meath, P.J. Hartnett, Proceedings of the Royal Irish Academy: Archaeology, Culture, History, Literature (Vol. 58 (1956/1957), pp. 197 – 277.

² Swan, D.L., 2000, “Mill Street/George’s Hill, Balbriggan”, in Bennett, I. (ed.) Excavations 1999. Bray.

Rogerstown Estuary north of Donabate is where the wetlands and saltwater marsh are spanned by a viaduct. A large number of Mesolithic flint artefacts have been collected along the coast from Howth to Balbriggan and the estuary would have been ideal for Mesolithic hunting and gathering activities. Permanent settlement was established early in this landscape, with a Neolithic house having been identified in Rogerstown overlooking the estuary (SMR DU008-110; Licence 10E0121). Archaeological sites dating to the Bronze Age, early medieval period and the medieval period have been identified on both sides of this estuary, with a cluster of monuments occurring in Rogerstown c. 1km northeast of the railway and the viaduct.

The Dublin and Drogheda Railway began operating in 1844 and the branch line to Howth opened in 1846. The Fingal Industrial Heritage Survey (FIHS) does not include the railway line itself as an item of industrial heritage interest, though it does list the 19th century stations located along it (Balbriggan, Skerries, Rush and Lusk, Donabate, Malahide and Portmarnock. Both Balbriggan and Malahide stations were designed by George Papworth). The introduction of the railway attracted further development and visitors. Industrial features were constructed at this time to support the railway, including, for example, coke ovens on the west side of the Balbriggan viaduct to supply fuel and tramlines which linked the ovens to the quay and the railway.

Excavations and testing as a result of predevelopment investigations have revealed archaeological remains in close proximity to the railway line at Barnageeragh, Beaverstown and at Drumnigh townlands. An examination of aerial imagery has also revealed cropmarks adjacent to the railway line, for example at Colp East (Google Earth 2021), Ministown (Apple Maps 2018) and Effelstown (Fairey Survey of Ireland (FSI) 578/7 1972).

2.4.3 Summary of Issues for Further Consideration

There is potential for archaeological sites to be revealed in the vicinity of the railway as evidenced in the past with excavations discovering previously unknown buried remains. This will require resolution either by preservation in situ, preservation by design and/ or preservation by record.

The proposed lands for the railway development have been subjected to a number of disturbances during the construction of the railway and over the years. The railway is in cut, in fill on embankments and at grade from Dublin to Drogheda and passes through urban, sub-urban and rural coastal environments. While this is likely to have reduced the archaeological potential, nonetheless, it is possible that archaeologically enriched soils, features and deposits may survive subsurface as evidenced from recent findings.

There are several recorded archaeological sites or their zones of notification within the constraints area (50m on either side of the existing railway line) and these sites are described and listed below, from north to south.

Table 2-1: Recorded archaeological sites

RMP No & Irish Transverse Mercator (ITM)	Townland	Site Type	Distance	Description
LH024-061 709336 774486	Lagavooren	Ex-Misc	7.4m north of the existing track	Two pits cut into subsoil and an associated metallated surface were uncovered during archaeological monitoring of drainage works (Excavation Licence No. 00E0629). No finds were recovered from these features but a barbed and tanged arrowhead and a sherd of blackware pottery were found on the surface beside the pits (O' Brien 2002, 221-2 ³).
LH024-038 709404 774466	Lagavooren	Burial Ground	Adjacent to the south of the existing track.	Triangular shaped enclosed area marked 'Burial Gd' on the 1938 'OS 6-inch' map (map dims. 125m x 105m x 103m) with 'Calvery Cemetery' adjoining it to the E. Referred to as 'the pauper's graveyard' in the 1930's (IFC Schools' Mss 679, 338) ⁴ . Shown as 'Poor Law Union Burial Ground' on the 25 inch revised edition OS map.
LH024-039 709550 774703	Bryanstown	Mound	58m to the north of the existing track, however the zone of notification lies within the 50m buffer zone for the project.	Circular mound (max. diam. c. 35m, H. 4m) truncated to the N by a modern laneway and to the W by a paddock. The mound bears the popular title of 'Cromwell's Mount' and is traditionally the site of a Cromwellian artillery bastion (Buckley 1986). However, the site is shown as a cairn with external fosse on the 1835 ed. of the OS 6-inch map. Owing to its prominent position with extensive views over the River Boyne to the N,

³ O'Brien, R. 2002 Lagavooren, Drogheda. In I. Bennett (ed.), Excavations 2000: summary accounts of archaeological excavations in Ireland, 221-2, no. 660. Bray. Wordwell.

⁴ IFC Schools' MSS: Irish Folklore Commission Schools' Manuscripts. Department of Folklore. University College, Dublin.

RMP No & Irish Transverse Mercator (ITM)	Townland	Site Type	Distance	Description
				coupled with its unlikely strategic value as an artillery bastion, this site has been reclassified as either a barrow or a denuded passage grave.
ME020-043010 711911 774412	Colp West	Kiln	On the track	Excavation has revealed a corn drying kiln.
ME021-037 712722 773971	Colp East	Ringfort	82m south of the existing track, however the zone of notification is located within 50m of the project.	Located at the tip of a low W-E spur. The cropmark of a subcircular enclosure (dims c. 38m NW-SE; c. 32m NE-SW) defined by a single fosse (Wth c. 3m) is visible only on Google Earth (21/07/2021). It was first reported by Anthony Murphy.
ME021-032 715036 772569	Ministown	Enclosure	91m west of the existing track, however the zone of notification is located within 50m of the project.	Faint cropmark (visible on Apple maps only) of a subcircular enclosure (int. dims c. 40m E-W; c. 35m N-S) defined by a slight and uncertain fosse. The fosse has many interruptions but a gap (Wth c. 8m) at E could be an original entrance. It was first reported by Anthony Murphy.
ME028-064 716178 771070	Corballis	Holy Well	52m west of the existing track, however the zone of notification is located within 50m of the project.	A natural spring known as 'Colmcille's well' that runs out of a rocky crevice in the south bank of the river Nanny. The bank at this point is revetted by a stone masonry wall. There is evidence for veneration with coins placed in the hollow and it is reputed to cure sore eyes.
ME028-063 716985 769230	Irishtown	Holy Well	14m east of the existing track.	Located on the foreshore above high water mark and just E of the railway embankment. The well is dedicated to St. Patrick and had a pattern from Julianstown in the nineteenth

RMP No & Irish Transverse Mercator (ITM)	Townland	Site Type	Distance	Description
				century (Herity 2001) ⁵ until 1912 when the last one was held (French 2011) ⁶ . There is a folk tale that St Benignus was baptised by St. Patrick at this well and promptly died (IFC: vol. 685, 193, 262). The well is a natural spring (diam. c. 3m) with a surround of stone slabs and it is situated between two bushes, but there is no evidence of veneration.
DU002-003 720029 764469	Bremore	Mound	55m east of the existing track, however the zone of notification is located within 50m of the project.	Situated on a slight slope at the N bank of the river near cliff edge. Pedestrian access to beach runs by it to north, drainage ditch to south. Comprises an overgrown oval, flat-topped mound (basal diam.9m, top 3m E-W, 2.2m N-S, H 2.5m).
DU005-017002 722973 760908	Barnageeragh	Prehistoric flint scatter	Zone of notification traverses the existing railway line.	A large quantity of flint debitage with a low density of retouched pieces, found during a survey of seven fields in the Barnageeragh area in 1990. Preliminary analysis of the lithic material collected indicates a human presence from the Mesolithic to the Bronze Age period (Guinan 1992) ⁷ . As part of pre-development investigations, a fieldwalking study was undertaken in this field which contains cairn DU005-017001- towards its eastern limit. There was a relatively low lithic count from this field with

⁵ Herity, M. (ed.) 2001 Ordnance Survey Letters: Meath. Dublin. Four Masters Press

⁶ French, N. 2012 Meath Holy Wells. Meath Heritage Centre.

⁷ Guinan, B. 1992 Fieldwalking in Irish walking: a case study from North County Dublin. Trowel 3, 4-8.

RMP No & Irish Transverse Mercator (ITM)	Townland	Site Type	Distance	Description
				undiagnostic flint being recovered (Doyle, S. 2003) ⁸ .
DU005-017001 723036 760875	Barnageeragh	Mound	Zone of notification extends to the railway line to the north-east	Located on a prominent ridge above the beach at Barnageeragh and indicated as 'site of cairn' on 1837 OS 6-inch map. The corner of a field boundary running NE-SW incorporates portion of the mound (dims. L 10m NW-SE; Wth 3.5m N-S; H 1.3m). Probably quarried for stone during construction of railway between Dublin and Drogheda which runs by the site (Healy 1975) ⁹ . The poorly preserved cairn was subject to magnetometry, resistivity and ground-penetrating radar. Several pits were identified close to/inside the monument and a large anomalous feature was detected in the interior of the mound indicating the cairn is much better preserved than expected. Despite development in the vicinity the site remains unchanged. It is however not demarcated.
DU005-071 723230 760796	Barnageeragh	Enclosure	Zone of notification traverses the existing railway line.	Pre-development monitoring in 2004 revealed archaeological features which were excavated late in 2004 and early 2005 (04E0209Ext). This revealed a u-shaped enclosure (diam. c. 10m) which enclosed a single pit and was defined by three curvilinear ditches, pits, spreads and possible slot-trenches. The main body of ditch activity was

⁸ Doyle, S. 2003 Archaeological Survey & Fieldwalking Report, Barnageeragh Townland, Skerries. Unpublished report submitted to the National Monuments Service, Department of Arts, Heritage and the Gaeltacht

⁹ Healy, P. 1975 Second report on monuments and sites of archaeological interest in county Dublin. An Foras Forbartha Teoranta.

