



Cork Area Commuter Rail Glounthaune - Midleton Twin Track

Natura Impact Statement

November 2022



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na hÉireann
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Udarás Náisiúnta Iompair
National Transport Authority



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1 Introduction

1.1 Overview of the Glounthaune Midleton Twin Track Project

The proposed development is located along the existing railway track between Glounthaune and Midleton in County Cork which is mostly comprised of single track. It is proposed to construct a new and directly adjacent additional railway track which will make the route a twin track between Glounthaune and Midleton to facilitate the passage of two trains along the railway line. The proposed development route is approximately 10km in length. The proposed development comprises:

- Twin tracking of the single-track sections between Glounthaune and Midleton totalling a distance of approximately 10km;
- Reconfiguration of the operational track layouts;
- Removal of bridge (OBY08, Ballyadam House overbridge) and widening of bridge deck (UBY11, crossing the Owenacurra River);
- Extinguishment of one level crossing (Ford CCTV XY010) and widening of one level crossing (Water-Rock CCTV XY009);
- Provision of sidings/turn back facility at Midleton Station;
- Provision of new cable containment routes from Glounthaune to Midleton to facilitate signalling upgrades and alterations;
- Associated signalling upgrades and alterations; and
- All associated works (e.g. temporary construction compounds; drainage, retaining walls, boundary treatments).

Drawings outlining the proposed development are presented in Appendix A (C745-WP3_03-XX-XX-XXX-DR-MMD-PR-0001 to C745-WP3_03-XX-XX-XXX-DR-MMD-PR-0028).

1.2 Requirement for Appropriate Assessment

Article 6 of the Habitats Directive (92/43/EEC) requires that where a plan or project is likely to have a significant effect on a European site, while not directly connected with or necessary to the nature conservation management of the site, it will be subject to 'Appropriate Assessment' to identify any implications for the European site in view of the site's Conservation Objectives. Specifically, Article 6(3) of the Habitats Directive states:

"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public".

Regulation 42 of Birds and Natural Habitats Regulations 2011, including the amendments in S.I. No. 293 of 2021, transposes Article 6 of the Habitats Directive into Irish law. The regulations require that before consent for a project is given, a screening for Appropriate Assessment of a project must be carried out by the public authority to assess, in view of best scientific knowledge and in view of the conservation objectives of the site, if that project, individually or in

combination with other plans or projects is likely to have a significant effect on the European site.

The public authority shall determine that an Appropriate Assessment of a plan or project is required where the plan or project is not directly connected with or necessary to the management of the site as a European Site and if it cannot be excluded, on the basis of objective scientific information following screening under this Regulation, that the plan or project, individually or in combination with other plans or projects, will have a significant effect on a European site.

The Project is not associated with the 'management' of a European Site having regard to Article 6 of the Habitats Directive. Therefore, the Project is not directly connected with or necessary to the management of any European Site and must undergo screening for Appropriate Assessment in accordance with Regulation 42(1) of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended.

This Natura Impact Statement report has been prepared by Mott MacDonald on behalf of Iarnród Éireann to inform the Appropriate Assessment determination required under Regulation 42 of the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended).

The purpose of this NIS is to provide an examination, analysis and evaluation of the potential impacts of the proposed Project on European sites and to present findings and conclusions with respect to the proposed Project in light of the best scientific knowledge in the field. This NIS is to inform and assist the competent authority, in carrying out its Appropriate Assessment and assess whether or not the proposed Project would adversely affect the integrity of European sites, either alone or in combination with other plans and projects, taking into account their conservation objectives.

This report has been prepared in accordance with the following European Commission Guidance:

- Assessment of Plans and Projects in Relation to Natura 2000 sites: Methodological Guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission, 2021);
- Assessment of Plans and Projects in Relation to Natura 2000 sites: Methodological Guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission, 2021);
- EC (2018) Managing Natura 2000 sites. The provisions of Article 6 of the Habitats Directive 92/43/EEC Commission Notice C (2018) 7621
- EC (2001) 'Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC'
- DEHLG (2009) Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities (Revised 2010).
- Office of the Planning Regulator (March 2021). Appropriate Assessment Screening for Development Management. OPR Practice Note PN01.

This report has similarly been prepared with regard to relevant rulings by the Court of Justice of the European Union (CJEU), the High Court, and the Supreme Court.

1.3 Summary of Appropriate Assessment Steps

A report for the Screening of Appropriate Assessment has been prepared for the Proposed Development (Mott MacDonald 2022) and accompanies this submission. This AA Screening report concludes that likely significant effects on three European sites cannot be excluded on the basis of objective evidence, from the Proposed Development alone, and in combination with

other plans or projects and Appropriate Assessment process needs to be carried out. These European sites identified include;

- Great Island SAC as the Proposed Development intersects with the site boundary
- Cork Harbour SPA due to viable source pathway receptor links
- Ballycotton Bay SPA due to viable source pathway receptor links

The stage 2 Appropriate Assessment is carried out by An Bord Pleanála which is the Competent Authority. The stage 2 Appropriate Assessment is the consideration of whether there is an adverse effect on the integrity of (a) European Site(s). The threshold at the second stage is 'noticeably higher than that laid down at the first stage' (*Sweetman & Others v An Bord Pleanála* (Case C-258/11) ECLI: EU:C:2012:743).

This stage 2 AA assesses whether a plan or project, either alone or in combination with other plans and projects, would adversely affect the integrity of European Sites in view of the Sites' conservation objectives. An appropriate assessment carried out under the Irish legislation must meet the requirements of Article 6(3) of the Habitats Directive as set out and interpreted in the CJEU caselaw. Hence, an appropriate assessment conducted includes (in terms of approach and methodology) an examination, analysis, evaluation, findings, conclusions, and a final determination (CJEU in Waddenzee (Case C-127/02) [2004] ECR I-7405, Commission v. Spain (Case C-404/09) [2011] E.C.R. I-11853 and Sweetman (Case C-258/11)).

Generally, there are four requirements. For example, after reviewing and approving the analysis of Finlay-Geoghegan J. in *Kelly (Ted) v An Bord Pleanála* (2014), Clarke CJ. (in *Connelly*) distilled these to the following:

- First, the appropriate assessment must identify, in the light of the best scientific knowledge in the field, all aspects of the development project which can, by itself or in combination with other plans or projects, affect the European site in the light of its conservation objectives.
- Second, there must be complete, precise, and definitive findings and conclusions regarding the previously identified potential effects on any relevant European Site. As a matter of EU law, there is a separate obligation to make specific scientific findings which allow the subsequent conclusion to be reached.
- Third, on the basis of those findings and conclusions, the competent authority (here An Bord Pleanála) must be able to determine that no scientific doubt remains as to the absence of the identified potential effects.
- Fourth and finally, where the preceding requirements are satisfied, the competent authority may determine that the proposed development, with the implementation of mitigation measures, would not alone or in combination with other plans and projects, with regard to the best scientific knowledge, have an adverse effect on the integrity on European sites, in view of their conservation objectives.

Accordingly, this Natura Impact Statement (NIS) has been produced in support of the Appropriate Assessment of the Proposed Development to be undertaken by the Competent Authority (which is An Bord Pleanála). The NIS considers the likely or possible significant effects of the proposed development. Mitigation measures are identified to avoid adverse effects on the integrity of European sites.

1.4 Definitions

1.4.1 European Sites and Features

A network of European sites of conservation importance has been identified by each Member State, hosting habitats and/or species identified in the Directives as needing to be either maintained at or returned to 'favourable conservation status'.

The sites of conservation importance known as European sites comprise the Natura 2000 network.

European sites comprise areas designated as Special Areas of Conservation (SACs) and/or Special Protection Areas (SPAs) in Ireland. The process of designating cSACs as SACs is ongoing in Ireland. Candidate sites (In Ireland, comprising cSACs) have the same legal protection as those whose designation is complete.

The designation features of SACs are referred to as Qualifying Interests (QIs), and these comprise both species (excluding birds), and habitats.

The designation features of SPAs are referred to as Special Conservation Interests (SCIs), and these comprise bird species, as well as wetland bird habitats.

The designation features of European sites are identified in the Statutory Instruments for European sites where such sites have completed the designation process. In all cases, designation features are also identified in Conservation Objectives published by the NPWS. Any Conservation Objectives referred to in this document are referenced to identify the date of publication and version number.

1.5 Statement of Competence

Authors

- **Dr Erin Johnston:** BSc (Hons), MSc, PhD, MCIEEM: (Senior Ecologist, Mott MacDonald). Erin is an Ecologist with ten years of post-graduate experience including three years in malacological research and six years in Ecological consultancy. She has prepared Ecological Impact Assessments, and Appropriate Assessments Screening Reports, and Natura Impact Statements for a variety of projects. Erin has experience carrying out field surveys for protected gastropods, along with vegetation, extended phase 1 habitat surveys, and targeted invasive species surveys. Other protected species surveys Erin has experience of include smooth newt, crayfish, badger, otter, marsh fritillary and bats.
- **Roger Macnaughton:** MSc, BSc (Hons), MCIEEM (Principal Ecologist, Mott MacDonald). Roger is a qualified and experienced environmental consultant specialising in ecology. He has over twenty years' professional experience in the environmental consultancy sector and an additional seven years of primarily research-based experience in freshwater and marine ecology. He specialises in the delivery of Ecological Impact Assessment (EclA) and Appropriate Assessment (AA) for a broad range of projects potentially affecting; terrestrial, freshwater and marine ecology. His project related experience to date includes; two 400kV overhead lines, five 110kV overhead lines, overhead line up-rates, electricity substations, underground power cables, 35 terrestrial wind farms, two marine wind farms and five solar farms. Roger has extensive experience carrying out and co-ordinating walkover field surveys for protected species (birds, mammals, amphibians), along with Fossitt (2000) botanic/habitat surveys, aquatic and fishery assessment, and targeted invasive species surveys.

Surveyors

- Walkover surveys and reporting of findings were carried out by APEM Ecologists Owen Twomey and Gráinne Keogh:
 - **Owen Twomey** is a Senior Ecologist with APEM. Owen holds a BSc (Hons) in Environmental Science with a major in Zoology and a Postgraduate Diploma (PgDip) in Ecological Assessment from University College Cork. Owen has worked in ecological consultancy since 2016. Owen's specialist areas are; mammal surveys (with a focus on bat, badger and otter); habitat survey, mapping and classification; ecological impact assessment; appropriate assessment; and geographical information systems. Owen has been part of numerous national infrastructure projects as well as a large variety of smaller

plans and projects in the past 6 years. Owen has prepared ecological reports for a wide range of projects, during his career.

- **Gráinne Keogh** is a graduate ecologist with APEM and holds a BSc(Hons) in Biological, Earth & Environmental Sciences from UCC and MSc in Marine Biology from UCC. Since joining APEM she has written and contributed to a number of ecological reports. She has experience in project design as well as ecological survey and data collection, analyses, interpretation, and report writing.
- Wintering bird surveys were carried out by MM Ecologist Fintan Damer:
 - **Fintan Damer** (BSc) (Ecologist, Mott MacDonald). Fintan Damer is a qualified and experienced ecologist with twenty-five years of practical knowledge in undertaking ornithological field studies including breeding bird surveys, winter wetland bird surveys and marine seabird surveys using ESAS (European seabirds at Sea) ship-based seabird survey methodologies. He has over three years full time experience as an ecologist consultant. Fintan has conducted numerous baseline ecological surveys including otter, badger, invasive species, and terrestrial botanical surveys, for a wide variety of project types. He also has good working knowledge of freshwater aquatic surveys. He has been involved in preparation of Ecological Impact Assessments and Appropriate Assessments Screening Reports and focussed specific bird and biodiversity reports.

2 Methodology

2.1.1 Desktop Study

This assessment includes a desk-based review of available records of protected species and habitats including the following sources:

- Conservation Status Assessment Reports (CSARs), Backing Documents and Maps prepared in accordance with Article 17 of the Habitats Directive;
- European site documentation including Conservation Objectives, National Parks and Wildlife Service (NPWS)
- National Biodiversity Action Plan 2017 – 2021 (Department of Culture, Heritage and the Gaeltacht, 2017)
- NPWS Site Synopses , Natura Standard Data Forms available from NPWS;
- Published and unpublished NPWS reports on protected habitats and species including Irish Wildlife Manual reports, and
- Existing relevant mapping and databases e.g. waterbody status, species and habitat distribution etc. (sourced from the Environmental Protection Agency - <http://gis.epa.ie/>, the National Biodiversity Data Centre - <http://maps.biodiversityireland.ie> and the NPWS - <http://www.npws.ie/mapsanddata/> and the Forestry Service (Department of Agriculture, Food and the Marine).

2.1.2 Field Survey Data

2.1.2.1 Walkover Surveys

The Proposed Development Site and lands up to 50 meters from the Site, where access was possible, were surveyed by experienced qualified ecologists on the following dates;

- between 6th and the 12th of April 2022 (APEM).
- 21st July, 3rd August and 9th of August 2022 (Mott MacDonald)

Habitats were classified to level three according to the scheme outlined in “*A Guide to Habitats in Ireland*” (Fossitt, 2000). Fit to European Annex 1 habitats was informed with reference to the EU Interpretation Manual for EU Habitats (European Commission, 2013) having regard to the Irish Vegetation Classification where relevant.

Habitat survey methods in accordance with ‘*Best Practice Guidance for Habitat Survey and Mapping*’ (Smith *et al.*, Heritage Council, 2011). During site walkovers searches were conducted for Invasive species listed under the Third Schedule to the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011), as amended.

During these surveys potential habitat for rare and protected plants and invertebrates were recorded (e.g. Marsh Fritillary *Euphydryas aurinia*).

Evidence of breeding birds was recorded during the April survey. Potential suitable habitat for breeding bird species of conservation concern was also recorded

2.1.2.2 Wintering Bird Surveys

Winter bird surveys counts were conducted within Cork Harbour SPA. The surveys were conducted each month between January and March 2022 inclusive. The scope of the surveys was to identify if any waterfowl roosts or foraging areas occur in the vicinity of the proposed

development where it occurs within up to 1km of the SPA boundary. The surveys also included monthly counts of water birds from Vantage Points (Figure 2.1) of sectors of the Cork Harbour SPA located close (potential Zone of Influence) of the Proposed Development.

Figure 2.1: Winter Bird Survey Location (Sectors)



Source: Mott MacDonald

Drive round surveys / counts of waterfowl were also conducted of potentially suitable lands (farmland) within approximately 0.5km of the SPA boundary, including the proposed development, that could be viewed from public roads.

The surveys aimed to confirm high tide roost locations within the SPA where the proposed development runs close to the SPA boundary (adjacent) and up to 500m from the SPA boundary. This focussed study area is between Glounthaune station east to chainage 850m. This is where the proposed development runs adjacent to the SPA boundary (intertidal mudflats) and is the considered Zone of Influence of the development that may possibly be disturbed during the construction phase of the proposed development. No significant areas of potential suitable habitat for wintering birds will be permanently impacted by the proposed development.

2.2 Consultation

As part of the EIAR process, a consultation exercise was carried out. A letter was issued via email to consultees, informing them of the proposed Railway Order, Glounthaune to Middleton Twin Track Project.

The purpose of this consultation exercise was to address potential concerns, and comments on the content of the EIAR, or to incorporate recommendations on the proposed project. Information on the proposed project and an outline of the proposed EIAR was provided to consultees requesting comments/input on the final scope and content of the EIAR. All stakeholders were informed that the current consultation does not preclude them from commenting during public consultation.

On 28 February 2022, Mott MacDonald, on behalf of Córas Iompair Éireann (CIÉ), issued consultation letters to the key bodies. Key relevant bodies in relation to AA are outlined in Table 2.1 below with responses received to date.

Table 2.1: Feedback from Stakeholder Consultation (February – March 2022)

Consultee	Feedback/Comments	Addressed in EIAR / NIS
Cork County Council	Response received with regarding policy and planning, appropriate assessment and ecology and heritage	Addressed as part of the planning report, biodiversity chapter and NIS
Developer Applications Unit (DAU)	The line passes adjacent to the IDA site at Ballyadam. The site is known to support a notable and localised flora, typical of the east Cork limestone flora. Any assessment should also take this flora into consideration	Biodiversity surveys were conducted along the railway line and lands affected by the proposed development.
DHLG-Department of Housing, Planning, and Local Government	None	
IFI-Inland Fisheries Ireland	Project transverses several salmonid bearing watercourses. Works to be in accordance with IFI Guidelines, specifically: Any crossings should be of a span nature avoiding the necessity for instream works. There should be no instream tracking of machinery. https://www.fisheriesireland.ie/media/guidelines-on-protection-of-fisheries-during-construction-works-in-and-adjacent-to-waters Request for further information.	Follow up consultation was held with IFI with regards to instream works which will only take place in the period July-September to avoid effects on salmonids. The only instream works required for the Owennacurra River is the erection of scaffolding which are temporary works.

A further meeting request was made to DAU which incorporates National Parks and Wildlife Services (NPWS) on 31/08/2022. No further feedback has been provided to date (September 2022).

2.3 Limitations

All areas within the footprint of the proposed development were accessed for survey. No significant limitations to the surveys arose.

2.4 Description of the Proposed Development

2.4.1 Site Location

Figure 1.2 illustrates the geographical context of the proposed development. Over the length of the route, twin tracking is currently in place over approximately 35% of the route which is ca. 10km in length. The new track will be required between these sections. These areas are shown on Figure 2.2. The existing train route runs from the Glounthaune train station between Lough Mahon and the local road (L3004 road) for approximately 850m. The line continues to run in a southerly direction between the L3004 and open ground for approximately 910m before crossing the local road network (L3004). The existing line then progresses eastwards for approximately 2.5km passing between the IDA Industrial Estate and Fota Retail and Business Park before reaching Carrigtwohill station. The line continues along mostly open ground for approximately 6km before terminating at Middleton train station.

The average working area either side of the existing railway line is ca. 20m. The majority of works will be contained within Iarnród Éireann's property boundary. Temporary landtake is required, including for five construction compounds, over an area of ca. 7ha and these are identified in the property drawings. Permanent land take by CPO will be ca. 1.4ha.

A detailed map showing the proposed twin-track railway line from Carrigrohilly Station to Fota Wildlife Park. The map includes topographical features like hills and water bodies, as well as existing infrastructure like roads and other railway lines. A legend identifies symbols for train stations (blue star), drainage (dashed line), proposed twin track (green line), and existing single line (black dashed line). An inset map shows the location of the project area within Ireland. A scale bar indicates distances up to 2,000 meters.

2.4.2 Current Railway Line Usage

The proposed development will facilitate an increase in frequency of trains of up to a 10 minute service in the future.

The design maximum line speed of the trains is 100km per hour and this will be maintained for the future operations.

2.4.3 Existing Stations

There are three existing train stations along the proposed development, at Glounthaune, Carrigtwohill and Middleton. No works are proposed to the existing station buildings.

2.4.4 Design Process

All appropriate Iarnród Éireann standards will be used in the development of the railway design, specifically the following:

- CCE-TMS-300 v1.8 Track Construction Requirements and Tolerances
- CCE-TMS-340 v1.0 Horizontal Curvature Design

- CCE-TMS-341 v1.0 Vertical Curvature Design
- CCE-TMS-344 Requirements for Undertrack Crossings and Pressure Pipelines
- CCE-TMS-345 v1.1 Engineering Requirements for Passenger Platforms and Barrow Paths
- CCE-TMS-347 Technical Standard for Breather Switches
- CCE-TMS-386 Requirements for Buffer Stops.pdf
- CCE-TMS-390 v1.1 Preparation of Drawings (Approval and Certification Process)
- CCE-TMS-410 Civil Engineering Structures Design Standard V 1.1
- I-PWY-1101 v1.1 Requirements for Track and Structures Clearances
- I-PWY-1136 Requirements for Design, Installation and Maintenance of Lineside Drainage

The following TII Publication's will be used where Iarnród Éireann infrastructure interfaces with public roads:

- DN-GEO-03031 - Rural Road Link Design, April 2017
- DN-GEO-03036 - Cross Sections and Headroom, May 2019
- DN-GEO-03060 - Geometric Design of Junctions (priority junctions, direct accesses, roundabouts, grade separated, and compact grade separated junctions), June 2017
- DN-REQ-03034 - The Design of Road Restraint Systems (Vehicle and Pedestrian) for Roads and Bridges, May 2019

In addition to the above design documents further guidance was drawn as necessary from relevant published standards/documents including the following:

- National Transport Authority, National Cycling Manual
- Design Manual for Urban Roads and Streets (DMURS)

The drainage design will be undertaken in accordance with best practice. The following standards have been consulted during the design process;

- TII Publications for Drainage
- The Greater Dublin Strategic Drainage Study (GDSDS): Volume 2 New Development, Dublin City Council, March 2005
- CIRIA Guidance Document C753: The SuDS Manual, 2015
- I-PWY-1136 Requirements for Design, Installation and Maintenance of Lineside Drainage

The methodology behind this design is to create a continuous twin-track railway by connecting the existing sections of double track using the following principles:

- Optimise the design alignment to make best use of the existing rail corridor.
- To limit development outside of the existing IE boundary.
- Avoid unnecessary demolition of existing assets.
- Retain as much of the existing track asset as is feasible within the above constraints.

The proposed alignment has been designed to achieve 60mph with passive provision for 70mph.

The Horizontal and vertical alignment have been developed in line with IE standards to achieve desirable limits for the proposed speed.

2.4.5 Bridges

There are two existing bridges which will require works as part of the proposed development. These are detailed in Table 2.2 and the requirement for works is also detailed.

Table 2.2: Bridge Structures along the Glounthaune – Middleton Railway Line

Name	Denotation	Chainage	Function	Works required
Ballyadam House Overbridge	OBY8	6+500m	Carries local access road on Ballyadam House property over the rail line	To be removed
Owenacurra River Bridge	UBY11	9+870m	Carries the rail line over the Owenacurra River	Deck to be widened using existing river piers.

2.4.5.1 Ballyadam House Overbridge (OBY8)

It is proposed to remove bridge OBY8 at Ballyadam House as part of the works. This bridge is an overpass built for agricultural purposes, to allow livestock and equipment access the farmyard at the rear of Ballyadam House. The bridge is constructed of limestone, with coursed rock-faced rusticated walls. The structure will be required to be dismantled. This bridge is not in use and would present an unjustifiable safety risk if it were retained.

The dismantling of OBY8 will comprise the following:

- Erect perimeter fencing around demolition works area.
- Undertake a photographic record of the bridge.
- Obtain railway line possession for duration of demolition works.
- Install crash mat under the span on the existing tracks.
- Remove any existing services on the deck.
- Temporarily remove existing trackside services.
- Remove stone parapets.
- Remove stone spandrel walls and retaining walls.
- Dismantle brick arch barrel and infill.
- Remove stone abutments.
- Remove approach embankments.
- Regrade embankments and remove crash mat.
- Reinstate trackside services.
- Check and adjust track and ballast levels as necessary.
- Sort demolition spoil for re-use on this and other projects including cut stone and brick.

2.4.5.2 Owenacurra River Bridge (UBY11)

All bridge structures (with the exception of the un-used bridge OBY8) are to be retained, however works will be required at Owenacurra River Bridge (UBY11) to widen the deck of the bridge on the existing piers to allow for a double track and the abutments are to be widened – see Figure 2.3 below. The bridge crosses the Owenacurra River. The span lengths from west to east are ca. 11m, 7m and 11m. The widening structure span arrangement, structural form and articulation will match the existing bridge. The widening deck consists of precast prestressed concrete beams with an in situ infill concrete deck which will be stitched to the existing deck. The bankseat (base of the bridge) widenings are supported on continuous flight auger piles. The existing pier capping beams will be widened to accommodate the proposed deck. The existing north walkway will be removed and reinstated on the widened deck. The existing reinforced concrete northern wingwalls will be dismantled and rebuilt to accommodate the widened deck.

The widening of the Owenacurra River Bridge will comprise the following:

- Erect perimeter fencing around construction works area.
- Construct a temporary access track to the bridge from both east and west approaches.
- Provide storage and set-down area for the precast beams.
- Remove rail track, ballast and granular fill on the bridge and on the approaches to the bridge.
- Excavate the existing wingwall backfill at both north-east and north-west wingwalls and remove the existing wingwalls.
- Remove / break-out the existing north concrete bridge walkway.
- Place and compact fill at both east and west abutment extension locations.
- Construct piling rig platform at both east and west abutments.
- Install piles.
- Construct in situ concrete abutment extensions.
- Install precast capping beam extension on top of two number of existing bridge piers located within the river.
- Construct temporary crane platform.
- Install precast prestressed bridge beams.
- Install precast concrete north parapet/walkway upstand.
- Install tubular metal handrail.
- Pour in situ concrete deck infill.
- Spray apply waterproof deck.
- Install granular fill on both east and west bridge approaches.
- Install precast concrete north-east and north-west wingwalls.
- Backfill wingwalls and abutments.
- Install track ballast

A scaffold will be required within the Owenacurra River as part of the works.

[illegible]

Source: Mott MacDonald

2.4.6 Culverts

There are works proposed at four culverts along the route – these are illustrated on Figure 2.4.

2.4.6.1 IDA Open Culvert

The existing open culvert is ca. 900m in length. The culvert consists of a u-shaped cross-section. The wall heights vary throughout the culvert length between ca. 1.4m and 2.56m. The channel width of the culvert is 1.45m.

A portion of the existing culvert is to be re-aligned by skewing to the north over a length of approximately 200m. It is proposed to re-use the existing culvert units.

An in-situ connection will be required at the interface where the repositioning begins and at the interface with the existing IDA attenuation outfall. The re-aligned culvert will tie into UBY2A which is also being lengthened with the construction of new wing walls.

A sheet pile wall will be installed just north of the works area to retain the existing embankment during construction. Refer to drawing C745-WP3_03-XX-XX-XXX-DR-MMD-SE-0240 in Appendix A.

2.4.6.2 Culvert UBY2A

UBY2A culverts the Killacloyne. The existing culvert is ca. 12m long twin cell structure. The widths are ca. 2.4m and 2.1m and the culvert internal height is ca. 1.2m. Reinforced concrete wingwalls are provided at both the inlet and outlet.

The culvert will be lengthened by ca. 2m to the north and ca. 2m to the south. The cross-section dimensions of the lengthened sections will be similar to the existing cross section. The existing north and south wingwalls will be dismantled and rebuilt to accommodate the lengthened structure. Refer to drawings C745-WP3_03-XX-XX-XXX-RP-MMD-SE-0003 UBY2A_AIP in Appendix A.

2.4.6.3 Culvert UBY1B

UBY1B culverts an unnamed watercourse. The existing culvert is ca. 14m long single barrel structure. The width is ca. 1.5m and the culvert internal height is ca. 1m. Reinforced concrete wingwalls will be provided at both the inlet and outlet.

The culvert is to be lengthened by ca. 1m to the north. The cross-section dimensions of the lengthened sections will be similar to the existing cross section. The existing north wingwalls are to be dismantled and rebuilt to accommodate the lengthened structure. Refer to drawing C745-WP3_03-XX-XX-XXX-RP-MMD-SE-0007 UBY1B in Appendix A.

2.4.6.4 Culvert UBY1C

UBY1C culverts the Killacloyne Stream. The existing culvert is a ca. 10m long single barrel structure. The width is ca. 2.1m and the culvert internal height is ca. 1m. Reinforced concrete wingwalls are provided at both the inlet and outlet.

The culvert is to be lengthened by ca. 1m to the north. The cross-section dimensions of the lengthened sections will match the existing cross section. The existing north wingwalls are to be dismantled and rebuilt to accommodate the lengthened structure. Refer to drawing C745-WP3_03-XX-XX-XXX-RP-MMD-SE-0008 UBY1C in Appendix A.

[illegible]

2.4.7 Level Crossings

There are three of level crossings along the route, and these are tabulated in Table 2.3.

Table 2.3: Existing Level Crossings

Level Crossing Code/Name	Location	Crossing Control Operation Type	Works	Chainage
Water Rock CCTV XY009	Castle Rock Avenue L-3618	Remotely controlled	Widen	8600
Ford CCTV XY010	un-named road	Remotely controlled	To be closed/extinguished, road not currently used.	9000
Mill Road R626 CCTV XY012	R626, Mill Road, west of Middleton Station	Remotely controlled	None	10050

It is proposed to close the Ford CCTV XY010 level crossing. The level crossing decking system will be removed together with the associated operational equipment and signage and the railway boundary secured using a 2.4m high blockwork wall in accordance with Transport Infrastructure Ireland standard construction detail CC-SCD-02401.

Water Rock level crossing (CCTV XY009) is to be widened to accommodate the twin tracks. Refer to drawings C745-WP3_03-XX-XX-XXX-DR-MMD-PR-2301 and C745-WP3_03-XX-XX-XXX-DR-MMD-PR-2302 in Appendix A for details.

2.4.8 Track, Retaining Structures and Ancillary Works

2.4.8.1 Track Works

It is proposed to construct new track alongside the existing single-track sections so that the line will have full twin tracks to facilitate an increase in train trips – this will facilitate up to a ten minute service operating at up to 100km/hr. It is necessary to realign the existing track slightly due to space constraints along the railway line. It is also proposed to construct additional sidings / turn back facilities are proposed at Middleton station.

There is existing twin track at Glounthaune and at the approaches to Carrigtwohill station and Middleton station. Over the length of the route, twin tracking is in place over approximately 35% of the ca. 10km route. The new track will be required between these sections. In some cases, the original alignment of the single track will remain in place. However, due to the existing track layout it will be required to adjust the track position to allow for the twin tracks within Iarnród Éireann's ownership boundary.

The new twin track along the railway line will require the site to be cleared of vegetation and soil and at some locations the embankments will need to be re-profiled to allow for the new track. In areas of cut, new sections of embankment will need to be installed. Retaining walls are also required in areas where space is restricted. The cut/fill and retaining structures in addition to the new track alignment are illustrated on C745-WP3_03-XX-XX-XXX-DR-MMD-PR-0001-P01 to C745-WP3_03-XX-XX-XXX-DR-MMD-PR-0028-P01 in Appendix A.

Drainage will also be constructed as part of the main works, as described. Subgrade drainage will be installed to prevent the line from water logging.

The new track formation will be graded and compacted then a capping material laid on top prior to the installation of the bottom ballast. Following laying, grading and compaction of the bottom ballast the railway sleepers put in place. The steel tracks can then be installed and connected to the railway sleepers by the rail fastening system. A top layer of ballast is then distributed following which the track is brought to design position and mechanically consolidated.

For vegetation clearance the machinery will vary depending on the location, but the following will be required:

- Chainsaws, axes, and hatchets will be used to fell and remove trees.
- Stumps for trees that are removed will be ground down with stump grinders. Mulchers will be used to clear underbrush, small trees and leftover fencing (the contractor can either use a tracked or wheeled mulching machine or there are also mulching machines that can be used with equipment such as tractors or excavators which can be road-rail for use on the railway).
- Bulldozers will be used for clearing large areas where leftover structures, boulders, standing trees and debris remain.
- Tractors with frontend loaders will be used to clear rocks, smaller trees, branches etc. and for levelling/grading the land.
- Backhoes and excavators will be used in small-scale land-clearing.
- A woodchipper will be required to turn trees into woodchips for easy disposal.

Ballast track construction works, as part of the horizontal alignment modifications, will involve the following typical sequence of activities.

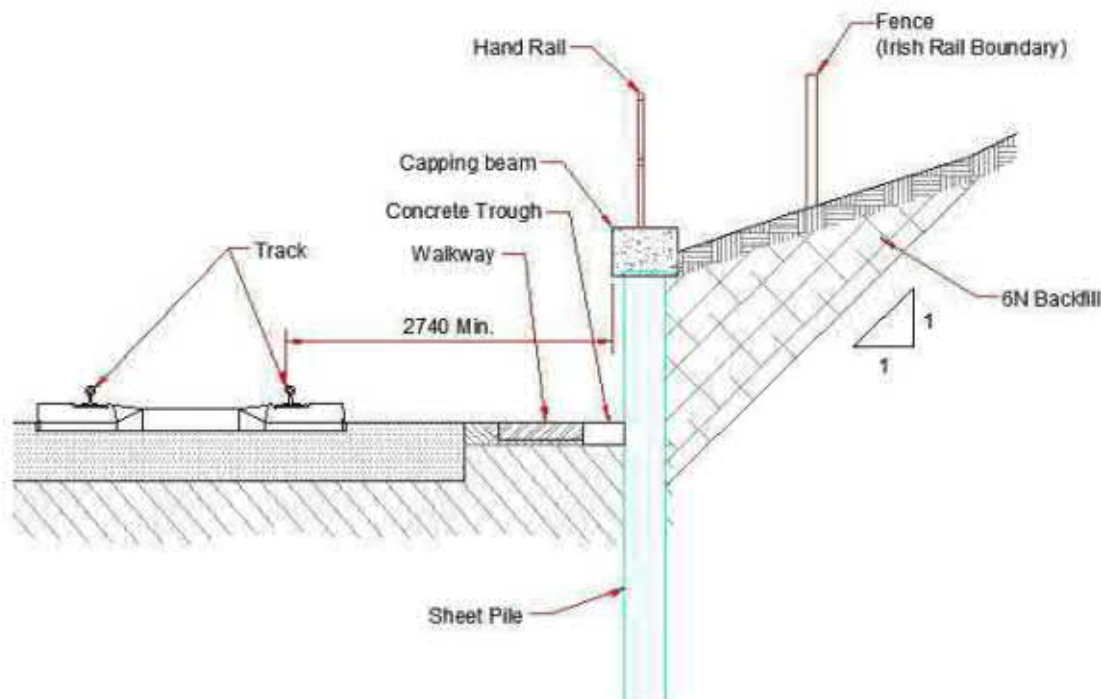
- Enabling works, such as: installation of facilities and storage areas; bringing machinery and materials on site; utilities diversions; railway operation safely cut etc.
- Rail cutting of the existing track (separate track panels of 18m length) using a rail cutting machine (if required).
- Removal of old track panels using road-rail vehicles (vehicles capable of running on both road and rails), excavators, crane on truck and other necessary engineering equipment.
- Removal of degraded ballast by means of road-rail vehicles, excavators and other engineering equipment that will load the materials into an articulated dump truck (if required).
- Preparation of the track formation until required level, using road-rail vehicle excavators.
- Extension and compaction on the subgrade, using a compactor.
- Extension of the geotextile.
- Placement of the longitudinal drainage, using trucks, mini diggers and plate compactors.
- Extension and compaction of the sub-ballast layer, using wheel loader, trucks and compactors.
- Extension of first ballast layer, levelling and compaction using wheel loader, trucks and compactors.
- Laying of the sleepers with the fastening systems, using crane on trucks and excavators.
- Laying of the rails and clamping the joints, using crane on trucks and excavators.
- Extension of second ballast layer, tamping and dynamic stabilisation, using crane on trucks, excavators and a ballast tamper.
- Welding of joints and second stabilisation.
- Rail destressing.

2.4.8.2 Retaining Structures

Retaining walls have been identified as required to minimise impact on adjacent lands due to environmental constraints, or to maintain the railway corridor within the existing railway corridor. The retaining walls are sheet piled structures due to the reduction in temporary and permanent land take required in comparison to a reinforced concrete gravity retaining wall structures and its increased retention height ability in comparison to gabion basket gravity structures. A typical sheet pile detail is shown in Figure 2.5. The walls will be sheet piles with a reinforced concrete capping beam and steel handrail. The piles will be driven by either a drop hammer or vibration

hammer depending on ground conditions. In certain circumstances where obstacles are present in the ground pre-auguring may be required to prepare the ground for the sheet pile installation.

Figure 2.5: Typical Sheet Pile Detail



Source: Mott MacDonald

2.4.8.3 Drainage

Drainage is included in drawings C745-WP3_03-XX-XX-XXX-DR-MMD-DE-0001 to C745-WP3_03-XX-XX-XXX-DR-MMD-DE-0028 in Appendix A. Where significant alteration to the existing track or where new track is proposed the existing drainage will be removed and new drainage will be installed.

The proposed drainage will consist of filter drains, carrier drains, open V-ditches and subsurface drains:

- Filter drains are open jointed, porous or perforated pipes laid in trenches which will be backfilled with a porous media and run longitudinally along the track both collecting water along its length and conveying water.
- Carrier drains are closed jointed and non-perforated and are used to convey water at a depth greater than the depth of filter drains.
- Open V-ditches are open channels which will intercept any overland runoff from adjacent land which slopes towards the track. These ditches will also be used to convey water to a discharge point.
- The ballast and sub-ballast provided as part of the permanent way normally consists of granular material with excellent drainage properties. The ballast and sub-ballast will be designed and graded to act as a drainage blanket in order to protect the formation and ensure the adequate performance and durability of the ballast layer and minimise maintenance requirements. All subsurface drainage will be designed on this basis in

combination with the use of filter drains, geo-membranes and geo-textiles to provide adequate sub-surface drainage and control the build-up of fines and sediment which could affect the long term performance of the ballast and sub-surface drainage facilities.

All existing outfalls will be retained and no new outfalls will be required.

The drainage design will be in accordance with 'E25. I-PWY-1136 Requirements for Design Installation and Maintenance of Lineside Drainage' and the rainfall intensities will be factored by 20% to account for the future effects of climate change.

2.4.8.4 Fencing and Environmental Barriers

There is an existing property boundary fence in place along the length of the line. Additional lands are required along sections of the line and these will be fenced following the compulsory purchase order of the lands. Existing fencing will be relocated and repositioned where appropriate and where there is a change in the track location similar type fence will be relocated at a minimum. Where the track is not being moved the boundary fence will remain in place. The fence types to be used or reused are:

- Concrete post and wire;
- Timber post and wire or other timber structures;
- Steel palisade fence (security fencing);
- Acoustic timber / concrete block wall

Fencing is illustrated on drawings C745-WP3_03-XX-XX-XXX-DR-MMD-PW001-0001 to C745-WP3_03-XX-XX-XXX-DR-MMD-PW028 in in Appendix A.

2.4.8.5 Crossings of services

Service providers were contacted in relation to services within the proposed works areas and no third-party services have been identified.

2.4.8.6 Signage

New signage will be required along the railway line and will be developed at detailed design stage and will include speed limit signs, mileposts, gradient signs and Warning signs.

2.4.8.7 Cable containment routes

There are currently cable routes parallel to and on either side of the existing rail track carrying operational railway communications, signalling and power cables. The cables are contained in precast concrete lidded troughs set flush with the ballast surface. To accommodate the construction of the second track ca.8500m of existing route will require to be relocated to either side of the new twin track layout. It is proposed to reuse the existing material where possible on the relocated sections of route.

2.4.8.8 Associated signalling upgrades and alterations

As part of a larger recontrol scheme and to enable the operation of the reconfigured railway a new signalling system is to be installed. The installation of this new system and the recovery of redundant equipment will take place in parallel with the twin tracking works with commissioning taking place during the line closure.

2.4.8.9 Lighting

During construction, a large proportion of the works will take place at night. The minimum light level required is 50lux and a maximum of 100lux. Illuminances provided need to be consistent, to avoid excessive contrast in illuminance, luminaires should not be spaced too far apart. Glare

is determined by the light distribution of fittings, their mounting height and, for floodlights, the direction of aiming.

With large areas, the lighting design chosen depends upon:

- The degree of obstruction;
- Whether illuminance is required primarily on horizontal or vertical planes

For the operational phase, additional lighting will be provided at Water Rock level crossing. The lighting will be directional. Existing lighting will be maintained at the level crossing and additional lighting will be similar to existing lighting. In line with Railway Safety Commission Guidance 'lighting should not cause glare to either road users or train drivers, interfere with the visibility of railway signals nor cause avoidable annoyance to local householders.

Walkway lighting will be provided in the new sidings in Middleton.

2.4.8.10 Lifting Operations

Cranes will be required at the Owenacurra River Bridge to lift the beams into place. This will be temporary. Track panels will also require lifting.

2.4.9 Iarnród Éireann Construction Methodology

2.4.9.1 Sustainable Construction Principles

Iarnród Éireann is committed to contributing to the achievement of the United Nations Sustainable Development Goals (SDGs) and together with the CIÉ Group of Companies has developed a Sustainability Strategy that coordinates actions that assist in addressing national economic, social and environmental challenges. The key themes used as a focus while designing the Proposed Development include:

- Avoid, mitigate and if not possible reduce the adverse effects on communities during the construction of the Proposed Development.
- Reduce the carbon footprint of the Proposed Development during the design, construction, and operation and encourage more sustainable transport modes.
- Support for cleaner energy and lower emissions through implementation of an electrically powered fleet.
- Facilitating population and sustainable development growth, and a low carbon climate resilient economy.
- Designing for resilience against future demand changes and climate needs.
- Minimising waste during construction of the Proposed Development, while focusing on using sustainable and reusable materials and construction methods.

2.4.9.2 Construction Compounds

During the construction phase five temporary construction compounds will be required. Please refer to Figure 2.6 for locations and in Appendix A for drawings of the construction compounds. The construction compounds will contain portacabins for offices and welfare facilities, parking for construction staff and material stockpiles. Welfare facilities will be provided at these locations and any discharges will be connected to a sealed holding tank to be emptied and disposed of off-site by a licenced contractor to an approved licenced facility. Water will be tankered onto site as required.

There are also two construction compounds proposed on the west side and east side of the Owenacurra River. The westerly compound is only to be used for access to the bridge abutments and there will be no portacabin or storage in this area. The easterly compound will

be used for storage of materials. Both compounds will be set back from the riverbank by a minimum of 15m.

The map displays the proposed Dublin to Drogheda railway line, running from Ballynagaul in the north to Carrigrohilly in the south. The alignment is marked with a dashed line, and the chainage is indicated along the route. Key stations are marked with blue stars: Johnstown, Carrigrohilly, and Carrigrohilly. The map also shows existing railway lines and various construction compounds. An inset map in the top right corner provides a broader geographical context, showing the line's location within the Dublin region. The map includes a legend for proposed construction compounds, train stations, chainage, and existing railway lines. The source is cited as Mott MacDonald.

2.4.9.3 Construction Hours and Programme

The proposed Works comprise civil engineering, permanent way and signalling works to enable the installation of a second running line along the length of the existing railway between Glounthaune Junction and Middleton to allow the introduction of a significantly increased frequency of train operation.

To minimise disruption to the current railway operations, it is proposed to undertake the construction works over an extended period of time utilising both day and nighttime working. Nighttime working is required to deliver works on or affecting the operational railway in a safe manner with regards to both the safety of the railway and the safety of those delivering the works. A disruptive blockade will be utilised to undertake the operational tie ins between the new and existing works and to test and commission the new signalling control systems.

The proposed development will take place in a long narrow corridor, 10km in length and of varying width (generally 15 to 30m).

Subject to the grant of statutory approvals, it is anticipated that proposed works will commence in Q4 2023 and will take approximately 36 months to complete. Indicative durations for the proposed works are detailed in Table 2.4.

Table 2.4: Indicative Construction Schedule

Phase	Revised timeline
1. Pre-construction works	Q4 2023
2. Enabling works	Q1 2024
3. Earthworks, drainage and track sub-base	Q2 2024 – Q3 2025
4. Track realignment and construction	Q2 2025 – Q1 2026
5. Signalling works	Q4 2024 – Q2 2026
6. Commissioning	Q2 2026 – Q3 2026

In general, it is anticipated that construction will take place between 07.00 and 19.00 Monday to Sunday when outside the operational railway footprint. Works within the operational railway footprint will be undertaken between 1900 and 0700 daily (in order to ensure the safety of the railway operations and construction staff). During the period of the railway closure, works will be undertaken around the clock. It is anticipated that the closure will be up to four months and buses will be provided to transfer passengers.

Table 2.5 outlines the proposed construction activities and the timelines.

Table 2.5: Construction Activities and Timelines

Construction Activity	Description of works
Earthworks	Predominantly night-time works, with rate of progress about 150m per week on average along the track
Formation treatment	Predominantly night-time works, with rate of progress about 350m per week on average along the track
Ballasting	Predominantly night-time works, with rate of progress about 350m per week on average along the track
Track installation	Daytime and night-time works, with rate of progress about 350m per week on average along the track.
Tamping	Daytime and night-time works, with rate of progress about 1km per week on average along the track.
Stressing and welding works	Daytime and night-time works, with rate of progress about 1km per week on average along the track.

Construction Activity	Description of works
Material stockpile and haulage at site compounds	Daytime and night-time works, locomotive trains haul materials and equipment to 5 site compound locations, depending on the current location of work.

The number of construction workers required during the construction phase is expected to peak at approximately 125 persons. Staff will travel to site via a combination of public transport, cycling, carpooling, minibuses and private passenger vehicles.

2.4.9.4 Pre-construction and Enabling Works

The pre-construction phase of development includes preparatory works and consultation with statutory bodies [Health and Safety Authority (HSA), EPA etc] and the general public as required. Following pre-construction, site clearance activities will commence.

Typical enabling works activities will include preparation of the construction working area, laydown areas and site clearance as required. Temporary and permanent boundary fencing will also be installed where required.

2.4.9.5 Other Consents

Section 50 consents from the OPW will be required for the realignment of the IDA culvert (UBY2A or CV3) and consent will also be required for works at the Owenacurra River bridge.

2.4.9.6 Rail Closures

It is likely that the railway line will be closed for a period of up to four months between months 29 to 32. Bus services will be used to accommodate passengers and will be run on a regular service between Cork and Middleton to minimise disruption. There will also be weekend closures for a period of eight months between 11pm on Fridays to 5.30am on Mondays.

2.4.9.7 Road Closures

It will be necessary to close Castle Rock Avenue to through traffic in order to facilitate level crossing upgrading works to Water Rock CCTV XY009. It is expected that the closure will last for 16 weeks with diversions via Ballyrichard More, the R626 and N25. Details of traffic diversion and road closures are presented in Chapter 15 of this EIA. Alternative routes are available and will be sign posted. Any road closure requirements will be adhered to and will be in accordance with local authority procedures including notification to emergency services.

2.4.9.8 Earthworks

Reprofiling of existing embankments will be required and existing embankments will be extended. In areas of cut, embankment slopes will be reprofiled to allow for the twin track gauge and may incorporate toe retention to reduce the quantity of spoil generated. In areas where space is restricted, retaining structures will be installed. The walls will be sheet piles with a reinforced concrete capping beam and steel handrail. The piles will be driven by either a drop hammer or vibration hammer depending on ground conditions. In certain circumstances where obstacles are present in the ground pre-auguring may be required to prepare the ground for the sheet pile installation. Ca. 40,000m³ of cutting/excavation is required and ca. 38,000m³ of fill is required for the works, along with ca. 14,000 m³ of ballast.

2.4.9.9 Construction Traffic and Routes

The majority of construction traffic will be generated during phase three and phase four, the earthworks phase (Q2 2024 – Q3 2025) and the track construction phase (Q2 2025 – Q1 2026). As part of the earthworks phase there will be a requirement to bring engineering fill onto the site.

Where surplus spoil is unsuitable for reuse on site it will be taken to the compound areas for sorting. Spoil that cannot be re-used will be disposed of to a licenced waste disposal facility.

On completion of the earthworks phase, the track construction phase will commence. The track construction phase will see the delivery of construction material such as concrete sleepers, steel rails and ballast.

For the earthworks and track construction it is estimated that up to 5500 Heavy Good Vehicles (HGVs) loads to or from the site (11000 HGV movements) will be required (maximum of 30 loads per day) to deliver and remove material over the period of works which is expected to extend over an initial period of 11 months, with a further 4 months of ballast deliveries in the finishing stages of the works.

It is planned that sleepers and rails will be brought to site using rail haulage.

2.4.9.10 Land Acquisition

Ca. 1.4ha of land is to be compulsorily acquired for the proposed development and is comprised predominantly of hedgerows at the boundary between the railway and agricultural lands. The permanent land take includes land necessary to construct, operate and maintain the proposed development and associated infrastructure.

Temporary landtake is required, including for the five compounds, over an area of ca. 7ha and these lands will be reinstated following completion of the construction phase.

2.4.10 Commissioning

The testing and commissioning of the new railway line will be a thorough and controlled process including inspections, measurements and electrical and mechanical systems commissioning.

The Commission for Railway Regulation will issue the final authorisation for the new railway line.

2.4.11 Operations and Maintenance

Following completion of construction and commissioning, the line will be returned to service.

In the future it is intended that trains will operate up to a 10-minute service at peak hours, when future electrified or alternative fuelled vehicles are available.

Maintenance of the railway line occurs between midnight and 6am. This night maintenance includes track ballast adjustment, termed 'tamping'. During daylight hours boundary maintenance is carried out which includes vegetation trimming.

2.4.12 Decommissioning

The design life of the proposed development is a minimum of 60 years, dependent on the type of infrastructure. Iarnród Éireann do not have current plans to decommission the railway infrastructure between Glounthaune and Midleton.

2.5 Summary of Potential Impacts

In the absence of mitigation measures, there is the potential for the following impacts.

Construction Phase:

- Potential for direct impact to habitats and species within the footprint of the Proposed Development.

- Potential for indirect impact to habitats and species within the vicinity / downstream of the Proposed Development through disturbance of breeding sites (otter) and roost/ foraging areas (wintering birds)
- Potential for generation of dust
- Potential for generation of surface-water and groundwater pollution/sedimentation
- Potential for light, noise and vibration effects.

Operational Phase:

- Potential for local increases in light levels
- Potential for noise/ visual disturbance effects

2.6 The Zone of Influence

In the context of an ecological impact assessment generally (CIEEM, 2018) the zone of influence (Zoi) for a proposed development is defined as that:

"The area over which ecological features may be affected by biophysical changes as a result of the proposed project and associated activities. This is likely to extend beyond the project site, for example where there are ecological or hydrological links beyond the site boundaries" and that "the zone of influence will vary for different ecological features depending on their sensitivity to an environmental change."

The Zoi varies depending on the construction and operational activity and the sensitivity of the receptor (e.g., flora, birds, terrestrial mammals) to the effect encountered.

The Zoi identified for various ecological receptors, having regard to the potential for impact as outlined previously are as detailed below:

- The footprint of the proposed development for direct damage to habitats
- A study carried out on the potential for effects via impacts on air quality and climate arising from the proposed development has been carried out as part of the EIAR. Within this assessment the Zoi for dust effects to ecological receptors was identified as 50m. As such, the Zoi is taken as 50m for dust effects within this NIS.
- 40m for detectable noise effects¹ to wetland bird species which may be detectable by roosting and foraging birds within the SPA between Chainage 0 and 800m of the works. The noise study found that the construction phase works noise will fall to below 65dB within up to 40m of the Proposed Development. As such, areas of suitable mudflat habitat in the vicinity of works (Chainage 340 – 800m) are taken as the Zoi for the construction related noise impacts to wintering birds. Operational daytime noise will rise slightly compared to baseline, generally between +3 and +4 dB, at the closest noise sensitive receptors to the SPA boundary. No significant change will arise to night time noise.
- 150m for breeding otter holts, (NRA 2006)²
- Catchment wide Zoi for surface waterbodies

¹ Cutts, N., Phelps, A., & Burdon, D. (2009). Construction and waterfowl: Defining sensitivity, response, impacts and guidance. Report to Humber INCA by the Institute of Estuarine and Coastal Studies, University of Hull. EN (2003) The Humber Estuary European Marine Site: English Nature's advice given under Regulation, 33(2).

² National Roads Authority (2006). Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes.

3 Description of the Receiving Environment

3.1 Habitats

A description of notable habitats located within the proposed development site is presented hereunder. Habitats were described in accordance with Fossitt (2000)³. An assessment of the habitats was undertaken in accordance with the NRA Guidelines (2009)⁴ and CIEEM Guidelines (2018)⁵. Details relating to watercourses are provided in Section 2.2.3.

A habitat map of the Proposed Development and surrounding areas is provided in Appendix B.

Arable crop (BC1)

Arable crop is a commonly occurring habitat adjacent to the existing rail line. This habitat within the study area comprises large, open fields of crop, such as rapeseed (*Brassica napus* subsp. *oleifera*), bordered by hedgerows and treelines. This habitat is heavily managed for agricultural land use. This habitat is not Annex 1 listed habitat.

Tilled land (BC3)

Similar to arable crop, tilled land is commonly occurring habitat adjacent to the existing rail line. This habitat was comprised of tilled fields which have not yet been reseeded for arable crop. This habitat within the study area comprised large, open fields of bare ground bordered by hedgerows and treelines. This habitat was heavily managed for agricultural land use. This habitat is not Annex 1 listed habitat.

Buildings and Artificial Surfaces (BL3)

Buildings and artificial surfaces was recorded as the most common habitat type throughout the site. This habitat type was comprised of made ground (hardcore), buildings and structures within the study area, including small areas of landscaping such as private gardens. These landscaping features, while corresponding to Flower beds and Borders (BC4) and Amenity Grassland (GA2) at a smaller scale, were not mapped separately as they did not meet the minimum size threshold as outlined by Smith *et al.* (2011). This habitat type also included artificial surfaces such as roads, pavement, hardstanding and the existing rail line. The existing rail line within the site includes the existing track infrastructure such as the steel rails, concrete spacers, limestone paving, retaining walls, bridges and associated equipment (Figure 3.1).

The rail line is often bordered by narrow (ca. 0.5 – 2 m wide) strips of disturbed ground and grassland which are also included in this habitat type (Figure 2.1). These areas of grassland are managed as part of the routine management of the rail line. The species recorded here contain a mixture of those recorded in Recolonising Bare Ground (ED3) and Dry Meadows and Grassy Verges (GS2) detailed below. Japanese knotweed (*Fallopia japonica*) was also recorded within this habitat type. This habitat is not Annex 1 listed habitat.

³ Fossitt (2000) A Guide to Habitats in Ireland, The Heritage Council

⁴ NRA (2009), Guidelines for Assessment of Ecological Impacts of National Roads Scheme.

⁵ CIEEM (2018, updated 2019) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater Coastal, and Marine Version 1.1.

Figure 3.1: Buildings and Artificial Surfaces



Source: Mott MacDonald 2022

Upper Salt Marsh (CM2)

There is a small area of upper salt marsh located towards Harpers Island (Figure 3.2). This habitat borders Cork Harbour and is ca. 10 m south of the existing rail line (Chainage 800 – 900m). This habitat was not accessible for health and safety reasons and was therefore surveyed from a distance.

The upper salt marsh at this location was degraded in nature and appeared to have been modified by historic drainage works likely for ground reclamation. A drainage channel and earth bank was recorded along the south and west border of this habitat, and a depression is noted within its centre. The habitat is drier to the north where it meets the rail line embankment. There are a number of small open ponds within the habitat. This habitat was largely dominated by grasses and rushes, such as red fescue (*Festuca rubra*) and creeping bent (*Agrostis stolonifera*). Common saltmarsh-grass (*Puccinellia maritima*) and sea rush (*Juncus maritimus*) were more common around the pans and along the lower section of the habitat towards the drainage channel. Other species recorded here include common scurvygrass (*Cochlearia officinalis*), sea-spurrey (*Spergularia* sp.), sea arrowgrass, (*Triglochin maritima*) and sea plantain (*Plantago maritima*).

Salt marsh habitat is noted as having links to the Annex I habitats, "Atlantic salt meadows (*Glaucopuccinellietalia maritimae*) (1330)" and "Mediterranean salt meadows (*Juncetalia maritimi*) (1410)". Atlantic salt marsh is a QI habitat of the Great Island Channel SAC. While this area is located outside of the SAC boundary, connectivity is present given that it is located immediately adjacent to the SAC. The saltmarsh grades to rank grassland and scrub near the rail track.

Figure 3.2: Upper Salt Marsh



Source: APEM 2022

Exposed Sand Gravel or Till (ED1)

This habitat comprised an area of stockpiled limestone gravel and stone adjacent to the rail line, and areas where hardcore gravel had been laid down. This habitat was largely devoid of vegetation and bordered by scrub, bare earth, and built lands. The sparse vegetation that did occur consisted of common and widespread ruderal species. This habitat is not Annex 1 listed habitat.

Spoil and Bare Ground (ED2)

Spoil and bare ground habitat was commonly recorded throughout the site. This habitat consisted of areas that had been recently cleared either for development or agricultural land improvement. The largest of these areas was present within the study area east of Middleton Railway Station where a large area ground had been cleared for the greenway development.

Where it occurs, this habitat had sparse vegetation cover consisting of common and widespread ruderal species such as willowherbs (*Epilobium* spp.), scentless mayweed (*Tripleurospermum inodorum*), weld (*Reseda luteola*), creeping thistle (*Cirsium arvense*), spear thistle (*Cirsium vulgare*), common field-speedwell (*Veronica persicall*), dock (*Rumex* spp.), and teasel (*Dipsacus fullonum*). This habitat is not Annex 1 listed habitat.

Recolonising Bare Ground (ED3)

Recolonising bare ground was a commonly occurring habitat throughout the study area. This habitat consisted of areas which had previously been disturbed and had begun to be recolonised by local vegetation.

Species recorded included red valerian (*Centranthus ruber*), black medick (*Medicago lupulina*), willowherbs, curly-leaved dock (*Rumex crispus*), winter heliotrope (*Petasites pyrenaicus*), herb-Robert (*Geranium robertianum*), oxeye daisy (*Leucanthemum vulgare*), horsetail (*Equisetum arvense*), creeping cinquefoil (*Potentilla reptans*), wild carrot (*Daucus carota*), ribwort plantain (*Plantago lanceolata*), common knapweed (*Centaurea nigra*), vetch (*Vicia* spp.), ragwort (*Senecio jacobaea*), sow thistles (*Sonchus* spp.), teasel (*Dipsacus fullonum*), red clover (*Trifolium pratense*), St John's Wort (*Hypericum* sp.), greater mullein (*Verbascum Thapsus*), dog rose (*Rosa canina*), cock's foot grass (*Dactylis glomerata*), and groundsel (*Senecio vulgaris*). In areas bramble, willow (*Salix* spp.), and butterfly bush (*Buddleja davurica*) scrub had begun to encroach in areas of which have been left undisturbed for longer periods of time. This habitat is not Annex 1 listed habitat.

Exposed Calcareous Rock (ER2)

Two small lengths of exposed calcareous rock borders the rail line at Water-Rock. This habitat was present within a cut section of limestone rock which was created during the construction of the rail line. The cut exposed rock was up to 4m high in places and steep with loose rock at its base in areas.

This habitat was largely unvegetated. Species recorded on the exposed rock included oxeye daisy, scented mayweed, herb-Robert, dandelion, (*Taraxacum* spp.), kidney vetch (*Anthyllis vulneraria*), ragwort, willowherbs, viper's-bugloss (*Echium vulgare*), beaked hawk's-beard, (*Crepis vesicaria*), wood sage (*Teucrium scorodonia*), common knapweed, old man's beard (*Clematis vitalba*), great mullein (*Verbascum Thapsus*), mouse-ear hawkweed (*Pilosella officinarum*) and common cornsalad (*Valerianella locusta*). This habitat is not Annex 1 listed habitat.

Other Artificial Lakes and Ponds (FL8)

Two artificial lakes and ponds were recorded at Ann Grove Business park. Both ponds were man made and used as part of the surface water management of the surrounding area.

The larger of the two, west of the Business Park covered an area of ca 0.7 ha. This functions as an attenuation pond draining the Business park and discharging water to a drainage ditch running adjacent to the rail line. There are numerous concrete headwalls forming inflow and outflow points to the pond. The pond had been dug to a level ca. 10 m deeper than the surrounding land and had steep grass lined banks. The pond was holding shallow stagnant water at the time of survey and contained a large amounts of silt at its base. There are stands of bulrush (*Typha latifolia*) and rushes (*Juncus* spp.), established along the edges and on silt deposits.

A second smaller artificial pond was located within the business park and incorporated into the water management system and landscaping of the park. This pond had a number of concrete headwalls discharging water from the surrounding lands into it. The Tibbotstown⁶ stream flowed to the south through the pond. The base of this pond consists of cobble, gravels and silt. Emergent vegetation includes bulrush, fool's-water-cress (*Apium nodiflorum*) and brooklime (*Veronica beccabunga*). Occasional green algae was also noted. This habitat is not Annex 1 listed habitat.

Drainage Ditches (FW4).

Drainage ditches were recorded throughout the study area. There was variation in the structure of the drainage ditches within the study area, ranging from heavily altered concrete lined drainage channels to watercourses with a more natural profile including small areas of riffle. All however are artificial or heavily altered watercourses and carried low levels of water. The

⁶ EPA Name: Tibbotstown. EPA Code: 19T25

watercourse beds were often heavily silted where they crossed under the Proposed Development and contained little to no instream vegetation.

Bankside vegetation recorded includes lesser celandine, opposite-leaved golden-saxifrage, (*Chrysosplenium oppositifolium*), creeping buttercup (*Ranunculus repens*), docks (*Rumex spp.*), nettles (*Urtica dioica*), hogweed, hemlock water-dropwort, fool's-water-cress, cuckooflower (*Cardamine pratense*), water mint (*Mentha aquatica*), willowherbs, bulrush, wood sage, winter heliotrope, meadowsweet (*Filipendula ulmaria*). Occasional in stream vegetation included duckweed (*Lemna minor*), and fool's-water-cress. This habitat is not Annex 1 listed habitat.

Improved Agricultural Grassland (GA1)

Improved agricultural grassland was one of the most common habitat types recorded throughout the study area. This habitat was typically comprised of heavily managed and fertilised homogenous fields of perennial ryegrass (*Lolium perenne*), poorly drained fields with areas dominated by soft rush (*Juncus effusus*), and less managed grasslands used as horse pasture. This habitat was highly modified due to from regular reseeding, increased drainage, and fertiliser use. Amenity grassland (GA2)

Amenity grassland was recorded as commonly occurring throughout the study area. This habitat was centred around Glounthaune village and Middleton town as well as Ann Grove Business Park. Amenity grassland was heavily managed and species poor. The species that do occur were widespread and commonly occurring. This habitat is not Annex 1 listed habitat.

Dry Meadows and Grassy Verges (GS2)

Dry meadows and grassy verges were recorded throughout the study area and occur in areas that are infrequently cut, such as along the rail line verge and in areas previously disturbed for development but have since been left unmanaged.

Grasses dominated this habitat including species such as red fescue (*Festuca rubra*), cock's-foot (*Dactylis glomerata*), Yorkshire fog (*Holcus lanatus*), sweet vernal-grass, perennial ryegrass (*Lolium perenne*), and crested dog's-tail (*Cynosurus cristatus*). Other species recorded within this habitat included yarrow (*Achillea millefolium*), sun spurge, (*Euphorbia helioscopia*), wood sage, hogweed, greater periwinkle (*Vinca major*), germander speedwell (*Veronica chamaedrys*), dandelion, primrose (*Primula vulgaris*), alexanders (*Smyrnium olusatrum*), figwort (*Scrophularia nodosa*), wild angelica (*Angelica sylvestris*), lords and ladies, foxglove (*Digitalis purpurea*), dove's-foot crane's-bill (*Geranium mole*), creeping thistle, field thistle, spear thistle, early dog violet (*Viola reichenbachiana*), field poppy (*Papaver rhoeas*), cowslip (*Primula veris*), red dead-nettle (*Lamium purpureum*), cow parsley (*Anthriscus sylvestris*), creeping cinquefoil (*Potentilla reptans*), woodrush (*Luzula sylvatica*), meadow buttercup (*Ranunculus acris*), creeping buttercup, and common knapweed. In areas in close proximity to Cork Harbour more saline tolerant species such as common scurvygrass (*Cochlearia officinalis*), sea plantain and sea mayweed (*Tripleurospermum maritimum*) were also recorded within the sward. This habitat is not Annex 1 listed habitat.

