

Jacobs

Cork Line Level Crossings
Volume 1, Non-Technical Summary
Iarnród Éireann

March 2021



Cork Line Level Crossings

Project No: 32111000
Document Title: Volume 1, Non Technical Summary
Document No.: 1
Revision: A03
Date: March 2021
Client Name: Iarnród Éireann
Project Manager: Alex Bradley
Author: Heidi Curran

Jacobs U.K. Limited

Artola House
 3rd & 4th Floors
 91 Victoria Street
 Belfast
 BT1 4PN
 T +44 (0)28 9032 4452
 F +44 (0)28 9033 0713
www.jacobs.com

© Copyright 2020 Jacobs Engineering Ireland Ltd. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright.

Limitation: This document has been prepared on behalf of, and for the exclusive use of Jacobs' client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this document by any third party.

Document history and status

Revision	Date	Description	Author	Checked	Reviewed	Approved
A01	May 2020	First Draft for Client Review	HC	GG/RM	GG/RM	AB
A02	December 2020	For Legal Review	LMG	HC/RM	HC/RM	AB
A03	March 2021	For Issue to An Bord Pleanála	LMG	HC/RM	HC/RM	AB

Contents

1. Introduction..... 1

1.1 Project Overview..... 1

1.2 Environmental Impact Assessment Report & Non Technical Summary 1

1.3 Structure of the EIAR and Supporting Documents..... 2

1.4 Other Assessments..... 3

1.5 Consultation..... 3

1.6 Purchase of Documents 5

1.7 Written Submissions 6

2. Project Need & Alternatives 7

2.1 Project Need 7

2.2 Alternatives 8

3. Project Description 10

3.1 Introduction 10

3.2 Existing Conditions..... 10

3.3 Proposed Project..... 11

3.4 Proportionality of Scheme 12

4. EIA Process & Method 13

4.1 Introduction 13

4.2 Legislation 13

4.3 Environmental Impact Assessment Process..... 13

4.4 Generic Methodology..... 13

4.5 Mitigation Measures 14

4.6 Monitoring 14

5. National, Regional and Local legislation, Policies and Transport Programmes 15

5.1 Introduction 15

5.2 Legislation 15

5.3 National Plans and Policies..... 15

6. XC187 Fantstown..... 16

6.1 Population and Human Health..... 16

6.2 Biodiversity..... 16

6.3 Soils, Geology & Hydrogeology..... 17

6.4 Water..... 17

6.5 Noise and Vibration..... 17

6.6 Traffic & Transport..... 18

6.7 Cultural Heritage..... 19

6.8 Landscape and Visual..... 19

6.9 Air Quality 19

7. XC201 Thomastown 21

7.1	Population and Human Health.....	21
7.2	Biodiversity.....	21
7.3	Soils, Geology & Hydrogeology.....	23
7.4	Water.....	24
7.5	Noise and Vibration.....	24
7.6	Traffic & Transport.....	25
7.7	Cultural Heritage.....	26
7.8	Landscape.....	27
7.9	Air Quality.....	28
8.	XC209 Ballyhay.....	30
8.1	Population and Human Health.....	30
8.2	Biodiversity.....	30
8.3	Soils, Geology & Hydrogeology.....	31
8.4	Water.....	32
8.5	Noise and Vibration.....	32
8.6	Traffic & Transport.....	33
8.7	Cultural Heritage.....	34
8.8	Landscape.....	34
8.9	Air Quality.....	35
9.	XC211 Newtown and XC212 Ballycoskery.....	36
9.1	Population and Human Health.....	36
9.2	Biodiversity.....	36
9.3	Soils, Geology & Hydrogeology.....	38
9.4	Water.....	39
9.5	Noise and Vibration.....	40
9.6	Traffic & Transport.....	40
9.7	Cultural Heritage.....	41
9.8	Landscape.....	42
9.9	Air Quality.....	44
10.	XC215 Shinanagh.....	46
10.1	Population and Human Health.....	46
10.2	Biodiversity.....	46
10.3	Soils, Geology & Hydrogeology.....	47
10.4	Water.....	48
10.5	Noise and Vibration.....	49
10.6	Traffic & Transport.....	50
10.7	Cultural Heritage.....	51
10.8	Landscape & Visual.....	52
10.9	Air Quality.....	53

11. XC219 Buttevant.....	54
11.1 Population and Human Health.....	54
11.2 Biodiversity.....	54
11.3 Soils, Geology & Hydrogeology.....	56
11.4 Water.....	57
11.5 Noise and Vibration.....	58
11.6 Traffic & Transport.....	59
11.7 Cultural Heritage.....	59
11.8 Landscape & Visual.....	60
11.9 Air Quality.....	61
12. All Sites: Resource Use & Waste and Cross-cutting Themes.....	63
12.1 Introduction.....	63
12.2 Chapter 14 - Resource Use and Waste Management.....	63
12.4 Chapter 16 Cross Cutting Themes.....	64
13. Interactions and Cumulative Impacts.....	68
14. Conclusion.....	70
Table 1.1 NTS Figures.....	2
Table 1.2 Structure of the EIAR.....	2
Table 1.3 Key Stakeholder meetings.....	3
Table 2.1: Relevant Project History.....	8
Table 2.2 Summary results at each site.....	9
Table 2.3 MCA Summary results.....	9
Table 3.1 Level Crossings.....	10
Table 3.2 Key Infrastructure Elements of proposed Project.....	11
Inset Figure 1. 1: Locations of the 7 no. Level Crossings.....	1
Inset Figure 2. 1: Steps in the Options Appraisal Process.....	8
Inset Figure 4. 1: The EIA Process (EPA 2017).....	13
Inset Figure 4. 2: Determining Significance (EPA, 2017).....	14
Inset Figure 7. 1: XC201 Viewpoints.....	27
Inset Figure 9. 1: Viewpoints XC211 Newtown.....	43
Inset Figure 9. 2: Viewpoints XC212 Ballycoskery.....	43
Inset Figure 10. 1: XC215 Shinanagh Viewpoints.....	52
Inset Figure 11. 1: XC219 Buttevant Viewpoints.....	61
Inset Figure 12. 1: Extraction Non-Metallic Minerals.....	63
Inset Figure 12. 2: Waste Arisings by Type.....	63
Inset Figure 12. 3: Waste Hierarchy.....	64

Appended Figures

NTS Figure	Level Crossing	Title
NTS Figure 1	All	Overall Project Context Plan
NTS Figure 2	XC187- Fantstown	Site Location
NTS Figure 3	XC187 - Fantstown	Site Layout
NTS Figure 4	XC201- Thomastown	Site Location
NTS Figure 5A	XC201- Thomastown	Site Layout
NTS Figure 5B	XC201 Thomastown	Site Layout
NTS Figure 6	XC201- Thomastown	Elevation
NTS Figure 7	XC209- Ballyhay	Site Location
NTS Figure 8	XC209- Ballyhay	Site Layout
NTS Figure 9	XC209-Ballyhay	Elevation
NTS Figure 10	XC211-Newtown	Site Location
NTS Figure 11A	XC211 Newtown	Site Layout
NTS Figure 11B	XC211 Newtown	Site Layout
NTS Figure 12	XC211 Newtown	Elevation
NTS Figure 13	XC212 Ballycoskery	Site Location
NTS Figure 13A	XC212 Ballycoskery	Site Layout
NTS Figure 13B	XC212 Ballycoskery	Site Layout
NTS Figure 14A	XC212 Ballycoskery	Sections
NTS Figure 14B	XC212 Ballycoskery	Sections
NTS Figure 15	XC215 Shinanagh	Site Location
NTS Figure 16A	XC215 Shinanagh	Site Layout
NTS Figure 16B	XC215 Shinanagh	Site Layout

NTS Figure	Level Crossing	Title
NTS Figure 16C	XC215 Shinanagh	Site Layout
NTS Figure 16D	XC215 Shinanagh	Site Layout
NTS Figure 16E	XC215 Shinanagh	Site Layout
NTS Figure 17A	XC215 Shinanagh	Elevation
NTS Figure 17B	XC215 Shinanagh	Elevation
NTS Figure 18	XC219 Buttevant	Site Location
NTS Figure 19A	XC219 Buttevant	Site Layout
NTS Figure 19B	XC219 Buttevant	Site Layout
NTS Figure 20A	XC219 Buttevant	Sections
NTS Figure 20B	XC219 Buttevant	Contiguous Elevations

1. Introduction

1.1 Project Overview

CIÉ is applying to An Bord Pleanála (ABP) for a Railway Order under the Transport (Railway Infrastructure) Act 2001 (as amended and substituted) ('the 2001 Act') to close or upgrade seven level crossings on the Dublin-Cork Railway Line (the proposed Project).

While the application is being made by CIÉ Iarnród Éireann (IÉ), a wholly owned subsidiary of CIÉ, have developed the proposed Project from concept to application stage.

It is the policy of Córas Iompair Éireann (CIÉ) and Iarnród Éireann (IÉ) to eliminate where practicable and possible all level crossings on the rail network across Ireland. The proposed Project is located on the section of the Dublin – Cork railway line between Limerick Junction and Mallow Stations where rail speeds can reach up to 160km/hr.

The proposed Project seeks to address the safety risks associated with the road rail interface at seven public road level crossings on this section of the line. The proposed Project seeks to close or upgrade these level crossings and considers the level of relief required to facilitate the closures. The proposed infrastructure to upgrade includes new access roads, road-over-rail bridges and a CCTV level crossing solution. The need and the alternatives considered for the relief are set out in Volume 2, Chapter 2: Project Need and Alternatives and Chapter 3: Project Description; the evolution of the proposed Project and key elements of it are described in Volume 2, Chapter 4: EIA Process and Methodology.

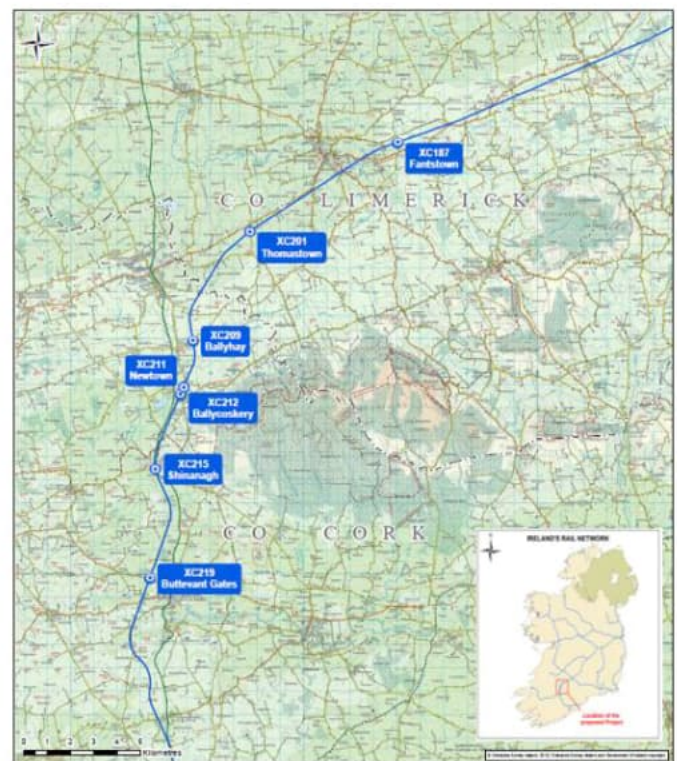
The application for a Railway Order is made pursuant to the provisions of section 37 of the 2001 Act. This requires, inter alia, that it shall be made in writing and shall be accompanied by:-

- a) *A draft of the proposed order,*
- b) *A plan of the proposed railway works,*
- c) *A book of reference to a plan required under this subsection (indicating the identity of the owners and of the occupiers of the lands described in the plan), and*
- d) *A statement of the likely effects on the environment of the proposed railway works.*

A statement of the likely effects on the environment of the proposed railway works is addressed by the preparation of this Environmental Impact Assessment Report (EIAR).

The seven level crossings associated with the proposed Project, as shown in Inset Figure 1.1 and Appendix A, of the NTS Figure 1, are located within a 24km section of the line, which straddles the Cork/Limerick county boundary.

Inset Figure 1. 1: Locations of the 7 no. Level Crossings



1.2 Environmental Impact Assessment Report & Non Technical Summary

This document is the Non-Technical Summary (NTS) of the Environmental Impact Assessment Report (EIAR) and has been prepared on behalf of CIÉ (the Applicant).

The figures associated with this NTS are set out in Table 1.1 below and attached at Appendix A. The figures should be read in conjunction with the text.

Table 1 1 NTS Figures

NTS Figure	Level Crossing	Title
NTS Figure 1	All	Overall Project Context Plan
NTS Figure 2	XC187 Fantstown	Site Location
NTS Figure 3	XC187 - Fantstown	Site Layout
NTS Figure 4	XC201- Thomastown	Site Location
NTS Figure 5A	XC201- Thomastown	Site Layout
NTS Figure 5B	XC201 Thomastown	Site Layout
NTS Figure 6	XC201- Thomastown	Elevation
NTS Figure 7	XC209 Ballyhay	Site Location
NTS Figure 8	XC209- Ballyhay	Site Layout
NTS Figure 9	XC209 Ballyhay	Elevation
NTS Figure 10	XC211- Newtown	Site Location
NTS Figure 11A	XC211 Newtown	Site Layout
NTS Figure 11B	XC211 Newtown	Site Layout
NTS Figure 12	XC211 Newtown	Elevation
NTS Figure 13	XC212 Ballycoskery	Site Location
NTS Figure 13A	XC212 Ballycoskery	Site Layout
NTS Figure 13B	XC212 Ballycoskery	Site Layout
NTS Figure 14A	XC212 Ballycoskery	Section
NTS Figure 14B	XC212 Ballycoskery	Section
NTS Figure 15	XC215 Shinanagh	Site Location

NTS Figure	Level Crossing	Title
NTS Figure 16A	XC215 Shinanagh	Site Layout
NTS Figure 16B	XC215 Shinanagh	Site Layout
NTS Figure 16C	XC215 Shinanagh	Site Layout
NTS Figure 16D	XC215 Shinanagh	Site Layout
NTS Figure 16 E	XC215 Shinanagh	Site Layout
NTS Figure 17A	XC215 Shinanagh	Elevation
NTS Figure 17B	XC215 Shinanagh	Elevation
NTS Figure 18	XC219 Buttevant	Site Location
NTS Figure 19A	XC219 Buttevant	Site Layout
NTS Figure 19B	XC219 Buttevant	Site Layout
NTS Figure 20A	XC219 Buttevant	Sections
NTS Figure 20B	XC2019	Contiguous Elevation

1.3 Structure of the EIAR and Supporting Documents

The EIAR is contained in five volumes and supported by the Natura Impact Statement (NIS) (EIAR Volume 5, Appendix 7H), a Flood Risk Assessment (EIAR Volume 5, Appendix 9A), a Water Framework Directive (WFD) (2000/60/EC) Assessment (Volume 5, Appendix 9B), a Planning Compliance Report (PCR) and a Consultation Report (EIAR Volume 5, Appendix 1E) The structure of the EIAR is provided in Table 1 2

Table 1 2 Structure of the EIAR

Section	Description
Volume 1: Non-Technical Summary (NTS)	
NTS	Summary of the EIAR in non-technical language.
Volume 2: Introductory Chapters	
Table of Acronyms	

Section	Description
Chapter 1	Introduction
Chapter 2	Project Need and Alternatives
Chapter 3	Project Description
Chapter 4	Environmental Impact Assessment Process and Methodology
Chapter 5	Plans, Policy & Guidance
Volume 3: EIAR: Discipline Chapters	
Chapter 6	Population & Health
Chapter 7	Biodiversity
Chapter 8	Soils, Geology & Hydrogeology
Chapter 9	Water
Chapter 10	Noise & Vibration
Chapter 11	Traffic & Transport
Chapter 12	Cultural Heritage
Chapter 13	Landscape & Visual
Chapter 14	Resource Use & Waste Management
Chapter 15	Air Quality
Chapter 16	Cross Cutting Themes
Chapter 17	Interactions and Cumulative Impacts
Chapter 18	References
Volume 4: Drawings & Figures	
Figures	Graphics and plans supporting the EIAR chapters, illustrating the proposed Project and environmental information. Figure reference numbers correspond to the relevant EIAR chapter (e.g. Figure 8.1 relates to Chapter 8)
Volume 5: Appendices & Schedules	
Appendices	Technical reference information supporting the EIAR chapters, such as calculations and detailed background data. Appendix numbers correspond to the relevant EIAR chapter (e.g. Appendix 8.1 relates to Chapter 8)
Schedules	Appendix 1L Schedule of Mitigation Measures

1.4 Other Assessments

A Natura Impact Statement (NIS) (See EIAR Volume 5, Appendix 7H) in accordance with the European Communities (Birds and Natural Habitats) Regulations 2011-2015.

A Water Framework Directive (WFD) Compliance Report (see EIAR Volume 5, Appendix 9B) has been prepared and assesses compliance with the Directive 2000/60/EC of the European Parliament and of the

Council establishing a framework for Community action in the field of water policy (the WFD) and the European Union (Water Policy) Regulations 2003.

1.5 Consultation

1.5.1 Consultation to Date

The initial consultation period lasted ten weeks from Tuesday 12th November 2019 to Tuesday 21st January 2020. The public consultation included both the Preliminary Design Report and the EIA Screening & Scoping Report.

Further non-statutory public consultation took place over a four-week period from Monday 10th February to Friday 6th March 2020. This consultation was organised immediately following the closure of the initial consultation in response to significant stakeholder feedback regarding XC211 Newtown

Further detailed information on the public consultations that took place for the proposed Project is provided in the Consultation Report that forms part of the suite of Railway Order Application documents and is available on the project website: www.irishrail.ie/CorkLineLevelCrossings

1.5.2 Key Stakeholder and Prescribed Bodies Consultation

In accordance with statutory requirements Prescribed Bodies and other consultees were issued letters in July 2019 advising of the proposed Project and seeking initial views. The consultees identified below were also issued with the EIAR Screening and Scoping Report as well as the Preliminary Design Report for consultation.

- An Bord Pleanála; and
- Cork and Limerick County Councils within which the proposed Project is located.

Dates of meetings with some of these stakeholder and key items discussed are provided in Table 1.3.

Table 1 3 Key Stakeholder meetings

Date	Key Items Raised and Outcomes
An Bord Pleanála (ABP)	
17/10/2019	Pre-application introduction to the proposed Project

Date	Key Items Raised and Outcomes
09/07/2020	<p>ABP has accepted that the proposed Project falls within the remit of a Railway Order and CIÉ can make an application for same.</p> <p>One Railway Order application can be made for all seven sites.</p> <p>Consultations have taken place with key consultees, including the NPWS and TII.</p> <p>A meaningful and extensive public engagement exercise has taken place and has helped to shape the proposed Project.</p> <p>CIÉ has applied the principle of proportionality in the design and application of the proposed project.</p> <p>Discussion around archaeological sites and liaison with NMS.</p>
04/02/21	<p>Final Pre application consultation meeting. Discussion included the existing proposed road alignment at Ballyhea Village in the Fermoy Municipal District Local Area Plan 2017 Discussion around the inclusion of a Schedule of Mitigation Measures within the EIAR The need for plans/elevations to have appropriate scale.</p> <p>ABP subsequently issued a letter dated 2nd March 2021 confirmed the pre application process to be concluded and that it is now open for the Applicant to lodge an application for a Railway Order.</p>
Cork County Council (CC)	
22/01/2020	<p>Noted that the proposed Project will improve safety. Principles of the proposed Project sound from a planning perspective.</p> <p>CCC confirmed on 02/12/2020 that it will take new roads in its charge.</p> <p>No heritage issues with replacement of level crossings.</p> <p>Recommendations for fauna surveys, and consultation with NPWS and IFI should take place.</p>
03/12/2020	<p>Discussed new CCTV design at XC209 Ballyhay, updated design at XC212 Ballycoskery and landscape plans.</p>
Limerick City and County Council (LCC)	

Date	Key Items Raised and Outcomes
08/01/2020	<p>LCC requested widening of the bridge at XC201 Thomastown; this is now part of the proposed Project design.</p> <p>LCC confirmed on 07/07/2020 that it will take new roads in its charge.</p> <p>Recommendations for items to be included in EIAR such as Construction Environmental Management Plan (CEMP); fragmentation of habitats, archaeology and landscape; tree removal and replanting and water quality issues for watercourses. All of these items are covered in the EIAR.</p>
18/12/20	<p>Confirmation email from Limerick City and County Council of no further comments.</p>
Cappamore-Kilmallock Municipal District Council	
16/01/2020	<p>Project team gave a presentation Some concerns raised in regard to XC187 Fantstown including (inter alia) the length of, potential for dumping and impacts upon the local community In regard to XC201 Thomastown there were some comments about the community being 'reasonably positive' about the scheme. Some queries regarding the design/width of the road/bridge and the importance of engagement with the community</p>
Ballyhea Village Community Group	
03/12/2019	<p>The concerns raised specifically in regard to the originally proposed alignment for XC211 Newtown directly led to a new consultation exercise from 10th February 6th March 2020 for a new alignment The responses from the consultation showed a broad support for the proposed alignment at XC211 Newtown which is now proposed.</p> <p>In regard to XC212 Ballycoskery there was no consensus in regard to the preferred alignment. A range of concerns were raised including potential for severance, impacts upon amenity, proximity of bridge infrastructure, overshadowing and visual impact.</p>
Ballyhea Landowner/Stakeholder Meetings	

Date	Key Items Raised and Outcomes
04/12/2020 & 07/12/20	Members of the Project Team met with key landowners and stakeholders for each of the proposed Project sites. The Project Team provided a further update on the status of the proposed Project and talked through the latest plans for each site. A range of issues were highlighted from suggested further design changes, to concerns regarding potential impacts upon amenity, noise, visual impact and traffic.

Table 1.4 Prescribed Bodies and other Consultees

Consultees	
Architectural Heritage Advisory Unit (AHAU)	Fáilte Ireland
An Taisce	Teagasc
Transport Infrastructure Ireland (TII)	The Arts Council (An Chomhairle Ealaíon)
National Transport Authority (NTA)	Gas Networks Ireland
National Museum of Ireland	Geological Survey of Ireland
Bat Conservation Ireland	Health Service Executive
Birdwatch Ireland	Irish Water
Coillte Teoranta	Inland Fisheries Ireland
Department of Communications, Energy and Natural Resources	National Parks and Wildlife Service
Department of Culture, Heritage and the Gaeltacht	Office of Public Works (OPW)
Minister for Arts, Heritage, Regional, Rural and Gaeltacht Affairs	Irish Aviation Authority
Department of Agriculture, Fisheries & Food	The M20 Cork to Limerick Project
National Parks and Wildlife unit-Development Applications Unit	Commission for Railway Regulation
Environmental Protection Agency	Waterways Ireland
ESB Networks	

The comments received from each of the consultees outlined through both rounds of consultation have been considered within the EIA and have helped to develop the proposed Project.