RMP No & Irish Transverse Mercator (ITM)	Townland	Site Type	Distance	Description
				radiocarbon dated to 660-860AD while the pit was dated to the Early Bronze Age (Baker, 2006) ¹⁰ .
DU005-058001/002 723211 760652	Barnageeragh / Baltrasna	Prehistoric flint scatter	Zone of notification is located to the south within the 50m buffer zone for the project	A large quantity of flint debitage with a low density of retouched pieces, found during a survey of seven fields in the Barnageeragh area in 1990. Preliminary analysis of the lithic material collected indicates a human presence from the Mesolithic to the Bronze Age period (Guinan 1992).
DU005-151 724650 759659	Townparks	Enclosure	43.1m west of the railway track and the zone of notification traverses the existing railway line.	Geophysical survey (Licence no. 06R0135) undertaken in advance of a proposed residential development, identified strong linear and curvilinear features which were interpreted as a network of ditches or structural remains. Test-excavation (Licence no. 06E0996) confirmed the presence of an enclosure ditch, evidence of in situ burning and extensive archaeological activity interpreted as probable multi-phase occupation (Turrell 2006, 28) ¹¹ . The site is located in a field to the west of the railway line.
DU008-011 723254 754322	Effelstown	Enclosure	64m west of railway, however the zone of notification is located within 50m	Located in level field immediately W of railway. Northern field boundary, well established hedge line is a townland boundary. An aerial photograph taken in 1972 (FSI 578/7) shows a circular cropmark of a

¹⁰ Baker, C. 2006 Archaeological and Excavation, Final report. Licence 04E0209Ext. Balbriggan-Skerries Waste Water Treatment Plant, Barnageeragh Co. Dublin. Unpublished report. National Monuments Service, Department of Arts, Heritage and the Gaeltacht

¹¹ Turrell, S. 2006 Pre-development Archaeological Test Trenching at Townparks, Skerries, Co. Dublin (Licence no. 06E0996). Unpublished report. National Monuments Service, Department of Arts, Heritage and the Gaeltacht.

RMP No & Irish Transverse Mercator (ITM)	Townland	Site Type	Distance	Description
			of the project.	levelled enclosure (diam c. 35m). Not visible at ground level.
DU012-083 722673 750145	Beaverstown	Ex – misc.	Adjacent to the west of the existing railway track and Donabate Railway Station	This site was excavated (Licence no. 04E0185) in advance of development. Characterised by a series of pits from which medieval pottery was recovered, the site was truncated by post-medieval activity including a curvilinear ditch from which a sherd of 17th century Frechen ware was recovered (Lohan 2002) ¹² .
DU012-067 722599 750048	Beaverstown	Enclosure	63.7m to the west of the carpark associated with the railway. Zone of notification within 50m of the project	An archaeological assessment in 2002 revealed a section of curvilinear ditch (L 15m, Wth 1.3m, D0.5-0.7m which produced Beaker pottery. Three features were revealed within the confines of the enclosure including a pit 0.4m in diameter and 0.2m deep which contained a small amount of burnt bone (Hagen, 2006) ¹³ .
DU012-023001/002 and 003 722537 746148 722529 746124 722537 746135	Malahide	Holy well/ Church and Earthwork	The zone of notification for these sites is located within 50m of the project.	St Sylvester's Church is located immediately to the east of the carpark associated Malahide Railway Station. Testing (Licence no.11E0326) on the site has uncovered medieval structural remains, a ditch, pits and 18 th 19 th masonry walls. There are no visible remains of the earthwork. The well is known as 'Sunday's Well and a plaque is inscribed St Sylvester's

¹² Lohan, K. 2004 Archaeological excavation Beaverstown, Donabate, Co. Dublin (Licence no. 04E0185). Unpublished report. National Monuments Service, Department of Arts, Heritage and the Gaeltacht.

¹³ Hagen, I. 2002, Final Report, Archaeological assessment, Portraine Graveyard. Licence 02E1451. Unpublished report submitted to the National Monuments Service, Department of Arts, Heritage and the Gaeltacht.

RMP No & Irish Transverse Mercator (ITM)	Townland	Site Type	Distance	Description
				well ca. AD 430, restored 2001.
DU015-004 722550 743969	Grange	Ringfort	The eastern edge of the zone of notification is located 33m from the railway works.	Situated on a low ridge in low-lying arable land. Named 'fort' on the 1837 OS 6-inch map and shown as a univallate circular enclosure (diam. c. 30m) with a central feature which may have been a house site.
DU015-005 722609 743742	Grange	Ringfort	Zone of notification located immediately west of the railway line.	Located under glasshouses west of Grange House with no visible remains.
DU015-119 722942 741874	Drumnigh	Ring-ditch	The site lies immediately adjacent to the west of the railway line.	A circular ring-ditch visible as a crop mark on an aerial photograph (SMR file; pers. comm. T. Condit). Geophysical survey (Licence no. 14R001) confirmed the presence of a ring ditch (c.12.5m diam.) as did subsequent test excavation (Licence no. (14E0007)). The site will be preserved in situ within green space of development.
DU015-117 722873 742008	Drumnigh	Enclosure	Zone of notification located immediately west of the railway line.	A large oval shaped enclosure visible as a crop mark on an aerial photograph (SMR file; pers. comm. T. Condit). Testing (Licence no. 14E0007) ¹⁴ confirmed the presence of a large enclosure (c.100m diam) ditch (2.5m wide x 1.1m deep). It is to be excavated in advance of development.

All recorded archaeological sites, their setting and visual amenity will be considered as cultural heritage constraints during the study and avoided where possible.

¹⁴ Walsh, F. 2014 Archaeological Assessment at Drumnigh, Co. Dublin (Licence no. 14E0007). Unpublished report submitted to the National Monuments Service, Department of Arts, Heritage and the Gaeltacht.

2.5 Architectural Heritage

2.5.1 Overview

The purpose of the architectural heritage section is to highlight the recorded features of architectural heritage interest within the constraints study area. This will allow the design team to make informed developmental and structural decisions based on available desktop architectural heritage information at this stage of the project.

2.5.2 Key Constraints

Where available, the key constraints for Architectural Heritage are presented in Annex 3.1 Appendix B – Constraints Mapping: Heritage Constraints.

Identified sensitive receptors identified for the purpose of this study are:

- Structures included in the Records of Protected Structures, in the Development Plans of Dublin City, Fingal, Meath and Louth County Councils;
- Architectural Conservation Areas included in the Development Plans of Dublin City, Fingal, Meath and Louth County Councils;
- Buildings included in the National Inventory of Architectural Heritage's Building Survey;
- Gardens included in the National Inventory of Architectural Heritage's Garden Survey;
- Designed Landscapes as identified with reference to aerial photographs, Ordnance Survey and historic mapping; and
- Other Structures of Built-Heritage Interest as identified with reference to aerial photographs, Ordnance Survey and historic mapping

The railway was built by the Dublin and Drogheda Railway (D&D Railway), and reached Drogheda from Dublin in 1844. The Howth Branch was completed by May 1847, with Howth Junction & Donaghmede Station opened on 30 October 1848. The D&D Railway eventually extended to link Dublin and Belfast, with the completion of the Boyne crossing in 1855, merging to form the Great Northern Railway of Ireland (GNR(I)) in 1876, which has been operated by Iarnród Éireann since 1987.

While some of the old line has been replaced over the years, the route has been in operation since the nineteenth century.

There are station buildings at Drogheda, Laytown, Gormanston, Balbriggan, Skerries, Rush and Lusk, Donabate, and Malahide, which are of significance for reasons including their architectural, artistic, technical, and industrial heritage interest. Structures of note within the station complexes include the station buildings, station master's houses, train sheds and warehouses, signal boxes and water towers. These features have various designations, with all included in one or more of the following inventories: NIAH, RPS and Industrial Heritage Records.

There are viaducts at Drogheda, Laytown, Gormanston, Balbriggan, Rogerstown and Malahide which are protected structures. The Boyne viaduct may be the most significant structure on the route in architectural and technical terms. It is 526m long, located to the north of Drogheda railway station. The structure is comprised of 18 spans, with a three-span lattice truss of 168.75 m total length and repeating masonry arches 20.8m long. The original structure was designed by Sir John McNeill, and opened in 1855. The three spans over the river were replaced in 1932, with iron trusses, designed by G.B. Howden. The Boyne Viaduct has a number of designations (NIAH, RPS and Industrial Heritage). Due to its impressive height, the bridge is described as an ‘awesome presence’ on the Drogheda skyline (NIAH 2021).

There are seven bridges along the railway line which are designated as protected structures. They are at Balbriggan, Tankardstown¹⁵, Skerries, Donabate, Kilcrea, Malahide and Clongriffin. In addition to these structures, there are other bridge structures and crossings, along the line which are of architectural interest but which are not included in any existing inventories.

The historic landscape character through which the railway traverses includes the historic towns and settlements of Drogheda, Laytown, Balbriggan, Donabate and Malahide, and all of these settlements feature buildings which are included in the NIAH and RPS. There are two designated Architectural Conservation Areas (ACAs) in the vicinity of Drogheda MacBride Station: at Ship Street, and at Railway Terrace, and the historic core of Malahide is also an ACA. There is an ACA in Laytown, encompassing Victoria Terrace, but it is remote from the railway line.

There are also historic landscapes and gardens which were established prior to the construction of the railway line. The most substantial and significant surviving landscapes are Ardgillan and Malahide Castle Demesnes which are also designated ACAs. Newbridge Demesne is another substantial historic landscape which is relatively intact, while Hampton Demesne has been diminished in modern times.

2.5.3 Summary of Issues for Further Consideration

In terms of the key constraints that require further consideration, the following architectural features have been identified as shown in the following table.