Dry Calcareous and Neutral Grassland (GS1)

Dry calcareous and neutral grassland was recorded in a number of locations, most notably on the banks of the Owencurra River, and at the Ballyadam IDA site. This habitat was typically recorded in areas where topsoil had been scraped back and calcareous hardcore/hardstanding surfaces laid down, and where vegetation had begun to regenerate. Due to this it was often found in associated with recolonising bare ground.

Species recorded within this habitat included false oat grass, sweet vernal grass, wild carrot, yellow wort (*Blackstonia perfoliata*), smooth meadow grass (*Poa pratensis*), creeping cinquefoil (*Potentilla reptans*), red clover (*Trifolium pratense*), selfheal (*Prunella vulgaris*), Timothy grass

(*Phleum pratense*), ribwort plantain, cock's foot grass, bird's foot trefoil, and ragwort. Areas of scrub were noted as beginning to colonise areas of the grassland with woody species recorded including; willow, cotoneaster (*Cotoneaster spp.*), bramble, butterfly bush, and gorse. This habitat is not Annex 1 listed habitat.

Wet Grassland (GS4)

The largest proportion of wet grassland was recorded on the southwestern bank of the Owenacurra. The sward was rank and overgrown in areas with a lower topography within the field, sward graded into pockets more affiliated with a marsh type habitat (GM1).

Pockets of reed canary grass (*Phalaris arundinaceae*), and dense stands of silverweed (*Potentilla anserina*) were noted. Other species recorded included Yorkshire fog, creeping bent, rushes (*Juncus spp.*), creeping buttercup, lesser celandine, meadow sweet (*Filipendula ulmaria*), meadow buttercup, cow parsley, wild Angelica (*Angelica sylvestris*), nettles, purple loosestrife (*Lythrum salicaria*), bindweed, perennial ryegrass, rosebay willowherb, bramble, broad dock, and cuckooflower. Himalayan balsam was present in multiple locations through this habitat, and in denser stands along the banks of the Owenacurra river. This habitat is not Annex 1 listed habitat.

Mud shores (LS4)

Mud shores was recorded to the south of the Site at Glounthaune Station (Figure 3.3). Mud shores were not accessible during the survey and were classified from a vantage point. This habitat comprised large areas of fine sediment with lesser amount of stone and boulder. A narrow section of rock armour bordered this habitat where it meets the rail line. Sea beet (*Beta vulgaris spp. maritima*), sea lavender (*Limonium sp.*), sea-milkwort (*Glaux maritima*) and white stonecrop (*Sedum album*) were recorded on the rock armour. A sparse strand line of seaweeds were noted at the high tide mark.

The mud shore habitat has links to the Annex I habitat "Mudflats and sandflats not covered by sea water at low tide (1140)". The area of mudflat identified is contiguous with NPWS Site Specific Conservation Objectives mapping for tidal mudflats and sandflats in Great Island SAC.

Figure 3.3: Mud Shores



Source: APEM 2022

Hedgerows (WL1)

Hedgerows were common and recorded throughout the study area. This habitat regularly borders the Proposed Development and forms field boundaries in the wider landscape. Where hedgerows border the Site they are highly maintained, and cut to approximately 2 m in height. This habitat was often recorded accompanied by a short earth bank and /or drainage ditch.

Species recorded within this habitat included ash, sycamore, oak, alder, hazel, willow, brambles, gorse, hawthorn, rosebay willowherb (*Chamaenerion angustifolium*), cherry laurel (*Prunus laurocerasus*), bindweed (*Calystegia sepium*), dog rose (*Rosa canina*), old man's beard, honeysuckle (*Lonicera periclymenum*), buddleja, winter heliotrope (*Petasites pyrenaicus*), hard fern (*Blechnum spicant*), lords and ladies, cleavers (*Galium aparine*). This habitat is not Annex 1 listed habitat.

Treelines (WL2)

Treelines were less commonly recorded than hedgerows within the study area but were still widespread. This habitat has a similar species assemblage to the hedgerows but with a greater amount of mature trees in some cases up to 20 m high. Within the study area this habitat is regularly accompanied by hedgerows as described above.

Ash was recorded as the dominant tree forming species within this habitat. Other species frequently recorded include oak, alder, sycamore and silver birch (*Betula pendula*). Scot's pine is present occasionally as are planted ornamental treelines of aspen (*Populus* spp.), cherry (*Prunus* spp.) and cypress leylandii (*Cupressus × leylandii*). This habitat is not Annex 1 listed habitat.

Wet Pedunculate Oak-Ash Woodland (WN4)

Wet pedunculate oak-ash woodland was recorded at Killacloyne. This habitat was not accessible and was classified from a vantage point. The canopy was dominated by ash with a height of up to 20 m. Alder and hawthorn were recorded as being frequent and there is occasional oak. The understory and ground layer were not visible during the survey, however, based on the surrounding topography and proximity to Cork Harbour, it is assumed that this wooded area is located on ground that is regularly flooded.

On alluvial sites this habitat can have links to the priority Annex I habitat "Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-padion*, *Alnion incanae*, *Salicion albae*) (91E0)". In addition, semi natural woodland is rare in the wider landscape. This habitat is located within great Island SAC but no works are proposed within this habitat.

Wet Willow-Alder-Ash Woodland (WN6)

Wet willow-alder-ash woodland as recorded at Killacloyne. This habitat was not accessible and was classified from a vantage point. This habitat was dominated by willows up to 6 m high over wet ground. Alder was recorded as frequently occurring. The full area was not visible during the survey and the extents were assessed based on the surrounding topography and recent satellite imagery. This habitat is not Annex 1 listed habitat. It is located within great Island SAC, but no works are proposed within this habitat.

Scrub (WS1)

Scrub was recorded as a commonly occurring and widespread habitat within the study area. This habitat is generally dominated either by gorse, bramble or willows up to 5 m high. A small area of planted hazel scrub is present at Carrigtwohill Train Station. Butterfly bush, blackthorn and willow occurred frequently. Other species recorded included cherry laurel, dog rose, old man's beard, honeysuckle, Japanese knotweed, Himalayan balsam, winter heliotrope, bracken, teasel, red valerian, wild angelica, montbretia (*Crocsmia x crocosmiiflora*), lords and ladies, blackthorn (*Prunus spinosa*), alder (*Alnus glutinosa*), and birch. There are also occasional individual mature trees of the same species present. This habitat is not Annex 1 listed habitat.

3.2 Invasive Species

Four species listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011-2021 (S.I. 477/2011) (under Regulations 49 & 50) were recorded during the site walkover. They are:

- Japanese knotweed (*Fallopia japonica*)
- Three cornered leek (*Allium triquetrum*)
- Spanish bluebell (*Hyacinthoides hispanica*)
- Himalayan Balsam (*Impatiens glandulifera*)

The locations of these species relative to the Proposed Development are provided in the Habitat Map, Appendix B.

3.3 Aquatic Surveys

Specialist aquatic surveys were undertaken of waterbodies within and downstream of the Proposed Development footprint. The site and wider study area does not include any river European sites and associated qualifying interests. However, several aquatic species present in the study area are QI of other European sites.

A summary of the findings of the report are provided below in Table 3.1. The site number corresponds to those presented in Figure 3.4 and Figure 3.5.

Figure 3.4: Aquatic Sampling Locations



Source: Triturus 2022

Figure 3.5: Aquatic Sampling Locations



Source: Triturus 2022

Table 3.1: Aquatic Baseline Survey

Site Number	Watercourse Name	Site Description	Overall Evaluation ²
1A	Killacloyne Stream	<p>The small stream channel supported a bed of mixed coarse, medium and fine gravels with abundant cobble. The substrata were partially bedded due to siltation pressures from the farming and suffered from moderate siltation (silt plumes underfoot and surface depositions locally). The channel did not support macrophytes due to its higher energy apart from very localised fool's watercress (<i>Apium nodiflorum</i>). It was bordered by heavily improved pasture (GA1) on the north bank with heavy cattle poaching and supported a mature riparian zone along the railway embankment side comprising ash (<i>Fraxinus excelsior</i>), alder (<i>Alnus glutinosa</i>), sycamore (<i>Acer pseudoplatanus</i>) and bramble (<i>Rubus fruticosus</i> agg.).</p> <p>The site was considered a low value salmonid nursery given the very shallow nature of the channel and siltation pressures from agriculture. However, the river likely supports a small localised brown trout population given improved habitat in its lower reaches (channel increases in flow volume). The site adjoining the railway alignment may have some value as a winter salmonid spawning area, but low summer flows and its diminutive size reduce its fisheries value. The site also supported low quality holding habitat due to the absence of pool habitat. The higher energy of the channel precluded it from being of any value to lamprey. The small stream had some value as a European eel nursery but the lower reaches below the railway crossing offer greater habitat value for eel.</p> <p>Biological water quality, based on Q-sampling, was calculated as Q3-4 (moderate status). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling. No white-clawed crayfish were recorded present, and no other signs were detected during site specific surveys.</p>	Local Importance (Lower Value).
1B	Killacloyne Stream	<p>The channel had a semi-natural profile downstream of the railway crossing with riffle and glide sequences but was largely in its natural form downstream of the local Killahore road into Carrigtwohill. The small stream supported mixed coarse, medium and fine gravels with frequent sand and localised pockets of silt. The substrata were partially bedded due to siltation pressures from farming in the upstream catchment and suffered from moderate siltation. The site did not support macrophytes due to its higher energy, but <i>Pellia</i> species liverwort was present locally on muddy banks. The site was bordered by tillage downstream of the railway crossing and by alder-dominated woodland downstream of the local road. Here its supported mature alder and elder (<i>Sambucus nigra</i>) with a heavily scrubbed understory with bramble, ivy (<i>Hedera helix</i>) and ferns.</p> <p>The channel was considered a low to moderate value salmonid nursery due to ample riffle and glide sequences that provided well oxygenated water. The stony bed with a semi-natural to natural profile provided some moderate refugia for juvenile salmonids (value reduced only because of the small size of channel and shallow water). It was also reduced because of siltation and nutrient enrichment pressures from agriculture. These pressures indicated it was only of low to moderate value as a spawning site (i.e. siltation of spawning gravels). Holding habitat was poor overall due to the limited pool habitat. The site was of too high energy to support lamprey but likely supports European eel given its close proximity to the sea. No other signs were recorded in the vicinity of the stream crossing.</p>	Local Importance (Lower Value).

² NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes.

Site Number	Watercourse Name	Site Description	Overall Evaluation ⁷
Site 2	Tibbotstown River	<p>Biological water quality, based on Q-sampling, was calculated as Q3-4 (moderate status). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.</p> <p>The river at this location was a 1.5m wide upland eroding (FW1) spate channel with water 0.1m-0.3m deep. The channel profile, despite being realigned historically, supported extensive riffle and glide sequences with very localised pool. The bed supported localised boulder, abundant cobble and mixed gravels. The substrata were partially bedded downstream of the railway but became loose and unbedded downstream with light to moderate siltation only. The channel did not support macrophytes due to its higher energy apart from very localised fool's watercress. The channel flowed along the north bank of the railway bordered by dense gorse (<i>Ulex europaeus</i>) and bramble scrub with a concrete retaining wall on the railway side and then was culverted south under the railway where it flowed in a realigned channel along the business park. Downstream of the railway the channel had extensive gabion baskets as scour protection on the business park (east bank) with a steep embankment supporting pine (<i>Pinus spp.</i>), beech (<i>Fagus sylvatica</i>), elder and sycamore on the west bank.</p> <p>The site was considered a low to moderate value salmonid nursery given the shallow and small nature of the river channel with limited holding habitat. As such, nursery habitat was considered of low to moderate value and the river at this location may support a localised small brown trout population. The river featured low to moderate spawning habitat downstream of the railway crossing given the presence of suitable spawning gravels with moderate siltation. Low quality holding habitat (for brown trout only) was present due to the paucity of deeper pool habitat. The higher energy of the channel precluded it from being of any value to lamprey. The small river had some value as a European eel nursery given abundant cobble habitat and close proximity to the sea. No otter signs were recorded in the vicinity of the railway crossing and suitability was low.</p> <p>Biological water quality, based on Q-sampling, was calculated as Q3-4 (moderate status). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.</p>	Local Importance (Lower Value).
Site 3	Tibbotstown River	<p>The river at this location was a 1m wide upland eroding (FW1) spate channel with water 0.05m-0.1m deep. The small heavily overgrown channel had a semi-natural profile dominated by shallow riffle. The bed was dominated by small boulder and cobble with coarse gravels, sand and silt. The substrata were heavily bedded and siltation was moderate to heavy but given the high energy depositions only blocked interstitial spaces in the substrata. The channel was moderately shaded by vegetation and did not support any macrophytes. Small patches of the moss species <i>Brachythecium rivulare</i> were present on boulders. The channel was situated between two earthen embankments with mature sycamore, elder and hawthorn (<i>Crataegus monogyna</i>) being the dominant riparian trees with abundant bramble and ivy.</p> <p>The site was considered a poor value salmonid nursery given the very shallow and small size of the river at this location. The channel bed was also heavily compacted and silted reducing the overall viability of the river as both a spawning area and nursery. It is possible that the larger lower reaches of the channel support a small salmonid population. The higher energy of the channel precluded it from being of any value to lamprey. The small river may</p>	Local Importance (Lower Value).

Site Number	Watercourse Name	Site Description	Overall Evaluation ⁷
Site 4	Water Rock River	have some value as a European eel nursery but would improve in the lower reaches where depths and flows provide more cover. No other signs were recorded during the survey.	Local Importance (Higher Value).
		Despite evident siltation pressures biological water quality was recorded as Q4 (good status) . No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.	
Site 5	Owenacurra River	Site 4 on the Water Rock River was a lowland depositing watercourse (FW2) with a semi-natural sinuous profile with a 1m-2m wide channel upstream of the railway crossing. The channel had 1m high banks that steepened to over 15m where the channel intersected a large limestone rock face and became subterranean at a karstic feature. The river did not re-emerge downstream (south) of the railway crossing. The channel had a mixed profile of riffle and glide with localised pool upstream of the railway crossing and was shallow with water depths between 0.1m and 0.3m. The bed comprised of mixed gravels and large banks of sand and silt.	County Importance
		The bed substrata were loose but suffered from heavy siltation. High winter flows helped reduce the silt burden. The channel also supported bars of limestone bedrock that intersected the channel. These supported the bryophyte species <i>Leptodictyum riparium</i> and <i>Rynchostegium riparioides</i> . The bed geology was mixed with sandstone gravels and limestone bedrock. The channel entered a karstic limestone cave system at the point where it became subterranean at intersection with the railway crossing. The channel supported the macrophyte species fool's watercress (<i>Apium nodiflorum</i>) and lesser water parsnip (<i>Berula erecta</i>) on depositing muddy bars with creeping bent grass (<i>Agrostis stolonifera</i>) and buttercups (<i>Ranunculus spp.</i>) in drier areas of bank.	
The riparian areas comprised amenity grassland scattered immature willow on the north bank. The south bank supported an exposed bedrock rockface strewn with bryophytes from wet seepages that may support the Annex 1 habitat 'Petrifying springs with tufa formation (Cratoneurion) [7220]' . The higher up drier areas near the railway supported non-native travellers joy (<i>Clematis vitalba</i>), cherry laurel (<i>Prunus laurocerasus</i>) with Leylandii cypress (<i>Cupressus x leylandii</i>) and sycamore. A small patch of amenity grassland on the south bank also supported a stand of invasive giant rhubarb (<i>Gunnera tinctoria</i>).			
The small river had some low value as a brown trout nursery albeit small salmonids were not observed during the site visit. The nursery habitat was considered low to moderate overall given it had ample broken riffle and glide habitat but was reduced in quality due to evident enrichment and siltation pressures. The spawning quality was of low to moderate quality as while mixed spawning gravels were present that could support spawning by brown trout, they were heavily silted. Holding habitat was moderate at best due to a paucity of deeper pools. Suitability for European eel was low due to its karstic nature and poor downstream connectivity with the sea. Brook lamprey habitat was considered good with ample spawning and nursery habitat present . No other signs were recorded and this may be due to poor downstream connectivity and likely low fisheries value.			
Despite evident siltation pressures biological water quality was recorded as Q4 (good status) . No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.			
The river was 12m wide and 0.3-1m deep. The channel profile was dominated by glide habitat with localised pool. The channel was historically realigned locally both upstream and downstream of the railway crossing and this was			

Site Number	Watercourse Name	Site Description	Overall Evaluation ⁷
		<p>supported by evident compaction of the bed and the straightness of the channel, albeit with good recovery. The substrata comprised a mixture of cobble and mixed gravels that were heavily bedded in the vicinity of the crossing and siltation was moderate with silt plumes visible underfoot.</p> <p>The site supported localised water crowfoot (<i>Ranunculus</i> sp.) and hemlock water dropwort (<i>Oenanthe crocata</i>). The bryophyte species <i>Chiloscyphos polyanthos</i> was present but rare with occasional <i>Fontinalis antipyretica</i>. These habitats were not extensive enough to be a good representation of the Annex I habitat 'Water courses of plain to montane levels, with submerged or floating vegetation of the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> (low water level during summer) or aquatic mosses [3260]'. However, better examples of this habitat do occur downstream of the survey location (e.g. Millbrook area).</p> <p>The riparian areas were very heavily scrubbed over and comprised mainly of bramble with localised areas of invasive buddleja (<i>Buddleja davidii</i>) present. Further downstream (c.50m from the bridge crossing), mature tree lines of alder and willow (<i>Salix</i> spp.) were present. One large stand of invasive Japanese knotweed (<i>Fallopia japonica</i>) was present immediately upstream of the railway bridge on the east bank covering c.50m². Both sides of the bridge i.e. dry gravels areas of the abutments on the east and west banks supported recent otter spraint sites.</p> <p>The Owenacurra River is a sea trout river of county importance and also supports Atlantic salmon and European eel in addition to abundant brown trout. The river also supports Lampetra spp. species (Triturus, 2019). The Owenacurra downstream of the railway crossing was considered a good salmonid nursery due to the presence of extensive areas of glide and cobble with a mixed gravel bed which would be considered characteristic of salmonid nursery habitat. Furthermore, the presence of beds of <i>Ranunculus</i> vegetation provided important refugia for juvenile salmonids. The holding habitat was also good locally due to the presence of deeper glide and pool. However, the best holding habitat was upstream of the bridge given deeper water depths of between 1m and 1.8m.</p> <p>Spawning habitat was moderate overall given the evident high levels of compaction in the vicinity of the railway crossing but nonetheless would support spawning salmonids. Lamprey ammocoete habitat was recorded adjoining the eastern abutment and arch where beds of soft silt had accumulated. This also adjoined mixed gravels that could be used for lamprey spawning.</p> <p>Despite historical channel alterations in the vicinity of the survey site, biological water quality was recorded as Q4 (good status). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.</p> <p>The Owenacurra River at site 5 had very high fisheries suitability for lamprey, salmonids and European eel at the survey location in addition to supporting an otter resting area and regular marking sites (spraint areas). It also had Q4 (good status water).</p>	

None of the species recorded during the aquatic surveys are QIs for the Great Island SAC.

3.4 Wintering Birds

The following section provides a summary of wintering bird data collected during surveys. Sections are as outlined in Figure 2.1.

Section 2 recorded the highest number of species, with 16 SCI species recorded there. Sections 1, 3, 4 and 5 recording 9, 7, and 5 SCI species respectively. This corresponds to the findings outlined in the Conservation Objectives Supporting Document (NPWS, 2014b) which outlines that Harpers Island is an important roost area for the Cork Harbour SPA.

The most numerous species recorded during the wintering surveys was black-tailed godwit. While numbers recorded of the species over the survey generally varied between 6 (Section 2 Harper's Island) and 78 (Section 1 Glounthaune Estuary), a notable count of 1400 was recorded in Section 2 Harper's Island during the March counts. This count was 7 times greater than the figure of national significance for the species and exceeded the 1% international threshold of 1100.

A notable count of 543 black-headed gulls was recorded in Section 4 in January. The species was recorded in all five of the sections, albeit in lower numbers. Counts of the species were high in section 4 with peak counts each month of 420 and 330 in February and March respectively.

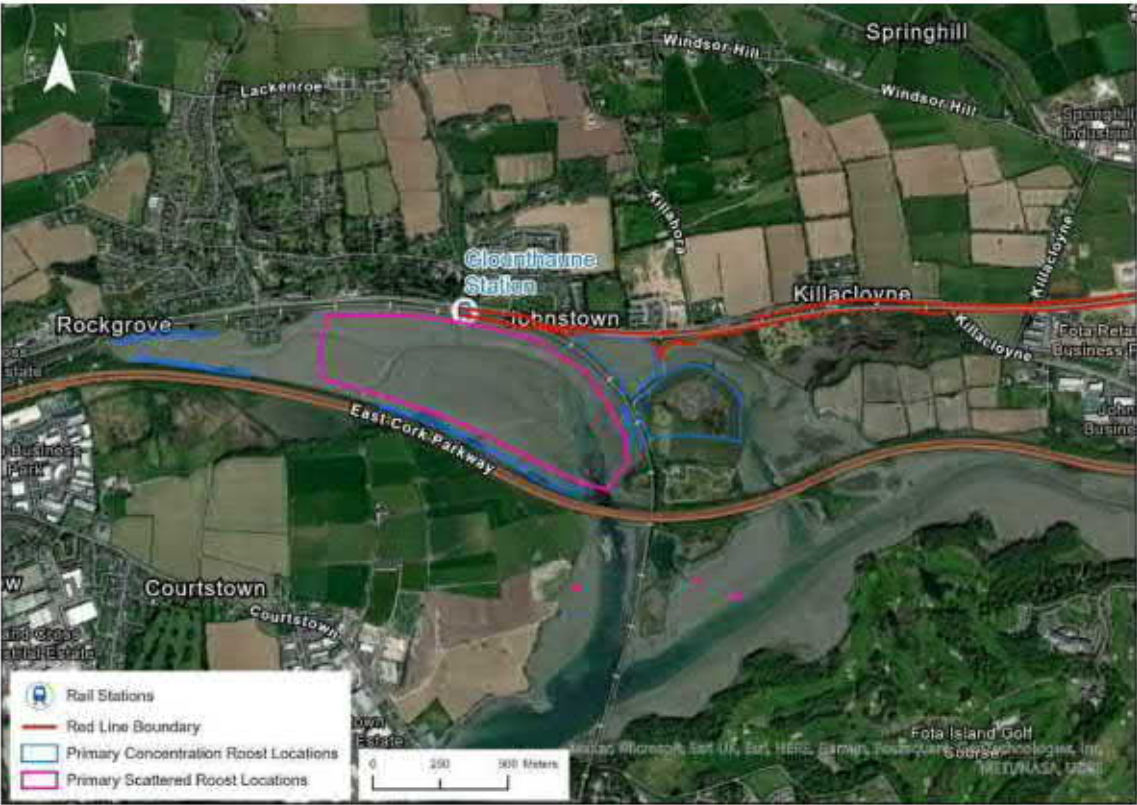
Other notable counts included the following peak counts of:

- 58 curlew recorded in Section 3
- 155 dunlin recorded in Section 1
- 3 little grebe recorded in Section 2
- 50 redshank recorded in Section 1
- 80 shelduck recorded in Section 2
- 57 teal recorded in Section 2

The largest roost concentrations were recorded at the northern end of Harper's Island (section 2). Species recorded within this roosting area included black-tailed godwit, redshank, shelduck, wigeon, and black-headed gull. Species recorded within the main section 1 roosting concentrations were primarily waders including dunlin, redshank, and black-tailed godwit. Smaller concentrations of teal and black-headed gull were recorded on the southern and western ends of the estuary, while large but scattered numbers of black-headed gull and shelduck were recorded roosting and feeding on the main estuary.

The locations of these roosting concentrations are presented below in Figure 3.6.

Figure 3.6: Winter Bird Roost Areas (January – March 2022)



Source: Mott MacDonald

Peak counts of the 16 SCI species recorded during the wintering bird surveys are provided below in Table 3.2.

Table 3.2: Summary of Wintering Bird Results

Species	BoCCI Status	SCL of Cork Harbour SPA	SCL of Ballycotton Bay SPA	Peak Count	Figure of national significance	Peak as % of Figure of National Significance
Bar tailed godwit	Red listed	Yes	Yes	2	170	1%
Black headed gull	Amber listed	Yes	-	543	1000	54%
Black tailed godwit	Red listed	Yes	Yes	1400	200	700% (127% of international threshold)
Common gull	Amber listed	Yes	Yes	2	500	<1%
Cormorant	Amber listed	Yes	-	6	110	5%
Curllew	Red listed	Yes	Yes	58	350	16%
Dunlin	Red listed	Yes	-	155	460	34%
Grey heron	Green listed	Yes	-	1	25	4%
Lapwing	Red listed	Yes	Yes	78	850	9%
Lesser black backed gull	Amber listed	Yes	Yes	13	Not published	-
Little grebe	Green listed	Yes	-	3	20	15%
Oystercatcher	Red listed	Yes	-	42	610	7%
Redshank	Red listed	Yes	-	50	240	21%
Shelduck	Amber listed	Yes	-	80	100	80%
Teal	Amber listed	Yes	Yes	57	360	16%
Wigeon	Amber listed	Yes	-	59	560	11%

No concentrations of wintering waterfowl were recorded outside any SPA boundary, specifically Cork Harbour SPA. All concentrations of birds were within the SPA boundary in particular the Harper Island area, where the main flocks were recorded (generally > 100m from potential works areas). Small, scattered roost areas of gull, waterfowl and wader species were also recorded up to within 20m from potential works areas between the existing Glounthaune station and east for approximately 800m (Chainage 340m to 800m). This area is identified as within the immediate ZoI of the proposed development (construction phase) and localised noise and visual disturbance are considered below. It is noted that no track laying works, and associated increased noise and visual disturbance, are proposed between Glounthane station and Chainage 340m.

4 European Sites

4.1 Summary of Relevant European Sites

A report for the Screening of Appropriate Assessment has been prepared for the Proposed Development (Mott MacDonald 2022) and accompanies this submission. This AA Screening report concludes that likely significant effects cannot be excluded on the basis of objective evidence, from the Proposed Development alone, and in combination with other plans or projects at the following European sites:

- Great Island SAC as the Proposed Development intersects with the site boundary
- Cork Harbour SPA due to viable source pathway receptor links
- Ballycotton Bay SPA due to viable source pathway receptor links

4.2 Great Island SAC

The Proposed Development intersects with the Great Island Channel SAC at the edge of the SAC's northern boundary.

The site synopsis for the SAC (NPWS, 2013) notes that *"The Great Island Channel stretches from Little Island to Middleton, with its southern boundary being formed by Great Island. It is an integral part of Cork Harbour which contains several other sites of conservation interest. Geologically, Cork Harbour consists of two large areas of open water in a limestone basin, separated from each other and the open sea by ridges of Old Red Sandstone. Within this system, Great Island Channel forms the eastern stretch of the river basin and, compared to the rest of Cork Harbour, is relatively undisturbed. Within the site is the estuary of the Owennacurra and Dungourney Rivers. These rivers, which flow through Middleton, provide the main source of freshwater to the North Channel."*

The Natura 2000 Standard Data Form (NPWS 2019) for the Great Island Channel SAC identifies the following most important impacts and activities with high negative effect on the site:

- Fertilisation
- Marine and freshwater aquaculture
- Reclamation of land from sea, estuary or marsh
- Roads, motorways
- Urbanised areas, human habitation
- Invasive non-native species
- Grazing
- Eutrophication (natural)

As previously noted, various invasive non-native species have been recorded during the field surveys for the Proposed Development and may be impacted by the construction phase. None of the other impacts and activities as outlined above are linked to the Proposed Development. The QIs for which the SAC is designated, the conservation objectives identified for the QIs, and their current national conservation status and trend are outlined in Table 4.1.

Table 4.1: Qualifying Interests for Great Island Channel SAC

Qualifying Interest (* indicates priority habitat)	Conservation Objective (NPWS 2014)	National Conservation Status and Trend (NPWS 2019)
Mudflats and sandflats not covered by seawater at low tide [1140]	To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in Great Island Channel SAC	The overall conservation status for the habitat is inadequate and the conservation status trend is deteriorating
Atlantic salt meadows (<i>Glaucopuccinellietalia maritima</i>) [1330]	To restore the favourable conservation condition of Atlantic salt meadows (<i>Glaucopuccinellietalia maritima</i>) in Great Island Channel SAC,	The overall conservation status for the habitat is inadequate and the conservation status trend is deteriorating

In summary, Table 4.1 indicates that

- One of the SAC's QIs is in favourable condition within the SAC itself [1140]; and,
- Both of the SAC's QIs are in unfavourable condition nationally.

The known extent of the tidal mudflats and Atlantic salt meadows associated with the site have been mapped in the Site-Specific Conservation Objectives (SSCO) (NPWS 2014). The SSCO mapping indicates that the tidal mudflat habitat occurs in close proximity to the Proposed Development between Glounthaune and chainage 850m. The site walkover confirmed the presence of this habitat type abutting this specific area of the Proposed Development footprint, i.e. between 20m and 50m of the development boundary in this area.

Atlantic Salt Meadow habitats in proximity to the proposed development have been mapped by the Saltmarsh Monitoring Project. The closest extent of this habitat within the SAC boundary to the Proposed Development is mapped as being 400m to the south of the Proposed Development. An additional area of non-designated potential Saltmarsh habitat was recorded during site walkovers and is noted as occurring approximately 10m south of the Proposed Development footprint. While not within the SAC boundary it is located immediately adjacent to it, and has direct connectivity to the SAC i.e. it is contiguous / supporting habitat to the saltmarsh habitat within the SAC boundary.

The Proposed Development also requires crossings of, and alterations to, three watercourses with downstream hydrological connectivity to this European site.

4.3 Cork Harbour SPA

Cork harbour SPA is located directly adjacent to the Proposed Development. The Proposed Development requires three watercourse crossings with downstream hydrological connectivity to the European site. The site synopsis for the SPA (NPWS, 2015) notes that "Cork Harbour is a large, sheltered bay system, with several river estuaries -principally those of the Rivers Lee, Douglas, Owenboy and Owennacurra."

The Natura 2000 Standard Data Form (NPWS 2018) for Cork Harbour SPA identifies the following most important impacts and activities with high negative effect on the site⁸:

- Pole fishing
- Industrial or commercial areas
- Nautical sports
- Shipping lanes

⁸ Skiing, off-piste, has also been identified in the data form but is not included as it does not take place in the area.

- Walking, horse-riding and non-motorised vehicles
- Roads, motorways
- Urbanised areas, human habitation
- Dispersed habitation
- Marine and Freshwater Aquaculture
- Fertilisation

The Proposed Development is located entirely outside of the boundary of the SPA and none of the impacts and activities as outlined above are likely from the Proposed Development.

The SCIs for which the SPA is designated, the conservation objectives identified for them, and their current conservation status trends are outlined in Table 4.2.

Table 4.2: Special Conservation Interests for Cork Harbour SPA

Special Conservation Interests	Conservation Objective (NPWS 2014)	Population Trends (Kennedy <i>et al.</i> 2022)
Little Grebe (<i>Tachybaptus ruficollis</i>) [A004] [A690]	To maintain the favourable conservation condition of Little Grebe in Cork Harbour SPA,	The long-term trend for the species is stable or increasing
Great Crested Grebe (<i>Podiceps cristatus</i>) [A005]	To maintain the favourable conservation condition of Great Crested Grebe in Cork Harbour SPA	The long-term trend for the species is undergoing an intermediate decline .
Cormorant (<i>Phalacrocorax carbo</i>) [A017]	To maintain the favourable conservation condition of Cormorant in Cork Harbour SPA	The long-term trend for the species is stable or increasing
Grey Heron (<i>Ardea cinerea</i>) [A028]	To maintain the favourable conservation condition of Grey Heron in Cork Harbour SPA,	The long-term trend for the species is stable or increasing
Shelduck (<i>Tadorna tadorna</i>) [A048]	To maintain the favourable conservation condition of Shelduck in Cork Harbour SPA,	The long-term trend for the species is stable or increasing
Wigeon (<i>Anas penelope</i>) [A050]	To maintain the favourable conservation condition of Wigeon in Cork Harbour SPA,	The long-term trend for the species is in an intermediate decline .
Teal (<i>Anas crecca</i>) [A052]	To maintain the favourable conservation condition of Teal in Cork Harbour SPA,	The long-term trend for the species is stable or increasing
Pintail (<i>Anas acuta</i>) [A054]	To maintain the favourable conservation condition of Pintail in Cork Harbour SPA,	The long-term trend for the species is in an intermediate decline .
Shoveler (<i>Anas clypeata</i>) [A056]	To maintain the favourable conservation condition of Shoveler in Cork Harbour SPA,	The long-term trend for the species is in an intermediate decline .
Red-breasted Merganser (<i>Mergus serrator</i>) [A069]	To maintain the favourable conservation condition of Red-breasted Merganser in Cork Harbour SPA,	The long-term trend for the species is in an intermediate decline .
Oystercatcher (<i>Haematopus ostralegus</i>) [A130]	To maintain the favourable conservation condition of Oystercatcher in Cork Harbour SPA,	The long-term trend for the species is stable or increasing .
Golden Plover (<i>Pluvialis apricaria</i>) [A140]	To maintain the favourable conservation condition of Golden Plover in Cork Harbour SPA,	The long-term trend for the species is in a large decline .

Special Conservation Interests	Conservation Objective (NPWS 2014)	Population Trends (Kennedy <i>et al.</i> 2022)
Grey Plover (<i>Pluvialis squatarola</i>) [A141]	To maintain the favourable conservation condition of Grey Plover in Cork Harbour SPA	The long-term trend for the species is in a large decline .
Lapwing (<i>Vanellus vanellus</i>) [A142]	To maintain the favourable conservation condition of Lapwing in Cork Harbour SPA,	The long-term trend for the species is in a large decline .
Dunlin (<i>Calidris alpina</i>) [A149]	To maintain the favourable conservation condition of Dunlin in Cork Harbour SPA	The long-term trend for the species is in a moderate decline .
Black-tailed Godwit (<i>Limosa limosa</i>) [A156]	To maintain the favourable conservation condition of Black-tailed Godwit in Cork Harbour SPA	The long-term trend for the species is stable or increasing
Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157]	To maintain the favourable conservation condition of Bar-tailed Godwit in Cork Harbour SPA	The long-term trend for the species is in an intermediate decline .
Curlew (<i>Numenius arquata</i>) [A160]	To maintain the favourable conservation condition of Curlew in Cork Harbour SPA	The long-term trend for the species is in a moderate decline .
Redshank (<i>Tringa totanus</i>) [A162]	To maintain the favourable conservation condition of Redshank in Cork Harbour SPA	The long-term trend for the species is stable or increasing
Greenshank (<i>Tringa nebularia</i>) [A164]	To maintain the favourable conservation condition of Greenshank in Cork Harbour SPA	The long-term trend for the species is stable or increasing
Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179]	To maintain the favourable conservation condition of Black-headed Gull in Cork Harbour SPA	Not provided in Kennedy <i>et al</i> 2022. Listed as unknown in NPWS trends (NPWS 2012).
Common Gull (<i>Larus canus</i>) [A182]	To maintain the favourable conservation condition of Common Gull in Cork Harbour SPA	Not provided Kennedy <i>et al</i> 2022. Listed as unknown in NPWS trends (NPWS 2012).
Lesser Black-backed Gull (<i>Larus fuscus</i>) [A183]	To maintain the favourable conservation condition of Lesser Black-backed Gull in Cork Harbour SPA	Not provided Kennedy <i>et al</i> 2022. Listed as unknown in NPWS trends (NPWS 2012).
Common Tern (<i>Sterna hirundo</i>) [A193]	To maintain the favourable conservation condition of Common Tern in Cork Harbour SPA	Not provided Kennedy <i>et al</i> 2022. NPWS lists the overall long-term population trend for the species is listed as increasing (NPWS 2012)
Wetlands	To maintain the favourable conservation condition of the wetland habitat in Cork Harbour SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.	Not applicable

In summary, Table 4.2 shows that:

- Ten of the SCIs associated with the SPA are identified as having long term trends that are stable or increasing.
- Five SCI species have trends listed as undergoing an intermediate decline
- Two SCI species have trends listed as undergoing a moderate decline
- Three SCI species trends are subject to a large decline

- Three SCl species are listed as “unknown”

Site specific conservation objective mapping for the site has identified a number of roosting areas for birds associated with the SPA. The closest of these sites to the Proposed Development is located approximately 30m to the south of the Proposed Development. The roost is associated with the SCl species redshank, and greenshank. Additionally roost areas are identified from bird surveys (Winter 2022) in Section 3.2.4 above and outlined in Figure 3.5.

It is important to note that bird species associated with the SPA may utilise areas outside of the designated boundary for roosting or foraging. The site Conservation Objectives Supporting Document notes that “*several of the listed waterbird species may at times use habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it.*”

As outlined previously, the wintering bird survey carried out between January and March 2022 identified the following bird species (peak counts listed in brackets) in the vicinity that are SCIs of Cork harbour SPA:

- Bar tailed godwit (2)
- Black headed gull (543)
- Black tailed godwit (1400)
- Common gull (2)
- Cormorant (6)
- Curlew (58)
- Dunlin (155)
- Grey heron (1)
- Lapwing (78)
- Lesser black backed gull (13)
- Little grebe (3)
- Oystercatcher (42)
- Redshank (50)
- Shelduck (80)
- Teal (57)
- Wigeon (59)

4.4 Ballycotton Bay SPA

Ballycotton Bay is located 12.5km to the east of the Proposed Development. No direct hydrological connectivity was identified to the site, however there is potential for SCl species associated with the European site to occur in close proximity to works areas.

The site synopsis for the SPA (NPWS, 2015) notes that “*Situated on the south coast of Co. Cork, Ballycotton Bay is an east-facing coastal complex, which stretches northwards from Ballycotton to Ballynamona, a distance of c. 2 km*”. The synopsis also notes that “*The principal habitat within the site is inter-tidal sand and mudflats.*”

The Natura 2000 Standard Data Form is currently unavailable.

The SCIs for which the SPA is designated, the conservation objectives identified for them, and their current conservation status trends are outlined in Table 4.3.

Table 4.3: Special Conservation Interests for Ballycotton Bay SPA

Special Conservation Interests	Conservation Objective (NPWS 2014)	Population Trends (Kennedy <i>et al.</i> 2022)
Teal (<i>Anas crecca</i>) [A052]	To maintain the favourable conservation condition of teal in Ballycotton Bay SPA	The long-term trend for the species is stable or increasing
Ringed Plover (<i>Charadrius hiaticula</i>) [A137]	To maintain the favourable conservation condition of Ringed Plover in Ballycotton Bay SPA	The long-term trend for the species is in an intermediate decline .
Golden plover (<i>Pluvialis apricaria</i>) [A140]	To maintain the favourable conservation condition of Golden Plover in Ballycotton Bay SPA	The long-term trend for the species is in a large decline .
Grey plover (<i>Pluvialis squatarola</i>) [A141]	To maintain the favourable conservation condition of Grey Plover in Ballycotton Bay SPA	The long-term trend for the species is in a large decline .
Lapwing (<i>Vanellus vanellus</i>) [A142]	To maintain the favourable conservation condition of Lapwing in Ballycotton Bay SPA	The long-term trend for the species is in a large decline .
Black-tailed godwit (<i>Limosa limosa</i>) [A156]	To maintain the favourable conservation condition of Black-tailed Godwit in Ballycotton Bay SPA	The long-term trend for the species is stable or increasing
Bar-tailed godwit (<i>Limosa lapponica</i>) [A157]	To maintain the favourable conservation condition of Bar-tailed Godwit in Ballycotton Bay	The long-term trend for the species is in an intermediate decline .
Curlew (<i>Numenius arquata</i>) [A160]	To maintain the favourable conservation condition of Curlew in Ballycotton Bay SPA	The long-term trend for the species is in a moderate decline .
Turnstone (<i>Arenaria interpres</i>) [A169]	To maintain the favourable conservation condition of Turnstone in Ballycotton Bay SPA	The long-term trend for the species is in an intermediate decline .
Common gull (<i>Larus canus</i>) [A182]	To maintain the favourable conservation condition of Common Gull in Ballycotton Bay SPA	Not provided Kennedy <i>et al.</i> 2022. Listed as unknown in NPWS trends (NPWS 2012).
Lesser black-backed gull (<i>Larus fuscus</i>) [A183]	To maintain the favourable conservation condition of Lesser Black-backed Gull in Ballycotton Bay SPA	Not provided Kennedy <i>et al.</i> 2022. Listed as unknown in NPWS trends (NPWS 2012).

In summary table 4.3 shows that:

- Two of the SCIs associated with the SPA are identified as having long term trends that are stable or increasing.
- Three SCI species have trends listed as undergoing an intermediate decline
- One SCI species have trends listed as undergoing a moderate decline
- Three SCI species trends are subject to a large decline
- Two SCI species are listed as "unknown"

Given the location of the Proposed Development relative to the SPA boundary, there are no core roosting areas within the Zol of the proposed development. There is potential, as outlined previously, for SCI species to occur outside the boundaries of European Sites. The wintering bird survey carried out between January and March 2022 identified the following bird species (peak counts listed in brackets) in the vicinity that are SCIs of Ballycotton Bay SPA:

- Bar-tailed godwit (2)
- Black-tailed godwit (1400)
- Common gull (2)

- Curlew (58)
- Lapwing (78)
- Lesser black backed gull (13)
- Teal (57)

5 Impact Prediction

The potential for impacts on the QIs/SCIs of European sites, as outlined above, associated with the construction, operational and decommissioning phases of the Proposed Development are discussed hereunder.

5.1 Construction Phase Impact Types

The layout of the section is such that the overarching potential for impact types is outlined first and initially in greater detail in Section 5.1. Site impacts to specific European sites are then outlined in Section 5.3.

5.1.1 Noise and Vibration

Construction phase of the proposed development will result in temporary elevated noise levels associated with the Proposed Development. A number of QIs/SCIs associated with European sites in the vicinity of the proposed development have the potential, as outlined previously, to occur within the ZOI of the proposed development in particular between Chainage 340 and 800m.

5.1.2 Pollution/Sedimentation Associated with Construction

The proposed works will require shallow excavation. Where excavations are within areas with high water tables there may be a requirement for pumping out of these excavations. There is potential, therefore, for the generation of sediment laden water associated with the construction phase of the works.

Works will require the general use of concrete. There is potential for the accidental release of concrete due to these works into nearby drains or surface water features.

The potential for impacts to specific QIs/SCIs caused by pollution and sedimentation caused by the works is discussed below in the context of each European site.

5.1.3 Human, Lighting and Machinery Presence – Visual Disturbance

The presence of humans, lighting and machinery have potential to result in avoidance behaviours by wetland birds. This may alter feeding behaviours and deter birds from utilising important foraging areas specifically between Glounthaune station (Chainage 0) and Chainage 800m.

The potential for impacts to specific SCI species caused by human disturbance associated with the works is discussed below in the context of each European site.

5.1.4 Dewatering Associated with construction

There is potential for dewatering associated with construction to cause a localised draw down in groundwater. As outlined previously the ZOI for Groundwater Dependent Terrestrial Ecosystems (GWDTE) from excavations deeper than 1m to be a 250m buffer around the proposed development. While it is noted that Karst limestone bedrock underlies at least part of the proposed development, there are no GWDTEs associated with European sites located within the minimum 250m and indeed > 2km, of the proposed development.

5.1.5 Lighting

The majority of works along the railway track will take place at night (7pm to 7am) and therefore artificial lighting will be required. The lighting will be predominantly downward lighting to minimise light spill, however, the increase in light may affect birds roosting in the SPA.

5.1.6 Introduction/Spread of Invasive Species

As outlined previously, the following species listed under the 3rd Schedule were recorded during site walkovers:

- Japanese knotweed
- Three cornered leek
- Spanish bluebell
- Himalayan Balsam

Given the location of these species (Appendix B.) in relation to the Proposed Development there is potential for the accidental spread of these species which may cause degradation of QI habitat and supporting habitat for SCI species.

The potential for impacts to specific QI/SCI species caused by spread of invasives associated with the proposed development is discussed below in the context of each European site.

5.1.7 Dust

The proposed construction works will include excavation activities, drilling, stripping of soil and the storing of spoil material. Breaking out of surfaces is also required. All activities have the potential to result in the generation of dust over the duration of the construction works.

As outlined previously the ZOI of dust is taken to be 50m from the proposed development. The proposed development is located directly adjacent to the Great Island SAC and Cork Harbour SPA boundaries. These sites are therefore within the ZOI and there is potential for degradation of QI habitats due to dust deposition.

5.2 Operational Phase Impact Types

There is potential for a local increase in noise levels associated with increased frequencies of trains. This increase will be within the existing rail corridor where the baseline includes noise from trains which SCI birds are used to as it is a predictable type of disturbance removed from areas used by SCI birds.

There is potential for alterations to lighting regimes to cause increases in fugitive lighting at Water Rock Level Crossing only.

Maintenance works have the potential to result in the spread of invasive species.

5.3 Effect Pathways During Construction

The potential for impacts to each European site is outlined in the relevant section hereunder. In combination effects are provided in Section 5.4. Where the potential for impact is identified this is assessed against the conservation objectives in Section 6.

5.3.1 Great Island Channel SAC

Direct Impacts to Habitats

The works are located outside of, but in close proximity to QI habitats within the European site boundary. The SAC boundary extends onto the existing train track and adjacent made ground at a few locations between Chainage 0 and 800m. Any works areas here are entirely within non QI habitat. There is no potential, for direct impacts to existing QI or supporting non designated habitat within the SPA.

Potential for Noise and Vibration Effects

There are no noise or vibration sensitive QIs associated with Great Island Channel SAC.

Surface and ground water Emissions Associated with Construction

Mudflats and sandflats are associated with communities of invertebrates within the sediment. A degradation of water quality caused by pollution associated with the Proposed Development has the potential to result in damage and alterations to these communities.

Atlantic salt marsh has been found to be impacted by changes in water quality. These changes are, however, associated with changes to vegetation structure caused by enrichment (Perrin et al. 2020) as opposed to changes to pH or increases in sediment levels.

The potential for impacts to Mudflats and Sandflats associated with the Proposed Development have been identified. There is potential therefore, in the absence of mitigation, for impacts to QIs associated with Great Island Channel SAC caused by the Proposed Development during the construction phase.

There is a risk of ground collapse associated with karst cavities in bedrock. The construction of site compounds, access tracks and other construction activities, may result in temporary alterations to the distribution of groundwater recharge and/or surface flow pathways. In areas of outcropping karstic bedrock / karst features this could result in localised enhanced erosion, the creation of void features and/or subsidence.

There is a risk of pollution to the underlying aquifers from the construction works, specifically from unplanned fuel or chemical spillage, or the mobilisation of sub-surface contamination during excavation. The removal of the top layer of ground during excavation will increase the risk of groundwater pollution. This is of particular risk in areas of karst, due to the presence of voids and conduits which may provide preferential pathways for contaminant transport. However embedded mitigation such as the CEMP and a construction waste management plan will reduce this risk.

Several sites of groundwater-surface water interaction have been identified close to the proposed development, including Cork Harbour SPA. There is the potential that karst features in close proximity to the proposed development may be connected to these sites. This includes a potential connection between a swallow hole at Carrigtwohill and a spring at Ballintubid (Great Island Channel SAC).

There is a risk that any pollution incident arising from construction near karst features could impact the identified designated sites.

Potential for Spread of Invasive Species

As outlined previously, Japanese knotweed has been recorded in a number of locations within the works area. This species is being treated within the rail corridor where it occurs to control its spread and eradicate it.

Small pieces of rhizome have been found to be buoyant and can be dispersed by rivers (Rouified et al. 2011) or tides (Bailey 1994). There is potential for works in proximity to Japanese knotweed stands to result in the fragmentation of the Japanese knotweed into the Great Island Channel SAC

Himalayan balsam has been recorded upstream of Cork Harbour SPA. Himalayan balsam has been found to disperse readily through hydrochory (Love *et al.* 2013). There is potential for the works at the river crossing of the Owennacurra to cause the dispersal of Himalayan balsam downstream of the works areas.

Where these fragments and seeds wash downstream, there is potential for establishment of the plant species along the upper fringes of the salt marsh habitats. The formation of virtually monospecific stands is a well-known effect of invasive species that can cause a reduction in biodiversity in impacted habitats (Cronk and Fuller, 2001; van der Wal *et al.*, 2008; Hejda *et al.*, 2009; Love *et al.* 2013).

There is potential, therefore, in the absence of mitigation for impacts to QIs associated with Great Island Channel SAC caused by the spread of invasive species during the construction phase.

5.3.2 Cork harbour SPA

Direct Impact to Special Conservation Interests and Supporting Habitat

The Works are located outside of, but in close habitats used by SCI birds within the European site boundary. The SPA boundary extends onto the existing traintrack and adjacent made ground at a few locations between Chainage 0 and 800m. Any works areas are entirely within non bird habitat. There is no potential, for direct impacts to mudflat, saltmarsh or other habitats used by SCI birds within the SPA.

Pollution Associated with Construction

Deterioration in water quality associated with the works has, as outlined previously in relation to Great Island Channel SAC, the potential to result in a degradation of mudflat and sandflat habitats and invertebrates communities associated with the SPA. These mudflat habitats for key foraging habitat for a large number of birds associated with the SPA. There is potential therefore, in the absence of mitigation, for impacts to SCIs associated with Cork Harbour SPA caused by the Proposed Development during the construction phase.

Potential for Noise and Vibration Effects

The following SCIs associated with Cork Harbour SPA have been recorded within the ZOI to the Proposed Development:

- Bar tailed godwit (2)
- Black headed gull (543)
- Black tailed godwit (1400)
- Common gull (2)
- Cormorant (6)
- Curlew (58)
- Dunlin (155)

- Grey heron (1)
- Lapwing (78)
- Lesser black backed gull (13)
- Little grebe (3)
- Oystercatcher (42)
- Redshank (50)
- Shelduck (80)
- Teal (57)
- Wigeon (59)

The Institute of Estuarine and Coastal Studies (2009) has reported on the differing sensitivity in terms of responses to disturbance stimuli, of different bird species. The report notes that while birds can habituate to a low level of noise (below 50dB), irregular construction noise above 70dB can have a moderate to high effect. Disturbance caused by noise impulses has the potential to displace wintering birds away from foraging areas which are in proximity to the Proposed Development. This displacement if it is from a key foraging area in the absence of other suitable habitat has the potential to cause a loss in fitness of the species and reduce their capacity for migration at the end of the wintering season if noise impulses are ongoing throughout the winter.

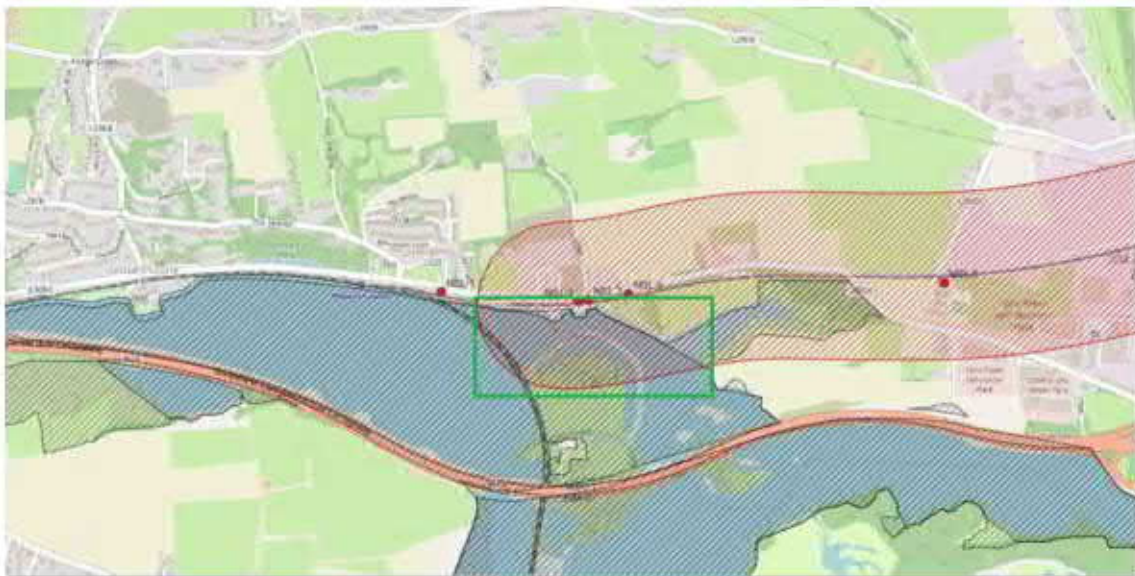
Noise modelling for the proposed development has been carried out and is detailed in Chapter 16 of the EIAR. The key findings in relation to noise and vibration during the construction phase, is the track installation work, with a maximum combined sound power level of 107.6 dBA at works areas, in the absence of mitigation. The distance at which the sound level falls below 65dB (potential disturbance level to birds) is determined as 54m (Figure 5.1). These buffers are estimated maximum extent and precautionary. It does not account for further noise reductions likely due to existing trackside trees/ woody vegetation.

The 65dB noise levels (Figure 5.1) only includes a very small portion of the edge of the SPA and will further reduce before it reaches the main mudflat areas and the northern edge of Harpers Island (important roost site for SCI birds). The 300m zone of temporary elevated noise (Figure 5.2) which will reduce to 50dB as it moves away from the shoreline (SPA edge) is indicated in below.

Figure 5.1: 65 dB Zol (Red Hatch) Overlap with SPA (Black Hatch)



Figure 5.2: 50dB (Red Hatch) Zol Overlap with SPA (Black Hatch)



It is important to note that these noise exceedances will be temporary and likely to be for a maximum of 14 days within the ZOI of birds on adjacent mudflats.

In summary temporary noise increases may possibly lead to localised temporary disturbance to roosting / foraging waterfowl. These noise exceedance effects are not likely to be significant given the short period of exceedance and noting works will likely be conducted outside the winter period (October – March inclusive) i.e., during the summer when bird numbers are much lower. The SPA is designated for wintering wildfowl so when works occur (summer) SCI bird numbers are much lower. Precautionary mitigation is outlined (Section 2.5) to minimise noise disturbance.

Visual Disturbance to SCI Species

The proposed development is located directly adjacent to the SPA boundary mudflats which form foraging and roosting habitat for SCI species. As such there is potential, in the absence of mitigation, for human presence (visual) to disturb SCI species within the SPA during the construction phase of the proposed development i.e., a temporary effect.

Lighting Disturbance to SCI Species

There will be increased lighting at night during the construction phase, which will be temporary. However, works in proximity to the SPA will be conducted during the summer months, avoiding effects on wintering birds species for which the SPA is designated.

Potential for Spread of Invasive Species

As outlined previously there is the potential for accidental spread of invasive species into the SPA boundary. Degradation of habitats within the SPA caused by invasive species has potential to detrimentally impact supporting habitat for SCI species.

There is potential, therefore, in the absence of mitigation for impacts to SCIs associated with Cork Harbour SPA caused by the spread of invasive species during the construction phase.

5.3.3 Ballycotton Bay SPA

Direct Impact to Special Conservation Interests and Supporting Habitat

The works are located entirely outside of the European site boundary. The closest extent of the proposed development to the SPA boundary is located approximately 12.5km to the west of the European site. There is no potential therefore, for direct impacts to supporting habitat within the SPA.

Pollution Associated with Construction

No hydrological connectivity which would result in the pollution of waters within Ballycotton Bay SPA has been identified. There is no potential for impacts to Ballycotton Bay associated with surface water emissions.

Potential for Noise and Vibration Effects

The wintering bird survey carried out between January and March 2022 identified the following bird species (peak counts listed in brackets) in the ZOI that are SCIs of Ballycotton Bay SPA:

- Bar-tailed godwit (2)
- Black-tailed godwit (1400)
- Common gull (2)
- Curlew (58)
- Lapwing (78)
- Lesser black backed gull (13)
- Teal (57)

As outlined previously, the Institute of Estuarine and Coastal Studies (2009) has reported on the differing sensitivity in terms of responses to disturbance stimuli, of different bird species. The report notes that while birds can habituate to a low level of noise (below 50dB), irregular construction noise above 70dB can have a moderate to high effect. The disturbance caused by the noise impulses has the potential to displace wintering birds away from *ex situ* foraging areas which are in proximity to the Proposed Development. This displacement, if it is from a key foraging area in the absence of other suitable habitat, has the potential to cause a loss in fitness

of the species and reduce their capacity for migration at the end of the wintering season if noise impulses are ongoing throughout the winter.

Noise modelling for the proposed development has been carried out and is detailed in Chapter 16 of the EIAR and effects to wintering birds are outlined in Section 5.3.2 above (Cork Harbour SPA).

It is noted that wintering birds may disperse between SPA sites including Ballycotton SPA and Cork Harbour SPA. Individuals from Ballycotton SPA will likely use Cork Harbour for relatively short periods (passage periods) and will widely disperse across suitable habitat so no effects are likely. Precautionary mitigation is outlined (Section 7.4) to minimise noise disturbance, if required.

Visual Disturbance SCI Species

The proposed development is located 12.5km from the boundary of Ballycotton Bay SPA. As such, there is no potential for direct visual disturbance within the boundary of the SPA. Given the record of SCI species within the ZOI of the proposed development, there is potential for visual disturbance of *ex situ* SCI species associated with Ballycotton Bay SPA. Precautionary mitigation is outlined (Section 7.4) to also minimise visual disturbance, if required.

Potential for Spread of Invasive Species

The proposed development is located 12.5km from the boundary of Ballycotton Bay SPA with no potential for downstream spread of invasive species into the boundary of the site.

As outlined previously there is potential for the spread of invasive species into nearby habitats which are used by *ex situ* species associated with Ballycotton Bay SPA. As such, there is potential for degradation of supporting habitat used by *ex situ* species associated with Ballycotton Bay caused by spread of invasive species.

5.3.4 Effect Pathways during Operation

The following effect pathways have been identified associated with the Operational Phase of the Proposed Development:

The operational phase will result in increased frequency of train operations. This has potential to result in a localised increase in noise levels of between 3 and <10dBA within 300m of the rail line. Some of these locations include areas within Cork Harbour SPA, refer to Figure 5.3.

Figure 5.3: Operational Noise increase (between 3 and <10dBA) Zone



Source: Mott MacDonald 2022. Note: Black hatch = Cork Harbour SPA

Wintering birds in the vicinity of the existing tracks are already subject to regular noise and visual disturbance due to the operation of the railway. Given the habituation exhibited by wintering birds in the area, this is not likely to result in a significant effect on wintering birds. Water birds regularly adapt to non-impulsive predictable noise, similar to train noise, even immediately adjacent to significant noise sources e.g., roads and rail running adjacent to wintering waterfowl sites in Dublin Bay and elsewhere in Cork Harbour.

It is considered that there is no potential for a significant increase in noise effects on SCI species (ex situ for Ballycotton Bay, and within the SPA boundary at Cork Harbour). As outlined in Chapter 16 of the EIA "noise and vibration levels will be below levels considered to result in significant adverse effects". The operational noise levels will be at the same locations as current (baseline) i.e. within the existing rail corridor which birds are accustomed to.

No change will arise to operational lighting in the vicinity of any European sites.

Maintenance works have the potential to cause increased spread of invasive species in the absence of mitigation within Cork Harbour SAC/ SPA specifically.

5.3.5 Summary

The Proposed Development has the potential to result in the following impacts at the construction phase of the works, as outlined below in Table 5.1.

Table 5.1: Potential for Impact in the Absence of Mitigation Identified

European site	Construction-Phase Impacts	Operation-Phase Impacts
Great Island Channel SAC	Potential for degradation of Mudflats and sandflats caused by pollution of watercourses	None
	Potential for degradation of Atlantic salt marsh due to invasive species spread	Degradation of supporting habitat caused by invasive species spread during maintenance.
Cork Harbour SPA	Degradation of wetland habitat within the SPA boundary caused by pollution	None

European site	Construction-Phase Impacts	Operation-Phase Impacts
	Potential for noise and visual disturbance to SCI populations of within Zol.	Localised temporary disturbance to birds possible
	Degradation of supporting habitat caused by invasive species spread	Degradation of supporting habitat caused by invasive species spread during maintenance.
Ballycotton Bay SPA	Potential for impact to <i>ex situ</i> supporting habitat of SCI species	Localised temporary disturbance to birds possible
	Noise and visual disturbance impacts to SCI populations within Zol	
	Degradation of supporting habitat for SCIs caused by invasive species spread	None

5.4 Plans and Projects Which Might Act In-Combination

Article 6(3) of the Habitats Directive requires that:

Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives.

It is therefore required that the potential impacts of the Proposed Development are considered in combination with any other relevant plans or projects. A search of planning applications in the vicinity of the works was undertaken in July 2022 to examine projects with potential for in combination effects.

5.4.1 Plans

Cork County Development Plan 2022-2028

The Proposed Development is located within the Cork County administrative area. The document includes objectives and policies which are associated within the protection of the natural environment. These are informed in part by an Appropriate Assessment which was undertaken to ensure that any likely effects of the plans' policies were considered in order to avoid any such adverse impacts.

The initial draft County Development plan was screened for Appropriate Assessment. Certain policies were identified which had potential to result in impacts to European sites. Amendments were made to the development plan which ultimately screened out the potential for impact to European sites.

5.4.2 Projects

Projects identified in the vicinity of the proposed development (valid, non-lapsed applications made in the last five years) are presented below in Table 5.2.