Volume 1, Chapter 1: Introduction includes a summary of the responses received from consultees.

National Monuments Service (NMS)

The National Monuments Service has been consulted on the potential archaeology throughout the proposed Project and in particular at XC215 Shinanagh and XC211 Newtown. The outcome of the pre application engagement with NMS was an Archaeological Mitigation Strategy dated 2nd February 2021, the recommendations/mitigation set out in that Strategy have been incorporated into Volume 3, Chapter 12: Cultural Heritage.

M20 Project Team

The M20 Project team has been consulted on the proposed Project design and tie-ins to regional and local roads in close proximity to the N20/proposed M20 and the potential for the proposed Project and the M20 project to have cumulative. Two teleconference meetings were held, the first on the 10th March 2020 and the second on the 5th November 2020.

It was noted that in terms of sequencing the Cork Line Level Crossings Project was more likely to be submitted first. No significant issues were raised by either project team and it was agreed to keep communications open between the projects.

1.6 Purchase of Documents

Copies or extracts from the documents which accompany the Railway Order application, including the Environment Impact Assessment Report (EIA), the Non-Technical Summary (NTS) and the Natura Impact Statement (NIS), may be purchased. The NTS is available free of charge, and a limited number of hard copies of the EIA are available for €295 per copy CDs containing PDF copies of the EIA are available for €15 per CD. The application documents may be obtained from the following locations:

- Cork Line Level Crossings Project, C/O Jacobs, Mahon Industrial Estate, Blackrock, Cork, T12 HY54;
- An Bord Pleanála, 64 Marlborough Street, Dublin, D01 V902;
- Limerick City and County Council, Dooradoyle Road, Dooradoyle, Limerick, V94 WV78; and

- Cork County Council, County Hall, Carrigrohane Road, Cork, T12 R2NC.

The Railway Order application and supporting documentation for the proposed Project, including the EIAR, will be available to view online at: www.irishrail.ie/CorkLineLevelCrossings

In addition to the above, the Railway Order application will be able to view at the following locations during normal opening hours (with the exception of Charleville Station where viewings will be made by appointment via the project email address cllc@irishrail.ie or by calling 01 7034451):

- An Bord Pleanála, 64 Marlborough Street, Dublin, D01 V902;
- Limerick City and County Council, Dooradoyle Road, Dooradoyle, Limerick, V94 WV78;
- Cork County Council Headquarters, County Hall, Carrigrohane Road, Cork, T12 R2NC; and
- Iarnród Éireann, Charleville Railway Station, Railway Road, Charleville, Co. Cork, P56 C654.

1.7 Written Submissions

An Bord Pleanála will consider any submissions in relation to the proposed Railway Order or in relation to the likely effects on the environment and the likely significant effects in the area concerned on European Sites, if any, of the proposed railway works which are submitted in writing to it by any person and accompanied by a fee of €50 (This fee is not payable by certain prescribed bodies or by persons whose lands may be acquired under the order). Submissions must be lodged in line with the dates specified on the Notice and must be addressed to An Bord Pleanála, 64 Marlborough Street, Dublin 1 and marked "Dublin to Cork Railway Line (Elimination and Upgrade) of Level Crossings between Limerick Junction and Mallow Order 2021"

2. Project Need & Alternatives

2.1 Project Need

2.1.1 Safety Issues and Need

The need for the proposed Project is two-fold: to reduce the safety risk profile of the railway; and to increase operational reliability. Reducing risk and improving safety is the primary purpose of the proposed Project, however

There are a wide variety of both safety and reliability issues which can occur with respect to the operation of level crossings, ranging from the gate keeper not being in attendance to equipment failure to trespass to animal incursion to low rail adhesion and to road vehicle strikes among other issues. In the period 2015 to 2020, there were five road vehicle strikes (involving a level crossing gate being struck) at the level crossings which are the subject with the proposed Project.

IE maintains its own register of incidents and accidents on its railways and in the first six months of 2019, IE reported 51 incidents at public road level crossings, an increase of 82% on the same period in 2018. This figure includes cars and Heavy Goods Vehicles (HGVs) colliding with barriers and near-misses between vehicles and trains.

2.1.2 Safety Policy

It is the general duty of CIÉ, as detailed in Section 15 of the Transport Act 1950 (i.e. establishing legislation for CIÉ), to:

"provide or secure or promote the provision of an efficient, economical, convenient and properly integrated system of public transport for passengers and merchandise by rail, road and water with due regard to safety of operation..." (underlining emphasis added)

Similarly, the Railway Safety Act 2005 (the 2005 Act), section 36, provides that it shall be the general duty of a railway organisation to ensure, in so far as is reasonably practicable, the safety of persons in the operation of its railway.

The Railway Safety Task Force recommends a series of investments including the closure or upgrading of level crossings.

The IE 10-year asset strategy states that:

"Ultimately, the elimination of level crossings is always going to be the best solution to reducing risk."

The Commission for Railway Regulation (CRR) in the Statement of Strategy 2018 – 2020 states under the heading 'Railway Interfaces' that:

"While the number of level crossings continues to decline, they are a significant area of risk given the reliance of third parties to operate and use the level crossing correctly. Misuse by level crossing users remains a cause for concern and we will continue to work with Iarnród Éireann and the road safety authority on reducing risk at level crossings."

The National Transport Authority (NTA) has prepared the Draft Integrated Implementation Plan 2019-2024 and one of its objectives under Section 7.2 for rail investment is to:

"Continue investment in a level crossing closure programme."

2.1.3 Efficiency of the Dublin-Cork Railway Line

The eventual electrification of the Dublin-Cork Railway line will allow for quicker train acceleration speeds, lower fuel costs and fewer CO² emissions.

In 2018 alone, the nature of each of the seven level crossings and their operation directly led to thirteen separate delays resulting in a total delay of 231 minutes to the Dublin – Cork Railway Line during this period. Furthermore, IE have estimated that a total delay of 100 minutes since 2015 has been attributed to human factors

2.1.4 Efficiency of the Local Road Network

Generally, it can take around nine minutes for a level crossing to re-open after one train passes and around fourteen minutes for two trains to pass at the same time. This creates driver and pedestrian delay. In addition to this delay during the day, the XC187 Fantstown, XC201 Thomastown XC209 Ballyhay and XC211 Newtown, are generally closed at night XC212 Ballycoskery, XC215 Shinanagh and XC219 Buttevant are generally open to road traffic and only closed to traffic to facilitate the movement of trains.

The proposed elimination and upgrade with a bridge or alternative new road/diversion at five level crossings (generally with the most significant traffic use) will remove driver and pedestrian/cyclist delay and allow unfettered movement 24hours a day, seven days a week.

2.2 Alternatives

A description of the alternatives considered is a requirement under Directive 2014/52/EU amending Directive 2011/92/EU on the Assessment of the Effects of Certain Public and Private Projects on the Environment (EIA Directive) in accordance with Article 5.1 (d), Annex IV paragraph 2 and Annex IV.3. The Directive states that the EIAR should include:

“A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects”.

The Alternatives Assessment in the EIAR (see Volume 2, Chapter 2: Project Need and Alternatives) considers the main alternatives for the proposed Project. This can include alternatives such as: “the do nothing” scenario, alternative locations, alternative alignments, alternative processes or equipment, alternative site layouts, alternative operating conditions, construction methodologies and alternative ways of addressing potential environmental impacts.

2.2.1 History of the Project

Table 2 1 provides a brief overview of the history of the project.

Table 2.1: Relevant Project History

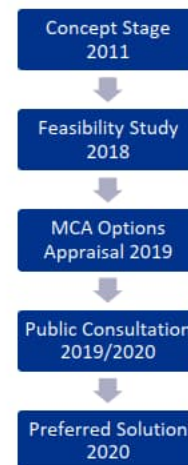
Timeline	Details
2009	XC187 Fantstown Oral Hearing under Section 73 of the Roads Act 1993 This sought to close the crossing by extinguishing the public right of way The Inspector recommended closure primarily due to health and safety benefits and this decision was supported by the management/executive of Limerick County Council. However, the “Section 73” motion was never finalised or brought before the Council

Timeline	Details
2010/2011	Concept stage schemes developed for over-bridges to eliminate each of the level crossings.
2011	XC212 Ballycoskery Cork County Council in collaboration with IÉ sought consent under Part 8 of the Planning and Development Regulations 2001 (as amended). The scheme included significant improvement works in the vicinity of the existing Ballyhea National School This proposal was not progressed due to funding constraints.
2018	Preparation of a Feasibility Study into the elimination/upgrade of the seven level crossings.
2019/2021	Updated Route Options Report, refining and developing a preliminary design for the proposed Project. Preparation of EIAR and all required materials for the submission of a Railway Order Application under Section 37 of the 2001 Act.

2.2.2 Proposed Project: Options Assessment process

Inset Figure 2.1 illustrates the process to determine a preferred solution at each site

Inset Figure 2. 1: Steps in the Options Appraisal Process



In 2010/2011, alternative route designs were developed for schemes to eliminate/upgrade each of the level crossings. However, none of the schemes were progressed at that time.

2.2.3 Feasibility Study

Overview

In 2018, IÉ undertook a Feasibility Study (finalised in February 2019) to investigate and appraise the options for the elimination/upgrade of the level crossings. The Feasibility Study included an options appraisal.

Options Considered

The Feasibility Study options appraisal assessed the following four options for each of the sites, as follows:

- Do Nothing;
- Straight Closure;
- Alternative access/Overbridge; and
- Upgrade to 4 Barrier CCTV

Findings

Detailed appraisal tables are provided in the Feasibility Study. Scores were given from 1 to 5 for each criterion, ranging from 1 "significant disadvantages over other options" to 5 "significant advantages over other options".

Table 2.2 provides an overview of the summary results for each option at each site

Table 2.2 Summary results at each site

Site	Do Nothing	Straight closure	Alt access/overbridge	CCTV
XC187	11	14	13	13
XC201	11	14	16	13
XC209	9	N/A	13	13
XC211	11	12	15	13
XC212	10	N/A	16	11
XC215	10	N/A	15	11
XC219	9	N/A	15	11

2.2.4 Preliminary Design to Railway Order Application

In 2019 IÉ commissioned the preparation of a Route Options Report and a Preliminary Design for the proposed Project. The Route Options Report performed a Multi-Criteria Analysis (MCA) for each route option where an alternative access/overbridge option was

found to be the preferred solution in the options appraisal.

IÉ have refined and developed the preliminary designs following consultation and additional survey information to form the basis of the Railway Order Application. The final designs are the subject of the EIAR.

Table 2.3 sets out the summary results of the multi criteria analysis and identifies the preferred solution for each of the subject sites.

Table 2.3 MCA Summary results

Level Crossing	Preferred Option	Option Colour	Description
XC201 Thomastown	Option 1	Green	New road-over-rail bridge to SW of level crossing. New junction on R515
XC209 Ballyhay	Option 2	N/A	Despite the Green-Pink option being the best performing of the route options of an overbridge, the cost and environmental implications of this confirmed the choice of CCTV as the Preferred Solution.
XC211 Newtown	Option 1		The MCA process identified the Green option as the preferred route option, however, following consultation in November 2019, the preferred option was updated to reflect local concerns
XC212 Ballycoskery	Option 1	Green	New road-over-rail bridge to South of level crossing.
XC215 Shinanagh	Option 1	Green Orange	New road alignment to North East of level crossing to connect with upgraded junction at existing road over rail bridge. Upgrade existing junction on N20.
XC219 Buttevant	Option 1	Green	New road-over-rail bridge to South of level crossing with new river bridge.

3. Project Description

3.1 Introduction

This chapter provides a description of the proposed Project, history of the project, and description of the proposed Project.

The proposed Project comprises the closure or upgrade of the seven level crossings on the Dublin-Cork Railway Line.

3.2 Existing Conditions

There is a relatively high volume of railway traffic along the Dublin-Cork Railway line that approaches significant speeds of around 160km/hr taking only around 15 minutes to travel past all seven level crossing locations.

The name, type and local authority area of each level crossing (LX) is detailed in Table 3.1. There are generally three different types of level crossing:

- C-Type: Gates normally CLOSED to road traffic;
- CD-Type: Gates normally OPEN to road traffic by DAY (0730hrs to 2330hrs) and normally closed at other times; and
- CX-Type: Gates normally OPEN to road traffic.

Table 3 1 Level Crossings

LX	Crossing Type	Road Type	Local Authority
XC187- Fantstown	C – Type	Local	Limerick City & County
XC201 Thomastown	C Type	Local	Limerick City & County
XC209- Ballyhay	CD – Type	Local	Cork County Council
XC211 Newtown	CD Type	Local	Cork County Council
XC212 Ballycoskery	CD Type*	Local	Cork County Council
XC215 Shinanagh	CD Type	Local	Cork County Council

LX	Crossing Type	Road Type	Local Authority
XC219- Buttevant	CX - Type	Regional	Cork County Council

*Although CD Type crossing, operated on a 24-hour basis as a CX type crossing.

Further details on site context and operation of the level crossings is provided below

3.2.1 XC187 Fantstown

The level crossing is located on local road LS 8514, 3km to the east of Kilmallock in the townland of Fantstown (see NTS Figures 2 and 3). The surrounding area for the crossing is characterised as a dispersed rural area with low density individual housing.

3.2.2 XC201 Thomastown

The level crossing is located on a local road, 5km to the east of Charleville in the townland of Thomastown (see NTS Figures 4 – 6).

3.2.3 XC209 Ballyhay

The crossing is located on a local road in the townland of Ballyhay (see NTS Figures 7 – 9). It is within a rural, dispersed community consisting of low-density individual housing, with a built-up area consisting of a supermarket distribution centre, GAA Club and ribbon development centring on a crossroads to the west.

The level crossing is immediately to the north of a rail over river bridge (UBC 296) on the Awbeg River, which is a tributary of the Blackwater River Special Area of Conservation (Site No 002170). There is also a junction on the road and a river bridge (Awbeg River) immediately to the east of the level crossing.

3.2.4 XC211 Newtown and XC 212 Ballycoskery

These level crossings run along the eastern side of Ballyhea Village in County Cork (see NTS Figures 10 – 14). XC211 Newton is located on a local road, 0.5km to the north of Ballyhea Village in the townland of Newtown, to the north-east of the Beechwood Housing Estate, while the XC212 Ballycoskery crossing is located in Ballyhea Village on local road L1533 in the townland of Ballycoskery, directly adjacent to the Ballyhea National School east side) and the Beechwood Housing Estate (west side).

3.2.5 XC215 Shinanagh

The XC215 Shinanagh crossing is located at in the townland of Imphrick, County Cork, approximately 3.5km north-east of the village of Churchtown (see NTS Figure 15) The surrounding area is predominantly rural in character with a dispersed population and low-density individual housing. The crossing is immediately adjacent to the junction between the N20 National Primary Route, which is due to be downgraded on the completion of the M20 in 2027.

3.2.6 XC219 Buttevant

The immediate locale for the XC219 Buttevant level crossing is rural in character with higher-density housing and small-scale commercial enterprises in the town, which is around 500m to the south-east, directly adjacent to the former Buttevant Station (see NTS Figures 18 - 20)

3.3 Proposed Project

3.3.1 Key Elements

The key elements of what is proposed for each level crossing as part of the proposed Project are provided in Table 3.2.

Table 3.2 Key Infrastructure Elements of proposed Project

Location	Infrastructure	Description
XC187 Fantstown (see NTS Figure 2)	N/A.	Closure of existing level crossing: Divert traffic along existing roads to existing overbridge approximately 3 kilometres to the north east.
XC201 Thomastown (see NTS Figure 4)	1no. road-over-rail bridge.	Closure of existing level crossing New road over-rail bridge. Tie into existing local road to south and new junction on Regional Road R515 to north.
XC209 Ballyhay (see NTS Figure 7)	CCTV Solution	Upgrade existing level crossing to a 4-barrier CCTV controlled level crossing.

Location	Infrastructure	Description
XC211 Newtown (see NTS Figure 10)	New access road.	Closure of existing level crossing. New access road immediately east of the existing road-over-rail bridge to the north of XC211 Newton, tie in to existing local road to the east of XC211 Newtown.
XC212 Ballycoskery (Ballyhea Village) (see NTS Figure 13)	1 no road over-rail bridge, 2no. retaining walls.	Closure of existing level crossing. New road-over-rail bridge to tie into existing local road to east and west of level crossing, new car park to existing school. Tie into Beechwood Estate and Ballyhea National School to north and existing local road to south.
XC215 Shinanagh (see NTS Figure 15)	Tie into existing road-over-rail bridge. Upgrade of existing junction on N20, closure of existing N20 junction at current level crossing location. Resurfacing of section of existing local road	Closure of existing level crossing. New access road to tie into existing road-over-rail bridge approximately 1km to the north.
XC219 Buttevant (see NTS Figure 18)	1no road over-rail bridge, 1no. portal frame road over river bridge culvert, 1no ditch box culvert, 1no.access road box culvert, 2no retaining walls	Closure of existing level crossing. Construction of a new road over-rail bridge and tie in to existing regional road to east and west

3.3.2 Ancillary Infrastructure

The proposed Project includes a range of ancillary infrastructure including, walls/fencing to stop up existing level crossings (where relevant) car parking, traffic signage, road markings, lighting, electricity connection and fencing. Furthermore, XC209 Ballyhay includes a Relocatable Equipment Building (REB), underground electricity cabling and relocation of the gate keepers hut.

3.3.3 Non- Motorised User (NMU) Provision

The proposed Project includes footpath provision where existing footpaths are present. Where footpaths are not provided, safety barriers are set back a minimum of 1m from edge of the pavement to allow NMU's to step off the carriageway if required, a 1.5-2m raised verge is also provided across the structure to allow for safe passage of NMUs

Surveyed cycle use in the locations of the subject sites is very low and therefore cyclists will continue to make use of the carriageway. Dismounted cyclists can make use of the footpath and the zig-zag slope at XC212 Ballycoskery

3.3.4 Construction Programme

Construction of the proposed Project is planned to take place over 18 no. months. A detailed construction plan and schedule will be developed for the proposed Project to ensure that the construction phasing allows for maximum efficiency while minimising potential for environmental impact. An outline Construction Environmental Management Plan (CEMP) has been prepared at EIAR Volume 5, Appendix 11.

3.4 Proportionality of Scheme

Volume 2, Chapter 3: Project Description sets out the rationale for the scale of the proposed infrastructure at each of the level crossing sites having particular regard to the application of the principle of proportionality in the context of the preferred options and the engineering works arising in the context of the planning and environmental impacts. The scale, key components and dimensions of the proposed bridges and alignments has been determined based on the speed and volume of existing and future traffic utilising the existing crossings. The existing alignment of roads, the need for pedestrian footpaths and the clearance required over the railway line are also critical factors

that determine the scale of the proposed Project. Furthermore, the volume of use of each level crossing has contributed to the design and therefore the scale of the proposed infrastructure at each proposed crossing

4. EIA Process & Method

4.1 Introduction

This chapter describes the EIA process of identifying, predicting, evaluating and mitigating the effects (positive and negative) on the receiving environment caused by a proposed Project. Where negative effects are considered unacceptable, design changes are made where possible; or mitigation measures are proposed which enable those effects to be avoided or minimised.

This chapter of the NTS briefly describes the legal provisions for EIA with respect to the proposed Project, the EIA process followed and the methodology for determining how important (or 'significant' any effects on the environment are.

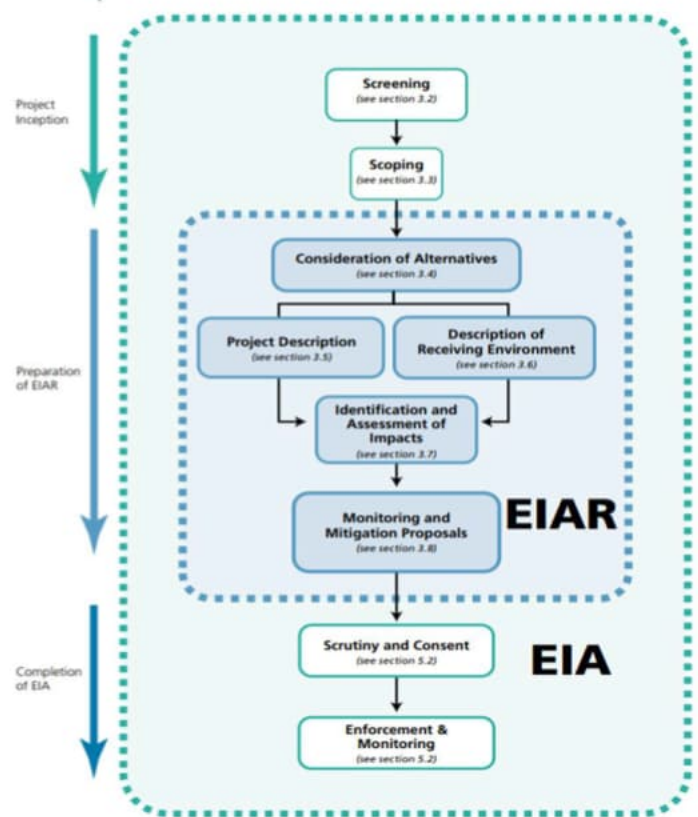
4.2 Legislation

As set out further above, CIÉ is applying to An Bord Pleanála (ABP) for a Railway Order (RO) under the Transport (Railway Infrastructure) Act 2001 (as amended and substituted) (the 2001 Act'. This requires inter alia a statement of the likely effects on the environment of the proposed railway works which is addressed by the preparation of this EIAR. The EIAR has been compiled in accordance with the EIA Directive 2014/52/EU and having regard to the 2001 Act. Further details in regard to the statutory requirements of the EIAR are set out in Volume 2, Chapter 4: EIA Process and Methodology

4.3 Environmental Impact Assessment Process

An overview of the stages of the EIA process for the proposed Project is presented in Inset Figure 4. 1.

Inset Figure 4. 1: The EIA Process (EPA 2017)



4.4 Generic Methodology

The assessment of the potential effects of the proposed Project generally follow the EPA guidance (EPA 2017c).

For some topics, industry sector or professional institute specific guidance is followed. Where this is the case, it is noted and details are provided in that topic chapter.

The first stage in the process is to identify the *quality* of the effect: will it be positive, neutral or negative (adverse)?