¹⁵ The description in the Fingal County Development Plan 2017 – 2023, Appendix 2 Report of Protected Structures notes the following: ‘Mid 19th century single-arch railway bridge over road (Possible error - appears that report relates to bridge already protected under RPS No. 12 but co-ordinates positioned on small pedestrian bridge)’

Table 2-2: Architectural Heritage Features

Description	Underbridge / Overbridge IE Reference	Protected Structure Reference	NIAH Building Survey Reference	Other References
Boyne Valley Viaduct	UBB82	LH DB 176, 184	NIAH 13620012	
Drogheda MacBride Station (Various buildings)		LH DB 195, 055, 396-9	NIAH 13902401-6	
Ship Street, Drogheda				Architectural Conservation Area
Railway Terrace, Drogheda				Architectural Conservation Area
Laytown Station			NIAH 14319001	
Laytown, Station Master's House		MH028-302	NIAH 14319001	
Laytown Viaduct	UBB72	MH028-303	NIAH 14402801	
Gormanstown Railway Station, Station Master's House and Warehouse			NIAH 14322016-8	
Gormanstown viaduct (Knocknaggan)	UBB65	MH028-114 FCC RPS 0001		
Railway Bridge off Drogheda Road (R132), Bremore, Balbriggan, Co. Dublin	UBB61	FCC RPS 0012	NIAH 11304001	
Railway Bridge, Bremore, Tankardstown, Balbriggan	UBB60	FCC RPS 0876		
Chimney of Former Sea Mills Hosiery Factory, Seabanks, Bath Road, Tankardstown		FCC RPS 0019	NIAH 11305008	
Marian House, Convent Lane, Balbriggan		FCC RPS 0028	NIAH 11305006	
Balbriggan Railway Station		FCC RPS 0030	NIAH 11305001	
Balbriggan Station Master's House		FCC RPS 0031	NIAH 11305002	
RNLI Lifeboat Station, Balbriggan		FCC RPS 0035	NIAH 11305020	

Description	Underbridge / Overbridge IE Reference	Protected Structure Reference	NIAH Building Survey Reference	Other References
Balbriggan Railway Viaduct	UBB56	FCC RPS 0036	NIAH 11305021	
Balbriggan Town Core				Architectural Conservation Area
Rectory Church Street, Balbriggan, Co. Dublin			NIAH 11305022	
St. George's Church Street, Balbriggan, Co. Dublin		FCC RPS 0052	NIAH 11305023	
Croom House Seapoint Lane, Balbriggan		FCC RPS 0053	NIAH 11305026	
Ardgillan Castle Demesne ACA		FCC RPS 0094 and 0881	NIAH 11310001	Architectural Conservation Area NIAH Garden Survey NIAH 2194
Balbriggan				Historic Landscape Characterisation
Railway Bridge Barnageeragh Road, Skerries		FCC RPS 0879 FCC RPS 0880		
Skerries Railway Station		FCC RPS 0191	NIAH 11311036	
Skerries, Station Master's House		FCC RPS 0192	NIAH 11311035	
Skerries Railway Bridge		FCC RPS 0231	NIAH 11311037	
Road Bridge L1285 Road, Ballykea, Loughshinny		FCC RPS 0246		
Road Bridge Tyrrelstown (OBB44)	OBB44	FCC RPS 292		
Rush and Lusk Railway Station and Signal Box		FCC RPS 288	NIAH 11323017-8	
Rush and Lusk Station Master's House			NIAH 11323016	
Rogerstown Lane Road Bridge (OBB38)	OBB38	FCC RPS 287		

Description	Underbridge / Overbridge IE Reference	Protected Structure Reference	NIAH Building Survey Reference	Other References
Rogerstown Rail Bridge	UBB37	FCC RPS 286		
Rogerstown Viaduct	UBB36	FCC RPS 0516		
Donabate Railway Station Signal Box			NIAH 11336011	
Donabate Station Master' House		FCC RPS 0510	NIAH 11336018	
Donabate Railway Station		FCC RPS 0511	NIAH 11336015	
Donabate Parish Hall and Cemetery		FCC RPS 0861	NIAH 11336016	
Donabate Railway Bridge (Bremore)	OBB33	FCC RPS 0876	NIAH 11336014	
Smyth's Public House, Hearse Road, Corballis, Donabate, Co. Dublin		FCC RPS 0509		
Newbridge House Demesne ACA encompassing Newbridge House, lodges and outbuildings Vickarage, St. Patrick's Church of Ireland Church		FCC RPS 0494 to 0495, 0506, 0507, 0508. 0862, 0863	NIAH 11329001, 11329002, 11329005, 11336001, 113360011, 11336013	Architectural Conservation Area NIAH Garden Survey NIAH 2193
Railway Bridge, Corballis Road, Kilcrea Townland	UBB32	FCC RPS 0502	NIAH 11336027	
Donabate				Historic Landscape Character Area
Malahide Viaduct	UBB30	FCC RPS 0420		
Malahide Railway Bridge (Bissetts Strand)		FCC RPS 0423	NIAH 11344015	
Malahide Station, Signal Box, Gates and Railings		FCC RPS 0388	NIAH 11344008-9 11344041	
Former Station Master's House, Malahide		FCC RPS 0387		
1 to 7 Castle Terrace, Dublin		FCC RPS 0391 to 0397		

Description	Underbridge / Overbridge IE Reference	Protected Structure Reference	NIAH Building Survey Reference	Other References
Road, Malahide, Co. Dublin				
Malahide Historic Core				Architectural Conservation Area
The Bawn & St Sylvester's Villas				Architectural Conservation Area
Malahide Castle demesne ACA containing Malahide Castle, Abbey and outbuildings		FCC RPS 0383 to 0384	NIAH 11344019 to 11344023	Architectural Conservation Area NIAH Garden Survey NIAH 2514
Beechwood House, Portmarnock, Co. Dublin				NIAH Garden Survey NIAH 2533
Portmarnock				Architectural Conservation Area
Clongriffin Rail Bridge (Mayne River)	UBB19	FCC RPS 0919		
Great Northern Railway {Dublin and Drogheda Railway}				DCIHR 15_10_001
DCIHR G.N.R. (Great Northern Railway – Howth Line)				DCIHR
Howth Junction & Donaghmede Station (demolished and re-built)				DCIHR 15_14_004
Former Signalman's House, Howth Junction		FCC RPS 0788		DCIHR 15_14_005

2.6 Noise & Vibration

2.6.1 Overview

The DART+ Coastal North project proposes to electrify the portion of the railway line between Malahide and Drogheda, as well as increase capacity along the entire corridor between Dublin and Drogheda. Electrification of the line will decrease the noise of each passing train; however, the increased frequency and speed of trains will likely result in an increase in overall noise and vibration levels.

The main constraints relating to noise and vibration generated from a railway line are sensitive receptors. Good design and maintenance of the rail corridor will minimise noise and vibration generated at sensitive receptors, and the potential for associated annoyance.

Sensitive receptors for noise are defined as:

- Residential dwellings, including houses and apartments;
- Hotels or hostels;
- Health buildings;
- Educational establishments;
- Places of worship or entertainment;
- Any other facility or area of high amenity for which its proper enjoyment requires the absence of noise at nuisance levels.

Sensitive receptors for vibration are defined as:

- Residential dwellings, including houses and apartments;
- Protected or heritage structures;
- Residential day care centres;
- Operating theatres;
- Premises with optical or electron microscopes, microbalances, lithography equipment or other vibration sensitive equipment;
- Data centres;
- Any other location in which inhabitants may be disturbed by vibrations from the nearby rail corridor.

Key sources of information with relation to noise and vibration include EPA Guidance Note for Noise¹⁶ (NG4), Dublin City Council Noise Action Plan (2018 – 2023)¹⁷, Noise Action Plan for Fingal County 2019 – 2023 (Draft)¹⁸, County Meath Noise Action Plan¹⁹, and the Louth County Council Noise Action Plan²⁰.

Information on key constraints has been compiled via desktop review at this stage. Detailed site visits along the railway corridor and proposed works areas will be scheduled as the project progresses.

¹⁶ Environmental Protection Agency Office of Environmental Enforcement (OEE), Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4), January 2016

¹⁷ Dublin Agglomeration environmental Noise Action Plan, December 2018 – July 2023 – Volume 1 – Dublin City Council, December 2018.

¹⁸ Draft for Public Consultation, Noise Action Plan for Fingal County 2019 – 2023, September 2018

¹⁹ County Meath Noise Action Plan 2019, Meath County Council

²⁰ Louth County Council Noise Action Plan 2018 – 2023

2.6.1.1 Strategic Environmental Noise Mapping: Major Sources

The Environmental Noise Directive (END) (2002/29/EC) sets out the obligation of member states to assess and manage environmental noise and is the main EU instrument to identify noise pollution levels. The Directive mandates that Member States must prepare and publish noise maps and noise management action plans every 5 years. Strategic noise maps have been produced by Iarnród Éireann (Irish Rail) for:

- Major heavy rail (more than 30,000 vehicle passages per annum) within and outside the Dublin Agglomeration Area;
- All rail (irrespective of the number of vehicle passages per annum) within the Dublin Agglomeration Area.

Three rounds of strategic noise mapping have taken place – for base years 2006, 2011, and 2016. The Round 3 mapped contours for areas that are part of the proposed DART+ Coastal North project are presented in Appendix C.

2.6.2 Key Constraints

Where available, the key constraints for Noise are presented in Annex 3.1 Appendix C – Constraints Mapping: Noise Constraints.

Noise and vibration sensitive receptors within the study area are residential dwellings, commercial premises, and community facilities near the DART+ Coastal North railway corridor.

The following items are key constraints at this stage:

- Proximity of sensitive receptors to the rail corridor, especially residential receptors;
- Additional noise and vibration from increased frequency of trains, although this will be partially mitigated by reducing noise by changing from diesel to electric engines;
- Construction noise and vibration where new infrastructure must be built for the railway line adjacent to sensitive receptors.

2.6.3 Summary of Issues for Further Consideration

As well as the key sensitive receptors and constraints referenced above, which will all be subject to further consideration, there are a number of other issues which will also be further examined. This includes sensitive properties such as cultural heritage sites, buildings, monuments, and bridges, as well as other potentially sensitive fauna, for example waterbirds or otters. This may include birds associated with EU and nationally designated sites.