Table 5.2: Plans and Projects which may act in combination

Development	Reference (planning or other)	Location	Summary of Details	Appropriate Assessment Findings and Potential for Significant Impact
Local Authority Own Development – Part 8 (Cork County Council)				
Burys Bridge, Kilcoolishal to Carrigtwohill via Glounthaune Pedestrian and Cycle scheme.	ABP confirmed associated CPO (Ref. CH04.310856) on 04/08/2021	Burys Bridge, Kilcoolishal to Carrigtwohill	<p>From the approved drawings, it is noted that a new bridge is proposed at eastern edge of Carrigtwohill. The Scheme involves the construction of a dedicated pedestrian and cycle route on the northern side of the L3004 (the former N25) road and includes the following:</p> <ul style="list-style-type: none"> A general cross section of 3m wide shared pedestrian and cycle path with a 1m landscaped separation between the path and the public road where possible; Formalised parking and controlled (i.e. traffic signals) pedestrian crossings; New footpaths, ducting and LED public lighting Approved Part 8: 2020 	<p>The scheme is located immediately adjacent to the proposed development extending out further to the west, and stopping at Carrigtwohill.</p> <p>An Appropriate Assessment Screening Report was produced for the scheme. The report identified that there is potential for a low-volume of sediment release into Great Island Channel SAC and Cork Harbour SPA albeit at levels which would not cause a significant effect to the European sites.</p> <p>The report also notes that there is potential for disturbance for SCI species associated within the SPA. It determined that given the short-term nature of the works there was no potential for significant effects.</p> <p>The CPO for the project was confirmed in August 2021. Given the location and potential timing of these works (i.e. construction phase may run concurrently with that of the Proposed Development) the potential for in-combination effects through noise disturbance to SCI species is identified.</p>
Carrigtwohill to Midleton Inter-Urban Cycleway -		Carrigtwohill to Midleton	<p>The construction of a dedicated pedestrian and cycle route from the western side of the L3616-0 west of Carrigtwohill to the south of L3617-0 the east of Carrigtwohill. Dedicated pedestrian and cycle links will be provided from this route to the Carrigtwohill Train Station, the planned Carrigtwohill School's Campus (planning reference 19/5707) and along the L3617-0. The proposed development includes the following:</p> <ul style="list-style-type: none"> A general cross section of 4m wide shared pedestrian and cycle path with public lighting and landscaping on both sides; 2 no. pedestrian/ cyclist bridges including one over the Cork to Midleton railway line. 1 no. railway underpass (at existing underpass structure) 	<p>The project is located immediately adjacent to the Proposed Development. Given the timing of the application, there is potential for the works to be carried out concurrently to the Proposed Development.</p> <p>An Appropriate Assessment screening report was produced for the scheme which identified potential project impacts through noise, surface water pollution, and invasive species spread. The report found that given the location of the scheme in relation to European sites (1.3km away) that there is no potential for impact to the Natura 2000 network.</p> <p>Given the location of the Carrigtwohill to Midleton Inter-urban cycle scheme in relation to the nearest European sites, no potential for in-combination effects associated with the Proposed Development have been identified.</p>

Development	Reference (planning or other)	Location	Summary of Details	Appropriate Assessment Findings and Potential for Significant Impact
Ballinacurra to Midleton pedestrian and cycle route	ABP - MA0011 and HA0039	Cork City	<ul style="list-style-type: none"> 1 no. road underpass of the L3617-0; At grade pedestrian/ cyclist crossings of existing roads (L3616-0, L3603-0, L3606-37, L7641-0 and L3617-0) The scope of the scheme includes a new cycle and footbridge over the existing rail line Traffic calming measures on existing roads (L3616-0, L3603-0, L3606-37, L7641-0 and L3617-0). Live Part 8 process: consultation closed January 2022. 	<p>The project is located in close proximity to the Proposed Development, on the eastern end of the site. The Part 8 for the scheme was approved in 2020 and documentation supporting the project indicates it is anticipated to take 5 years for the installation of the scheme. As such, there is potential for works to take place concurrently with the Proposed Development.</p> <p>An Appropriate Assessment screening report was produced for the scheme which concluded that the project does not pose a risk of causing significant negative effects to European Sites due to the topography, location and nature of the works.</p> <p>Works will be required within, and directly adjacent to the Cork Harbour SPA, and the screening report outlines minor temporary disturbance to wintering birds within the SPA. Given the location and timing of the works, there is potential for cumulative impacts due to disturbance of SCI species associated with Cork Harbour SPA.</p>
			<p>The construction of a dedicated pedestrian and cycle route from Ballinacurra to Midleton Train Station and includes the following:</p> <ul style="list-style-type: none"> A mixture of segregated cycle facilities, shared use pedestrian and cycle paths and greenway. A one-way system for traffic from the south of the Ballick Road to Charlestown Wharf. A traffic light shuttle system at the N25 underbridge on the Ballick Road. Works are proposed to Protected Structure Ref number 00517 on Ballick Road. An underbridge under the existing Irish Rail railway line. New footpaths, Controlled Crossings, Bus Stop <p>The Part 8 planning application was approved in 2020</p>	
Dunkettle Interchange Improvement Motorway Scheme			<p>The scheme relates to the proposed provision of an improved interchange at the location of the existing Dunkettle Interchange at the intersection of the N8, the N25 and the N40 in the townland of Dunkettle, Co. Cork.</p> <p>The scheme comprises a series of direct road links between the above existing elements of road infrastructure and also provides links to the R623</p>	<p>The scheme is located approximately 3km to the west of the proposed development. An NIS was written to support the planning application for the scheme.</p> <p>Potential impacts to European sites were identified through disturbance to SCI species, and surface-water run-off. Mitigation measures for these impacts are</p>

Development	Reference (planning or other)	Location	Summary of Details	Appropriate Assessment Findings and Potential for Significant Impact
Ballyadam Proposed new 110kV substation and associated works	ABP - VC04.309585	Ballyadam, former Amgen site	Regional Road in Little Island and Bury's Bridge in Dunkettle. In particular, the proposed development includes direct road links for northbound traffic exiting the Jack Lynch Tunnel to access the N25 in the East and for southbound traffic on the N8 to access the Jack Lynch Tunnel southbound and vice versa. The scheme also includes a direct link for N8 traffic heading east towards the existing Dunkettle Interchange to gain access onto the M8 Northbound or directly under the existing N8 to access Bury's Bridge. Other links are also provided. The scheme is currently under construction.	outlined in the NIS and have been incorporated into the planning conditions for the scheme. The scheme is due to finish construction in Q1 2024. As such there is potential for works to run concurrently with the Proposed Development. However, given the location of the Proposed Development relative to the Dunkettle scheme, and the implementation of the outlined mitigation measures no potential for in-combination effects is identified.
				Consultation has been commenced with An Bord Pleanála but at the time of writing has not been completed. Given that the project has not yet been defined at the time of writing, the extent of any potential impacts is unclear. Following the submission of the application, the project will be subject to the provisions of the Directive, i.e. requiring screening for Appropriate Assessment in its own right. However, given the location of the proposed new substation relative to European sites and the proposed development, no potential for in-combination effects is anticipated.
Water Rock Urban Expansion Area Infrastructure Works	Local Authority Own Development – Part 8 Approved with Modifications	Water-Rock (townland), west of Middleton	Various infrastructural works and services – <ul style="list-style-type: none"> Traffic Management Measures for Water Rock Road (L3618) – Erection of bollards within the existing Water Rock public road (L3618) each side of the railway line to close the level crossing to vehicular traffic. Railway level crossing to remain operational and access across the level crossing will be maintained for pedestrians and cyclists. Bridge over Railway and Extension to Services Corridor Link Road – New bridge over the Cork to Middleton railway line 	The scheme bisects the Proposed Development on the eastern side, running north to south. An Appropriate Assessment screening report was written to support the planning application. The screening report outlined that disturbance to SCI species is not anticipated due to the nature, scale and location of the project. The report also stated that while there is potential for surface water emissions, any effects will be negligible. Given the nature, scale and location of these works relative to the European sites and the proposed development, no potential for in-combination effects is anticipated.

Appropriate Assessment Findings and Potential for Significant Impact

Summary of Details

- connecting the Services Corridor Link Road to lands to the south of the railway line and new serviced road corridor with footpaths and cycle tracks to access the proposed railway stop and bridge and ancillary works
- Railway Stop – New railway stop along the Cork to Midleton railway line consisting of a platform and shelter, drop-off area, cycle parking, disabled parking and access, ticket machines and ancillary works
 - Approved Part 8: March 2019

PCI & Strategic Infrastructure Development and Strategic Housing Development Applications: Application made directly to ABP

North Midleton Wastewater pumping station	Future Irish Water application to Cork County Council	Water-Rock and various townlands	<p>Proposed construction of a new wastewater PS and associated network infrastructure (rising mains and gravity sewers) to transfer loads from Midleton WWTP to Carrigrohilly WWTP via Waterrock PS.</p> <p>The connection to Waterrock PS will require a trenchless sewer connection under the Owenacurra River and requires two crossing beneath the Cork to Midleton rail line, one via an existing sleeve under the rail line, and a second crossing via a new sleeve (townland of Carrigrohilly).</p>	<p>Given that the project has not yet been fully defined at the time of writing, the extent of any potential impacts is unclear.</p> <p>Following the submission of the application, the project will be subject to the provisions of the Directive, i.e. requiring screening for Appropriate Assessment in its own right. However, given the location relative to European sites and the Proposed Development, no potential for in-combination effects is anticipated.</p>
South Midleton Wastewater Network Diversion Project	Future Irish Water application to Cork County Council	Townparks	<p>This project seeks to transfer further loads to Carrigrohilly WWTP via a wastewater pumping station located east of Ballick Road within the southern half of Midtown, via a rising main to Midleton North Pumping Station to cater for loads for future developments in Midleton town centre and wider area.</p>	<p>Given that the project has not yet been fully defined at the time of writing, the extent of any potential impacts is unclear.</p> <p>Following the submission of the application, the project will be subject to the provisions of the Directive, i.e. requiring screening for Appropriate Assessment in its own right. However, given the location relative to European sites and the Proposed Development, no potential for in-combination effects is anticipated.</p>
Celtic Interconnector	310798	Townlands of Ballynanelagh, Ballyadam and other various townlands, County Cork	<p>EirGrid - Proposed development of that portion of an electricity transmission interconnector (Celtic Interconnector) to be constructed onshore in Ireland to the mean high-water mark, including a connection to the Irish National Grid, an electricity converter station and all associated and ancillary works.</p> <p>The project was granted May 2022</p>	<p>The Celtic Interconnector project runs on-shore from Claycastle in Youghal and terminates at the Ballyadam site, which is located immediately south of the proposed development. The project is expected to be completed in 2026.</p> <p>An NIS was written for the project which outlined potential impacts through surface-water emissions,</p>

Development	Reference (planning or other)	Location	Summary of Details	Appropriate Assessment Findings and Potential for Significant Impact
Harpers Creek	ABP-301197-18	Harpers Creek	O'Mahony Developments - 174 No residential units (201 No houses and 88 No. apartments); 35 place creche & doctor's surgery. Granted - 29/05/2018	spread of invasive species, and disturbance of <i>ex situ</i> SCI bird species. Mitigation measures have been outlined within the reporting to ameliorate any impacts to European sites Given the location of this development, the nature of the impacts described (particularly in relation to the western extent of the Celtic Interconnector), and the mitigation measures to be employed, no potential for in- combination effects is identified. A screening for Appropriate Assessment was carried out by An Bord Pleanála. The report concluded that "by <i>itself or in combination with other development in the vicinity, the proposed development would not be likely to have a significant effect on any European Site in view of the sites' conservation objectives, and that a Stage 2 Appropriate Assessment is not, therefore, required.</i> " The development is currently under construction with phase three due to be released imminently. Given the stage the development is at, and the location of the scheme relative to European sites and the Proposed Development no potential for in-combination effects is identified.
Ballynaroan Housing development	ABP Ref. 312658	Ballynaroan, Glounthaune, Co. Cork.	Ruden Homes Ltd (Agent: Brian McCutcheon: McCutcheon Halley Planning Consultants) Demolition of an existing buildings, construction of 112 no. residential units (72 no. houses, 40 no. apartments). Lodged with ABP: 07/02/2022	The Ballynaroan housing development is located north of the Proposed Development. An Appropriate Assessment screening report has been submitted as part of the planning application. The housing development is set back from the SPA and SAC and is buffered by an existing road and the railway. The Appropriate Assessment produced for the scheme concluded that "In view of best scientific knowledge this report concludes that the proposed development at Ballynaroan, individually or in combination with another plan or project, will not have a significant effect on any European sites." Given the nature and location of the housing development works, no potential for in-combination effects is identified.

Development	Reference (planning or other)	Location	Summary of Details	Appropriate Assessment Findings and Potential for Significant Impact
BAM Property Limited - housing development	311855 – ABP SHD Pre-App Consultation	Castlelake, Terry's land and Carrigtohill (townlands).	BAM Property Limited - 706No residential units (239No houses, 467 No apartments, creche and associated site works. Signed 28/02/2022	The housing development is located immediately south of the Proposed Development. An NIS was produced for the project. The report identified the potential for effects on Great Island Channel SAC, and Cork Harbour SPA. Impacts were identified through insignificant low-level disturbance effects to grey heron, and surface water emissions. Mitigation measures were prescribed to ameliorate surface water impacts. Given these measures, and the development location relative to European sites, no potential for in-combination effects is identified.

Section 34 Planning Applications lodged with Cork County Council

Bluescape Development	17/5699	Bluescape Development	Bluescape Ltd, 31 No 2-storey houses - 21/05/2018 - Granted on appeal by ABP (Ref. ABP-300128-17)	<p>The Bluescape development is located approximately 1km to the north west of the proposed development.</p> <p>The inspector's report for the application notes that "... the proposal individually or in combination with other plans or projects, would not adversely affect the integrity of the Great Island Channel Special Area of Conservation (SAC) (site code 1056) or Cork Harbour Special Protection Area (SPA) (site code 4030) having regard to the nature and scale of the proposed development, infrastructure services in place and separation distances involved to adjoining Natura 2000 sites. It is also not considered that the development would be likely to have a significant effect individually or in combination with other plans or projects on a European Site."</p> <p>Given the location and nature of the Bluescape Development. No potential for in combination effects is identified.</p>
Church Road Development, Murnane & O'Shea Ltd	174498	Church Road, Carrigtohill, Co. Cork	Residential development of 25 no. residential units and all ancillary site development works. The proposed development consists of 20 no. 3 bed semi-detached dwellings, 4 no. 2 bed semi-detached dwellings and 1 no. 3 bedroom detached dwelling. Granted 03/03/2017	<p>The location of this development is approximately 500m from the Proposed Development. The houses associated with the development have already finished construction</p> <p>Given the location of this development, and that the works associated with this scheme have been</p>

Development	Reference (planning or other)	Location	Summary of Details	Appropriate Assessment Findings and Potential for Significant Impact
Bluescape Ltd	175315	Cluain Cairn, Station Road, Carrigrohilly, Co. Cork	Construction of 19 no. 2 storey dwelling houses and all ancillary site development works. The proposed development consists of 7 no. 2 bed townhouses, 10 no. 3 bed townhouses, and 2 no 3 bed semi-detached dwellings. Ancillary site development work. Granted 26/05/2017	completed, no potential for in-combination effects is identified. The location of this development is approximately 300m from the Proposed Development. The houses associated with the development have already finished construction Given the location of this development, and that the works associated with this scheme have been completed, no potential for in-combination effects is identified.
Cork Co-operative Marts Ltd	175516	Market Green, Knockgriffin, Middleton	Construction of a residential development of 42 no. residential units and a community room. The proposed development consists of the demolition of the existing Educate Together School and ancillary structures located on the eastern portion of the site, extinguishing the existing vehicular access to the north. New vehicular & pedestrian access to the west of the site onto Knockgriffin Rd; Granted 27/10/2017	The location of this development is approximately 300m from the Proposed Development. The development has already finished construction phase. Given the location of this development, and that the works associated with this scheme have been completed, no potential for in-combination effects is identified.
Stryker Ireland Ltd	185546		Extension to Manufacturing facility: 6,235m ² . Will be carried out on a phased basis – Phase 1 has been implemented, Phase 2 remains to be implemented. Granted 08/08/2018	This development is located immediately adjacent to the Proposed Development. A report for the screening for appropriate assessment was completed for this development. The report concluded that there is no potential for the proposed development to significantly impact on Natura 2000 sites. Given the location of the site relative to European sites, and the nature of the works, No potential for in-combination effects is identified.
Castle Rock Homes (Middleton) Ltd	186553	Middleton	Construction of 26 no. dwelling houses consisting of 8 no. 5 bedroom detached dwelling houses and 18 no. 3 bedroom semi-detached dwelling houses and all ancillary site works.	The location of this development is approximately 500m from the Proposed Development. The construction phase of this housing development has commenced with two phases complete as of 2020. Given the location of this development, and the stage of development, no potential for in-combination effects is identified.
Park Hill View Estates Ltd,	187236	Broomfield West, Middleton. NE of existing	Demolition of existing sheds and construction of 41 no. residential units. The proposed development includes the demolition of existing sheds (2 no.	This housing development is located approximately 800m from the Proposed Development.

Development	Reference (planning or other)	Location	Summary of Details	Appropriate Assessment Findings and Potential for Significant Impact
		Carrigtohill station	agricultural sheds) and the construction of 2 and 3 storey detached and semi-detached houses and the provision of landscaping, car parking and all assoc. infrastructural and site development works, including widening of L-7630 Broomfield Road and provision of pedestrian footpath. Granted - 20/08/2019	A report for the screening for appropriate assessment was completed for this development. The report concluded that given the location of the development relative to European sites, and the lack of connectivity between both, no potential for impacts was identified. Given these factors, along with the location of the housing development relative to the proposed development, no potential for in-combination effects is identified.
Castle Rock Homes (Middleton) Ltd	187321	Middleton	The construction of 13 no. dwelling houses consisting of 12 no. 3 bedroom semi-detached dwelling houses and 1 no. 3 bedroom detached dormer dwelling house and all ancillary site works. Granted 12/02/2019	The location of this development is approximately 500m from the Proposed Development. The construction phase of this housing development has commenced with two phases complete as of 2020. Given the location of this development, and the stage of development, no potential for in-combination effects is identified.
Murnane & O'Shea Ltd	194124	Carrigane Rd. Carrigtohill (townland), Carrigtohill	The construction of 94 no. dwelling houses and all ancillary site works. The proposed residential development represents a change of house type from that permitted under Cork County Council planning reference 06/10171 (as amended under planning ref. 14/4654). Granted 13/01/2020	The location of this development is approximately 200m south of the Proposed Development. Ecological review was provided for this development which noted that due to the location of the development and the lack of connectivity to European sites, no potential for significant impacts was identified. Given these factors, along with the location of the housing development relative to the proposed development, no potential for in-combination effects is identified.
Anceltierre Investments Ltd,	194216	Avoncora Mill Rd, Broomfield West, Middleton	Construction of 40 no. dwelling houses consisting of 2 no. 2 bedroom townhouses, 28 no. 3 bedroom townhouses, 8 no. 3 bedroom semi-detached dwelling houses and 2 no. 4 bedroom semi detached dwelling houses and all ancillary site works. Granted 02/08/2019	The location of this development is approximately 200m from the Proposed Development. The development is located on the banks of the Owencurra river which is also crossed by the Proposed Development. A Natura Impact Statement was produced as part of the application process for the development. Potential impacts associated with the scheme included release of surface water emissions, spread of invasive species, noise impacts. Mitigation measures relating to the protection of groundwater and watercourses, management of invasive species, and noise reduction are prescribed as part of the development.

Development	Reference (planning or other)	Location	Summary of Details	Appropriate Assessment Findings and Potential for Significant Impact
Smithkline Beecham (Cork) Ltd	204090	IDA Business & Technology Park, Killacloyne, Carroghtohill	The development will consist of (1) a single storey laboratory building to include plant and equipment area, office area, meeting rooms, canteen and kitchen, staff toilets, laboratories, IT room, electrical switch rooms and store rooms. The main laboratory bldg is 6.1m high, 44.5m long and 21.5m wide; incl. 19No new car pkg spaces. Granted 23/04/2020	Given the mitigation measures as outlined in the NIS, the location of the development relative to the Proposed Development, and European sites, no potential for in-combination effects is identified. This development is located immediately adjacent to the Proposed Development. Low level, short term, disturbance impacts to wintering curlew were identified associated with the development of the laboratory. The development of the site is currently under construction. Given the timing of these works (i.e. will be completed ahead of the Proposed Development) no potential for in-combination effects is identified.
The Cork Education and Training Board - Post Primary School accommodation:	204810	Fota Retail & Business Park, Killacloyne, Carrigtwohill.	Installation of 8no prefab units and associated surfacing and drainage – temporary permission for a period of no longer than 5 yrs. Granted 03/07/2020	This development is located immediately adjacent to the Proposed Development. The planning documentation identified three phases of accommodation needs for the accommodation ranging from ending in 2022. Given that the nature, scale and timing of the works, no potential for in-combination effects is identified.
Middleton Association Football Club Ltd	214154	Immediate south of Middleton Station	The construction of a full size all weather playing surface on pitch number two, floodlighting, surrounding fencing, ball catching nets and all associated site development works on the club grounds. Granted 22/03/2021	This development is located 300m south of the proposed development. Given the nature, scale and location of the development relative to both the Proposed Development and European sites, no potential for in-combination effects is identified.
Mumane & O'Shea Ltd	214267	Carrigane Rd. Carrigtwohill (townland), Carrigtwohill	The construction of 10 no. 4 bed semi-detached dwelling houses and all ancillary site development works. The proposed development is a change of plan from that previously permitted under Cork County Council planning application reference 19/4124. Granted 01/04/2021	The location of this development is approximately 200m south of the Proposed Development. Ecological review was provided for this development which noted that due to the location of the development and the lack of connectivity to European sites, no potential for significant impacts was identified. Given these factors, along with the location of the housing development relative to the proposed development, no potential for in-combination effects is identified.

Development	Reference (planning or other)	Location	Summary of Details	Appropriate Assessment Findings and Potential for Significant Impact
Barlow Properties Ltd	215072	Ashbourne House, Johnstown, Glounthaune	94no. residential units (comprising 5no. 4-bed detached dwelling houses, 3no. 3-bed detached dwelling houses, 9no. 3-bed apartments, 4no. 3-bed duplex apartments, 65no. 2-bed apartments and 8no. 1-bed apartments in 8no blocks ranging in height from 2-4storey.	This development is located immediately north west of the proposed development. Conditional permission was granted for this development in May 2022, which has since been appealed. A screening for Appropriate Assessment has been submitted as part of this application. The report notes that the site is screened by mature trees and infrastructure such that any disturbance or displacement is extremely unlikely. Given these factors, no potential for in-combination effects is identified.
Murnane & O'Shea Ltd	215150	Carrigtohill (townland), Carrigtohill	The construction of 67 no. dwelling houses and all ancillary site works. The proposed development consists of the construction of 34 no. 4 bedroom dwellings, 30 no. 3 bedroom dwellings and 3no. 2 bedroom dwellings. Access to the proposed development via estate entrance (2nd phase of 'Elmbury' development); Granted 08/12/2021	This development is located approximately 250m to the south of the Proposed Development. Given the location of this development in the context of the European sites in the wider landscape, no potential for in-combination effects is identified.
Park Hill View Estates Ltd,	215664	at Broomfield West, Middleton, Co. Cork	A temporary waste water treatment system to serve the permitted housing consent 18/7236 (a consent for 41 houses), including ancillary links, connections to the public foul system, local servicing and access off the. Granted 16/09/2021	This temporary waste water treatment system is located north of the Proposed Development. The development is located outside of any European sites, the closest of which is located 1.7km to the south, with no identified direct hydrological linkages. Given the nature and location of this development, no potential for in-combination effects is identified.
Compass Homes Ltd	216240	Station Road, Carrigtohill, Carrigtohill (townland), Co. Cork	Construction of 38 houses and a café; ABP decision due: 20/06/2022	This development is located approximately 500m to the south of the Proposed Development. Given the location of this development in the context of the European sites in the wider landscape, no potential for in-combination effects is identified.
Vella Homes Ltd	216874	Junction of Mill Rd & Northern Relief Rd, Broomfield West, Middleton.	The construction of a mixed-use residential development with café/community space and all ancillary site works. The proposed development provides for the construction of 57 no. residential units comprising 4 no. 3 bedroom two storey townhouses and 53 no apartment/ duplex units; Close proximity to sln - NW side on opposite side of bridge. CEMP indicates a potential construction start	This development is located approximately 180m north of the proposed development. An NIS was produced for this development which identified the potential for impacts to Cork Harbour SPA and Great Island Channel SAC. Potential impacts were identified in relation to surface water runoff, and in-combination impacts. Mitigation for these impacts has been identified to ameliorate any effects associated with the works on

Development	Reference (planning or other)	Location	Summary of Details	Appropriate Assessment Findings and Potential for Significant Impact
Connaught Trust Limited	217130	Ballyadam and Carrigtohill (townland), Carrigtohill.	63No Residential units (47No houses and 16No duplex apartment units); vehicular entrance from upgraded site entrance from the Bog Road.	European sites. As such, no potential for in-combination effects is identified. This development is located immediately south of the Proposed Development. A screening for Appropriate Assessment was submitted as part of the documentation supporting the planning application. The report concluded that "The proposed development at Ballyadam and Carrigtohill, either alone or in- combination with other plans and/or projects, does not have the potential to significantly affect any European site, in light of their conservation objectives." As such, given the location of the development in relation to European sites, no potential for in- combination effects is identified.
EMR Projects Ltd	217264	Knockgriffin and Water Rock, Middleton	284No Residential units on 6.7Ha site; 7.525sqm is non-residential (childcare facility, retail unit; café unit; medical clinic; office units and associated ancillary accommodation). FI requested 07/02/2022	This development is located immediately north of the proposed development. An Appropriate Assessment Screening report was produced in support of the planning application. The report concluded that "... the proposed development, either individually or in combination with other plans or projects, is not likely to have a significant effect on the Cork Harbour SPA, the Great Island Channel SAC or any other European sites, in view of best scientific knowledge and the Conservation Objectives of the sites concerned." Given the nature and location of the works relative to European sites, no potential for in-combination effects is identified.
IDA Ireland	217374	Carrigane Rd, Ballyadam, Carrigtohill	New site access, local road improvement works and site development works comprising; new vehicular site entrance from L-7642 (Hedgy Boreen) including approx. 34m of internal stub road; road improvement works to approx. 140m of the northern end of the L- 7642 to widen approx. 80m of carriageway and provide a grass verge and new setback boundary to the north and south of proposed entrance;	This development is located immediately south of the proposed development. An Appropriate Assessment Screening report was produced in support of the planning application. The report concluded that "... it can be excluded, on the basis of objective information, that the proposed development, individually or in combination with other

Development	Reference (planning or other)	Location	Summary of Details	Appropriate Assessment Findings and Potential for Significant Impact
			Improvement of sightlines along L-3617. Granted 18/02/2022	<i>plans or projects, will have a significant effect on a European site".</i>
				Given the nature and location of the works relative to European sites, no potential for in-combination effects is identified..
				This development is located approximately 200m south of the proposed development. A request for further information has been made by the planning authority due to potential for loss of and damage of QI habitats, impact to supporting habitat for QI and SCI species, and risk of disturbance to SCI species. Following the submission of the required information, the project will be subject to the provisions of the Directive, i.e. requiring screening for Appropriate Assessment in its own right. However, given the location relative to European sites and the Proposed Development, and given the uncertainty surrounding the potential for impacts, there is potential identified for in-combination effects .
Cruachan Investment Limited Partnership	217424		Construction of 13 no. warehouse/light industrial units in 3 no. buildings with ancillary two storey offices internally and associated site works (part of previous permitted development under planning reg no. 06/6741 and extension of permission Reg No. 1	

5.4.3 In-Combination Effects

Cork Harbour SPA and Great Island SAC

The conservation objectives supporting document for Cork harbour SPA (NPWS 2014e) notes the following historic activities which have caused habitat loss and degradation in habitats associated with Cork harbour SPA and Great Islands SAC:

- Loss of habitat associated with the Dunkettle roundabout
- Reclamation of land at Marino point, Rushbrooke, brown Island, Long Point, Adhada, and Ringaskiddy
- Construction of the Slatty Bridge Sluice cutting off intertidal zone and some salt marsh habitat
- The expansion of towns and villages which has required an expanding road network with many roads being built on the edges or across intertidal mudflats (Smiddy et al. 1995) with resulting habitat loss.
- General development of nearby farmland
- Grazing in salt marsh habitats

The Proposed Development will not result in land take, reclamation or change of use of any lands within any European sites.

It is noted that Cork Harbour has a history of problems which are caused by water pollution and eutrophication (NPWS 2014e). This is caused by enrichment of the coastal waters caused by wastewater discharges. The proposed development will not result in wastewater enrichment of coastal waters.

The type of potential effects that could arise from the Proposed Development alone are not outlined as issues in relation to achieving conservation objectives for the SAC. There is potential for temporary (construction phase) indirect disturbance effects, to relatively small numbers of SCI birds, principally associated with Cork Harbour SPA. The area where disturbance may arise is between Glounthaune station, east to chainage 850m, where intertidal mudflats used by roosting birds occur immediately adjacent to construction works from the proposed development. These effects are not likely to be significant. No other developments of note occur in this area.

In summary, no measurable additional effects are likely to Cork Harbour SPA and Great Island SAC from the other developments.

Ballycotton Bay SPA

The conservation objectives supporting document for Cork harbour SPA (NPWS 2014e) notes the following historic activities which have caused habitat loss and degradation in habitats associated with Ballycotton Bay

- Drainage works, and flood prevention
- Coastal erosion
- Construction of car-parks on sand dune habitats
- Water quality issues due to agricultural activities, waste water treatment plants and septic tank discharge

The Proposed Development will not result in land take, reclamation or change of use of any lands within any European sites. Further, there is no hydrological connectivity by which the Proposed Development may cause water quality effects on the SPA.

In summary, no measurable additional effects are likely to Ballycotton Bay SPA from other developments.

6 Potential for Adverse Effects on Site Integrity

6.1 Potential for Adverse Effects on Great Island Channel SAC

It has been determined through desk-based assessment and ecological field surveys that the Proposed Development alone has potential to impact the QIs of the Great Island Channel SAC due to indirect impacts associated with the construction phase of the Proposed Development as follows:

- Potential for degradation of Mudflats and Sandflats due to pollution of watercourses and groundwater and
- Potential for degradation of Atlantic salt marsh caused by accidental spread of invasive species

Site Specific Conservation Objectives have been developed for Great Island Channel SAC. An assessment of the potential for adverse effects on the integrity of the Great Island Channel SAC, in the absence of mitigation, and in light of conservation objectives, is presented hereunder in the tables below.

Table 6.1: Assessment of Potential for Adverse Effects on the site Integrity (before mitigation) of Great Island Channel SAC – Mudflats and sandflats not covered by seawater at low tide

Attribute		Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Habitat area	Hectares		The permanent habitat area is stable or increasing, subject to natural processes.	No works are proposed within areas of mudflat. There will be no direct loss of tidal mudflats and sandflats associated with the works. There is potential for surface water pollution to enter into the habitat during construction (temporary). However, given that there will be no changes to the hydrological process which govern the sediment processes within the SAC, there will be no loss of permanent habitat area within the SAC	No potential for adverse effects on site integrity have been identified.
Community distribution	Hectares		Conserve the following community type in a natural condition: Mixed sediment to sandy mud with polychaetes and oligochaetes community complex	The potential for temporary pollution of watercourses with downstream connectivity, and through groundwater contamination has been identified. Changes in pH which are associated with the release of cement fines into watercourses have the potential to cause localised die off among invertebrate communities within the mud complexes, and an associated change in the community distribution within the site.	Impacts on the community distribution would constitute an adverse effect on the site's integrity .

Table 6.2: Assessment of Potential for Adverse Effects on the site Integrity of Great Island Channel SAC – Atlantic salt meadows (*Glauco-Puccinellietalia maritima*) Insert Table Caption - Update fields via ribbon

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Bawnard - 0.29ha; Carrigrohilly - 1.01ha. See map 5	The Proposed Development is located such that there will be no ingress into salt meadow habitat. There will be no loss of salt meadow habitat area associated with the development.	No potential for adverse effects on site integrity have been identified.
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes.	The Proposed Development is located such that there will be no ingress into salt meadow habitat. There will be no decline or change in habitat distribution associated with the development.	No potential for adverse effects on site integrity have been identified.
Physical structure: sediment supply	Presence/absence of physical barriers	Maintain/restore natural circulation of sediments and organic matter, without any physical obstructions	The Proposed Development is located such that there will be no ingress into salt meadow habitat. There are no physical barriers that might alter the natural circulation of sediments and organic matter associated with the development.	No potential for adverse effects on site integrity have been identified.
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession	The Proposed Development is located such that there will be no ingress into salt meadow habitat. There will be no alteration to the physical structure of the salt marsh.	No potential for adverse effects on site integrity have been identified.
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	The Proposed Development is located such that there will be no ingress into salt meadow habitat. There will be no alteration to the natural tidal regime caused by the development.	No potential for adverse effects on site integrity have been identified.

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Vegetation structure: zonation	Occurrence	Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	There is potential for the spread of Japanese knotweed and Himalayan balsam associated with the works. While these species are not associated with saline conditions, there is potential for stands to become established at the upper margins of the salt meadows in areas that are subject to less tidal inundation. The establishment of invasive species in these areas has the potential to cause changes to the zonation within the salt meadow habitat.	Impacts on the vegetation structure would constitute an adverse effect on site's integrity .
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	There is potential for the spread of Japanese knotweed and Himalayan balsam associated with the works. While these species are not associated with saline conditions, there is potential for stands to become established at the upper margins of the salt meadows in areas that are subject to less tidal inundation. The establishment of invasive species in these areas has the potential to cause changes to the vegetation structure within the salt meadows. Where stands of Japanese knotweed and Himalayan balsam occur, there is potential for a loss of structural variation within the swards.	Impacts on the structural variation would constitute an adverse effect on site's integrity .

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Vegetation structure: vegetation cover	Percentage cover at a representative number of monitoring stops	Maintain more than 90% area outside creeks vegetated	There is potential for the spread of Japanese knotweed and Himalayan balsam associated with the works. There is potential for these stands to become established at the upper margins of salt meadows in areas that are subject to less tidal inundation. Where stands become established and die back during winter there is the potential for erosion of ground and a subsequent increase in bare earth.	Impacts on the vegetation cover would constitute an adverse effect on site's integrity .
Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops	Maintain range of subcommunities with typical species listed in SMP (McCorry and Ryle, 2009)	There is potential for the spread of Japanese knotweed and Himalayan balsam associated with the works. There is potential for these stands to become established at the upper margins of salt meadows in areas that are subject to less tidal inundation. As these species become established there is the potential for the vegetation composition to become altered, and a loss of typical species which are typically associated with salt marsh.	Impacts on the vegetation communities would constitute an adverse effect on site's integrity .
Vegetation structure: negative indicator species - <i>Spartina anglica</i>	Hectares	No significant expansion of common cordgrass (<i>Spartina anglica</i>), with an annual spread of less than 1% where it is known to occur	Common cordgrass has not been identified within the footprint of the Proposed Development. Given the nature of the habitats within the footprint of the there is no potential for the introduction or expansion of common cordgrass as a result of the works.	No potential for adverse effects on site integrity have been identified.

6.2 Potential for Adverse Effects on Cork Harbour SPA

It has been determined through desk-based assessment and ecological field surveys that the Proposed Development has potential to (temporarily) impact the SCIs of the Cork Harbour SPA due to impacts associated with the construction phase of the Proposed Development as follows:

- Degradation of wetland habitat within the SPA boundary caused by pollution/sedimentation
- Potential for construction phase noise, lighting and visual disturbance (from machinery and personnel presence) to the following species:
 - Bar tailed godwit
 - Black headed gull
 - Black tailed godwit
 - Common gull
 - Cormorant
 - Curlew
 - Dunlin
 - Grey heron
 - Lapwing
 - Lesser black backed gull
 - Little grebe
 - Oystercatcher
 - Redshank
 - Shelduck
 - Teal
 - Wigeon

No significant changes are likely in operational phase noise disturbance.

Site Specific Conservation Objectives have been developed for Cork Harbour SPA. An assessment of the potential for adverse effects on the integrity of Cork Harbour SPA, based on relevant conservation objective targets, for each SCI bird species, is presented and considered in more detail hereunder.

Table 6.3: Assessment of Potential for Adverse Effects on the site Integrity of Cork Harbour SPA – Bar Tailed Godwit

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Population trend	Percentage change	Long term population trend stable or increasing	<p>As outlined previously a peak count of two bar tailed godwit were recorded within the Zol of the proposed development.</p> <p>There will be no loss of suitable roosting or foraging habitat for the species. Potential impacts are limited to temporary disturbance to made ground (non SCI habitat) within the SPA boundary.</p> <p>Given the low numbers of Bar tailed godwit recorded within potential Zol, and short term nature of possible noise impacts, any disturbance of the species from the Zol is not likely to result in a long term reduction in population trends for the species.</p>	No potential for adverse effects on site integrity have been identified.
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by bar tailed godwit other than that occurring from natural patterns of variation	<p>As outlined previously low numbers of two bar tailed godwit were recorded within the Zol of the proposed development.</p> <p>The temporary disturbance of two individuals from the Zol does not constitute a significant decrease in range, timing, or intensity of use of areas.</p>	No potential for adverse effects on site integrity have been identified.

Table 6.4: Assessment of Potential for Adverse Effects on the site Integrity of Cork Harbour SPA – Black headed gull

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Population trend	Percentage change	Long term population trend stable or increasing	<p>A peak count of 543 black headed gulls were recorded within the Zol of the proposed development.</p> <p>The habitat into which the Zol extends within the SPA is noted in the conservation objective supporting documents as being the principal supporting habitat within the SPA for the species. Disturbance from this habitat has potential to cause to decrease their usage of this habitat.</p> <p>Any disturbance effects will be temporary in nature, limited to the construction phase of the Proposed Development. The temporary disturbance of black headed gulls from the Zol of the works is not likely to cause a long term population trend decrease.</p>	No potential for adverse effects on site integrity have been identified.
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas black headed gull other than that occurring from natural patterns of variation	<p>As previously noted, the habitat into which the Zol extends within the SPA is noted in the conservation objective supporting documents as being the principal supporting habitat within the SPA for the species.</p> <p>Given that the disturbance effects (noise) are temporary in nature and very localised, the effects are not likely to cause a long term reduction in population trends for the species.</p>	No potential for adverse effects on site integrity have been identified.

Table 6.5: Assessment of Potential for Adverse Effects on the site Integrity of Cork Harbour SPA – Black tailed godwit

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Population trend	Percentage change	Long term population trend stable or increasing	<p>A significant peak count of 1400 black tailed godwit were recorded within the Zol of the proposed development. This count represents 82% of the peak site count for the entire SPA as outlined in the Conservation Objectives Supporting Document.</p> <p>The habitat into which the Zol extends within the SPA is noted in the conservation objective supporting documents as being the principal supporting habitat within the SPA for the species. The Conservation Objective Supporting Documentation also notes Harpers Island as being an important area for the species.</p> <p>Disturbance from this habitat has potential to cause to decrease their usage of this habitat.</p> <p>Given that the disturbance effects are temporary in nature, despite the significance in numbers and location, the effects are not likely to cause a long term reduction in population trends for the species.</p>	No potential for adverse effects on site integrity have been identified.
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by black tailed godwit other than that occurring from natural patterns of variation	<p>As outlined previously the counts recorded for the species are significant, and the habitat within the Zol is noted as being of particular importance for the species. The species is also noted as having a high level of fidelity to sites.</p> <p>Given that the disturbance effects (noise/ visual) are short term in nature and very localised, the effects are not likely to cause a long term change in distribution of this species.</p>	No potential for adverse effects on site integrity have been identified.

Table 6.6: Assessment of Potential for Adverse Effects on the site Integrity of Cork Harbour SPA – Common Gull

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Population trend	Percentage change	Long term population trend stable or increasing	<p>As outlined previously a peak count of two common gull were recorded within the Zol of the proposed development.</p> <p>There will be no loss of suitable roosting or foraging habitat for the species. Potential impacts are limited to temporary disturbance to made ground (non SCI habitat) within the SPA.</p> <p>Given the low numbers of common gull recorded, any disturbance of the species from the Zol is not likely to result in a long term reduction in population trends for the species.</p>	No potential for adverse effects on site integrity have been identified.
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by common gull other than that occurring from natural patterns of variation	<p>As outlined previously low numbers of two common gull were recorded within the Zol of the proposed development.</p> <p>The temporary disturbance of two individuals from the Zol does not constitute a significant decrease in range, timing, or intensity of use of areas.</p>	No potential for adverse effects on site integrity have been identified.

Table 6.7: Assessment of Potential for Adverse Effects on the site Integrity of Cork Harbour SPA – Cormorant

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Population trend	Percentage change	Long term population trend stable or increasing	<p>A peak count of six cormorant were recorded within the Zol of the proposed works area. The Zol does not comprise an area which is identified within the site-specific conservation objectives documentation as a significant roosting site.</p> <p>In addition, the species is noted as being one with a good ability to utilise other/alternative habitats. As such, the temporary disturbance of cormorant from the Zol does not have potential to result in a significant decrease in long-term population trends.</p>	No potential for adverse effects on site integrity have been identified.
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by cormorant other than that occurring from natural patterns of variation	<p>As outlined previously a peak count of six cormorant were identified within the Zol of the proposed development. This species has not been recorded as having a significant roosting area within the Zol of the proposed development. Given the relatively low numbers recorded, the temporary disturbance of cormorant from the Zol does not have the potential to cause a significant decrease in range, timing, or intensity of use of areas.</p>	No potential for adverse effects on site integrity have been identified.

Table 6.8: Assessment of Potential for Adverse Effects on the site Integrity of Cork harbour SPA – Curlew

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Population trend	Percentage change	Long term population trend stable or increasing	<p>A peak count of 58 curlew were recorded within the Zol of the proposed development. The Conservation Objectives supporting document notes that the species forages within the SPA in intertidal habitats, but also regularly outside of the SPA boundary.</p> <p>The temporary disturbance of 58 curlew does not have the potential to result in a long term reduction in population trend.</p>	No potential for adverse effects on site integrity have been identified
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by curlew, other than that occurring from natural patterns of variation	<p>A peak count of 58 curlew were recorded within the Zol of the proposed development. This Conservation Objectives supporting document also notes that curlew have been recorded roosting on and in the vicinity of Harper's Island.</p> <p>Given that the disturbance effects (noise/ visual) are temporary in nature and very localised, the effects are not likely to cause a long term reduction in population distribution for this species.</p>	No potential for adverse effects on site integrity have been identified.

Table 6.9: Assessment of Potential for Adverse Effects on the site Integrity of Cork harbour SPA – Dunlin

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Population trend	Percentage change	Long term population trend stable or increasing	<p>A peak count of 155 dunlin were recorded within the Zol of the proposed development. The count represents 34% of the figure of national significance.</p> <p>Dunlin are noted in the Site-Specific Conservation Objectives as being highly site faithful. The disturbance associated with the construction phase of works has the potential to result in the disruption of dunlin from the Harper's Island area. Given that the disturbance effects (noise/visual) are temporary in nature and very localised, the effects are not likely to cause a long term reduction in population trends for the species.</p>	No potential for adverse effects on site integrity have been identified
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by dunlin, other than that occurring from natural patterns of variation	<p>As noted previously, a peak count of 155 dunlin were recorded within the Zol of the works. The disturbance associated with the construction phase of works has the potential to result in the temporary disruption of dunlin from the Harper's Island mudflats area. While the species is noted as being highly site faithful, temporary (construction phase) disturbance will be temporary and sporadic and not likely to have a significant on this species locally and more widely across the SPA. Dunlin will continue to forage on mudflats given works are outside forage and roost habitat</p> <p>As such, the disturbance of dunlin from within the Zol is unlikely to cause a decrease in the range and intensity of use by dunlin.</p>	No potential for adverse effects on site integrity have been identified.

Table 6.10: Assessment of Potential for Adverse Effects on the site Integrity of Cork Harbour SPA – Grey Heron

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Population trend	Percentage change	Long term population trend stable or increasing	A peak count of one grey heron was recorded during the wintering surveys. This is reflective of the species being a typically solitary feeder. The temporary disturbance of one heron species does not have the potential to result in a reduction in the long term population trends for the species.	No potential for adverse effects on site integrity have been identified.
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by grey heron, other than that occurring from natural patterns of variation	As previously noted, a peak count of one grey heron was recorded during the wintering surveys. The disruption of a single grey heron from the ZOI does not have potential to result in a significant decrease in the range, timing, or intensity of use of areas by grey heron.	No potential for adverse effects on site integrity have been identified.

Table 6.11: Assessment of Potential for Adverse Effects on the site Integrity of Cork Harbour SPA – Lapwing

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Population trend	Percentage change	Long term population trend stable or increasing	<p>A peak count of 78 lapwing were recorded within the Zol of the Proposed Development. The conservation objectives supporting document notes that lapwings are opportunistic and mobile birds, which readily exploit temporary food sources. The report also notes that the species typically uses estuaries as roosting areas, and often forage terrestrially. The report also notes that harper's Island was noted as a terrestrial roosting area. Given that the disturbance effects (noise/visual) are temporary in nature and very localised, the effects are not likely to cause a long term reduction in population trends for the species.</p>	No potential for adverse effects on site integrity have been identified.
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by lapwing, other than that occurring from natural patterns of variation	<p>As noted previously a peak count of 78 lapwing were recorded within the Zol of the Proposed Development, and the Harper's Island area has been identified as a roosting area for the species. Given that the disturbance effects (noise/visual) are temporary in nature and very localised, the effects are not likely to cause a change in distribution for this species.</p>	No potential for adverse effects on site integrity have been identified.

Table 6.12: Assessment of Potential for Adverse Effects on the site Integrity of Cork Harbour SPA – Lesser Black-backed gull

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Population trend	Percentage change	Long term population trend stable or increasing	<p>A peak count of 13 lesser black-backed gulls were recorded within the Zol of the Proposed Development. The Conservation Objectives supporting document does not identify the Zol adverse effects on site as being of particular note for the species. The species is also identified as having wide food/prey requirements and a wide-ranging ability to utilise other/alternative habitats.</p> <p>Given that the disturbance effects (noise/visual) are temporary in nature and very localised, the effects are not likely to cause a long term reduction in population trends for the species.</p>	No potential for adverse effects on site integrity have been identified.
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by lesser black-backed gull, other than that occurring from natural patterns of variation	<p>As noted above lesser black backed gulls are noted as having wide food/prey requirements and a wide-ranging ability to utilise other/alternative habitats. The temporary disturbance of the species from the Zol does not constitute a significant decrease in the range, timing or intensity of use of areas by the species.</p>	No potential for adverse effects on site integrity have been identified.

Table 6.13: Assessment of Potential for Adverse Effects on the site Integrity of Cork Harbour SPA – Little Grebe

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Population trend	Percentage change	Long term population trend stable or increasing	<p>Peak counts of three little grebe were recorded within the ZOI of the Proposed Development. Harper's Island subsite is also identified as a foraging area for the species in the Conservation Objective Supporting Document. The species is noted as being considered totally reliant on wetland habitats due to unsuitable surrounding habitats and/or limited habitat requirements.</p> <p>Disturbance associated with the Proposed Development has potential to result in disruption of little grebe from the ZOI. Despite this, the temporary disruption of the species is not likely to result in a long term population reduction for the species.</p>	No potential for adverse effects on site integrity have been identified.
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by little grebe, other than that occurring from natural patterns of variation	<p>Relatively low numbers of little grebe are known to be associated with the SPA (Conservation Objective Supporting Document notes baseline population of 57). The temporary (construction phase) localised disruption and redistribution to alternative habitat of three little grebe will not result in a significant decrease in the range, timing and intensity of use of areas by the species.</p>	No potential for adverse effects on site integrity have been identified.

Table 6.14: Assessment of Potential for Adverse Effects on the site Integrity of Cork Harbour SPA – Oystercatcher

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Population trend	Percentage change	Long term population trend stable or increasing	<p>A peak count of 42 oystercatcher were recorded during the wintering bird surveys within the Zol of the proposed development. The species is noted by the conservation objectives supporting document to have a high degree of site fidelity, to be reliant on the site (but likely to use alternative habitat at certain times), and to have a narrow range of food/prey requirements.</p> <p>Harper's Island is noted as being of importance for the species in the conservation objectives supporting document, with historic counts of 10% of the total site numbers recorded there.</p> <p>The proposed works have the potential to result in disturbance of oystercatcher from the Zol. Given that this is a temporary disturbance, there is no potential for the effects to result in a long term reduction in the population trends for the species.</p>	No potential for adverse effects on site integrity have been identified.
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by oystercatcher, other than that occurring from natural patterns of variation	<p>As outlined previously the area of SPA within the Zol of the Proposed Development is noted as being of importance for the species, with significant counts recorded historically.</p> <p>As such, the temporary disturbance of occasional oystercatcher from the Zol does not have the potential to result in a significant decrease in the range, timing and intensity of use of areas by the species.</p>	No potential for adverse effects on site integrity have been identified.

Table 6.15: Assessment of Potential for Adverse Effects on the site Integrity of Cork Harbour SPA – Redshank

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Population trend	Percentage change	Long term population trend stable or increasing	<p>A peak count of 50 redshank were recorded during the wintering bird surveys. The redshank were recorded on the northern end of Harper's Island. The conservation objective supporting document notes that the species has a moderate site fidelity and as being reliant on the site, but likely to use alternative habitats adjacent to the SPA. Redshank are also noted as having a wide food/prey requirement, and as being typically well dispersed throughout the SPA.</p> <p>Given the above, the temporary disturbance of redshank from the Zol of the Proposed Development does not have potential to result in a long-term population trend reduction.</p>	No potential for adverse effects on site integrity have been identified.
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by redshank, other than that occurring from natural patterns of variation	<p>The Zol of the Proposed Development has not been identified as being an area of importance for the species within the SPA. It does, however incorporate principal supporting habitat for the species, on which they are reliant on. As such, the temporary disturbance of a small number of redshank within the Zol does not have the potential to result in a significant decrease in the range, timing and intensity of use of areas by the species.</p>	No potential for adverse effects on site integrity have been identified.

Table 6.16: Assessment of Potential for Adverse Effects on the site Integrity of Cork Harbour SPA – Shelduck

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Population trend	Percentage change	Long term population trend stable or increasing	<p>A peak count of 80 shelduck were recorded during the wintering bird surveys within the Zol of the proposed development. The species was largely recorded at the northern end of Harper's Island.</p> <p>Any disturbance effects to shelduck will be temporary during the construction phase of the proposed development. As such there is no potential for the proposed development to cause a long term reduction in population trends.</p>	No potential for adverse effects on site integrity have been identified.
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by shelduck, other than that occurring from natural patterns of variation	<p>As noted previously, a peak count of 80 shelduck were recorded during the wintering bird surveys within the Zol of the proposed development. The conservation objective supporting document notes that the Harper's Island area recorded good numbers of roosting shelduck, and good densities of foraging shelduck. The species is also noted as being entirely reliant on wetland habitats, having a localised distribution during the wintering season, and having a high degree of site fidelity.</p> <p>As such, the temporary disturbance of shelduck from within the Zol of the proposed development does not have the potential to result in a significant decrease in the range, timing and intensity of use of areas by the species.</p>	No potential for adverse effects on site integrity have been identified.

Table 6.17: Assessment of Potential for Adverse Effects on the site Integrity of Cork Harbour SPA – Teal

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Population trend	Percentage change	Long term population trend stable or increasing	A peak count of 57 teal were recorded within the Zol of the proposed development. Teal are noted as having a widespread distribution within the SPA. In addition to this, the species has wide food requirements, and a weak site fidelity. As such, the temporary disturbance of teal from the Zol is not likely to cause a long term reduction in population trends for the species.	No potential for adverse effects on site integrity have been identified.
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by teal, other than that occurring from natural patterns of variation	As previously noted, the species is noted as having a widespread distribution within the SPA and a weak site fidelity. The conservation objective supporting document notes the species forages on land outside of the SPA boundary but within the Zol of the proposed development. In addition, the Harper's Island area is noted historically as a roosting area for the species. As such, temporary disturbance from the Zol does not have the potential to result in the disruption of teal away from areas identified as regular roosting and foraging areas for the species. As such, the disturbance of teal from within the Zol of the proposed development will not result in a significant decrease in the range, timing and intensity of use of areas by the species.	No potential for adverse effects on site integrity have been identified.

Table 6.18: Assessment of Potential for Adverse Effects on the site Integrity of Cork Harbour SPA – Wigeon

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Population trend	Percentage change	Long term population trend stable or increasing	<p>A peak count of 59 wigeon was recorded within the Zol of the Proposed Development. Wigeon are noted as having weak site fidelity and a widespread winter distribution. They are noted as having a narrow food/prey requirement, albeit with a good ability to utilise other/alternative habitats.</p> <p>Given their ability to utilise other areas within the SPA the temporary disturbance of wigeon from the Zol does not have potential to result in a long-term reduction in population trend.</p>	No potential for adverse effects on site integrity have been identified.
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by wigeon, other than that occurring from natural patterns of variation	Foraging wigeon have been noted historically in the Harper's island area, both inside and outside of the SPA boundary. The supporting document notes that subtidal areas suitable for wigeon comprise approximately 826ha within the SPA. Given the large amount of suitable habitat for the species, and the low site fidelity exhibited by the species, the temporary disruption of wigeon from the Zol is not likely to cause a significant decrease in range, timing or intensity of use of areas by the species.	No potential for adverse effects on site integrity have been identified.

Table 6.19: Assessment of Potential for Adverse Effects on the site Integrity of Cork Harbour SPA –Wetlands

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Habitat Area	Hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 2,587 hectares, other than that occurring from natural patterns of variation	<p>The Proposed Development has the potential to result in a deterioration in water quality caused by accidental pollution of surface and ground waters. This has the potential to result in a degradation of mudflat and sandflat habitats associated with the SPA. These mudflat habitats for key foraging habitat for a large number of birds associated with the SPA.</p> <p>Further, there is the potential for accidental spread of invasive species into the SPA boundary during the works. These invasive species have the potential to cause degradation of salt marshes within the SPA which are utilised by wildfowl.</p> <p>The associated reduction in wetland quality has the potential to result in a lowering of the carrying capacity for wetland birds. However, this will not constitute a reduction in the permanent area occupied by wetland habitats.</p>	No potential for adverse effects on site integrity have been identified.

6.3 Potential for Adverse Effects on Ballycotton Bay SPA

It has been determined through desk-based assessment and ecological field surveys that the Proposed Development is likely to impact the SCIs of the Ballycotton Bay SPA due to impacts associated with the construction phase of the Proposed Development as follows:

- Bar-tailed godwit
- Black-tailed godwit
- Common gull
- Curlew
- Lapwing
- Lesser black backed gull
- Teal

No significant changes are likely in operational phase noise disturbance.

Site Specific Conservation Objectives have been developed for Ballycotton Bay SPA. An assessment of the potential for adverse effects on the integrity of Ballycotton Bay SPA, based on relevant conservation objective targets for each SCI bird species are considered in more detail and presented hereunder.

Table 6.20: Assessment of Potential for Adverse Effects on the site Integrity of Ballycotton Bay SPA – Bar Tailed Godwit

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Population trend	Percentage change	Long term population trend stable or increasing	<p>As outlined previously a peak count of two bar tailed godwit were recorded within the Zol of the proposed development.</p> <p>There will be no loss of suitable roosting or foraging habitat for the species. Given the low numbers of Bar tailed godwit recorded, any disturbance of the species from the Zol is not likely to result in a long term reduction in population trends for the species.</p>	No potential for adverse effects on site integrity have been identified.
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by bar tailed godwit other than that occurring from natural patterns of variation	<p>As outlined previously low numbers of two bar tailed godwit were recorded within the Zol of the proposed development.</p> <p>The temporary disturbance of two individuals from the Zol does not constitute a significant decrease in range, timing, or intensity of use of areas.</p>	No potential for adverse effects on site integrity have been identified.

Table 6.21: Assessment of Potential for Adverse Effects on the site Integrity of Ballycotton Bay SPA – Black tailed godwit

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Population trend	Percentage change	Long term population trend stable or increasing	<p>A significant peak count of 1400 black tailed godwit were recorded within the Zol of the proposed development.</p> <p>The Zol does not extend into core foraging and roosting areas identified within the SPA boundary for the species.</p> <p>Given that the disturbance effects are short term in nature, despite the significance in numbers and location, the effects are not likely to cause a long term reduction in population trends for the species.</p>	No potential for adverse effects on site integrity have been identified.
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by black tailed godwit other than that occurring from natural patterns of variation	<p>As outlined previously the counts recorded for the species are significant, and the habitat within the Zol is noted as being of particular importance for the species. The species is also noted as having a high level of fidelity to sites.</p> <p>Given that the disturbance effects (noise/ visual) are short term in nature and very localised, the effects are not likely to cause a long term change in distribution of the species.</p>	No potential for adverse effects on site integrity have been identified.

Table 6.22: Assessment of Potential for Adverse Effects on the site Integrity of Ballycotton Bay SPA – Common Gull

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Population trend	Percentage change	Long term population trend stable or increasing	<p>As outlined previously a peak count of two common gull were recorded within the Zol of the proposed development.</p> <p>There will be no loss of suitable roosting or foraging habitat for the species. Potential impacts are limited to temporary disturbance.</p> <p>Given the low numbers of common gull recorded, any disturbance of the species from the Zol is not likely to result in a long term reduction in population trends for the species.</p>	No potential for adverse effects on site integrity have been identified.
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by common gull other than that occurring from natural patterns of variation	<p>As outlined previously low numbers of two common gull were recorded within the Zol of the proposed development.</p> <p>The temporary disturbance of two individuals from the Zol does not constitute a significant decrease in range, timing, or intensity of use of areas.</p>	No potential for adverse effects on site integrity have been identified.

Table 6.23: Assessment of Potential for Adverse Effects on the site Integrity of Ballycotton Bay – Curlew

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Population trend	Percentage change	Long term population trend stable or increasing	<p>A peak count of 58 curlew were recorded within the Zol of the proposed development. The Zol for the Proposed Development does not constitute any core foraging or roosting habitat within the boundary of the SPA.</p> <p>While there is potential for impacts to <i>ex situ</i> populations of curlew, the temporary disturbance of the species from the Zol will not cause a reduction in the long term population trends for the species.</p>	No potential for adverse effects on site integrity have been identified
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by curlew, other than that occurring from natural patterns of variation	<p>A peak count of 58 curlew were recorded within the Zol of the proposed development.</p> <p>As outlined above, there is no potential for a reduction in range, timing, or intensity of use of areas within the SPA boundary. Any impacts will be to <i>ex situ</i> populations. Given that the disturbance effects (noise/ visual) are temporary in nature and very localised, the effects are not likely to cause a long term reduction in population distribution for the species.</p>	No potential for adverse effects on site integrity have been identified.

Table 6.24: Assessment of Potential for Adverse Effects on the site Integrity of Ballycotton Bay SPA – Lapwing

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Population trend	Percentage change	Long term population trend stable or increasing	<p>A peak count of 78 lapwing were recorded within the Zol of the Proposed Development. There is no potential for impacts to core roosting and foraging habitats within the SPA boundary.</p> <p>Noise and human presence associated with the proposed development has potential to result in the disruption of <i>ex situ</i> populations of lapwing away from the Zol. This disruption will be temporary in nature, and does not have the potential to result in a long term reduction in population trends for the species.</p>	No potential for adverse effects on site integrity have been identified.
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by lapwing, other than that occurring from natural patterns of variation	<p>As noted previously a peak count of 78 lapwing were recorded within the Zol of the Proposed Development, and the Harper's Island area has been identified as a roosting area for the species.</p> <p>Given that the disturbance effects (noise/ visual) are short term in nature and very localised, the effects are not likely to cause a long term reduction in population distribution for the species.</p>	No potential for adverse effects on site integrity have been identified.

Table 6.25: Assessment of Potential for Adverse Effects on the site Integrity of Cork Harbour SPA – Lesser Black-backed gull

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Population trend	Percentage change	Long term population trend stable or increasing	<p>A peak count of 13 lesser black-backed gulls were recorded within the Zol of the Proposed Development. There is no potential for impacts to core roosting and foraging habitats within the SPA boundary. The species is identified as having wide food/prey requirements and a wide-ranging ability to utilise other/alternative habitats.</p> <p>Given the above, the temporary disturbance of <i>ex situ</i> populations of lesser black backed gulls in the numbers identified within the Zol, does not have potential to result in a reduction of the long-term population trend for the species.</p>	No potential for adverse effects on site integrity have been identified.
Distribution	Range, timing and intensity of use of areas	<p>No significant decrease in the range, timing or intensity of use of areas by lesser black-backed gull, other than that occurring from natural patterns of variation</p>	<p>As noted above lesser black backed gulls are noted as having wide food/prey requirements and a wide-ranging ability to utilise other/alternative habitats. The temporary disturbance of the species from the Zol does not constitute a significant decrease in the range, timing or intensity of use of areas by the species.</p>	No potential for adverse effects on site integrity have been identified.

Table 6.26: Assessment of Potential for Adverse Effects on the site Integrity of Ballycotton Bay SPA – Teal

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Population trend	Percentage change	Long term population trend stable or increasing	A peak count of 57 teal were recorded within the Zol of the proposed development. There is no potential for impacts to core roosting and foraging habitats within the SPA boundary. Teal are noted as having wide food requirements, and a weak site fidelity. As such, the temporary disturbance of teal from the Zol is not likely to cause a long term reduction in population trends for the species	No potential for adverse effects on site integrity have been identified.
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by teal, other than that occurring from natural patterns of variation	As previously noted, there is no potential for impacts to core roosting and foraging habitats for the species within the SPA boundary. Given that the disturbance effects (noise/ visual) are short term in nature and very localised, the effects are not likely to cause a long term reduction in population distribution for this species.	No potential for adverse effects on site integrity have been identified.

7 Mitigation Measures

Mitigation is prescribed hereunder to address the impacts identified such that adverse effects on site integrity of the European site do not occur.

Mitigation measures are set out in accordance with the European Commission guidance on the: 'Assessment of plans and projects significantly affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, (2001). And 'Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive (2018)'. Mitigation is described with respect to:

- How the measures will avoid / prevent / reduce the adverse impacts on the site to an acceptable level;
- The degree of confidence in their likely success;
- The timescale, relative to the proposed development, when they will be implemented;
- How and when the measures will be monitored.

All mitigation prescribed in this NIS must be implemented by the appointed Contractor for the works, in consultation with the Developer's Ecologist, and the relevant statutory bodies identified hereunder. The Contractor will incorporate the mitigation measures being outlined below into a Construction Environmental Management Plan (CEMP) for the Proposed Development and agree the CEMP with the Developer and the local authority in advance of mobilisation. The CEMP will be a key construction contract document, which will ensure that all mitigation measures are implemented.

A CEMP has been produced for this Proposed Development and is appended in Appendix C.

A summary of mitigation measures outlined in this section and its application to each of the European Sites identified with potential for effects is outlined below. Note mitigation is precautionary (not strictly required) for SCI birds in SPA sites outlined. Mitigation proposed is to minimise localised noise and visual disturbance if required. Mitigation is adaptive in this case and will be decided by the site EcoW based on monitoring results of bird distribution if timing of works beside Cork Harbour SPA extends into the main winter season (October to March inclusive).