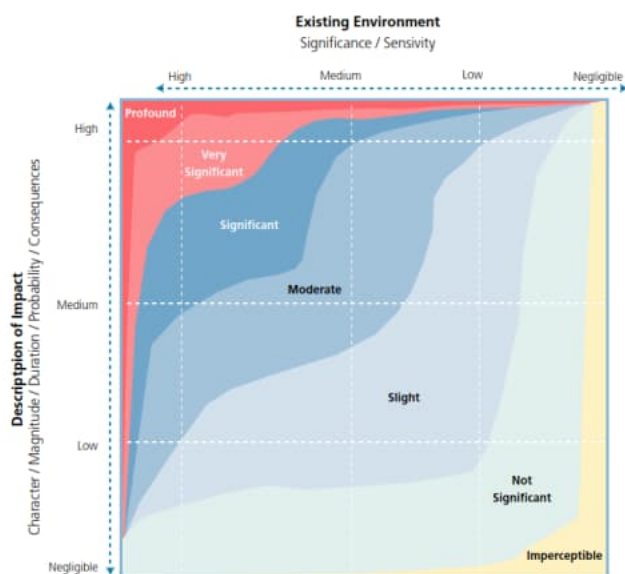
The second step is to identify how important (or *significant*) an effect is on different aspects of the environment generally considers a combination of how *sensitive* that part of the environment (also known as 'the receptor') is to change and the nature of *magnitude* of the change.

The sensitivity of a receptor will include consideration of internal and national legislation, protections and thresholds, values placed by statutory bodies and other key stakeholders and professional body guidelines.

The magnitude of the effect includes consideration of the extent of the effect, i.e. its size, the duration and frequency.

The EPA guidance presents varying degrees of significance depending on these two factors, as shown in Inset Figure 4. 2.

Inset Figure 4. 2: Determining Significance (EPA, 2017)



Finally, the *likelihood* of the effect occurring is considered for some topics.

4.5 Mitigation Measures

The EIAR addresses potential environmental effects associated with the proposed Project and proposes mitigation where significant effects are identified. All measures proposed as mitigation for the proposed Project have been reported within the relevant chapter of the EIAR.

Mitigation and control measures required during the construction phase are provided in the Outline CEMP (EIAR Volume 5, Appendix 11).

The EIAR also includes a Schedule of Mitigation Measures (EIAR Volume 5, Appendix 1L) which will bring together all of the mitigation measures recommended in the various EIAR chapters for ease of reference.

4.6 Monitoring

In addition to the proposed mitigation measures, monitoring programmes have been developed to oversee the implementation and maintenance of the measures proposed, and their efficacy to ensure no unacceptable effects occur. Monitoring also allows for the comparison of pre and post project conditions and will enable any unforeseen effects to be identified and mitigated where required.

5. National, Regional and Local legislation, Policies and Transport Programmes

5.1 Introduction

This chapter provides a summary of the relevant legislation, planning policy and guidance for the proposed Project. EIAR Volume 2, Chapter 5: Plans, Policy and Guidance, provides a full overview. In addition, the Railway Order Application contains a Planning Compliance Report which is separate to the EIAR and sets out the compliance with all key policy and legislation.

Each topic chapter also includes a review of relevant legislation and policy, relevant to that topic.

The full hierarchy of national, regional, and local policy supports the closure or upgrade of level crossings.

5.2 Legislation

The key legislation of relevance to the proposed Project are:

- Directive 2014/52/EU;
- Transport (Railway Infrastructure) Act 2001, as amended and substituted; and
- Planning and Development (Strategic Infrastructure Act) 2006.

The Planning and Development (Strategic Infrastructure Act) 2006 sets out which development projects are considered to be Strategic Infrastructure Development (SID). Application for planning consent for SID projects is determined by An Bord Pleanála (ABP). Projects which require a Railway Order under the 2001 Act are included within the definitions of SID.

Projects determined to be SID are automatically required to undergo EIA, as set out in the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No.296/2018) and further regard has been had to section 172(1A)(a)(i) of the Planning and Development Act 2000 (as amended), SI 296/2018 and Circular letter PL 1/2017 (15 May 2017).

The proposed Project has been subject to EIA, as set out in Chapters 1 and 4 of this NTS.

5.3 National Plans and Policies

A number of national plans and policies were also reviewed, including those relevant to development consent, sustainable transport and railway infrastructure and safety:

- Project Ireland 2040: National Planning Framework;
- National Development Plan 2018 – 2027;
- Draft Regional Spatial and Economic Strategy for the Southern Region;
- Regional Planning Guidelines for the South West and Mid West (2010 – 2022);
- Relevant Metropolitan Area Strategic Plans (MASPs);
- Cork County Development Plan (CCDP) 2014;
- Limerick County Development Plan (LCDP) 2010-2016;
- Relevant Local Area Plans;
- 2030 Rail Network Strategy Review, 2011;
- Draft Cork Metropolitan Area Transport Strategy (CMATS) 2040;
- Building on Recovery: Infrastructure and Capital Investment 2016 – 2021;
- Rail Review: 2016 Report;
- Commission for Railway Safety - Statement of Strategy 2018 – 2020;
- NTA - Draft Integrated Implementation Plan 2019-2024; and
- Smarter Travel: A Sustainable Transport Future: A new Transport Strategy for Ireland 2009 -2020.

The National Development Plan (2018-2027) and other policy documents highlighted demonstrate the Government's commitment to support investment in improving safety and gaining the service and journey time efficiencies within the rail network that the closure or upgrade of the seven level crossings will deliver.

6. XC187 Fantstown

6.1 Population and Human Health

6.1.1 Baseline

A predominantly dispersed rural area consisting of agricultural lands and farm buildings, and some residential properties. The through road on which the level crossing is located has several houses to the north, whilst the section of road to the south of the crossing is predominantly used for access to agricultural lands. There is a Public Right of Way (PRoW) across the level crossing; there are no schools, emergency or health services within the local study area

In terms of safety, between January 2016 and June 2019, the level crossing experienced one incident by which a road vehicle crashed into the crossing barrier.

6.1.2 Potential Effects

Do Nothing

In absence of the proposed Project, the level crossing would continue to operate and the existing safety risk at the interface between road and rail would remain, which, whilst low the proposed Project seeks to permanently remove.

Construction Phase

As there is no construction associated with the closure of the existing crossing, there will be no impacts to population and human health.

Operational Phase

The proposal to close the level crossing requires no construction work and so there would be no impacts from this 'phase' of the proposed Project. The main effects would be felt once the closure was completed. However the assessment has found that one of these would be significant.

The main benefit would be one of increased safety and reduced risk of accidents at this level crossing.

The main areas of potential impact relate to the potential for severed access to services, businesses and recreational routes; the diversion is approximately 5km. Surveys have shown there to be little use of the level

crossing by cars or non-motorised users (NMU) such as walkers, cyclists and those on horseback and so the potential for this to affect access to local sports clubs or recreational routes is considered to be of slight significance only.

A question of severance for local residents and land users was raised during consultation; however the level of use of the existing level crossing, as identified in recent (2019 and 2020) traffic and non-motorised user surveys is very low and has been for many years: evidence provided at the Fantstown Oral Hearing in 2009 stated that *"there is little traffic using the road, even agricultural traffic, except at harvest time, and the latter would pose a high risk crossing a railway"*. This means the significance of this potential effect is likely to be slight.

6.2 Biodiversity

6.2.1 Baseline

The study area is surrounded predominantly by improved agricultural grassland delineated by hedgerow and scrub. The Ahnagluggin Stream is located within the study area approximately 20m from the existing crossing.

Protected, rare and notable species recorded within 5km of the site include European eel; freshwater White-clawed crayfish; Otter; Leisler's Bat; and Atlantic Salmon.

6.2.2 Potential Effects

Do Nothing

If the closure did not go ahead, there would be little change to the existing environment, and it is likely it would continue to be used for agricultural purposes and remain in this current managed state.

Construction Phase

The proposal to close the level crossing requires no construction work and so there would be no impacts from this 'phase' of the proposed Project

Operational Phase

Once closed, road users would be diverted to the east to an existing overbridge. This would have no effect on biodiversity.

6.3 Soils, Geology & Hydrogeology

6.3.1 Baseline

The existing conditions for soils and geology at this site include a number of different soil associations and superficial deposits most likely of alluvium and till. There are no geological sites of interest, no active quarries or pits and there is little local potential for aggregates. The potential for contaminated land is very low, with the only 'industrial' infrastructure present being the railway itself. Historic mapping shows this has been the case going back to 1837

In terms of hydrogeology, the bedrock at the site is classed as a Locally Important Aquifer. No other aquifer types are indicated within the study area. The Water Framework Directive status for groundwater is classified as Good. There may be private water supplies in use in the area, but none was identified during the landowner consultation exercise.

6.3.2 Potential Effects

Do Nothing

If this level crossing was not closed, no changes would be expected for soils, geology or hydrogeology beyond those naturally occurring.

Construction Phase

The proposal to close the level crossing requires no construction work and so there would be no impacts from this 'phase' of the proposed Project.

Operational Phase

Once closed the closure of this level crossing will have not have any effects on soils, geology or hydrogeology.

6.4 Water

6.4.1 Baseline

All watercourses in the study area are part of the Loobagh_020 waterbody which has a good ecological, chemical and biological WFD status and the Fairyfield_Glebe_010 waterbody which is not currently assigned any WFD status. All watercourses are located in the River Loobagh catchment and part of the Shannon Estuary South management catchment. In terms of flood risk, the overall risk is determined to be low from all sources.

6.4.2 Potential Effects

Do Nothing

Existing drainage and surface water systems will continue as they currently do if the proposed Project does not go ahead.

Construction Phase

The proposal to close the level crossing requires no construction work and so there would be no impacts from this 'phase' of the proposed Project

Operational Phase

Once closed users will be diverted along an existing road; the increased level of use of this road will not be significant and therefore no significant impacts are foreseen.

There is potential for a beneficial effect as a result of fewer vehicles crossing the existing bridge over the Loobagh_020, immediately north of the level crossing. This would reduce the risk of contaminants from road use entering the waterbody, although it is not anticipated that this would be a significant effect.

6.5 Noise and Vibration

6.5.1 Baseline

XC187 Fantstown is located in a rural area dominated by farmland and with occasional, scattered residential properties. There are 6 residential receptors within 300m of the site.

The main noise sources in the area are road traffic on the R515, railway noise on the Dublin to Cork railway line, bird sounds and noise from agricultural machinery.

6.5.2 Potential Effects

Do Nothing

If the proposed Project does not go ahead, traffic volumes are predicted to increase in line with natural traffic growth and the noise environment is expected to remain similar to the baseline.

Construction Phase

The proposal to close the level crossing requires no construction work and so there would be no impacts from this 'phase' of the proposed Project.

No new crossing is proposed at this location, and existing traffic using this crossing will be permanently diverted along existing roads. As such, there are no realignment works required at this site, therefore no construction impacts are expected

Operational Phase

Once closed, as traffic is proposed to be diverted along existing roads there is the potential for an increase in traffic flows along the existing road network. There is also the potential for a decrease in noise levels on the roads where traffic is being diverted from. Traffic flows using the existing crossing are very low (less than 30 AADT) therefore it is considered unlikely that increases in road traffic noise of 1dB(A) or greater could occur at any noise sensitive receptor along the R515.

6.6 **Traffic & Transport**

6.6.1 Baseline

The XC187 Fantstown Level Crossing is located on local road LS8514, to the east of Kilmallock. The road is single-track along its length, running north from the R515. South of Bantard an unnamed single-track road, that passes through Kilmaculla, connects to a wider single carriageway road to the north east with an existing rail bridge connected to the R515. All roads within this area are subject to a speed limit of 80km/h.

As the surrounding roads are single-track rural roads there is no dedicated footpath or cycling provision

There is however a local cycling hub within Kilmallock. It is the largest of 12 hubs around the country with four cycling routes of varying distances. One of these routes uses roads which will be impacted by the proposed diversion

There are no public transport services within the immediate vicinity of the level crossing.

There are several dwellings within this local area that have direct frontage or drive access to the roads surrounding the existing crossing.

Two classified volumetric ATC traffic surveys were carried out at this location;. The traffic flows were recorded for seven days, commencing on Tuesday 15th October 2019.

Non-motorised user (NMU) surveys were also carried out at each crossing location between 0700-2100 for seven days, commencing on Tuesday 21st January 2020. Potential Effects

Do Nothing

If the closure did not go ahead, growthed 2019 baseline traffic flows to future years 2021 and 2022 indicate that there would be very little change in overall numbers.

Construction Phase

The proposal to close the level crossing requires no construction work and so there would be no impacts from this 'phase' of the proposed Project.

Operational Phase

Once closed, although there is no additional traffic generated road users will be diverted eastwards to the existing overbridge and junction of the R515. However, given the low level of flows using the existing level crossing this rerouting is not predicted to have a material impact on the operation of the local road network. There are also very few non-motorised users using either crossing and so the diversion will not have a significant impact on the local population.

Between January 2016 and June 2019 there was one crossing equipment failure and one level crossing incident. Although the new diversion could lead to an increased journey time, better safety as a result of the level crossing closure is beneficial

6.7 Cultural Heritage

6.7.1 Baseline

There are nine previously recorded archaeological sites within c.500m of the level crossing. Previously recorded architectural heritage assets comprise a railway bridge, built c.1849, and Bawntard House, built c.1840. Ahnagluggin Bridge is labelled on historical Ordnance Survey maps to the north of the crossing. A cultural heritage field survey was carried out in October 2019 to confirm the location of cultural heritage features identified during the desktop research; it resulted in a previously unrecorded timber water pump being identified along the roadside c.80m north of XC187 Fantstown.

6.7.2 Potential Effects

Do Nothing

If the closure did not go ahead, the level crossing (IH-2), which is depicted on the 25-inch Ordnance Survey map (surveyed 1897–1903) and is considered to be of local historical and social interest, would continue to operate much as it has done since the nineteenth century. The other heritage assets would also remain unchanged.

Construction Phase

The proposal to close the level crossing requires no construction work and so there would be no impacts from this 'phase' of the proposed Project.

Operational Phase

Closure of the existing level crossing is predicted to have a moderate negative effect on the cultural heritage of the area and a slight negative effect on the railway

Detailed recording shall be carried out on the level crossing and adjoining sections of the Cork–Dublin rail line.

Additional traffic over the railway bridge AH001 could increase risk of damage through vehicle strikes, resulting in potential negative impacts. However, this risk is considered low and the overall significance of effect from increased traffic is predicted to be imperceptible. Conversely, less traffic over

Ahnagluggin Bridge is predicted to result in an imperceptible positive impact.

6.8 Landscape and Visual

As it is proposed that the level crossing will be closed, with any traffic using an alternative route along the existing road network and no additional infrastructure is proposed, a landscape and visual impact assessment for XC187 Fantstown was scoped out in the Scoping Report stage.

6.9 Air Quality

6.9.1 Baseline

The XC187 Fantstown Level Crossing is located approximately 3km to the east of Kilmallock in the townland of Fantstown, County Limerick. The level crossing is in a rural setting with a small number of individual residential properties located nearby. The nearest property is approximately 20m to the west of the level crossing and there are a total of six residential properties within 300m of the level crossing. The nearest non-local road is the R515, which is approximately 400m to the south of the level crossing.

The available traffic flow information indicates a very low number of vehicles crossing the Dublin to Cork rail line via the XC187 Fantstown Level Crossing. A survey in June 2011 recorded a total of 17 light duty vehicles (LDVs) (i.e. motorcycles, cars and light goods vehicles) using the level crossing over the period of 24 hours. The 2019 survey recorded an AADT of 19 LDVs.

6.9.2 Potential Effects

Do Nothing

If the proposed Project does not proceed traffic volumes are predicted to increase in line with natural traffic growth and would remain at around 19 vehicle movements as an AADT across the XC187 Fantstown Level Crossing in 2021. Concentrations of NO₂, PM₁₀ and PM_{2.5} would remain at the low values representative of the rural location, well below the relevant air quality standards.

Construction Phase

The proposal to close the level crossing requires no construction work and so there would be no impacts from this 'phase' of the proposed Project.

Operational Phase

Once closed, as traffic is proposed to be diverted along existing roads there is the potential for an increase in traffic flows along the existing road network to the nearby crossing to the east northeast. However, the increases in flows are in the order of only 19 vehicle movements per day, well below the criteria set out in the DMRB of 1,000 AADT for identifying an affected road. On this basis, there would be no perceptible change from the Do-Nothing scenario. Changes to pollutant concentrations at receptor locations close to the local road network would be negligible and the air quality effects would be insignificant.

7. XC201 Thomastown

7.1 Population and Human Health

7.1.1 Baseline

The level crossing is located approximately midway between Kilmallock and Charleville in a predominantly rural area, consisting of agricultural lands, farm buildings and some residential properties. There are a few houses on the level crossing through road, both to the north and south of the railway. There are no schools, emergency or health services or PRow located near the site, however Effin School is located approximately 3km south of the level crossing and it is understood from the public consultation that the crossing is used by families taking children to the school from north of the railway.

7.1.2 Potential Effects

Do Nothing

In absence of the proposed Project, the level crossing would continue to operate and the existing safety risk at the interface between road and rail would remain, which, whilst low the proposed Project seeks to permanently remove.

Construction Phase

Amenity effects are considered to be the combined effects of traffic, air quality, noise and views. These topics report no significant effects during construction and so no significant amenity effects are expected. Similarly, there would be no direct effects on health from air quality or traffic.

The noise effects on three properties are at a level above which could have adverse effects on health, however, with the mitigation proposed and the temporary nature of the effects, overall effects on health are likely to be negligible

The Traffic assessment states that there is likely to be an increase in perceived risk of accidents as a result of heavily loaded HGVs in the area. However, with sufficient capacity to accommodate the small increases in traffic, the proposed Project will not have significant impact on fear, intimidation and pedestrian delay.

A Construction Traffic Management Plan (CTMP) will be prepared by the Contractor to prevent or minimise these and other concerns relating to construction traffic.

Whilst the existing PRow will be extinguished, the road over rail bridge provides an enhanced alternative in very close proximity for non-motorised users of the road.

The relatively small area of land required and the provision of alternative accesses where necessary means that there will be no significant effects on land use and viability.

There will be no significant effect on local employment Tourism or local expenditure as a result of the proposed Project

Operational Phase

As there are no significant residual effects on traffic, air quality or landscape and visual, no significant amenity effects are expected.

The proposed Project will result in better safety as a result of the closure of the level crossing and associated road improvements.

The provision of a road over rail bridge means there will be no restrictions in crossing the railway once operational It will enable emergency services and the wider public to use this route 24h a day whereas previously access would be restricted (particularly at night).

7.2 Biodiversity

7.2.1 Baseline

The site is surrounded predominantly by improved agricultural grassland hedgerows and scrub There are no designated sites in close proximity of this site , The nearest watercourse is the Gortacrank stream, approximately 360m from the proposed Project. It is not hydrologically linked to any designated site.

There are several protected bird species and badger No other protected species were identified.

The closest bat roosts are over 13km from the proposed Project at this site; however, several bat species have been recorded within 4km of the site.

There were no records of invasive species within this 2km area

Field surveys were carried out in early 2020

There were no protected plant species, non-native invasive plant species or signs of badger, otter or any other protected mammal recorded during field surveys within the study area.

Other protected mammals such as Irish stoat and hedgehog are likely to be present hedgehog have been recorded within 5km of the study area previously

A juvenile common frog was observed in a section of wet ditch to the south of the study area.

Whilst none of the trees (potentially at risk of removal) were considered to have potential to support roosting bats, hedgerows and treelines are considered to provide suitable foraging and commuting habitat for common bat species likely to be present.

Protected breeding birds including Robin, Wren, Swallow and Goldfinch were recorded

No wintering bird species were recorded during any of the field surveys. Habitats within the 500m survey buffer were considered suitable for foraging swans. Several fields were considered unsuitable for species such as whooper swan i.e. small in size and with tall dense hedgerows.

7.2.2 Potential Effects

Do Nothing

The majority of land proposed for development is currently managed as agricultural land. If the proposed Project was not progressed it is likely that there would be little change to the existing environment, and it is likely it would continue to be used for agricultural purposes and remain in this current managed state.

Construction Phase

There are no predicted effects for designated sites.

There may be effects on fauna during site clearance; larger and more mobile species such as stoat (if present) would not be affected, however, there could be significant effects on small mammals, amphibians and breeding birds; especially if site clearance occurred when nesting and breeding was taking place.

Proposed mitigation to avoid, prevent, reduce or, if possible includes, but is not limited to:

- careful timing of site clearance to avoid nesting and breeding seasons;
- an Ecological Clerk of Works (ECoW);
- no night-time working and restrictions on noise and light levels;

Further, there will be full reinstatement of any temporary habitat and vegetation loss post-construction.

Operational Phase

At a local geographical scale, significant effects are predicted for:

- all habitats with the exception of tall herb swamps;
- foraging habitat and hedgerows/treelines used by commuting bats;
- potential bird breeding habitat, which would likely result in a significant impact on green and amber listed bird species

There will also be the permanent loss of a small area of suitable common frog habitat; however, it is so small that it is not likely to have a significant impact on the local amphibian population

To minimise the impacts on habitats, areas of existing vegetation will be retained and enhanced insofar as possible. Hedgerows will be retained or reinstated where possible. Where hedgerows will need to be removed to facilitate the footprint of the proposed Project, these will be replaced with areas of planting throughout the site and are included on the Landscape Management Plan for this site. Any residual space between the landscape measures will be planted with a wild grass seeding mix of local provenance.

This will also provide compensatory habitat for some bird species. And for bats. For birds, nest boxes will also be provided to compensate for passerine habitat loss.

7.3 Soils, Geology & Hydrogeology

7.3.1 Baseline

Soils and Geology

A GI was completed in 2020 at the proposed crossing location. This provides more detailed, site specific information on the local ground conditions, including the depth and thicknesses of the soils and geology, and potential presence of Made Ground. It informs on local groundwater conditions, with groundwater monitoring due to take place. Further detail is provided in EIAR Appendix Volume 5, 3A: Ground Investigation.

The existing conditions for soils and geology at this site include Howardstown soil association, Viséan limestone and superficial deposits most likely of Till. There is no 'Made ground'. There are no geological sites of interest, no active quarries or pits and there is moderate local potential for crushed rock aggregate. There is no bedrock above 20m. The potential for contaminated land is very low, with the only 'industrial' infrastructure present being the railway itself. Historic mapping shows this has been the case going back to 1837.

In terms of contaminated land the GI confirms the presence of both Polyaromatic Hydrocarbons (PAH) and Total Petroleum Hydrocarbons (TPH), most likely from rail and road infrastructure.

Hydrogeology

The bedrock is classed as a locally important aquifer; the water table is shallow; and there are no Groundwater Dependent Terrestrial Ecosystems (GWDTEs). The nearest groundwater abstraction is 330m away.

A consultation exercise with landowners identified two Private Water Supplies; one is fed by a stream (See Section 7.4 Water; the second is a 30m deep well used for cattle only. There are also two septic tanks in the study area.

The crossing location is not located within a SPA or zone of contribution. The Water Framework Directive status for groundwater is classified as Good.

7.3.2 Potential Effects

Do Nothing

If the proposed Project does not occur at this site, no changes would be expected for soils, geology or hydrogeology beyond those naturally occurring.

Construction Phase

There will be no impact on bedrock; the small amount of soil and superficial deposits to be removed would have a Negligible effect on soils; and a negligible to no loss is expected from a mineral resource.