2.7 Air Quality & Climate

2.7.1 Overview

The purpose of the air quality and climate section is to highlight the sensitive receptors and key constraints from an air quality and climate perspective within the constraints study area. This will allow the design team to make informed developmental and structural decisions based on available desktop air quality and climate information at this stage of the project.

The Air Quality Standards Regulations (2011) defines four air quality zones for Ireland, as follows:

- Zone A: Dublin;
- Zone B: Cork;
- Zone C: Other cities and large towns comprising Limerick, Galway, Waterford, Drogheda, Dundalk, Bray, Navan, Ennis, Tralee, Kilkenny, Carlow, Naas, Sligo, Newbridge, Mullingar, Wexford, Letterkenny, Athlone, Celbridge, Clonmel, Balbriggan, Greystones, Leixlip and Portlaoise; and
- Zone D: Rural Ireland i.e. the remainder of the State excluding Zones A, B and C.

The proposed scheme is situated within Zone A – Dublin, and Zone C – Drogheda and Zone D, rural Ireland. The Climate Action Plan 2021 proposes to support modal shift through the implementation of major sustainable-mobility projects such as DART+ Coastal North. The Plan supports the Climate Action and Low Carbon Development Act 2021 as amended *to reduce the extent of further global warming, pursue and achieve, by no later than the end of the year 2050, the transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy.*

2.7.2 Key Constraints

The main sources of pollution in the study area relate to roads traffic, railway traffic, industrial sources and dust from construction / agriculture. Elevated concentrations of nitrogen dioxide have been recorded in heavily trafficked areas of Dublin City Centre in 2019^[1].

Sensitive receptors are defined in the TII Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes as residential housing, schools, hospitals, places of worship, sports centres and shopping areas, i.e. locations where members of the public are likely to be regularly present.

^[1] [Microsoft Word - Air Quality In Ireland 2019 \(epa.ie\)](https://www.epa.ie/publications/microsof-word-air-quality-in-ireland-2019)

Sensitive receptors are present throughout the study area but mainly focussed in the following areas:

- Dublin City Centre and suburbs;
- Malahide;
- Donabate;
- Skerries;
- Balbriggan;
- Laytown;
- Drogheda.

The proposed development will support the aims of the Climate Action Plan. However, a key constraint in the development of the proposed scheme is to ensure the following:

- the use of construction materials with low embodied carbon;
- the reduction of road traffic due to modal shift.

2.7.3 Summary of Issues for Further Consideration

Elevated concentrations of nitrogen dioxide measured in Dublin City Centre in 2019 were due to traffic congestion. The proposed scheme can reduce traffic congestion through encouraging a modal shift away from private car.

This modal shift will also have the effect of reducing carbon emissions, in line with the Climate Action Plan. The selection of low carbon construction materials should be considered as well as the reuse of existing infrastructure, where possible. This will have the effect of minimising carbon emissions during the construction phase.

2.8 Material Assets

2.8.1 Overview

The DART+ Coastal North project is located between Dublin City Centre and Drogheda MacBride Station. It passes through urban, sub-urban and coastal areas along its route, including several town and village centres.

A desk-based assessment of key constraints has been carried out to date. The section considers material assets primarily in respect of agricultural land and utilities.

2.8.1.1 Material Assets - Agriculture

The proposed DART+ Coastal North development for the most part, will be within existing IÉ property and therefore, there are unlikely to be significant constraints from the point of view of agriculture. Therefore, the magnitude of potential impacts on agriculture as a result of the proposed development, including land-take,

increased frequency of service, etc, is expected to be low. Where access to separated land is modified the potential impacts are higher.

The following sources of information informed the constraints study:

- Data from the Central Statistics Office
 - The 2010 Census of Agriculture²¹. The Agricultural Census in 2010 publication is the only available source of data which gives the number of farms for each farm enterprise at a county level. The county data is used as an indicator of the size of farms within the study area;
- Google²² aerial maps were used to identify yards, farm facilities, forestry, scrub and rough boggy land;
- The Property Registration Authority of Ireland (PRAI)²³ open database was used to identify folio land parcels.

2.8.1.2 Material Assets – Non-Agricultural

Some of the material assets constraints, such as water resources, soils and geology are covered in other sections of this Report and in the constraints mapping included in the appendices. These aspects are not covered herein.

There is also considerable utilities infrastructure present within the overall study area. Key sources of information for this utilities infrastructure, includes ESB, GNI, the EPA, Health and Safety Authority (HSA) as well as relevant local authorities.

2.8.2 Key Constraints

Some of the key constraints for Material Assets are presented in Annex 3.1, as follows:

Appendix D – Constraints Mapping: Utilities and Licenced Facilities

Appendix F – Constraints Mapping: Land Use (Zoning) Constraints

Appendix N – Constraints Mapping: Water Services.

2.8.2.1 Agricultural land adjoining the railway line between Dublin City Centre and Drogheda MacBride Station

Aerial imagery was examined to describe agriculture along the DART line. Between Dublin City Centre and Drogheda MacBride Station the railway line crosses through Counties Dublin, Meath and Louth for approx. 50.5km. The

²¹ Central Statistics Office (December 2012), Census of Agriculture 2010 – Final Results. Available from:

<https://www.cso.ie/en/media/csoie/releasespublications/documents/agriculture/2010/full2010.pdf> [Accessed on 04/08/2021]

²² Google Aerial Mapping (2020). Available from: <https://www.google.com/maps> [Accessed June - August 2021]

²³Property Registration Authority (2019). Available from <https://www.landdirect.ie/index>. [Accessed in June - August 2021]

majority of the land adjoining the railway line is non-agricultural. For the first 21km (from the city centre northwards), to the north of Rogerstown Estuary, the land use is predominantly urban, golf courses, landfill site and estuary with only 3.25km of the line crossing through agricultural land. Further north the land use includes urban development in Skerries, Balbriggan, Laytown and Drogheda. There is a golf course in Skerries and a military barrack in Gormanston. In addition to short lengths of woodland and scrub dominated land along the entire length of the railway line, there are strips of land along the coast between Skerries and Laytown which are non-agricultural.

Along the entire length between Dublin City Centre and Drogheda MacBride Station approximately 40% of the land at each side of the railway is agricultural. The cropping is 53% arable, 35% grass and 3% horticulture. This is in contrast to the statistics for Counties Dublin, Meath and Louth as presented in , where 77% are grass based enterprises (dairy, beef, sheep, mixed livestock and grass forage cropping), 21% are tillage farms or mixed livestock and tillage, and 2% are other farms (including equine and horticulture). When compared to the state, tillage is much more prevalent in the three counties. It is likely that it is more prevalent again along the Northern line where proximity to large urban centres and a dry climate may favour arable cropping rather than grassland-based enterprises. The average farm size is significantly larger than the state average.

Table 2-3: Enterprise Types (CSO 2010, Agricultural Census, Table 2)

Farm enterprise type	% of farms within each category				
	Dublin	Meath	Louth	Average (3 counties)	State
Mainly dairy	4	10	8	7	11
Non - dairy grazing livestock (beef cattle), sheep, mixed livestock grass forage cropping.	65	79	67	70	72.5
Mainly tillage	25	8	17	17	3.5
Mixed crops & livestock	3	2	6	4	2
Other	3	1	2	2	1
Total	100	100	100	100	100
Average size (ha) (Table 1 of 2010 Census)	47.6	42	36.4	42	32.7

High sensitivity farm enterprises include dairy farms, equine / stud farms and horticultural farms. Tillage, beef, sheep and grass forage cropping farms are medium sensitivity. Therefore, the majority of agriculture along the Northern Line is medium sensitivity. Notable high sensitivity enterprises include:

- Whitepark Nurseries, Raheny, Lusk, Co Dublin (east of the railway line) is a horticultural site with a large glasshouse complex;
- There is a large glasshouse and polytunnel site west of the railway in Hayestown, Lusk, Co Dublin;

- Racehorse training enterprise east of the railway line at Hayestown, Lusk, Co Dublin;
- Horticultural enterprise at Bremore, Co Dublin;
- Batray Cottage Stables equine enterprise west of the railway at Gormanston, Co Meath;
- Fruit tree farm in Stagrennan, Co Louth

Of particular interest, from an agricultural point of view, in respect of the proposed DART+ Coastal North project are the following areas within the study area:

1. Howth Junction & Donaghmede Station is located in non-agricultural land;
2. Clongriffin Station is located in non-agricultural land;
3. The proposed turn back at Malahide Station is located in non-agricultural land;
4. The level crossing north of Malahide Estuary is located in agricultural land. There is a beef and tillage enterprise located at the crossing. The setting is medium sensitivity. The agricultural environment adjoining the crossing is medium sensitivity; and
5. Drogheda MacBride Station. The northern boundary of the station is bordered by a pitch and putt field, a grass field and two tillage fields. Overall the agricultural environment adjoining the station is medium sensitivity.
6. To progress the scheme, there will be a requirement for a number of substations at various points along the railway line, as well as the possible requirement for bridge re-alignments/re-construction in key areas.

2.8.2.2 Material Assets – Non-Agricultural

Key utility constraints within the study area are shown on the constraints maps in Appendix D and Appendix N. These include the medium and high voltage electricity network, existing potable water, surface water and foul sewer infrastructure and the gas transmission and distribution network in the vicinity of the study area (including any relevant interconnector infrastructure). While not shown on the constraints mapping herein, telecommunications infrastructure is also considered a constraint which will need to be considered as part of the proposed scheme.

More detailed information showing these utilities is available to the design team.

EPA licensed sites (waste and IED facilities) are also shown on the constraints maps in Appendix D.

There is one licensed waste facility within 1 km of the study area, being Milverton Waste Recovery Facility, in Skerries (licence reference W0272-01).

There are a number of IED/IPC licensed facilities within 1 km of the study area. One of these licences, for Irish Building Chemicals, in Baldoyle Industrial Estate (licence reference P0231-01) is now surrendered, as noted on the EPA website.