Table 7.1: Mitigation Measure Summary

Measure	Great Island Channel SAC	Cork Harbour SPA	Ballycotton Bay SPA
Mitigation for protection of water quality	✓	-	-
Mitigate Disturbance to Wintering Birds	-	✓	✓
Mitigate Spread of Invasive Species	✓	-	-

7.2 Ecological Supervision and Monitoring

An ECoW will be employed by the Contractor to oversee implementation of mitigation. This will include monitoring and auditing the works and contractor programmes and works method statements, to ensure mitigation is correctly implemented.

The Contractor's ECoW will advise on mitigation measures implementation including the scheduling of works and will be included in regular liaison meetings between project teams to ensure that plans are co-ordinated and effects are minimised.

All monitoring reports will be provided to the Employer's Representative team and to local authority or other parties where required by condition.

An independent Environmental Clerk of Works (EnCoW) will be employed on behalf of the Employers Representative team, who will review and comment on the pre-construction survey reports, mitigation proposals, monitoring and compliance reports generated by the Contractor's ECoW.

7.3 Mitigation Against Water Quality Impacts to Surface and ground Water

No new water crossings are proposed, and all works are at existing river crossings within the existing railway corridor. Likely pollution sources from construction activities are generally likely to be associated with water crossings. Other sources are contaminated surface water run-off, including silty water arising from exposed ground / stockpiles / and from accidental leaks / spills of oil / fuels from machinery or storage areas, and run off from areas where concrete pours are taking place.

Mitigation measures to avoid / prevent contaminated runoff and pollution from site are prescribed below.

Table 7.2: Mitigation Against Surface and Ground Water Pollution - General

Measure	How the measures will avoid / prevent / reduce impacts	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
<p>At a minimum, all pollution control measures will be designed, installed, and maintained in accordance with measures outlined below and under the supervision of the Contractor's Environmental Clerk of Works (EnCoW).</p> <p>Concrete</p> <p>The pouring of concrete will be required during the construction phase. To prevent the runoff of concrete into nearby watercourses and drains, the following will be implemented.</p> <ul style="list-style-type: none"> No on-site batching will be permitted at the proposed works areas. Concrete will instead be transported to the site within a concrete truck. Quick setting concrete mixes will be used to reduce the risk of contaminated run-off to the nearby watercourses. Concrete trucks will be washed down in a sealed mortar bin / skip which has been examined in advance for any defects. This requirement will be communicated to each concrete truck driver prior to entering into the works area. Where concrete pours are to take place instream they will only take place within an isolated, dry, works area. Where concrete pours are required within a watercourse, the Contractor's EnCoW will regularly monitor the pH of the watercourse during concrete works. Should any change in pH +/-0.5 be detected concrete works will immediately be ceased. The entry point to the watercourse will then be identified and implement appropriate measures to prevent further escape to the environment. 	<p>Measures will prevent the uncontrolled releases of pollutants into the environment.</p>	<p>Measures prescribed as standard best practice and are aligned with CIRIA Guidelines C532</p>	<p>Pollution prevention measures will need to be in place before the enabling and construction works commence at each location.</p>	<p>The Contractor's EnCoW will carry out ongoing monitoring of all pollution control measures.</p>	<p>Measures will prevent and/or remedy the uncontrolled releases of pollutants into the environment.</p>

Measure	How the measures will avoid / prevent / reduce impacts	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
<ul style="list-style-type: none"> The Contractor's EnCoW will ensure that covers are available for freshly poured concrete to avoid wash off in the event of rain. Waste concrete slurry will be allowed to dry and taken to a licensed waste depot for disposal. The Contractor will schedule concrete works during dry weather conditions to reduce the elevated risk of runoff. The Contractor's EnCoW will notify the Independent EnCoW employed within the Employer's Representative Team, the NPWS and IFI immediately of any concrete spills into watercourses. 					
Hydrocarbons					
<p>Where mobile equipment is required e.g. generators, these will be housed in a suitably sized bund / plant nappy such that any leaks / spills are intercepted. All mobile equipment used will be stored within a plant nappy. Operators will regularly inspect the plant nappy, at a minimum on a daily basis, and replace it where it has become contaminated. Fuelling and lubrication of plant and equipment will be restricted to the construction compound sites, or laydown areas.</p> <p>All waste fuels, oils, and other hazardous wastes will be disposed of in accordance with the requirements of waste legislation.</p> <p>Spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and operators will be fully trained during induction to site by the Contractor's EnCoW in the use of this equipment.</p> <p>Should use of a spill-kit be required it will be immediately re-stocked by the Contractor.</p>					

Measure	How the measures will avoid / prevent / reduce impacts	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
<p>All spill-kits will be inspected on a weekly basis by the SHEQ officer to ensure they are maintained as fit for purpose. Records relating to these inspections will be kept.</p> <p>Welfare / hygiene facilities will be located within the construction compounds.</p> <p>All water from wheel washes will be removed from site and disposed of in line with Waste Legislation. No wheel wash water will be discharged into any watercourses or drainage ditches.</p> <p>Water crossings</p> <p>As outlined previously, alterations to existing culverts at water crossings is required.</p> <p>In-stream works will have regard to the potential for tidal ingress into the works area.</p> <p>The clearance of any riparian vegetation will be kept to the minimum required for the facilitation of the works such that no unnecessary exposure of riverbanks occurs.</p> <p>Works to clear vegetation will take place from the bank with vegetation pulled back towards the land. The vegetation removed will be transported off site and disposed of appropriately.</p> <p>Following the vegetation clearance, a dry works area will be established. The measures required to achieve this will be appropriate for the size and flow associated with each watercourse. This may be achieved by:</p> <p>Isolating the entire watercourse and over pumping the flow.</p> <p>The outflow of any over pumped river will be placed such that there is no scouring of the riverbed. This will be monitored on an on-going basis by the Contractor's EnCoW. Should scouring be identified, the Contractor's EnCoW will oversee the moving of the outflow such that scouring does not occur.</p>					

Measure	How the measures will avoid / prevent / reduce impacts	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
<p>Isolating half of the watercourse through the use of measures such as sandbags (double-bagged, containing only washed sand, from a licensed quarry) or aqua dams and diverting the flow around the works area.</p> <p>Following pollution control measure setup, but prior to instream works commencing, the isolated area will be inspected by the Contractor's EnCoW to ensure that the watercourse is sufficiently protected. The contractor's EnCoW will monitor turbidity within the watercourses using a handheld turbidity meter.</p> <p>The Contractor's EnCoW will direct the Contractor to take corrective actions required. The Contractor's will record all works authorisations, report these to the independent EnCoW within the Employers Representative Team and maintain on file for inspection as required.</p> <p>Should pumping out of the isolated area be required to maintain the dry works area, it will be ensured that any discharge is treated appropriately prior to entering the watercourse. This may be achieved by discharging to a treatment system such as a silt buster or similar, discharge to a silt bag, or discharging to an area of the watercourse that is protected by a silt boom. These measures will be used in combination in cases where ground conditions are such that just one measure is not achieving sufficient protection. The success of these measures will be monitored regularly by the Contractor's EnCoW as works proceed at the watercourse crossings.</p> <p>Where the implementation of these measures fail, or are inadequate, the Contractor will implement adapted measures (for example replacement sediment treatment system) in agreement with the Contractor's EnCoW and the Employers Representative Team.</p>					

Measure	How the measures will avoid / prevent / reduce impacts	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
<p>Any diversion or over pumping of watercourses will be sized such that they will accommodate a 1% AEP flood event over the period in question, so as to prevent the overtopping of work areas.</p> <p>Groundwater/ Karst</p> <p>A pre-construction survey of karstic features will be carried out to confirm the presence of listed features and identify features absent from this desk-study assessment. Due to the sensitivity and connectivity of the karstic environment, including the risk of potential connections between karst features and sensitive receptors outside of the study area, additional mitigation measures to reduce the risk of impact will be used. These include that:</p> <ul style="list-style-type: none"> • a buffer area (at least 20 m) will be provided surrounding each identified karst feature, whereby no construction activity, including storage of materials will occur. • Storage of materials (including excavated materials and fill and ballast) will avoid areas at risk of surface water or groundwater flooding or areas of convergence of flow; and • The use of additional pollution prevention measures, such as double silt fencing, will be used where excavation occurs adjacent to an identified feature. • It is anticipated that all existing drainage outfalls will be retained and that no new outfalls will be required. Where new drainage will be installed (in areas where significant alterations are proposed to the track), the design of the drainage will avoid discharge of surface run-off to any identified karst feature or area of karst bedrock. This will include the use of lined ditches or impermeable pipes to direct collected water away from such features. 					

7.4 Mitigation Against Disturbance to Wintering Birds

The principle likely disturbance from construction activities are from works installing the new tracks along the western end of the Proposed Development between Chainage 340m and 850m. Mitigation measures to minimise localised short-term noise and visual disturbance from works, associated with the construction phase of the development, are outlined below.

Table 7.3: Mitigation Against Disturbance to Wintering Waterfowl

Measure	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
<p>All works along the coastal section (0 – 850m chainage) are proposed during the summer.</p> <p>If works are proposed between September and March then prior to the commencement of the works, a sound reducing hoarding will be placed along works area within Ch 340 – 850m. Sound hoarding will help to reduce the noise impacts associated with the construction phase of the works. It will also reduce visibility of workers.</p> <p>The barrier material will have a mass per unit area exceeding 7kg/m² in accordance with the recommendations of BS 5228 Part 1:2009+A1:2014 Part B.4.</p> <p>Any temporary lighting used to facilitate the works will be cowed and angled away from the SPA and watercourses.</p> <p>The EnCoW will undertake daily monitoring of the barrier to ensure installed correctly and identify any defects for the contractor to remedy.</p> <p>All plant used during the construction phase will be the quietest of its type practical for achieving the works, as demonstrated in writing by the Contractor to the local authority, with reference to other noisier models.</p> <p>All plant will be operated and maintained in accordance with the manufacturer's recommendations including the use and maintenance of the specific noise reduction measures in the next bullet.</p>	<p>Measures prescribed as standard best practice and are proven technologies / methods (sound hoarding and noise reduction measures are used generally to reduce noise impacts on projects).</p>	<p>Hoarding will need to be in place before the construction works commence</p> <p>Implementation of plant specific noise reduction to take place on an ongoing basis.</p>	<p>The Contractor's EnCoW will carry out daily monitoring of noise and visual reduction measures</p>	<p>Measures will ensure any adverse effects associated with noise and visual disturbance are avoided.</p>

Measure	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
The following may be incorporated to reduce the impact further: The use of mufflers on pneumatic tools Effective exhaust silencers Sound reducing enclosures Machines in intermittent use will be shut down during periods where they are not required				

7.5 Mitigation to Prevent the Spread of Invasive Species

Field surveys identified significant stands of invasive species which will be directly impacted by the works. In addition, there is potential for stands of invasive species to become established within the proposed development footprint prior to the commencement of construction.

It is an offence under Regulation 49 of the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) to plant, disperse, allow, or cause to disperse, spread or otherwise cause to grow any plant species specified in the Third Schedule of the Regulations.

In order to comply with the Regulations, the appointed Contractor will ensure biosecurity measures are implemented during the construction phase to ensure the introduction and/or spread of invasive species is prevented. Biosecurity measures which will be implemented during the construction phase are outlined below.

Table 7.4: Mitigation Against Spread of Invasive Species

Measure	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
General				
<ul style="list-style-type: none"> Prior to works commencing a full invasive species confirmatory survey will be carried out. The pre-construction invasive species survey will be carried out within the works areas, including compound locations, and along proposed access routes to identify the presence of all invasive species within and adjacent to works areas. The invasive species confirmatory survey will be carried out during the appropriate growing season (May–October). The findings of this invasive species survey will be incorporated into an updated Invasive Species Management Plan by the Contractor's ECoW. Any stands of invasive species recorded within the Proposed Development boundary, including within compounds and along access tracks, will be clearly marked out as restricted areas. This exclusion zone will incorporate a buffer surrounding stands of Japanese knotweed such that below ground growth is accounted for (7m in diameter and 3m depth and inclusive of both treated and untreated material at a worst-case scenario). No works will be carried out within the exclusion zones unless approved by the Contractor's ECoW. 'Biosecure zone' signage will be erected at each potentially contaminated site. This is to alert staff that invasive species have been recorded and to avoid accidental entering or interfering with these sites. Likewise, any stockpiles of soil that are or could be contaminated with any of the aforementioned invasive species will be clearly marked. Marked haulage routes protected by root barrier membranes may be established within the 	Measures prescribed as best practice and are proven technologies / methods.	Biosecurity measures will be implemented throughout the duration of the construction works.	The ECoW will inspect and monitor all biosecurity measures to ensure they are undertaken correctly.	Biosecurity measures will ensure any adverse effects associated with invasive species spread are avoided.

Proposed Development footprint to allow transport to bunds.

- Designated and clearly marked cleaning stations will be strategically placed within the work site for use by staff, vehicles, and machinery. Where it is necessary to work in contaminated areas, every effort will be made not to use vehicles with caterpillar tracks.
- The Contractor's ECoW will carry out a toolbox talk for all construction personnel which will provide information on how to identify and manage invasive species. The toolbox talk will take place prior to works commencing in any areas where Invasive Species have been recorded.
- All vehicles and equipment that have been used in these control operations will be steam-cleaned in a designated wash-down area each time they leave the works site, and once work in that area has been completed. This also includes footwear, personal protective equipment (PPE), tools, and other light equipment. This is essential to remove soil that may contain plant fragments (vector material), which otherwise could be transported along the Proposed Development as works are being undertaken.
- Vehicles leaving contaminated area(s) will either be confined to marked haulage routes protected by root barrier membranes or be pressure-washed before leaving the area. Only vehicles that are deemed to be Biosecure (i.e. sealed so that no soil can escape) will be used to transport contaminated soil and all must be thoroughly steam cleaned in the designated wash-down area before exiting the designated area.

Chemical Control

- Three cornered leek, Spanish bluebell and Himalayan balsam can all be controlled effectively using herbicide application. Applications should take place in spring. Follow up monitoring of treatment sites will be required, however, to ensure that regrowth of new plants does not take place.

- The stands of knotweed identified within the proposed development footprint have been subject to a chemical treatment regime. In order to control established stands of Japanese knotweed, repeated treatments over successive years is necessary.
- Per TII guidelines (2020) the site will only be considered remediated after two consecutive growing seasons with no sign of regrowth from all of the previously identified stands. It is of note, however, there is always the possibility of further regrowth occurring, this happens most commonly through the reactivation of dormant rhizomes due to disturbance of soils but may also occur through re-infestation of the site from off-site. Subsequent surveys will be cognisant of this potential
- Treatment of established stands of knotweed will be continued in order to prevent the spread of existing stands within the Proposed Development footprint.

Physical Control

- Pulling and digging of Himalayan balsam plants (before seed is mature), three cornered leek, and Spanish bluebell will be used to control and remove stands. This treatment will only be carried out under supervision of the EcoW. All waste material associated with these stands will be treated in accordance with legislative requirements on disposal.
- Physical control methods (cutting, digging, excavating etc) of Japanese knotweed will be avoided wherever possible as interference with stands may result in a resurgence of growth in dormant stands, and increase potential for spread of vector material should biosecurity measures not be adhered to.
- Where excavation of Japanese knotweed material is required, it may be subject to burial as follows:
 - Stands of Japanese knotweed identified for removal will be treated with a non-persistent herbicide prior to excavation.

-
- Material with potential to contain Japanese knotweed, or vector material, will only be excavated under strict supervision and placed within a vehicle for transportation.
 - Only vehicles that are deemed to be Biosecure (i.e. sealed so that no soil can escape) will be used to transport contaminated soil and all must be thoroughly steam cleaned in the designated wash-down area before exiting the contaminated area.
 - Burial of material may be undertaken as follows:
 - Where deep burial of a minimum depth of 5m is feasible, the waste will be covered with a proprietary root barrier membrane. Any joins in the membrane will be overlapped and secured. No material will be placed over the membrane until it has been inspected by the EcoW. A layer of pea gravel will be placed on top of the barrier membrane to reduce the potential for perforation of the barrier membrane. The waste will then be infilled with a minimum 5m depth of uncontaminated soil.
 - Where a burial of 5m is not feasible, the waste will be completely encapsulated in a proprietary root barrier membrane cell. The lower surface of membrane will be covered in a layer of pea gravel to reduce the potential for perforation of the barrier membrane. Any joins in the barrier membranes will be overlapped and suitably sealed. The upper surface of the cell will be covered in a layer of pea gravel and buried to a minimum depth of 2m. No material will be placed over the membrane (both internally and over the upper surface until it has been inspected by the EcoW).
 - Where burial is not feasible due to site constraints, the material may be transported off-site (under license). It is a requirement to dispose of this material in a fully licenced waste facility, capable of accepting such contaminated material. This disposal
-

requirement applies to all Japanese knotweed contaminated material including untreated and treated plant material.

Monitoring

- As outlined previously, a single herbicide treatment is unlikely to control an established stand of Japanese knotweed. Any re-growth of treated Japanese knotweed will be accurately mapped.
- Monitoring will be conducted post treatment to determine the level of control success that the treatments of all species have achieved. All stands identified within the Proposed Development, and any areas where burial or storage has taken place will be monitored. This will continue at a minimum until such time that after two consecutive growing seasons there is no sign of regrowth from all the previously identified stands within the Proposed Development site.
- Following control of large areas Japanese knotweed, a subsequent disturbance of the soil may give rise to revitalised rhizome growth. To avoid this, bare soil will be mulched (covered with a natural or synthetic barrier, such as wood chip, straw, geotextile, or other appropriate material) and planted at the earliest opportunity with appropriate native replacement vegetation to stabilize the soil and deter subsequent re-invasion.

8 Conclusion

The mitigation measures detailed in Section 7 of this NIS will ensure no adverse effects on the integrity of any European sites in light of the site's conservation objectives.

The NIS contains information which the Competent Authority, may consider in making its own complete, precise and definitive findings and conclusions and upon which the Competent Authority is capable of determining that all reasonable scientific doubt has been removed as to the effects of the proposed development on the integrity of the relevant Natura 2000 sites.

In the light of the conclusions of the assessment which it shall conduct on the implications for the European sites concerned, the Competent Authority is enabled to ascertain that the proposed development will not adversely affect the integrity of any of the European sites concerned.

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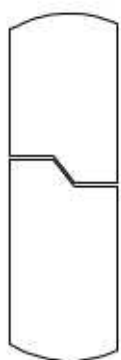
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Appendices

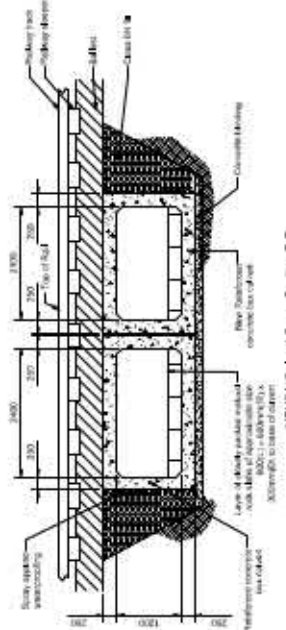
- A. Drawings Outlining the Proposed Development
- B. Habitat Map
- C. Construction Environmental Management Plan

A. Drawings Outlining the Proposed Development

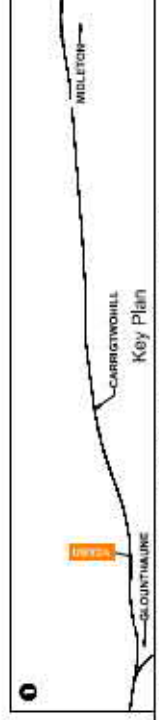
9. REPEAT PROCESSES FOR EACH 20M SECTION.



Open Culvert Unit Joint Detail



UBRY2A Culvert Cross Section B-B



IDA OPEN CULVERT AND CULVERT UBYZA CH1997 TO CH2200 PLAN, SECTION & DETAILS

CORK AREA COMMITTEE RAIL
GLOUNTHAUNE - MIDLETON TWIN TRACK

Sheet: 15 of 26
 Date: 15/11/20

Plan View

Scale: 1:1000 @ A1

Stationing: 1997.00 to 2200.00

Section View

Scale: 1:100 @ A1

Dimensions: 10.00m x 10.00m

Details

Scale: 1:100 @ A1

Dimensions: 10.00m x 10.00m

Notes

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE STATED.

2. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE STATED.

3. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE STATED.

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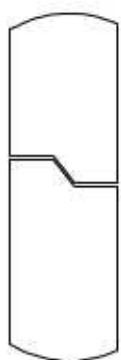
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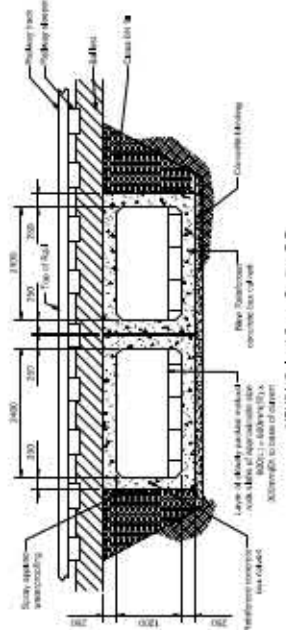
10. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE STATED.

DO NOT SCALE USE FIGURED DIMENSIONS ONLY

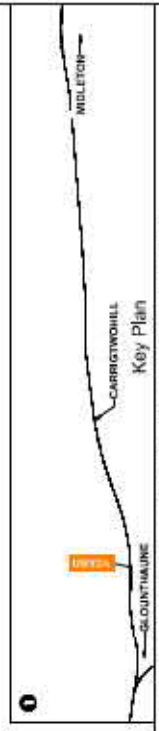
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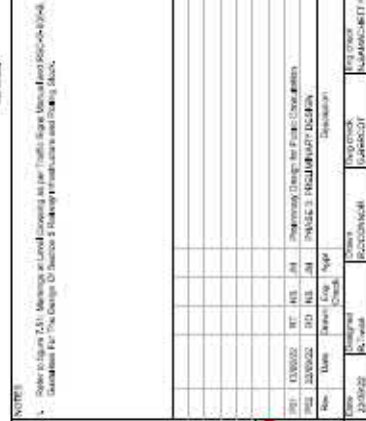
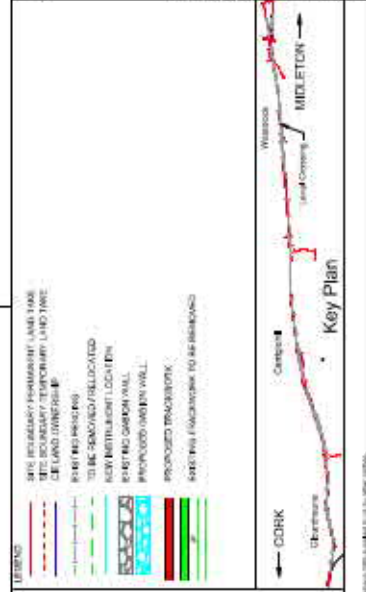
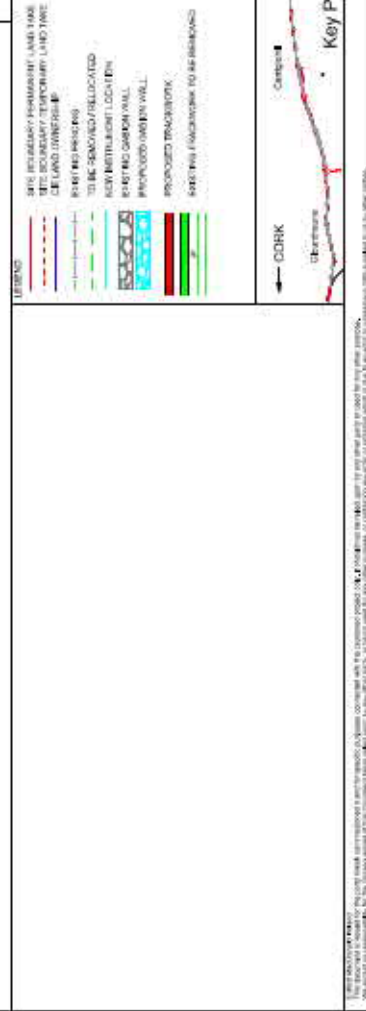
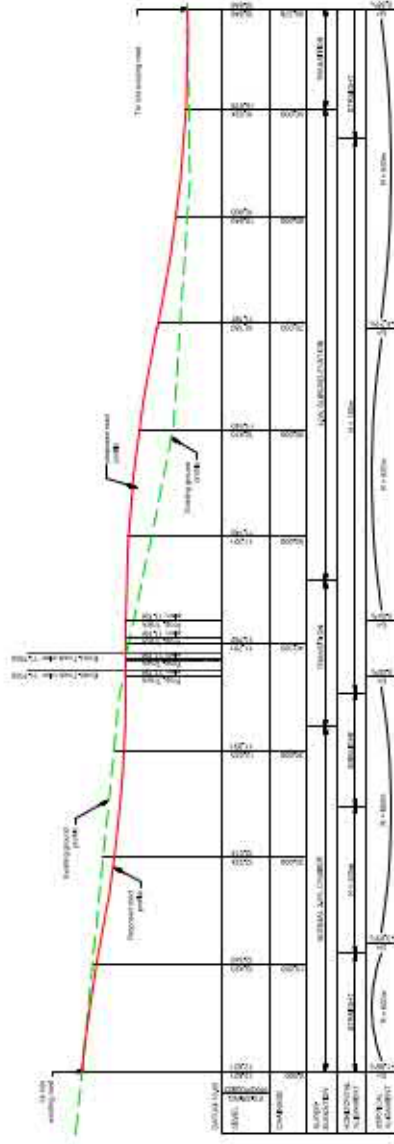
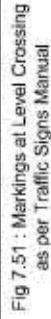


Open Culvert Unit Joint Detail



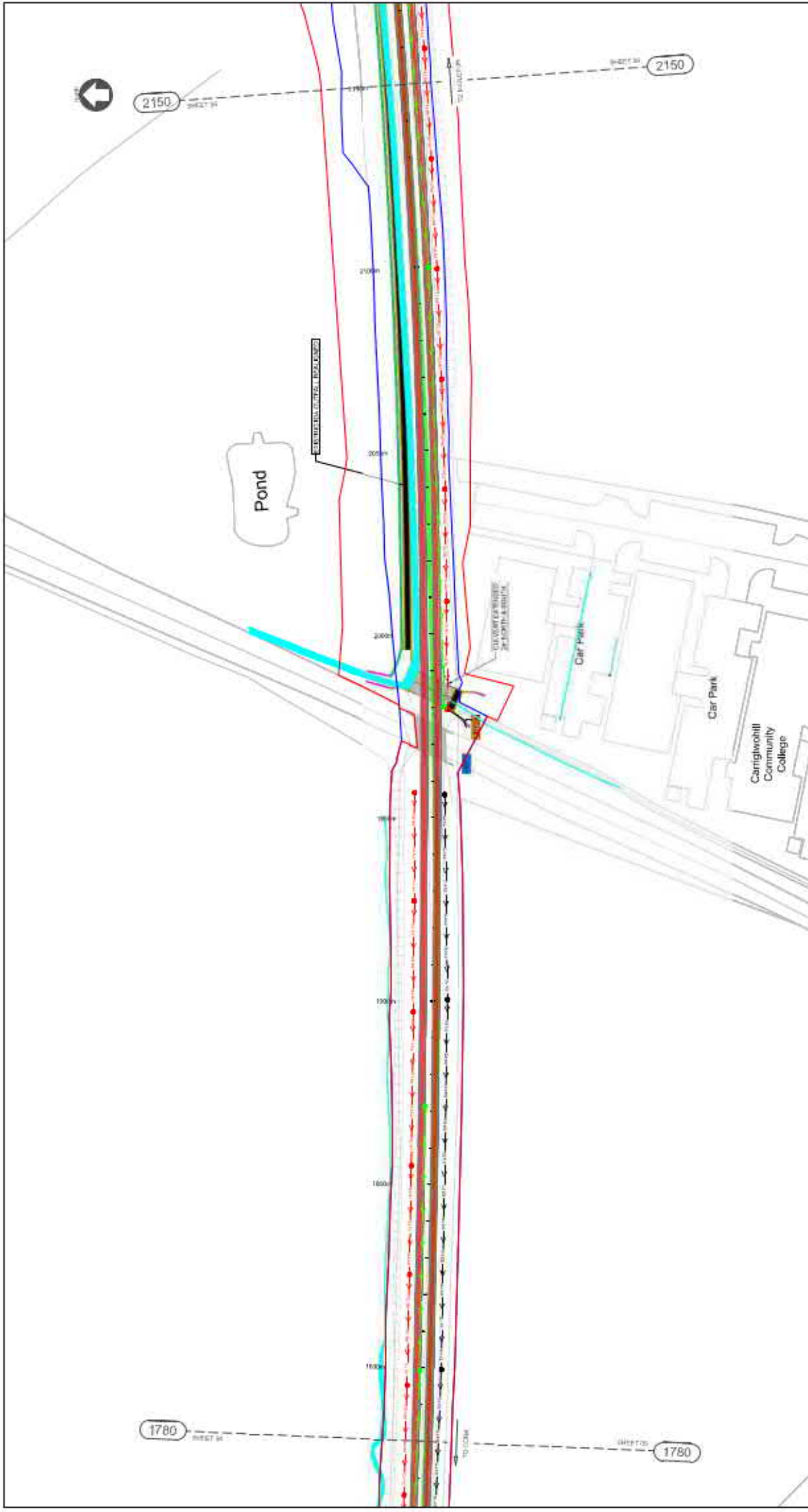
UBRY2A Culvert Cross Section B-B

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NOTES

1. THE DRAINAGE ANALYSIS AND REPRESENTATION OF THE DRAINAGE LAYOUT AND ITS TO BE USED FOR INFORMATION ONLY. THE PROPOSED DRAINAGE LAYOUT IS SUBJECT TO CHANGE AS THE DESIGN DEVELOPS.

2. ALL DRAINAGE LINES ARE IN RED UNLESS OTHERWISE STATED. THE DRAINAGE LAYOUT IS NOT TO BE USED FOR CONSTRUCTION PURPOSES.

3. THE DRAINAGE LAYOUT IS NOT TO BE USED FOR CONSTRUCTION PURPOSES.

4. THE DRAINAGE LAYOUT IS NOT TO BE USED FOR CONSTRUCTION PURPOSES.

5. THE DRAINAGE LAYOUT IS NOT TO BE USED FOR CONSTRUCTION PURPOSES.

SYMBOLS

EXISTING DRAINAGE
DRAINAGE TO BE CONSIDERED
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DRAINAGE TO BE CONSIDERED

STRUCTURE LEGEND

EXISTING DRAINAGE
DRAINAGE TO BE CONSIDERED
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DRAINAGE TO BE CONSIDERED

PROPOSED TRACK DRAINAGE LAYOUT

CH1780 TO CH2150

Scale: 1:500 @ A1 1:500 @ A0

Scale: 1:500 @ A1 1:500 @ A0

Scale: 1:500 @ A1 1:500 @ A0

CLIENT

GLINTHALL - MILETON TOWN TRAIL

PROJECT

GLINTHALL - MILETON TOWN TRAIL

DATE

2023-03-01

DESIGNER

GLINTHALL - MILETON TOWN TRAIL

PROJECT NO.

GLINTHALL - MILETON TOWN TRAIL

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DRAWING TITLE

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Rialtas na hÉireann
Government of Ireland

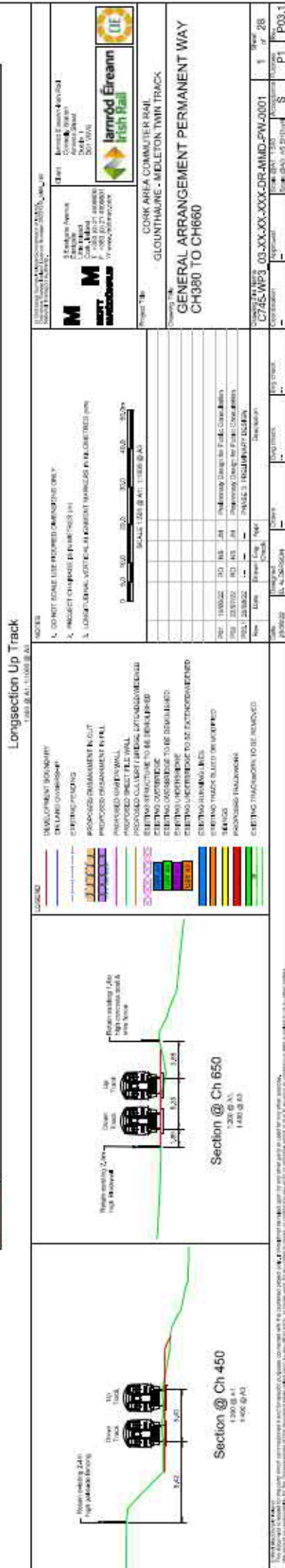
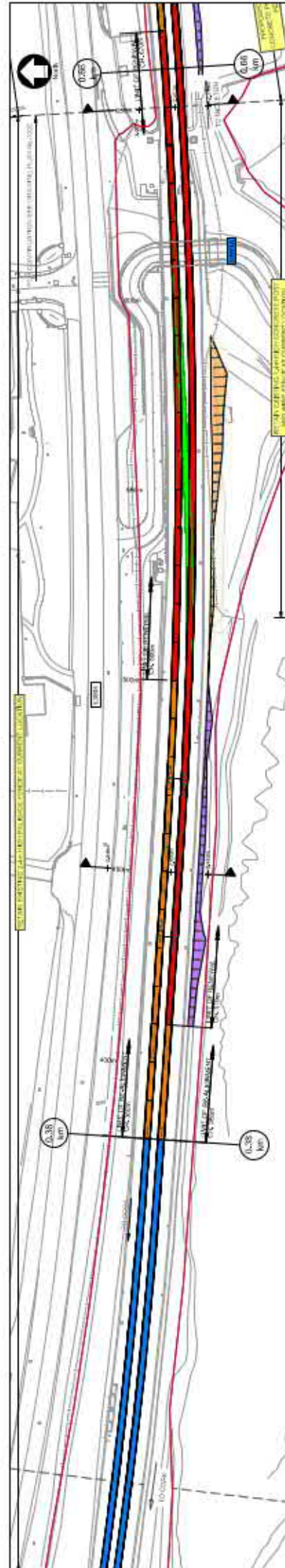


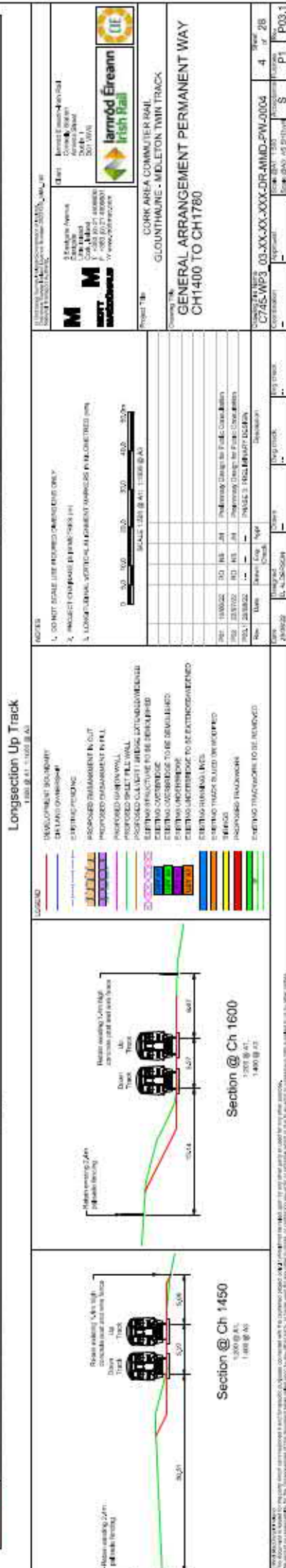
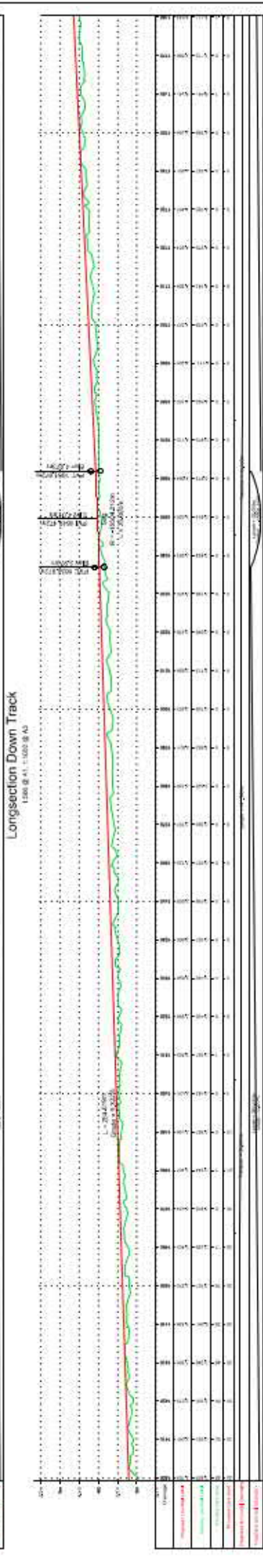
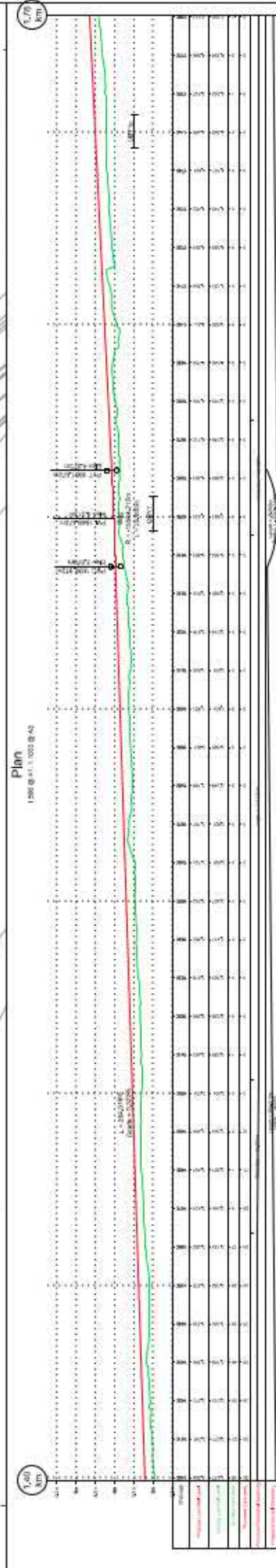
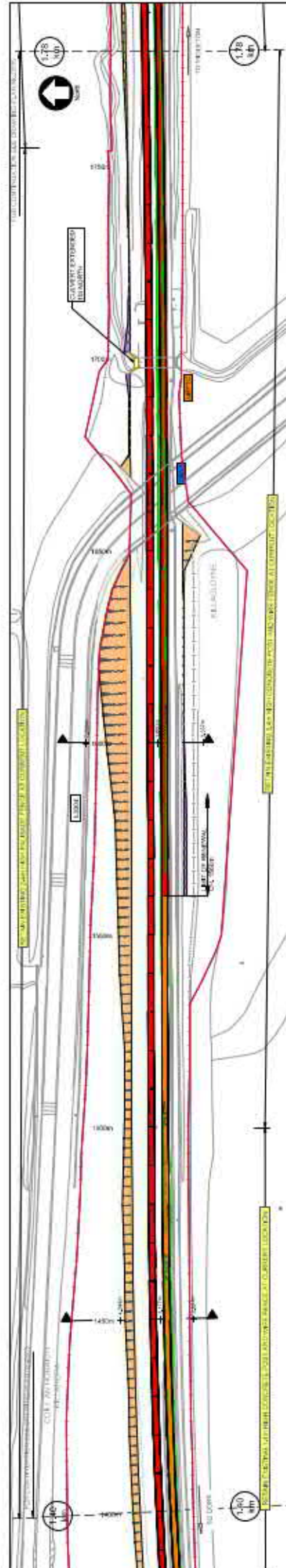
Macinifhe ag an
Aontas Eorpach
Funded by the
European Union

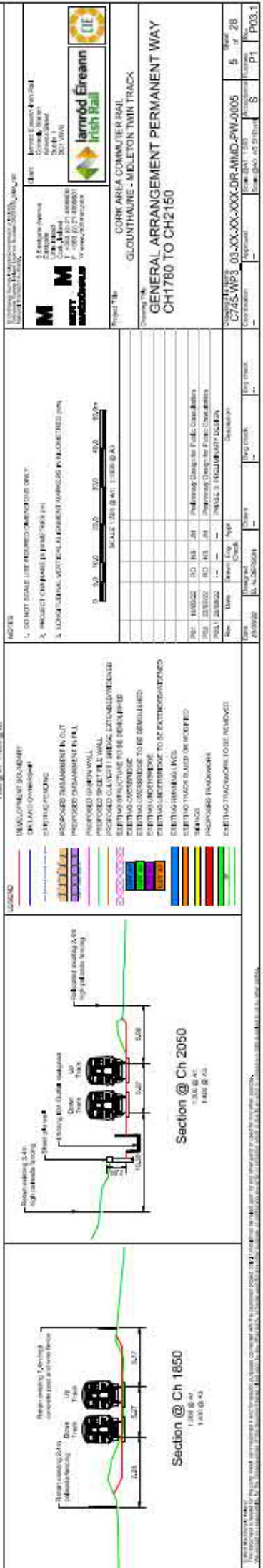
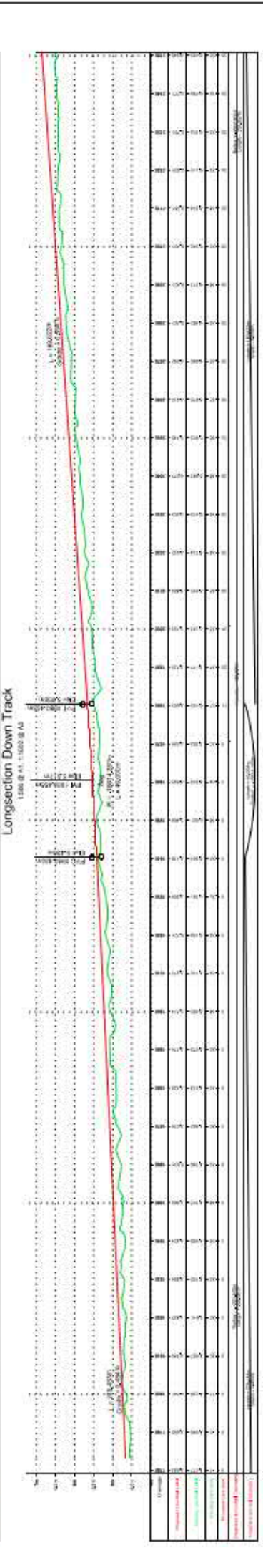
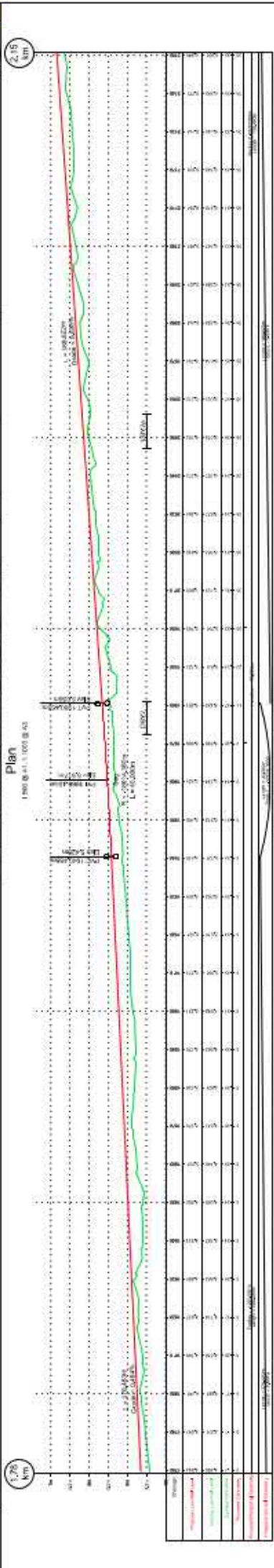
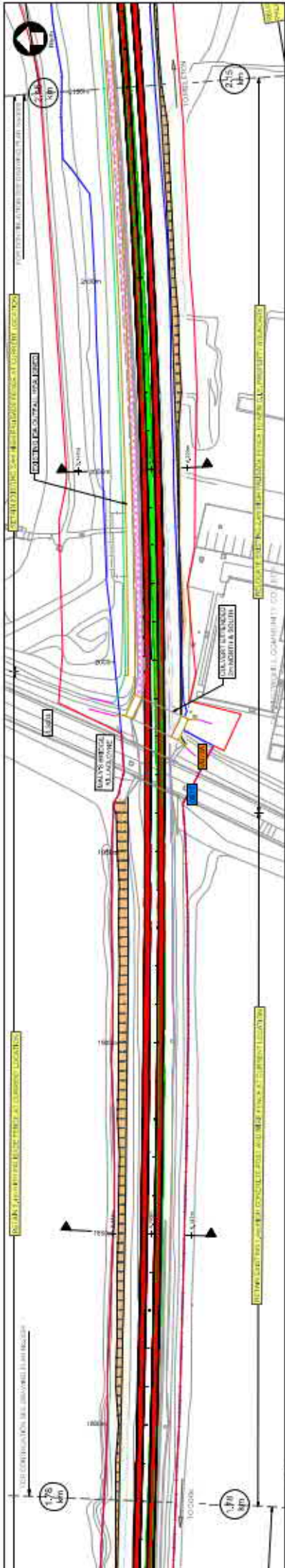
Iarnród Éireann
Irish Rail

**CORK AREA COMMUTER RAIL
GLOUNTHAUNE - MIDLETON
TWIN TRACK**

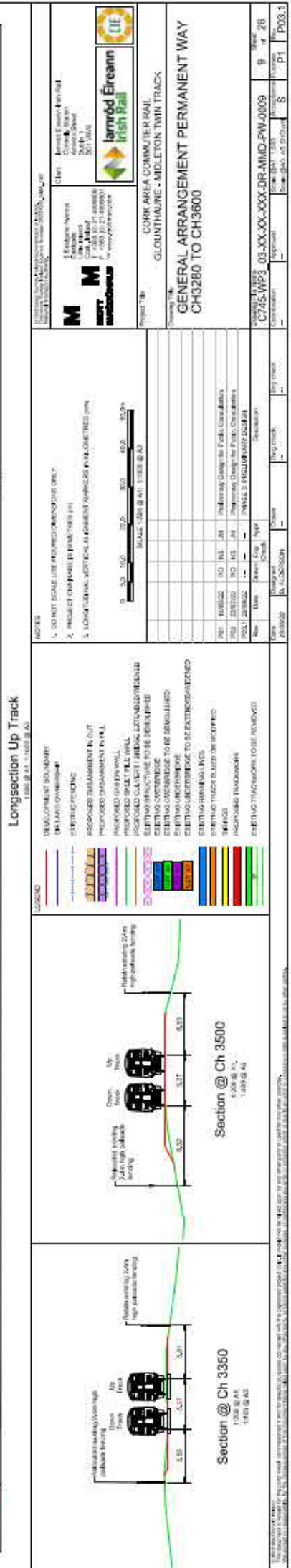
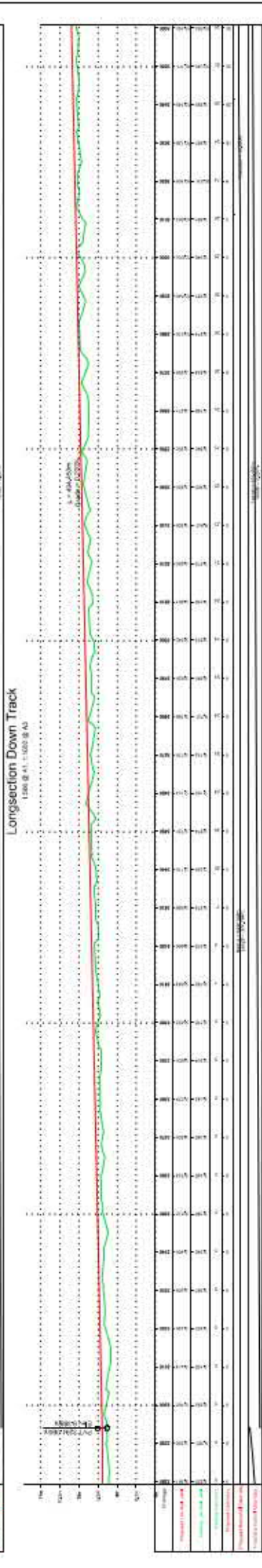
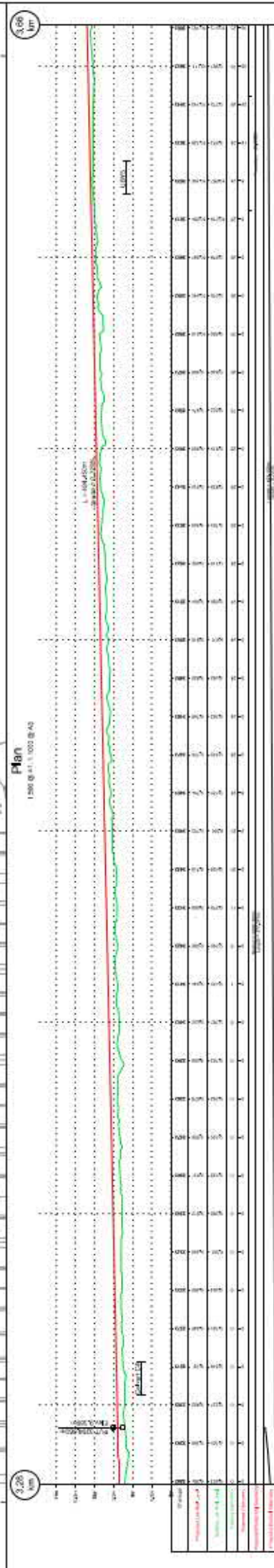
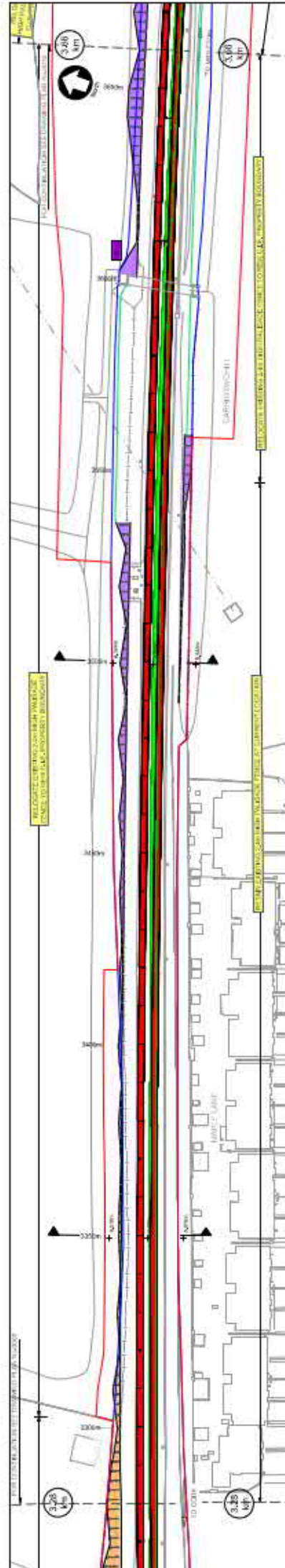
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CORK AREA COMMUTER RAIL GLCUNTHAUNE - MIDDLETON TWIN TRACK									
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Grading File									
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Sheet Description									
Sheet Date									
Sheet Author									
Sheet Checker									
Sheet Designer									
Sheet Engineer									
Sheet Surveyor									
Sheet Draftsman									
Sheet Plotter									
Sheet Printer									
Sheet Binder									
Sheet Folder									
Sheet Carrier									
Sheet Protector									
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Sheet Stapler									
Sheet Punch									
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Sheet Hole Punching Machine Operator									
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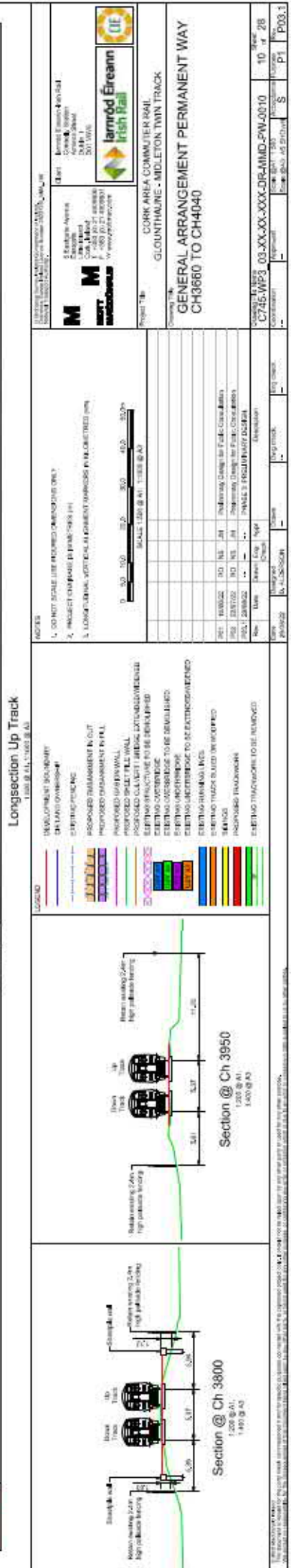
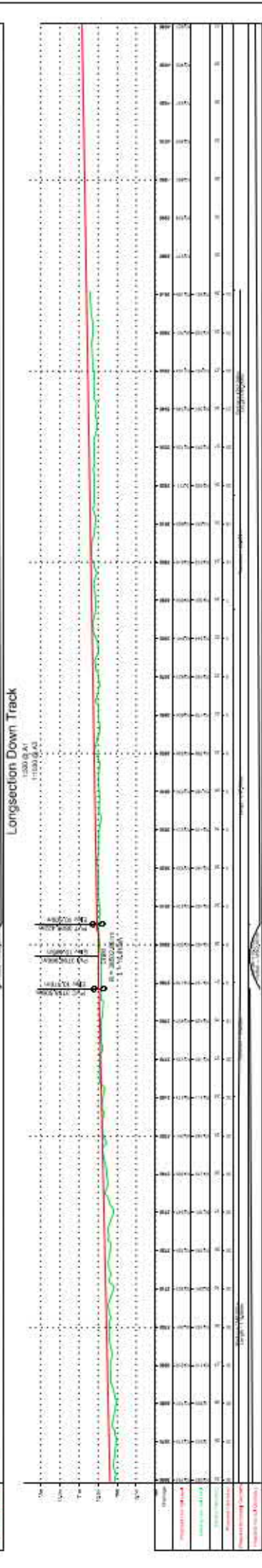
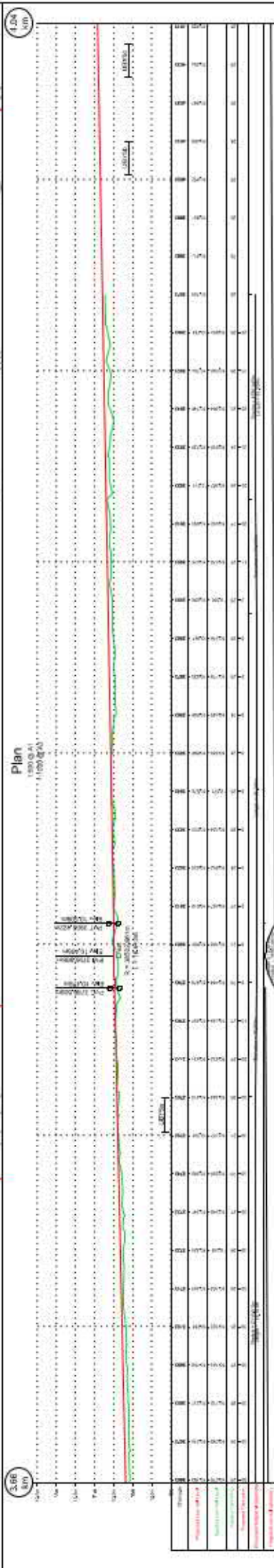
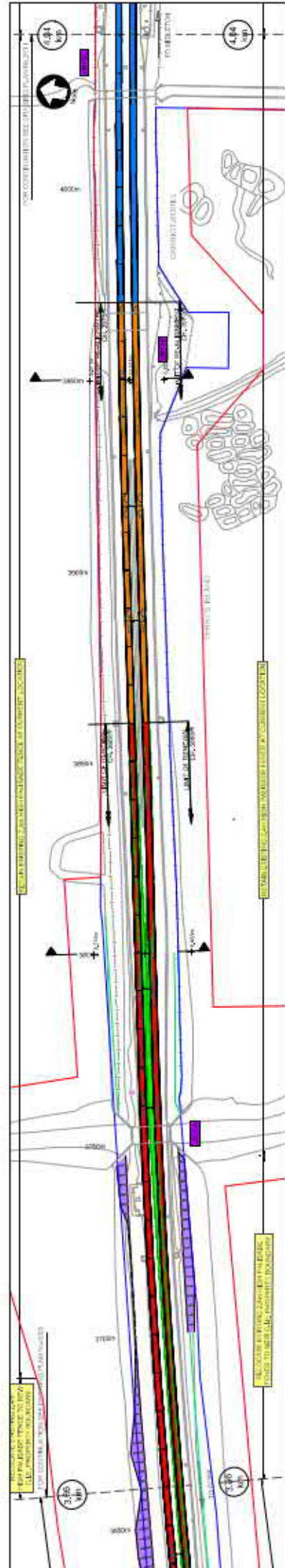


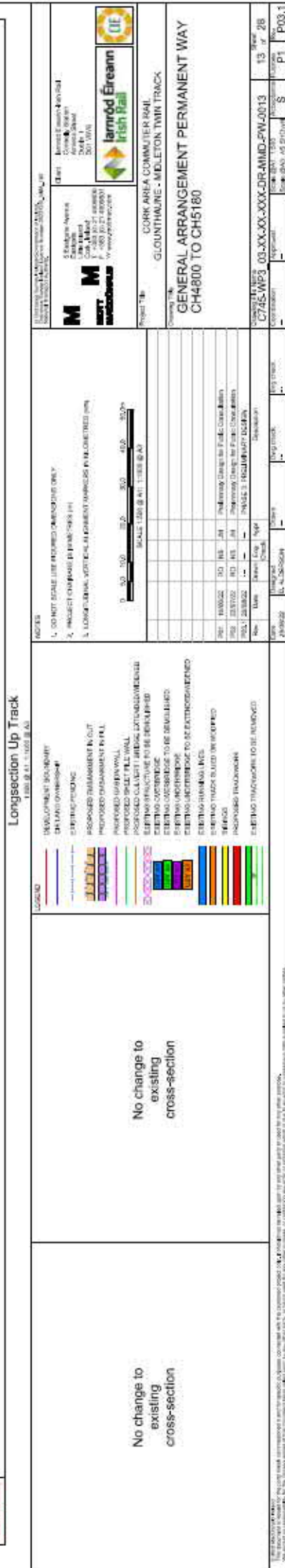
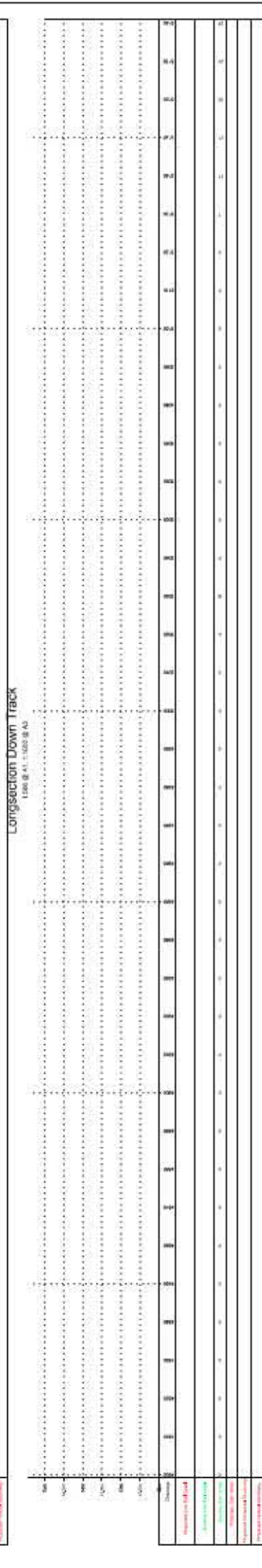
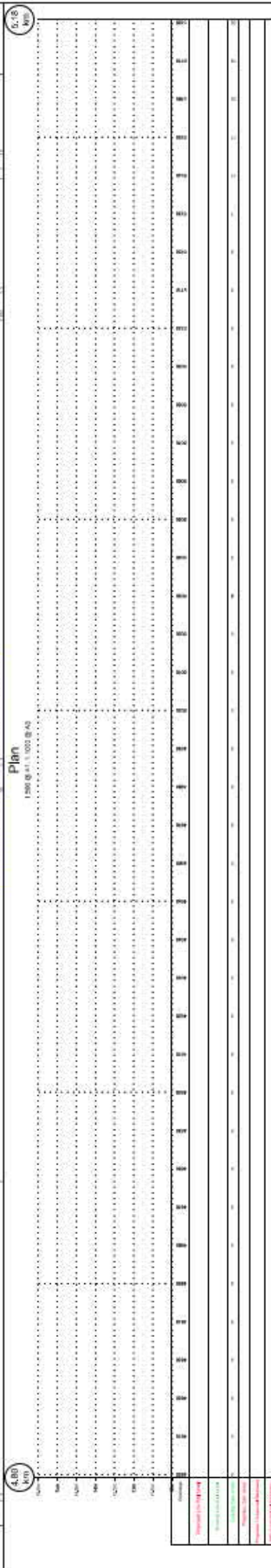
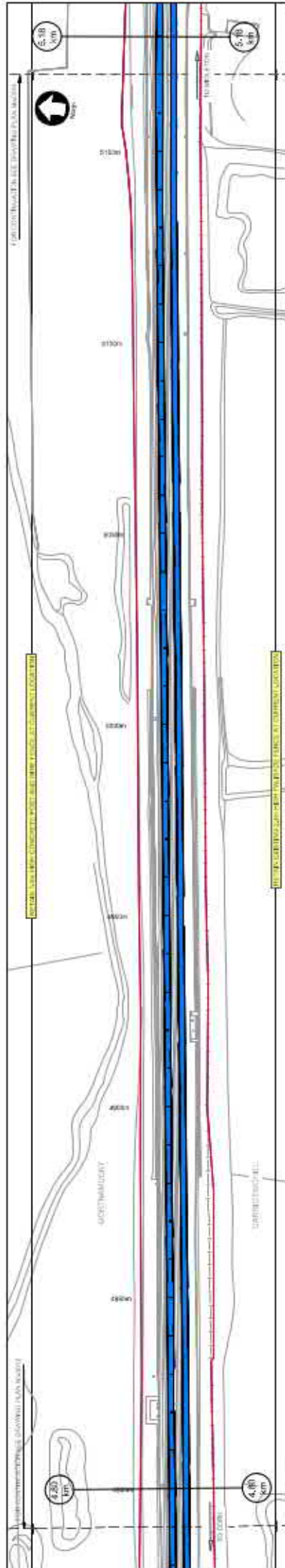