No direct interaction is expected with potentially contaminated groundwater. The likelihood of workers interacting with any contaminated materials is low and would result in a Low significance of impact. No other potential contamination pathway is considered to be present.

Temporary storage of oils, fuels and chemicals will be required during the construction phase. Accidental spillage of these contaminants could result in effects to some types of groundwater however implementation of control measures outlined in detail in Volume 2, Chapter 9 Water for oil storage and handling will prevent such effects.

Groundwater disturbances are expected to be very minor and localised as a result of the construction activities. As a result, any groundwater flow disturbance is expected to be negligible for the superficial aquifer and no impact is expected on bedrock groundwater.

To manage the potential of contamination to land, measures such as the training of staff working in/or near contaminated land, Personal Protective Equipment (PPE), and application of regulations and guidance will be implemented.

Mitigation measures in relation to hydrogeology will include monitoring of the PWS and alternative water supplies to be provided.

Operational Phase

There are generally no impacts for soils, geology and hydrogeology during the operational phase of the proposed Project. The potential disturbance of contaminated land will be managed during the construction phase and no long-term effects are anticipated from that.

7.4 Water

7.4.1 Baseline

The proposed Project is in the Shannon Estuary South catchment. The closest water bodies to the site are the Loobagh_030, which is of Good WFD Status and the Ballysalagh_010, which is of Unassigned Status. There is no hydrological connection to the Ballysalagh_010 from the site and so no impacts could occur; there is a connection to the Loobagh_030 via a ditch at the tie-in to the R515.

In terms of flood risk, the overall risk is determined to be low from all sources.

7.4.2 Potential Effects

Do Nothing

In the absence of the proposed Project, the Loobagh_030 is anticipated to maintain its Good status; it has no pressures identified by the WFD process and is Not At Risk of deteriorating in status.

Construction

Potential impacts on the Loobagh_030 include silty water runoff and associated effects on hydromorphology and the possibility of accidental spillages and releases during construction activities and activities in compound locations. In the absence of mitigation, the effects would be of moderate significance.

Generic mitigation measures are provided in the Outline CEMP to control silty water, manage dewatering of excavations and there is a detailed set of measures for the storage and use of fuels and other materials on site and in construction compounds.

In addition, it is proposed to install the permanent drainage elements at the outset, prior to full site

clearance so that these can be used to control water on and entering the site. They would be 'stopped up' during construction, and the water further directed to settlement tanks or lagoons if necessary, before being discharged to local watercourses or drains.

Operational Phase

Changes to local drainage systems to accommodate the new road and bridge could lead to local issues with drainage and increased flows to the water body; however, the design of the drainage system for the proposed Project means that there will be no net increase in runoff and no changes to established field drains. No alterations to the ditch are proposed and no new outfall to the Loobagh_030 is proposed.

The FRA concluded that the XC201 Thomastown site is a less vulnerable development (local transport infrastructure) and is at low risk of flooding from all sources. As such, the proposed works is appropriate and do not require a Justification Test.

7.5 Noise and Vibration

7.5.1 Baseline

XC201 Thomastown is located in a rural area dominated by farmland and with occasional, scattered residential properties. There are 13 residential receptors within 300m of the site.

A site walkover and noise survey were undertaken on 20 and 22 January 2020. The main noise sources were confirmed as road traffic on the R515 and surrounding roads, occasional railway noise on the Dublin to Cork railway line, noise from agricultural machinery and bird sounds.

7.5.2 Potential Effects

Do Nothing

If the proposed Project does not go ahead, traffic volumes are predicted to increase in line with natural traffic growth and the noise environment is expected to remain similar to the baseline.

Construction Phase

There are noise sensitive receptors within 300m of this site which are likely to experience an increase in noise levels during construction. Therefore, there is the

potential for temporary noise and vibration impacts during the construction phase.

Significant adverse noise effects during construction were predicted at three properties as construction noise levels were above 65dB and total noise exceeds baseline noise levels by at least 5dB. These works are expected to last approximately 27 weeks, which is longer than the one-month cut-off duration stated in BS 5228. As a result, mitigation measures are required as follows:

- Use of plant conforming with or better than relevant national or international standards on noise or vibration emissions would be used and maintained in good condition;
- Programming works so that the requirement for working outside normal working hours is minimised.
- Use of appropriate noise abatement site hoardings and screens, where appropriate; and
- The use, where necessary, of effective sound reducing enclosures;
- communications with local communities about the length of the programme.

The installation of the foundation piles has the potential to give rise to the highest vibration levels at nearby receptors. Calculations show however that vibration levels at the nearest property were below the 1.0 mm/s threshold from BS5228-2 therefore were not predicted to be significant.

Operational Phase

The proposals for XC201 Thomastown realign the road by around 100m to the south-west of the existing road. In the opening year and the design year the noise change was predicted to be zero at all the representative receptors therefore the magnitude of impact is negligible. Also, noise levels at the receptors do not exceed the design goal of 60dB L_{den} therefore no mitigation is required.

7.6 Traffic & Transport

7.6.1 Baseline

The existing XC201 Thomastown Level Crossing is situated on an unnamed road, west of Kilmallock, running north to south between the R515 and Effin

Road. This road is single-track and subject to an 80km/h speed limit. The R515 links to the N20 at Charleville in the west and passes through Kilmallock in the east, stretching as far as Tipperary.

With a mixture of single-track and narrow single carriageway rural roads surrounding the proposed Project at this site, there is no footpath or cycling provision however many locals may still use these roads for local commuting and recreation due to the rural nature and relatively low traffic flows.

There are no public transport services within the immediate vicinity. Nearby, the 325 service on Effin Road only operates two services on a Friday.

There are several dwellings within this local area that have direct frontage or drive access to roads that will be directly impacted by the construction vehicles. This includes a concentration of several homes near the existing crossing location and proposed road-over-rail bridge alignment.

One classified volumetric ATC (24 hours) traffic survey was commissioned for seven days commencing on Tuesday 15th October 2019 at the existing rail crossing (ATC 3).

One classified JTC (0700-1000 and 1600-1900) was also installed at the crossroads on the R515 to the north (JTC 1) for one day on Tuesday 15th October 2019.

A non-motorised user (NMU) survey was also carried out at each crossing location between 0700-2100 for seven days, commencing on Tuesday 21st January 2020.

7.6.2 Potential Effects

Do Nothing

Growthed 2019 baseline traffic flows to future years 2021 and 2022 indicate that there would be very little change in overall numbers over the construction period. These increases suggest a negligible operational impact over this period if no works were carried out.

Construction Phase

Increases in overall traffic numbers during construction will be minimal. Increases in HGV movements will also

be low. No significant impacts are predicted on traffic flows. No significant impact is predicted for driver delay or severance as a result of construction traffic.

There is likely to be an increase in perceived risk of accidents as a result of heavily loaded HGVs in the area. However, with sufficient capacity to accommodate the small increases in traffic, the proposed Project will not have significant impact on fear, intimidation and pedestrian delay.

Notwithstanding that there will be no significant impact on these elements, proposed mitigation measures have been developed and will be incorporated into a Construction Traffic Management Plan (CTMP) by the Contractor prior to commencement of construction. These include measures related to the timing and routing of Construction Phase HGV traffic; communications with local communities about timings, for example to avoid school arrival and departure times, and key local dates; and a Travel Plan for construction workers.

Operational Phase

During the operational phase of the proposed Project there will be no additional traffic generated by the works other than the very occasional inspection or maintenance of the new overbridge which is negligible.

Between January 2016 and June 2019 there was one recorded incident of a vehicle striking the level crossing gate/barrier which the proposed Project works will remove.

The creation of a new junction access and realignment of the railway crossing will result in an element of traffic redistribution although this is anticipated to be beneficial due to road improvements and better safety for both vehicle and non-motorised users as a result of the road-over-rail bridge. In addition, will provide benefits of unconstrained access over the railway line.

7.7 Cultural Heritage

7.7.1 Baseline

There are two (2) previously recorded archaeological sites within the Study Area comprising an enclosure (AY010) and a mound (AY011); both monuments are listed on the RMP. Previously recorded architectural heritage assets comprise a water pump (AH005) and a

thatched cottage/former licensed premise (AH006). The existing rail line follows the nineteenth-century Great Southern and Western Railway (IH-1) and the level crossing (IH-3) is labelled on the 25-inch Ordnance Survey map (surveyed 1897–1903). The existing level crossing is on the townland boundary between Thomastown and Effin.

A cultural heritage field survey was carried out in October 2019 to confirm the location of cultural heritage features identified in the desktop study and to identify any other unrecorded features of potential cultural heritage significance. No previously unrecorded aboveground archaeological features were identified.

Informal consultation was carried out with the owner of the house adjacent to the existing level crossing, that suggested the crossing is of local historical and social interest.

A geophysical survey was completed by ACSU under licence number 20R0239 in November/December 2020. The survey identified a number of anomalies that may be of archaeological significance (postholes, pits etc.) but conversely could also be natural in origin (stone sockets etc.). A programme of archaeological testing shall be carried out by a licensed archaeologist prior to construction to establish whether any of these anomalies are archaeological in nature.

7.7.2 Potential Effects

Do Nothing

The level crossing, would continue to operate much as it has done since the nineteenth century. The other heritage assets would remain unchanged, though future developments, accidental damage and natural erosion of archaeological sites may affect these assets in the future. If subsurface archaeological remains exist within the footprint of the proposed Project, these would remain unaffected.

Construction Phase

No previously recorded archaeological or architectural heritage sites would be impacted by the proposed Project. If currently unidentified subsurface archaeological remains exist, these may be impacted during construction.

Operational Phase

Closure of the level crossing (IH-3) is predicted to have a moderate negative effect on the cultural heritage of the area. The impact on the townland boundary TB-2 is not considered to be significant.

Detailed recording shall be carried out on the level crossing and adjoining sections of the Cork–Dublin rail line.

7.8 Landscape

7.8.1 Baseline

The proposed Project is contained within the northern periphery of the ‘Ballyhoura/Slieve Reagh’ Land scape Character Area (LCA) and is situated immediately adjacent to the ‘Agricultural Lowlands’ LCA. There are no scenic views or routes located within the immediate vicinity of the proposed Project.

The site is located within an area of agricultural farmland comprising of a mixture cropping and pasture. Irregular shaped field patterns vary from small to medium in size with a mixture and are often bound by a mix of mature tree lined hedgerows and low clipped hedgerows.

The most notable centre of population nearby is Charleville, 4km southwest of the site; Kilmallock is 4.5km to the northeast of the site. There is a modest rural population located along the local and regional roads in the surrounds of the proposed Project. The nearest residences to the proposed Project are located along the local road immediately east of the alignment.

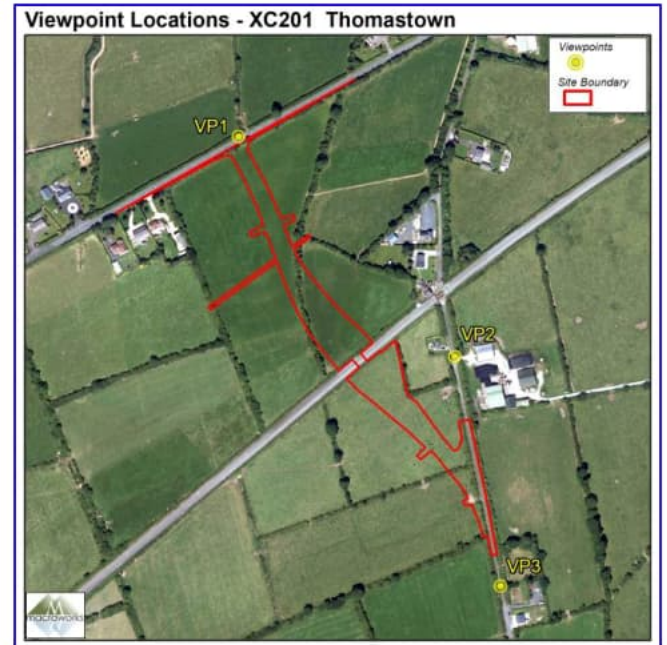
The most notable transport corridors with which the proposed Project interacts are the Dublin–Cork Railway Line, and the R515 regional road. The N20 national primary route is 4km to the west.

Effin GAA club is 1km southeast of the proposed Project.

Fieldwork was undertaken to identify sensitive landscape features and potentially affected visual receptors. The final viewpoint set was refined on the basis of scheme visibility from key receptor locations.

Three representative viewpoints were selected for the purposes of the visual impact appraisal. These are shown in Inset .

Inset Figure 7 1: XC201 Viewpoints



7.8.2 Potential Effects

Do Nothing

In a ‘do-nothing’ scenario the landscape and visual setting of each of the projects would remain in its current form and there would be no landscape or visual effects.

Construction Phase

During the construction phase there will be a far higher intensity of activity at the site than during the operational phase. This will include HGV and workers vehicle movement to and from the site; construction machinery, within the site; temporary and permanent physical disruption of the land cover during site establishment; stockpiling of material for use in the landscape mitigation; storage of construction materials; and a crane and crane pad. All of these will detract slightly from the low intensity pastoral character of the rural surrounds of the proposed rail overpass, but only within the immediate landscape context of the works.

Impacts from the change in land cover are considered to be minor; and construction related activity and its effect on landscape character will be temporary in duration. The overall significance of construction stage landscape effects is deemed to be Moderate-slight. For these reasons, the significance of visual impact would also be moderate-slight.

Operational Phase

Landscape impacts are likely to arise from the modifications to the landform generated by the engineered elevated embankments. Once mitigation planting has become fully established (c. 3-4 years), the engineered embankments will blend with the surrounding fields and hedgerows, however, the precast concrete sections of the road-over-rail bridge and metal crash barriers and signage will contrast with the natural tones and textures of the pastoral fields of the surrounding rural context.

In terms of the landscape character, the proposed Project represents the intensification of road infrastructure within the study area rather than the introduction of a new or distinctive form of development.

The significance of effect on landscapes is judged to be Slight.

In terms of visual impacts, the proposed Project will be most visible where it ties in with local roads, north and south of the railway line. There will also be intermittent views of it as it rises over the railway; seen between existing hedges and trees. Some hedges will be removed to facilitate junctions; reducing screening in these areas.

Visual impacts at VP1 and VP2 are predicted to be moderate to slight and at VP3 slight to imperceptible. Planting is proposed for this site; areas of retained hedgerow will be supplemented; any removed will be replaced and additional hedgerow will be planted alongside the timber fence. In addition, low shrub mix will be planted at the lower portions of the proposed engineered embankments.

7.9 Air Quality

7.9.1 Baseline

Although there are no specific measurements of dust deposition in the vicinity of the XC201 Thomastown level crossing, it is anticipated that existing dust deposition levels would be typical of rural levels (i.e. generally relatively low and well below the level which could affect amenity).

7.9.2 Potential Impacts

Do Nothing

If the proposed Project does not proceed traffic volumes are predicted to increase in line with natural traffic growth and would remain around 25 vehicle movements as an AADT across the XC201 Thomastown Level Crossing in 2022. Concentrations of NO₂, PM₁₀ and PM_{2.5} would remain at the low values representative of the rural location, well below the relevant air quality standards.

Construction Phase

The vehicle movements associated with the construction activities (20 LDVs and 34 HDVs) are below the criteria set out in the DMRB guidance and are considered to be insignificant.

Emissions of dust during construction were scoped out from the air quality assessment on the basis that the construction activities associated with each of the level crossings are relatively small-scale. Guidance produced by the Institute of Air Quality Management (IAQM) (IAQM, 2016) was used at the scoping stage to identify the likely dust risks for each of the level crossings. This consideration concluded that given the low to medium risks of dust impacts, the application of a suite of appropriate good practice mitigation measures and management techniques, as set out in the IAQM guidance (IAQM, 2016), would ensure significant effects from dust emissions would not occur.

The measures include a requirement for a Dust Management Plan to be produced by the Contractor prior to construction commencing, which will include the wider set of measures outlined in the EIAR and be in line with the IAQM 2016 Guidance.

Operational Phase

Although the proposed new route alignment is closer to some residential properties, the projected vehicle movements on the new route are very low (25 AADT) and well below criteria set out in the DMRB of 1,000 AADT for identifying an affected road. On this basis, there would be no perceptible change from the Do Nothing scenario. Changes to pollutant concentrations at receptor locations close to the local road network would be negligible and the air quality effects would be insignificant.

8. XC209 Ballyhay

8.1 Population and Human Health

8.1.1 Baseline

The area surrounding the level crossing is a rural dispersed community consisting of 163 residential properties and a built-up area which consists of a supermarket distribution centre, GAA Club and ribbon development centring on a crossroads to the west. Within 10 metres of the crossing there is a residential dwelling and a stable. The through road is a forked junction where three roads meet at the crossing - each containing residential houses and farm buildings.

In the wider study area, there are several small businesses, housing clusters and individual houses, farm buildings and recreational facilities (including Ballyhea GAA club). There are no schools, emergency or health services or PRow located near the site.

Charleville is just under 5km away and is the nearest town to the site. There are also several businesses on the L1322 road approximately 1km to the west of the crossing, including a Lidl Distribution Centre and O'Brien Refrigeration and Catering Equipment.

The local study area is not a key tourism destination with only one B&B, Marengo Guest accommodation, located approximately 1.5km south west of the existing crossing.

8.1.2 Potential Effects

Do Nothing

In absence of the proposed Project, the level crossing would continue to operate and the existing safety risk at the interface between road and rail would remain, which, whilst low the proposed Project seeks to permanently remove

Construction Phase

The proposed Project involves installing CCTV to replace the staffed level crossing therefore minimal construction will occur and impacts on population and human health are not anticipated, with the exception of some disruption to the use of the crossing during the upgrade and installation of electricity cables.

Operational Phase

As there are no significant residual effects on traffic, air quality or landscape and visual, no significant amenity effects are expected

The upgrade of the level crossing to CCTV is not expected to have a significant effect on traffic flows, air quality or noise. Similarly, there will be improved access for the local community as the crossing will operate on a 24 hour basis, remotely monitored from the Level Crossing Control Centre in Mallow; currently the crossing is closed between 2330 and 0730hours.

There will be no significant impacts on land use, employment or access to employment.

8.2 Biodiversity

8.2.1 Baseline

The level crossing is surrounded predominantly by improved agricultural grassland and wet grassland delineated by hedgerows and scrub. The nearest watercourse is the Awbeg (Buttevant East) River, which flows under the road into which new electricity cables will be installed for the CCTV.

Protected, rare or notable flora and fauna within 5km of the site include: Freshwater White-Clawed Crayfish; Irish Hare; Otter; Golden Dock, Orange Foxtail, Hasselquist's Hyssop and Badger.

No field surveys were required at this site.

8.2.2 Potential Effects

Do Nothing

The majority of land proposed for development is currently within the footprint of the existing level crossing and Dublin – Cork Railway Line area. If the proposed Project was not progressed it is likely that there would be little change to the existing environment, and it is likely it would continue to be used for railway line and level crossing purposes.

Construction Phase

The proposed Project at XC209 Ballyhay is adjacent to the Awbeg (Buttevant East) River, which is designated as the River Blackwater (Cork/Waterford) SAC approximately 1.5km downstream. There is potential

for the proposed works and method of installation of the CCTV to have an impact on the Awbeg (Buttevant East) River. Due to this direct hydrological link a pollution event could affect the Awbeg River during the Construction phase of the works. It is not anticipated that a significant volume of water will be dewatered from the proposed trenches, however as part of the additional Ground Investigation proposed for prior to construction, groundwater samples will be taken. The groundwater quality samples will identify if there is any issue with groundwater quality. Based on the results, it may be possible to dewater and discharge to the Awbeg (Buttevant East) River following settlement; alternatively, if other contamination such as metals or hydrocarbons are detected, additional measures will be needed which could include additional treatment or disposal off site.

Operational Phase

No effects are predicted.

8.3 Soils, Geology & Hydrogeology

8.3.1 Baseline

Soils and Geology

The soil type at the crossing location is likely to comprise Alluvium; additional deposits of Gravels, Till are anticipated; there are no geological sites of interest; bedrock at the is likely to comprise the Copstown Limestone Formation. The bedrock to the north is likely to comprise the Visean Limestone (undifferentiated). A number of superficial deposits are shown as present in the vicinity of the crossing.

There are no active quarries or pits within the study area. There is a thrust fault shown trending NE-SW, located approximately 110m north of the crossing location.

There is a low, moderate and high potential for crushed rock aggregate, located close together. There is a moderate to high potential for granular aggregate at the crossing location, and very high potential areas located within the wider study area.

Based on historic and current land use, there are no anticipated additional sources of potential contamination, other than materials used during the construction of the existing rail line.

Hydrogeology

The bedrock is classed as a Locally Important Aquifer. A worst-case assumption is made that the water table is shallow. No designated superficial aquifers are present within the study area.

There are no mapped karst features and no mapped groundwater wells and springs within the study area.

A consultation exercise with landowners has been undertaken and has recorded one PWS (PWS209/1) adjacent to the southwestern part of the proposed Project and which feeds two properties. No septic tanks were identified.

Habitat surveys have identified the presence of a wet grassland area which could have a groundwater component.

8.3.2 Potential Effects

Do Nothing

This scenario does not interact with any known potentially contaminated land site nor groundwater, and the soils and geology are equally non-affected. As a consequence, no effects are expected for the "do nothing" scenario in relation to soils, geology, contaminated land and hydrogeology.

Construction Phase

The installation of the cables will require open trench excavation. This is expected to have negligible impact on bedrock, soils and any mineral resource.

In terms of hydrogeology, there is a risk the excavation could create a vertical pathway for any pre-existing contamination in the road to groundwater and/or surface waters. There is also the potential for accidental contamination during construction and for workers to interact with potentially contaminated soils and groundwater.

Any dewatering of the open cut trench excavation would have a localised slight adverse impact on the superficial aquifer and local groundwater.

The exact location of PWS209/1 (medium sensitivity) is unknown but is greater than 50m away from the open trench excavation areas. The dewatering effect is expected to be localised and unlikely to generate a

dewatering zone of influence greater than 50m. As a result, a potential impact on yield to the PWS is unlikely, but as a precaution assessed as Slight on flows. The PWS is expected to be either upgradient or cross-gradient of the proposed Project and therefore no impact is expected on its water quality.

Mitigation and control measures are detailed in the CEMP and highlighted in Section 9.4 (Water) of this NTS.

The backfilling of the trenches in XC209 Ballyhay which fall within the wet grassland area will be backfilled with the material that was dug out to prevent any preferential pathways being created.

Operational Phase

No effects are expected in relation to soils, geology, and contaminated land. The open cut trench excavation, if backfilled with granular material more permeable than the natural superficial deposits, has the potential to create a preferential pathway for groundwater in the long-term. This could be of significance to the potential GWDTE identified within the study area (medium magnitude).

Long term potential significance of impact on the potential GWDTE (low sensitivity) as result has been assessed as Slight / Moderate.