There are two other IED licensed facilities, being:

- Glanbia Foods Society Limited, Drogheda, licence reference P0799-01;
- Newport Synthesis Ltd, Baldoyle Industrial Estate, licence reference P0097-01.

Seveso sites are also shown on the constraints maps (Population) in Appendix E.

There is one upper tier Seveso site in the vicinity of the study area, the Flogas Facility, at Marsh Road, Stagreenan, in Drogheda.

2.8.3 Summary of Issues for Further Consideration

The constraints study involved an aerial photography assessment of land use adjoining the railway line. The majority (approximately 60%) of the line between Dublin City Centre and Drogheda MacBride Station is non-agricultural and the predominant enterprise along the railway line is arable/tillage (53%). Overall, the agricultural environment along the railway line is medium sensitivity, however four high sensitivity horticultural enterprises and two high sensitivity equine enterprises were noted along the railway line. There are no high sensitivity enterprises at the five key areas assessed where DART+ Coastal North developments are proposed.

There is a need to consult with the HSA with regard to any development in the vicinity of Seveso sites and to take account of the relevant consultation distances. Further consultation will also be undertaken with relevant utilities providers in respect of any interactions with utilities infrastructure.

2.9 Population and Human Health

2.9.1 Overview

The proposed development will provide for improved accessibility to employment, community and social infrastructure, and friends and family from a catchment extending from Dublin, through Fingal and into County Meath and County Louth. It will potentially open up new areas to changes in land use subject to local spatial planning policy and zoning. When operational, the development will permit an increased frequency of train services, but during the construction phase there could be environmental effects which could impact on people living or working locally or on businesses and community facilities.

2.9.2 Key Constraints

Where available, the key constraints for Population are presented in Annex 3.1 Appendix E – Constraints Mapping: Population Constraints.

The population assessment is based on five criteria of journey characteristics, journey amenity, general amenity and community facilities, community severance and economic. The assessment of these same criteria can inform the Project Appraisal Guidelines (PAG) criteria of social inclusion and accessibility, active travel and transport integration. The presence of roads, cycleways or footpaths can present a constraint if there is a possibility of impacts on journey characteristics such as journey time, for example where bridges are affected or diversions are necessary during construction. These types of impacts can, in turn, affect journey amenity or the pleasantness of journeys, for example due to traffic congestion or proximity to construction vehicles, or create community severance where access to community facilities can be impeded temporarily or permanently. Community facilities are themselves a constraint as their use may be impacted by severance or by environmental effects such as noise. Environmental effects or land take can also impact on local businesses, and therefore employment, even though the proposed development as a whole will have positive economic and social effects.

For the purposes of the population assessment, constraints are represented by:

- Towns, villages and other residential areas;
- Schools and colleges;
- Religious facilities, including cemeteries;
- Health facilities and nursing homes;
- Sports facilities, including golf courses;
- Other local community facilities such as community centres, meeting places, creches or playgrounds;
- Sites used for recreation and amenity, including greenways;
- Tourism, including beaches, hotels, museums and other attractions;
- Retail facilities;
- Private businesses;
- Bridges, level crossings and road access.

Residential development

The proposed development passes through the Dublin suburbs of Fairview, Killester, Raheny, Baldoyle and Clongriffin. Other towns and communities include Old Portmarnock, Malahide, Donabate, Skerries, Balbriggan, Laytown and Grangerath in Drogheda. Individual houses and clusters of residential properties are also found along the railway line at various locations.

Nearby residential properties present a constraint because occupants can be impacted by noise, air quality effects or visual intrusion. These specific impacts are addressed by the relevant specialisms, but there is a need to be conscious of the community dimension where, for example, residential developments may be high density, such as apartments, or occupied by vulnerable population subsets, including people working nights.

Community facilities

The use of community facilities varies in its sensitivity to environmental effects such as noise or lighting, for which most impacts can be expected during the proposed construction works. For example, churches or other religious buildings, nursing homes, healthcare facilities, public parks, greenways or amenity green space would be sensitive to these environmental effects. Some sports facilities such as golf courses or equestrian facilities could be sensitive to noise or powerful lighting. Similarly, hotels and other accommodation such as guest houses and Bed & Breakfasts, while private, also have a community dimension and would be sensitive to environmental effects. Likewise, some other types of private business would be sensitive to environmental effects.

Recreation facilities and amenity destinations can be subject to environmental effects which would impact on the amenity of users. Although this use might be

relatively short-term compared with the needs of local residents, such sites could be visited by large numbers of people and also have a tourism or economic dimension.

Bridges

Some bridges and level crossings would require temporary construction works of varying scale. Temporary closures would have a severance effect on local accessibility and connectivity and could require formal or informal detours, and consequently lengthier journey times, to destinations such as workplaces or community facilities. Pedestrian, cycle and public transport access could be affected as well as journeys by car or commercial vehicles. A few bridges permit access to community facilities such as the motorcross track on Cock Lane in Gormanston, or to beaches for example at Gormanston, Balbriggan or Laytown. There are also a few footbridges too in Dublin and at Argillian (Ladies Stairs), while the railway bridge at Balbriggan doubles as a footbridge.

2.9.2.1 Planning Applications

A planning applications monitor has been established to track live planning applications within the study area within Appendix G – Planning Application Monitor. A review of all planning applications submitted within the last 5 years of September 2021 within 200m from the DART+ Coastal North project centreline has been undertaken. Maps showing the locations of relevant planning applications within the study area (Planning Application Monitor) are provided in Appendix G of this report. A spreadsheet listing all applications and relevant details is included within Appendix P of this report (the Planning Application Monitor is a live document and is current to September 2021). It is noted that this is a live register, and the enclosed information represents a point in time and will evolve as the project progresses.

The search of national planning applications found 1,091 approved cases in the study area. The vast majority of applications in the area are for minor works (e.g. housing extensions). An investigation into other planning application types, such as Strategic Infrastructure Developments (SIDs), Strategic Housing Developments (SHDs) and Local Authority Applications (Part 8s), identified just over 30 further proposals of significance.

Developments of note are as follows:

- ABP-305110-19: SHD for 450. no residential units (81 no. houses and 369 no. apartments), creche and associated site works. Located on Marsh Road, Drogheda – directly north east of Drogheda MacBride Station, with pedestrian/cyclist access on the south over the railway tracks via Railway Terrace.
- ABP-307652-20: SID for Boyne Greenway, a pedestrian and cycleway linking Drogheda Town to Mornington Village, passing under railway line at Boyne Viaduct on Marsh Road.
- ABP-306794-20: SHD for 144 no. apartments and associated site works. Located on lands off Turvey Avenue, west of Donabate Train Station.

- ABP-311059-21: SHD for 1,365 no. units (346 no. houses, 1,019 no. apartments), creche and associated site works. Located at Corballis East, south east of Donabate Train Station.
- ABP-304624-19: Section 177AE application for Greenway between Malahide Demesne and Newbridge Demesne to be known as 'Broadmeadow Way'. Located adjacent to and crosses over railway line.
- ABP-311315-21: SID for Park development project at Racecourse Park between Baldoyle and Portmarnock, including repair to existing railway underpass north of Clongriffin Station.
- ABP-305316-19: SHD for 1,030 no. apartments (352 no. residential, 678 no. Build to Rent units), 2 no. creches, 10 no. retail units and all associated site works. Located north and south of Main Street, Clongriffin – northwest of Clongriffin Station.
- ABP-311016-21: SHD for 1221 no. apartments, creche and associated site works. Located at Baldoyle and Strapolin, adjacent to area formerly known as 'The Coast' – directly east of Clongriffin Station.
- ABP-310418-21: SHD for 882 no. residential units and 3,314 sq.m of non-residential space (commercial, restaurants, play areas, storage units). Located on lands formerly known as The Coast, Baldoyle – directly south east of Clongriffin Station.
- ABP-306102-19: SHD for 512 no. apartments, childcare facility and associated site works. Located at former Techrete site, Howth Road – west of Howth Station, adjacent to railway line.
- PartXI/004/19: Local Authority Part 8 Application for pedestrian/cycle overbridge, south of Donabate Train Station.
- PartXI/006/20: Local Authority Part 8 Application for a 15 ha Sports and Recreational hub at Bremore Regional Park. Located adjacent to and crosses over railway line north of Balbriggan Train Station.

The national planning applications have been plotted using available data from data.gov.ie. Some data for applications relating to SIDs, SHDs and Local Authority developments have been obtained from the Local Authorities and An Bord Pleanála, however it must be noted that the available digital data is incomplete and therefore missing some specific proposals. The planning application monitor will continue to be updated throughout the planning of the project, and additional data will be mapped as it becomes available.

2.9.2.2 Listed constraints

The following list is not intended to be exhaustive but lists the main constraints along the Drogheda to Dublin railway line. Some key constraints, with regard to sensitivity of use or their proximity to the railway line, are identified by an asterisk.

Educational facilities

- Loreto Secondary School*;
- St Michael's House Special School*;
- Malahide Community School;
- Colaiste Dhulaigh Kilbarrack;
- College of Further Education*, Killester;
- Howth Road National School*, Killester;
- DDLETB Training Centre, Baldoyle;
- Small World Montessori, Raheny.

Religious facilities

- St. George's Church*, Balbriggan;
- Malahide Parish Pastoral Centre;
- Our Lady Mother of God Church, Raheny;
- St Brigids Church, Killester.

Health facilities

- Ballykea Osteopath Services;
- West Wood Club gym.

Sports facilities

- Laytown GAA, Laytown United FC, Laytown Pitch & Putt, Sunshine House Playing Fields Balbriggan;
- O'Dwyers GAA, Balbriggan FC;
- Sylvesters GAA;
- Hadden Park United FC;
- Mountemple School pitches;
- All Weather pitches, Fairview;
- Skerries Golf Club;
- Beaverstown Golf Club;
- Malahide Golf Club;
- Clontarf Golf Club.