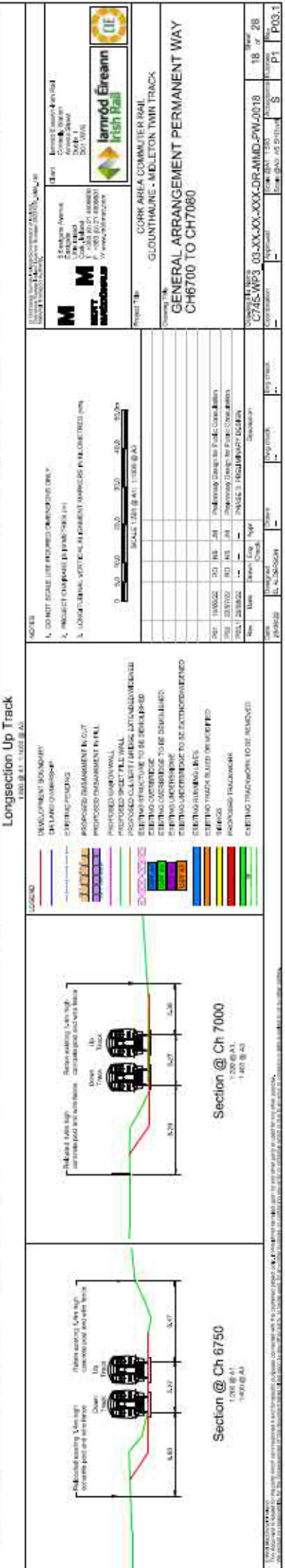
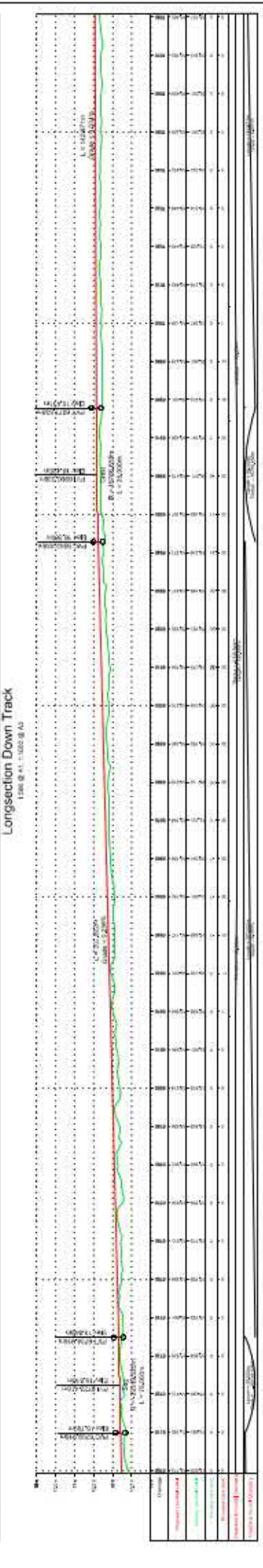
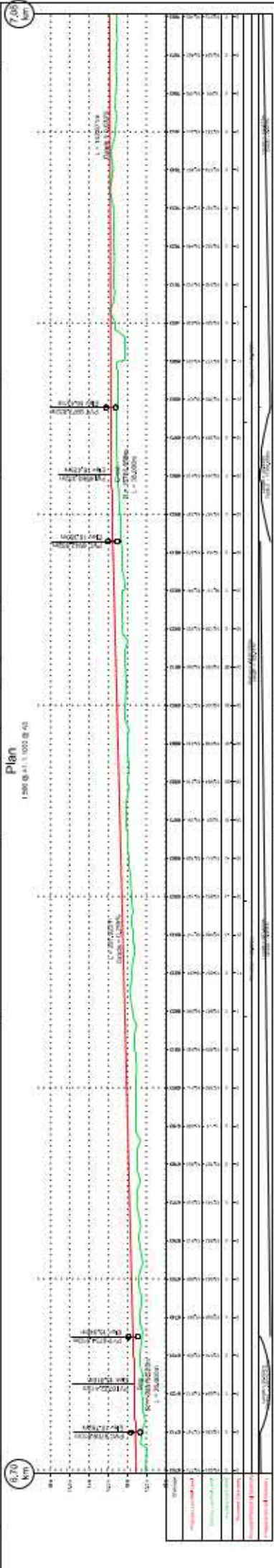
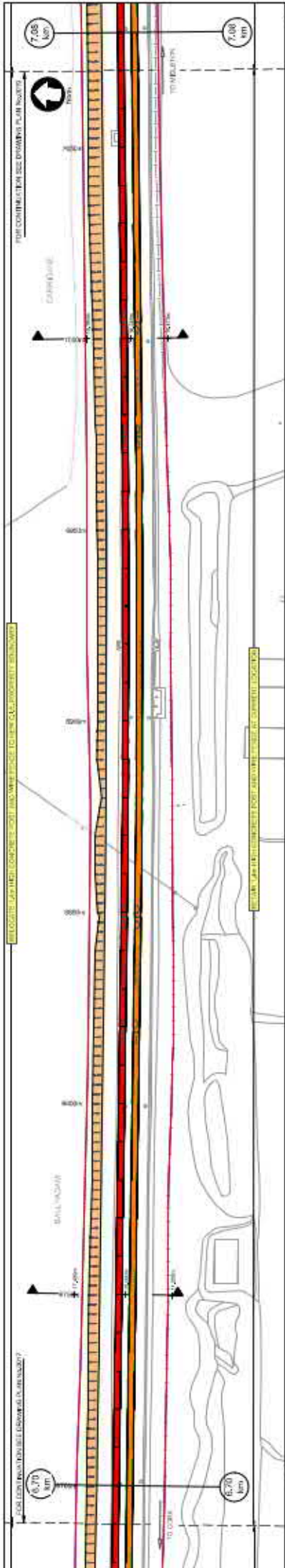


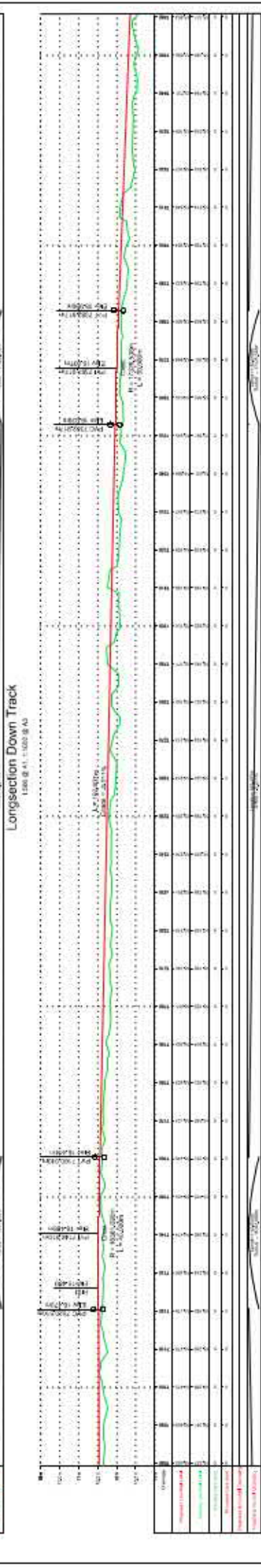
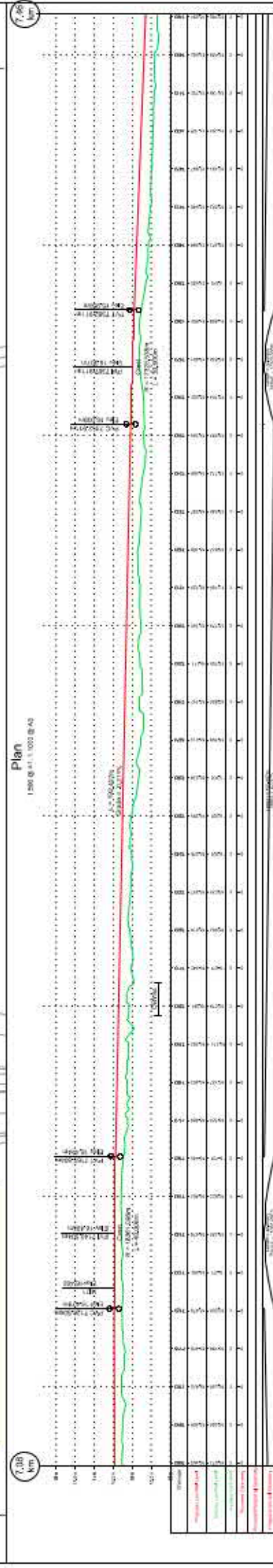
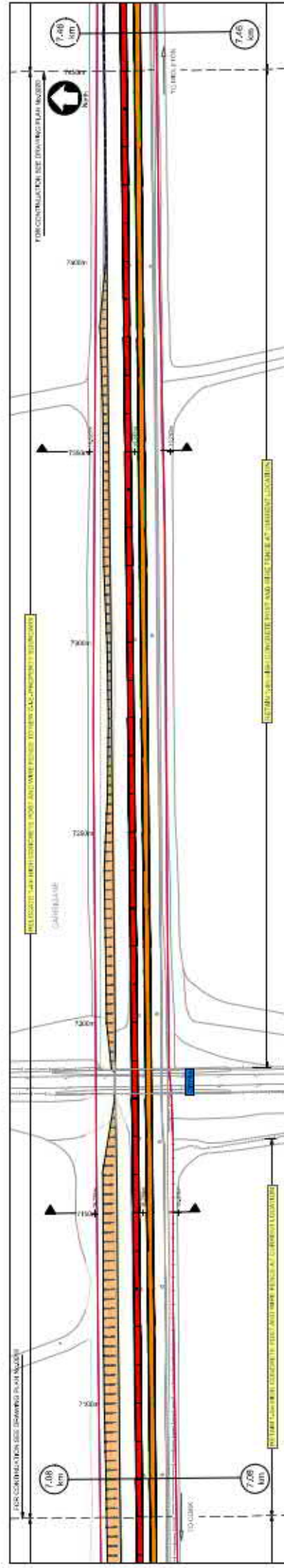
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NOTES

- DO NOT SCALE LINE DRAWING DIMENSIONS ONLY
- PROJECT CHANGES IN PLAN VIEW ONLY
- LOCAL CIRCULAR VERTICAL ALIGNMENT DIMENSIONS IN PLAN VIEW ONLY

LEGEND

- PROPOSED TRACK
- EXISTING TRACK
- PROPOSED TRACK BED
- EXISTING TRACK BED
- PROPOSED TRACK BED TO BE REMOVED
- EXISTING TRACK BED TO BE REMOVED
- PROPOSED TRACK BED TO BE REMOVED
- EXISTING TRACK BED TO BE REMOVED

Section @ Ch 7150

Section @ Ch 7350

GENERAL ARRANGEMENT PERMANENT WAY CH7080 TO CH7460

Project No: C74S-WP3 03.XX.XX-XXX-DRAMD-PW-0019

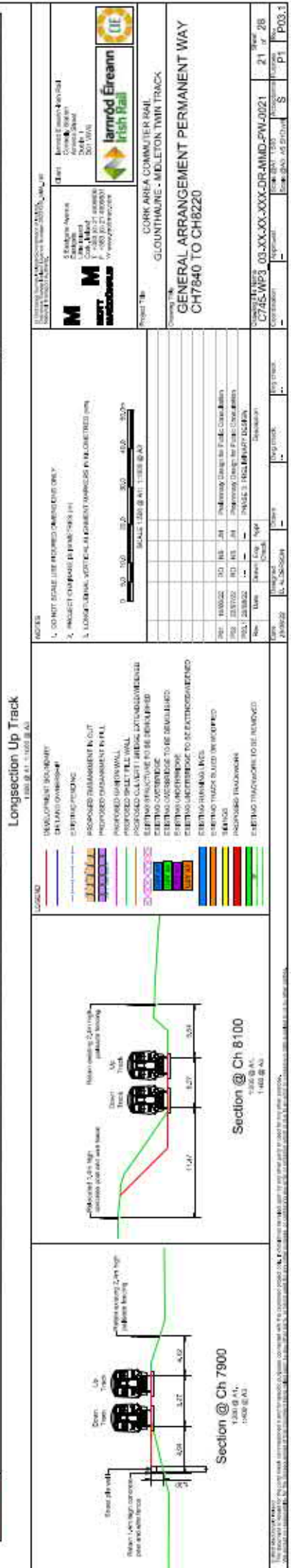
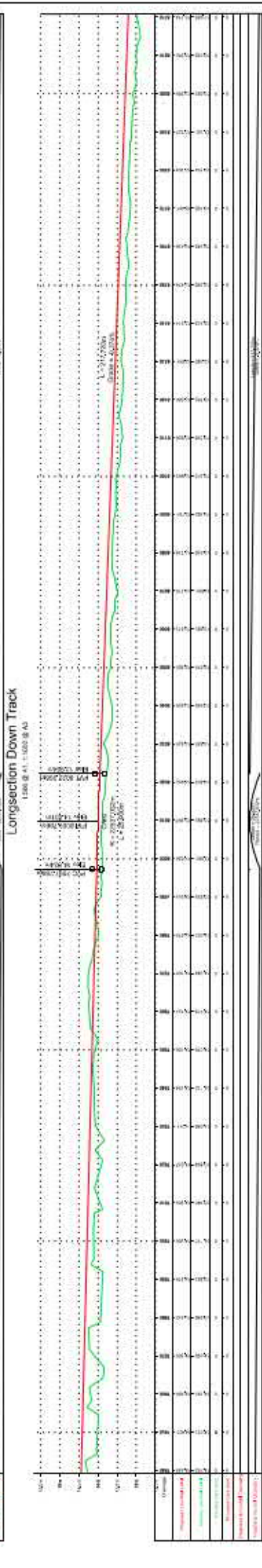
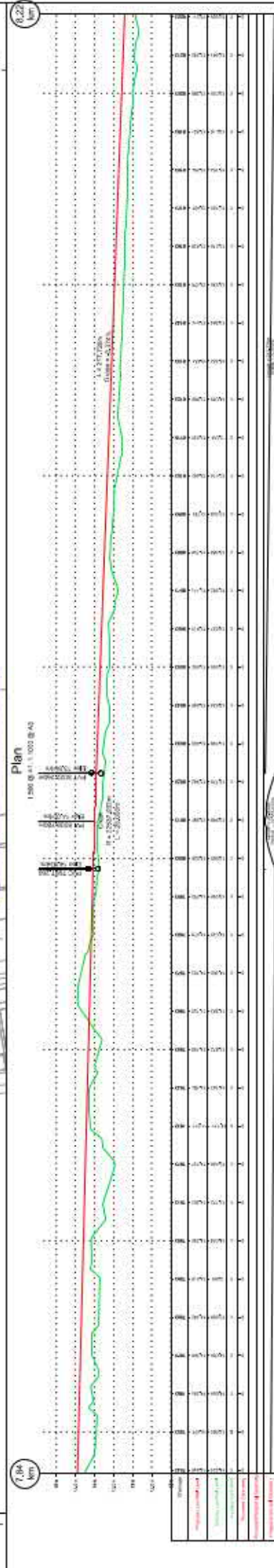
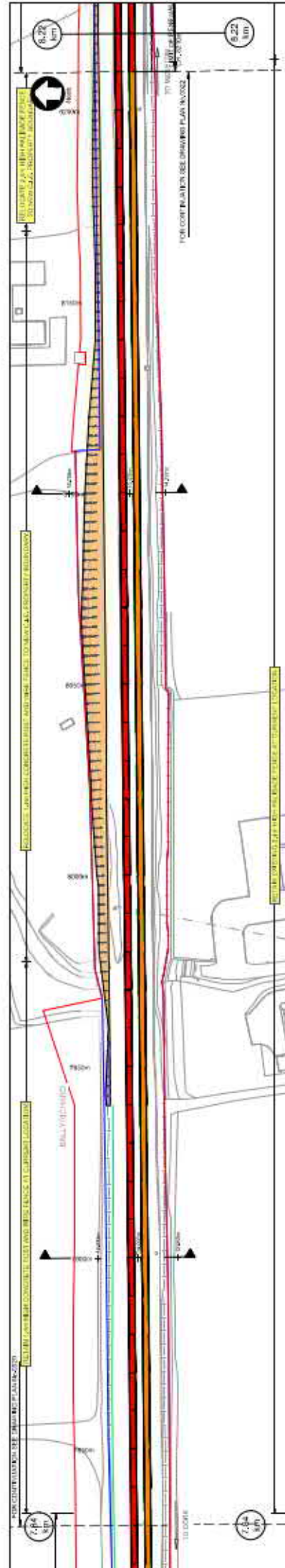
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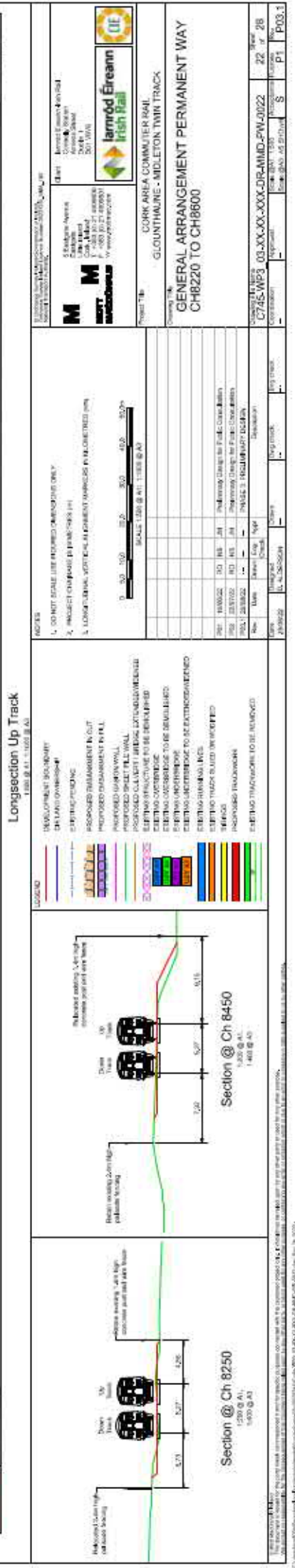
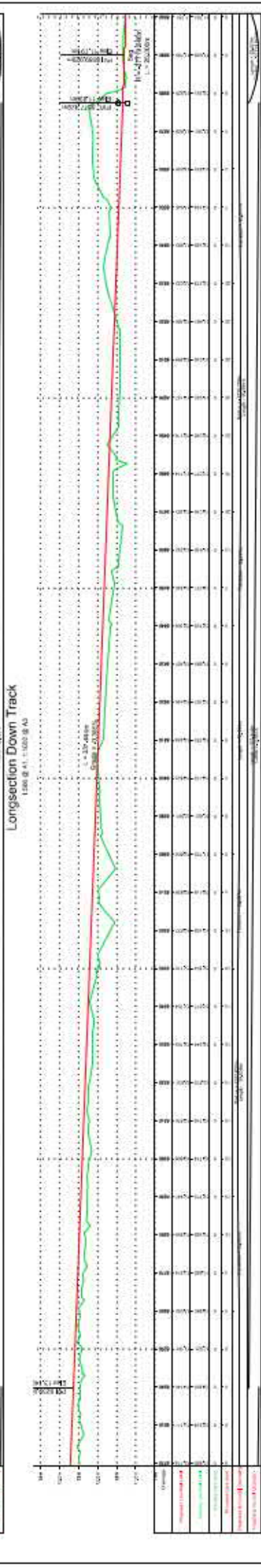
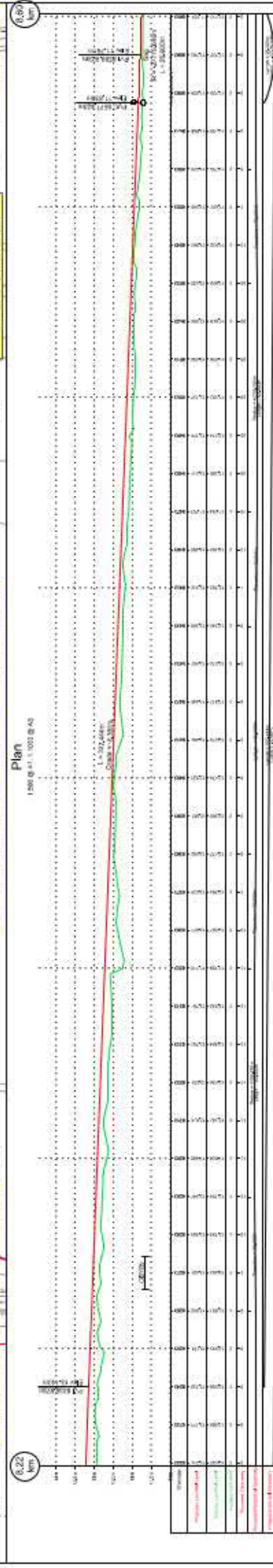
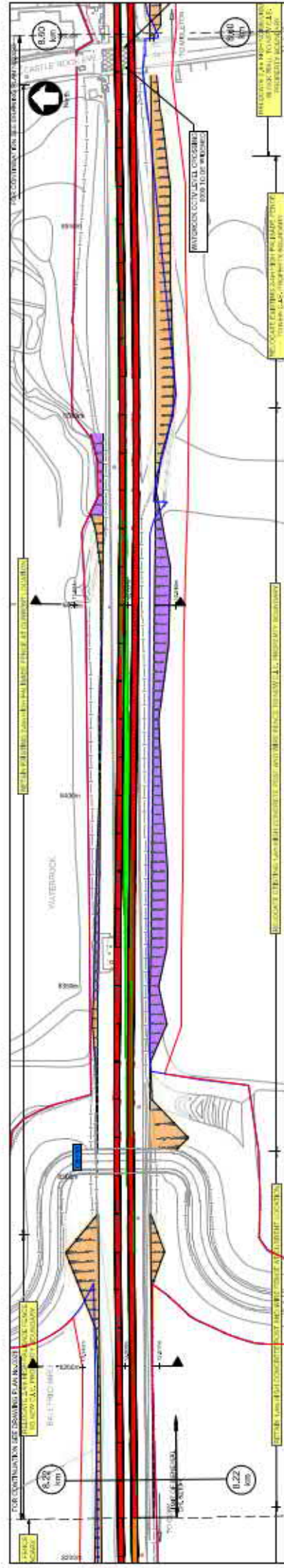
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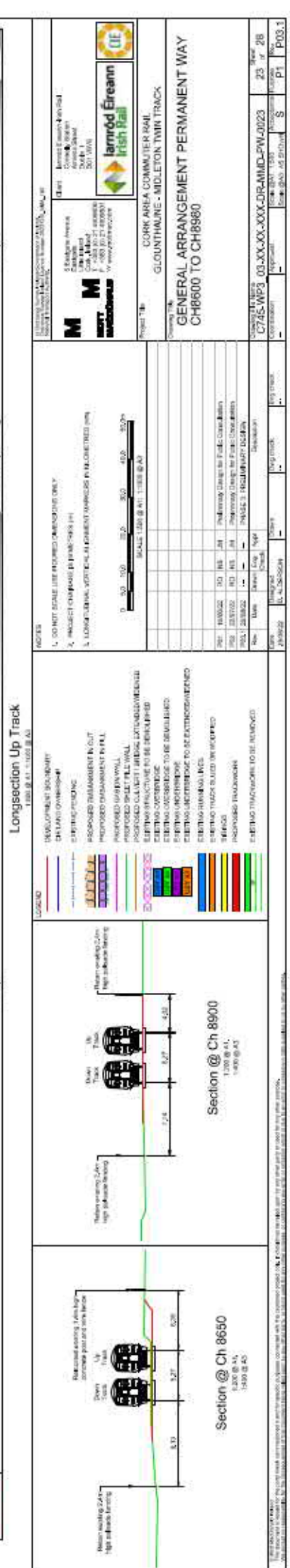
Irish Rail

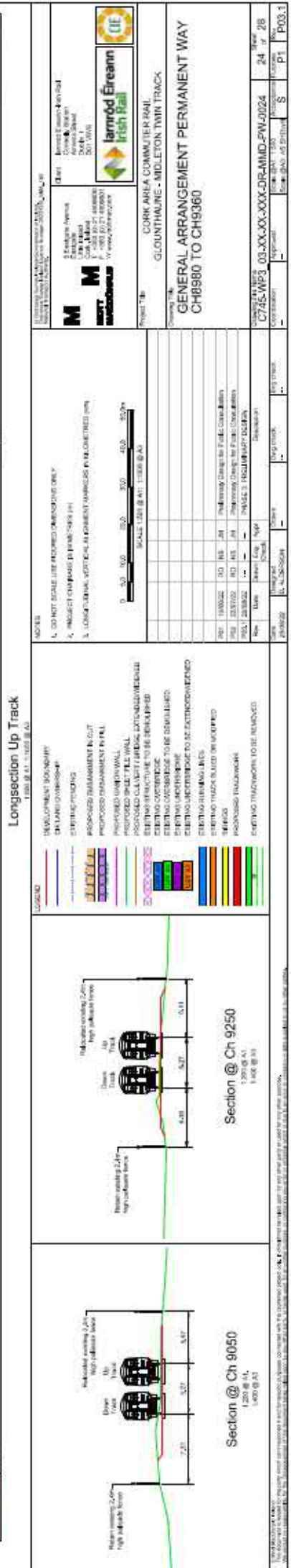
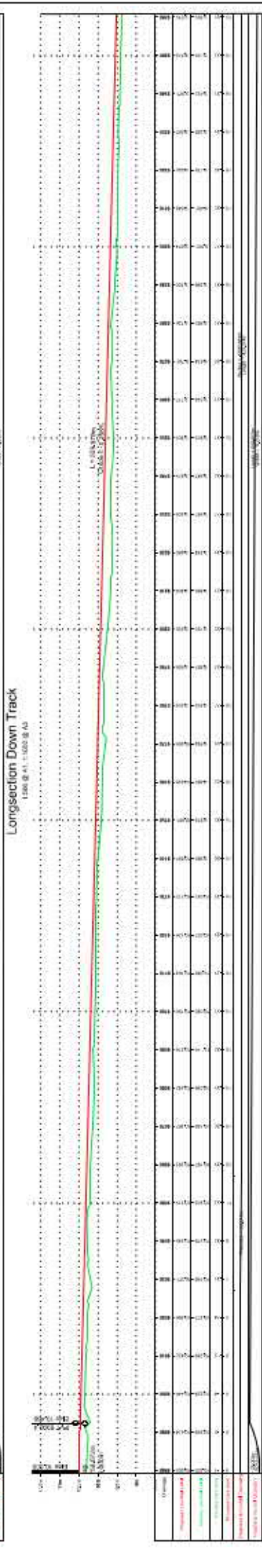
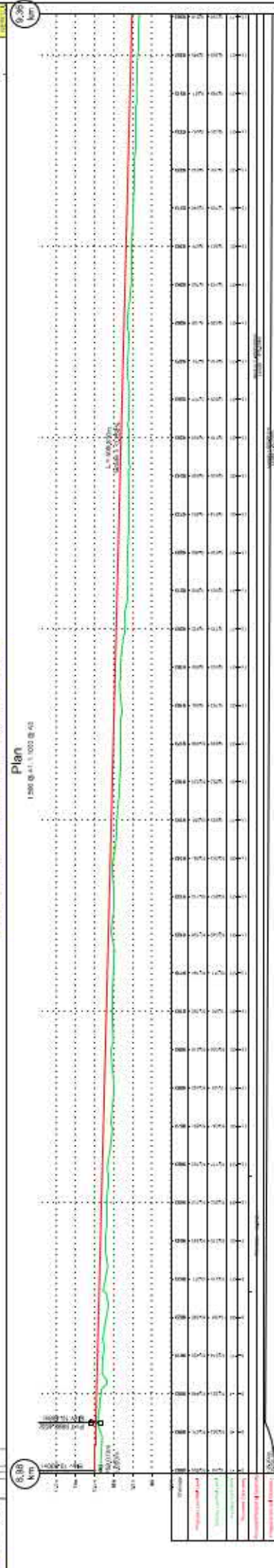
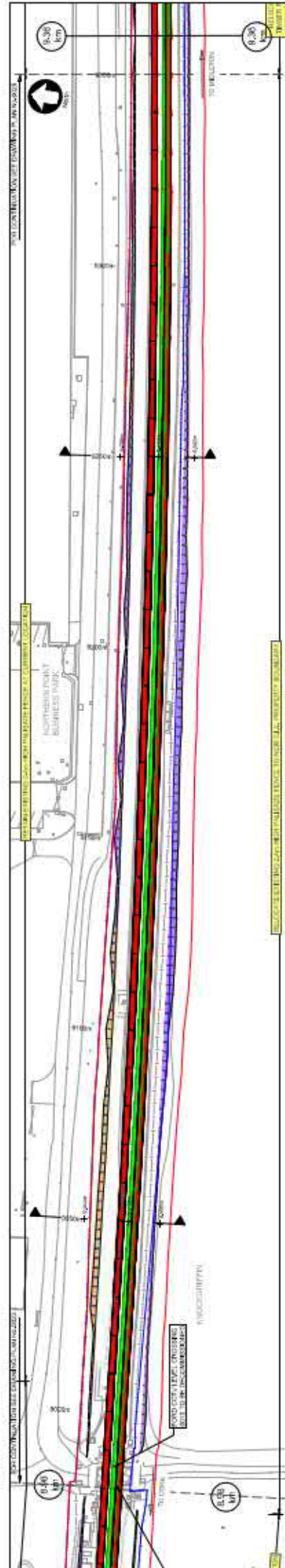
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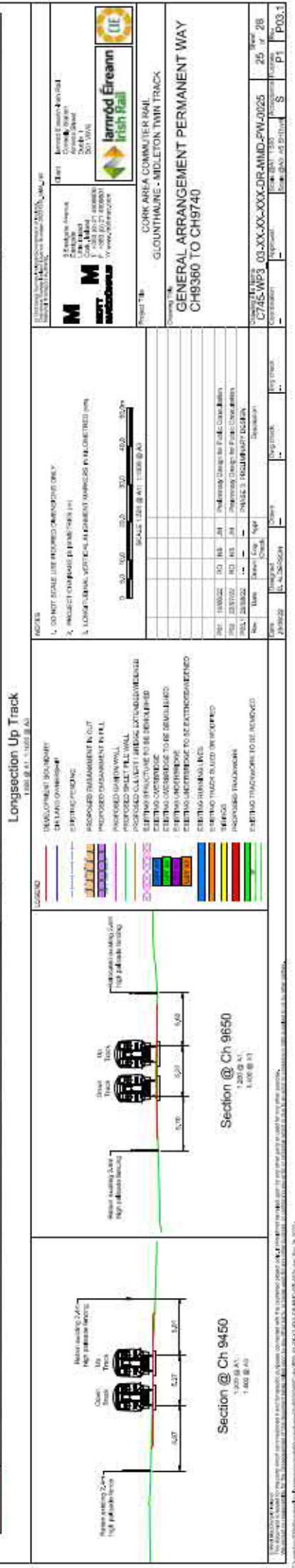
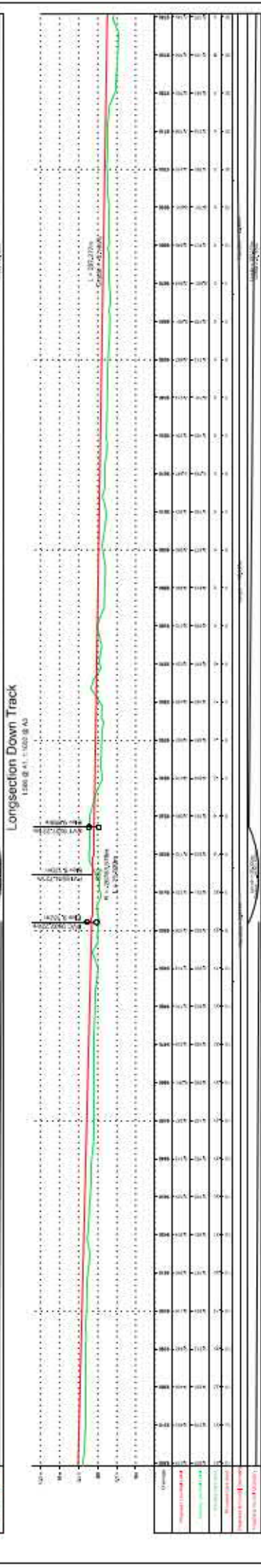
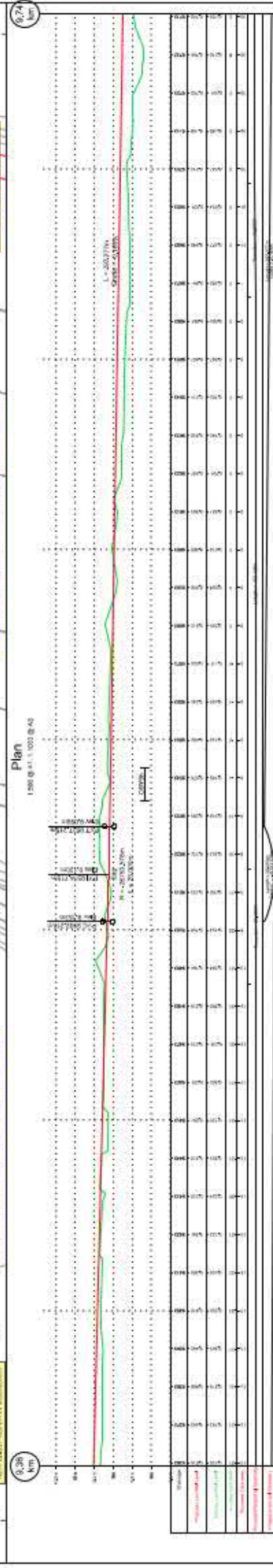
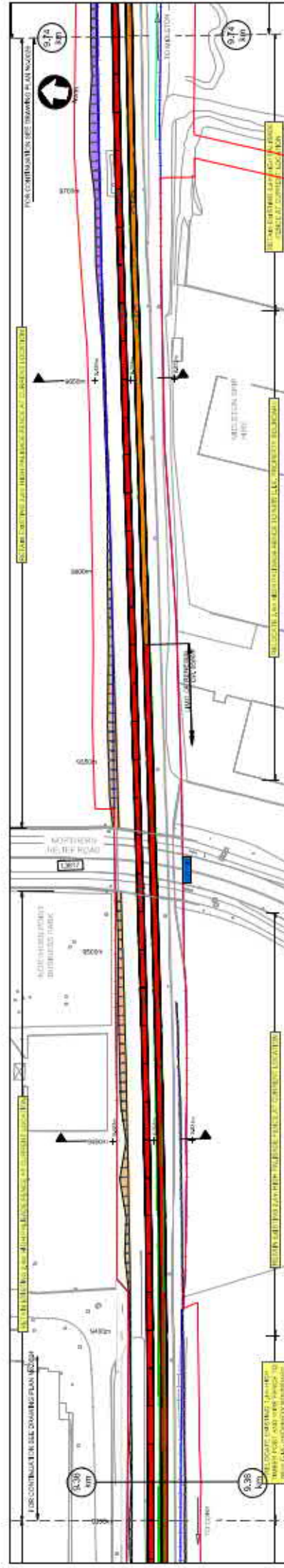
Irish Rail logo

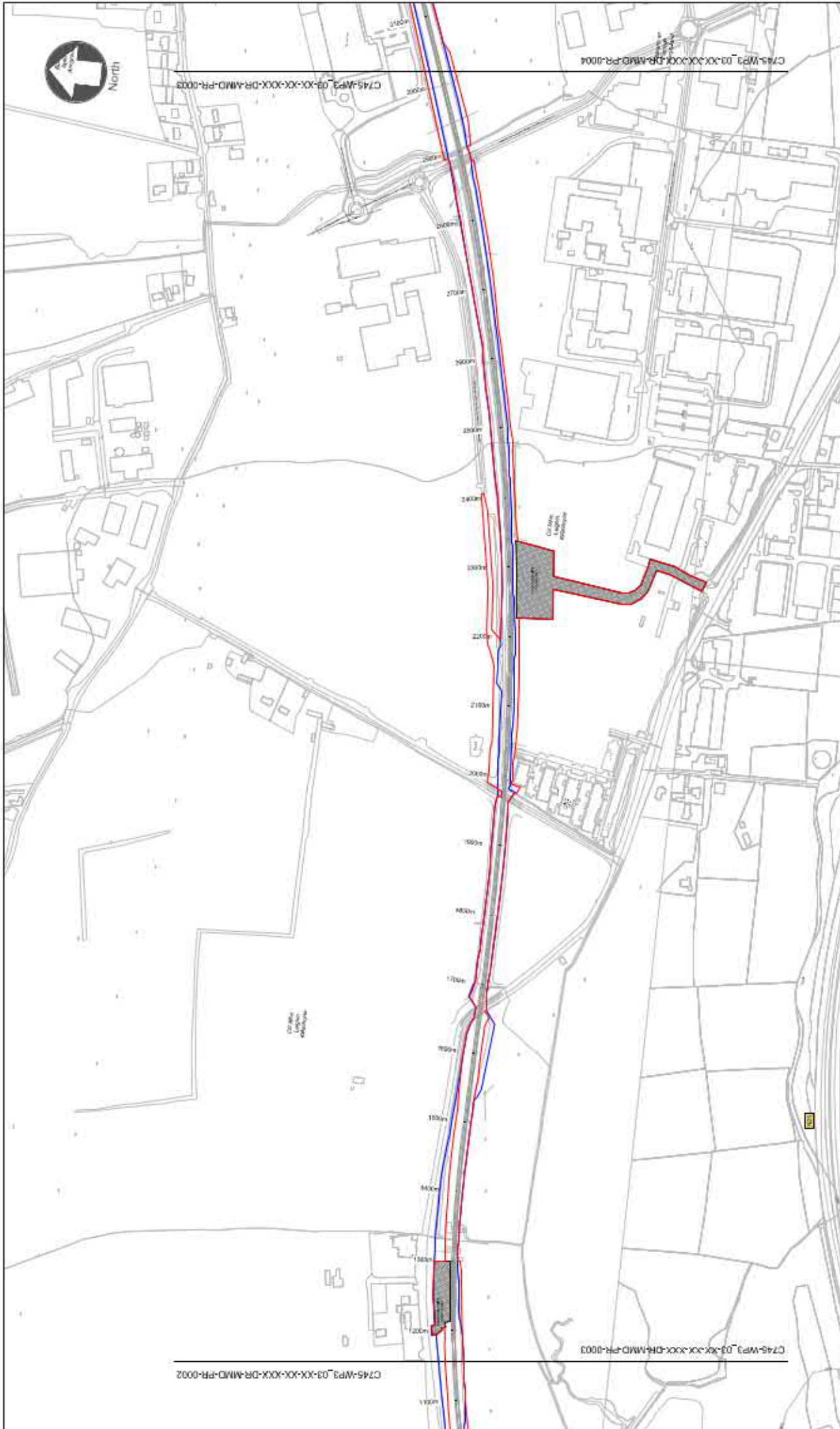


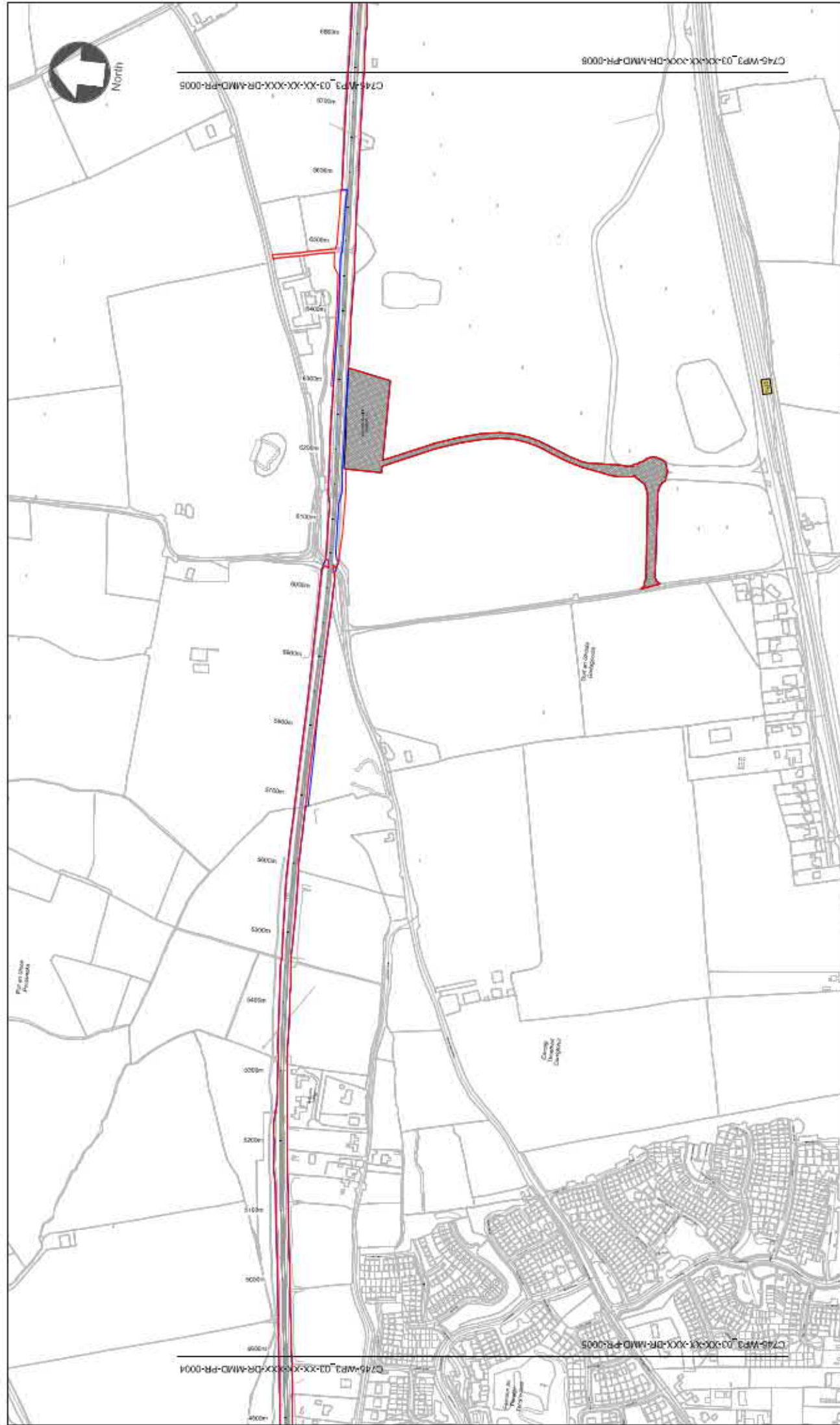




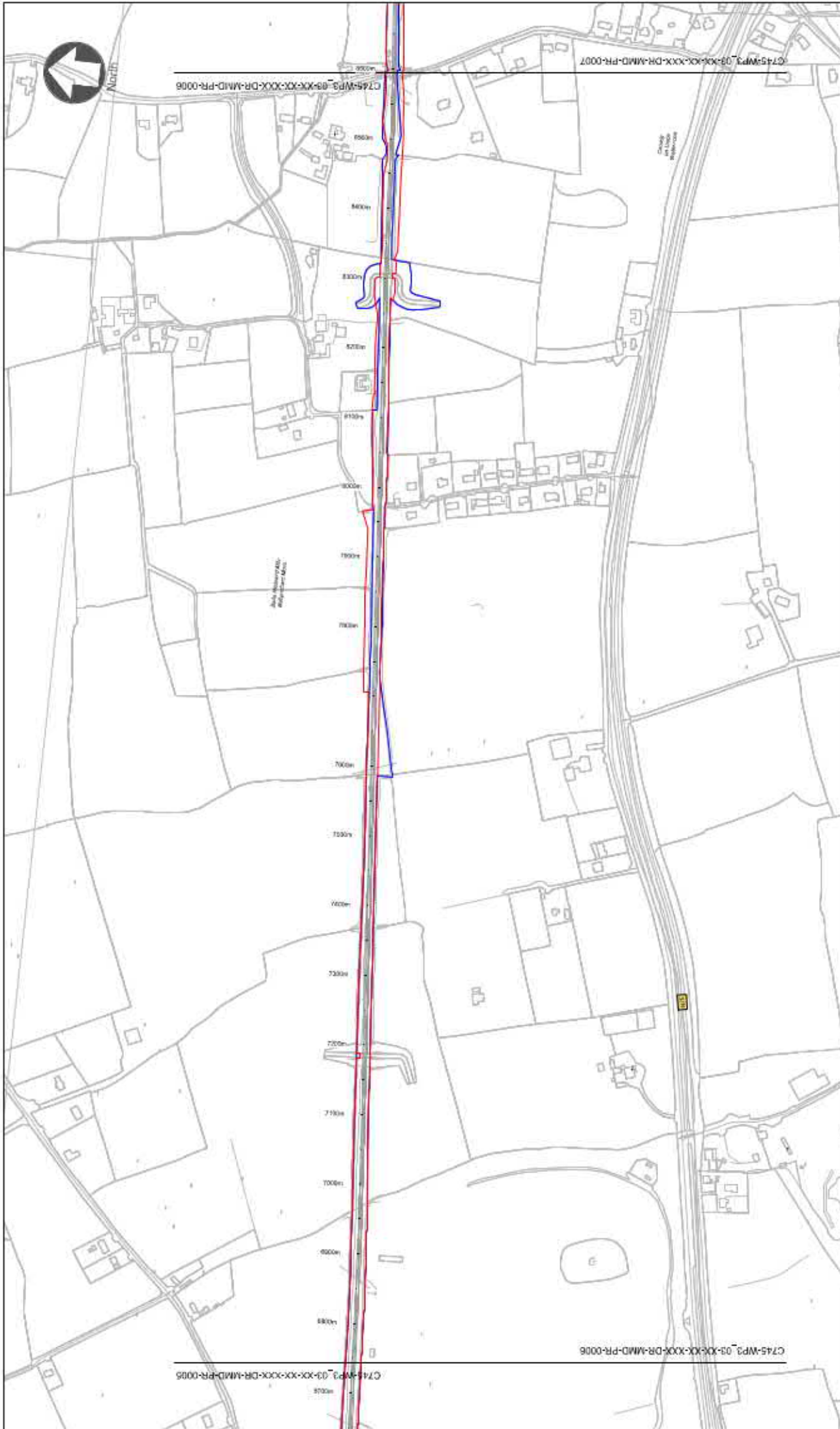




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NOTES	<p>1. THE DRAWING IS AN INTERIM REPRESENTATION OF THE ENVIRONMENT AND IS TO BE USED FOR INFORMATION ONLY. THE FINAL DESIGN SHALL BE BASED ON THE RESULTS OF THE ENVIRONMENTAL IMPACT ASSESSMENT AND THE RESULTS OF THE PUBLIC CONSULTATION.</p> <p>2. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED.</p> <p>3. THE DRAWING IS BASED ON THE DATA PROVIDED BY THE CLIENT AND THE DESIGNER HAS NOT CONDUCTED A FIELD VISIT TO THE SITE.</p> <p>4. THE DRAWING IS BASED ON THE DATA PROVIDED BY THE CLIENT AND THE DESIGNER HAS NOT CONDUCTED A FIELD VISIT TO THE SITE.</p>	LEGEND	<p>DEVELOPMENT BOUNDARY</p> <p>DEVELOPMENT BOUNDARY</p> <p>DEVELOPMENT BOUNDARY</p>	<p>0 20 50 100 150 200 250m</p> <p>SCALE 1:2500 (A1)</p>
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NOTES

- THE PROPOSED RAIL ALIGNMENT IS SHOWN IN RED ON THIS PLAN. THE EXISTING RAIL ALIGNMENT IS SHOWN IN BLUE. THE PROPOSED RAIL ALIGNMENT IS SUBJECT TO CHANGE AS THE DESIGN DEVELOPS.
- THE PROPOSED RAIL ALIGNMENT IS SHOWN IN RED ON THIS PLAN. THE EXISTING RAIL ALIGNMENT IS SHOWN IN BLUE. THE PROPOSED RAIL ALIGNMENT IS SUBJECT TO CHANGE AS THE DESIGN DEVELOPS.
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- THE PROPOSED RAIL ALIGNMENT IS SHOWN IN RED ON THIS PLAN. THE EXISTING RAIL ALIGNMENT IS SHOWN IN BLUE. THE PROPOSED RAIL ALIGNMENT IS SUBJECT TO CHANGE AS THE DESIGN DEVELOPS.

LEGEND

- PROPOSED RAIL ALIGNMENT
- EXISTING RAIL ALIGNMENT

REFERENCES

1. 1:50,000 Scale Map of the Area

2. 1:50,000 Scale Map of the Area

3. 1:50,000 Scale Map of the Area

4. 1:50,000 Scale Map of the Area

PROJECT INFORMATION

Project Name: CORK AREA COMMUTER RAIL

Project Title: GLOUNTHAUNE - MIDLETON TWIN TRACK

Client: DUBLIN AREA RAIL AUTHORITY

Scale: 1:50,000

Sheet: 5 of 7

DATE

15/11/2011

SCALE

1:50,000

PROJECT INFORMATION

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Project Title: GLOUNTHAUNE - MIDLETON TWIN TRACK

Client: DUBLIN AREA RAIL AUTHORITY

Scale: 1:50,000

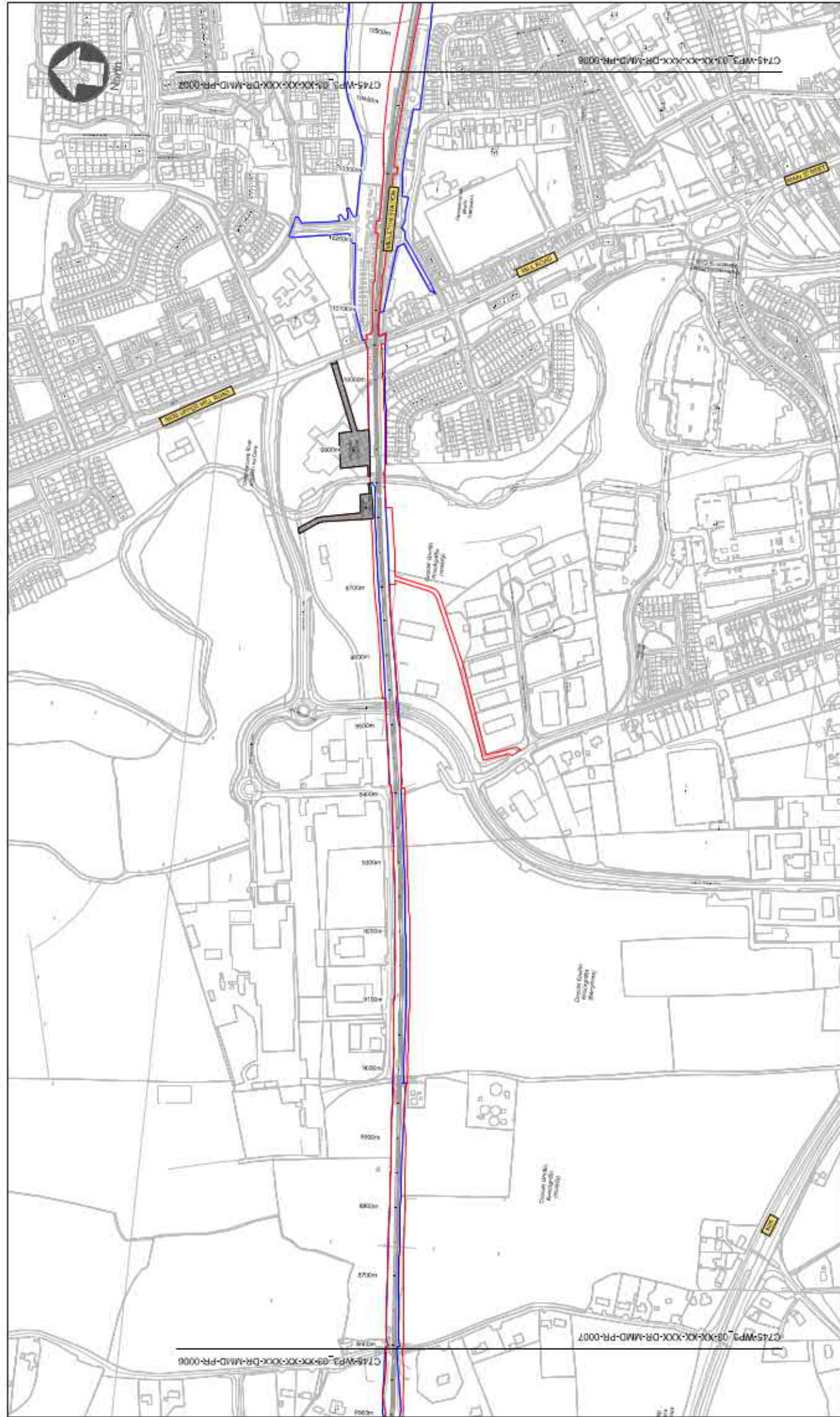
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DATE

15/11/2011

SCALE

1:50,000

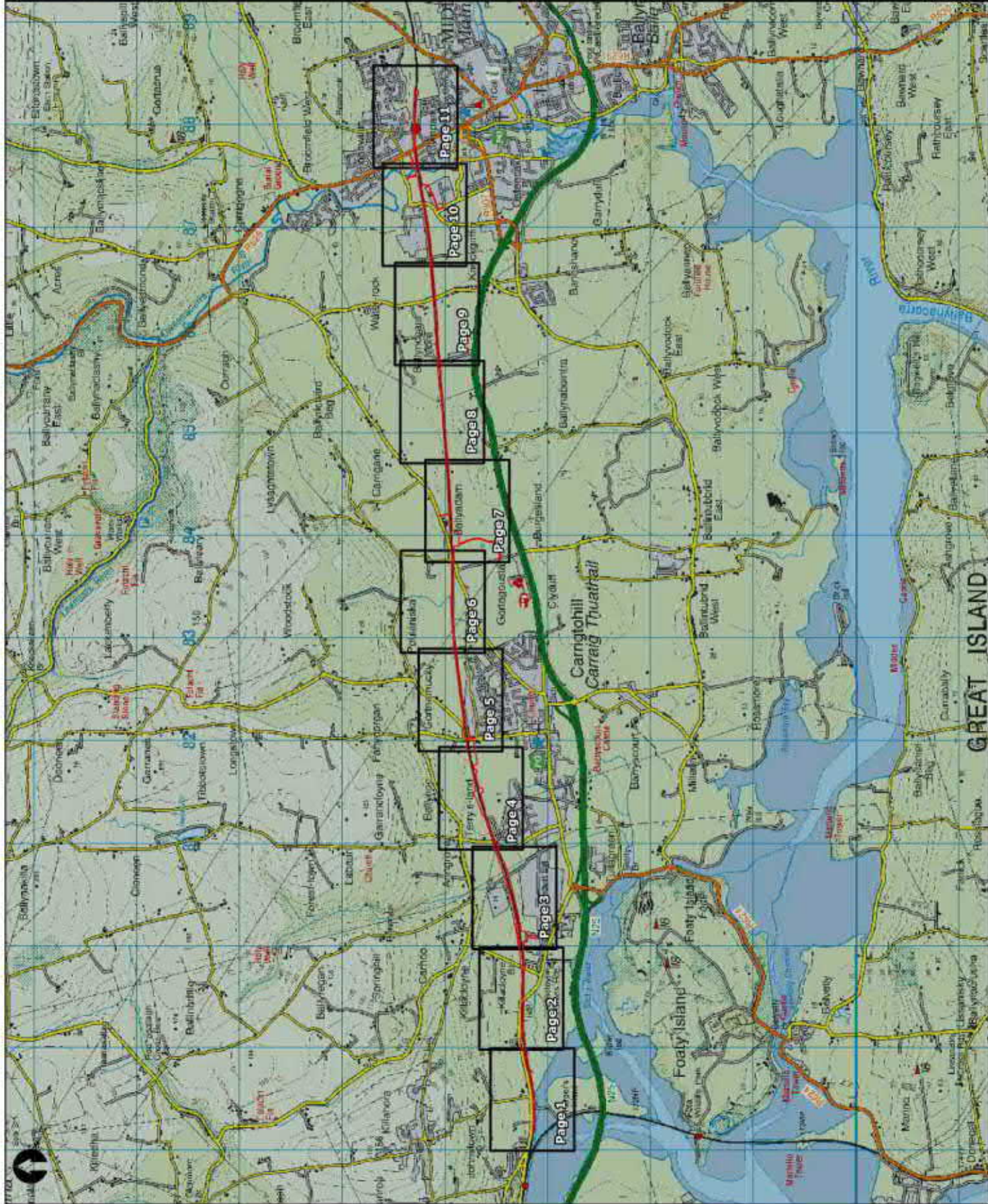
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B. Habitat Map



Key to Symbols

Red Line Boundary



Notes

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Glounthaune to Midleton
Twin Track Project
Habitat Mapping

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Location Map

Key to Symbols			
Invasive Species			
	Fallopia japonica		
	Fallopia japonica		
Habitat Fossil Code			
	WL1 - Hedgerows		
	BL3 - Buildings and artificial surfaces		
	CM2 - Upper salt marsh		
	ED1 - Exposed sand, gravel or till		
	GS1 - Dry calcareous and neutral grassland		
	GS2 - Dry meadows and grassy verges		
	LS4 - Mud shores		
	WS1 - Scrub		
	Red Line Boundary		
	Change		
	Rivers		

Notes

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Invasive Species
 *Fallopija japonica*
 *Fallipia japonica*
Habitat Fossil Code

FW4 - Drainage ditches
WL1 - Hedgerows
WL2 - Treelines
BL3 - Buildings and artificial surfaces
ED1 - Exposed sand, gravel or till
ED3 - Recolonising bare ground
FL8 - Other artificial lakes and ponds
GA1 - Improved agricultural grassland
GS1 - Dry calcareous and neutral grassland
WN4 - Wet pedunculate oak woodland
WS1 - Scrub
Red Line Boundary

Chainage
Rivers

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Sources: Eni, Airbus DS, USGS, NOAA, NASA, CGIAR, IN Rottmann, NCEAS, NLS, OS, NMA, Geodatasystem, Rijkswaterstaat, GSA, GeoZand, FEMA, Intermap and the GIS user community, Eni Community Maps Contributors, Eni UK, Eni, HERE, Garmin, Fourquare, GeoTechnology, Inc, METI/JRASA, USGS

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Key to Symbols

Invasive Species

▲ Felopia japonica

Habitat Fossit Code

FW4 - Drainage ditches

WL1 - Hedgerows

WL2 - Treelines

BL3 - Buildings and artificial surfaces

GA1 - Improved agricultural grassland

WS1 - Scrub

● Bat

Red Line Boundary

Chainage

Rivers



Sources: Eri, Airbus DS, USGS, NOAA, NASA, CGIAR, N Robinson, NCLAS, NLS, OS, NMA, Geodanzyne, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, Eri Community Maps Contributors, Eri UK, Eri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, MET/NASA, USGS

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C. Construction Environmental Management Plan



Construction Environmental Management Plan

Glounthaune - Midleton Twin Track Project

October 2022

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1 Introduction

1.1 Overview of the Proposed Development

The proposed development is the Glounthaune to Midleton Twin Track project. This development will provide twin tracking of the existing single track rail line between Glounthaune and Midleton train stations, County Cork. It is proposed to construct a new and directly adjacent additional railway track which will make the route a twin track between Glounthaune and Midleton to facilitate the passage of two trains along the railway line. The railway line is ca. 10km in length. Twin tracking of the single-track sections between Glounthaune and Midleton totalling a distance of approximately 10km.

1.2 Purpose of the CEMP

The purpose of this Construction Environmental Management Plan (CEMP) is to document and describe the main activities that will be undertaken to facilitate the proposed development and to provide a framework of environmental protection measures that will be implemented prior to commencement of, and throughout the duration of, the proposed works. This document will be further developed by the appointed Contractor, within the parameters assessed in the application particulars, taking into account any conditions of the statutory Approval (which, it is anticipated, will include a requirement for agreement of the content of this CEMP with the relevant planning authority – Cork County Council), the results of confirmatory surveys and any additional measures identified during detailed design. This CEMP will remain a 'live' document which will be reviewed regularly and revised as necessary and appropriate.

The works will be undertaken by Contractors engaged by Iarnród Éireann. This CEMP will be provided to the appointed Contractor prior to the commencement of works and will be further developed by the appointed Contractor. The appointed Contractor will be required to obtain approval of any updated CEMP by Iarnród Éireann prior to commencement of any works, irrespective of any Condition of Statutory Approval that might be imposed by An Bord Pleanála for agreement of the content of the CEMP with Cork County Council.

The Contractor's CEMP will set out the approach and methodology which the Contractor will follow in scheduling and undertaking the work and will incorporate the control (mitigation) measures detailed in this CEMP in addition to specified conditions that may be prescribed in any grant of development consent for the proposed development, the measures provided in the Natura Impact Statement (NIS) and the Environmental Impact Assessment Report (EIAR) and any commitments given by Iarnród Éireann in relation to environmental protection associated with the activities described in this CEMP.

The primary objective of the CEMP is to safeguard the environment, site personnel and nearby sensitive receptors from site activity which may cause harm or nuisance. As such, the CEMP sets out a project framework to ensure that key mitigation measures and conditions set out as part of the planning consent process are translated into measurable actions and are appropriately implemented during the construction phase of the proposed development. As part of this framework, transparent and effective monitoring of the receiving environment during construction will be used to inform and manage on-going activities on site and to demonstrate effectiveness of the measures outlined therein.

A contractual obligation will be included within the tendering processes and implemented on appointment of the Contractor to ensure that the proposed works are developed in compliance with the requirements of the CEMP, EIAR, NIS and planning conditions which will take precedence over this current version of the CEMP in the event of conflicting information.

Iarnród Éireann will monitor the contractor(s) performance on a regular basis and will undertake the following compliance checks throughout the duration of the construction period:

- Review contractor documents against the requirements of the CEMP;
- Undertake regular audits;
- Continuously check records;
- Set up a contractor reporting structure; and
- Conduct regular meetings (at least fortnightly) where Environmental Health and Safety is an agenda item.

As will be specified under Roles and Responsibilities, the Contractor's Environmental Clerk of Works (EnCoW) will also coordinate regularly with the corresponding staff delivering the elements of the Glounthaune – Midleton Twin Track Project.

1.3 Structure of the CEMP

The structure of this CEMP is set out below.