8.4 Water

8.4.1 Baseline

All watercourses in the study area fall within the Awbeg (Buttevant) (East)_020 sub-catchment which has a moderate ecological and biological WFD status. Chemical status is not provided. All watercourses are located in the Blackwater catchment and part of the Blackwater (Munster) management catchment.

Flood risk from most sources is considered to be low or very low. However, there is a 0.1% low probability (PFRA Ireland) that the Awbeg (Buttevant) East_020 will flood across the site and nearby lands.

The site was surveyed in January 2020 from publicly accessible lands. The survey confirmed that the Rathmorgan EPA segment of Awbeg (Buttevant) (East)_020 is a field drain and at the time of survey it was stagnant with no flow.

8.4.2 Potential Effects

Do Nothing

Local watercourses will remain in their current WFD status and with the identified risks unchanged. Flood risk will remain unchanged.

Construction Phase

There is potential for a Very Significant impact on the Awbeg (Buttevant) (East)_020 as a result of dewatering of the trenches required to lay cable ducts if the water was discharged directly to the water body. Pollutants would include sediment and potentially metals or hydrocarbons. Groundwater analysis will be carried out prior to construction (during ground investigation works) to determine the extent of any contamination. Control measures for the settlement of silty water will be applied and, if there is no contamination present, the water could be discharged to the river, with the correct permits and licences in place.

The site is at high risk of fluvial flooding. However, as no new works are being constructed beyond the CCTV infrastructure so there is no effect on fluvial flood risk.

Operational Phase

The de-manning of the crossing will result in no requirement for staff or welfare facilities during the operational phase. Any benefits associated with this are expected to be imperceptible, however.

The road carriageway will continue to drain as it does currently and so no additional effects (or benefits) are expected.

8.5 Noise and Vibration

8.5.1 Baseline

XC209 Ballyhay is located in a rural area dominated by farmland and with occasional, scattered residential properties. There are 3 residential receptors within 300m of the site.

A site walkover was undertaken on 22 January 2020. No noise measurements were made, however, the main noise sources were confirmed as road traffic on the N20 and surrounding road network.

8.5.2 Potential Effects

Do Nothing

If the proposed Project does not go ahead, traffic volumes are predicted to increase in line with natural traffic growth and the noise environment is expected to remain similar to the baseline.

Construction Phase

The proposed Project involves installing CCTV to replace the manned level crossing therefore minimal construction is expected to occur and noise is not expected to be an issue during the CCTV conversion.

Operational Phase

No changes to traffic volumes are expected therefore noise levels are not predicted to change in either the short term or the long term.

There is, however, a warning alarm associated with the proposed CCTV level crossing. The alarm is expected to sound for around one minute and can be sounded any time night or day. There is one noise sensitive receptor within 50m of the crossing and the warning alarm may cause annoyance at this receptor. According to guidance, where audible warnings may cause a disturbance to local residents the warning may stop or continue at a reduced volume when the barriers are fully lowered.

8.6 Traffic & Transport

8.6.1 Baseline

The existing XC209 Ballyhay Level is situated on the L5531 single carriageway local road, north of Ballyhea, that connects to the N20 in the west. On the eastern side of the existing level crossing the road meets a fork; while the single carriageway road continues east, passing to the north of Gortagarry, a single-track road splits off in a north east direction towards Ballyshonakin. All local roads are subject to an 80km/h speed limit.

With a mixture of single-track and narrow single carriageway rural roads surrounding the proposed crossing XC209 Ballyhay there is no footpath or cycling provision however many locals may still use these roads

for commuting and recreation due to the rural nature and relatively low traffic flows.

There are no public transport services within the immediate vicinity of the existing crossing.

There are several dwellings, commercial properties and the Ballyhea GAA Club sportsground between the N20 junction and west of the existing crossing that have direct access onto this previously described unnamed road. There is a property directly next to the existing crossing and a few sporadic properties on the eastern side.

One classified JTC (0700-1000 and 1600-1900) traffic survey, installed at the junction on the eastern side of the existing rail crossing (JTC 2), was commissioned for one day on Tuesday 15th October 2019.

A non-motorised user (NMU) survey was also carried out at each crossing location between 0700-2100 for seven days, commencing on Tuesday 21st January 2020.

8.6.2 Potential Effects

Do Nothing

Growthed 2019 baseline traffic flows to future years 2021 and 2022 indicate that there would be very little change in overall numbers over the construction period. These increases suggest a negligible operational impact over this period if no works were carried out.

Construction Phase

As there is no significant construction associated with the conversion of the existing manned crossing to CCTV controlled there will be negligible impact to existing traffic as a result.

Operational Phase

There is no additional traffic generated during the Operational Phase, other than for occasional routine maintenance of the cameras, and so there will be negligible impact to existing traffic as a result. The existing railway crossing does not operate between 2330 and 0730 therefore the proposed Project will provide benefits of unconstrained access (except

during the need to close for oncoming trains) over the railway line.

8.7 Cultural Heritage

8.7.1 Baseline

There are five previously recorded archaeological sites within c.500m of the existing crossing, comprising a church and graveyard with effigial tomb (AY012–AY014), a castle (AY015) and a corn mill (AY016). These monuments are all listed on the RMP, and the church and castle are also Protected Structures. The study area also contains a house (AH007) listed on the NIAH. The existing rail line follows the nineteenth-century Great Southern and Western Railway (IH-1) and the level crossing (IH-4) is labelled on the 25-inch Ordnance Survey map (surveyed 1897–1903).

A cultural heritage field survey was carried out in October 2019 and comprised a walkover site inspection of the area immediately adjacent to the crossing. The survey identified two previously unrecorded bridges (AH008 & AH009) located to the southeast and south of the crossing respectively.

8.7.2 Potential Effects

Do Nothing

The level crossing (IH-4), which is depicted on the 25-inch Ordnance Survey map (surveyed 1897–1903) and is considered to be of local historical and social interest, would continue to operate much as it has done since the nineteenth century. The other heritage assets would also remain unchanged.

Construction Phase

No construction impacts are predicted for cultural heritage other than the impact to the crossing itself (IH-4) which is assessed as slight negative. No works are proposed to the existing bridge (AH008) to the east of the level crossing as part of the upgrade; no widening of the existing carriageways is proposed as part of the upgrade.

Operational Phase

No operational impacts are predicted.

8.8 Landscape

8.8.1 Baseline

The proposed Project is located in the townland of Pruntus immediately west of the River Awbeg corridor. The surrounding landscape is comprised of flat to low rolling terrain, much of which drains into the River Awbeg and its surrounding tributaries. Agricultural farmland is the most prominent land uses within the immediate surrounds of the project and is typically enclosed by mixed hedgerow vegetation.

In terms of landscape designations, the proposed Project is located wholly contained within LCT 5 – Fertile Plain with Moorland Ridge, and within the westernmost periphery of an area designated ‘High Value Landscape’. There are no designated scenic routes or views located within the immediate or wider surrounds of the proposed Project.

8.8.2 Potential effects

Do Nothing

In a ‘do-nothing’ scenario the landscape and visual setting of each of the projects would remain in its current form and there would be no landscape or visual effects.

Construction Phase

During the construction stage, there will be a slightly higher intensity of activity at the site than during the operational phase, however, this is limited by the very modest degree of construction works required, including a minor amount of soil stripping and stripping of the existing road surface. Effects on the landscape character will be temporary in duration. For these reasons, the magnitude of landscape impacts during the construction stage is deemed to be Low.

During construction, the main visual impacts will arise from some heavy vehicle movements, worker vehicles and construction machinery. There may be some small stockpiles of stripped topsoil as well. However, due to the very minor degree of upgrade works required here, the magnitude of visual impact at construction stage is deemed to be Low.

Operational Phase

The most notable operational phase landscape impacts will arise from the introduction of modest amount of new infrastructure which will result in a slight intensification of railway infrastructure. In terms of the landscape character, key elements of railway infrastructure are not incongruous features. Due to the relatively modest scale of the proposed Project, landscape impacts will be very localised, the significance effect is judged to be Slight-imperceptible.

In terms of visual effects, the proposed upgrade will result in an increased intensity of railway related development within the immediate surrounds of the level crossing. The largest piece of infrastructure here will be the proposed REB building which will be finished in a dull muted tone to help it visually blend with the surrounding vegetation. These effects would not be considered significant in EIA terms.

8.9 Air Quality

8.9.1 Baseline

The level crossing is in a rural setting with a small number of individual residential properties located nearby, the nearest of which is within 5m of the level crossing.

The available traffic flow information indicates a relatively low number of vehicles crossing the Dublin to Cork rail line via the XC209 Ballyhay Level Crossing.

8.9.2 Potential Effects

Do Nothing

If the proposed Project does not proceed traffic volumes are predicted to increase in line with natural traffic growth. Concentrations of NO₂, PM₁₀ and PM_{2.5} would remain at the low values representative of the rural location, well below the relevant air quality standards.

Construction Phase

Therefore, no construction impacts are expected in relation to road traffic emissions.

Operational Phase

There would be no change from the Do Nothing scenario for this level crossing in terms of air quality.

9. XC211 Newtown and XC212 Ballycoskery

9.1 Population and Human Health

9.1.1 Baseline

The XC211 Newtown Crossing is located 500m north-east of the XC212 Ballycoskery crossing. There is a total of 274 residential properties within the local study area.

The nearest dwelling to the XC211 Newton crossing is located 15m away. While there are four dwellings located on the through road south of the crossing and a number of dwellings located on the through road heading north towards the XC209 Ballyhay crossing, which is close to some main settlements. The Beechwood Drive Housing Estate is located within 50m to the west of the XC212 Ballycoskery crossing and the Ballyhea National School is approximately 80m to the east. Within the wider study area there is a Roman Catholic Church, Petrol station and Supermac's restaurant. There are no emergency or health services, or Public Rights of Way located in close proximity to either Crossings (XC211 Newtown and XC212 Ballycoskery).

Charleville, located 5km to the north of the local study area, is a key local employment hub.

The majority of local residents travel less than 15 minutes to work, school or college. While a minority of residents have a commute time of over one hour.

The wider study area, Fermoy is not known as being a tourist destination. However, there are a few local attractions such as, Fermoy Town (home to the Thomas Kent Bridge) and Corrin Wood National Forest. There is limited tourism accommodation in the area, with only one B&B, which is located approximately 1.2km north-west of the proposed Project.

9.1.2 Potential Effects

Do Nothing

In absence of the proposed Project, the level crossing would continue to operate as it does currently and the existing safety risk at the interface between road and rail would remain, which, whilst low the proposed Project seeks to reduce further

Construction Phase

Amenity effects could be experienced as a result of construction works close to the school and residential area.

A circular walking route of approximately 2.5 km used for recreation, will be directly impacted during construction by HGV routing, which may make it less attractive as a recreational option. However, since the works are temporary, and there are alternate green spaces located in the wider green space. This is not likely to result in long-term health effect and therefore the impacts on health are expected to be neutral.

Due to the low tourism activity in the area. It is not anticipated that the Operational phase will significantly change tourism in the area or change the tourist numbers in the area.

Operational Phase

The extinguishment of the PROWs at XC211 and XC212 are not anticipated to have significant impacts; at XC211 there is likely to be a slight inconvenience to residents as a result of being diverted to the new access road; at XC212 the impacts are likely to be beneficial as the new crossing will have no time delays whilst waiting for trains and unconstrained 24-hour access across the railway

There could be some benefits for human safety as there will no longer be a need to manually operate the crossing gates. There will be beneficial effects for those travelling to Ballyhea National School and the users of the Killmallock cycle hub as a result of the improved pedestrian provision and redistribution of traffic. During operation the local primary school will benefit from a new car park located directly adjacent to the building as a result of the Project. This will accommodate a safer drop off and pick up for the school and improve safety.

9.2 Biodiversity

9.2.1 Baseline

The local receiving environment is dominated by agricultural fields and residential properties, local roads and a School. The crossing at XC212 Ballycoskery crosses a local ditch which connects to the Newton River which flows directly into the Awbeg (Buttevant

East) River where it is part of the Blackwater (Cork/Waterford) SAC. The SAC is designated for a number of aquatic species including all three lamprey species, Atlantic salmon European eel, Freshwater pearl mussel and White-clawed crayfish

Field surveys were carried out in early 2020.

No protected plant species or non-native invasive plant species were recorded within the study area

No signs of badger, otter or any other protected mammal were recorded. Small mammals like Irish Stoat and hedgehog may be present.

Amphibians including Frog Spawn at XC211 Newtown were recorded. Habitats within the study area are considered suitable to support common frog and smooth newt; they are not considered suitable to support reptiles.

No bat roosts were identified within a building or the tree that was assessed as having PRFs. However, three bat species were recorded within the study area during the surveys including Common pipistrelle Soprano pipistrelle; and Leisler's

Breeding birds including Wren, Swallow, House Martin, Goldfinch, Jackdaw and Willow Warbler were recorded. No wintering birds were recorded during the surveys. Habitats within the 500m survey buffer were considered sub-optimal for foraging swans, however whooper swans were recorded 600m from the XC212 Ballycoskery survey buffer, foraging in grassland. An incidental record of a moorhen, mallard and barn owl were recorded at XC211 Newtown.

Tall-herb swamps (including vegetation likely to correspond with EU HD Annex I habitat 6430 Hydrophilous tall herb) are present on the banks of the ditch to the west of the proposed road-over-rail bridge.

9.2.2 Potential Effects

Do Nothing

The majority of land proposed for development is currently managed as agricultural land. If the proposed Project was not progressed it is likely that there would be little change to the existing environment, and it is likely it would continue to be used for agricultural purposes and remain in this current managed state.

Pressures on the Tall-herb swamp include invasive species; and agricultural intensification and drainage in the lowlands. If the project were not to progress it is unlikely then that there would be any change to this habitat given its location fenced off from grazing, and topography of the site water draining from the field to the north and from the railway embankment.

Construction Phase

A pollution event (release of contaminated surface water runoff and sediments) into the River Awbeg/River Blackwater SAC during construction (via the local ditch and Newtown river) will likely result in a significant effect on this European site, qualifying interest fish species, and white-clawed crayfish at a local to county geographic scale.

Other significant effects associated with habitat loss anticipated at a local geographical scale are to:

- Small mammals;
- Frogs; and
- Green and amber listed nesting bird species

Mitigation measures to protect the River Blackwater (Cork/Waterford) SAC have been set out in the NIS, included in Volume 5, Appendix 7H. of the EIAR.

Mitigation measures for pollution control to protect watercourses and the habitats and species that they support are set out in the CEMP with key measures set out in Section 9.4 of this NTS.

Specific control measures will be adhered to for the installation of the proposed culvert. See Section 9.4 Water

Operational Phase

Permanent loss of habitat as a result of the works proposed at this crossing would likely result in a significant effect at a local scale for all habitats with the exception of tall herb swamps, where loss would likely result in a significant effect at a local to county scale.

The loss of available foraging habitat and hedgerows/treelines used by commuting bats would likely result in a significant impact at the local geographic scale.

The loss of potential bird breeding habitat would likely result in a significant impact on green and amber listed bird species at the local geographic scale.

The design of the drainage for the new road to replace the XC211 Newtown crossing includes swales which will control the rate and quality of discharge into the existing road drainage. At XC212 swales are proposed, where possible; where not physically possible new gullies and surface water systems will drain to the swales via under-road drains.

An indicative Mitigation Strategy has been developed (see EIAR Volume 5, Appendix 7G) which details the method for translocating the area of tall herb swamps (FS2), including the Annex I habitat (6430) Hydrophilous tall herb swap communities, which will be lost under the footprint of the proposed Project. The extent of the receptor site for this habitat will be based on a like for like area basis.

To mitigate for loss of nesting habitat trees, hedgerows and scrub replacement and supplemental planting for these habitats has been incorporated into the landscape plan at XC211 Newtown and XC212 Ballycoskery. Whilst no significant impacts are anticipated during the operational phase, this will provide compensatory habitat for some bird species. Next boxes will also be provided where necessary. Pollution control measures as identified in Volume 3, Chapter 7: Biodiversity will be adopted to ensure no disturbance or loss of habitat for wintering birds at XC211 Newtown

9.3 Soils, Geology & Hydrogeology

9.3.1 Baseline

Soils and Geology

The soil type is likely to be the Howardstown association there are no geological sites of interest present; the bedrock is expected to comprise the Ballysteen Formation of limestone Local phase G1 indicates the presence of topsoil and sandy gravelly silty clay at XC211 and no bedrock to a depth of 12m. At XC212, made ground and silty sandy gravel and no bedrock to a depth of 20m.

Superficial deposits at crossing XC211 are expected to comprise gravels derived from limestones, whereas at XC212 these are expected to comprise Till.

There is an unnamed fault line within the XC211 study area.

There are no active quarries or pits within the study area.

The crossings are both located within areas where there is moderate potential for crushed rock aggregate; and areas of very low, low, high and very high potential for crushed rock XC211 Newtown is in an area with very high potential for granular aggregate; there is no data mapped at crossing XC212 Ballycoskery. Within both crossing study areas are areas with a high potential for granular aggregate.

Hydrogeology

The crossings are located within an area designated as a Locally Important Aquifer, where the bedrock is classed as moderately productive only in local zones. A bedrock aquifer fault is approximately 350m to 400m to the north of crossing XC211 There are no superficial aquifers indicated at the crossing locations nor within the study area.

XC211 has high permeability subsoil, sand and gravels overlain by well-drained soil XC212 has moderate permeability subsoil overlain by poorly drained gley soils. There are no karst landform features, groundwater wells or springs within the study area Local phase G1 indicated groundwater levels to be between 2.19m and 4.15m for XC211 and 3.13m and 3.76m for XC212.

WFD status for the GWB for the area (Newtown Ballyhay) is classified as Good.

Landowners in the vicinity have been contacted with regard to a private water supply survey and septic tanks. None was identified in the area, although habitat surveys identified a potential outfall from a septic tank in the field to the east of the existing level crossing.

Habitat surveys identified the presence of a wet grassland area and tall herb swamp (corresponding to Annex I habitat 6430 hydrophilous tall herb) at XC212 which could have a groundwater component The nature of the vegetation suggests the area remains wet a large proportion of the year.

9.3.2 Potential Effects

Do Nothing

This scenario does not interact with any known potentially contaminated land site nor groundwater, and the soils and geology area equally non-affected. As a consequence, no effects are expected for the "do nothing" scenario in relation to soils, geology, contaminated land and hydrogeology.

Construction Phase

Negligible to slight impacts are anticipated for soils, superficial deposits and mineral resources.

The existing railway and road infrastructure have the potential to have leaked some heavy metals and hydrocarbons in soils and any shallow groundwater, if present, however no direct interaction is expected. As such, the likelihood of workers interacting with any contaminated materials is considered to be Low significance. No other potential contamination pathway is considered to be present.

Temporary storage of oils, fuels and chemicals will be required during the construction phase. Accidental spillage of these contaminants could result in pollution of groundwater however, it is categorised as a low likelihood resulting in the potential impact significance of Moderate/Low.

A short cutting is proposed for the new road at XC211 Newtown, which is expected to result in a very localised dewatering impact. Any groundwater flow disturbance is expected to be Negligible/Slight. No to negligible impact is expected locally on bedrock groundwater.

No PWS have been identified in the study area, consequently, no impact is expected on groundwater abstractions.

One potential GWDTE has been identified immediately to the south of the proposed Project at Ballycoskery; mitigation measures are outlined in Section 9.2 Biodiversity.

Mitigation measures for the prevention of accidental spillages are outlined in the CEMP with key measures set out in Section 9.4 (Water) of this NTS. Operational Phase

Long-term impacts on geology are the same as the ones discussed during the construction phase.

Based on the information available, no long-term impact is expected on contaminated land.

9.4 Water

9.4.1 Baseline

The proposed road-over-rail bridge crosses a local ditch on its west side, which it is likely receives surface water from Beechfield housing estate. It was identified during a hydrological field survey in January 2020. The ditch flows into the Newtown_18 waterbody approximately 250m downstream of the proposed Project. The Newtown_18 flows west into the Awbeg (Buttevant) (East)_020. Both water bodies are of moderate WFD status. The Awbeg (Buttevant) (East)_020 at this point is within the Blackwater River (Cork/Waterford) SAC.

Flood risk from most sources is considered to be low or very low. However, there is a risk of fluvial flooding which is considered to be moderate.

An ecological walkover was undertaken in October 2019 and an outfall located near XC212 Ballycoskery was observed to be discharging grey water into a nearby field. It was considered that this could be from a non-functional or broken septic tank which may serve the nearby Ballyhea National School. Pre-construction surveys and discussions with landowners will determine if this is an ongoing problem and identify any potential sources so that it can be resolved.

9.4.2 Potential Effects

Do Nothing

There will be no direct impacts to water bodies if the proposed Project is not progressed; existing pressures from agriculture will remain.

Construction Phase

During the construction phase there is potential for site specific impacts on the water environment. Most of these will be common to most construction projects, and include silty water runoff, accidental spillages, and sediment from dewatering. These will be managed and

reduced by a series of control measures set out in EIAR Volume 5, Appendix 11 Outline CEMP.

The bridge at XC212 will incorporate a new pipe culvert to accommodate an existing ditch to the west of the railway line. There is potential for impacts as a result of in-stream working. To minimise impacts, the culvert will be pre-fabricated and clean, so as to avoid concrete washings contamination. If the ditch is flowing, it will be dammed and pumped over the installation area to avoid the transportation of sediment downstream. Additional in-stream measures will also be deployed, such as straw bales and oil booms to ensure there is no downstream impact as a result of the installation process.

Operational Phase

The introduction of new impermeable areas could potentially increase the volume and peak flow of surface runoff reaching watercourses and could therefore contribute to an increase in flood risk. This potential impact has been assessed and designed out (embedded mitigation) through the provision of swales at several locations along the proposed new road alignments at XC211 and XC212. .

Through these, maximum outflow is capped at existing greenfield runoff rates resulting in no increase in flood risk

The FRA concluded that the XC211 Newtown & XC212 Ballycoskery site is a less vulnerable development (local transport infrastructure) and is at low risk of flooding from all sources. As such, the proposed works are appropriate and do not require a Justification Test.

9.5 Noise and Vibration

9.5.1 Baseline

XC211 Newtown and XC212 Ballycoskery are located in a rural area dominated by farmland and the village of Ballyhea which contains a school, a pre-school and a church, as well as residential properties. There are 99 residential receptors and 3 other receptors (including the aforementioned school, pre-school and church) within 300m of the sites.

A site walkover and noise survey were undertaken in January 2020. The main noise sources were confirmed as road traffic on the N20 and local roads, occasional

railway noise on the Dublin to Cork railway line, human voices, bird sounds and noise from agricultural machinery.

9.5.2 Potential Effects

Do Nothing

If the proposed Project does not go ahead, traffic volumes are predicted to increase in line with natural traffic growth and the noise environment is expected to remain similar to the baseline.