Other community facilities and services

- Trinity Care Nursing Home*;
- Mosney Direct Provision facility;
- Balbriggan Bridge & bridge pathway*;
- Skerries Fire Station;
- Malahide Marina;
- Tasnuva Foundation and mosque, Clongriffin

Amenities and recreational facilities

- Gormanston Beach, Delvin Bridge Beach, Laytown Beach, Balbriggan beach and harbour;
- Bremore Castle;
- Rogerstown Park and estuary bridge*;
- Broadmeadow Greenway* and bridge across Malahide Estuary (environmental effects and possible temporary severance);
- Portmarnock Raceway;
- Malahide Casino and museum;
- Malahide Castle Demesne;
- Fairview Park*

Hotels and other accommodation

- Boyne Valley Hotel and County Club*, Drogheda.

Businesses

- Flower Power Garden Centre, Barnageeragh;
- Floatation Therapy Centre, Malahide.

Key business areas which may be affected by the proposed DART+ Coastal North project include those in the following locations. Note this is not intended to be an exhaustive list but rather to identify business areas in close proximity to the proposed scheme that may benefit / be impacted by the scheme, including businesses in:

- Drogheda;
- Laytown;
- Balbriggan;
- Skerries;
- Donabate;

- Malahide;
- Clongriffin;
- Howth;
- Baldoyle;
- Fairview.

2.9.2.3 Constraints specific to Irish Rail Infrastructure

Other constraints are those present at Irish Rail stations, for example where passengers need to cross platforms or reach distant platforms. Consideration should be given to the distance and signage or spatial legibility by which passengers can purchase a ticket, pass through barriers and locate and board their train. In particular, consideration must be given to the needs of people with disabilities by providing at-grade connections at minimal distance where possible, or ramp or lift facilities which are easy to access and use. Consideration should also be given to the safety and mobility of passengers who are visually or hearing impaired, to more elderly passengers, and parents with children.

Any works proposed at stations as part of the proposed scheme, will need to consider access by pedestrians, public transport users, cyclists and car drivers, including especially drivers who are more elderly, are accompanied by young children or who may have disabilities.

2.9.3 Summary of Issues for Further Consideration

For the most part, impacts on population are likely to be contained within the rail corridor. However, impacts could arise from bridge closures or diversions during construction which could affect access to workplaces and community facilities. Impacts on communities, or community facilities, could also occur directly from any land take that is deemed necessary or from environmental effects such as noise, vibration, lighting and visual intrusion, or air quality. The sensitivity of community facilities depends on their use, including the nature and level of use, and the sensitivity of users. Potential key constraints have been identified which include several schools and colleges, a church, a nursing home, a walkway, future planned greenways including Broadmeadow, Fingal Way and Sutton to Malahide Pedestrian and Cycle scheme, as well as parks and a hotel.

2.10 Land and Soils

2.10.1 Overview

This constraints study was undertaken to identify the key constraints from available published information, which need to be considered further as the project progresses. The following sources were studied in order to identify soils and geological constraints.

- Ordnance Survey Ireland (OSI) – Historic and recent topographical and geographic maps, orthophotos and datasets;

- Geological Survey Ireland (GSI) - Geological Mapping and publications including soils, subsoils bedrock geology, active quarries, geological heritage sites, mineral localities, landslides and economic geology mapping; and
- Environmental Protection Agency (EPA) – Licensed Waste Facilities and IPPC Sites

The main constraints relating to soils and geology as a result of the proposed project relate to the following soils and geology sensitive receptors:

- Soils: well drained of agricultural value, wetland areas or those potentially requiring excavation and disposal for construction activities;
- Soil stability;
- Geological Heritage Areas (County Geological Sites and those recommended for Geological National Heritage Areas (NHA));
- Contaminated sites and unsuitable material (landfills, dumping sites, burial grounds, existing and historic pits and quarries, industrial facilities, and historic land use contamination);
- Existing quarries and pits; and
- Economic Geology (Economically viable or extractable mineral resources).

2.10.2 Key Constraints

Where available, the key constraints for Land and Soils are presented in Annex 3.1 Appendix H – Constraints Mapping: Geology Constraints.

The landcover for the study area includes artificial, recreational and urban fabric in urban and developed areas and along the railway corridor with agricultural areas in between. While there is limited historic ground investigation information along the proposed project corridor, it is anticipated that the overburden stratigraphy is comprised of up to 5m depth of made ground in urban areas.

The subsoils along the proposed development are comprised of recent fine and coarse grained alluvial, peatland estuarine and marine sediments associated with the rivers, estuaries and marine locations. These overlie or are adjacent to Quaternary glacial deposits derived from the underlying bedrock with widespread glacial tills including Irish Sea till adjacent to the coast.

The underlying bedrock is variable and dominated by Carboniferous limestones and calcareous shales with older Silurian deep marine sediments (mudstones, greywacke and conglomerates) indicated along the route from Skerries to Laytown and volcanic Ordovician basalt (andesite, tuff, slate & mudstone) expected in the area around Balbriggan.

Soil stability

The GSI landslide susceptibility mapping has classified the area as being of low susceptibility to landslides. However, there is a potential for soft and unstable soils associated with waterbodies and the estuary crossings at Malahide and Rogerstown.

Geological Heritage Areas

Table 2-4 indicates the Geological Heritage Areas along the proposed development.

Table 2-4: Geological Heritage Areas

GHA	Site Code	Designation	Description	Geological	Distance from railway (m)
Laytown to Gormanston	MH008	CGS	Coastal plain, including sea cliffs	Flat to gently undulating glacial outwash plain of sandur gravels	0
Milverton Quarry	D015	CGS*	Working Quarry	Exposed faces of Lower Carboniferous limestone and shale displaying karst weathering features (pipes and caves)	115
Fancourt Shore	DF002	CGS*	Coastal cliffs and foreshore	Coastal exposures of near complete Silurian succession (slates, sandstones and volcanics) dated by its graptolite fossils	150
Ardgillan House Boulder	DF008	CGS	Single large boulder on access path to Ardgillan house	A boulder composed of Ordovician pillow lavas, displaying concentric cooling structures	435
Malahide Point	DF020	CGS*	Dunes and a sand/shingle beach	A large dune system and beach formed by a long sand and shingle spit	500
Curkeen Hill Quarry	DF004	CGS*	Disused quarry used as landfill site	Exposed face of Lower Carboniferous mudbank limestone composed largely of diverse shelly fauna	585

GHA	Site Code	Designation	Description	Geological	Distance from railway (m)
North Bull Island	DC007	CGS	This site comprises sand flats and associated beach, dune, lagoon and slack features	The island itself is a very recent result of human intervention in the bay in the last 200 years	1600

*recommended for Geological NHA

Contaminated Land and Existing quarries and pits

Potential sources of contamination within the study area have been investigated and identified ranging from historic heavy industries, such as gas works and linen factories in urban areas, to a number of historical quarries, pits and brickworks on and along the proposed route. There are numerous light industries within the study area which are not considered to be a significant constraint for soils and geology. The railway itself poses a potential source for contaminated land.

Landfills of interest along the proposed project area include the remediated Balleally Landfill now Rogerstown Park and Milverton Waste Recovery Facility to the south of Skerries Station.

Economic Geology

The nearest active quarries in the area are Feltrim Quarry in Swords and Greenhills Pit in Gormanston. The crushed rock aggregate potential for the project area ranges from Very Low to Low for the majority of the area with increasing potential to the north and pockets of high potential around Skerries and Malahide. The granular aggregate potential in the area is limited to superficial deposits associated with waterbodies, estuaries, marine sediments and old glacial valleys and is quite variable. There are several licences held for prospecting within the study area, but these are generally reporting uneconomically extractable mineral resources.

2.10.3 Summary of Issues for Further Consideration

The key constraints in terms of land and soils at this stage of the project includes the removal of soils and subsoils and the generation of earthworks material which may include contaminated land unsuitable for direct reuse within the proposed development.

Understanding the expected ground conditions along the proposed route through ground investigations and further assessment will be necessary to mitigate against design or construction risks and potential impacts on existing earthworks or structures and interactions with sensitive receptors and designated sites.

2.11 Water Resources

2.11.1 Overview

Water resources within the study area are described below under the headings of:

- Surface water bodies;
- Groundwater;
- Flooding.

2.11.1.1 Surface water bodies

The DART+ Coastal North route extends through 16 river sub-basins. The river sub-basins and their status from Dublin city centre to Drogheda are summarised in **Table 2-5**.

Table 2-5: River sub-basins

River sub-basin	WFD code	River Waterbody WFD Status 2013-2018	WFD Risk
Liffey_190	IE_EA_09L012360	Moderate	At Risk
Tolka_060	IE_EA_09T011150	Unassigned	At Risk
Santry_020	IE_EA_09S011100	Unassigned	At Risk
Mayne_010	IE_EA_09M030500	Poor	At Risk
Sluice_010	IE_EA_09S071100	Unassigned	Review
Gaybrook_010	IE_EA_08G080700	Unassigned	Review
Turvey_010	E_EA_08T020700	Unassigned	At Risk
Ballyboghil_010	IE_EA_08B012200	Poor	At Risk
Palmerstown_010	IE_EA_08P030930	Unassigned	At Risk
Balcunnin_010	IE_EA_08B310940	Unassigned	Review
Mill Stream (Skerries)_010	IE_EA_08M030500	Unassigned	At Risk
Matt_010	IE_EA_08M010900	Unassigned	At Risk
Delvin_040	IE_EA_08D010400	Poor	At Risk
Mosney_010	IE_EA_08M020100	Poor	At Risk
Nanny (Meath)_050	IE_EA_08N010700	Poor	At Risk
Betaghstown_010	IE_EA_08B330980	Unassigned	Review
Stagrennan_010	IE_EA_07S320550	Unassigned	Review

Downstream of the river sub-basins there are seven transitional and five Coastal waterbodies. A summary of the transitional and coastal waterbodies is provided in **Table 2-6**.