- Chapter 1 describes the purpose of this CEMP
- Chapter 2 describes the roles and responsibilities of the construction phase team
- Chapter 3 describes the proposed construction activities
- Chapter 4 describes the control measures that will be implemented
- Chapter 5 includes an Environmental Incident Management Plan
- Chapter 6 describes the training and auditing protocols that will be implemented
- Chapter 7 describes the communications and procedure for complaints

A Waste Management Plan is provided in Appendix A and a Traffic Management Plan is provided in Appendix B.

2 Roles and Responsibilities

2.1 Introduction

This initial issue of the CEMP identifies the key roles for the construction works. The contractor will update the CEMP and will set out detailed roles and responsibilities (including named individuals) and an organogram of the team structure.

2.2 Employer

Iarnród Éireann is the Employer and has the following responsibilities:

- The Railway Order application as set out in the Transport (Railway Infrastructure) Act 2001 as amended by the Strategic Infrastructure Act 2006, including decision-making on the nature and extent of the proposed development, and setting out of environmental mitigation measures, included in this CEMP. The CEMP forms part of the documents supporting the RO Application;
- Post-consent manages the process towards construction including liaison with key environmental agencies and stakeholders;
- Undertakes a Client Engineering function, including inspections to ensure that detailed designs, plant, materials and works including scheduling meet the requirements of its Development Plan, its functional specifications, its outline designs and its generic standards; and
- Continued liaison with landowners and local residents, as required.

2.3 Employers Representative

The Employer will employ an independent Environmental Clerk of Works (EnCoW) within the Employer's Representative Team to assess the construction of the Proposed Development and advise the Contractor and Contractor's EnCoW on the implementation of the agreed Contractors CEMP.

2.4 Contractor

Contractors for the Signalling and Communications Upgrade and for the Glounthaune to Midleton Twin track will be appointed following a tendering process and Iarnród Éireann will be responsible for the track works. All parties will be responsible for the Health and Safety of site workers, for the implementation of all mitigation as set out in Table 4.1 and the completion of the works to the satisfaction of the Employer.

2.5 Site Manager

The Site Manager will be responsible for the day to day running of the site and will direct and oversee the activities of a range of contractors and subcontractors throughout the works. The Site Manager will be responsible for programming of the works, will consult regularly with the Employer and will maintain site safety.

2.6 Contractors' Environmental Clerk of Works

The Contractors' EnCoW will have suitable environmental qualifications and the necessary experience and knowledge appropriate to the role. The Contractors' EnCoW will be delegated sufficient powers under the construction contract so that she / he will be able to instruct the Contractors to stop works and to direct the carrying out of emergency mitigation / clean-up

operations. The Contractors' EnCoW will also manage consultation with environmental bodies including the NPWS and IFI. The Contractors' EnCoW will be responsible for carrying out regular monitoring of the Contractors' CEMP and will report monitoring findings as required by the planning consent. The Contractors' EnCoW will also report monitoring findings in writing to the independent EnCoW within the Employer's Representative Team on a regular basis (at least weekly, but immediately in the case of incidents or accidents).

2.7 Contractor's Ecological Clerk of Works (ECOW)

An Ecological Clerk of Works (ECOW) will be employed by the Contractors to oversee implementation of ecological mitigation and support the Contractors' Environmental Clerk of Works (Contractor's EnCoW) responsible for wider environmental mitigation. This will include monitoring and auditing the works and contractor programmes and Works method statements, to ensure mitigation is correctly implemented. The Contractor's ECOW will also ensure any disturbance licenses for protected species are arranged for in the event that confirmatory pre-construction surveys identify breeding or resting sites within the ZOI.

The Contractors' ECOW will advise on ecological mitigation measures which require to be implemented and scheduled as part of the works and will be included in regular liaison meetings between project teams.

The independent EnCoW, employed on behalf of the Employers Representative team, will review and comment on the reports generated by the Contractor's EnCoW/ECOW; namely pre-construction survey reports, and the specific monitoring and compliance reports referenced under the mitigation measures in this CEMP.

3 Proposed Activities

3.1 Project Overview

The proposed development is the Glounthaune to Midleton Twin Track project. This development will provide twin tracking of the existing single track rail line between Glounthaune and Midleton train stations, County Cork.

It is proposed to construct an adjacent railway track between Glounthaune and Midleton to facilitate the passage of two trains along the railway line. The railway line is ca. 10km in length.

The proposed development comprises:

- Twin tracking of the single-track sections between Glounthaune and Midleton totalling a distance of approximately 10km;
- Reconfiguration of the operational track layouts;
- Removal of 1No. bridge (OBY08, Ballyadam House overbridge) and widening of bridge deck crossing the Ownenacurra River (UBY11);
- Extinguishment of one level crossing (Ford CCTV XY010) and widening of one level crossing (Water Rock CCTV XY009);
- Provision of sidings/turn back facility at Midleton Station;
- Provision of new cable containment routes from Glounthaune to Midleton to facilitate signalling upgrades and alterations;
- Associated signalling upgrades and alterations; and
- All associated works (e.g. temporary construction compounds; drainage, retaining walls, boundary treatments).

3.2 Site Location

The proposed development is located between Glounthaune and Midleton in Co. Cork within the functional area of Cork County Council. Figure 6.1 illustrates the geographical context of the proposed development. Over the length of the route, twin tracking is currently in place over approximately 35% of the route. The new track will be required between these areas.

The proposed development is located between Glounthaune and Midleton in Co. Cork. Figure 3.1 illustrates the location of the railway line.

Figure 3.1: Site Location



3.3 Construction Phase Activities

3.3.1 Bridges

There are two existing bridges which will require works as part of the proposed development. These are detailed in Table 3.1 and the requirement for works is also detailed.

Table 3.1: Bridge Structures along the Glounthaune – Midleton Railway Line

Structure		Chainage	Function	Works required
Name	Denotation			
Ballyadam House Overbridge	OBY8	6+500m	Carries local access road on Ballyadam House property over the rail line	To be removed
Owenacurra River Bridge	UBY11	9+870m	Carries the rail line over the Owenacurra River	Deck to be widened using existing river piers.

3.3.1 Ballyadam House Overbridge (OBY8)

It is proposed to remove bridge OBY8 at Ballyadam House as part of the works. This bridge is an overpass built for agricultural purposes, to allow livestock and equipment access the farmyard at the rear of Ballyadam House. The bridge is constructed of limestone, with coursed rock-faced rusticated walls. The structure will be required to be dismantled. This bridge is not in use and would present an unjustifiable safety risk if it were retained.

The dismantling of OBY8 will comprise the following:-

- Erect perimeter fencing around demolition works area.
- Undertake a photographic record of the bridge.
- Obtain railway line possession for duration of demolition works.
- Install crash mat under the span on the existing tracks.
- Remove any existing services on the deck.
- Temporarily remove existing trackside services.
- Remove stone parapets.
- Remove stone spandrel walls and retaining walls.
- Dismantle brick arch barrel and infill.
- Remove stone abutments.
- Remove approach embankments.
- Regrade embankments and remove crash mat.
- Reinstate trackside services.
- Check and adjust track and ballast levels as necessary.
- Sort demolition spoil for re-use on this and other projects including cut stone and brick.

3.3.2 Owenacurra River Bridge (UBY11)

All bridge structures (with the exception of the un-used bridge OBY8) are to be retained, however works will be required at Owenacurra River Bridge (UBY11) to widen the deck of the bridge on the existing piers to allow for a double track and the abutments are to be widened – see Figure 6.2 below. The bridge crosses the Owenacurra River. The span lengths from west to east are ca. 11m, 7m and 11m. The widening structure span arrangement, structural form and articulation will match the existing bridge. The widening deck consists of precast prestressed concrete beams with an in situ infill concrete deck which will be stitched to the existing deck. The bankseat (base of the bridge) widenings are supported on continuous flight auger piles. The existing pier capping beams will be widened to accommodate the proposed deck. The existing north walkway will be removed and reinstated on the widened deck. The existing reinforced concrete northern wingwalls will be dismantled and rebuilt to accommodate the widened deck.

The widening of the Owenacurra River Bridge will comprise the following:

- Erect perimeter fencing around construction works area.
- Construct a temporary access track to the bridge from both east and west approaches.
- Provide storage and set-down area for the precast beams.
- Install environmental protection measures which include silt fences and water management.
- Remove rail track, ballast and granular fill on the bridge and on the approaches to the bridge.
- Excavate the existing wingwall backfill at both north-east and north-west wingwalls and remove the existing wingwalls.
- Remove / break-out the existing north concrete bridge walkway.

- Place and compact fill at both east and west abutment extension locations.
- Construct piling rig platform at both east and west abutments.
- Install piles.
- Construct in situ concrete abutment extensions.
- Install precast capping beam extension on top of two number of existing bridge piers located within the river.
- Construct temporary crane platform.
- Install precast prestressed bridge beams.
- Install precast concrete north parapet/walkway upstand.
- Install tubular metal handrail.
- Pour in situ concrete deck infill.
- Spray apply waterproof deck.
- Install granular fill on both east and west bridge approaches.
- Install precast concrete north-east and north-west wingwalls.
- Backfill wingwalls and abutments.
- Install track ballast
- Remove water management measures.
- Remove silt fences.

A scaffold will be required within the Owenacurra River as part of the works. As the works in-stream are restricted to July-September, water levels will likely be low. In this situation scaffolding is erected in the wet, founding the scaffold legs on steel plates to spread the load over the riverbed material. The piers at this location are approximately 1-2m high so the scaffolding will be a single level just above water level which will allow staff to work on the piers in the dry and also to catch any pier material from entering the river. In the unlikely event that water levels are high the scaffolding will be supported from the piers rather than the riverbed.

The works at the Owenacurra River bridge are expected to last eight weeks for preparation works and an additional one week for deck works.

Source: Mott MacDonald

3.4 Culverts

There are works proposed at four culverts along the route – these are illustrated on Figure 3.3.

3.4.1 IDA Open Culvert

The existing open culvert is ca. 900m in length. The culvert consists of a u-shaped cross-section. The wall heights vary throughout the culvert length between ca. 1.4m and 2.56m. The channel width of the culvert is 1.45m.

A portion of the existing culvert is to be re-aligned by skewing to the north over a length of approximately 200m. It is proposed to re-use the existing culvert units.

An in-situ connection will be required at the interface where the repositioning begins and at the interface with the existing IDA attenuation outfall. The re-aligned culvert will tie into UBY2A which is also being lengthened with the construction of new wing walls.

A sheet pile wall will be installed just north of the works area to retain the existing embankment during construction. Refer to drawing C745-WP3_03-XX-XX-XXX-DR-MMD-SE-0240 in Appendix 6.2.

3.4.2 Culvert UBY2A

UBY2A culverts the Killacloyne. The existing culvert is ca. 12m long twin cell structure. The widths are ca. 2.4m and 2.1m and the culvert internal height is ca. 1.2m. Reinforced concrete wingwalls are provided at both the inlet and outlet.

The culvert will be lengthened by ca. 2m to the north and ca. 2m to the south. The cross-section dimensions of the lengthened sections will be similar to the existing cross section. The existing north and south wingwalls will be dismantled and rebuilt to accommodate the lengthened structure. Refer to drawings C745-WP3_03-XX-XX-XXX-RP-MMD-SE-0003 UBY2A_AIP in Appendix 6.2.

3.4.3 Culvert UBY1B

UBY1B culverts an unnamed watercourse. The existing culvert is ca. 14m long single barrel structure. The width is ca. 1.5m and the culvert internal height is ca. 1m. Reinforced concrete wingwalls will be provided at both the inlet and outlet.

The culvert is to be lengthened by ca. 1m to the north. The cross-section dimensions of the lengthened sections will be similar to the existing cross section. The existing north wingwalls are to be dismantled and rebuilt to accommodate the lengthened structure. Refer to drawing C745-WP3_03-XX-XX-XXX-RP-MMD-SE-0007 UBY1B in Appendix 6.2.

3.4.4 Culvert UBY1C

UBY1C culverts the Killacloyne Stream. The existing culvert is a ca. 10m long single barrel structure. The width is ca. 2.1m and the culvert internal height is ca. 1m. Reinforced concrete wingwalls are provided at both the inlet and outlet.

The culvert is to be lengthened by ca. 1m to the north. The cross-section dimensions of the lengthened sections will match the existing cross section. The existing north wingwalls are to be dismantled and rebuilt to accommodate the lengthened structure. Refer to drawing C745-WP3_03-XX-XX-XXX-RP-MMD-SE-0008 UBY1C in Appendix 6.2.

[illegible]

3.5 Level Crossings

There are three of level crossings along the route, and these are tabulated in Table 3.2.

Table 3.2: Existing Level Crossings

Level Crossing Code/Name	Location	Crossing Control Operation Type	Works	Chainage
Water Rock CCTV XY009	Castle Rock Avenue L-3618	Remotely controlled	Widen	8600
Ford CCTV XY010	un-named road	Remotely controlled	To be closed/extinguished, road not currently used.	9000
Mill Road R626 CCTV XY012	R626, Mill Road, west of Midleton Station	Remotely controlled	None	10050

It is proposed to close the Ford CCTV XY010 level crossing. The level crossing decking system will be removed together with the associated operational equipment and signage and the railway boundary secured using a 2.4m high blockwork wall in accordance with Transport Infrastructure Ireland standard construction detail CC-SCD-02401.

Water Rock level crossing (CCTV XY009) is to be widened to accommodate the twin tracks. Refer to drawings C745-WP3_03-XX-XX-XXX-DR-MMD-PR-2301 and C745-WP3_03-XX-XX-XXX-DR-MMD-PR-2302 in Appendix 6.2 for details.

3.6 Track, Retaining Structures and Ancillary Works

3.6.1 Track Works

It is proposed to construct new track alongside the existing single-track sections so that the line will have full twin tracks to facilitate an increase in train trips – this will facilitate up to a ten minute service operating at up to 100km/hr. It is necessary to realign the existing track slightly due to space constraints along the railway line. It is also proposed to construct additional sidings / turn back facilities are proposed at Midleton station.

There is existing twin track at Glounthaune and at the approaches to Carrigtwohill station and Midleton station. Over the length of the route, twin tracking is in place over approximately 35% of the ca. 10km route. The new track will be required between these sections. In some cases, the original alignment of the single track will remain in place. However, due to the existing track layout it will be required to adjust the track position to allow for the twin tracks within Iarnród Éireann's ownership boundary.

The new twin track along the railway line will require the site to be cleared of vegetation (outside of the bird breeding season which is between 01 March and 31 August, as per the Wildlife Act 1976, as amended) and soil and at some locations the embankments will need to be re-profiled to allow for the new track. In areas of cut, new sections of embankment will need to be installed. Retaining walls are also required in areas where space is restricted. The cut/fill and retaining structures in addition to the new track alignment are illustrated on C745-WP3_03-XX-XX-XXX-DR-MMD-PR-0001 to C745-WP3_03-XX-XX-XXX-DR-MMD-PR-0028.

Drainage will also be constructed as part of the main works, as described in Section 6.9.3. Subgrade drainage will be installed to prevent the line from water logging.

The new track formation will be graded and compacted then a capping material laid on top prior to the installation of the bottom ballast. Following laying, grading and compaction of the bottom ballast the railway sleepers put in place. The steel tracks can then be installed and connected to the railway sleepers by the rail fastening system. A top layer of ballast is then distributed following which the track is brought to design position and mechanically consolidated.

For vegetation clearance the machinery will vary depending on the location, but the following will be required:

- Chainsaws, axes, and hatchets will be used to fell and remove trees.
- Stumps for trees that are removed will be ground down with stump grinders. Mulchers will be used to clear underbrush, small trees and leftover fencing (the contractor can either use a tracked or wheeled mulching machine or there are also mulching machines that can be used with equipment such as tractors or excavators which can be road-rail for use on the railway).
- Bulldozers will be used for clearing large areas where leftover structures, boulders, standing trees and debris remain.
- Tractors with frontend loaders will be used to clear rocks, smaller trees, branches etc. and for levelling/grading the land.
- Backhoes and excavators will be used in small-scale land-clearing.
- A woodchipper will be required to turn trees into woodchips for easy disposal.

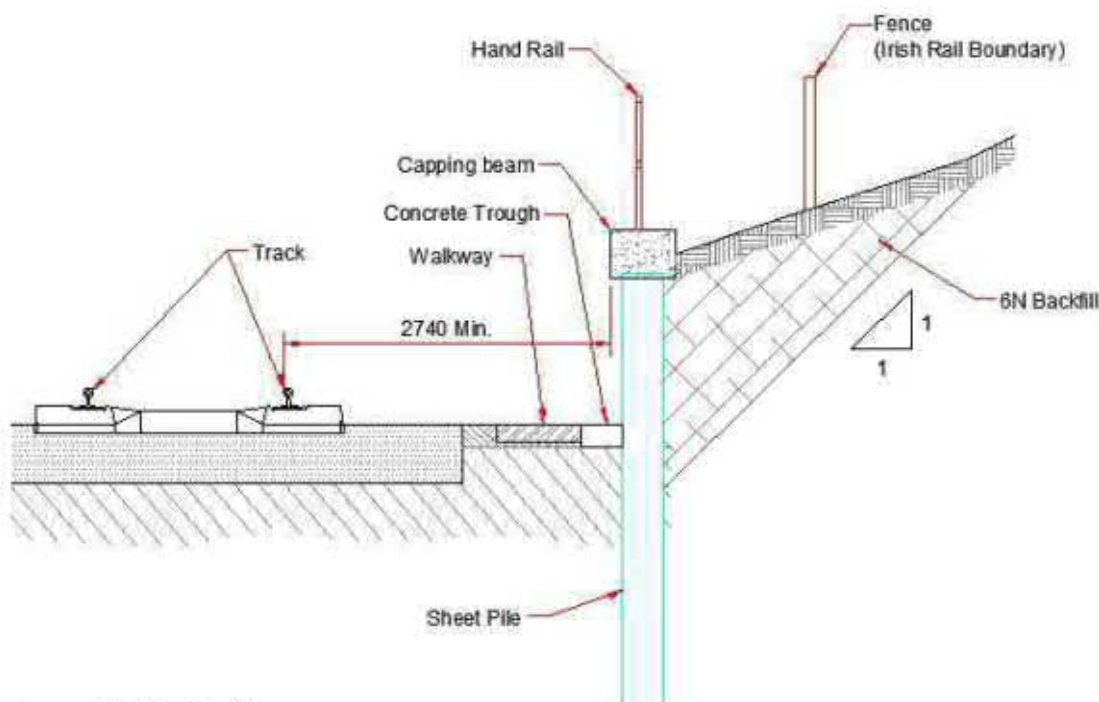
Ballast track construction works, as part of the horizontal alignment modifications, will involve the following typical sequence of activities.

- Enabling works, such as: installation of facilities and storage areas; bringing machinery and materials on site; utilities diversions; railway operation safely cut etc.
- Rail cutting of the existing track (separate track panels of 18m length) using a rail cutting machine (if required).
- Removal of old track panels using road-rail vehicles (vehicles capable of running on both road and rails), excavators, crane on truck and other necessary engineering equipment.
- Removal of degraded ballast by means of road-rail vehicles, excavators and other engineering equipment that will load the materials into an articulated dump truck (if required).
- Preparation of the track formation until required level, using road-rail vehicle excavators.
- Extension and compaction on the subgrade, using a compactor.
- Extension of the geotextile.
- Placement of the longitudinal drainage, using trucks, mini diggers and plate compactors.
- Extension and compaction of the sub-ballast layer, using wheel loader, trucks and compactors.
- Extension of first ballast layer, levelling and compaction using wheel loader, trucks and compactors.
- Laying of the sleepers with the fastening systems, using crane on trucks and excavators.
- Laying of the rails and clamping the joints, using crane on trucks and excavators.
- Extension of second ballast layer, tamping and dynamic stabilisation, using crane on trucks, excavators and a ballast tamper.
- Welding of joints and second stabilisation.
- Rail destressing.

3.6.2 Retaining Structures

Retaining walls have been identified as required to minimise impact on adjacent lands due to environmental constraints, or to maintain the railway corridor within the existing railway corridor. The retaining walls are sheet piled structures due to the reduction in temporary and permanent land take required in comparison to a reinforced concrete gravity retaining wall structures and its increased retention height ability in comparison to gabion basket gravity structures. A typical sheet pile detail is shown in Figure 3.4. The walls will be sheet piles with a reinforced concrete capping beam and steel handrail. The piles will be driven by either a drop hammer or vibration hammer depending on ground conditions. In certain circumstances where obstacles are present in the ground pre-auguring may be required to prepare the ground for the sheet pile installation.

Figure 3.4: Typical Sheet Pile Detail



Source: Mott MacDonald

3.6.3 Drainage

Drainage is included in drawings C745-WP3_03-XX-XX-XXX-DR-MMD-DE-0001 to C745-WP3_03-XX-XX-XXX-DR-MMD-DE-0028 in Appendix 6.2. Where significant alteration to the existing track or where new track is proposed the existing drainage will be removed and new drainage will be installed.

The proposed drainage will consist of filter drains, carrier drains, open V-ditches and subsurface drains:

- Filter drains are open jointed, porous or perforated pipes laid in trenches which will be backfilled with a porous media and run longitudinally along the track both collecting water along its length and conveying water.
- Carrier drains are closed jointed and non-perforated and are used to convey water at a depth greater than the depth of filter drains.

- Open V-ditches are open channels which will intercept any overland runoff from adjacent land which slopes towards the track. These ditches will also be used to convey water to a discharge point.
- The ballast and sub-ballast provided as part of the permanent way normally consists of granular material with excellent drainage properties. The ballast and sub-ballast will be designed and graded to act as a drainage blanket in order to protect the formation and ensure the adequate performance and durability of the ballast layer and minimise maintenance requirements. All subsurface drainage will be designed on this basis in combination with the use of filter drains, geo-membranes and geo-textiles to provide adequate sub-surface drainage and control the build-up of fines and sediment which could affect the long term performance of the ballast and sub-surface drainage facilities.

All existing outfalls will be retained and no new outfalls will be required.

The drainage design will be in accordance with 'E25. I-PWY-1136 Requirements for Design Installation and Maintenance of Lineside Drainage' and the rainfall intensities will be factored by 20% to account for the future effects of climate change.

3.6.4 Fencing and Environmental Barriers

There is an existing property boundary fence in place along the length of the line. Additional lands are required along sections of the line and these will be fenced following the compulsory purchase order of the lands. Existing fencing will be relocated and repositioned where appropriate and where there is a change in the track location similar type fence will be relocated at a minimum. Where the track is not being moved the boundary fence will remain in place. The fence types to be used or reused are:

- Concrete post and wire;
- Timber post and wire or other timber structures;
- Steel palisade fence (security fencing);
- Acoustic timber / concrete block wall

Fencing is illustrated on drawings C745-WP3_03-XX-XX-XXX-DR-MMD-PW001-0001 to C745-WP3_03-XX-XX-XXX-DR-MMD-PW028 in Appendix 6.2.

Temporary noise barriers will be required at construction compounds to minimise noise effects.

3.6.5 Crossings of services

Service providers were contacted in relation to services within the proposed works areas and no third-party services have been identified.

3.6.6 Signage

New signage will be required along the railway line and will be developed at detailed design stage and will include speed limit signs, mileposts, gradient signs and warning signs.

3.6.7 Cable containment routes

There are currently cable routes parallel to and on either side of the existing rail track carrying operational railway communications, signalling and power cables. The cables are contained in precast concrete lidded troughs set flush with the ballast surface. To accommodate the construction of the second track ca.8500m of existing route will require to be relocated to either side of the new twin track layout. It is proposed to reuse the existing material where possible on the relocated sections of route.

3.6.8 Associated signalling upgrades and alterations

As part of a larger recontrol scheme and to enable the operation of the reconfigured railway a new signalling system is to be installed. The installation of this new system and the recovery of redundant equipment will take place in parallel with the twin tracking works with commissioning taking place during the line closure.

3.6.9 Lighting

During construction, a large proportion of the works will take place at night. The minimum light level required is 50lux and a maximum of 100lux. Illuminances provided need to be consistent, to avoid excessive contrast in illuminance, luminaires should not be spaced too far apart. Glare is determined by the light distribution of fittings, their mounting height and, for floodlights, the direction of aiming.

With large areas, the lighting design chosen depends upon:

- the degree of obstruction;
- whether illuminance is required primarily on horizontal or vertical planes

The lighting will be predominantly downward lighting to minimise light spill.

For the operational phase, additional lighting will be provided at Water Rock level crossing. The lighting will be directional. Existing lighting will be maintained at the level crossing and additional lighting will be similar to existing lighting. In line with Railway Safety Commission Guidance 'lighting should not cause glare to either road users or train drivers, interfere with the visibility of railway signals nor cause avoidable annoyance to local householders.

Walkway lighting will be provided in the new sidings in Midleton.

3.6.10 Lifting Operations

Cranes will be required at the Owenacurra River Bridge to lift the beams into place. This will be temporary. Track panels will also require lifting.

3.7 Iarnród Éireann Construction Methodology

3.7.1 Sustainable Construction Principles

Iarnród Éireann is committed to contributing to the achievement of the United Nations Sustainable Development Goals (SDGs) and together with the CIÉ Group of Companies has developed a Sustainability Strategy that coordinates actions that assist in addressing national economic, social and environmental challenges. The key themes used as a focus while designing the project include:

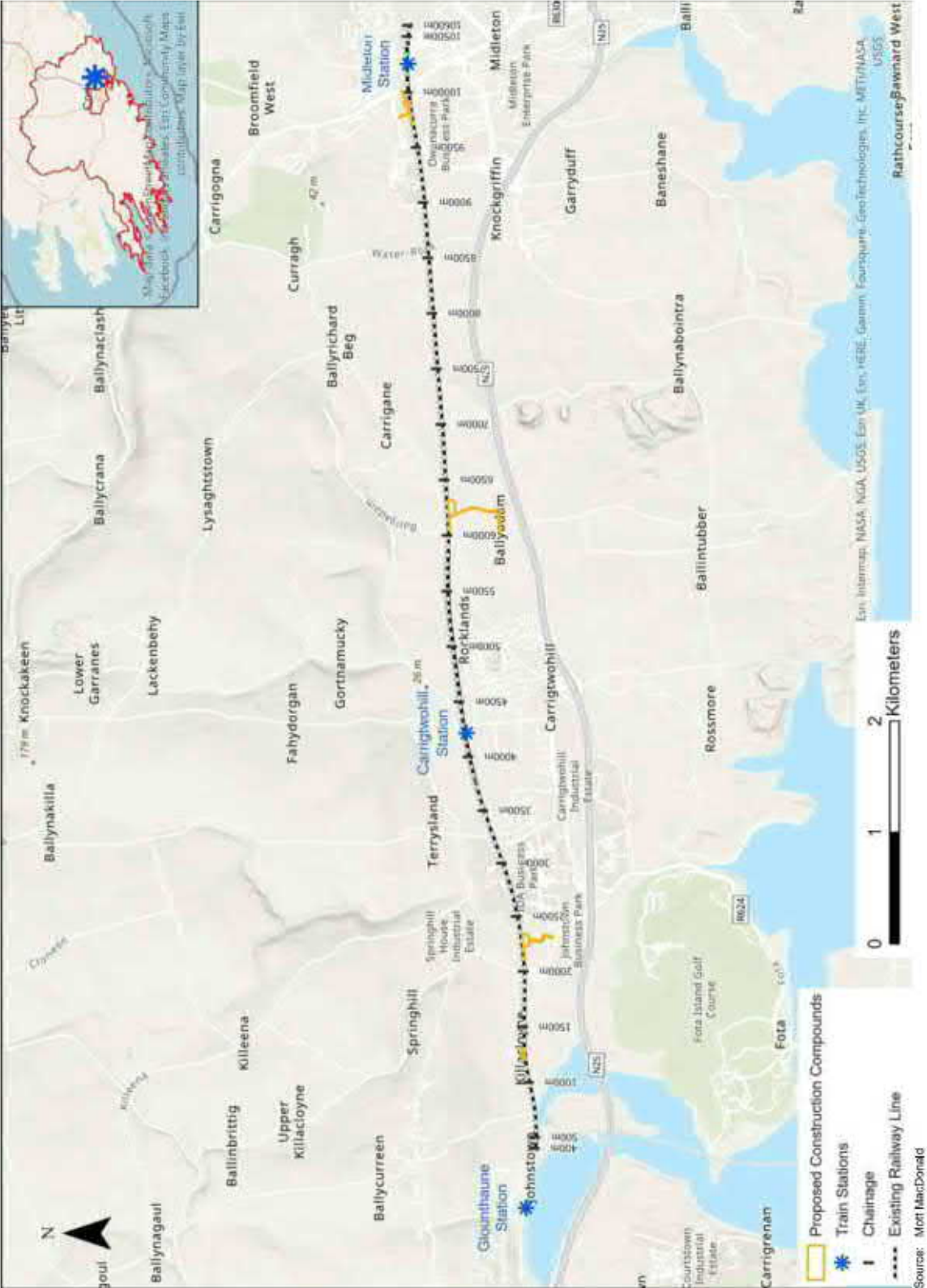
- Avoid, mitigate and if not possible reduce the adverse effects on communities during the construction of the project.
- Reduce the carbon footprint of the project during the design, construction, and operation and encourage more sustainable transport modes.
- Support for cleaner energy and lower emissions through implementation of an electrically powered fleet.
- Facilitating population and sustainable development growth, and a low carbon climate resilient economy.
- Designing for resilience against future demand changes and climate needs.
- Minimising waste during construction of the project, while focusing on using sustainable and reusable materials and construction methods.

3.7.2 Construction Compounds

During the construction phase five temporary construction compounds will be required. Please refer to Figure 3.2 for locations and the Appendix 6.2 within Chapter 6 – Description of the Proposed Development for drawings of the construction compounds. The construction compounds will contain portacabins for offices and welfare facilities, parking for construction staff and material stockpiles. Welfare facilities will be provided at these locations and any discharges will be connected to a sealed holding tank to be emptied and disposed of off-site by a licenced contractor to an approved licenced facility. Water will be tankered onto site as required.

There are also two construction compounds proposed on the west side and east side of the Owenacurra River. The westerly compound is only to be used for access to the bridge abutments and there will be no portacabin or storage in this area. The easterly compound will be used for storage of materials. Both compounds will be set back from the riverbank by a minimum of 15m.

Figure 3.5: Location of Construction Compounds



3.7.3 Construction Hours and Programme

The proposed Works comprise civil engineering, permanent way and signalling works to enable the installation of a second running line along the length of the existing railway between Glounthaune Junction and Middleton to allow the introduction of a significantly increased frequency of train operation.

To minimise disruption to the current railway operations, it is proposed to undertake the construction works over an extended period of time utilising both day and night time working. Night time working is required to deliver works on or affecting the operational railway in a safe manner with regards to both the safety of the railway and the safety of those delivering the works. A disruptive blockade will be utilised to undertake the operational tie ins between the new and existing works and to test and commission the new signalling control systems.

The proposed development will take place in a long narrow corridor, 10km in length and of varying width (generally 15 to 30m).

Subject to the grant of statutory approvals, it is anticipated that proposed works will commence in Q4 2023 and will take approximately 36 months to complete. Indicative durations for the proposed works are detailed in Table 3.1.

Table 3.3: Indicative Construction Schedule

Phase	Revised timeline
1. Pre-construction works	Q4 2023
2. Enabling works	Q1 2024
3. Earthworks, drainage and track sub-base	Q2 2024 – Q3 2025
4. Track realignment and construction	Q2 2025 – Q1 2026
5. Signalling works	Q4 2024 – Q2 2026
6. Commissioning	Q2 2026 – Q3 2026

In general, it is anticipated that construction will take place between 07.00 and 19.00 Monday to Sunday when outside the operational railway footprint. Works within the operational railway footprint will be undertaken between 1900 and 0700 daily (in order to ensure the safety of the railway operations and construction staff). During the period of the railway closure, works will be undertaken around the clock. It is anticipated that the closure will be up to four months and buses will be provided to transfer passengers.

Table 3.2 outlines the proposed construction activities and the timelines.

Table 3.4: Construction Activities and Timelines

Construction Activity	Description of works
Earthworks	Predominantly night-time works, with rate of progress about 150m per week on average along the track
Formation treatment	Predominantly night-time works, with rate of progress about 350m per week on average along the track
Ballasting	Predominantly night-time works, with rate of progress about 350m per week on average along the track
Track installation	Daytime and night-time works, with rate of progress about 350m per week on average along the track.
Tamping	Daytime and night-time works, with rate of progress about 1km per week on average along the track.

Construction Activity	Description of works
Stressing and welding works	Daytime and night-time works, with rate of progress about 1km per week on average along the track.
Material stockpile and haulage at site compounds	Daytime and night-time works, locomotive trains haul materials and equipment to 5 site compound locations, depending on the current location of work.

The number of construction workers required during the construction phase is expected to peak at approximately 125 persons. Staff will travel to site via a combination of public transport, cycling, carpooling, minibus and private passenger vehicles.

3.7.4 Pre-construction and Enabling Works

The pre-construction phase of development includes preparatory works and consultation with statutory bodies [Health and Safety Authority (HSA), EPA etc] and the general public as required. Following pre-construction, site clearance activities will commence.

Typical enabling works activities will include preparation of the construction working area, laydown areas and site clearance as required. Temporary and permanent boundary fencing will also be installed where required.

3.7.5 Other Consents

Section 50 consents from the OPW will be required for the realignment of the IDA culvert (UBY2A or CV3) and consent will also be required for works at the Owenacurra River bridge. Following consultation with IFI, if electrofishing is required, a licence will be required from IFI.

3.7.6 Rail Closures

It is likely that the railway line will be closed for a period of up to four months between months 29 to 32. Bus services will be used to accommodate passengers and will be run on a regular service between Cork and Middleton to minimise disruption. There will also be weekend closures for a period of eight months between 11pm on Fridays to 5.30am on Mondays.

3.7.7 Road Closures

It will be necessary to close Castle Rock Avenue to through traffic in order to facilitate level crossing upgrading works to Water Rock CCTV XY009. It is expected that the closure will last for 16 weeks with diversions via Ballyrichard More, the R626 and N25. Details of traffic diversion and road closures are presented in Chapter 15 of this EIAR. Alternative routes are available and will be sign posted. Any road closure requirements will be adhered to and will be in accordance with local authority procedures including notification to emergency services.

3.7.8 Earthworks

Reprofiling of existing embankments will be required and existing embankments will be extended. In areas of cut, embankment slopes will be reprofiled to allow for the twin track gauge and may incorporate toe retention to reduce the quantity of spoil generated. In areas where space is restricted, retaining structures will be installed. The walls will be sheet piles with a reinforced concrete capping beam and steel handrail. The piles will be driven by either a drop hammer or vibration hammer depending on ground conditions. In certain circumstances where obstacles are present in the ground pre-auguring may be required to prepare the ground for the sheet pile installation. Ca. 40,000m³ of cutting/excavation is required and ca. 38,000m³ of fill is required for the works, along with ca. 14,000 m³ of ballast.

3.7.9 Construction Traffic and Routes

The majority of construction traffic will be generated during phase three and phase four, the earthworks phase (Q2 2024 – Q3 2025) and the track construction phase (Q2 2025 – Q1 2026). As part of the earthworks phase there will be a requirement to bring engineering fill onto the site.

Where surplus spoil is unsuitable for reuse on site it will be taken to the compound areas for sorting. Spoil that cannot be re-used will be disposed of to a licenced waste disposal facility.

On completion of the earthworks phase, the track construction phase will commence. The track construction phase will see the delivery of construction material such as concrete sleepers, steel rails and ballast.

For the earthworks and track construction it is estimated that up to 5500 Heavy Good Vehicles (HGVs) loads to or from the site (11000 HGV movements) will be required (maximum of 30 loads per day) to deliver and remove material over the period of works which is expected to extend over an initial period of 11 months, with a further 4 months of ballast deliveries in the finishing stages of the works.

It is planned that sleepers and rails will be brought to site using rail haulage.

Chapter 15 of this EIAR describes the construction traffic and roads to be used as part of the works.

3.7.10 Land Acquisition

Ca. 1.4ha of land is to be compulsorily acquired for the proposed development and is comprised predominantly of hedgerows at the boundary between the railway and agricultural lands. Replacement hedgerows will be planted along the new fence line, comprising of native species. The permanent land take includes land necessary to construct, operate and maintain the proposed development and associated infrastructure and to undertake essential environmental mitigation measures as outlined in this EIAR.

Temporary landtake is required, including for the five compounds, over an area of ca. 7ha and these lands will be reinstated following completion of the construction phase.

4 Control Measures

4.1 Introduction

The following sections detail the minimum control (mitigation) measures that will be implemented prior to commencement and throughout the duration of the proposed works.

As detailed in Section 1.2 *Purpose of this CEMP*, the Contractor's CEMP to be prepared by the appointed Contractor will incorporate the control measures detailed in this CEMP in addition to specified conditions that may be prescribed in any grant of consent, measures outlined in the NIS and the EIAR and any commitments given by Iarnród Éireann in relation to environmental protection associated with the activities outlined in this CEMP.

All mitigation measures will be implemented under the supervision of an Environmental Clerk of Works (EnCoW) whom will be appointed by the Contractor (the Contractor's EnCoW).

4.2 General Site Environmental Rules

- The proposed works area will be demarcated, and pollution prevention measures will be implemented prior to commencement of construction works.
- All pollution control measures will be designed, installed, and maintained in accordance with CIRIA guidance for '*Environmental Good Practice on Site*' (C741) and '*Control of water pollution from linear construction projects. Technical guidance*' (C648) and under the supervision of an Environmental Clerk of Works (EnCoW).
- All mitigation will be implemented under the supervision of the Contractor's EnCoW.
- The EnCoW will carry out daily inspection of works areas for evidence of pollution, and areas where corrective action is required

4.3 Construction Environmental Management – Measures to be Implemented

The mitigation and monitoring measures detailed in the EIAR are detailed in Table 4.1, each under the separate headings as per the EIAR. Also detailed in Section 4.3 are the mitigation measures and monitoring specified in the Natura Impact Statement (NIS).

Table 4.1: Mitigation and Monitoring Measures

	Phase	Mitigation and Monitoring
Chapter 7 Population and Human Health		
7.1		This CEMP will be implemented by the contractor during the construction phase to safeguard the environment, site personnel, and nearby sensitive receptors, i.e. occupiers of residential and commercial properties, from site activities that may cause harm or nuisance.
7.2		The appointed contractor (in collaboration with Iarróid Éireann) will be required to maintain close liaison with local community representatives, landowners and statutory consultees throughout the construction period.
7.3	Construction	The appointed Contractor will also implement the Traffic Management Plan included as Appendix 6.1 of this EIAR, which will be finally agreed upon with Cork County Council to mitigate any potential construction traffic impacts on the public road network. All construction activities, including construction traffic, will be managed through this site CEMP.
7.4		There are no specific mitigation measures required to ameliorate potential impacts on population and human health in addition to the measures specified in other chapters of this EIAR. Specific measures to mitigate likely significant impacts on human health during the construction phase (i.e. Noise and Vibration, Air Quality and Climate, Water, Traffic and Major Accidents and/or Disasters) are dealt with separately in the relevant chapters in this EIAR.
Chapter 8 Air Quality		
8.1		Construction dust emissions
8.2		Mitigation measures included in this CEMP are set out below and have been adapted from best practice guidance from the IAQM, based on the dust risk identified in Section 8.6 and considering the duration of the construction period.
8.3	Construction	Different mitigation measures have been recommended for different areas, based on construction activities and level of risk. With the implementation of these measures, fugitive emissions of dust from the proposed development will be negligible and therefore not significant.
8.4		The CEMP will facilitate stakeholder communications and community engagement prior to the commencement of construction.
		All areas
8.5		All areas are predicted to have at least 'low risk' in terms of dust soiling and PM ₁₀ effects due to earthworks activities, with no mitigation in place. Best practice mitigation measures which will be implemented for these activities are presented below:
		Communication:
8.6	Construction	Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary
8.7		Display the head or regional office contact information.
		Site Management:
8.8		Record all dust and air quality complaints, identify causes and take appropriate measures to reduce emissions in a timely manner and record the measures taken;
8.9		Make the complaints log available to the local authority when asked; and

Phase	Mitigation and Monitoring
8.1	Record any exceptional incidents that cause dust and or air emissions, either on or off site, and the action taken to resolve the situation in the log book.
	Monitoring:
8.11	Carry out regular site inspections to monitor compliance with this CEMP and record inspection results, and make an inspection log available to the local authority when asked; and
8.12	Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
	Preparing and maintaining the site
8.13	Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible;
8.14	Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site;
8.15	Avoid site runoff of water or mud.
	Operating vehicles/ machinery and sustainable travel:
8.16	Ensure all vehicles switch off engines when stationary – no idling vehicles; and,
8.17	Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
	Operations:
8.18	Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction;
8.19	Ensure an adequate water supply on the site for effective dust / particulate matter suppression / mitigation using non-potable water where possible and appropriate;
8.2	Use enclosed chutes and conveyors and covered skips; and
8.21	Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
8.22	Waste management:
8.23	Avoid bonfires and burning of waste materials.
	Area 4 ('Low' risk from demolition activities)
8.24	In addition to all measures specified in (All areas):
	Measures specific to demolition:
8.25	Ensure effective water suppression is used during demolition operations;
8.26	Avoid explosive blasting, using appropriate manual or mechanical alternatives; and

Phase	Mitigation and Monitoring
8.27	Bag and remove any biological debris or damp down such material before demolition.
8.28	Areas 1, 3, 4 and 5 ('Medium' risk from earthworks activities) In addition to all measures specified in Section 8.5 (All areas):
8.29	Communication: Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
	Monitoring: Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust settling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary.
	Preparing and maintaining the site Keep site fencing, barriers and scaffolding clean using wet methods;
8.31	Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below; and
8.32	Cover, seed or fence stockpiles to prevent wind whipping.
8.33	Operating vehicles/ machinery and sustainable travel.
8.34	Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
8.35	Operations: Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
8.36	
Chapter 9 Climate	
9.1	Ireland's Climate Action and Low Carbon Development (Amendment) Bill 2021 commits to net-zero carbon emissions by 2050. To support this, the development shall seek to reduce GHG emissions as far as practicable in all cases to contribute to a net reduction in carbon emissions. It is recommended that emissions reduction measures are put in place as part of the proposed development at design stage.
9.2	Construction In the different stages of the development lifetime, several best practice mitigation measures will be implemented as detailed through this Construction Environmental Management Plan (CEMP):
9.3	Ensuring all vehicles are switched off when stationary;
9.4	Increasing the use of biofuel blends in petrol and diesel;

Phase	Mitigation and Monitoring
9.5	Avoid using diesel- or petrol-powered generators, using battery or powered or mains electricity where practicable;
9.6	Regular maintenance of construction plant to limit GHG emission intensity;
9.7	No bonfires or burning of waste materials;
9.8	Construction works should be carried out in accordance with the best practicable means, to reduce fumes or emissions which may result in additional GHG emissions. Plant equipment and vehicles to be used on the proposed project should be selected based on their relative environmental performance.
9.9	A Construction Transport Management Plan (Appendix B) will include measures to minimise congestion during construction, and to coordinate efficient delivery to minimise the number of vehicle movements.
9.1	A Construction Resource Waste Management Plan (Appendix A) has also been developed, detailing additional measures that will further help mitigate the impact of the project. This includes:
9.11	Reduce the use of virgin resources, e.g. concrete reuse/recovery target of 85%;
9.12	Keeping materials in the economy as long as possible;
9.13	Where suitable source materials locally and use more sustainable / lower carbon intensity materials;
9.14	Maintain the intrinsic value/quality of materials as high as possible.
9.15	During operation the following measures will be taken:
9.16	Regular maintenance of train engines to limit GHG emission intensity;
9.17	Electrical switchgear which contains SF6 is compliant with European F-Gas Regulations to reduce leakage rates. Where possible non-SF6 equipment is preferred from a GHG emissions perspective.
Chapter 10 Land, Soils and Hydrogeology	
Construction	
10.1	No impact on land or land use is predicted. As such no mitigation, beyond the embedded mitigation, is proposed.
Soils and Geology	
10.2	Ground investigation will be carried out to establish the potential presence of any made ground or contamination along the route. This will target areas of soils identified as having a high risk of contamination.
10.3	The CEMP will include protocols to deal with unexpected contamination including:
10.4	An appropriately qualified person will be present on site during construction to identify visual and olfactory evidence of contamination during excavation; and
10.5	Any contaminated ground will be characterised according to Waste Acceptance Criteria and dealt with as soon as possible via a bespoke remediation strategy or a materials management plan. Any waste arising will be managed in accordance with the Waste Management Act 1996 (as amended) and associated Regulations.

	Phase	Mitigation and Monitoring
10.6		To reduce the risk of contamination, stockpiling of contaminated material is prohibited.
10.7		If it is not possible to immediately remove contaminated material then it will be stored on, and covered by, polythene sheeting to prevent rain water infiltrating through the material.
10.8		In-situ remediation of contaminated soils will be used in preference to offsite disposal where practicable.
10.9		A pre-construction survey will be completed to confirm the presence of identified areas of landslide hazard, and identify further areas of risk absent from this desk-study. Additionally, a Geotechnical Risk Register will be created to ensure any landslide and slope stability risks are systematically captured. This register will quantify the risk of failure and propose location-specific mitigation. The location of any identified areas of hazard will be incorporated into construction site management plans. Excavation, the use of heavy machinery, and site traffic routes will be planned to avoid these areas.
10.10		A pre-construction survey of karstic features will be carried out to confirm the presence of listed features and identify features absent from this desk-study assessment. The design of drainage, and temporary construction features (e.g. site compounds and access tracks) will be as such to avoid discharge of surface run-off to any identified karst feature or area of karst bedrock. This will include the use of lined ditches or impermeable pipes to direct collected water away from such features.
10.11		If excavation exposes limestone bedrock, an impervious liner will be used to mitigate against the risks of surface water directly entering into the karstified rock. Karst features will be assessed by a suitably qualified professional to determine their extent across the proposed development. Any Karst features will be filled with an appropriate granular material (to preserve hydraulic connectivity) and sealed before the liner is used.
10.12		Extensive GI will be carried out at the location of the limestone cutting at Water Rock to confirm the location of subsurface karst features including caves. The cutting at Water Rock will use an experienced contractor who will avoid caves and karst features. A geotechnical expert will be appointed by the contractor to closely monitor vibrations during cutting. Vibrations will be kept to within 'T1' specifications[1] which will ensure no disturbance to wider karst features including caves. In the unlikely event that vibration limits are exceeded, cutting will cease on site until the reason for the increased vibration is determined.
10.13		If GI or site work identifies potentially contaminated land at piling locations, an alternative (non-piling) method of embankment retention will be used. Where this is not possible, a Piling Risk Assessment will be carried out to select an appropriate piling method and identify any specific mitigation and monitoring measures required.
10.14		Where GI identifies that bedrock is likely to be encountered at proposed piling locations an alternative to drive piling will be required. This is likely to be either:
10.15		An alternative embankment retention method (reinforced concrete or gabion baskets). These alternatives may require additional excavation and land take; or
10.16		An alternative to drive piling (e.g. concrete sockets into bedrock). Socket piling will not be used in areas where GI has identified contaminated land due to the risk of mobilising contamination to the sensitive limestone bedrock. If socket piling is proposed into limestone.
10.17		A detailed karst stability assessment will be carried out. The objective will be to assess the ground stability and the need for reinforcement.
10.18		Impermeable liners will be used during socket piling to prevent loss of concrete to the limestone.

Phase	Mitigation and Monitoring
10.19	As a basis for a worst-case assessment, the quantities of material to be excavated and imported during construction have been assessed. This assessment assumes that no material can be reused. To the greatest extent possible, excavated material will be appropriately stored and reused on site to minimise the volume required for offsite disposal. The Contractor will ensure acceptability of the material for re-use within the proposed development. GI will be carried out to assess the properties of the material to be excavated. A construction earthworks programme will be implemented as part of the CEMP, which will categorise the source of material for each fill section and ensure it is appropriate.
10.20	Where non-granular fill material is used for embankment construction (e.g. reuse of local material) measures (e.g. the use of geotextile separator) will be taken to minimise washout of fines and/or sediment runoff from the embankment.
10.21	Where offsite disposal of excavated material is required, it will be managed in accordance with the Waste Management Act 1996 (as amended) and associated Regulations.
Hydrogeology	
10.22	A pre-construction verification survey of the identified boreholes / wells within 150m of the new track or construction compounds will be carried out to confirm whether they remain in use, and the nature of use.
10.23	If they are used for drinking water purposes, water quality testing of the boreholes (for standard drinking water parameters including turbidity) will be carried out. Water quality testing will be carried out monthly for 12 months before construction, monthly during construction and for at least 12 months after construction to ensure no degradation of water quality as a result of the construction activities.
10.24	A pre-construction survey of karstic features will be carried out to confirm the presence of listed features and identify features absent from this desk-study assessment. Due to the sensitivity and connectivity of the karstic environment, including the risk of potential connections between karst features and sensitive receptors outside of the study area, additional mitigation measures to reduce the risk of impact will be used. These include that:
10.25	A buffer area (at least 20 m) will be provided surrounding each identified karst feature, whereby no construction activity, including storage of materials will occur.
10.26	Storage of materials (including excavated materials and fill and ballast) will avoid areas at risk of surface water or groundwater flooding or areas of convergence of flow; and
10.27	The use of additional pollution prevention measures, such as double silt fencing, will be used where excavation occurs adjacent to an identified feature.
10.28	It is anticipated that all existing drainage outfalls will be retained and that no new outfalls will be required. Where new drainage will be installed (in areas where significant alterations are proposed to the track), the design of the drainage will avoid discharge of surface run-off to any identified karst feature or area of karst bedrock. This will include the use of lined ditches or impermeable pipes to direct collected water away from such features.
10.29	Regular inspection and maintenance of trains (and other machinery) operating on the proposed development will occur. This will reduce the risk of accidental spillage of fuels, lubricants and chemicals, and subsequent pollution of run-off.
Chapter 11 Water and Flood Risk	
General	
11.1 Construction	The following mitigation measures will be implemented prior to commencement and throughout the duration of the proposed works.
11.2	A full-time on-site Environmental Clerk of Works (EnCoW) will be appointed prior to commencement of works.

Phase	Mitigation and Monitoring
11.3	Confirmatory pre-construction surveys will be carried out and seasonal constraints will be confirmed in agreement with IFI and National Parks and Wildlife Service (NPWS) and Cork County Council, as appropriate.
11.4	Works will be carried out in accordance with the guidelines set out by IFI in 'Guidelines on Protecting Fisheries During Construction Works in and Adjacent to Waters' (IFI, 2016).
11.5	The IFI Biosecurity Protocol for Field Survey Works will be complied with.
Surface Water Quality Protection Measures	
11.6	The following water quality mitigation measures will be implemented prior to commencement and throughout the duration of the works:
11.7	Water quality monitoring will be conducted upstream and downstream of the works prior to works commencing and at regular intervals during the works.
11.8	Activities will be planned in advance and machinery will be managed to ensure that the number of trips is limited to the minimum required at each location i.e. the more times a piece of ground is tracked, the more likely it is that vegetative cover will be removed and ruts will be created that will act as miniature rivers where dirty water will flow.
11.9	Tracking beside streams and tracks will be avoided to avoid damage to the bankside.
11.10	Geotextile or timber matting will be used on soft ground, and in all protected areas
11.11	A buffer zone of 10m will be maintained between storage and working areas and watercourses, taking account of the minimum working area required to facilitate the works.
11.12	The time period over which areas of clearance are left open will be reduced insofar as is reasonably practicable.
11.13	Re-instatement method statements will be subject to approval by the EnCoW.
11.14	Concrete will be brought to site by covered truck. Wet concrete operations adjacent to watercourses will be avoided where possible.
11.15	The Contractor will ensure that all concrete truck wash watering / cleaning is undertaken offsite where possible and remote from watercourses.
11.16	In order to reduce the risk of contamination arising as a result of spills or leakages, measures including, but not limited to, the following will be employed:
11.17	<ul style="list-style-type: none"> All collected waste will be managed in accordance with the Waste Management Act 1996, and associated Regulations;
11.18	<ul style="list-style-type: none"> Fuels, chemicals, liquid and solid waste will be stored on impermeable surfaces;
11.19	<ul style="list-style-type: none"> Refuelling of plant, equipment and vehicles will be carried out on impermeable surfaces;
11.2	<ul style="list-style-type: none"> All tanks and drums will be banded in accordance with established best practice guidelines; and
11.21	<ul style="list-style-type: none"> Spill kits will be provided at all compound locations and carried by all crews during underground cable installation works.
11.22	Works will not be carried out during extreme rainfall or high flow events. An early flood warning system will be set up to allow the removal of plant and material from construction compounds located in Flood Zones A and B in the events of flood warning.

Phase	Mitigation and Monitoring
11.23	Silt fences (to Hy-Tex Premium specification or similar) and silt traps will be installed prior to commencement of works and will be inspected daily to inform adaptive management as required. The locations of same will be determined by the EnCoW.
11.24	Site restoration post works will be carried out, in agreement with IFI with regard to the IDA culvert and works at the Owenacurra River Bridge. These works may include riverbank stabilization, gravel replacements etc. In all cases, the site will be restored post installation.
11.25	There are also two construction compounds proposed on the west side and east side of the Owenacurra River. The westerly compound is only for access to the bridge abutments and there will be no portacabin or storage in this area. The easterly compound will be used for storage of materials. Both compounds will be set back from the riverbank by a minimum of 15m.
11.26	The works to extend/reconfigure culverts will be conducted during the period July – September to avoid effects on fisheries.
11.27	Catch netting will be installed on the underside of the Owenacurra River Bridge to prevent any material from entering the watercourse.
	Silt Control Measures
11.28	Silt control measures will be used to control silt generated from activities on site and prevent it gaining access to surface drainage which could convey silt to larger streams and watercourses.
11.29	Silt control measures include silt traps which can be located in small drains where flow is small and silt fences where runoff from large areas needs to be controlled.
11.30	Silt fences must be installed in the working areas and not at the watercourse.
11.31	Access routes will be delineated such that an appropriate set back distance from watercourses is maintained. Where works are to be undertaken adjacent to watercourses the setback distance will be delineated by the EnCoW on site.
11.32	Where distances between the works and watercourse allow, a minimum setback distance of 30m from the watercourse will be maintained.
11.33	Where the site is constrained, the best available set back distance will be employed taking account of the minimum working area required to facilitate the works.
	Silt Fences
11.34	Silt fences will be installed downslope of the area where silt is being generated on disturbed ground.
11.35	To be effective the silt curtain must contain the area where silt is generated and must terminate on high ground (i.e. an elevated area not in the watercourse).
11.36	Silt fences will be constructed using a permeable filter fabric (e.g. Hy Tex Terrastop Premium silt fence or similar) and not a mesh.
11.37	The base of the silt fence will be bedded at least 15-30 cm into the ground at 2 metre intervals.
11.38	Once installed the silt fence will be inspected regularly, daily during the proposed works, weekly on completion of the works for at least one month, but particularly after heavy rains.
11.39	The integrity of the silt fencing will be checked daily by the EnCoW and after poor weather conditions (rain or wind) and any failures rectified immediately.
11.40	Two lines of silt curtain / fence will be installed, where considered necessary, by the EnCoW.

Phase	Mitigation and Monitoring
11.41	Any build-up of sediment along the fence boundary will be removed daily.
11.42	Silt fences will be maintained until vegetation on the disturbed ground has re-established. Re-instatement method statements will be subject to approval by the EnCoW.
11.43	The silt fencing must be left in place until the works are completed (which includes removal of any temporary ground treatment).
11.44	Silt fences will not be removed during heavy rainfall.
11.45	The silt fence will not be pulled from the ground but cutaway at ground level and posts removed.
11.46	A record of when it was installed, inspected and removed will be maintained by the EnCoW.
Construction	
Silt Traps	
11.52	The purpose of the trap is to reduce the level of solids in the slowly flowing water. The silt trap works by allowing a build-up of water behind it slowing flow and allowing solids to settle out. The following requirements will apply:
11.53	Silt traps will only be placed in drains downstream of working areas where the volume of water flow is expected to be low.
11.54	Silt traps will be made of terram or similar material, not mesh.
11.55	The trap will be staked into the banks of the drain / watercourse such that no water can flow around the sides.
11.56	The material will be bedded into the drain bed/watercourse to prevent water flowing beneath it.
11.57	The height of the trap will be lower than the bank heights. The upper edge will be fixed to a timber cross piece. This will allow water to overtop the silt trap and not burst through or around it.
11.58	Inspections will be carried out daily; during the proposed works, weekly on completion of the works for at least one month, and after heavy rains, and monthly thereafter until bare areas have developed new growth.
11.59	Any build-up of solids will be carefully removed without removing any vegetation growing on the bottom.
11.6	In sensitive areas a series of silt traps will be placed in the drain.
11.61	The silt trap will not be pulled from the ground but cutaway at ground level and posts removed.
11.62	A record of when it was installed, inspected and removed will be maintained by the EnCoW.
Karst Measures	
11.64	Due to the sensitivity and connectivity of the karstic environment, including the risk of potential connections between karst features and sensitive receptors outside of the study area, additional mitigation measures to reduce the risk of impact will be used. These include that:
11.65	A buffer area (at least 20 m) will be provided surrounding each identified karst feature, whereby no construction activity, including storage of materials will occur.
11.66	Storage of materials (including excavated materials and fill and ballast) will avoid areas at risk of surface water or groundwater flooding or areas of convergence of flow ; and

	Phase	Mitigation and Monitoring
	11.67	The use of additional pollution prevention measures, such as double silt fencing, will be used where excavation occurs adjacent to an identified karst feature.
	11.68	The design of drainage will be as such to avoid discharge of surface run-off to any identified karst feature or area of karst bedrock. This will include the use of lined ditches or impermeable pipes to direct collected water away from such features.
		Flood Risk Protection Measures
	11.7	Any construction activities inside the watercourse or impeding flow area of the existing watercourse or inside the existing floodplain should be consulted with a Flood Risk Specialist. The Flood Risk Specialist will determine if a further assessment or mitigation measures are required. The mitigation measures may include the creation of a flood plan and putting an early flood warning system in place.
	11.71	Appendix 11.3 (FRA Stage 3) of Chapter 11 Surface Water and Flood Risk, identified the potential risks and mitigation in relation to the construction works on culverts and the Ownennacurra Bridge. Should the construction method change, a new assessment will be required by the Flood Risk Specialist.
Chapter 12 Biodiversity		
		Mitigation and Monitoring Measures
		Construction Phase Mitigation Measures
	12.1	Mitigation measures were designed having regard to the Mitigation Hierarchy. This is a sequential order of mitigation actions whereby the preference for mitigation measures are as outlined below:
	12.2	Avoidance: Steps to avoid harm to biodiversity.
	12.3	Minimisation: Where adverse impacts cannot be avoided, action is taken to minimise these impacts.
	12.4	Compensation: Only considered after all possibilities for avoidance and minimisation of impacts have been implemented.
	12.5	Care has been taken throughout the design process to avoid impacts to sensitive ecological receptors. Additional mitigation measures to ameliorate the impacts as described in this chapter are outlined hereunder. These are incorporated into this CEMP for the proposed development.
		Ecological Clerk of Works
	12.6	An ECoW will be employed by the Contractor to oversee implementation of mitigation. This will include monitoring and auditing the works and contractor programmes and works method statements, to ensure mitigation is correctly implemented. The Contractor's ECoW will also ensure any disturbance licenses are arranged based on relevant details outlined in this EIAR and any significant findings of further confirmatory pre-construction surveys outlined above. The Contractor's ECoW will advise on mitigation measures implementation including the scheduling of works and will be included in regular liaison meetings between project teams to ensure that plans are co-ordinated and impacts are minimised. An independent Environmental Clerk of Works (EnCoW) will be employed on behalf of the Employers Representative team, who will review and comment on the monitoring and compliance reports generated by the Contractor's ECoW.

Phase	Mitigation and Monitoring
12.7	<p>Key sensitive habitats, where works areas are adjacent, including saltmarsh and tidal mud will be monitored by the site EcoW on a full-time basis to ensure impacts to these sensitive adjacent habitats are avoided. Prior to enabling and construction works the site EcoW will review and confirm proposed access routes, demarcate sensitive habitats and confirm works areas in these locations.</p>
	<p>Mitigation to Prevent Spread of Invasive Species</p>
12.8	<p>It is an offence under Regulation 49 of the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) to plant, disperse, allow, or cause to disperse, spread or otherwise cause to grow any plant species specified in the Third Schedule of the Regulations.</p>
12.9	<p>Japanese knotweed, three cornered leek, Spanish bluebell, and Himalayan balsam (all listed under the above legislation) have been recorded within the footprint of the proposed development.</p>
	<p>General</p>
12.10	<p>It is noted that Japanese Knotweed is being actively treated along most of the proposed work's area currently (2022). Prior to works commencing a full preconstruction confirmatory invasive species survey will be carried out. The confirmatory survey will be carried out within the works areas, including compound locations, and along proposed access routes to identify the presence of all invasive species within and adjacent to works areas.</p>
12.11	<p>The invasive species confirmatory survey will be carried out during the appropriate growing season (May–October). The findings of this confirmatory survey will be incorporated into an updated Invasive Species Management Plan by the Contractor's EcoW.</p>
12.12	<p>Any stands of invasive species recorded within the proposed development boundary, including within compounds and along access tracks, will be clearly marked out as restricted areas. This exclusion zone will incorporate a buffer surrounding stands of Japanese knotweed such that below ground growth is accounted for (7m in diameter and 3m depth and inclusive of both treated and untreated material at a worst-case scenario). No works will be carried out within the exclusion zones unless approved by the Contractor's EcoW.</p>
12.13	<p>'Biosecure zone' signage will be erected at each potentially contaminated site. This is to alert staff that invasive species have been recorded and to avoid accidental entering or interfering with these sites. Likewise, any stockpiles of soil that are or could be contaminated with any of the aforementioned invasive species will be clearly marked. Marked haulage routes protected by root barrier membranes will be established within the proposed development footprint to allow transport to bunds.</p>
12.14	<p>Designated and clearly marked cleaning stations will be strategically placed within the work site for use by staff, vehicles, and machinery. Where it is necessary to work in contaminated areas, every effort will be made not to use vehicles with caterpillar tracks.</p>
12.15	<p>The Contractor's EcoW will carry out a toolbox talk for all construction personnel which will provide information on how to identify and manage invasive species. The toolbox talk will take place prior to works commencing in any areas where Invasive Species have been recorded.</p>
12.16	<p>All vehicles and equipment that have been used in these control operations will be steam-cleaned in a designated wash-down area each time they leave the contaminated area, and once work in that area has been completed. This also includes footwear, personal protective equipment (PPE), tools, and other light equipment. This is essential to remove soil that may contain plant fragments (vector material), which otherwise could be transported along the proposed development as works are being undertaken. Any water required for this will be brought to site in a bowser.</p>

Phase	Mitigation and Monitoring
12.17	Vehicles leaving contaminated area(s) will either be confined to marked haulage routes protected by root barrier membranes or be steam cleaned as outlined above before leaving the area. Only vehicles that are deemed to be Biosecure (i.e. sealed so that no soil can escape) will be used to transport contaminated soil and all must be thoroughly steam cleaned in the designated wash-down area before exiting the designated area.
	Chemical Control
12.18	Three cornered leek, Spanish bluebell and Himalayan balsam can all be controlled effectively using herbicide application. Applications will take place in Spring. Follow up monitoring of treatment sites will be undertaken annually, to ensure that regrowth of new plants does not take place.
12.19	The stands of Japanese knotweed identified within the proposed development footprint have been subject to a chemical treatment regime. In order to control established stands of Japanese knotweed, repeated treatments over successive years is necessary. Treatment will be carried out annually by Irish Rail.
12.20	TII (2020) outline that a site may be considered remediated after two consecutive growing seasons with no sign of regrowth from all of the previously identified stands. It is of note however, there is always the possibility of further regrowth occurring, this happens most commonly through the reactivation of dormant rhizomes due to disturbance of soils but may also occur through re-infestation of the site from off-site.
12.21	Treatment of established stands of knotweed will be continued in order to prevent the spread of existing stands within the proposed development footprint.
	Physical Control
12.22	Pulling and digging of Himalayan balsam plants (before seed is mature), three cornered leek, and Spanish bluebell has been found to be an effective methodology to control and remove stands. This treatment will only be carried out under supervision of the EcoW or by an appropriately experienced knotweed contractor. All waste material associated with these stands will be treated in accordance with legislative requirements on disposal.
12.23	Physical control methods (cutting, digging, excavating etc) of Japanese knotweed will be avoided wherever possible as interference with stands may result in a resurgence of growth in dormant stands, and increase potential for spread of vector material should biosecurity measures not be adhered to.
12.24	Where excavation of Japanese knotweed material is required, it may be subject to burial at a suitable location agreed with the site EcoW, as follows:
12.25	Stands of Japanese knotweed identified for removal will be treated with a non-persistent herbicide prior to excavation.
12.26	Material with potential to contain Japanese knotweed, or vector material, will only be excavated under strict supervision and placed within a vehicle for transportation.
12.27	Only vehicles that are deemed to be Biosecure (i.e. sealed so that no soil can escape) will be used to transport contaminated soil and all must be thoroughly steam cleaned in the designated wash-down area before exiting the contaminated area.
12.28	Burial of material may be undertaken as follows:
12.29	Where deep burial of a minimum depth of 5m is feasible, the waste will be covered with a proprietary root barrier membrane. Any joins in the membrane will be overlapped and secured. No material will be placed over the membrane until it has been inspected by the EcoW. A layer of pea gravel will be placed on top of the barrier membrane to reduce the potential for perforation of the barrier membrane. The waste will then be infilled with a minimum 5m depth of uncontaminated soil.