Construction Phase

Significant noise effects are predicted at four receptors at XC212 Ballycoskery. This is mainly due to the long construction period of approximately 63 weeks and the presence of sensitive receptors including residential houses and a primary school. Mitigation is proposed, including clear communication with residents, noise abatement hoardings and screens, and programming of works to ensure minimal work takes place outside of normal working hours. The construction programme for XC211 Newtown is a maximum of 15 weeks, however following consultation, the construction is not located near any sensitive receptors

Operational Phase

The proposed alignment for XC211 Newtown links two unnamed roads to the east of the railway line so there is potential for an increase in traffic noise levels at receptors in close proximity to the road. The proposals for XC212 Ballycoskery realign the road to the south of the existing road by around 30m, thereby potentially reducing noise levels at some receptors in this area including Ballyhea National School.

No receptors were predicted to meet the criteria for requiring mitigation.

9.6 Traffic & Transport

9.6.1 Baseline

The existing XC211 Newtown Level Crossing is situated on an unnamed local single-track road, subject to an 80km/h speed limit, that connects to the L1533 at Dooley's Cross Roads in Ballyhea with the L5531 in the north. The existing crossing XC212 is located on the L1533, a single carriageway road that runs east to west

from the N20 to Ardrpatrick. The section of road within Ballyhea is subject to a 50km/h speed limit as is Beechwood Dive which directly accesses off this, on the west side of the existing crossing, into a local housing estate. The N20 national road is links between Cork to the south and Limerick to the north. Within the boundaries of the study area it is single carriageway and subject to a speed limit of 60km/h.

Three classified volumetric ATC (24 hours) surveys were commissioned for seven days commencing on Tuesday 15th October 2019.

Two classified JTC (0700-1000 and 1600-1900) surveys were also commissioned for Tuesday 15th and Wednesday 23rd October 2019.

Non-motorised user (NMU) surveys were also carried out at each crossing location between for seven days commencing Tuesday 21st January 2020.

9.6.2 Potential Effects

Do Nothing

Growthed 2019 baseline traffic flows to future years 2021 and 2022, as shown in EIAR Volume 3, Chapter 11: Traffic and Transport Table 11 27 and 11 28, indicate that there would be very little change in overall numbers over the construction period

Construction Phase

Increases in overall traffic numbers during construction will be minimal. Increases in HGV movements will also be low. No significant impacts are predicted on traffic flows. No significant impact is predicted for driver delay or severance as a result of construction traffic.

There is likely to be an increase in perceived risk of accidents as a result of heavily loaded HGVs in the area. It is predicted the proposed Project will have significant impact on fear, intimidation and pedestrian delay given the proximity of residential properties and the local school.

Proposed mitigation measures have been developed and will be incorporated into a Construction Traffic Management Plan (CTMP) by the Contractor prior to commencement of construction. These include measures related to the timing and routing of Construction Phase HGV traffic; communications with local communities about timings, for example to avoid

school arrival and departure times, and key local dates; and a Travel Plan for construction workers.

Following implementation of these measures there would be no significant residual effects.

Operational Phase

Although the proposed Project involves the rerouting of traffic, the rerouting would, , actually reduce the numbers of vehicles passing several houses to the west of existing crossing XC211 Newtown.

The rerouting of traffic from XC211 Newtown to the existing overbridge and the creation of a new junction and realignment of the railway crossing at XC212 Ballycoskery this is anticipated to be beneficial to all road users due to road and junction improvements including new footways.

At XC212 Ballycoskery, during the operational phase of the proposed Project there will be no additional traffic generated by the works other than the very occasional inspection or maintenance of the new road-over-rail bridge which is negligible.

9.7 Cultural Heritage

9.7.1 Baseline

There are nine (9) previously recorded archaeological sites in the study area. These monuments are all listed on the RMP, and the church is also recorded by the NIAH (AH010) along with the associated parochial house with its entrance gates and piers (AH011). The existing rail line follows the 19th-century Great Southern and Western Railway (IH-1), and the level crossing (IH-5 & IH-6).

Information on the origin of townland names and folklore stories within the study area presented in EIAR Volume 3, Chapter 12: Cultural Heritage

Field surveys were carried out as follows:

- October 2019: a site walkover inspection, which identified a possible leat (AY020a) and previously unrecorded earthworks (AY020b) that may be associated with the moated site (AY020); a previously unrecorded sub rectangular enclosure (AY026);, and a farmhouse of architectural heritage interest (AH012). The survey confirmed that the former

gatekeeper's house (IH-7 [AH013]) is also of architectural heritage interest.

- February 2020: a geophysical survey of the proposed new road for XC211 Newtown in the immediate vicinity of ringfort AY023 This identified a number of geophysical anomalies of potential archaeological significance.
- June 2020: an extended geophysical survey at XC211, to the south of the ringfort, which resulted in further anomalies being identified.
- November 2020: archaeological test excavations to investigate the geophysical anomalies at XC211 Newtown. No archaeological features were identified during the testing.
- November/December 2020: geophysical survey of the proposed new roads at XC212 Ballycoskery The survey identified an L-shaped anomaly at the location of the potential rectangular enclosure (AY026) identified during the 2019 survey, and a possible old road/relict field boundaries (AY044)

9.7.2 Potential Effects

Do Nothing

The level crossing (IH-6), which is considered to be of local historical and social interest, would continue to operate much as it has done since the nineteenth century. The former gatekeeper's house (IH-7 [AH013]) and other heritage assets would remain essentially unchanged, though future developments, accidental damage and natural erosion of archaeological sites may affect these assets in the future. If subsurface archaeological remains exist within the development design extents, these will remain unaffected by the railway.

Construction Phase

There will be slight adverse effects on the setting of the ringfort (AY020); the potential leat (AY020a); the church (AY025) and its burial ground (which could be disturbed by groundworks); the parochial house (AH011) and the farmhouse (AH012).

The proposed Project at XC212 Ballycoskery could have a potentially significant impact on archaeology associated with the earthwork/enclosure AY026

Archaeological monitoring of groundworks by a suitably qualified, licensed archaeologist shall be carried out at XC211 Newtown. Should significant archaeological features be identified, all works which might affect them shall stop. The exposed archaeological material shall be recorded, and further mitigation will be undertaken as required.

Archaeological test excavations shall be carried out by a licensed archaeologist at XC212 Ballycoskery to investigate the potential archaeological features identified through field walking and geophysical survey including the potential enclosure (AY026), possible leat adjacent to the moated site (AY020a) and former road and field boundaries (AY044).

Operational Phase

Slight impacts are predicted during construction for the Moated site (AY020), the ringfort (AY023) the church (AY025), the parochial house (AH011), the farmhouse (AH012) and the railway line and embankment. Moderate impacts are predicted for the level crossings at XC211 and XC212 as these are of local and historical interest

A significant negative impact for architectural heritage is predicted due to the demolition of the former gatekeeper's lodge (AH013/IH-7)

Detailed recording shall also be carried out on the level crossings to be closed and removed and adjoining sections of the Cork–Dublin rail line.

Detailed building recording shall be carried out on all architectural heritage features that are to be removed or otherwise impacted by the development. This includes the former gatekeeper's house at Ballycoskery (AH013/IH-7).

9.8 Landscape

9.8.1 Baseline

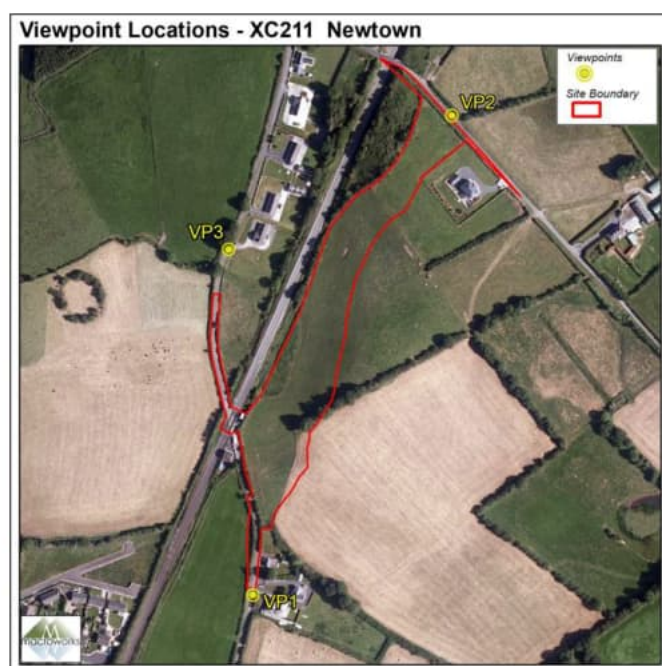
The landscape of the study area is generally flat to mildly undulating. On the eastern periphery of the study area the terrain begins to rise towards the rolling foothills of the Ballyhoura Mountains which are the most prominent landscape feature within the wider surrounds of the proposed Project. The Awbeg River is the most prominent watercourse within the study area

and flows in a southerly direction just over 400m west of the proposed Project at its nearest point.

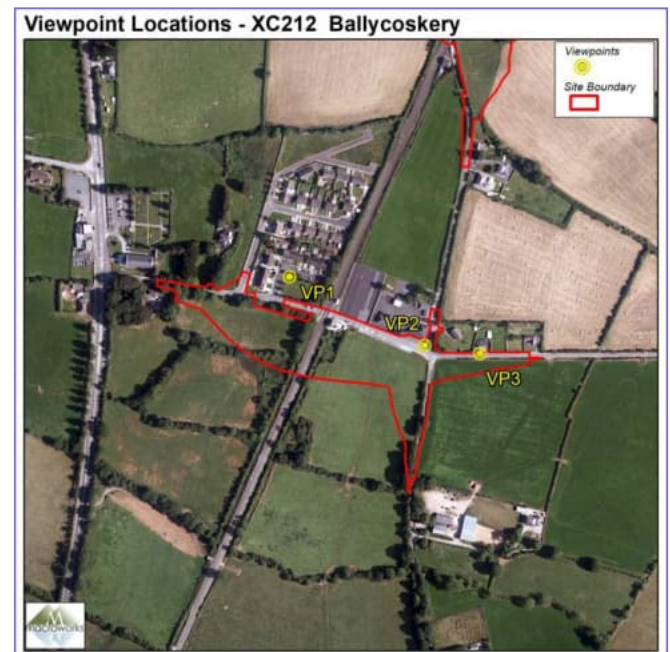
Many of the landscape elements relate to the visual receptors i.e places and transport routes from which viewers can potentially see the proposed Project

Three representative viewpoints for (XC211 Newtown (see Inset) and XC212 Ballycoskery (see Inset) have been selected for the purposes of the visual impact appraisal

Inset Figure 9. 1: Viewpoints XC211 Newtown



Inset Figure 9 2: Viewpoints XC212 Ballycoskery



9.8.2 Potential Effects

Do Nothing

If the proposed Project were not to proceed the site and its immediate surrounds would remain in its present form. The existing crossing and local road would remain, and the pastoral fields would also remain in situ. The existing vegetation would likely continue to grow and be managed and maintained as it is presently.

Construction Phase

During the construction phase there will be a far higher intensity of activity at the site than during the operational phase. This will include HGV and workers vehicle movement to and from the site; construction machinery, within the site; temporary and permanent physical disruption of the land cover during site establishment; stockpiling of material for use in the landscape mitigation; storage of construction materials. ; and a crane and crane pad All of these will detract slightly from the low intensity pastoral character of the rural surrounds of the proposed rail overpass, but only within the immediate landscape context of the works.

Impacts from the change in land cover are considered to be minor; and construction related activity and its effect on landscape character will be temporary in

duration The overall significance of construction stage landscape effects is deemed to be Moderate-slight. For these reasons, the significance of visual impact would also be moderate-slight.

Operational Phase

Landscape impacts are likely to arise from the modifications to the landform generated by the engineered elevated embankments. Once mitigation planting has become fully established (c. 3-4 years), the engineered embankments will blend with the surrounding fields and hedgerows, however, the precast concrete sections of the road-over-rail bridge and metal crash barriers and signage will contrast with the natural tones and textures of the pastoral fields of the surrounding rural context.

In terms of the landscape character, the proposed Project represents the intensification of road infrastructure within the study area rather than the introduction of a new or distinctive form of development. The proposed new road alignment will not appear incongruous within the small village of Ballyhea. The significance effect on landscapes is judged to be Slight.

In terms of visual impacts, the proposed Project will be most visible where it ties in with local roads, north and south of the railway line. There will also be intermittent views of it as it rises over the railway; seen between existing hedges and trees. Existing trees and hedgerows which provide screening will be retained in so far as possible; some hedges will be removed to facilitate junctions, reducing screening in these areas.

For viewpoints of XC211, impacts are predicted to be Moderate for VPs 1 and 2 and slight to imperceptible at VP3. Planting is proposed for this site; areas of retained hedgerow will be supplemented; any removed will be replaced and additional hedgerow will be planted alongside the timber fence.

For viewpoints at XC212, VP1 (Beechwood Estate) impacts are predicted to be Moderate. For VP2 (Ballyhea School) impacts are predicted to be Substantial-moderate. Impacts at VP3 (Dooley's Crossroads) impacts are predicted to be moderate-slight. Significant planting is proposed including supplementing existing hedgerows, replacement hedgerows and trees and additional trees on the embankments and to provide screening, reduce these

impacts to Moderate to Slight for VP1 Moderate for VP2 and Slight for VP3.

9.9 Air Quality

9.9.1 Baseline

The available traffic flow information indicates a very low number of vehicles the XC211 Newtown Level Crossing. The available traffic flow information indicates a relatively low number of vehicles using the XC212 Ballycoskery Level Crossing. No specific air quality surveys were required to inform the assessment, which relied on existing data or data produced from surveys undertaken by other disciplines (e.g. traffic and transport surveys).

9.9.2 Potential Effects

Do Nothing

If the proposed Project does not proceed traffic volumes are predicted to increase in line with natural traffic growth. Concentrations of NO₂, PM₁₀ and PM_{2.5} at receptors close to the existing level crossings would remain at the low values representative of the rural location, well below the relevant air quality standards.

Construction Phase

Due to low numbers of construction vehicles, no air quality effects are expected.

Emissions of dust during construction were scoped out from the air quality assessment on the basis that the construction activities associated with each of the level crossings are relatively small-scale. Guidance produced by the Institute of Air Quality Management (IAQM) (IAQM, 2016) was used at the scoping stage to identify the likely dust risks for each of the level crossings. This consideration concluded that given the low to medium risks of dust impacts, the application of a suite of appropriate good practice mitigation measures and management techniques, as set out in the IAQM guidance (IAQM, 2016), would ensure significant effects from dust emissions would not occur.

The measures include a requirement for a Dust Management Plan to be produced by the Contractor prior to construction commencing, which will include

the wider set of measures outlined in the EIAR and be in line with the IAQM 2016 Guidance.

Operational Phase

There would be no perceptible change from the Do Nothing scenario. Changes to pollutant concentrations at receptor locations close to the local road network in the vicinity of XC211 Newtown and XC212 Ballycoskery would be negligible and the air quality effects would be insignificant.

10. XC215 Shinanagh

10.1 Population and Human Health

10.1.1 Baseline

The area surrounding the level crossing is a rural dispersed community consisting of 356 residential properties and a small number of businesses.

Buttevant is 5km away and Charleville is just under 8km away

10.1.2 Potential Effects

Do Nothing

In absence of the proposed Project, the level crossing would continue to operate and the existing safety risk at the interface between road and rail would remain, which, whilst low the proposed Project seeks to permanently remove.

Construction Phase

During construction of the proposed new road, potential amenity effects may be experienced by nearby residential receptors due to noise and visual effects associated with the construction activities over a 44 week period. Overall effects on health are likely to be neutral.

Operational Phase

As there are no significant residual effects on traffic, air quality or landscape and visual, no significant amenity effects are expected. No significant effects are expected on residential land no significant impacts are predicted for WCH users. Based on the low levels of existing traffic flows on this route, this is expected to result in minor beneficial effects on access to local employment and tourism. The effect is not considered to be significant. the health outcome is considered to be positive.

The extinguishment of the PRoW may present a slight inconvenience for users wishing to access the local road to the west of the existing crossing, as these will be diverted 800m north to an existing overbridge. However, there will also be benefits from reduced wait times, especially for those accessing from the north and so this is not significant.

10.2 Biodiversity

10.2.1 Baseline

The proposed crossing is surrounded predominantly by agricultural and amenity grassland delineated by hedgerow and scrub. The closest watercourse is the Awbeg (Buttevant), located approximately 400m from the proposed crossing

Protected, rare or notable flora and fauna recorded in the desktop survey within 5km of the site include: Freshwater White-Clawed Crayfish; Irish Hare; Fallow Deer Otter; Badger, Stoat, Brown Long eared bat, Common Frog, Sea lamprey, Whooper Swan, Japanese Knotweed, Hasselquist's hyssop, golden dock and orange foxtail.

Field surveys were carried out in early 2020.

No protected plant species listed on the Flora (Protection) Order, 2015 were recorded within the study area. One non-native invasive plant species, Japanese Knotweed was recorded within the study area

No signs of otter were recorded within the study area. However, badgers are present within the study area although no setts were identified. Other protected mammals such as the Irish stoat and hedgehog are likely to be present within the study area within the areas of suitable habitat.

Common frog is likely to utilise seasonally wet ditches within the study area.

No records of common lizard and habitats are not considered to support this species.

Hedgerows and treelines would provide suitable foraging and commuting habitat for common bat species. Brown long-eared bat (*Plecotus auratus*) have also been recorded within 5km of the study area. A derelict building next to the existing crossing was considered to have high potential to support a bat roost. This building will not be affected as part of the proposals.

Breeding birds including Wren, Willow Warbler, Robin, House Martin, Blackbird, Chaffinch, Goldcrest, Great Tit, Starling, Song Thrush, Hooded Crow and Woodpigeon were recorded within the study area. No wintering birds were recorded. Habitats within the 500m survey buffer were considered suitable for foraging swans

10.2.2 Potential Effects

Do Nothing

The majority of land proposed for development is currently managed as agricultural land. If the proposed Project was not progressed it is likely that there would be little change to the existing environment, and it is likely it would continue to be used for agricultural purposes and remain in this current managed state.

Construction Phase

There are no predicted effects for designated sites in relation to works proposed at this crossing point.

Construction works during the proposed Project could result in the spread of Japanese knotweed within the study area leading to a significant effect on habitats and species at a local geographic scale.

Potential significant impacts at a local geographical scale are predicted for badger (as a result of injury), small mammals (habitat loss), amber and green listed birds (disturbance and loss of nesting habitat), frogs (disturbance near ditches during breeding season).

Mitigation measures include the generic mitigation measures as outlined in Volume 3, Chapter 7: Biodiversity. Specific mitigation measures during construction are associated with invasive species and badger. These include:

- Exclusion zones and no machinery to be allowed within exclusion zones to prevent spread of invasive species;
- Limited night-time working and control of noisy plant and machinery in the vicinity of badger setts;
- Excavations covered at night-time to protect badgers from falling;
- Minimum distance of barrows pits and spoil heaps from badger setts; and
- Control on chemicals near badger setts.

Operational Phase

Permanent loss of habitat and the resultant loss of foraging habitat as a result of the proposed Project would likely result in a significant effect at a local

geographic scale on badger, commuting bats, and breeding birds (green and amber listed).

No impacts are predicted on the water quality of local ditches or the Awbeg River; the proposed swales alongside the new road will reduce runoff rates to existing greenfield rates and provide a level of treatment to prevent routine road contaminants from entering nearby water bodies.

Areas of existing vegetation will be retained and enhanced insofar as possible. Hedgerows will be retained or reinstated where possible. Where hedgerows will need to be removed to facilitate the footprint of the proposed Project, these will be replaced with areas of additional planting throughout the site. Mitigation measures for the loss of habitat at XC215 Shinanagh, planting of native scrub and trees have been incorporated into the landscape plan (see Volume 3, Chapter 13: Landscape and Visual).

These measures will also protect bat species from loss of foraging and commuting habitat.

To mitigate for loss of nesting habitat trees, hedgerows and scrub will be incorporated into the landscape plan at XC215 Shinanagh. Whilst no significant impacts are anticipated during the operational phase, this will provide compensatory habitat for some bird species. Nest boxes will also be provided.

10.3 Soils, Geology & Hydrogeology

10.3.1 Baseline

Soils and Geology

The existing conditions for soils and geology at this site include Howardstown soil association, river alluvium. To the north of the study area, are small areas described as bedrock at the surface, comprising shallow well drained mineral. There is no 'Made ground'. There are no geological sites of interest, no active quarries or pits and there is very low local potential for crushed rock aggregate and moderate to high potential for granular aggregate.

Geological maps show that the bedrock at the crossing location is expected to comprise the Kiltorcan Formation Superficial deposits are expected to comprise Till. Local phase G1 indicates predominantly sandstone with some weaker layers of mudstone and siltstone interbedded. Also, sandy, gravelly, clay/ silt

frequently with low cobble content. No made ground was identified.

The potential for contaminated land is very low, with the only 'industrial' infrastructure present being the railway itself. Historic mapping shows this has been the case going back to 1837.

Hydrogeology

Available mapping shows that the bedrock underlying the crossing location itself is classed as a regionally important aquifer – fissured bedrock.

The local phase GI in August/September 2020 indicated the presence of groundwater in superficial deposits, with the water table ranging from 4.6 to 9.6m. Records from February 2020 indicated a water table of 0.6 to 1.8m. This indicates either large seasonal fluctuations here or perched groundwater in the February sampling.

A consultation exercise with landowners has been undertaken and recorded two PWS (PWS215/1 and PWS215/2) within a 0.5 km radius of the proposed Project. PWS215/1 is located roughly 50 m from the proposed new access road due west. It is understood to be a 60 m deep well providing the sole domestic supply to the property as well as for animal drinkers. PWS215/2 is understood to be a shallow active abstraction used to supply the property and cattle. Two septic tanks were also recorded (ST215/1 and ST215/2) within 600 m of the proposed Project.

The Water Framework Directive status for the groundwater body here (Ballyhouran Kiltorcan) is classified as Good.

Habitat surveys did not record the presence of any likely GWDTEs in this.

10.3.2 Potential Effects

Do Nothing

No effects are expected for the "do nothing" scenario in relation to soils, geology, contaminated land and hydrogeology.

Construction Phase

The potential impact on superficial deposits and mineral resources is predicted to be negligible.

In terms of contaminated land, whilst the exact locations of the septic tanks are unknown, it is estimated they are several hundred metres from the proposed new road at their nearest point and so the likelihood of interaction is very low. Whilst the railway infrastructure is close by to the proposed new road, there is no evidence of any contamination in the area associated with it. As a result, no pathway for contaminated materials to ground or surface water is predicted and there would be low risk of interaction with contaminated material by workers.

Accidental spillage could result in a medium magnitude disturbance to groundwater however, it is categorised as a low likelihood resulting in the potential impact significance of Moderate/Low. In the absence of cuttings, no dewatering impact is expected.