Table 2-6: Transitional and coastal waterbodies

Waterbody type	Waterbody	WFD code	River Waterbody WFD Status 2013-2018	WFD Risk
Transitional	Liffey Estuary Lower	IE_EA_090_0300	Good	Review
Transitional	Tolka Estuary	IE_EA_090_0200	Moderate	At Risk
Transitional	North Bull Island	IE_EA_090_0100	Unassigned	Review
Coastal	Dublin Bay	IE_EA_090_0000	Good	Not at Risk
Transitional	Mayne Estuary	IE_EA_080_0100	Unassigned	Review
Coastal	Irish Sea Dublin (HA 09)	IE_EA_070_0000	Good	Not at Risk
Transitional	Broadmeadow Water	IE_EA_060_0100	Poor	At Risk
Coastal	Malahide Bay	IE_EA_060_0000	Moderate	At Risk
Transitional	Rogerstown Estuary	IE_EA_050_0100	Bad	At Risk
Coastal	Northwestern Irish Sea (HA 08)	IE_EA_020_0000	High	Not at Risk
Transitional	Nanny Estuary	IE_EA_080_0100	Unassigned	Review
Transitional	Boyne Estuary	IE_EA_010_0100	Moderate	At Risk
Coastal	Boyne Estuary Plume Zone	IE_EA_010_0000	Moderate	At Risk

A number of the transitional and coastal waterbodies are protected habitats including North Dublin Bay SAC and NHA, North Bull Island SPA, Baldoyle Bay SAC, SPA and NHA, Malahide Estuary SAC, SPA and NHA, Rogerstown Estuary SAC, SPA and NHA and Boyne Coast and Estuary SAC, SPA and NHA.

2.11.1.2 Groundwater

The bedrock along the DART+ Coastal North route is highly variable. The southern part of the route between Dublin city centre and Rush and Lusk is mainly underlain by a *Locally Important (Ll) Aquifer which is Moderately Productive only in Local Zones*, with some bands of *Poor (Pl) Aquifer bedrock which is Generally Unproductive except for Local Zones*, and bands of *Locally Important Aquifer (Lm) where bedrock which is Generally Moderately Productive*. North of Rush and Lusk the bedrock is more variable with areas of:

- Regionally Important Aquifer - Karstified (diffuse) (Rkd);
- Locally Important Aquifer - Bedrock which is Generally Moderately Productive (Lm);
- Locally Important Aquifer - Karstified (Lk);
- Locally important gravel aquifer (Lg);
- Poor Aquifer - Bedrock which is Generally Unproductive (Pu); and

- Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones (Pl).

The groundwater vulnerability along the route ranges from Low to X-Extreme (Rock at surface).

There are no significant karst features identified along the DART+ Coastal North route.

There are no high yielding water supply springs and wells i.e. public water supplies or group water scheme supplies along the route corridor. No Source Protection Zones associated with public or group groundwater supply schemes are located along the route.

The route extends over the following groundwater bodies: Dublin (IE_EA_G_008), Swords (IE_EA_G_011), Lusk-Bog of the Ring (IE_EA_G_014), Balrothery (IE_EA_G_043), Balbriggan (IE_EA_G_039), Duleek (IE_EA_G_012), Bettystown (IE_EA_G_016) and Drogheda (IE_EA_G_025). All of the groundwater bodies with the exception of Bettystown are at Good WFD Status for the 2013-2018 monitoring cycle and either Not at Risk or in Review with regard to achieving their WFD objectives. Bettystown is at Poor status and is also At Risk with regard to achieving its WFD objectives.

2.11.1.3 Flooding

Historical flooding has been assessed by examining reports and maps from the OPW's National Flood Hazard mapping. The DART+ Coastal Northern Line is impacted by both fluvial (1%AEP) and coastal flooding sources (0.5% AEP) at various locations between Dublin City and Drogheda MacBride Station. Specifically, there is risk of flooding in the vicinity of Clontarf Road Station, Raheny Station, Howth Station, Sutton Station, the Malahide Viaduct, Balbriggan Station, Laytown station Drogheda McBride Station and Marsh Road car park. There are several surface water crossings (bridges/culverts) where flood risk could be high.

2.11.2 Key Constraints

Where available, the key constraints in terms of water resources are the surface water bodies including river water bodies, transitional and coastal waterbodies, protected water dependant habitats, underlying aquifers and areas of fluvial and coastal flooding.

The key constraints for Water are presented in Annex 3.1 Appendix I – Aquifer Vulnerability Constraints, Appendix J – Aquifer Bedrock Constraints, Appendix K – Groundwater Constraints and Appendix L – Surface Water Constraints.

2.11.3 Summary of Issues for Further Consideration

The key constraints in terms of water resources, which include surface water, groundwater and flooding need to be included for future consideration with particular consideration where there are surface water crossings and direct

interactions with protected habitats. Flooding risk is significant from both fluvial and coastal sources and any improvement works on or near the existing DART line should assess this risk in greater detail.

2.12 Biodiversity

2.12.1 Overview

This section describes the potential biodiversity constraints identified within the study area for the DART+ Coastal North project. The objective of the biodiversity constraints report is to identify the important biodiversity receptors or sites to be taken into account during and to inform the subsequent options selection, EIA phases, Appropriate Assessment Screening Report and subsequent Natura Impact Statement Report. The key issues to examine are:

- What are the features of ecological relevance within the study area and environs?
- What habitats are present within and adjacent to the railway line?
- What plant species are present within and adjacent to the railway line?
- What fauna species are present within and in lands adjacent to the railway line?
- What ecological rating should be attached to the railway line and environs?
- What is the Zone of Influence of the ecological features present?
- What are the potential Impacts on Natura 2000 sites and National Heritage Areas (NHAs)?

Key sources of information relating to these types of features have been identified with reference to: National Parks and Wildlife Service (NPWS); National Biodiversity Data Centre (NBDC); Bat Conservation Ireland (BCI); Environmental Protection Agency watercourse and water quality data; Geological Survey of Ireland (GSI) geology, soils and hydrogeology data; Ordnance Survey maps and orthophotography; Fingal County Development Plan 2017-2023; Meath County Development Plan 2021 – 2027; Draft Louth County Development Plan 2021-2027; datasets on invasives and badger setts provided by Irish Rail; photos provided by Arup of bridges along the railway line. The constraints information on biodiversity has to date constituted a desk-based study of the entirety of the existing railway line from Dublin City to Drogheda.

2.12.2 Key Constraints

Where available, the key constraints for Biodiversity are presented in Appendix M – Constraints Mapping: Biodiversity Constraints.

2.12.2.1 European sites

There are a number of European sites traversed by the DART+ Coastal North project, or is in close proximity to, or hydrologically linked. This includes:

- South Dublin Bay and River Tolka Estuary SPA [004024]. SCIs include; Brent Goose *Branta bernicla hrota*, Oystercatcher *Haematopus ostralegus*, Ringed Plover *Charadrius hiaticula*, Grey Plover *Pluvialis squatarola*, Knot *Calidris canutus*, Sanderling *Calidris alba*, Dunlin *Calidris alpina alpina*, Bar-tailed Godwit *Limosa lapponica*, Redshank *Tringa tetanus*, Black-headed Gull *Chroicocephalus ridibundus*, Roseate Tern *Sterna dougallii*, Common Tern *Sterna hirundo*, Arctic Tern *Sterna paradisaea*, Wetlands and Waterbirds. The DART+ Coastal North works are within c. 300m of this European site;
- North Dublin Bay SAC [000206]. QIs include: Mudflats and sandflats not covered by seawater at low tide, Annual vegetation of drift lines, *Salicornia* and other annuals colonising mud and sand, Atlantic salt meadows (*Glauco-Puccinellietalia maritima*), Petalwort *Petalophyllum ralfsii*, Mediterranean salt meadows (*Juncetalia maritimi*), Embryonic shifting dunes, Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes), Fixed coastal dunes with herbaceous vegetation (grey dunes), and Humid dune slacks. The DART+ Coastal North works are within c. 900m of this European site;
- North Bull Island SPA [004006]. SCIs include: Brent Goose *Branta bernicla hrota*, Shelduck *Tadorna tadorna*, Teal *Anas crecca*, Pintail *Anas acuta*, Shoveler *Anas clypeata*, Oystercatcher *Haematopus ostralegus*, Golden Plover *Pluvialis apricaria*, Grey Plover *Pluvialis squatarola*, Knot *Calidris canutus*, Sanderling *Calidris alba*, Dunlin *Calidris alpina alpina*, Black-tailed Godwit *Limosa limosa*, Bar-tailed Godwit *Limosa lapponica*, Curlew *Numenius arquata*, Redshank *Tringa tetanus*, Turnstone *Arenaria interpres*, Black-headed Gull *Chroicocephalus ridibundus*, Wetlands. The DART+ Coastal North works are within c. 900m of this European site;
- Baldoyle Bay SAC [000199]. QIs include: Mudflats and sandflats not covered by seawater at low tide, *Salicornia* and other annuals colonising mud and sand, *Spartina* swards (*Spartinion maritima*), Atlantic salt meadows (*Glauco-Puccinellietalia maritima*), Mediterranean salt meadows (*Juncetalia maritimi*). The DART+ Coastal North works are within c. 450m of this European site;
- Baldoyle Bay SPA [004016]. SCIs include: Brent Goose *Branta bernicla hrota*, Shelduck *Tadorna tadorna*, Ringed Plover *Charadrius hiaticula*, Golden Plover *Pluvialis apricaria*, Grey Plover *Pluvialis squatarola*, Bar-tailed Godwit *Limosa lapponica*, Wetlands. The DART+ Coastal North works are within c. 550m of this European site;
- Malahide Estuary SAC [000205]. QIs include: Mudflats and sandflats not covered by seawater at low tide, *Salicornia* and other annuals colonising mud and sand, *Spartina* swards (*Spartinion maritima*), Atlantic salt

meadows (*Glauco-Puccinellietalia maritimae*), Mediterranean salt meadows (*Juncetalia maritimi*), Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes), and Fixed coastal dunes with herbaceous vegetation (grey dunes). The DART+ Coastal North works traverse this European site;