Phase	Mitigation and Monitoring
12.30	Where a burial of 5m is not feasible, the waste will be completely encapsulated in a proprietary root barrier membrane cell. The lower surface of membrane will be covered in a layer of pea gravel to reduce the potential for perforation of the barrier membrane. Any joins in the barrier membranes will be overlapped and suitably sealed. The upper surface of the cell will be covered in a layer of pea gravel and buried to a minimum depth of 2m. No material will be placed over the membrane (both internally and over the upper surface until it has been inspected by-site (under license). It is a requirement to dispose of this material in a fully licenced waste facility, capable of accepting such contaminated material. This disposal requirement applies to all Japanese knotweed contaminated material including untreated and treated plant material.
12.31	Where burial is not feasible due to site constraints, the material may be transported off-site (under license). It is a requirement to dispose of this material in a fully licenced waste facility, capable of accepting such contaminated material. This disposal requirement applies to all Japanese knotweed contaminated material including untreated and treated plant material.
	Monitoring
12.32	As outlined previously, a single herbicide treatment is unlikely to control an established stand of Japanese knotweed. Any re-growth of treated Japanese knotweed will be accurately mapped.
12.33	Monitoring will be conducted post treatment to determine the level of control success that the treatments of all species have achieved. All stands identified within the proposed development, and any areas where burial or storage has taken place will be monitored. This will continue at a minimum until such time that after two consecutive growing seasons there is no sign of regrowth from all the previously identified stands within the proposed development site.
12.34	Following control of large areas Japanese knotweed, a subsequent disturbance of the soil may give rise to revitalised rhizome growth. To avoid this, bare soil will be mulched (covered with a natural or synthetic barrier, such as wood chip, straw, geo-textile, or other appropriate material) and planted at the earliest opportunity with appropriate native replacement vegetation to stabilize the soil and deter subsequent re-invasion.
	Reinstatement
12.35	Unless otherwise agreed with the Employer's Representative, the Contractor will re-instate hedgerows, and treelines, to a species-rich condition (i.e. five woody species per 30 m), comprising only native species suited to the locality.
12.36	The Contractor will seed all grassland verges with a native wildflower mix (to specification of EC12 Wild Flora for Earth Banks, Bunds and Ditches [1]).
12.37	All other sites will be returned as close as possible to their pre-existing condition, using the same woody species removed, or similar verge seed mixes, under the supervision and direction of the ECoW. Plant species of native provenance will be used in all replanting of semi natural habitats.
12.38	The Contractor will commit to a five year after-care plan for hedging, grassland, and agricultural reinstatement, or as otherwise agreed with the local authority.
12.39	The Contractor's agronomist will inspect, photograph and report in writing to the Employer's Representative on the establishment-phase of all vegetation.
12.40	The Contractor's agronomist will review, and advise on any corrective measures required to ensure good condition, immediately after reinstatement, and at least twice yearly thereafter for a five year period.
	Mitigation Against Impact to Rare and Protected Plant Species
12.41	As outlined previously, historical records of little robin, round leaved crane's bill and wood small reed were identified during the desktop study. These species were not recorded during site walkovers and are considered unlikely to occur. However, given their habitat associations, the following mitigation measures will be incorporated at a minimum:
12.42	Prior to works commencing a confirmatory survey for the species within suitable habitat, where direct impacts will arise, will be carried out by an experienced botanist during the appropriate flowering season.

Phase	Mitigation and Monitoring
12.43	The botanist, to be appointed by the Contractor, will coordinate with the Contractors ECoW and, report findings to the ENCoW within the Client's Representative Team. The botanist will be contracted for a period lasting at least one year following the cessation of potentially damaging construction works at the plant location(s).
12.44	In the event where one or more plants are identified at risk of impact, an assessment of risk of impact will be carried out by the appointed botanist, in consultation with NPWS where relevant. The assessment will be specific to the species which identify any additional measures required to protect the species by either avoiding and protecting the plant species in situ, or (only as a last resort) through the translocation of the plant species to new receptor locations nearby, under licence from the NPWS where appropriate. Any additional measures as outlined under the terms of the licence will also be included.
	Mitigation Against Impact to Breeding Birds
12.45	Woody vegetation clearance will take place outside the main bird breeding season (March – August inclusive). Where tree clearance is proposed during the bird breeding season an experienced ecologist will conduct a pre-construction confirmatory survey to confirm no bird breeding sites will be disturbed. This will be monitored by the site ECoW.
12.46	Habitat reinstatement (Section 12.7.3) will ensure replanting of suitable woody vegetation breeding habitat for birds post works.
	Mitigation Against Impact to Amphibians
12.47	A pre-construction confirmatory survey for frog will be undertaken prior to works commencing during the breeding season (February and March) at potential suitable breeding habitat (ditches, drains, and standing water impacted).
12.48	When surveying for the species biosecurity measures will be followed to ensure that there is no incidental spread of vector borne diseases between waterbodies. This includes the cleaning, disinfection and drying of all equipment and will have regard to guidelines from IFI.
12.49	Should frog be recorded, translocation of the species to areas outside of the proposed development footprint will be undertaken, in consultation with the NPWS. Any translocation of these species will be under license by the NPWS.
12.50	Any spawn or adult frogs recorded will be captured and removed from affected habitat by hand net and translocated to the nearest area of available suitable habitat.
	Mitigation for the Protection of Otter
12.51	The Contractor will ensure an initial confirmatory otter survey is undertaken in advance of the commencement of any works within 150m of the works areas as per Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes. This will allow for the identification of any additional holts which have been established prior to commencement of works and the confirmation of the activity status of the identified holt.
12.52	The confirmatory pre-construction survey will be conducted no more than 10-12 months prior to construction commencing.
12.53	The existing holt is located approximately 115m from the existing track. This is within the ZOI of noise effects associated with the proposed development. Should the holt be confirmed to be active during preconstruction confirmatory surveys, prior to works commencing between Ch 800 and Ch 925 sound reducing hoarding will be placed adjacent to works areas on the southern boundary of the site. This will reduce further the noise impacts associated with the construction phase of the works.
12.54	In addition, all plant used during the construction phase will be the quietest of its type practical for achieving the works.
12.55	All plant will be operated and maintained in accordance with the manufacturer's recommendations including the use and maintenance of any specific noise reduction measures.

Phase	Mitigation and Monitoring
12.56	At a minimum the following will be incorporated to reduce the impact further:
12.57	The use of mufflers on pneumatic tools.
12.58	Effective exhaust silencers.
12.59	Machines in intermittent use will be shut down during periods where they are not required.
12.60	Should any additional holts be identified within 150m of the proposed development the following will, at a minimum, be employed, unless otherwise agreed with the NPWS:
12.61	No works will be undertaken within 150m of holts where breeding females or cubs are present. Presence of breeding females will be assumed until confirmed otherwise.
12.62	Works within 150m of such a holt can only take place following consultation and in agreement with the NPWS
12.63	No wheeled or tracked vehicles of any kind will be used within 20m of active but non breeding holts
12.64	No light work such as digging by hand or scrub will take place within 15m of such holts except under license from NPWS
12.65	The identified exclusion zones will be fenced and clearly marked on site prior to any invasive works.
12.66	All contractors on site will be made fully aware of the procedures in relation to the holts by the EcoW
Mitigation for the Protection of Badger	
12.67	Prior to any works commencing a preconstruction confirmatory badger survey will be carried out. Surveys will be conducted having regard to Surveying Badgers (Harris et al. 1989) and record signs of badgers including tracks, hair, latrines and setts. The extent of the confirmatory survey area will be defined with regard to Guidelines for the Treatment of Badgers during the Construction of National Road Schemes (NRA, 2006) as 150m beyond all works areas within suitable habitat.
12.68	Prior to works commencing, sett activity at all identified setts (including sett identified as inactive during initial walkovers) within 150m will be confirmed. This may be confirmed through the use of camera monitoring, setting of footprint traps, soft blocking of the sett entrance or similar. Any risk of disturbance to badger will be subject to disturbance license requirements.
12.69	A description of the setts i.e. main sett, annex sett, or outlier sett will be provided by the EcoW along with the level of activity at the sett. This will allow for an understanding of the importance of the setts in the wider context of the local population.
12.70	As per the Guidelines for the Treatment of Badgers during the Construction of National Road Schemes (NRA, 2006), where setts have been confirmed, no heavy machinery will be used within 30m of badger setts (unless carried out under licence from the NPWS). Lighter machinery (generally wheeled vehicles) will not be used within 20m of a sett entrance; light work, such as digging by hand or scrub clearance will not take place within 10m of sett entrances.
12.71	Unless otherwise agreed, and under license from the NPWS, during the breeding season (December to June inclusive), none of the above works will be undertaken within 50m of active setts nor blasting or pile driving within 150m of active setts. An assumption that the sett is active will apply unless proven otherwise during the course of investigation.
12.72	The three setts already identified are located in close proximity to the proposed works areas, with two requiring removals, and the third potentially directly impacted by works depending on the direction of underground chambers.

Phase	Mitigation and Monitoring
12.73	Sett Evacuation and Destruction
12.74	Any exclusion and/or destruction of setts will be undertaken in consultation with, and under license by the NPWS.
12.75	Prior to works commencing all three of the setts, and any additional setts identified during pre-construction confirmatory surveys will be clearly marked and the extent of bounds of exclusion zones clearly marked by fencing and signage. The location and restrictions surrounding these setts will be clearly communicated to personnel on site.
12.76	No exclusion or destruction procedures will take place during the badger breeding season due to risk of young being trapped within the sett.
	Inactive Setts
12.77	All entrances will be lightly blocked with vegetation and soil. The sett will be left undisturbed for approximately five days. If all entrances remain undisturbed for the time period the sett will be destroyed immediately using a mechanical digger, under the supervision of the licensee.
12.78	Should there be a delay all entrances will be hard blocked. Immediately prior to destruction the licensee will inspect the sett to ensure there are no signs of activity. The sett may then be destroyed as outlined above.
	Active Sett
12.79	Sett exclusions of active setts will include setts within the footprint of the works, but also setts where the proximity of the feature is such that there is potential for impact to outer chambers.
12.80	All entrances will have one-way gates installed to allow badgers to exit but not to return. The gates will be tied open for three days prior to the exclusion procedure taking place. During the exclusion procedure, gates will be left installed, with regular inspections, over a period of a minimum of 21 days before the sett is deemed to be inactive.
12.81	Inspections will include areas between sett entrances to identify any areas where badgers may have attempted to dig around the gates, or created new entrances and tunnels into the sett. Provided the gates are effective, and no activity is observed for 21 days, the sett may be considered inactive.
12.82	In the case of setts identified within the footprint of the works, destruction of the sett will be required. Once the sett is considered inactive destruction may take place.
	Sett Destruction
12.83	Destruction of setts will be avoided wherever possible.
12.84	Destruction of inactive and evacuated setts may only be conducted under license from NPWS and supervision of qualified and experienced personnel. Preparation must be made, and equipment on hand, to deal with any badgers which may be trapped within the sett, or injured during destruction.
12.85	Destruction may be undertaken with a tracked digger over the time period of no more than one day. The digger will commence at approximately 25m from the outer sett entrances and work towards the centre of the sett cutting small 0.5m sections in a trench to a depth of 2m. Any tunnels which are exposed may be checked for recent badger activity. The sett will be destroyed from several directions until only the centre core remains. Once it is ensured that no badgers are present, the core may be removed and the area backfilled and made safe.
	Artificial Setts
12.86	As the two setts identified for destruction are noted as being outliers, there are alternative natural setts present in the wider area to accommodate any displaced badgers. Should setts be identified for destruction where no suitable natural setts are present, i.e. a breeding sett, an artificial sett will be constructed to replace the sett.

Phase	Mitigation and Monitoring
12.87	Any artificial sett will be constructed months in advance of the closure of the breeding sett. Closure and destruction of the existing sett will not take place until it is ensured that the affected badgers are utilising the artificial sett.
12.88	The sett will be constructed as close as possible to the existing sett, outside of the development footprint at a location that avoids significant residual impacts to habitats of ecological value.
12.89	The artificial sett will be located in well drained soils, landscaped, and planted, such that the sett is well covered to ensure lack of disturbance.
	Mitigation for the Protection of Bats
12.90	The Design and Construction of bat mitigation measures will be site specific, and comply with licensing requirements, having regard for relevant guidance including the NRA's "Guidelines for the Treatment of Bats During the Construction of National Road Schemes"[2], and the NPWS Bat Mitigation Guidelines for Ireland[3].
12.91	The following measures will, at a minimum, be undertaken:
12.92	Trees with suitability for roosting bats will not be felled in advance of surveying for bats, unless in agreement with the ECoW, and NPWS as relevant. This includes trees identified during baseline walkover surveys, and any additional trees with roosting features that may develop prior to works commencing.
12.93	Prior to felling of any trees, an initial bat survey of trees to be felled will be undertaken, by a licensed qualified specialist, to assess the suitability of the tree to contain bat roosts as per Bat Surveys for Professional Ecologists: Good Practice Guidelines...
12.94	Trees identified with potential roost features will be thoroughly examined, under licence from the NPWS, to ascertain the presence or absence of roosting bats. This will be conducted by an experienced bat expert. The trees will be examined for the presence or absence of bats / bat roosts immediately prior to felling. NPWS (2022) guidance notes that emergence/re-entry surveys of trees are limited in terms of effectiveness. As such, inspections via endoscope will be carried out, including of features at height.
12.95	Where felling does not occur within one day of the examination, the trees will be re-assessed.
12.96	Where evidence of a roost, or roosting bats has been determined, a license for destruction of a roost and/or exclusion of bats will be required from the NPWS. The procedures for the exclusion of bats and destruction of roost as detailed in the license document will be obeyed, at all times, by the Contractor.
12.97	Where bat exclusions are required, they will be undertaken in accordance with the requirements of the bat specialist, and any conditions under license. They will not be carried out during the breeding season, between the months of June to August inclusive, or during hibernation in the months of November to March inclusive, unless under license from the NPWS. Where the felling of trees found to be suitable as bat roosts cannot be avoided, appropriate mitigation will be agreed with the NPWS and put in place at least one month in advance of any felling or disturbance.
12.98	If any bat roost sites are removed by the Works, appropriate replacement bat roost sites will be provided following consultation with the NPWS, and in consultation with the local authority.
12.99	The Design and Construction of bat mitigation measures will be site specific, and comply with the requirements of the bat specialist, the Standards, the TII's "Guidelines for the Treatment of Bats During the Construction of National Road Schemes", the National Parks and Wildlife Services Bat Mitigation Guidelines for Ireland, the National Parks and Wildlife Service Circular 2/07 Guidance on Compliance with Regulation 23 of the Habitats Regulations 1997.
	Mitigation for the Protection of Wintering Birds

Phase	Mitigation and Monitoring
12.100	Prior to the commencement of the works, a sound reducing hoarding will be placed along works area from Ch 600 to 800. Sound hoarding will reduce the noise impacts associated with the construction phase of the works. It will also reduce visibility of workers.
12.101	The barrier material will have a mass per unit area exceeding 7kg/m ² in accordance with the recommendations of BS 5228 Part 1:2009+A1:2014 Part B.4.
12.102	Any temporary lighting used to facilitate the works will be cowed and angled away from the SPA and watercourses.
12.103	The EnCoW will undertake daily monitoring of the barrier to ensure installed correctly, and identify any defects for the contractor to remedy.
12.104	All plant will be operated and maintained in accordance with the manufacturer's recommendations including the use and maintenance of the specific noise reduction measures in the next bullet.
12.105	The following may be incorporated to reduce the impact further:
12.106	The use of mufflers on pneumatic tools
12.107	Effective exhaust silencers
12.108	Sound reducing enclosures
12.109	Machines in intermittent use will be shut down during periods where they are not required.
Mitigation for the Protection of Breeding Birds	
12.110	Retention and compensation for areas of habitat which may be used by Breeding Birds (i.e. scrub, hedgerows, and grassland habitats is outlined previously in Section xx.
12.111	As outlined in the description of the development the clearance of all vegetation (except for improved grassland, recognising bare ground, or other vegetation with no nesting potential as determined by the ECoW), will take place outside of the breeding season for birds where possible or as determined by risk of disturbance to a nest site.
12.112	Should clearance within the breeding season be required, a suitably qualified ecologist / ECoW will conduct pre-construction confirmatory surveys to assess risk of disturbance to nesting birds to inform vegetation clearance activity. In the event where pre-construction surveys confirm or presume nesting birds are present, an exclusion zone will be established around the nesting bird (to include the risk of abandonment due to indirect disturbance), and no vegetation clearance may proceed until young are presumed to have fledged, or nesting has failed. Repeat surveys will be required if vegetation has not been cleared within 72 hours of the initial survey. This will prevent direct impact to nesting birds within the footprint of the works.
12.113	Pre-construction confirmatory surveys will be carried out for kingfisher and other riparian breeding bird species. These will incorporate a survey area of approximately 100m upstream and downstream of the works at all river crossings.
12.114	Features likely to be of note to kingfisher and other breeding riparian bird species will be recorded and watches of suitable nest areas undertaken. If actual nest sites (i.e. confirmed or presumed) are present at or within close proximity to works areas at water crossings, the NPWS will be consulted regarding the potential requirement to stop works. The loss of any potentially suitable nesting sites will be compensated through the addition of artificial nesting sites or suitable nest features within the reinstated riverbank. The provision of any new nesting sites (if required) for kingfisher or other riparian bird species will be undertaken in line with NPWS and JFI consultation.
Mitigation for the Protection of Watercourses	

Phase	Mitigation and Monitoring
12.115	Mitigation for the protection of water quality in watercourses has been outlined previously in Chapter 11. Additional mitigation for the protection of aquatic species is outlined hereunder.
	General
12.116	Works will be carried out in accordance with the guidelines set out by IFI in 'Guidelines on Protecting Fisheries During Construction Works in and Adjacent to Waters' (IFI, 2016).
12.117	The IFI biosecurity protocol for works will be complied with for all instream works.
12.118	The open season (July-September) restriction for instream works will apply for all instream works.
12.119	Works method statements will be agreed with IFI for all instream works at watercourse crossings prior to works commencing. These method statements will be site and river specific.
12.120	The works method statement will include details on the works to take place, along with clear instructions relating to placement and monitoring of aquatic mitigation measures.
12.121	Works will not continue during adverse weather events, including during Met Éireann (Red, Orange, Yellow) warnings, and periods of high flow. High temperature will also be considered during instream works as this has the potential to cause increased stress on aquatic species.
	Instream Works
21.123	Instream works will be required to facilitate certain works. In the case of the Owenacurra River, the instream works will be restricted to the installation of scaffolding to support the addition of capping beams to the existing piers.
12.124	All instream works, including silt control measures, biosecurity measures, and fish salvage operations will be monitored by an appropriately experienced ECoW.
12.125	These instream works will be carried out between July and September, which is outside of the salmonid spawning season.
12.126	Instream works will take place within an isolated works area. Any isolated area will be kept to the minimum size required to facilitate the works. Works will take place span by span to ensure that there is no loss of flow during the works.
12.127	The riverbed will be isolated using either an aquadam, or sandbags, dependant on the water levels present when the works take place. Any sandbags used will be filled with clean, sediment free material to ensure that there is no downstream mobilisation of silt.
12.128	Prior to drying out of the works area, de-fishing will be undertaken under license. This will include for the translocation of fish out of the works footprint, should they be found within the isolated works area. The base of the realigned concrete channel will be lined with a layer of closely packed natural rock slabs. The rock slabs will be of approximate dimension 600mm(l) x 600mm(w) x 200mm(d).
12.129	Any pump used to dewater the works area will be fitted with a screen to prevent aquatic species from being sucked into the pump.
12.130	No dewatering will take place directly into the river itself. Any water pumped out of the works area will be treated to prevent downstream mobilisation of pollutants and sediment. Water will be discharged back to the river in such a way that scour is prevented.
Chapter 14 Archaeology, Architectural & Cultural Heritage	

	Phase	Mitigation and Monitoring
14.1	Construction Phase	The mitigation strategies outlined in this section detail the techniques to be adopted in order to ameliorate the impacts that the proposed development may have on features of archaeological, architectural and / or cultural heritage within the study area during both the construction and operation phases of the scheme. The residual impacts that will remain once these mitigation measures have been implemented are set out in Section 14.1.8.
14.2		The following proposed mitigation measures are subject to approval by An Bord Pleanála and the National Monuments Service of DHLGH:
14.3		All sub-surface groundworks associated with the proposed development works at the Glounthaune Estuary AAP (Johnstown/Killahora; CH030) shall be subject to a programme of archaeological monitoring:
14.4		This should be carried out by a suitably qualified archaeologist under license and in accordance with the provisions of the National Monuments Acts 1930-2004.
14.5		If significant archaeological material is encountered during the course of archaeological monitoring, then resolution of any such significant material will be determined in consultation with the National Monuments Service (DHLGH).
14.6		Where possible, every reasonable effort should be made to preserve in situ or reduce the impact on any identified archaeological material. Where preservation in situ cannot be achieved, either in whole or in part, then a programme of full archaeological excavation should be implemented to ensure the preservation by record of the portion of the site that will be directly impacted upon. This work should be carried out by a suitably qualified archaeologist under license and in accordance with the provisions of the National Monuments Acts 1930-2004.
14.7		A written report will be prepared detailing the results of all archaeological work undertaken.
14.8		It is recommended that architectural heritage structures along the railway line are monitored for signs of stress/cracking during the construction phase. Recommendations for a 5-year maintenance inspections on architectural heritage structures have also been identified in Chapter 14 Appendix 14.2
14.9		In relation to the dismantling of OBY 8, Ballyadam House Bridge conservation by record will be carried out, including laser-scanning; careful dismantling and storage for repair of similar structures; and consideration of off-setting the effect by restoring Carrigrohilly Station building to compensate for loss of fabric at agricultural overpass.
14.1		When construction works are being carried out to widen the bridge deck of the Owenacurra river bridge (UBY 11), the historic buttresses that carry the bridge need to be protected during the works and assessed to ensure they can carry the structure without damaging them, during the operational phase.
14.11		Piling for a retaining wall to realign culvert UBY 2 in close proximity to Halv's Bridge (OBY2) should use CFA piles and the bridge should be monitored frequently by conservation engineer to assess it for signs of stress. It is considered to be a neutral, manageable effect of brief duration.
14.12		The extension of UBY 2 by 2m north and south will also necessitate the demolition and re-building of the NE wing-wall of Halv's Bridge (OBY 2), listed on the NIAH. The proposal to record, demolish and re-build using lime mortar and the original stone is considered to be a slight, localised and brief effect.
14.13		The proposed construction compounds at Glounthaune, Killacloyne, Ballyadam Knockgriffen and Townparks are not considered to have an effect from an architectural/ built heritage perspective and they are not in close proximity to any designated or undesignated architectural heritage structures and therefore no mitigation is required.
14.14		Halv's Bridge (OBY 2) piling in close proximity: Piling for retaining wall to realign culvert should use CFA piles and OBY 2 monitored frequently by conservation engineer to monitor signs of stress

Phase	Mitigation and Monitoring
14.15	Halv's Bridge (OBY 2) demolition & rebuilding of c. 1m ² section of NE wing wall to allow for extension of culvert UBY 2. Obtain permission from Cork County Council; Photographic survey of NE wing wall to record arrangement of courses, pinning stones/ snecks etc. Inspection and photographic record by heritage consultant during demolition, to agree specification for re-building post culvert extension. Inspection of sample panel of re-building 0.5m ² prior to complete re-building in original location and using original stone to match other wing-wall. Ensure soft joint between OBY2 and UBY2
14.16	Ballyadam House Bridge/ OBY 8 Agricultural Overpass: Conservation by record, including laser-scanning; careful dismantling and storage for repair of similar structures; consideration of off-setting the effect by restoring Carrigwohill Station building to compensate for loss of fabric at agricultural overpass
14.17	River Bridge (Knockgriffen) buttresses (UBY 11) new bridge structure on historic buttresses: Protect the historic buttresses that carry the bridge during the works and assess to ensure they can carry the structure without damaging them, during the operational phase.
Chapter 15 Road and Traffic	
15.1 Construction	The temporary effects of construction (none of which have been assessed as 'significant') or otherwise) will be mitigated through adoption of a regulated and approved CTMP.
15.2	The assessment of post-mitigation effects has been undertaken on the assumption that key measures set out in the CTMP will be developed as appropriate by the appointed contractor and be implemented during the proposed development construction phase.
15.3	The appointed contractor will agree temporary traffic management measures then adopt and monitor an appropriate way of working in consultation with Cork County Council, the appointed contractor, TII and/or their Agents and An Garda Síochána as appropriate. Construction activity generated vehicles (with the exception of site personnel in cars and vans) will travel on pre-defined routes to and from the relevant sites to reduce effects on existing local traffic.
15.4	The CTMP has been developed for the purposes of this assessment and will be further developed as necessary in consultation with Cork County Council and the Gardai prior to construction commencing. The CTMP will document measures to promote the efficient transportation of components and materials to site, whilst reducing congestion and disruption which might impact negatively on local communities or general traffic and in particular the emergency services. The CTMP will be considered a 'live' document and will be developed accordingly, within the parameters assessed in this EIA.
15.5	Signed diversion routes will be provided to mitigate journey disruption. Where practically achievable, diversion routes will not apply outside of the worksite hours of operation.
15.6	During the construction phase, signage will be installed to warn road and recreational route users to the presence of the works access and the associated likely presence of large or slow-moving construction traffic.
15.7	To minimise inconvenience to the local community in terms of obstructive parking, adequate car parking for permanent site personnel, visitors and deliveries would be provided within the four worksite compounds. Adequate vehicle parking space will be provided on-site and car parking will not be permitted on any public road network adjacent to the site, so that sight lines will be maintained and to minimise potential for obstruction and delay for other road users.
15.8	Furthermore, only vehicles essentially required to facilitate construction will be allowed to attend worksites. Car sharing will be promoted to construction personnel by the contractor during the induction process.
15.9	In order to reduce the potential for mud and other debris being deposited onto the local road network in the vicinity of worksite accesses, the appointed contractor will ensure that all concrete truck wash watering / cleaning is undertaken onsite where practical and remote from watercourses, in accordance with Chapter 12 (Biodiversity). This will minimise the amount of deleterious material deposited on the road surface and the appointed contractor will ensure that the

Phase	Mitigation and Monitoring
	nearest public road (between the worksite and the N25) will be kept clear of debris by monitoring and then utilising a road sweeper where necessary
15.1	The appointed contractor could employ a number of sub-contractors and all will fall under the umbrella of the CTMP and will have an obligation to adhere to the Plan; this obligation will form part of the procurement process and will be written into any contract of employment.
15.11	Compliance will be monitored by the Project Manager, on behalf of the appointed contractor, via spot checks to ensure that vehicles follow the measures set out in the CTMP and recording of any complaints. The appointed contractor will be required to stipulate that all contractors disseminate these rules to their sub-contractors.
15.12	In liaison with Iarróid Éireann the appointed contractors will be required to maintain close liaison with local community representatives, landowners and statutory consultees throughout the construction period. This will include circulation of information about ongoing activities; particularly those that could potentially cause disturbance, including due to traffic.
15.13	The appointed contractor will nominate a person to be responsible for the co-ordination of all elements of Traffic and Transport during the construction process (Liaison Officer). This person will liaise with the local community so that the community has a direct point of contact within the developer organisation who they could contact for information purposes or to discuss matters pertaining to traffic management or site operation.
15.14	If the construction phase of any notably sized development(s) appears likely to overlap with the proposed development, the appointed contractor will seek to liaise with the appropriate developer organisation regarding the scheduling of deliveries to identify potential means of reducing the effects of combined construction.
	Construction Access Arrangements
15.15	Transportation, including deliveries to and from the construction areas will be taken from the existing public road network and in some cases the rail network (it is planned that sleepers and rails will be brought to site using rail haulage).
15.16	The local area road network is shown on Chapter 15 Roads and Figure 15-1 Given the nature of construction of the railway, there will be multiple work sites along the route throughout the construction programme.
15.17	The construction methodology, including construction access arrangements are provided within Chapter 6. The proposed programme of worksite locations will be confirmed by the appointed contractor as an integral part of their adopted CTMP provided in Appendix 6.1. All construction vehicle drivers will be instructed to access their destination worksite via an approved route; this is to be determined by the approved contractor in conjunction with the administering local authority.
Chapter 16 Noise & Vibration	
16.1 Construction	A CEMP including noise and vibration mitigation will be implemented during the construction phase in consultation with Cork County Council.
16.2	The contractor is obliged to comply with Local Authority controls on noise and vibration during construction. This will include (but is not limited to) the setting of limits for the control of noise and vibration from construction activities, the provision of mitigation measures required whilst adopting best practicable means, and any noise or vibration monitoring where significant adverse effects are required to be monitored. A comprehensive noise and vibration monitoring protocol will also be implemented.
16.3	As part of the CEMP, the Contractor will also develop and implement a stakeholder communications plan which will facilitate community engagement prior to the commencement of construction.

Phase	Mitigation and Monitoring
	Mitigation applicable to HGV deliveries
16.4	The number of vehicle movements and levels of noise are expected to be relatively low but have the potential to cause disturbance as being unusual, noise-emitting activity in a quiet, rural area. Measures will be implemented to control vehicle movements:
16.5	To avoid the need to perform reverse manoeuvres and therefore use of audible reverse alarms. However, in the interest of safety, the use of adjustable or directional audible vehicle-reversing alarms or use of alternative warning systems, e.g. white noise alarms rather than tonal alarms will be adopted.
16.6	To avoid the need to queue or wait to gain access to the site
16.7	To ensure vehicle engines are switched off when not in use
16.8	To ensure unloading activities are undertaken during the daytime
16.9	Further to the mitigation measures set out within the CEMP, the Contractor will:
16.10	Manage the timing of activities so that noise-emitting works are conducted in the daytime only
16.11	Where it is required that noise-emitting activities are undertaken in the evening or at night, provide prior notification to the occupiers of nearby dwellings
	Mitigation applicable to construction works
16.12	Typical means by which noise and vibration may be minimised include the following:
16.13	Selecting quiet equipment;
16.14	Ensuring equipment is maintained, in good working order, and is used in accordance with the manufacturer's instructions
16.15	Members of the construction team should be trained and advised during toolbox briefings on quiet working methods
16.16	Equipment shall not be left running unnecessarily
16.17	Equipment shall be fitted with silencers or mufflers where possible
16.18	Use plant enclosures whenever feasible
16.19	Materials shall be lowered instead of dropped from height
16.20	Manage deliveries to prevent queuing of site traffic at access points
13.21 Construction	Use of adjustable or directional audible vehicle-reversing alarms and/or alternative warning systems (i.e. white noise alarms)
13.22	Utilising low vibration working methods
16.23	Provision of noise insulation measures and/or temporary rehousing of residents during periods of particularly intense noise construction work

Phase		Mitigation and Monitoring
16.24		Good public relations are invaluable in securing public acceptance of construction noise. People are more tolerant of noise if they understand the reason behind it, the likely duration, start and completion dates, and mitigation measures used to minimise noise levels. Letter box drops explaining these shall be considered. A dedicated site contact will be nominated to liaise with residents and establish good rapport. A complaint handling procedure shall also be put in place.
		Mitigation applicable to site compound works
		Typical means by which noise impacts may be minimised include the following:
16.25		Selecting quiet equipment
16.26		Ensure equipment is maintained, in good working order, and is used in accordance with the manufacturer's instructions.
16.27		Trains will be at the opposite end of the site compounds when idling during material deliveries to ensure greater distances to the NSLs.
16.28		The provision of noise barriers or site hoarding is needed at site compounds 1, 3, 4 and 5 due to their close proximity to residential receptors. In accordance with BS 5228, as an approximation, a noise barrier that can partially block the line of sight between the noise source and receiver could achieve 5 dB attenuation. Where line of sight is completely broken a reduction of 10 dB may be achieved. Such screening will reduce the adverse noise impacts on the affected NSLs.
Chapter 17 Material Assets	Construction	
		Utilities
17.1		All reasonable measures will be taken to avoid unplanned disruptions to any services during the proposed works.
		Structures to be modified
17.2		Mitigation during the construction phase for the alteration to the culverts and the Owenacurra Rive Bridge is detailed in Chapters 10, 11 and 12 of the EIA.
		Waste Management
17.3		A Construction Waste Management Plan (as part of this CEMP) is appended. The plan provides for the segregation of all construction wastes to facilitate optimum levels of re-use, recovery, and recycling operations.
17.4		All operations will be managed and programmed in such a manner as to prevent / minimise waste production and maximise upper tier waste management (i.e. re-use, recycle, and recovery) in line with the Waste Hierarchy where technically and economically feasible.
17.5		Waste arisings will be handled, stored, managed and re-used or recycled as close as practicable to the point of origin.
17.6		Wastes sent off site for recovery or disposal will only be conveyed by an authorised waste contractor and transported from the proposed development site to an authorised site of recovery / disposal in accordance with the Waste Management Act 1996 and associated amendments and regulations and in a manner which will not adversely affect the environment. All employees will be made aware of their obligations under the CEMP.
17.7		The CEMP will be available for inspection at all reasonable times for examination by the Local Authority.

4.4 Appropriate Assessment Screening and Natura Impact Statement Mitigation

Additional mitigation measures, where not included above, are proposed with the Appropriate Assessment Screening and Natura Impact Statement and are included as follows:

Table 4.2: Mitigation and Monitoring Measures

Table 4.3: Mitigation Against Surface Water Pollution - General

Measure	How the measures will avoid / prevent / reduce impacts	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
At a minimum, all pollution control measures will be designed, installed, and maintained in accordance with measures outlined below and under the supervision of the Contractor's Environmental Clerk of Works (EnCoW).	Measures will prevent the uncontrolled releases of pollutants into the environment.	Measures prescribed as standard best practice and are aligned with CIRIA Guidelines C532	Pollution prevention measures will need to be in place before the enabling and construction works commence at each location.	The Contractor's EnCoW will carry out ongoing monitoring of all pollution control measures.	Measures will prevent and/or remedy the uncontrolled releases of pollutants into the environment.
Concrete The pouring of concrete will be required during the construction phase. To prevent the runoff of concrete into nearby watercourses and drains, the following will be implemented. No on-site batching will be permitted at the proposed works areas. Concrete will instead be transported to the site within a concrete truck. Quick setting concrete mixes will be used to reduce the risk of contaminated run-off to the nearby watercourses. Concrete trucks will be washed down in a sealed mortar bin / skip which has been examined in advance for any defects. This requirement will be communicated to each concrete truck driver prior to entering into the works area. Where concrete pours are to take place instream they will only take place within an isolated, dry, works area. Where concrete pours are required within a watercourse, the Contractor's EnCoW will regularly monitor the pH of the watercourse during concrete works. Should any change in pH +/-0.5 be detected concrete works shall immediately be ceased. The entry point to the watercourse will then be identified and implement appropriate measures to prevent further escape to the environment.					

Measure	How the measures will avoid / prevent / reduce impacts	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
<p>The Contractor's EnCoW will ensure that covers are available for freshly poured concrete to avoid wash off in the event of rain.</p> <p>Waste concrete slurry will be allowed to dry and taken to a licensed waste depot for disposal.</p> <p>The Contractor will schedule concrete works during dry weather conditions to reduce the elevated risk of runoff.</p> <p>The Contractor's EnCoW will notify the Independent EnCoW employed within the Employer's Representative Team, the NPWS and IFI immediately of any concrete spills into watercourses.</p> <p>Hydrocarbons</p> <p>Where mobile equipment is required e.g. generators, these will be housed in a suitably sized bund / plant nappy such that any leaks / spills are intercepted. All mobile equipment used will be stored within a plant nappy. Operators will regularly inspect the plant nappy, at a minimum on a daily basis, and replace it where it has become contaminated.</p> <p>Fuelling and lubrication of plant and equipment will be restricted to the construction compound sites, or laydown areas.</p> <p>All waste fuels, oils, and other hazardous wastes will be disposed of in accordance with the requirements of waste legislation.</p> <p>Spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and operators will be fully trained during induction to site by the Contractor's EnCoW in the use of this equipment.</p> <p>Should use of a spill-kit be required it shall be immediately re-stocked by the Contractor.</p> <p>All spill-kits shall be inspected on a weekly basis by the SHEQ officer to ensure they are maintained as fit for</p>					

Measure	How the measures will avoid / prevent / reduce impacts	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
purpose. Records relating to these inspections shall be kept.					
Welfare / hygiene facilities will be located within the construction compounds.					
All water from wheel washes will be removed from site and disposed of in line with Waste Legislation. No wheel wash water will be discharged into any watercourses or drainage ditches.					
Water crossings					
As outlined previously, alterations to existing culverts at water crossings is required.					
In-stream works will have regard to the potential for tidal ingress into the works area.					
The clearance of any riparian vegetation will be kept to the minimum required for the facilitation of the works such that no unnecessary exposure of riverbanks occurs.					
Works to clear vegetation shall take place from the bank with vegetation pulled back towards the land. The vegetation removed shall be transported off site and disposed of appropriately.					
Following the vegetation clearance, a dry works area shall be established. The measures required to achieve this will be appropriate for the size and flow associated with each watercourse. This may be achieved by:					
Isolating the entire watercourse and over pumping the flow.					
The outflow of any over pumped river shall be placed such that there is no scouring of the riverbed. This will be monitored on an on-going basis by the Contractor's EnCoW. Should scouring be identified, the Contractor's EnCoW will oversee the moving of the outflow such that scouring does not occur.					
Isolating half of the watercourse through the use of measures such as sandbags (double-bagged, containing only washed					

Measure	How the measures will avoid / prevent / reduce impacts	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
<p>sand, from a licensed quarry) or aqua dams and diverting the flow around the works area.</p> <p>Following pollution control measure setup, but prior to instream works commencing, the isolated area shall be inspected by the Contractor's EnCoW to ensure that the watercourse is sufficiently protected. The contractor's EnCoW shall monitor turbidity within the watercourses using a handheld turbidity meter.</p> <p>The Contractor's EnCoW shall direct the Contractor to take corrective actions required. The Contractor's will record all works authorisations, report these to the independent EnCoW within the Employers Representative Team and maintain on file for inspection as required.</p> <p>Should pumping out of the isolated area be required to maintain the dry works area, it shall be ensured that any discharge is treated appropriately prior to entering the watercourse. This may be achieved by discharging to a treatment system such as a silt buster or similar, discharge to a silt bag, or discharging to an area of the watercourse that is protected by a silt boom. These measures shall be used in combination in cases where ground conditions are such that just one measure is not achieving sufficient protection. The success of these measures shall be monitored regularly by the Contractor's EnCoW as works proceed at the watercourse crossings.</p> <p>Where the implementation of these measures fail, or are inadequate, the Contractor will implement adapted measures (for example replacement sediment treatment system) in agreement with the Contractor's EnCoW and the Employers Representative Team.</p> <p>Any diversion or over pumping of watercourses shall be sized such that they will accommodate a 1% AEP flood event over</p>					

Measure	How the measures will avoid / prevent / reduce impacts	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
the period in question, so as to prevent the overtopping of work areas.					

Table 4.4: Mitigation Against Disturbance to Wintering Waterfowl

Measure	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
<p>All works along the coastal section (0 – 850m chainage) are proposed during the summer.</p> <p>If works are proposed between September and March then prior to the commencement of the works, a sound reducing hoarding shall be placed along works area within Ch 0 – 800m Sound hoarding will help to reduce the noise impacts associated with the construction phase of the works. It will also reduce visibility of workers.</p> <p>The barrier material shall have a mass per unit area exceeding 7kg/m2 in accordance with the recommendations of BS 5228 Part 1:2009+A1:2014 Part B.4.</p> <p>Any temporary lighting used to facilitate the works will be cowed and angled away from the SPA and watercourses.</p> <p>The EnCoW will undertake daily monitoring of the barrier to ensure installed correctly and identify any defects for the contractor to remedy.</p> <p>All plant used during the construction phase shall be the quietest of its type practical for achieving the works, as demonstrated in writing by the Contractor to the local authority, with reference to other noisier models.</p> <p>All plant shall be operated and maintained in accordance with the manufacturer's recommendations including the use and</p>	<p>Measures prescribed as standard best practice and are proven technologies / methods (sound hoarding and noise reduction measures are used generally to reduce noise impacts on projects).</p>	<p>Hoarding will need to be in place before the construction works commence</p> <p>Implementation of plant specific noise reduction to take place on an ongoing basis.</p>	<p>The Contractor's EnCoW will carry out daily monitoring of noise and visual reduction measures</p>	<p>Measures will ensure any adverse effects associated with noise and visual disturbance are avoided.</p>

Measure	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
maintenance of the specific noise reduction measures in the next bullet.				
The following may be incorporated to reduce the impact further:				
The use of mufflers on pneumatic tools				
Effective exhaust silencers				
Sound reducing enclosures				
Machines in intermittent use shall be shut down during periods where they are not required				

Table 4.5: Mitigation Against Spread of Invasive Species

Measure	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
<p>General</p> <p>Prior to works commencing a full invasive species survey will be carried out. The pre-construction invasive species survey will be carried out within the works areas, including compound locations, and along proposed access routes to identify the presence of all invasive species within and adjacent to works areas.</p> <p>The invasive species survey will be carried out during the appropriate growing season (May–October). The findings of this invasive species survey will be incorporated into an updated Invasive Species Management Plan by the Contractor's ECoW.</p> <p>Any stands of invasive species recorded within the Proposed Development boundary, including within compounds and along access tracks, will be clearly marked out as restricted areas. This exclusion zone will incorporate a buffer surrounding stands of Japanese knotweed such that below ground growth is accounted for (7m in diameter and 3m depth and inclusive of both treated and untreated material at a worst-case scenario). No works will be carried out within the exclusion zones unless approved by the Contractor's ECoW.</p> <p>'Biosecure zone' signage shall be erected at each potentially contaminated site. This is to alert staff that invasive species have been recorded and to avoid accidental entering or interfering with these sites. Likewise, any stockpiles of soil that are or could be contaminated with any of the aforementioned invasive species shall be clearly marked. Marked haulage routes protected by root barrier membranes may be established within the</p>	<p>Measures prescribed as best practice and are proven technologies / methods.</p>	<p>Biosecurity measures will be implemented throughout the duration of the construction works.</p>	<p>The ECoW will inspect and monitor all biosecurity measures to ensure they are undertaken correctly.</p>	<p>Biosecurity measures will ensure any adverse effects associated with invasive species spread are avoided.</p>

Measure	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
<p>Proposed Development footprint to allow transport to bunds.</p> <p>Designated and clearly marked cleaning stations shall be strategically placed within the work site for use by staff, vehicles, and machinery. Where it is necessary to work in contaminated areas, every effort shall be made not to use vehicles with caterpillar tracks.</p> <p>The Contractor's ECoW will carry out a toolbox talk for all construction personnel which will provide information on how to identify and manage invasive species. The toolbox talk will take place prior to works commencing in any areas where Invasive Species have been recorded.</p> <p>All vehicles and equipment that have been used in these control operations shall be steam-cleaned in a designated wash-down area each time they leave the works site, and once work in that area has been completed. This also includes footwear, personal protective equipment (PPE), tools, and other light equipment. This is essential to remove soil that may contain plant fragments (vector material), which otherwise could be transported along the Proposed Development as works are being undertaken.</p> <p>Vehicles leaving contaminated area(s) shall either be confined to marked haulage routes protected by root barrier membranes or be pressure-washed before leaving the area. Only vehicles that are deemed to be Biosecure (i.e. sealed so that no soil can escape) shall be used to transport contaminated soil and all must be thoroughly steam cleaned in the designated wash-down area before exiting the designated area.</p> <p>Chemical Control</p> <p>Three cornered leek, Spanish bluebell and Himalayan balsam can all be controlled effectively</p>				

Measure	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
<p>using herbicide application. Applications should take place in spring. Follow up monitoring of treatment sites will be required, however, to ensure that regrowth of new plants does not take place.</p> <p>The stands of knotweed identified within the proposed development footprint have been subject to a chemical treatment regime. In order to control established stands of Japanese knotweed, repeated treatments over successive years is necessary.</p> <p>Per TII guidelines (2020) the site will only be considered remediated after two consecutive growing seasons with no sign of regrowth from all of the previously identified stands. It is of note, however, there is always the possibility of further regrowth occurring, this happens most commonly through the reactivation of dormant rhizomes due to disturbance of soils but may also occur through re-infestation of the site from off-site. Subsequent surveys will be cognisant of this potential</p> <p>Treatment of established stands of knotweed shall be continued in order to prevent the spread of existing stands within the Proposed Development footprint.</p>				
<p>Physical Control</p> <p>Pulling and digging of Himalayan balsam plants (before seed is mature), three cornered leek, and Spanish bluebell has been shall be used to control and remove stands. This treatment shall only be carried out under supervision of the EcoW. All waste material associated with these stands shall be treated in accordance with legislative requirements on disposal.</p> <p>Physical control methods (cutting, digging, excavating etc) of Japanese knotweed shall be avoided wherever possible as interference with stands may result in a resurgence of growth in</p>				

Measure	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
<p>dormant stands, and increase potential for spread of vector material should biosecurity measures not be adhered to.</p> <p>Where excavation of Japanese knotweed material is required, it may be subject to burial as follows:</p> <p>Stands of Japanese knotweed identified for removal shall be treated with a non-persistent herbicide prior to excavation.</p> <p>Material with potential to contain Japanese knotweed, or vector material, shall only be excavated under strict supervision and placed within a vehicle for transportation. Only vehicles that are deemed to be Biosecure (i.e. sealed so that no soil can escape) shall be used to transport contaminated soil and all must be thoroughly steam cleaned in the designated wash-down area before exiting the contaminated area.</p> <p>Burial of material may be undertaken as follows:</p> <p>Where deep burial of a minimum depth of 5m is feasible, the waste shall be covered with a proprietary root barrier membrane. Any joins in the membrane will be overlapped and secured. No material shall be placed over the membrane until it has been inspected by the EcoW. A layer of pea gravel shall be placed on top of the barrier membrane to reduce the potential for perforation of the barrier membrane. The waste shall then be infilled with a minimum 5m depth of uncontaminated soil.</p> <p>Where a burial of 5m is not feasible, the waste shall be completely encapsulated in a proprietary root barrier membrane cell. The lower surface of membrane shall be covered in a layer of pea gravel to reduce the potential for perforation of the barrier membrane. Any joins in the barrier membranes shall be overlapped and suitably sealed. The upper surface of the cell shall be covered in a layer of pea gravel and buried to a minimum depth of 2m. No material shall be placed over the membrane</p>				

Measure	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
<p>(both internally and over the upper surface until it has been inspected by the EcoW.</p> <p>Where burial is not feasible due to site constraints, the material may be transported off-site (under license). It is a requirement to dispose of this material in a fully licenced waste facility, capable of accepting such contaminated material. This disposal requirement applies to all Japanese knotweed contaminated material including untreated and treated plant material.</p>				
<p>Monitoring</p> <p>As outlined previously, a single herbicide treatment is unlikely to control an established stand of Japanese knotweed. Any re-growth of treated Japanese knotweed shall be accurately mapped. Monitoring shall be conducted post treatment to determine the level of control success that the treatments of all species have achieved. All stands identified within the Proposed Development, and any areas where burial or storage has taken place shall be monitored. This shall continue at a minimum until such time that after two consecutive growing seasons there is no sign of regrowth from all the previously identified stands within the Proposed Development site.</p> <p>Following control of large areas Japanese knotweed, a subsequent disturbance of the soil may give rise to revitalised rhizome growth. To avoid this, bare soil shall be mulched (covered with a natural or synthetic barrier, such as wood chip, straw, geotextile, or other appropriate material) and planted at the earliest opportunity with appropriate native replacement vegetation to stabilize the soil and deter subsequent re-invasion.</p>				

5 Environmental Incident Response Plan

5.1 Introduction

In the unlikely event of an incident, the Environmental Incident Response Plan will ensure that any incident is dealt with effectively, and that the response is timely and appropriate. This plan will be further developed by the appointed Contractor, in line with the mitigation measures detailed in the EIAR and NIS for the proposed development, to describe the procedures, lines of authority and processes that will be followed to ensure that all incident response efforts are prompt, efficient and appropriate to the particular incident.

5.2 Plan Objectives

The objectives of the plan are:

- To ensure the health and safety of all workers on site
- To minimise environmental effects
- To devise response procedures
- To establish procedures for an effective response to the incident which minimises effects on the environment and the health and wellbeing of personnel.

5.3 Implementation of the Plan

Risks and appropriate responses for incidents will be reviewed and updated regularly to ensure that all risks and response mechanisms are included within the plan. It will identify the risks associated with health and safety and the environment and will evolve throughout the project lifecycle, with inputs from the contractor/PSCS and sub-contractors.

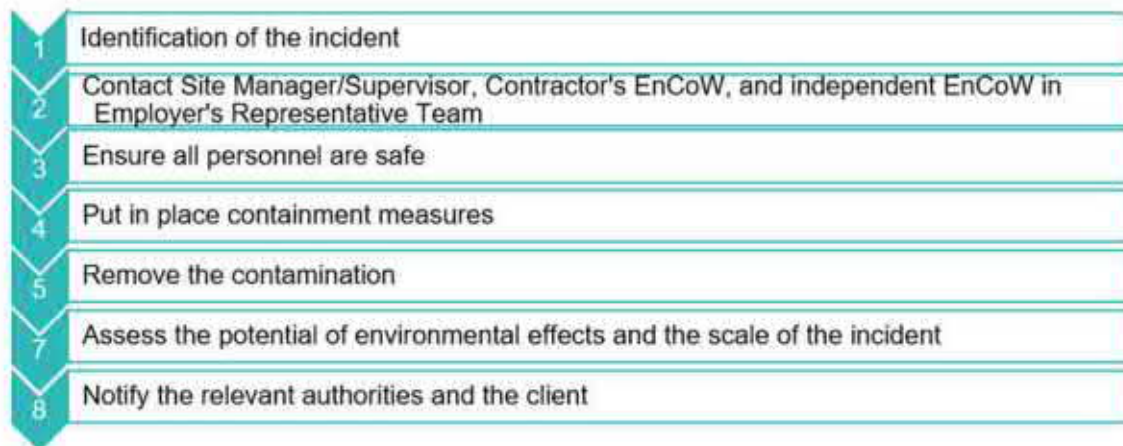
5.4 Environmental Emergency Response Procedures

The mitigation measures specified in the EIAR and NIS will minimise / avoid environmental pollution. However, procedures must be in place in the unlikely event of an incident. The following are required to ensure that the project / site / activity risks are known to all personnel on site:

- Identify all activities related to the project which have the potential to cause an incident;
- Conduct a risk assessment for each activity;
- Ensure effective planning of the works and the required equipment to deliver EIAR mitigation requirements;
- Contact details for those contacts detailed in section 5.5 to be distributed to personnel and displayed on site; and
- Training of staff/personnel in relation to response procedures, including drills.

In the unlikely event of an incident, the response will follow the following steps:

Figure 5.1: Incident Response Procedure



Source: <Insert Notes or Source>

An example of emergency response actions required, in the event of a spillage is as follows:

If safe, stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers.

If safe, contain the spill using the absorbent spills material provided. Do not spread or flush away the spill.

Cover or bund off any vulnerable areas where appropriate.

If possible, clean up as much as possible using the absorbent spills materials.

Do not hose the spillage down or use any detergents.

Contain any used absorbent material in weather tight containers bins/bags so that further contamination is limited.

Notify the Site Manager so that used absorbent material can be disposed of using a licensed Waste Contractor, and

An accident investigation should be performed in accordance with procedures and the report sent to the Site Manager.

All works in the vicinity of the incident must be ceased until such a time as the Site Manager notifies personnel that it is safe to proceed with the works. The Contractor's EnCoW will be responsible for formulating any corrective actions that are required (e.g. repairs silt fencing in the event of damage from extreme weather) in consultation with the Contractor and relevant stakeholders.

For each incident, the following will be reported:

- Location of the incident;
- Time and Date;
- Scale of the incident;
- Nature of the incident and source-pathway and receptor;
- Remediation measures undertaken;
- Name of the personnel who reported the incident; and
- Any other relevant details.

The Site Manager will keep a log of all environmental incidents on file, and these will be made available to the Local Authority, the independent EnCoW within the Employer's Representative

Team and other agencies, as required, such as the Inland Fisheries Ireland or the Environmental Protection Agency.

5.5 Emergency Contact List

An emergency contact list will be displayed at prominent and suitable locations at construction sites during the proposed works. An example is provided in Table 5.1, and this will be further developed to include contact details for key personnel with environmental responsibilities, as detailed in Chapter 2 of this CEMP.

Table 5.1: Emergency Services and Authorities Contact Details

Emergency Services	Contact Telephone Number
Ambulance	999 or 112
Cork County Council Fire Services	999 or 112
Cork County Council Fire and Building Control Department (Ballincollig)	021 4304077
Cork County Council Environment Department	021 42768941/ Out of hours (021 4800048)
Cork County Council, East Cork Municipal District, Road Operations (Midleton Office)	022 211123
Inland Fisheries Ireland (Macroom office)	026 41222
National Parks and Wildlife Services	1890 383 000/ (01) 888 3200
Environmental Protection Agency	1890 33 55 99 / 053 9160600
National Monuments Services	01 888 2178
ESB Emergency	1850 372 999
Bord Gais Emergency	1850 20 50 50
Irish Water Emergency	1850 278 278
Irish Rail	01 8555454
Health and Safety Authority	1890 289 389

6 Training and Auditing

6.1 Environmental Induction and Awareness Training

All site personnel will receive environmental induction and awareness training in conjunction with site safety training. The environmental training and awareness training will ensure that staff are familiar with the principles of the CEMP, the environmental aspects and potential impacts associated with their activities, the controls in place to mitigate said impacts. Prior to working in areas of particular sensitivity, the Contractors' EnCoW will give a toolbox talk to site personnel. All site personnel will be trained in relation to incident response procedures and drills will be undertaken to ensure timely and effective responses to incidences.

All signed training records will be held on site for future inspection.

6.2 CEMP Reviews and Auditing

Internal and external auditing will facilitate the assessment of the effectiveness of the CEMP and compliance against regulatory and legislative requirements. Audit reports will be produced identifying examples of good practice, opportunities for improvement, non-conformances, and corrective actions taken, as appropriate. Recommendations for follow-up audits will also be provided. The findings of the audits will be reported to the Site Manager, the Contractors and the independent EnCoW within the Employer's Representative Team.

Internally, the Contractors' EnCoW will bring any changes required to the CEMP to the attention of the Contractor. A report on each change to the CEMP will be appended to the CEMP. The Contractors' EnCoW will monitor and track any changes in environmental legislation and any changes required will be brought to the attention of the Site Manager and Contractor. Changes to the CEMP may also arise due to changes in activities and measures contained in the CEMP may need to be updated / altered to take account of this.

Externally, the independent EnCoW within the Employer's Representative Team will carry out regular reviews of the CEMP to ensure that the Contractors are conducting the works in compliance with the EIAR, NIS and any conditions imposed by the Consenting Authorities.

The CEMP, environmental inspection reports and audit records will be maintained in hard copy and electronic formats for inspection.

7 Communications and Complaints

7.1 Communication and Engagement

Communication with the public and other stakeholders will be a two-way mechanism, to ensure awareness of the project and to share information. The Contractor will share important information with the public and other stakeholders.

The communication strategy will include:

- List of environmental stakeholders
- Road users – the Contractor will ensure that traffic disruption is minimised during construction.
- Local population – the Contractor will provide the local population and other stakeholders with advance notice of works in the area,
- Method and frequency of communication – this can include personal contact, letter drops, emails, telephone, meetings/presentations
- Details of key contacts – Employer, Site Manager, Contractors' EnCoW
- Details of the consultation register – a record will be maintained of all third-party communication and consultation. This includes consultation with statutory and non-statutory organisations, and members of the public.

The Contractors' Community Liaison Team will be expected to interface with the Employer's Community Liaison Team to ensure the successful delivery of the project in so far as communities are concerned.

7.2 Environmental Complaints

A formal complaints procedure will be developed and implemented by the Contractor.

Signage will be provided at site entrances or on perimeter hoarding locations showing details of whom to contact in the event of a complaint.

The Contractor will:

- Assess what corrective and preventive action is required.
- Carry out further investigation if necessary.
- Provide a response within a reasonable timescale.
- Notify the relevant stakeholder of the proposed corrective and preventive actions to be adopted.
- On completion of the corrective action and following agreement that the complaint has been adequately addressed; the Site Manager will close the case and record the date of closure. The complaints register will include details of the preventative measures undertaken to avoid a reoccurrence and will be agreed with the Contractor's EnCoW.

The Contractor will additionally communicate the specifics of any environmental complaint to Iarnród Éireann.

Appendices

A. Construction Resource Waste Management Plan



Construction Resource Waste Management Plan

Glounthaune-Midleton Twin Track Project

September 2022

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1 Introduction

1.1 Purpose of this CRWMP

This Construction Resource Waste Management Plan (CRWMP) has been prepared for the construction of an adjacent railway track between Glounthaune and Midleton, as detailed in Chapter 6 Description of the Development, in accordance with waste management guidance and principles as outlined in *Best practice guidelines for the preparation of resource & waste management plans for construction & demolition projects* (EPA, 2021)¹.

The 2021 EPA guidelines replace the *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects* (DoEHLG), June 2006.

This CRWMP will evolve in agreement with the planning authority, in the context of matters such as Conditions of the Statutory Approval, and as detailed design of the development emerges, to ensure that optimum levels of waste prevention, reduction, re-use, recycling, and recovery are achieved throughout the duration of the proposed development. Litter management will also be included. Because at this point – the commencement of the statutory consenting process, exact quantities and volumes of waste material cannot be determined, particularly in the absence of any Conditions of the Consent Approval.

The requirement to develop, maintain and operate this CRWMP will form part of the contract documents for the project and will be updated by the appointed Contractor in advance of the commencement of construction activities on site. Waste sent off site for recovery or disposal will only be conveyed by an authorised waste contractor and transported from the proposed development site to an authorised site of recovery/disposal in a manner which will not adversely affect the environment. All employees will be required to comply with the obligations under this CRWMP.

On commencement of the project, the Contractor appointed to undertake the works will be responsible for the further development of this CRWMP and the implementation of all necessary protocols and measures to ensure regulatory compliance, including the provision of data to Cork County Council to enable fulfilment of reporting obligations. The CRWMP will be developed and agreed in line with the process presented in Figure 1.2 *Process Lifecycle of Resource Waste Management Plan*.

The Contractor will be required to regularly revisit this CRWMP throughout the lifecycle of the project so that opportunities to maximise waste reduction / efficiencies are exploited throughout, and to ensure that that data is collected on an ongoing basis so that it is as accurate as possible.

The Contractor will be required to:

- Reduce the use of virgin resources;
- Keeping materials in the economy as long as possible;
- Maintain their intrinsic value/quality as high as possible;
- Reduce fumes or emissions which may result in additional GHG emissions. Plant equipment and vehicles to be used on the proposed project should be selected based on their relative environmental performance; and
- Reduce hazardous substances in products and waste.