PWS215/2 is less than 50m from the proposed new access road. Potential impacts on groundwater flow and quality are possible. Assuming a worst-case scenario of a medium magnitude of impact, this would result in a significance of impact of Moderate. The supply will be monitored for yield and quality before and during construction. Should any impact be recorded, an alternative water supply will be provided to the property affected.

Operational Phase

Based on the information available, no long-term impact is expected.

10.4 Water

10.4.1 Baseline

There are two water bodies in the study area; the Awbeg (Buttevant)_010 and the Awbeg (Buttevant)_020. Both are partially designated as part of the Blackwater River (Cork/Waterford) SAC. Field ditches close to the proposed Project drain to these water bodies. Flood risk from all most sources is considered to be low or very low.

The hydrological survey undertaken in January 2020 resulted in the identification of a field drain running

adjacent to the proposed Project which flows north to south. Some surface water flooding was observed in the northern section of the drain. The southern end of the drain had no flow at the time of survey

10.4.2 Potential Effects

Do Nothing

Local watercourses will remain in their current WFD status and with the identified risks unchanged. Flood risk will remain unchanged.

Construction Phase

The construction of the proposed new road has the potential to impact upon hydrology, water quality and geomorphology. In terms of hydrology and drainage, disruption to local field drains is possible as the topography slopes east to west and surface water flows to the ditches could be severed as a result of pollution control measures seeking to minimise surface water flows across stripped soil. Without such measures in place, however there is the potential for increased sediment loads in the ditch, affecting water quality and geomorphology. Impacts in both waterbodies are predicted to be moderate to significant for hydrology and geomorphology, significant to very significant for water quality.

Generic mitigation measures are proposed to minimise this impacts. No site specific measures are required at this site.

It is unlikely there would be any impacts on water bodies from the construction compound at this site, however it would be managed in accordance with the control measures set out in Volume 3, Chapter 9 Water and the Outline CEMP to ensure no impacts occur,

Operational Phase

The baseline assessment of flood risk at the site is low from all sources. That aside, the introduction of new impermeable areas could potentially increase the volume and peak flow of surface runoff reaching watercourses and could therefore contribute to an increase in flood risk This potential impact has been assessed and designed out (embedded mitigation) through the proposed drainage strategy .

The proposed new road will drain to local surface water networks via swales. Maximum outflow is capped at existing greenfield runoff rates resulting in no increase in flood risk. Some level of treatment in respect of routine road contaminants will also be provided As a result, no significant impact is predicted during the operational phase on either of the water bodies.

The FRA concluded that the XC215 Shinanagh site is a less vulnerable development (local transport infrastructure) and is at low risk of flooding from all sources. As such, the proposed works are appropriate and do not require a Justification Test.

10.5 **Noise and Vibration**

10.5.1 Baseline

XC215 Shinanagh is located in a rural area dominated by farmland and with occasional, scattered residential properties. There are 22 residential receptors within 300m of the site.

The main noise sources were confirmed as road traffic using the N20, train noise on the Dublin to Cork railway line and bird sounds.

10.5.2 Potential Effects

Do Nothing

If the proposed Project does not go ahead, traffic volumes are predicted to increase in line with natural traffic growth and the noise environment is expected to remain similar to the baseline.

Construction Phase

Significant noise effects are predicted for Phase 1 of the proposed works at two locations and for Phase 2 at two locations. As no piling works are proposed, vibration is not expected to be an issue.

Operational Phase

In the opening year and the design year the proposed Project is predicted to result in an increase in noise levels at one receptor due to a redistribution of traffic within the local road network increasing the traffic volumes on local roads.

At the remaining receptors no change in noise levels is predicted in the opening year. In the design year noise levels are predicted to increase between the Do-Something design year and the Do-Minimum Opening Year. The reason for the increase is twofold: natural traffic growth and redistribution of traffic within the local road network.

10.6 Traffic & Transport

10.6.1 Baseline

The existing XC215 Shinanagh Level Crossing is situated on the L1320, a single carriageway road linking the N20 to the east and Churchtown to the west. With a mixture of single-track and narrow single carriageway rural roads surrounding the proposed crossing XC215 Shinanagh there is no footpath or cycling provision however many locals may still use these roads for commuting and recreation due to the rural nature and relatively low traffic flows. The Ballyhoura Way follow roads in this area. There are no public transport services within the immediate vicinity, with the nearest train station at Charleville.

Three classified volumetric ATC (24 hours) traffic surveys were commissioned for seven days, commencing Tuesday 15th October 2019. The highest volumes were identified as 1,029 on the L1320 (all directions) with 5.2% HGV traffic.

A non-motorised user survey was also carried out on several days between 21st January and 15th February 2020. Fewer than five people (walking or cycling) used the level crossing over this period. are negligible.

10.6.2 Potential Effects

Do Nothing

Growthed 2019 baseline traffic flows to future years 2021 and 2022 indicate that there would be very little change in overall numbers over the construction period. These increases suggest a negligible operational impact over this period if no works were carried out.

Construction Phase

Increases in overall traffic numbers during construction will be minimal. Increases in HGV movements will also be low. No significant impacts are predicted on traffic flows. No significant impact is predicted for driver delay or severance as a result of construction traffic.

There is likely to be an increase in perceived risk of accidents as a result of heavily loaded HGVs in the area. However, with sufficient capacity to accommodate the small increases in traffic, the proposed Project will not have significant impact on fear, intimidation and pedestrian delay.

Notwithstanding that there will be no significant impact on these elements, proposed mitigation measures have been developed and will be incorporated into a Construction Traffic Management Plan (CTMP) by the Contractor prior to commencement of construction. These include measures related to the timing and routing of Construction Phase HGV traffic; communications with local communities about timings, for example to avoid school arrival and departure times, and key local dates; and a Travel Plan for construction workers.

Following implementation of these measures there would be no significant residual effects.

Operational Phase

During the operational phase of the proposed Project there will be no additional traffic generated, however, as the works involve the rerouting of traffic due to the closure of existing crossing XC215 Shinanagh and new road diversion to the existing road-over-rail bridge to the north there will be some significant traffic redistribution. No significant impacts on traffic numbers on the L5507 are predicted as a result of the redistribution.

There is predicted to be an improvement to safety as a result of the closure of the level crossing and reduced driver delay. No significant impact is predicted in terms of fear, intimidation and pedestrian delay or severance.

10.7 Cultural Heritage

10.7.1 Baseline

There are eight (8) previously recorded archaeological sites within 500m of the proposed works. Apart from the standing stone which is listed on the SRMP only, these monuments are all listed on the RMP. The existing rail line follows the nineteenth-century Great Southern and Western Railway (IH-1), and the level crossing (IH-8) with associated gatekeeper's cottage alongside is depicted on the 25-inch Ordnance Survey map (surveyed 1896–1904) as is Shinanagh railway bridge (IH-11 [AH015]).

A number of field surveys have been carried out at this site, as follows:

- October 2019: A cultural heritage site inspection walkover, which identified substantial earthworks in the field adjacent to Imphrick Church & Graveyard.
- February 2020: geophysical survey of the proposed road in the field near to the church and graveyard, which identified a number of geophysical anomalies of potential archaeological significance.
- June 2020: an extended geophysical survey to the north over the remainder of the route which identified further anomalies of archaeological potential.
- November 2020: archaeological test investigations which identified three separate areas of archaeology:
 - Spread, along with linears and ditches;
 - Linears, pits, ditches and charcoal spreads associated with metalworking; and
 - Pits/post-holes, linears and ditches suggestive of settlement activity
- November 2020: geophysical survey of possible alternative route alignment to the west of the proposed Project, which revealed extensive anomalies that are likely to be archaeological.

10.7.2 Potential Effects

Do Nothing

The level crossing (IH-8), which is considered to be of local historical and social interest, would continue to operate much as it has done since the nineteenth century. The other heritage assets would also remain unchanged.

Construction Phase

The proposed Project will have direct impacts on three areas of recently identified archaeology: the earthworks/possible field system and possible burnt spread (AY035) in the field containing Imphrick Church; subsurface features (AY036) in the field immediately north of Imphrick Church; and pits/post-holes, linears and ditches (AY045) further north in Ballynageragh. In the case of AY035 and AY036, the effect is predicted to be moderate to potentially significant adverse, due in part to the potential association with the medieval church; in the case of AY045 the effect is predicted to be slight–moderate adverse.

The areas of archaeology identified during surveys and testing to the north of Imphrick Church (AY036 and AY045) shall be subject to full open-area excavation.

Additional archaeological test excavations shall also be carried out to the east, southeast and south of Imphrick Church and graveyard to investigate the archaeology in this area.

Where significant archaeological features are recorded during testing, further mitigation will be undertaken as required.

Operational Phase

Closure of the level crossing (IH-8) is predicted to have a moderate negative effect on the cultural heritage of the area. A slight negative impact is also predicted for the nineteenth-century railway bridge in Shinanagh (AH015).

Detailed recording shall also be carried out on the level crossing to be closed and removed and adjoining sections of the Cork–Dublin rail line (IH-1).

A slight negative impact is predicted during operation for Imphrick Church & Graveyard (AY029 & AY030) and

Shinanagh Bridge (AH015) as a result of additional infrastructure being introduced into their settings.

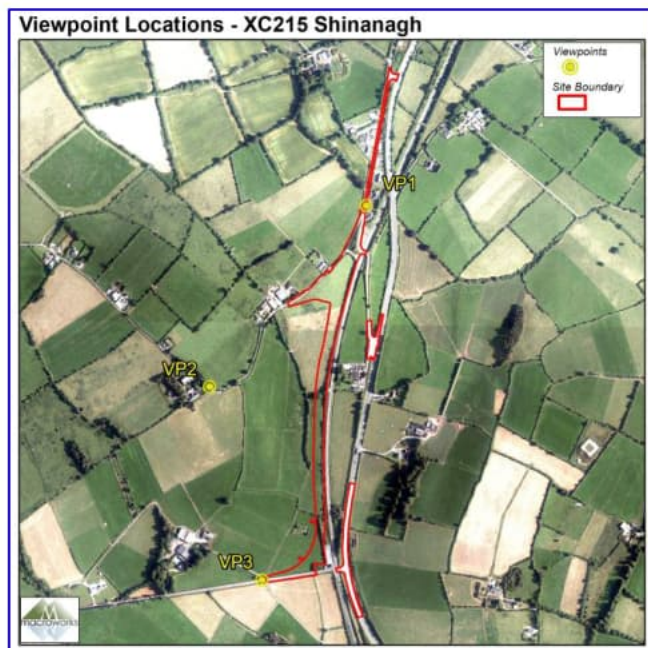
10.8 Landscape & Visual

10.8.1 Baseline

The landscape of the study area is mixed farmland with an extensive network of geometric fields generally contained in pastoral farming and cropping. There are no designated scenic routes or views within the study area or its immediate surrounds, however a section of the Ballyhoura Way national waymarked trail enters the study area. A small cluster of dwellings occurs immediately north of the proposed road in the townland of Shinanagh, whilst several dwellings also occur along a local road immediately west. Aside from this, there are no notable public amenities and facilities within the study area. The remnants of the Imphrick Church and Graveyard are situated in an agricultural field northwest of the existing railway crossing with a the L1320 local road.

Three representative viewpoints were selected for the purposes of the visual impact appraisal. These are shown in Inset.

Inset Figure 10. 1: XC215 Shinanagh Viewpoints



10.8.2 Potential Effects

Do Nothing

If the proposed Project were not to proceed the site and its immediate surrounds would remain in its present form.

Construction Phase

During the construction phase there will be a far higher intensity of activity at the site than during the operational phase. This will include HGV and workers vehicle movement to and from the site; construction machinery, within the site; temporary and permanent physical disruption of the land cover during site establishment; stockpiling of material for use in the landscape mitigation; storage of construction materials; and a crane and crane pad. All of these will detract slightly from the low intensity pastoral character of the rural surrounds of the proposed rail overpass, but only within the immediate landscape context of the works.

Impacts from the change in land cover are considered to be minor; and construction related activity and its effect on landscape character will be temporary in duration. The overall significance of construction stage landscape effects is deemed to be Moderate-slight.

For these reasons, the significance of visual impact would also be moderate-slight.

Operational Phase

The most notable operational phase landscape impact will be the introduction of a new piece of road infrastructure and its associated signage, fencing and safety barriers into an area comprising of pastoral farmland. The magnitude of operation stage landscape impacts is deemed to be Medium-low. When combined with the Medium-low landscape sensitivity rating, the significance effect is judged to be Slight.

The visual impact of the proposed project from the three viewpoints examined is slight-imperceptible at VP1 and VP2, and slight at VP3.

These impacts will be reduced to as a result of the proposed landscape planting at the site. Here it is proposed that any areas of existing retained hedgerow within the proposed Project site are supplemented; new hedgerow will be planted along the project side of the

proposed timber post and rail fencing, and an area of low shrub mix will be planted along the proposed east facing embankment at the northern end of the proposed road

10.9 Air Quality

10.9.1 Baseline

The level crossing is in an isolated rural setting with no nearby residential properties. The nearest property is approximately 350m to the north northeast of the level crossing. The nearest non-local road is the N20, which is approximately 20m to the east of the level crossing

The available traffic flow information and additional survey data carried out for the proposed Project indicates a relatively low number using the XC215 Shinanagh Level Crossing.

10.9.2 Potential Effects

Do Nothing

If the proposed Project does not proceed traffic volumes are predicted to increase in line with natural traffic growth. Concentrations of NO₂, PM₁₀ and PM_{2.5} at receptors along the route of the existing level crossing would remain at the low values representative of the rural location, well below the relevant air quality standards.

Construction Phase

The vehicle movements associated with the construction activities are considered to be insignificant.

Emissions of dust during construction were scoped out from the air quality assessment on the basis that the construction activities associated with each of the level crossings are relatively small-scale. Guidance produced by the Institute of Air Quality Management (IAQM) (IAQM, 2016) was used at the scoping stage to identify the likely dust risks for each of the level crossings. This consideration concluded that given the low to medium risks of dust impacts, the application of a suite of appropriate good practice mitigation measures and management techniques, as set out in the IAQM guidance (IAQM, 2016), would ensure significant effects from dust emissions would not occur

The measures include a requirement for a Dust Management Plan to be produced by the Contractor prior to construction commencing, which will include the wider set of measures outlined in the EIAR and be in line with the IAQM 2016 Guidance

Operational Phase

The change in air quality at any receptor within 200m of the new route alignment would be described as negligible and the air quality effect would be not significant.

11. XC219 Buttevant

11.1 Population and Human Health

11.1.1 Baseline

The local study area is rural in character with some higher-density housing and small-scale commercial enterprises in Buttevant town - located 500m to the south-east.

The more industrial area of Mallow is located at approximately 11km to the south and provides a wider variety of employment.

11.1.2 Potential Effects

Do Nothing

In absence of the proposed Project, the level crossing would continue to operate and the existing safety risk at the interface between road and rail would remain, which, whilst low the proposed Project seeks to permanently remove.

Construction Phase

No significant amenity effects are expected. The overall effect on agricultural land is not significant. negligible effects are expected on WCH users. The presence of HGVs and increased traffic flow could result in adverse severance effects for those accessing the school and local community facilities. For those accessing the school, mitigation will ensure that, as far as possible, timings of HGV movements avoid school pickup and drop off times. The overall impact on the local community is expected to be slight and not significant. Based on the low traffic flows on the existing road and the lack of impacts locally, it is unlikely that there would be any wider impacts on access to employment and tourism in the region overall effects on health are likely to be neutral.

Operational Phase

As there are no significant residual effects on traffic, air quality or landscape and visual, no significant amenity effects are expected. No significant effects are expected on residential land no significant impacts are predicted for WCH users. Based on the low levels of existing traffic flows on this route, this is expected to result in minor

beneficial effects on access to local employment and tourism. The effect is not considered to be significant. the health outcome is considered to be positive

The existing PRoW here will be replaced by a new crossing, less than 50m south. With no delays as result of waiting for trains, this is considered a beneficial impact, although not significant.

11.2 Biodiversity

11.2.1 Baseline

The proposed Project at this site is surrounded predominantly by agricultural grassland with hedgerows and scrub. The proposed road-over-rail bridge would cross directly over the Pepperhill River and one of its off shoots. The Pepperhill River flows directly into the Awbeg River (Buttevant) 240m downstream. The Awbeg River at this point is within the Blackwater River (Cork/Waterford) SAC.

Protected, rare or notable flora and fauna recorded in the desktop survey within 5km of the site include: Freshwater White-Clawed Crayfish; Fallow Deer, Irish Hare; Otter; Badger, Leisler's bat, Hedgehog, Common Frog, smooth newt, Kingfisher, Barn Owl, Teal, Northern Shoveler, Sea lamprey, Hasselquist's hyssop, golden dock, orange foxtail and Killarney Fern

Field surveys were carried out in early 2020.

No protected plant species listed on the Flora (Protection) Order, 2015 were recorded within the study area

In terms of mammals, although otters are present within the study no resting sites (holts) were identified.

Irish stoat and hedgehog are likely to be present within the study area. Hedgehog have been recorded within 5km of the study area previously

Immediately upstream of the study area the Pepperhill River was considered suitable to support both common frog and smooth newt.

The study area is hydrologically linked to the Blackwater (Cork/Waterford) SAC via the Pepperhill River. The SAC is designated for a number of aquatic species including lamprey, salmon and freshwater pearl mussel. Salmon and river lamprey have been recorded on the Awbeg river. Freshwater pearl mussels are

known to occur within the Blackwater (Cork/Waterford) SAC approximately 2km downstream of the study area. The Pepperhill River is considered to provide suitable habitat for white-clawed crayfish.

Two buildings within the study area were assessed as having PRFs. A large stone building / shed was assessed as having high bat roost potential. No bat roosts were identified within the buildings surveyed. However, four bat species were recorded within the study area during the surveys including Common pipistrelle; Soprano pipistrelle; Leisler; and Daubenton's (Myotis daubentonii).

Breeding birds including Wren, Swallow, Robin, House Sparrow, Swift, and were recorded within the study area.

Whooper swans were recorded within 300m of the proposed alignment crossing. Mute swans, Little egret, grey heron and mallard were recorded foraging within 500m of the study area.

11.2.2 Potential Effects

Do Nothing

The majority of land proposed for development is currently managed as agricultural land. If the proposed Project was not progressed it is likely that there would be little change to the existing environment, and it is likely it would continue to be used for agricultural purposes and remain in this current managed state. It is possible that there may be an increase in scrub encroachment into the habitat corresponding to Annex I habitat Lowland Hay meadows resulting in the reduction or loss of this habitat.

Construction Phase

At a national geographical scale, significant impacts are predicted for whooper swans as a result of disturbance.

The short (approx 200m) hydrological connection to the Blackwater (Cork/Waterford) SAC from the site via the Pepperhill river and its offshoot, means that a pollution event (release of contaminated surface water runoff and sediments) at the site could reach the SAC and would likely result in a significant effect on this European site at a local to county geographic scale. A disturbance event resulting in displacement of whooper swan during construction will also likely result in a significant effect on this European site at a national geographic scale.

Also at a local to county geographical scale, significant impacts are predicted for qualifying fish species and white-clawed cray fish in the River Awbeg (release of contaminated surface water runoff and sediments) and little egret, mallard and grey heron (disturbance).

At a local geographical scale, significant effects are predicted on otter (disturbance), small mammals (disturbance and habitat), amphibians (habitat loss), and green and amber listed nesting bird species.

No significant impacts are predicted for freshwater pearl mussels.

Mitigation measures to protect European sites have been set out in the NIS included in EIAR Volume 5, Appendix 7H.

Other mitigation measures for this site include:

- Protection of Otter species through pre-construction surveys; prohibited night-time working; managing noise levels; covered excavations at night-time; lights to be turned off after working hours; light work, wheeled or tracked vehicles to be carried out at a particular distance from holts;
- Protection of fish species and Invertebrates through pollution control measures and additional measures, including the method of installation of the culverts here are outlined in Section 11.4 Water of this NTS and the Outline CEMP;; and
- Protection of wintering birds in relation to whooper swans through timing of works; retained treeline; screening to be installed to ensure the site/works are screened before the main migration period artificial screening where treeline cannot be retained; adequate fencing heights; ECoW to supervise screening.

Operational Phase

At a local geographical scale, permanent loss of available foraging habitat and hedgerows/treelines is predicted to have significant impacts for commuting bats and breeding birds.

An area of high conservation value corresponding to Annex I habitat 'Lowland Hay meadows' will be lost. This habitat type is important for pollinators and support a number of invertebrate species including a population of the red-tailed bumblebee (*Bombus*

lapidarius) as species which is has near threatened conservation status in Ireland.

The proposed new road will drain to local surface water networks via swales. Maximum outflow is capped at existing greenfield runoff rates resulting in no increase in flood risk. Some level of treatment in respect of routine road contaminants will also be provided. As a result, no significant impact is predicted during the operational phase on either of the water bodies.

An indicative Mitigation Strategy has been developed (see EIAR, Volume 5, Appendix 7G) which details the method for translocating the area of dry meadows and grassy verges (GS2), including the habitat corresponding to Annex I habitat (6510) Lowland hay meadows, which will be lost under the footprint of the proposed Project. The extent of the receptor site will be greater than a like for like area to include an area that will be enhanced for invertebrates, reptiles and birds.

Areas of existing vegetation will be retained and enhanced insofar as possible. Hedgerows will be retained or reinstated where possible. Where hedgerows will need to be removed to facilitate the footprint of the proposed Project, these will be replaced with areas of additional planting throughout the site. Mitigation measures for the loss of habitat at XC215 Shinanagh, planting of native scrub and trees will be incorporated into the landscape plan. Nest boxes will also be provided.

A section of a stone wall will be removed at this site. The stones from this wall will be retained and moved to the lowland hay meadow receptor site to create refugia for reptiles. An EcoW will be present during these works to check for reptiles and a license may be required if reptiles are found to be present.

11.3 Soils, Geology & Hydrogeology

11.3.1 Baseline

Soils and Geology

The existing conditions for soils and geology at this site include Alluvium with Howardstown soil association adjacent. There are small, localised areas of bedrock outcrop or sub-crop to the south of the crossing. The crossing is located within the Hazelwood Limestone Formation. To the south of the crossing location, within the study area, the Caherduggan Limestone Formation is indicated as present and on-ground investigations

suggest that a cavity filled with soft clay was encountered.

There are no geological sites of interest, no active quarries or pits; there is very high local potential for crushed rock aggregate and moderate to high potential for granular aggregate.

Local phase G1 indicates the presence of sandy, gravelly silty clay, below made ground and topsoil. Bedrock was found at 2.3m and 8.3m.

There is a thrust fault indicated immediately north of the crossing location, trending roughly east-west, and a series of other un-named faults both within the study area and in the surrounding region.

Hydrogeology

Hydrocarbons were detected in the groundwater analysis indicating the potential for contaminated land. Existing rail lines and associated historical station / yard as well as road infrastructure are the most likely local source of contamination due to potential minor leakage of hydrocarbons and heavy metals over time.