- Malahide Estuary SPA [004025]. SCIs include: Great Crested Grebe *Podiceps cristatus*, Brent Goose *Branta bernicla hrota*, Shelduck *Tadorna tadorna*, Pintail *Anas acuta*, Goldeneye *Bucephala clangula*, Red-breasted Merganser *Mergus serrator*, Oystercatcher *Haematopus ostralegus*, Golden Plover *Pluvialis apricaria*, Grey Plover *Pluvialis squatarola*, Knot *Calidris canutus*, Dunlin *Calidris alpina alpina*, Black-tailed Godwit *Limosa limosa*, Bar-tailed Godwit *Limosa lapponica*, Redshank *Tringa tetanus*, and Wetlands. The DART+ Coastal North works traverse this European site;
- Rogerstown Estuary SAC [000208]. QI include; Estuaries, Mudflats and sandflats not covered by seawater at low tide, *Salicornia* and other annuals colonising mud and sand, Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*), Mediterranean salt meadows (*Juncetalia maritimi*), Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes), and Fixed coastal dunes with herbaceous vegetation (grey dunes). The DART+ Coastal North works traverse this European site;
- Rogerstown Estuary SPA [004015]. SCIs include; Greylag Goose *Anser anser*, Brent Goose *Branta bernicla hrota*, Shelduck *Tadorna tadorna*, Shoveler *Anas clypeata*, Oystercatcher *Haematopus ostralegus*, Ringed Plover *Charadrius hiaticula*, Grey Plover *Pluvialis squatarola*, Knot *Calidris canutus*, Dunlin *Calidris alpina alpina*, Black-tailed Godwit *Limosa limosa*, Redshank *Tringa tetanus*, Wetlands. The DART+ Coastal North works traverse this European site;
- River Nanny Estuary and Shore SPA [004158]. SCIs include: Oystercatcher *Haematopus ostralegus*, Ringed Plover *Charadrius hiaticula*, Golden Plover *Pluvialis apricaria*, Knot *Calidris canutus*, Sanderling *Calidris alba*, Herring Gull *Larus argentatus*, Wetlands. The DART+ Coastal North works are within 10m of this European site;
- River Boyne And River Blackwater SAC [002299]. SCIs include; Alkaline fens, Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*), River Lamprey *Lampetra fluviatilis*, Salmon *Salmo salar*, Otter *Lutra lutra*. The DART+ Coastal North works are within c. 10m of this European site;
- Boyne Coast and Estuary SAC [001957]. QIs include; Estuaries, Mudflats and sandflats not covered by seawater at low tide, *Salicornia* and other annuals colonising mud and sand, Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*), Mediterranean salt meadows (*Juncetalia maritimi*), Embryonic shifting dunes, Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes), and Fixed coastal dunes with herbaceous vegetation (grey dunes). The DART+ Coastal North works are

located c. 2km from this European site and is hydrologically linked via the River Boyne;

- Boyne Estuary SPA [004080]. SCIs include: Shelduck *Tadorna tadorna*, Oystercatcher *Haematopus ostralegus*, Golden Plover *Pluvialis apricaria*, Grey Plover *Pluvialis squatarola*, Lapwing *Vanellus vanellus*, Knot *Calidris canutus*, Sanderling *Calidris alba*, Black-tailed Godwit *Limosa limosa*, Redshank *Tringa tetanus*, Turnstone *Arenaria interpres*, Little Tern *Sterna albifrons*, Wetlands. The DART+ Coastal North works are located c. 1km from this European site and is hydrologically linked via the River Boyne.

2.12.2.2 National sites

There are no NHAs traversed by or in proximity to the DART+ Coastal North project. There are a number of pNHAs traversed by the project or that are located in close proximity to. This includes:

- Royal Canal pNHA [002103]. The ecological value of the canal lies in the diversity of species along its linear habitats, many of which are further protected under European and National Legislation. The DART+ Coastal North project boundary traverses this National site;
- North Dublin Bay pNHA [000206]. See SAC/SPA above;
- Baldoyle Bay pNHA [000199]. See SAC/SPA above;
- Sluice River Marsh [pNHA]. Designated for its importance as a relatively intact freshwater marsh - a habitat that is now rare in County Dublin. Some waterfowl from Baldoyle Estuary may use the marsh on occasions. The DART+ Coastal North project boundary runs directly adjacent to this National site in Pormarnock;
- Malahide Estuary pNHA [000205]. See SAC/SPA above;
- Rogerstown Estuary pNHA [000208]. See SAC/SPA above;
- Laytown Dunes/Nanny Estuary pNHA [000554]. See SPA above, also designated for freshwater marsh, salt-march, sandy beach and muddy estuary. The DART+ Coastal North project boundary traverses this National site;
- Boyne Coast and Estuary pNHA [001957]. See SAC/SPA above.

2.12.2.3 Other Potential Key Constraints

There are a number of other biodiversity features that are present or potentially present within the existing railway line, and in the surrounding environs. This includes:

- Habitats listed on Annex I of the Habitats Directive that are outwith designated sites, but within the ZoI of the project and associated works e.g.

Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] adjacent to the railway line in Gormanston;

- Plant species listed on Annexes II and IV of the Habitats Directive, Flora (Protection) Order 2015, and Red List species on data lists No.8, and No. 10. Railway lines can support interesting flora species due to the calcareous nature of the ballast and their often relatively undisturbed nature;
- Birds listed on Annex I of the EC Birds Directive and habitats of particular importance to SCI birds adjacent or near the railway line, e.g. amenity grassland and/or football/GAA pitches in Laytown and Balbriggan, and golf courses (Skerries Golf Club, Beaverstown Golf Club, McBride Pitch & Putt Club in Drogheda);
- Species listed on Annexes II and IV of the Habitats Directive, e.g. otter, river lamprey, and Atlantic salmon in the River Boyne and other watercourses close to or that flow under the railway line; Petalwort in Dublin Bay; Desmoulin's Whorl Snail *Vertigo moulinsiana* in wetland areas near Drogheda; bat species (*Pipistrellus* sp., Leisler's bat, brown long-eared bat, *Myotis* sp.) using the railway line for foraging and/or commuting, and using bridges, structures and trees for summer roosting and/or winter hibernation sites; marine mammals such as grey and common seal, and harbour porpoise within the estuaries and Dublin Bay;
- Species (and their resting and breeding places) protected under the Wildlife Acts 1976-2021:
 - Badgers using the railway line and associated habitats for commuting/foraging, and setts in close proximity. Data provided by Irish Rail identified four badger setts adjacent to the railway line, in Laytown, Bettystown, and Colp. These setts and any others identified during surveys will be monitored to determine current usage;
 - Small mammals (i.e. hedgehog, Irish stoat, pygmy shrew, Irish hare), using the line and associated habitat for commuting/foraging and burrows/dens in close proximity;
 - Amphibians (i.e. common frog and smooth newt) in ponds and wetlands close to or hydrologically connected to the railway line;
 - Red, Amber and Green-listed bird species (as listed on the Birds of Conservation Concern in Ireland 2021 – 2026), and breeding birds utilising the hedgerows, trees or scrub along or in close proximity to the railway line for nesting and foraging;
 - Invertebrates as listed on Red List No.1 Water Beetles, Red List No. 1 Non-marine Molluscs), Red List No.4 Butterflies, and Red list No. 6 Damselflies and Dragonflies, and the Regional Red List of Irish Bees.
- Non-native invasive species as listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011-2015; e.g.

Japanese knotweed *Reynoutria japonica* recorded in various locations near the trainline (Irish Rail database); Clontarf, south of Malahide Viaduct, and Donabate. Other locations and species may be present, surveys will ascertain any further locations and the current extent of invasives on the railway line.

2.12.3 Summary of Issues for Further Consideration

Further to the location-specific issues identified above, consideration has also been given to aspects of the development that may result in further constraints for project delivery. The Biodiversity Chapter of the EIAR will address the ecological impact from the development based on defined habitat types, the character of the areas traversed and the specific land use activities. It will provide comprehensive information on habitat loss, habitat and species disturbance, impacts on watercourses and impacts to European and Nationally designated area and qualifying interests. Potential impacts on biodiversity due to excavation and construction works, and new overhead and underground infrastructure will include the following:

- Loss and/or degradation of habitat (trimming or removal of hedgerows, trees, grassland);
- Fragmentation of commuting/foraging corridors;
- Spread of Third Schedule non-native invasive species;
- Disturbance (e.g. noise, vibration, lighting) resulting from machinery use during construction and operation;
- Disturbance and/or displacement to protected species (e.g. nesting birds and roosting bats);
- Collision risk associated with new infrastructure such as overhead lines/masts; and
- Deterioration of local waterbodies and waterbodies downstream resulting in changes to hydrological regimes and the species that rely on these.

Appendix A

Constraint Mapping: Landscape Constraints

Appendix B

Constraint Mapping: Heritage Constraints

Appendix C

Constraint Mapping: Noise Constraints

Appendix D

Constraint Mapping: Utilities and Licensed Constraints

Appendix E

Constraint Mapping: Population Constraints

Appendix F

Constraint Mapping: Zoning Constraints

Appendix G

Constraint Mapping: Planning Application Monitor

Appendix H

Constraint Mapping: Geological Constraints

Appendix I

Constraint Mapping: Aquifer Vulnerability Constraints

Appendix J

Constraint Mapping: Aquifer Bedrock Constraints

Appendix K

Constraint Mapping: Groundwater Constraints

Appendix L

Constraint Mapping: Surface Water Constraints

Appendix M

Constraint Mapping: Biodiversity Constraints

Appendix N

Water Services Constraints Mapping

Appendix O

Register of Constraints Report Data

Appendix P

Register of Relevant Planning Applications within Study Area