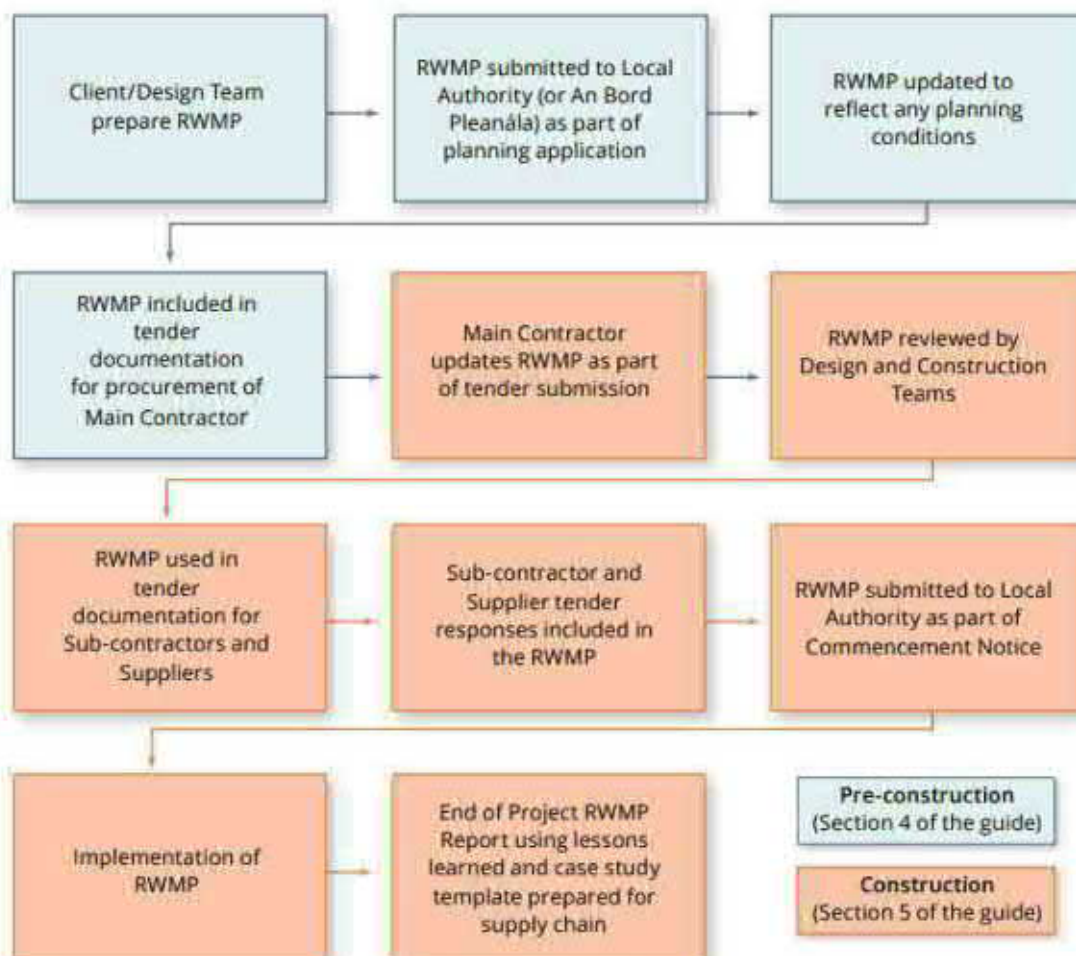
¹ [CDWasteGuidelines.pdf \(epa.ie\)](#)

This CRWMP has been prepared for the proposed development as there is potential for the project to exceed the specified Tier 2 construction waste threshold limits set out in the above referenced guidelines, namely Demolition projects generating in total less than 100m³ in volume of C&D waste.

This CRWMP has been prepared with reference to, and taking account of, the following legislation, plans and waste management guidance documents:

- The Waste Management Act 1996 – 2008, Amendments & Associated Regulations;
- Construction Industry Research and Information Association (CIRIA) document 133 Waste Minimisation in Construction;
- Design Out Waste: A design team guide to waste reduction in construction and demolition projects (EPA, 2015) The Litter Pollution Act 1997;
- The Waste Management Plan for the Connacht-Ulster Waste Management Plan 2015-2021; and
- Best practice guidelines for the preparation of resource & waste management plans for construction & demolition projects (EPA, 2021).

Figure 1.1: Process Lifecycle of Resource Waste Management Plan



Source: Best practice guidelines for the preparation of resource & waste management plans for construction & demolition projects (EPA, 2021)

1.2 Structure of this CRWMP

Design Out Waste (EPA, 2015) notes that the preparation of a Waste Management Plan within the early design and feasibility phases provides a framework to carry out design reviews, and should be used as an implementation, benchmarking, monitoring and reporting tool throughout the overall construction process.

This CRWMP has been prepared in line with the recommendations of the *Best Practice Guidelines* (EPA, 2021) for Tier 2 projects and consequently addresses the following:

- Introduction
- Project description.
- Roles and Responsibilities
- Design Approach
- Key Materials, Quantities and Costs
 - Waste forecasting: Analysis of the waste arising / materials surpluses.
 - Specific waste management objectives for the project.
 - Proposed strategies and associated costs: Methods proposed for prevention, reuse and recycling of wastes.
 - Materials logistics.
- Site Management
 - Monitoring procedures: Auditing and record keeping; and
 - Proposals for education of workforce and plan dissemination programme.
- Site Infrastructure

1.3 Irish Waste Management Targets

The EU Waste Framework Directive (Directive 2008/98/EC) set the basic concepts and definitions related to waste management, such as definitions of waste, recycling and recovery. It also included definitions for when waste ceases to be waste and becomes a secondary raw material (end-of-waste criteria) and how to distinguish between waste and by-product. The Directive was enacted in Ireland under the Waste Directive Regulations 2011 (S.I. No. 126 of 2011).

The EU Waste Framework Directive (2008/98/EC) requires Member States to take the necessary measures to achieve the minimum recycling/recovery target of 70% by weight for non-hazardous construction and demolition (C&D) waste, excluding naturally occurring materials. The Directive specifies that such a target should be achieved by preparing for reuse, recycling and other material recovery, including backfilling operations using waste to substitute other material.

Ireland is required to meet the waste re-use and recycling targets presented in Table 1.1.

Table 1.1: Targets

Target Specifics	Reference Year	Rate	Indicator
Preparing for re-use, recycling and other material recovery (incl. beneficial backfilling operations using waste as a substitute) of 70% by weight of C&D non-hazardous waste (excluding natural soils & stone)	2019	84%	On Track

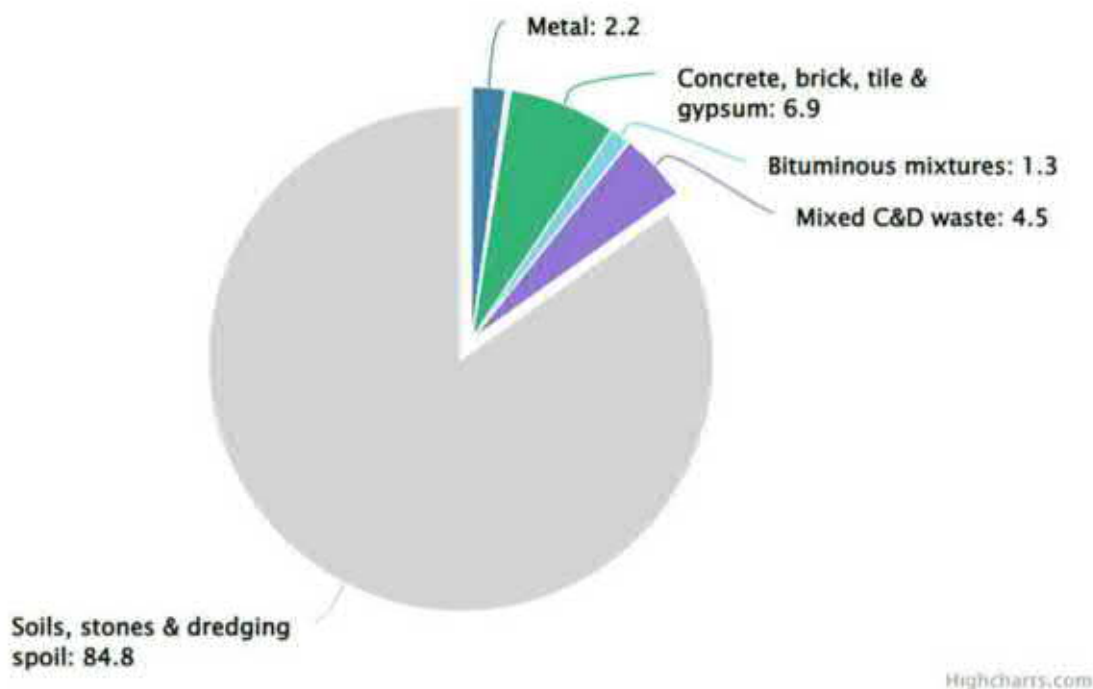
Source: <http://www.epa.ie/nationalwastestatistics/constructiondemolition/>, EPA Waste Data Release, 1 December 2021 (Accessed: 11/03/2022)

Ireland is currently on-track to meet the EU waste targets for C&D waste. It should be noted, however, that soil and stones waste are excluded from the calculation of the Waste Framework Directive targets.

The EPA² notes that just over 8.8 million tonnes C&D waste was generated in Ireland in 2019. This represents an increase of 2.6 million tonnes on the 6.2 million tonnes of C&D waste generated in 2018. This increase in C&D waste corresponded with an increase in construction activity nationally.

The composition of C&D waste in Ireland in 2019 is illustrated in Figure 1.3.

Figure 1.2: Composition of C&D waste material collected in Ireland, 2019



Source: www.epa.ie

The vast majority (96%) of C&D waste underwent final treatment in Ireland in 2019; only four per cent (359,812 tonnes) was exported abroad for final treatment. Soil and stones made up the large majority (85%) of C&D waste collected in 2019. The next largest C&D waste types in 2019 were concrete, brick, tile and gypsum waste (7%) and mixed C&D waste (4%).

Most of the C&D waste finally treated in Ireland (82%) was backfilled in 2019, while ten per cent went for disposal and only seven per cent of all C&D waste was recycled. The dominance of backfilling as a treatment operation reflects the large proportion of soil and stones in C&D waste. Recycling was the main treatment operation for the smaller fractions of metal, plastic, glass and wood.

The Contractor will be obliged to aim for an overall recycling rate of 70% of C&D material, in accordance with EU targets under Waste Framework Directive (2008/98/EC) as well as regional waste management targets.

² [Construction & Demolition | Environmental Protection Agency \(epa.ie\)](http://www.epa.ie)

1.4 Waste Management Regulatory and Policy Requirements

The Southern Region Waste Management Plan 2015 -2021³, which includes Cork County Council acting, states the following:

A clear strategy, policies and actions are required to manage our wastes in a safe and compliant manner. The Waste Management Plan for the Southern Region is the framework for the prevention and management of wastes in a safe and sustainable manner. The scope of the waste plan is broad and ultimately it needs to provide policy direction, setting out what we want to achieve and a roadmap of actions to get us there. The waste management plan is a statutory document prepared by the local authorities of the region. This waste plan covers the period from 2015 to 2021 and is required to be revised or replaced every six years. The waste plan contains a comprehensive list of policy actions which are scheduled to be implemented by the local authorities over the plan's period, including streamlining and proximity principle, national targets and ensuring the best overall environmental outcome. The following waste management principles will be applied:

- Establish reuse, repair and preparing for reuse activities and networks to recirculate the lifespan of items.
- Optimise the value of recycled and residual waste resources in the system to turn these materials into reliable sources of secondary raw materials for reprocessing and recovery.

The Waste Framework Directive 2008/98/EC defines waste as “any substance or object that the holder discards or intends to or is required to discard”.

The Waste Hierarchy described in the framework prioritises prevention over re-use, recycling recovery and disposal, as illustrated in Figure 1.4.

Figure 1.3: Waste Hierarchy



Source: Waste Framework Directive (https://ec.europa.eu/environment/topics/waste-and-recycling/waste-framework-directive_en)

The primary legislative instruments that govern waste management in Ireland relevant to the proposed Temporary Emergency Generation Plant Project are as follows:

³ Southern Waste Region

- Waste Management Act 1996 (S.I. No. 10 of 1996), as amended. Sub-ordinate legislation to this Act includes:
 - European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011) as amended 2011 (S.I. No. 323 of 2011)
 - Waste Management (Collection Permit) Regulations S.I. No. 820 of 2007 as amended 2008 (S.I. No. 87 of 2008)
 - Waste Management (Facility Permit and Registration) Regulations, S.I. No. 821 of 2007 as amended 2008 (S.I. No. 86 of 2008)
 - Waste Management (Licensing) Regulations 2000 (S.I. No. 185 of 2000) as amended 2004 (S.I. No. 395 of 2004), 2010 and (S.I. No. 350 of 2010)
 - Waste Management (Packaging) Regulations 2003 (S.I. No. 61 of 2003) as amended 2004 (S.I. No. 871 of 2004), 2006 (S.I. No. 308 of 2006) and 2007 (S.I. No. 798 of 2007)
 - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997)
 - Waste Management (Landfill Levy) (Amendment) Regulations 2012 (S.I. No. 221 of 2012), as amended 2015 (S.I. No. 189 of 2015)
 - European Communities (Waste Electrical and Electronic Equipment) Regulations 2011
 - Waste Management (Registration of Brokers and Dealers) Regulations 2008 (S.I. 113 of 2008)
 - Waste Management (Food Waste) Regulations 2009 (S.I. No. 508 of 2009), as amended 2015 (S.I. 190 of 2015)
- Protection of the Environment Act 2003 (S.I. No. 413 of 2003)
- Litter Pollution Act 1997 (S.I. No. 12 of 1997)

1.5 Iarnród Éireann Group Environment and Waste Policies

The Iarnród Éireann (IE) Environmental Policy Statement⁴ states that they 'recognise our activities have an impact on the environment. It is our responsibility to manage these impacts and improve our efficiency to reduce our consumption of natural resources'. IE are committed to undertake activities in an environmentally responsible manner, with challenging targets, with reviews annually. The Sustainability policy⁵ ensures the commitment of IE to the future and advancing environmental sustainability by decarbonising transport, ensuring climate change resilience; reducing the impact on the natural environment, and proactively protecting and enhancing biodiversity.

⁴ [Environmental Policy \(irishrail.ie\)](https://www.irishrail.ie/EnvironmentalPolicy)

⁵ [Sustainability \(irishrail.ie\)](https://www.irishrail.ie/Sustainability)

2 Roles and Responsibilities

2.1 Description and Role of the Client and Key Personnel

IE is the Employer with the following responsibilities:

- Manages the process towards construction including liaison with stakeholders.
- Undertakes a Client Engineering function, including inspections, to ensure that detailed designs, plant, materials and works including scheduling meet the requirements of outline designs and the proposal requirements.
- Ensures that the Contractor employs an independent Environmental Clerk of Works (EnCoW) to assess the construction of the Proposed Development, and advise the Contractor on the implementation of the agreed Contractor's CRWMP.

The Work Package 2 (WP2) Design and Build (D&B) Contractor will be Project Supervisor Construction Stage (PSCS) during the enabling works phase and the WP3 Contractor will take over as PSCS when they mobilise to site. IE will then take over as PSCS for the blockade when both contractors (WP2 & WP3) and IE are carrying out works on site. All three parties will be responsible for the Health and Safety of site workers, for the implementation of this CRWMP.

The following sections provide further detail on roles and responsibilities.

2.2 Description and Role of the Resource Manager

The Resource Manager will be appointed by the Contractor(s) who will ensure that the objectives and measures contained within this CRWMP are incorporated into the project specific CRWMP to achieve the associated target re-use / recycling rates.

The Resource Manager will be responsible for all aspects of waste management at the different stages of the proposed development, and overall implementation of this CRWMP and associated procedures.

The Resource Manager, as appointed by the Contractor, will be technically competent and appropriately trained.

The Resource Manager will facilitate effective communication of the waste management objectives with all operatives associated with the project (including site staff, external contractors and suppliers).

Another key objective of the Resource Manager will be the maintenance of accurate records on the quantities of waste / surplus materials generated and the real cost (including purchasing) associated with waste generation and management. The recording of summary information will further assist the implementation of the plan.

The Resource Manager will keep records of the quantities of waste / surplus materials generated and the costs associated with waste generation and management.

The Resource Manager will ensure that reporting and recording requirements are met, and all necessary resources are in place to support the implementation of the plan.

2.3 Description of the future role of the Contractor

The appointed Contractor(s) will be responsible for the Health and Safety of site workers and the completion of the works to the satisfaction of the Employer.

2.4 Description and role of other parties and key personnel

2.4.1 Project Supervisor Design Process (PSDP) / PSCS

- Mott MacDonald will be PSDP for the detailed design phase (WP3) of this project.
- It is likely that the PSCS on the project will change with the various stages. The WP2 D&B Contractor will be PSCS during the enabling works phase and the WP3 Contractor will take over as PSCS when they mobilise to site. IÉ will then take over as PSCS for the blockade when both contractors (WP2 & WP3) and IÉ are carrying out works on site.

2.4.2 Site Manager

The Site Manager will be responsible for the day to day running of the site and will direct and oversee the activities of the Contractor and subcontractors throughout the works. The Site Manager will be responsible for programming the works, will regularly consult with the Employer and will maintain site safety.

2.5 Contact Details

As detailed previously, the requirement to develop, maintain and operate this CRWMP will form part of the contract documents for the project and will be updated by the appointed Contractor in advance of the commencement of construction activities on site. At that time the specific roles and responsibilities will be confirmed with the Planning Authority as part of the next iteration of this CRWMP prior to construction.

Table 2.1: Contact details of site personnel and their roles

Organisation	Role	Name	Contact Number	Email
To be confirmed	To be confirmed	To be confirmed	To be confirmed	To be confirmed
To be confirmed	To be confirmed	To be confirmed	To be confirmed	To be confirmed
To be confirmed	To be confirmed	To be confirmed	To be confirmed	To be confirmed

3 Design Approach

3.1 Proposals for Managing Waste Arisings

Waste arisings will be managed in accordance with the principles outlined in the Waste Management Hierarchy as illustrated in Figure 1.4.

In order of priority, the Waste Management Hierarchy sets out the most desirable approaches to waste management in the following order:

1. Prevention
2. Reduction/Minimisation
3. Re-use
4. Recycle
5. Other Recover (including energy recovery)
6. Disposal

3.1.1 Opportunity for Prevention and Reduction

Opportunities for the prevention of waste will be considered throughout all stages of the project. Contractors will plan the construction process to eliminate / reduce waste; specifically, careful planning will minimise the volume arising on-site, facilitate the use of reclaimed materials in the works, and influence wastage caused by poor materials handling.

Design Out Waste (EPA, 2015) notes that 33% of all on-site waste is due to a failure to implement waste reduction measures during the design stages. Materials logistics, specifically the avoidance of overstocking of materials, is a critical factor for material optimisation in preventing wasted material. A review assessment of this plan and detailed design plans will inform the appropriate quantities of materials required for the project thereby minimising, and potentially preventing, the generation of certain waste streams. In accordance with *Best Practice Guidelines* (EPA, 2021) and *Design Out Waste*, the following measures will be implemented at a minimum:

- Materials will be ordered on an 'as needed' basis to prevent over-supply to site;
- Materials required will be purchased in shape, dimensions, and form that minimise the creation of excessive scrap waste on-site;
- Storage and handling procedures and systems will be introduced to minimise generation of damaged materials / waste e.g. deliveries will remain unpacked until ready for use, sufficient space will be made available for manoeuvring of machinery etc.;
- The correct sequence of operations will be determined and implemented;
- Agreements will be made with suppliers, where possible, to ensure take back / buy back of surplus and sub-standard / rejected materials; and
- The primary Contractor will assign individual responsibility (through appropriate contractual arrangements) to sub-contractors for the purchase of raw materials and for the management of wastes arising from their activities.

Waste generated during the project will be re-used on-site, where practicable. Opportunities for recycling will be employed for any waste that cannot be re-used. Waste will only be sent for disposal if no other reasonable economically or technically feasible alternative can be found.

All wastes will be handled in a responsible manner with due regard to relevant legislation, codes and best practice guidelines.

Only authorised waste contractors with appropriate waste collection permits will be authorised to collect waste streams from the facility. Waste will only be transferred to facilities authorised to treat or dispose of the material in accordance with the requirements of the Waste Management Act 1996 (as amended) and associated Regulations.

Copies of all permits and licences will be retained with other waste-related documentation. Comprehensive waste descriptions will be provided on all documentation.

Appropriate and adequate waste segregation areas will be provided at secure locations on site. The number and size of containers and the number of uplifts required will be determined at a later stage in the project. The Contractor will ensure that containers are not filled beyond the maximum loading capacity of the collection vehicle. Effective inspection, containment and control measures will be implemented to ensure that no litter escapes from the construction site. Litter pickers will be employed within the construction site as required.

3.1.2 Opportunity for Re-use/Recycling

Material that is generated will be reused on site or salvaged for subsequent reuse to the greatest extent possible or recycled. Disposal will only be considered as a last resort. Initiatives will be put in place to maximise the efficient use/reuse of materials.

3.1.2.1 Concrete

The contractor will be encouraged to process concrete troughing to be reused.

3.1.2.2 Soil

All material will be tested and in the event that contaminated material is encountered and subsequently classified as hazardous, this material will be stored separately to any non-hazardous material and disposed of appropriately. Soil will be reused where possible. Note, that soil infested with Japanese Knotweed cannot be reused.

3.1.2.3 Hazardous Waste Arisings

Waste fuel and oil and nominally empty containers will be appropriately contained and stored in designated areas on drip trays to prevent loss through drips and spills. Paints will be stored in appropriate containers in designated areas on drip trays, where practicable, non-hazardous paints will be used.

Hazardous wastes will be collected by appropriately authorised waste contractors for recovery or disposal as appropriate. Nominally empty containers will not be sent for disposal unless a determination can be made that the residual content does not exhibit any of the hazardous characteristics associated with hazardous waste.

3.1.2.4 Scrap Metal

Scrap metal will be sent to an appropriately authorised waste contractor for recycling.

3.1.2.5 Miscellaneous Waste Arisings

Small volumes of a variety of waste streams will be generated including packaging waste, plastic pipe and cable cut-offs, green, and mixed municipal type waste. The generation of surplus waste streams will be minimised through careful planning; however, it will not be possible to eliminate all surplus waste arisings.

- Cardboard will be flattened while paper and cardboard containers will be covered to prevent ingress of water.

- Plastic will be segregated at source and kept as clean as possible prior to placement in a covered container.
- Paper, cardboard and plastics will be recycled whereas mixed municipal waste arising will be sent for disposal.

3.1.3 Green Procurement

Tender specifications, selection and award criteria and contract conditions will require procurement of products and services that prevent and reduce waste.

4 Key Materials, Quantities and Cost

4.1 Analysis of Waste Arisings

The main waste stream arisings (including surplus materials) which are likely to be generated during the demolition and construction phase, are presented in Table 4.1 hereunder.

Table 4.1: Waste Types and Associated EWC codes

Waste Type	European Waste Classification (EWC) Code ⁶	Waste Classification
Concrete	17 01 01	Non-hazardous
Bricks	17 01 012	Non-hazardous
Tiles and ceramics	17 01 03	Non-hazardous
Soil and Stones	17 05 04	Non-hazardous
Track ballast containing hazardous substances	17 05 07*	Hazardous
Nominally Empty Containers containing residues of or contaminated by dangerous substances	15 01 10*	Hazardous
Waste Diesel and Oil	13 07 01*	Hazardous
Waste Fuels (Miscellaneous)	13 07 03*	Hazardous
Scrap Metal	17 04 07	Non-hazardous
Gypsum-based construction material	17 08 02	Non-hazardous
Mixed construction and demolition waste	17 09 04	Non-hazardous
Electrical and electronic components	20 01 35*	Hazardous
Electrical and electronic components	20 01 36	Non-hazardous
Batteries and accumulators	20 01 33*	Hazardous
Batteries and accumulators	20 01 34	Non-hazardous
Insulation materials and asbestos-containing construction materials*	17 06 04*	Hazardous
Plastic Pipe Cut-offs	17 02 03	Non-hazardous
Plastic Packaging	15 01 02	Non-hazardous
Paper and Cardboard Packaging	15 01 01	Non-hazardous

4.2 Waste Management Targets

The Contractor will be obliged to aim for an overall recycling rate of 70% of C&D material, in accordance with EU targets under Waste Framework Directive (2008/98/EC) as well as regional

⁶ The selected European Waste Classification (EWC) codes provided are provisional only. In a number of instances more than one EWC may be considered appropriate. Care should be taken to ensure that the waste collectors permit includes all EWC codes specified in the appropriate documentation. In addition, there will be a requirement for a technically competent person to assess waste as it arises and to make a determination as to the classification of the material in accordance with the Hazardous Waste List.

waste management targets. Waste management targets for anticipated waste arisings regarding reuse / recycling / recovery and disposal rates are presented in Table 4.2 below.

Table 4.2: Waste Management Targets

Waste Type	Reuse/Recovery %	Recycling %	Disposal %
Concrete troughing	85	-	15
Non-hazardous Soils	100	-	0
Nominally Empty Containers containing residues of or contaminated by dangerous substances	100	-	-
Waste Diesel and Oil	80	20	-
Waste Fuels (Miscellaneous)	80	20	-
Scrap Metal	85	10	5
Plastic Packaging	-	85	15
Paper and Cardboard Packaging	15	85	-

The volume of fill (stone) and ballast required for construction of the proposed development is estimated for worst-case assessment purposes at approximately 52,000m³. The volume of cut for disposal offsite is estimated at approximately 40,000m³. These volumes can be reduced if cut ground can be reused on site.

Iarnrod Eireann have an operating procedure in place for the management of spent ballast. This sets out the roles and responsibilities, classification of the ballast, disposal removal and best practice measures which include the following:

- The requirement for potential assessment of spent ballast and the waste classification process should be considered at the earliest stages of the process.
- Spent ballast should ideally be classified at source, however, due to the restrictive nature of the railway corridor, it is permissible to temporarily store spent ballast at compounds while awaiting classification.
- Spent ballast should be separated at source or at a designated IE compound from other material such as vegetation, soil and other building/construction materials before undergoing waste classification sampling.
- Spent ballast which is uncontaminated should never be mixed with spent ballast that is likely to be contaminated.
- Ideally, where spent ballast from cluster worksites is stored at a hub compound, the stockpile should be labelled with the line name and mileage point from which the spent ballast was excavated from in order to differentiate between plane line and stations/sidings material.

4.3 Waste Management Costs

4.3.1 Financial Cost Associated with Waste

The total cost of implementing the CRWMP will have to consider costs such as, handling, storage, transportation, revenue from rebates and disposal costs.

4.3.2 Re-use / Recovery

Reusing of materials on site will reduce disposal costs. Clean and inert soils, gravel, stones etc. which cannot be reused on site may be classified as a by-product (under Article 27 of the 2011 Waste Directive Regulations). This material may be used as capping material for landfill sites, or for the reinstatement of quarries etc. subject to approvals by the EPA. This material is often taken free of charge for such purposes, or when used as capping in landfills will not attract the landfill tax levy, thereby reducing final waste disposal costs.

4.3.3 Recycling

All metals are salvable and can earn a rebate which can offset collection and transportation costs. Clean, uncontaminated cardboard and certain hard plastics can be recycled. Waste contractors will charge considerably less to take segregated wastes such as recyclable waste from a site than mixed waste. Timber can be recycled as chipboard. If wastes are segregated, waste contractors will charge considerably less as sorting and processing of waste reduces.

4.3.4 Disposal Charge

The total cost of waste management associated with the proposed development will be calculated in regard to the purchase costs of materials, handling costs, storage costs, transportation costs, revenue from sales, disposal costs etc. Costs will be recorded for the range of C&D materials and waste arising. At this stage, it is difficult to determine indicative total waste management costs as the CRWMP is preliminary in nature. When exact quantities and volumes of waste material cannot be determined the full disposal costs can be calculated.

A template for the recording of costs is provided in Table 4.3. This record will be live and will be developed as the project progresses.

Table 4.3: Indicative Costs Breakdown for Waste Management

Waste Type	Estimated Quantity (Tonnes)	Estimated Cost (€)
Quantity of Material	To be confirmed	To be confirmed
Purchase Cost	To be confirmed	To be confirmed
Materials Handling Costs	To be confirmed	To be confirmed
Material Storage Costs	To be confirmed	To be confirmed
Material Transportation Costs	To be confirmed	To be confirmed
Material Treatment Costs	To be confirmed	To be confirmed
Total Waste Management Cost	To be confirmed	To be confirmed
Unit Waste Management Cost	To be confirmed	To be confirmed

5 Site Management

5.1 Resource Manager

The Resource Manager will take responsibility for all aspects of waste management at the different stages of the proposed development and overall implementation of the CRWMP and associated procedures.

The Resource Manager, as appointed by the Contractor, will be technically competent and appropriately trained, and will take responsibility to ensure that the objectives and measures contained within this CRWMP are transposed into the detailed CRWMP, and are subsequently implemented including associated target re-use / recycling rates. The Resource Manager will also facilitate effective communication of the waste management objectives with all operatives associated with the project (including site staff, external contractors and suppliers).

Another key objective of the Resource Manager will be the maintenance of accurate records on the quantities of waste / surplus materials generated and the real cost (including purchasing) associated with waste generation and management. The recording of summary information will further assist the implementation of the plan.

The Resource Manager will ensure that reporting and recording requirements are met, and all necessary resources are in place to support the implementation of the plan.

5.2 Site Personnel

All site personnel will be instructed about the objectives of the CRWMP and informed of the responsibilities to effectively implement the plan. Where waste prevention, source segregation, material reuse techniques, and best practice guidelines apply, each member of staff will be given instructions on how to comply with the CRWMP.

5.3 Training

Copies of the CRWMP will be made available to all relevant personnel on site. The Resource Manager will arrange for all site personnel to receive training on the objectives of the plan and materials management. The topics to be covered will include:

- Project programme and requirements;
- Project commitments and targets;
- Health and safety requirements;
- Materials to be segregated;
- Segregation systems and protocols;
- Arrangements for the storage and handling of reusable materials and recyclables;
- Instruction on hazardous wastes and the dangers of each hazardous waste; and
- Document control requirements.

Toolbox talks on resource management will be provided on a regular basis to ensure that site personnel are aware of the resource management practices associated with their work and the appropriate control measures that are required to carry out their work in compliance with this CRWMP.

5.4 Record Keeping and Communications

A system will be developed to ensure that all details of generation, movement and treatment of C&D waste is recorded. Where practicable, a computerised monitoring tool will be employed to assist in facilitating waste reduction via benchmarking. As such, this system will enable the Contractor to measure and record the quantity of waste generated and identify wastage more readily as well as identify successes or failures as measured against performance targets. An indicative template is provided in Appendix A *Tracking Template*.

Verifiable and validated tracking and authorisation documentation will be maintained for all wastes destined for re-use, recovery, recycling, other recovery (including energy recovery), or disposal. Justification will also be provided where a disposal option has been employed.

In addition, a record will be kept of all materials as they arrive on site detailing the assignment of specific uses within the works. This will enable the monitoring of the quantity and type of waste produced at various stages throughout the project.

All waste material will be managed in accordance with the Waste Management Act 1996 (as amended) and associated Regulations e.g. all hauliers will hold waste licences and/or Certificates of Registration (COR) for the specified EWC and the appropriate local authority at the final destination. Waste will only be sent to facilities authorised to accept, treat and / or dispose of the material. Copies of all waste accreditations relevant to the waste treatment / collection will be retained with other waste records.

5.5 Communications

The Resource Manager will be responsible for internal reporting of resource statistics to IÉ and the Contractor management. This will include performance relative to agreed targets and objectives which will be included as an agenda item at site meetings.

The Resource Manager will engage with Cork County Council and the EPA on any site inspection or enforcement audits undertaken at the site. All follow-up actions and corrective actions will be logged and reported to Cork County Council, as appropriate.

The Resource Manager will engage with other stakeholders (the public, etc.) as appropriate in relation to the resource management on site.

Upon completion of construction, the Resource Manager will prepare a final report summarising the outcomes of resource management processes adopted, the total reuse and recovery figures and the final destinations of all resources taken off-site. This report will be issued to IÉ, Contractor management and Cork County Council.

5.6 Waste Auditing

The effectiveness of the plan, and its implementation, will be subject to regular audits by the Resource Manager throughout the duration of the project. The purpose of the waste audit is to highlight the problems that waste can cause and the benefits of prevention and minimisation.

The audits will focus on material inputs to the project (assignment of materials to specific uses within the works) and the waste outputs for each operation, identifying additional opportunities for waste reduction, re-use and recycling. The audits will also investigate the operational factors and management policies that contribute to the generation of waste and identify appropriate corrective actions, where necessary.

The audit findings will reflect the success or failure of reaching performance targets and subsequent Action Plans will be developed to address any issues and highlight corrective actions that may be taken in relation to management policies or site practices in order to bring

about further waste reductions. Inspections of the waste storage areas will be undertaken on a weekly basis, issues relating to housekeeping, inappropriate storage and / or segregation will be actioned at the earliest practicable opportunity.

6 Site Infrastructure

This section relates to on-site signage, separation, and storage for handling and managing of waste and resources.

Prior to construction, the site layout will be reviewed by IÉ to ensure that the proposed Waste Storage Areas (WSAs) have adequate space for storage and handling.

WSAs include stockpiles, skips or secure containers for hazardous materials. All WSAs will be assessed as fit for purpose and suitably contained, or banded as required.

The WSA will be set out to reduce any potential impact on sensitive human or natural environments and a suitable buffer will be applied to mitigate any impact.

Labelling and signage will be used onsite to inform personnel of key WSA requirements and restrictions, with clear signage provided on all WSAs.

Signage will provide information to assist good resource practice across the site.

Appendices

A. Tracking Template

Table A.1: Waste Tracking Template

[illegible]

B. Traffic Management Plan



Glounthaune-Midleton Twin Track Project

Construction Traffic Management Plan

September 2022

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1 Introduction

The Construction Traffic Management Plan (CTMP) is targeted at minimising disruption and enhancing safety in traffic operations during the construction phase of the Glounthaune-Midleton Twin Track project (hereafter referred to as the proposed development). It incorporates measures which will specifically mitigate transport impacts identified in the Roads and Traffic chapter of the Environmental Impact Assessment Report (EIAR).

1.1 General

The CTMP has been developed in support of the proposed development. The CTMP provides details of proposed traffic management measures and associated interventions to be implemented during the construction phase of the proposed development to minimise disruption and enhance safety.

Mott MacDonald produced the EIAR Chapter 15: Traffic and Transport to support the Environmental Impact Assessment (EIA) process for the Project. It was identified through the EIA process that a CTMP would be required.

The CTMP will remain a 'live' document which will be updated in response to any relevant conditions of the Approval, and to reflect the detailed design of the Approved development – in collaboration and agreement with the relevant Roads Authorities, primarily Cork County Council. It will be reviewed regularly and revised as necessary to ensure that the measures implemented are effective.

1.2 Glounthaune-Midleton Twin Track Project

The CTMP considers anticipated development traffic movements on public roads directly within the proposed development study area along with other public roads likely to be used for construction access. These have been set out in Chapter 15 – Traffic and Transport of the EIAR, submitted with the application for Approval of the proposed development.

There are five construction compounds and the categorised compound locations (referenced by measured chainage distance of railway centreline from 50m east of the end of the station carpark. See Figure 1-1.) are:

- Compound at chainage 1200m;
- Compound at chainage 2340m;
- Compound at chainage 6600m;
- Compound at chainage 9800m; and
- Compound at chainage 9900m.

The compound at chainage 9800m is only for machinery access, with the main compound being the compound at 9900m.

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Figure 1-2 indicates the sites in a local context.

[illegible]

September 2022

1.3 Structure of this Report

The report is sub-divided into the following Sections:

- **Section 2** outlines the background context attributed to the project
- **Section 3** lists the proposed traffic management mitigation measures over the course of the construction phase of the project
- **Section 4** presents the measures to monitor and implement the CTMP
- **Section 5** provides a summary statement for the CTMP

2 Construction Traffic

2.1 Construction Programme

Construction is expected to commence in Q4 2023 with a scheduled duration of 36 months. The construction programme is presented in EIAR Chapter 6.

2.2 Construction Traffic

The wide geographic spread of the proposed development necessitates that construction related traffic will utilise several public roads in the Cork County Council area. The access routes utilised will depend upon the origination of the journey.

The construction traffic movements will comprise construction workers and Heavy Good Vehicles (HGV) carrying construction material / plant.

It is planned that sleepers and rails will be brought to site using rail haulage.

Subject to the grant of statutory approvals, it is anticipated that proposed works will commence in Q4 2023 and will take approximately 36 months to complete. Indicative durations for the proposed works are detailed in Table 2.1.

Table 2.1: Indicative Construction Schedule

Phase	Revised timeline
1. Pre-construction works	Q4 2023
2. Enabling works	Q1 2024
3. Earthworks, drainage and track sub-base	Q2 2024 – Q3 2025
4. Track realignment and construction	Q2 2025 – Q1 2026
5. Signalling works	Q4 2024 – Q2 2026
6. Commissioning	Q1 2026 – Q2 2026

It is estimated that the peak of construction activities will occur from Q2 2024 to Q1 2026 and will be associated with phase three and phase four; the earthworks phase and the track construction phase. The whole construction period runs from Phase 1 in Q4 2023 to Q2 2026.

Construction will occur between 0700 and 1900 Monday to Sunday, outside the operational railway footprint. Works within the operational railway footprint will be undertaken between 1900 and 0700 daily. Construction workers will generally arrive and depart outside the traditional peak hours associated with the surrounding road network. Most of these movements will be undertaken by car or van, termed as Light Goods Vehicle (LGV) movements, and will most likely include carpooling; generally, these movements will be undertaken outside of network peak periods and thus the impact of LGV traffic on the network is negligible.

The predicted number of HGV traffic movements (note: one trip = two movements; i.e., one delivery and one return journey) generated by construction activity are summarised in Table 2.2

Table 2.2: Vehicle Movements Summary

Site	Total HGV Movements	Peak Total HGV Movements per Day
Compound at chainage 1200m	7198	60
Compound at chainage 2340m	9575	60

Site	Total HGV Movements	Peak Total HGV Movements per Day
Compound at chainage 6600m	9609	40
Compound at chainage 9800m	1928	10
Compound at chainage 9900m	7010	39
Total	36,540	

Source: Mott MacDonald

As indicated in Table 2.2 the total HGV traffic generated by the proposed development is estimated to be 36,540 movements, spread over the approximate 36 months construction period whereby traffic will impact the roads. Peak HGV traffic activity will occur during phase three and four of the works.

It will be necessary to close Castle Rock Avenue to through traffic to facilitate upgrading works to the level crossing (Water Rock CCTV XY009). It is expected that the closure will last for 16 weeks with diversions via Ballyrichard More, the R626 and N25.

2.2.1 Abnormal Load Deliveries

No abnormal loads are anticipated to be required.

2.2.2 Construction Access and Public Road Impacts

2.2.2.1 Construction Compounds

HGV construction traffic and construction personnel (travelling by car mini-bus or small van) will access each of the four compounds via the N25 from either the east or west.

The number of construction personnel required during the construction phase is expected to peak at approximately 125 persons. It is assumed that staff will travel to site via a combination of public transport, cycle, minibus, and private passenger vehicles (in some cases accommodating more than one occupant). The construction compounds will contain portacabins for offices and welfare facilities, parking for construction staff and material stockpiles.

Space to accommodate large vehicle manoeuvring and laydown will be provided within the curtilage of the compounds. Accordingly, no construction-related vehicles associated with the proposed development at a compound will be required to park on local public roads. This will be advised to all construction personnel before the commencement of works and reinforced via 'toolbox talks'.

Apart from site signage, there are no works envisaged being required on the public road network to facilitate the work at each compound. Proposed construction routes to and from each compound are shown in Table 2-3.

Table 2-3: Construction Routes

Compound Reference and Route Description

To Compound 1 at chainage 1200m from the west on the N25

Route:

- N25 (J2)
- L3004 (N25 (J2) to Compound 1)
- Compound 1 opposite The Elm Tree



From Compound 1 at chainage 1200m towards the west on the N25

Route:

- Compound 1 opposite The Elm Tree
- L3004 (Compound 1 to N25 (J2))
- N25 (J2)



To Compound 1 at chainage 1200m from the east on the N25

Route:

- N25 (J3)
- L3004 (N25 (J3) to Compound 1)
- Compound 1 opposite The Elm Tree



Compound Reference and Route Description

From Compound 1 at chainage 1200m towards the east on the N25

Route:

- Compound 1 opposite The Elm Tree
- L3004 (Compound 1 to N25 (J3))
- N25 (J3)



To Compound 2 at chainage 2340m from the west on the N25

Route:

- N25 (J3)
- L3004 (N25 (J3) to Fota Retail and Business Park)
- Compound 2 at Fota Retail and Business Park



Compound Reference and Route Description

From Compound 2 at chainage 2340m towards the west on the N25

Route:

- Compound 2 at Fota Retail and Business Park
- L3004 (Fota Retail and Business Park to N25 (J3))
- N25 (J3)



To Compound 2 at chainage 2340m from the east on the N25

Route:

- N25 (J3)
- L3004 (N25 (J3) to Fota Retail and Business Park)
- Compound 2 at Fota Retail and Business Park



Compound Reference and Route Description

From Compound 2 at chainage 2340m towards the east on the N25

Route:

- Compound 2 at Fota Retail and Business Park
- L3004 (Fota Retail and Business Park to N25 (J3))
- N25 (J3)



To Compound 3 at chainage 6600m from the west on the N25

Route:

- N25
- L7642 Private Access (c. 200m north of N25 junction)

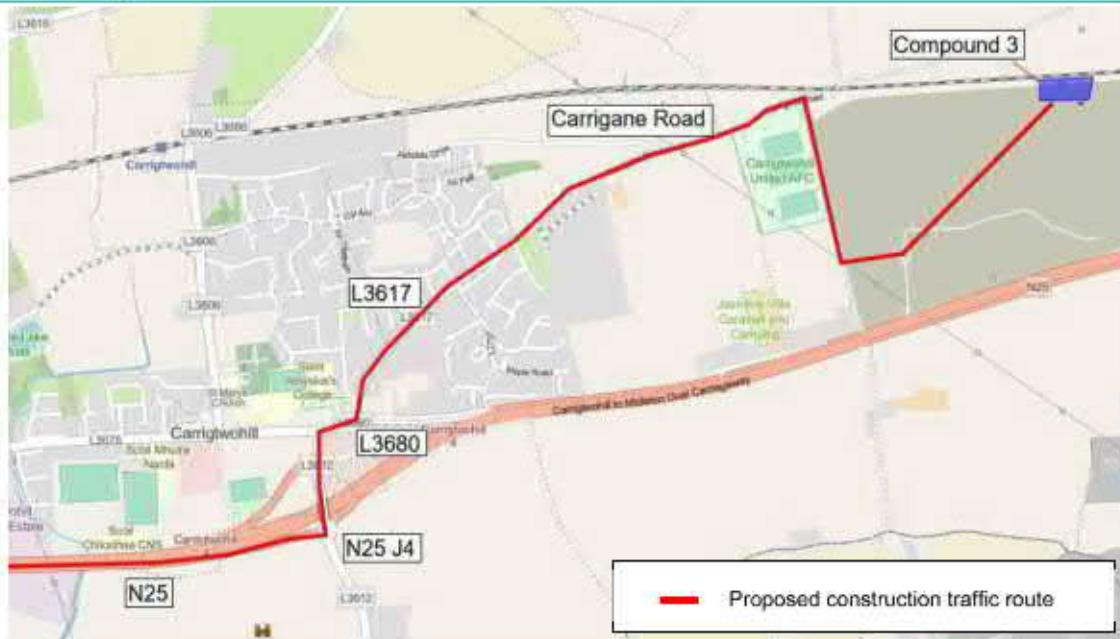


Compound Reference and Route Description

From Compound 3 at chainage 6600m towards the west on the N25

Route:

- Private Access Track from Compound 3
- L7642 (between Private Access and Carrigane Road)
- Carrigane Road/L3617 (between L7642 and L3680)
- L3680 (between L3680 and L3612)
- N25 (J4)



To Compound 3 at chainage 6600m from the east on the N25

Route:

- N25 (J4)
- L3612/L3680 ('U' turn via N25 (J4))
- L7642 Private Access (c. 200m north of N25 junction)



Compound Reference and Route Description

From Compound 3 at chainage 6600m towards the east on the N25

Route:

- Private Access Track from Compound 3
- L7642 Private Access (c. 200m north of N25 junction)



To Compound 4 at chainage 9800m from the west on the N25

Route:

- N25 (J5)
- R907 (between N25 (J5) and L3288)
- L3288/L3822 (to Compound 4 via private access)



Compound Reference and Route Description

From Compound 4 at chainage 9800m to the west on the N25

Route:

- L3288/L3822 (from Compound 4 via private access)
- R907 (between L3288 and N25 (J5))
- N25 (J5)



To Compound 4 at chainage 9800m from the east on the N25

Route:

- N25 (J5)
- R907 (between N25 (J5) and L3288)

L3288/L3822 (to Compound 4 via private access)



Compound Reference and Route Description

From Compound 4 at chainage 9800m towards the east on the N25

Route:

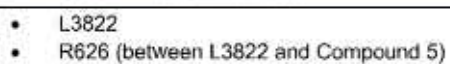
- L3288/L3822 (from Compound 4 via private access)
- R907 (between L3288 and N25 (J5))
- N25 (J5)



To Compound 5 at chainage 9900m from the west on the N25

Route:

- N25 (J5)
- R907 (between N25 (J5) and L3288)
- L3288



Compound Reference and Route Description

From Compound 5 at chainage 9900m to the west on the N25

Route:

- R626 (between L3822 and Compound 5)
- L3822
- L3288
- R907 (between N25 (J5) and L3288)
- N25 (J5)



To Compound 5 at chainage 9900m from the east on the N25

Route:

- N25 (J5)
- R907 (between N25 (J5) and L3288)
- L3288
- L3822
- R626 (between L3822 and Compound 5)



Compound Reference and Route Description

From Compound 5 at chainage 9900m to the east on the N25

Route:

- R626 (between L3822 and Compound 5)
- L3822
- L3288
- R907 (between N25 (J5) and L3288)
- N25 (J5)



Source: Mott MacDonald/OpenStreetMap



Specific traffic management requirements and localised arrangements will be developed by the appointed contractor(s) and will be agreed upon in advance of implementation with the appropriate reviewing authority.

2.2.2.2 Castle Rock Avenue

It will be necessary to close Castle Rock Avenue to through traffic to facilitate level crossing upgrading works to Water Rock CCTV XY009. It is expected that the closure will last for 16 weeks from December 2025 to March 2026. The additional length of the diversion route would be 6.7km and would typically add 6 minutes travel time onto journeys previously utilising Castle Rock Avenue (assuming the level crossing barriers were open).

Table 2-4 shows the planned diversion due to the temporary closure of the Water Rock level crossing on Castle Rock Avenue.

Table 2-4: Castle Rock Avenue Diversion

Section Name and Route Description
<p>Diversion for traffic going north on Castle Rock Avenue</p> <p>Route:</p> <ul style="list-style-type: none"> • N25 (Castle Rock Avenue to J5) • L3612 • L3680 (between L3612 and L3617) • L3617 (to Castle Rock Avenue)

<p>Diversion for traffic going south on Castle Rock Avenue</p> <p>Route:</p> <ul style="list-style-type: none"> • L3617 (Castle Rock Avenue to L3680) • L3680 (between L3617 and N25) • N25 (to Castle Rock Avenue)


Source: Mott MacDonald/OpenStreetMap

Specific traffic management requirements and localised arrangements will be developed by the appointed contractor(s) and will be agreed upon in advance of implementation with the appropriate reviewing authority.

3 Measures Identified to Minimise and Mitigate Traffic Impacts

3.1 General

Local vehicle routes have been reviewed, with the principal aim being to minimise disruption to local communities and users of the N25 and local traffic routes.

There are several traffic management measures proposed to mitigate potentially disruptive impacts associated with construction traffic. These measures are hereafter described.

3.1.1 Time Control

It is anticipated that the proposed development will operate a 7-day working week with operations/deliveries typically being undertaken between 0700 and 1900 Monday to Sunday, outside the operational railway footprint. If works generating road traffic are to be undertaken outside these hours, then prior notification will be provided, and agreement sought from Cork County Council. Works within the operational railway footprint will be undertaken between 1900 and 0700 daily.

The appointed contractor will plan and manage deliveries and collections from each compound to minimise potential disruption on the surrounding road network to minimise the impact on the local community's day-to-day life within peak traffic hours.

The appointed contractor will liaise with Cork County Council upon finalisation of the construction programme to ensure (as far as is reasonably practicable) that no conflict with planned road works in the vicinity of each compound occurs so as not to impact motorists further.

Deliveries will be scheduled, as far as is reasonably practicable, to avoid network peak hours and passing by schools around typical drop-off and pick-up times. Where practically achievable, diversion routes will not apply outside of the compound's hours of operation.

Accordingly, the appointed contractor will discuss and agree with Cork County Council on times to be avoided at schools and other community receptors at peak periods of the construction programme to minimise disruption.

The appointed contractor will liaise with Cork County Council regarding local events dates and seek to avoid traversing affected route sections at agreed times.

3.1.2 Diversion Routes

At the location where local road diversions would be implemented (due to construction activity) all reasonable and practically achievable measures will be implemented to facilitate local access requirements for emergency services, residential and commercial purposes.

Once the construction programme, construction methodologies and associated compound layout requirements are firmly established, there will be a process of approvals for signage and information provision regarding essential traffic diversions. These will be discussed and agreed upon with Cork County Council and other authorities as required. When a road closure is required, the procedure set out in Section 75 of the Roads Act 1993 will be followed and the proposed diversion route will be approved by the relevant Road Authority.

When a closure is required, there will be a provision for a diversion route suitable to accommodate the types and volumes of traffic. Diversion route signage will be clear and consistent, guiding the traffic through each decision point until it re-joins the route from which it was diverted.

Diversion routes will be maintained in a satisfactory condition throughout the period of the diversion. Figure 3-1 below shows some examples of diversion signage and is not exhaustive.

Figure 3-1: Temporary Traffic Measures and Signs for Roadworks



Source: 'Temporary Traffic Measures and Signs for Roadworks'. Traffic Signs Manual Chapter 8 (August 2019). Department of Transport, Tourism and Sport.

An indication of the location of and potential implications of diversions are set out in **Table 2-4** of the CTMP. Confirmed diversion routes will be agreed before construction between the appointed contractor and relevant authorities.

3.1.3 Transportation Protocol

All contractors will adhere to the agreed CTMP and any agreed conditions imposed by Cork County Council.

All construction vehicles associated with the proposed development will:

- Display a unique identification number shown on a plate clearly visible.
- Be securely sealed.
- Record origin, destination, and route of the vehicle.
- Not leave in convoy.
- Ensure all vehicle identifications including registration plates on the vehicle are clearly visible.

On route to and from their destinations drivers of all construction vehicles will:

- Access their destination compound via an approved route; this is to be determined by the approved contractor in conjunction with the administering local authority.

- Strictly observe speed limits.
- Drive in a safe and courteous manner with due care and consideration for other road users both vehicular and pedestrian.
- Be aware and alert whilst driving through towns and villages particularly at school times.
- Strictly adhere to the hours of operation detailed by the TMP.
- Not deliberately wait or stack on any public road.

The appointed contractor will maintain a management system whereby the following records are kept and are available to Cork County Council:

- The number of vehicles arriving and leaving their destination.
- All complaints received regarding transport and resultant action taken.
- All instances where a protocol has been breached and resultant action taken.

The appointed contractor will supply the following information to Cork County Council, which will be treated in confidence:

- Action to be taken when a protocol is breached; and
- A log of vehicle movements.

3.1.4 Wheel Wash and Road Cleaning / Sweeping

To reduce the potential for mud and other debris being deposited onto the local road network, a wheel washing facility will be installed on-site, at each compound, during the construction period. This would minimise the amount of deleterious material deposited on the road surface and the appointed contractor will ensure that the nearest public road (between the compound and the N25) will be kept clear of debris by monitoring and then utilising a road sweeper where necessary.

3.1.5 Speed Restrictions

All construction personnel, including contractor managed HGV drivers, will be briefed on the absolute requirement to adhere to posted speed limits on public roads through induction sessions and through regular briefings (toolbox talks). Other parties responsible for site deliveries will also be instructed per the requirement for compliance with posted speed limits on all roads.

Speed limits posted within compounds will be considered mandatory and, therefore will be complied with.

3.1.6 Temporary Signage

During the construction phase, signage will be installed to warn road users to the presence of the works access and the associated likely presence of large or slow-moving construction traffic.

General information signage will be installed to inform road users and local communities of the nature and location of the works, including contact details should they require additional information.

Indicative signage for use on these routes is illustrated in **Figure 3-2**.

Figure 3-2: Indicative Warning Signs



Source: Mott MacDonald

Temporary signage will be formally agreed with Cork County Council prior to installation and commencement of construction. All signing will also be provided in accordance with Traffic Signs Manual.

3.1.7 Temporary Traffic Lane Closures

To safely accommodate works on sections of Castle Rock Avenue, the road will need to be closed and diversions required, see Section 2.2.2.2 for diversion routes.

The contractor will request permission from the relevant Authority prior to installation of any potential traffic management. All necessary signing will be provided in accordance with Traffic Signs Manual.

3.1.8 Public Transport

The appointed contractor will discuss with Cork County Council and local bus operators regarding matters that could affect the flow of buses and, will implement reasonable and practically achievable measures to mitigate any disruption to bus services and inconvenience to service users.

Public Transport services that may be affected by local traffic management are listed below in Table 3-1.

Table 3-1: Public Transport services that utilise road sections affected by construction activity

Service Number	Route Summary	Service Operator	Weekday Frequency (Mon-Fri) (Two-way)	Weekend Frequency (Two-way)	Railway or Road Closure	Diversion	Construction Access
40	Tralee – Rosslare Europort via Cork	Bus Éireann	Between 08:00 and 21:00 (between Cork and Waterford City); 26 services	Saturday: between 08:00 and 21:00 (between Cork and Waterford City); 26 services Sunday: between	-	-	✓

Service Number	Route Summary	Service Operator	Weekday Frequency (Mon-Fri) (Two-way)	Weekend Frequency (Two-way)	Railway or Road Closure	Diversion	Construction Access
				09:00 and 21:00 (between Cork and Waterford City): 22 services			
240	Cork Bus Station - Ballycotton	Bus Éireann	Between 06:00 and 17:45: four services	Saturday: between 08:50 and 15:30: three services	-	-	✓
241	Cork Bus Station - Trabolgan	Bus Éireann	Between 07:15 and 18:00: nine services	Saturday: between 11:00 and 18:40: three services	-	-	✓
260	Cork Bus Station - Ardmore	Bus Éireann	Between 07:00 and 23:00: seven services	Saturday: between 07:55 and 23:00: five services Sunday: between 10:30 and 23:00: four services	-	-	✓
261	Cork Bus Station - Ballinacurra	Bus Éireann	Between 07:20 and 22:50: 31 services	Saturday: between 08:25 and 22:50: 20 services Sunday: between 07:50 and 22:05: 16 services	-	-	✓
Rail Service	Midleton - Cork	Irish Rail	Between 05:45 and 22:45: 44 services.	Saturday: between 05:45 and 22:45: 36 services. Sunday: between 08:15 and 20:45: 17 services	✓	-	-

Source 1: <https://www.transportforireland.ie/getting-around/by-bus/route-maps/> , <https://www.buseireann.ie/>, <https://www.irishrail.ie/en-ie/train-timetables/timetables-by-route>

It is likely that the railway line will be closed for a period of four months commencing in Q1 2026. Rail replacement bus services will be used to accommodate passengers. Table 3-2 shows the assumed rail replacement bus route.

Table 3-2: Rail Replacement Bus Routes

Section Name and Route Description
Bus service eastbound (Glounthaune Station to Carrigtwohill Station to Midleton Station) Route: <ul style="list-style-type: none">• L3004 (From Glounthaune Station)• L3678• L3606• L3680• N25 (to J5)• R907• R626
Bus route westbound (Midleton Station to Carrigtwohill Station to Glounthaune Station) Route: <ul style="list-style-type: none">• R626• R907• N25 (J5 to J4)• L3612• L3606• L3678• L3004 (To Glounthaune Station)

Source: Mott MacDonald/OpenStreetMap

3.1.9 Pedestrian, Cyclist or Equestrian Routes

Appropriate signage advising of dates and hours of working will be installed on the pedestrian, cyclist, and recreational routes, among others, in advance of road crossing points to warn users of construction traffic:

Table 3-3: Pedestrian, cyclist or equestrian routes that may be affected by local traffic management

Route Type	Description	Location	Existing/Proposed	Road Closure	Diversion	Construction Access
Cycling	Inter-Urban Route (IU-1): Glounthaune to Midleton. Construction between Glounthaune between Fitzpatrick's shop and the Elm Tree restaurant completed in July 2021. Public consultation opened for Carrigtwohill to Midleton Phase 1 in November 2021.	Glounthaune to Midleton	Proposed	-	-	✓
Cycling	CT-U8 along Western Distributor Road (Cork Road)/ Kilahora Road, connecting Old N28 to Fota Retail Park. Currently in public consultation.	Carrigtwohill	Proposed	-	-	✓
Cycling	CT-U6 along Main Street/ Western Distributor Road (Cork Road), from intersection with Maryville Estate to the IDA Business Park. Currently in public consultation.	Carrigtwohill	Proposed	-	-	✓
Cycling	CT-U9 along Main Street/Midleton Road, from the western end of Main Street to	Carrigtwohill	Proposed	-	-	✓

Route Type	Description	Location	Existing/Proposed	Road Closure	Diversion	Construction Access
	Fota Rocks Estate. Currently in public consultation.					
Cycling	CT-U14 along New Link, from Castlelake Road to Station Road.	Carrigtwohill	Existing	-	-	✓
Cycling	CT-U4 along Cul Ard, from Station Road to Carrigane Road	Carrigtwohill	Existing	-	-	✓
Cycling	CT-U3 along Fota Rock Estate from Midleton Road to Carrigane Road.	Carrigtwohill	Existing	-	-	✓
Cycling/Walking	M-U2 Northern Relief Road, between Cork Road to Mill Road	Midleton	Existing	-	-	✓
Cycling	M-GW3 along the Owenacurra River Greenway, between Water Rock Master Plan area to Gyratory. Currently in public consultation.	Midleton	Proposed	-	-	✓
Cycling	M-GW2 from Midleton to Youghal Greenway. Currently scheduled to be opened in 2023.	Midleton to Youghal	Existing (will be completed prior to construction of proposed development)	-	-	✓

Indicative signage for use at these locations is illustrated in **Figure 3-3**. The exact details and location of the signage would be agreed with Cork County Council.

Figure 3-3: Recreational Routes Warning Signage



Source: Mott MacDonald

3.1.10 Parking for Vehicles of Site Personnel, Operatives and Visitors

To minimise inconvenience to the local community in terms of obstructive parking, adequate car parking for permanent site personnel, visitors and deliveries will be provided within the site compounds. Adequate vehicle parking space will be provided on-site, and car parking will not be permitted on any public road network adjacent to the site so that sight lines would be maintained and to minimise the potential for obstruction and delay for other road users. The requirement for construction personnel not to park their private vehicles on public roads will be a mandated requirement and advised to all construction personnel prior to commencement of works and reinforced via 'toolbox talks'.

Vehicle sharing will be promoted to construction personnel by the contractor during the induction process.

4 CTMP Implementation and Monitoring

4.1 General

The implementation of the CTMP will be the responsibility of the appointed contractor who will also be responsible for monitoring the Plan. Further evolution of the CTMP will likely be required during the detailed proposed development planning stages and during the construction period itself.

The appointed contractor could employ several sub-contractors, and all in such cases sub-contractors' activities will fall under the requirements of the CTMP and therefore sub-contractor personnel and sub-contractor managed construction vehicle drivers will have an obligation to adhere to the CTMP. This obligation will form part of the procurement process and will be written into any relevant employment or commissioning contract.

Compliance will be monitored by the Project Manager, on behalf of the appointed contractor, via spot checks to ensure that vehicles follow the measures in the CTMP and record any complaints. The appointed contractor will stipulate that all contractors circulate these rules to their sub-contractors.

Non-compliance with the CTMP will constitute a breach of contract, and action will be taken against the contractor or supplier should repeated non-compliance continue. Details of the proposed monitoring and enforcement regime will be supplied to Cork County Council upon request.

4.2 Responsibilities

The appointed contractor will nominate a person responsible for the coordination of all elements of traffic and transport during the construction process, a nominated Liaison Officer. The Liaison Officer will be the direct point of contact for the developer organisation with the local community. Accordingly, local residents and business holders can contact the Liaison Officer for information purposes or discuss specific matters about traffic management or site operation.

Contact details for the Liaison Officer will be made available to relevant parties and more generally to the local community prior to commencement of works on-site.

The appointed contractor (or their appointed agent) will review the number of site personnel, traffic numbers, and the construction programme as the proposed development progresses. Any proposed or unplanned substantive changes will be discussed and agreed with Cork County Council as far as is reasonably practicable.

As necessary, meetings would be held with Cork Council and the appointed contractor to discuss the CTMP and to discuss any relevant issues raised by the local community.

4.3 Transport Co-ordination

The appointed contractor will be responsible for the co-ordination of all elements of HGV transport to and from the compounds. The appointed contractor (or their appointed agents) will be responsible for co-ordination and liaison with sub-contractors, Cork County Council, TII, emergency services and the local community.

The Liaison Officer will inform Cork County Council (or agents thereof) of any important matters that could affect traffic movement through reports issued at regular intervals or by day-to-day reports of any substantial, essential changes to transport plans necessitated by circumstances.

4.4 Communication and Consultation

As indicated above, the appointed contractor will nominate a Liaison Officer to act as a point of contact with the local community. The Liaison Officer would be responsible for keeping the local community informed of progress on the site and communicating upcoming activities which could give rise to increased construction vehicle movements.

The Liaison Officer will be able to attend Community Council meetings to provide a report and to be on hand to answer any questions that the local community may have. Contact details will be provided for the Liaison Officer (telephone number and email address) and will be made available locally so that members of the public have an opportunity to ask questions and provide feedback.

The appointed contractor will utilise local media channels to circulate information regarding traffic management.

Signs will be erected at access points to construction compounds to provide contact details of the appointed contractor's Project Manager. These contact details will also be provided directly to the emergency services.

4.5 Liaison with Other Construction Sites

It is recognised that the construction period associated with the proposed development could coincide with the construction of other proposed developments whereby construction related traffic will travel through the same area and use the same public roads.

If the construction phase of any notably sized development(s) appears likely to overlap with the proposed development, the appointed contractor will seek to liaise with the appropriate developer organisation regarding the scheduling of deliveries to identify potential means of reducing the effects of combined construction.

4.6 CTMP Review

The CTMP, as a 'live document' will be reviewed on a regular basis by the appointed (as needed, in tandem with the appointed contractor(s) prior to and during the project construction phase. The CTMP, during the project's evolution, will be subject to change to enable the most effective and suitable measures for implementation and where needed, approved by Cork County Council.

5 Summary Statement

5.1 Summary

The CTMP represents a commitment to satisfy reviewing Authority requirements and sets out proposed traffic management and contingency planning measures to enhance road safety and limit adverse effects of construction traffic on the existing road network and the communities it serves.

It is anticipated that once the contractors are appointed, further useful information would become available, including a finalised construction programme. Such details would be submitted to Cork County Council for information and/or agreement as appropriate.