Hydrogeological maps show that the crossing is located within an area defined as a regionally important aquifer, which is karstified (diffuse).

The local phase G1 indicated that groundwater was present at 2.2m in one location and 5 to 7m at two others.

A consultation exercise with landowners has been undertaken and three PWS have been recorded: PWS219/1, PWS2019/2 and PWS219/3. PWS219/1 is understood to be sourced from a stream and is considered in Volume 3 Chapter 9 Water. PWS219/2 and PWS219/3 are located within 10m of the proposed Project. Both are also understood to be fed from wells, but the depth of the supplies is not known. The supply from PWS219/3 was found to be equipped with a pumping system that feeds water to a pressurised container located close to the property. Two further surface water abstractions (PWS219/4 and PWS219/5) understood to be animal troughs fed by a small stream are situated adjacent to the proposed crossing location to the south and north respectively.

Six septic tanks have been identified.

The Water Framework Directive status for the groundwater body (Mitchelstown) is classified as poor.

Habitat surveys have identified the presence of a wet grassland area, however this area was observed as generally flooded the day the site visit took place, adjacent to a minor surface water feature. This area also falls within a flood risk zone, which would suggest that the main mechanism is associated with surface water flooding. For this reason, this area of wet grassland is considered unlikely to be a GWDTE, even though a degree of groundwater contribution cannot be ruled out.

11.3.2 Potential Effects

Do Nothing

No effects are expected for the “do nothing” scenario in relation to soils, geology, contaminated land and hydrogeology.

Construction Phase

Negligible to no loss is expected from a mineral resource (low sensitivity) perspective. The potential significance of impact is therefore assigned as Moderate/Low on groundwater in superficial deposits and Low on bedrock groundwater.

In terms of contaminated land and groundwater, the septic tanks identified during the landowner consultation are unlikely to be a source of contamination as none is close enough to interact with the proposed Project. The analysis of groundwater showing the presence of hydrocarbons means that there is potential for the proposed Project to create a pathway for contaminants to reach other groundwater areas or surface waters. The close proximity of the Blackwater (Cork/Waterford) SAC means that any impact could be significant on that receptor. Additional GI will be required prior to construction commencing and any contaminated material will be removed by specialist contractors and taken off site for disposal at a licensed facility. This will prevent the possibility of pathways to sensitive receptors. Impacts on works will be minimised by the use of specialist contractors on identification of the contamination through GI.

Accidental spillage could result in a potential moderate impact to groundwater. The likelihood of this is low, however owing to the measures outlined in the Outline CEMP in relation to fuel and materials storage and refuelling

No impact is expected on bedrock groundwater or as a result of dewatering. Impact on groundwater flow disturbance is expected to be negligible for the superficial aquifer

The area of wet grassland could be directly impacted by the construction of the western embankment and would result in a potential significance of impact of Negligible / Slight from a shallow groundwater flow perspective

Operational Phase

Based on the information available, long term potential significance of impact on the wet grassland identified near Ballycoskery remains Negligible / Slight from a shallow groundwater flow perspective.

11.4 **Water**

11.4.1 Baseline

The only WFD water body within this study area is the Awbeg (Buttevant)_020. A segment of it, the Pepperhill River and an offshoot of this water body flow north across the proposed Project site and combine again before meeting the main segment of the water body in the SAC.

In terms of flood risk, the site is located within the 1% AEP flood extent, which equates to Flood Zone A, based on OPW National PFRA mapping. Given the location, and nature of proposed works, detailed hydraulic modelling was undertaken. Peak flood levels of 83.63mOD in the 1% AEP flood event (including climate change) were estimated at the site, consistent with past observations of widespread out of bank flooding in the area. The site is at high risk of fluvial flooding. Flood risk from all other sources is considered to be low.

A hydrological walk over survey was undertaken in January 2020. Some surface water flooding was observed in the fields to the north and south of Station Road surrounding the Pepperhill EPA segment of the Awbeg (Buttevant)_020 which is proposed to be crossed by the new access road.

11.4.2 Potential Effects

Do Nothing

Local watercourses will remain in their current WFD status and with the identified risks unchanged Flood risk will remain unchanged.

Construction Phase

The construction of the road-over-rail bridge has two elements to it which present a risk to the water bodies within the footprint of the proposed Project: the construction of the road and bridge, and the installation of culverts to facilitate the crossing of the water bodies.

In the case of the road and bridge, risks are associated with silty water runoff, affecting water quality and geomorphology in the receiving waters. There is also the potential for inundation of the site as it is within a flood risk zone; measures to control ingress of water to the site to control flood risk and silty water runoff could result in overland surface flows being disrupted. These would be managed using cutoff drains and directing the clean surface water to the water bodies without allowing it to become contaminated.

The installation of the culverts has the potential for significant impacts on water quality and geomorphology as a result of concrete washout and the disturbance of the riverbeds and banks. This will be minimised by the culverts being prefabricated and clean and the damming and overpumping of the rivers to enable a dry working area. As the two water bodies on site are from the same source and combine before entering the Awbeg (Buttevant)_020, water from one will be pumped to the other during installation.

Potential impacts exist from the construction compound, however as it is located in Irish Rail land to the far side of the railway, away from the water bodies, no impacts are predicted. Control measures will be in place in any event to ensure no spillages occur or could reach the water bodies via local surface water drains.

Operational Phase

The culverts will be embedded below the level of the existing stream bed and therefore following reinstatement, will re-establish a natural bed substrate.

The impacts on the banks are permanent, however they are a short section of a low sensitivity water body (the watercourses are channelised here) and so no significant impact is expected for geomorphology.

The introduction of new impermeable areas could potentially increase the volume and peak flow of surface runoff reaching watercourses and could therefore contribute to an increase in flood risk. This potential impact has been assessed and designed out (embedded mitigation) through the proposed drainage strategy.

Some of the proposed new road will drain to local surface water networks via swales. This is not the case in the existing floodplain as they could become overwhelmed. In this area the water will be captured and discharged to the Pepperhill via an interceptor. The swales and the interceptor provide some level of treatment in respect of routine road contaminants and so impacts on water quality will not be significant.

11.5 Noise and Vibration

11.5.1 Baseline

XC219 Buttevant is located in a rural area dominated by farmland and close to the town of Buttevant. There is also an industrial estate close to the site. There are 9 residential receptors and one other receptor (a school) within 300m of the site.

The main noise source was from road traffic using the R522, but traffic could also be heard from the N20 and other surrounding roads.

11.5.2 Potential Effects

Do Nothing

If the proposed Project does not go ahead, traffic volumes are predicted to increase in line with natural traffic growth and the noise environment is expected to remain similar to the baseline.

Construction Phase

Significant noise effects are predicted for Phase 2 of the proposed works at two locations and for Phase 2 at three locations. Of the construction activities proposed the installation of the foundation piles has the potential

to give rise to the highest vibration levels at nearby receptors.

Operational Phase

In the opening year and the design year the proposed Project was predicted to result in a decrease in noise levels at two receptors and no change to noise levels at the other receptors.

11.6 Traffic & Transport

11.6.1 Baseline: Desk Top Survey

The existing XC219 Buttevant Level Crossing is situated on the R522 single carriageway regional road which links Buttevant and the N20 with Doneraile to the east and Liscarroll to the west. The road is subject to an 80km/h speed limit for the most part within the vicinity of the existing crossing however this reduces to 50km/h within the Buttevant town extents. With footpath provision providing access to the local town there are likely to be residents using this route for both commuting and recreation purposes. There are no public transport services within the immediate vicinity of the existing crossing.

One classified volumetric ATC traffic survey was carried out for seven days commencing on Tuesday 15th October 2019 on the R522 to the west of the existing crossing (ATC 10) and identified a 24-hour total of 2,275 vehicles, of which 5.2% comprised HGVs.

A non-motorised user (NMU) survey was also carried out at each crossing location between 0700-2100 for seven days, commencing on Tuesday 21st January 2020. Fewer than ten people and cyclists used the crossing on a seven day average.

11.6.2 Potential Effects

Do Nothing

Growthed 2019 baseline traffic flows to future years 2021 and 2022 indicate that there would be very little change in overall numbers over the construction period. These increases suggest a negligible operational impact over this period if no works were carried out.

Construction Phase

Increases in overall traffic numbers during construction will be minimal. Increases in HGV movements will also be low. No significant impacts are predicted on traffic flows. No significant impact is predicted for driver delay or severance as a result of construction traffic.

There is likely to be an increase in perceived risk of accidents as a result of heavily loaded HGVs in the area. However, with sufficient capacity to accommodate the small increases in traffic, the proposed Project may have significant impact on fear, intimidation and pedestrian delay.

Proposed mitigation measures have been developed and will be incorporated into a Construction Traffic Management Plan (CTMP) by the Contractor prior to commencement of construction. These include measures related to the timing and routing of Construction Phase HGV traffic; communications with local communities about timings, for example to avoid school arrival and departure times, and key local dates; and a Travel Plan for construction workers.

Following implementation of these measures there would be no significant residual effects.

Operational Phase

During the operational phase of the proposed Project there will be a negligible effect on traffic generated. The new overbridge will provide improved safety for both vehicle and non-motorised users and unconstrained access across the railway line as a result of the road upgrade and level crossing closure. Delays of typically six minutes for one train to pass will be removed as a result of the works.

11.7 Cultural Heritage

11.7.1 Baseline: Desk Top Survey

There are four (4) previously recorded archaeological sites within 500m of the proposed works. These are all listed on the RMP. Other heritage assets include the existing rail line, which follows the nineteenth-century Great Southern and Western Railway; the level crossing, and Buttevant Station, which date back to 1896; and 'Bregoge New Bridge', which dates back to 1845. There are two Protected Structures within 500m of the proposed works: a barracks and a farmhouse. The

National Inventory of Architectural Heritage (NIAH) lists a terrace of former soldiers' houses and a railway goods shed within Buttevant Station.

Field surveys were carried out as follows:

- October 2019: a cultural heritage field survey identified the following features of archaeological potential: a linear bank, and a semi-circular depression close to the footprint of the proposed Project; and the stream and drain to the west of the crossing as well as kerbstones relating to a former pathway were also located on the approach road to Buttevant Station from the west.
- February 2020: monitoring of GI works, identified a potential ditch.
- November/December 2020: geophysical survey of proposed roads, no definite archaeological features identified but anomalies detected.

11.7.2 Potential Effects

Do Nothing

The level crossing (IH-9), is considered to be of local historical and social interest and would continue to operate much as it has done since the nineteenth century. The other heritage assets would also remain unchanged.

Construction Phase

A significant negative impact is predicted to the former Buttevant Station (AH020). The development will directly impact the remains of the western goods shed, boundary walls, platforms and sidings. As well as being of architectural heritage interest, the historical significance of the station relates to its status as an original station on the Great Southern and Western Railway (Dublin-Cork line) and due to it being the location of the worst rail disaster in Irish history.

Detailed building recording shall be carried out on all architectural heritage features that are to be removed or otherwise impacted by the development, in this instance the station and kerbstones.

There would be no impact on any known archaeological sites or monuments. Archaeological test excavations shall be carried out by a licensed archaeologist to

investigate the potential archaeological features identified in field surveys.

Operational Phase

The flyover will significantly alter the setting of the former Buttevant Station resulting in a moderate indirect negative impact during operation and will also alter the setting of the goods shed listed on the NIAH, resulting in a slight indirect negative impact during operation.

The historical significance of the Buttevant rail disaster will continue to be acknowledged by the memorial and a short section of footpath is proposed to keep the link between the town and the memorial site.

Closure of the level crossing (IH-9) is predicted to have a moderate negative effect on the cultural heritage of the area.

Detailed recording shall also be carried out on the level crossing and adjoining sections of the Cork–Dublin rail line.

11.8 Landscape & Visual

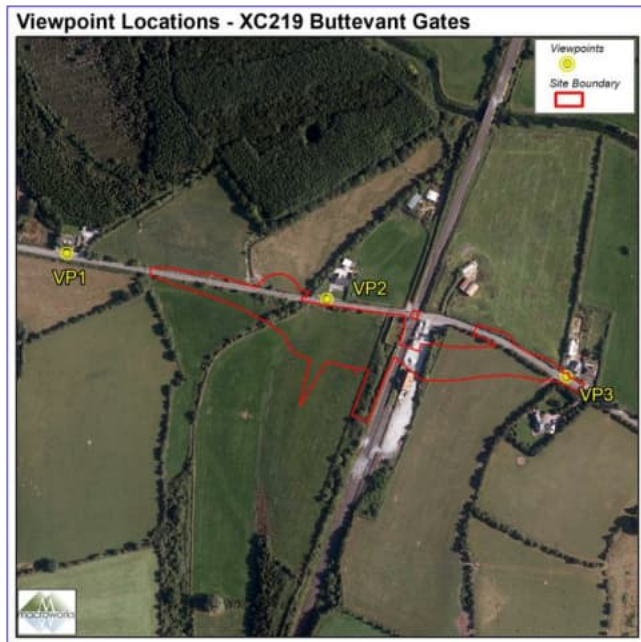
11.8.1 Baseline

The landform of the study area is that of a low rolling landscape that contains a number of locally elevated rolling hills. The terrain in the central areas of the site and its surrounds generally drains in a northerly direction towards the River Awbeg.

Agriculture is the primary land use within the study area and are often bound by dense mature tree-lined hedgerows. The north-western extents of Buttevant are the most notable urban land use within the study area. Several small residential estates and linear clusters of dwellings occur to the southeast. Buttevant GAA club and sports pitches are just over 500m east of the proposed Project.

Three representative viewpoints were selected for the purposes of the visual impact appraisal. These are shown in Inset

Inset Figure 11 1: XC219 Buttevant Viewpoints



11.8.2 Potential Effects

Do Nothing

If the proposed Project were not to proceed the site and its immediate surrounds would remain in its present form.

Construction Phase

During the construction phase there will be a far higher intensity of activity at the site than during the operational phase. This will include HGV and workers vehicle movement to and from the site; construction machinery, within the site; temporary and permanent physical disruption of the land cover during site establishment; stockpiling of material for use in the landscape mitigation; storage of construction materials; and a crane and crane pad. All of these will detract slightly from the low intensity pastoral character of the rural surrounds of the proposed rail overpass, but only within the immediate landscape context of the works.

Impacts from the change in land cover are considered to be minor; and construction related activity and its effect on landscape character will be temporary in duration. The overall significance of construction stage landscape effects is deemed to be Moderate-slight. For these reasons, the significance of visual impact would also be moderate-slight.

Operational Phase

The most notable operational phase landscape impact will be the introduction of a new piece of road infrastructure and its associated signage, fencing and safety barriers into an area comprising of pastoral farmland. The magnitude of operation stage landscape impacts is deemed to be Medium-low. When combined with the Medium-low landscape sensitivity rating, the significance effect is judged to be Slight

In terms of visual impacts, all of the viewpoints (VP1 to 3) are based on the regional road R522, west, north and east respectively. There would be a slight impact on VP1, a moderate to slight impact on VP3 and a Substantial to moderate impact on VP2. VP2 is the viewpoint from a property on the R522, directly across the road from the proposed Project.

Mitigation for impacts on views and landscape at this site include supplementing existing hedgerows, replacement of any hedgerows removed, and new hedgerow to be planted alongside the timber fencing. Shrubs will be planted on the embankments and native ivy planted at the base of concrete structures. Following planting and establishment, impacts on VP2 will be moderate.

11.9 Air Quality

11.9.1 Baseline

The level crossing is in a rural setting with a small number of individual residential properties located nearby, the nearest of which is approximately 90m to the west of the level crossing. The nearest national road is the N20, which is approximately 0.9km to the east of the level crossing

The available traffic flow information and traffic surveys for the proposed Project indicate a relatively low number of vehicles using the XC219 Buttevant Level Crossing on the R522

11.9.2 Potential Effects

Do Nothing

If the proposed Project does not proceed, traffic volumes are predicted to increase in line with natural traffic growth. Concentrations of NO₂, PM₁₀ and PM_{2.5} at receptors along the route of the existing level

crossing would remain at the low values representative of the rural location, well below the relevant air quality standards.

Construction Phase

The vehicle movements associated with the construction activities are below the criteria set out in the DMRB guidance and are considered to be insignificant.

Emissions of dust during construction were scoped out from the air quality assessment on the basis that the construction activities associated with each of the level crossings are relatively small-scale. Guidance produced by the Institute of Air Quality Management (IAQM) (IAQM, 2016) was used at the scoping stage to identify the likely dust risks for each of the level crossings. This consideration concluded that given the low to medium risks of dust impacts, the application of a suite of appropriate good practice mitigation measures and management techniques, as set out in the IAQM guidance (IAQM, 2016), would ensure significant effects from dust emissions would not occur

The measures include a requirement for a Dust Management Plan to be produced by the Contractor prior to construction commencing, which will include the wider set of measures outlined in the EIAR and be in line with the IAQM 2016 Guidance.

Operational Phase

The proposed new route alignment does not lead to road traffic emissions being any closer to receptors than the Do Nothing scenario. Therefore, no changes to pollutant concentrations at receptor locations close to the local road network are expected and the air quality effects would be insignificant.

12. All Sites: Resource Use & Waste and Cross-cutting Themes

12.1 Introduction

This section of the NTS includes a summary of EIAR Volume 3 Chapter 14: Resource Use and Waste Management as well as Chapter 16: Cross Cutting Themes. These chapters have assessed the proposed Project as a whole and have a different approach to assessment than the preceding chapters

12.2 Chapter 14 - Resource Use and Waste Management

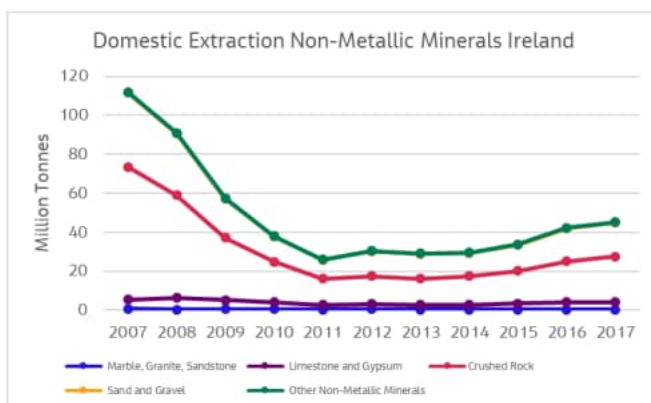
12.2.1 Baseline

Resource Use

Domestic Material Consumption (DMC) is calculated by adding Imports to Domestic Extraction and deducting Exports. Between 2000 and 2007, Ireland had the highest DMC per capita in the European Union, at three times the EU-27 average. The economic decline started in 2008 and resulted in the total DMC per capita decreasing by 55% between 2007 and 2012, with the use of construction minerals decreasing by 70%. With a DMC per capita of 24.2 tonnes in 2012, Ireland was still the third-highest in the EU-27, 77% above the EU-27 average.

The trend in consumption of construction materials is provided in Inset

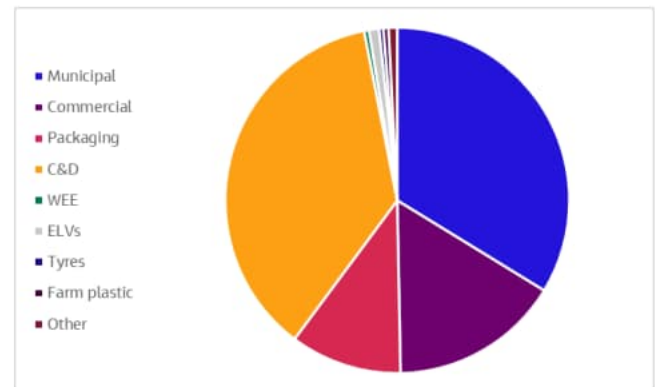
Inset Figure 12 1: Extraction Non Metallic Minerals



Waste

In the Southern Waste region, construction and demolition waste accounts for the highest portion of waste arisings at 37%; municipal (domestic) waste accounts for 34%. See Inset

Inset Figure 12. 2: Waste Arisings by Type



12.3.1 Potential Effects

Resource Use and Waste Arisings Overview

Resource use and waste are considered together for each level crossing site. The likely construction wastes which could be generated during the Construction Phase of the proposed Project include among others waste hydraulic oils, concrete, bricks, tiles, ceramics and Gypsum-based construction material.

All Sites: Do Nothing

To maintain the status quo, will require the continued use of the dwelling nearby and include resource use and waste arisings as would be expected from a single, domestic dwelling. In addition, there will be an ongoing requirement for the repair and maintenance of the level crossings and the gates. These would be small in magnitude compared to resource use and waste arisings for the county and region and so would be Not Significant.

All Sites: Construction

A variety of resources are used and wastes created during any civil engineering project. The most significant types of resource use and waste for the proposed Project include cut and fill, hazardous substances and general construction waste.

For the most part, the greatest amount of resource use will be in the construction of the bridges over the rail line at XC201 Thomastown, XC212 Ballycoskery and XC219 Buttevant. There will be large quantities of materials needed for the bridges; the imported fill, materials required for the bulk earth ramps and special structures for the bridge.

The resources used for structures other than for the creation of embankments, at the levels calculated for the proposed Project across all sites is not significant. In addition, materials used for drainage are minimised through the use of swales across all sites where drainage is installed. Materials will be ordered 'just in time' and in precise quantities to minimise waste and so waste production from these sources would also be not significant.

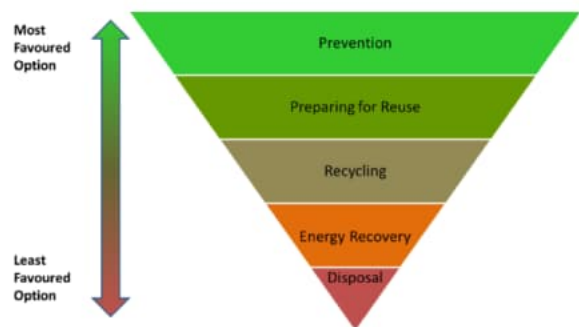
There will be some use of hazardous substance such oil, hydraulic fluid and some contaminated material may be encountered during construction. Management of these resources and wastes, including their storage and disposal is set out in detail in EIAR Volume 5, Appendix 11, Outline CEMP. Following implementation of these measures there will be no significant impact from these materials.

It is anticipated that, at least 70% of all excavated material (cut) will be able to be reused for the construction of the bridge embankments and general landscaping on site. For the unacceptable material excavated, there is sufficient capacity in the region's landfill sites for this to be accepted; however, it will be recovered or recycled if possible, landfill will be a last resort.

The greatest potential impact arises from the construction of the road over rail bridges, for which large quantities of 'fill' require to be imported to create the embankments. A measure of significance for this requires comparison to national targets for the use of secondary materials; no such target exists for Ireland yet.

The design of the proposed Project seeks to maximise resource efficiency, reducing the amount of waste generated, minimising water consumption and making the most efficient use of energy (see Inset). This will be adhered to also in the development of the Site Waste Management Plans (SWMPs) that will be produced for each site by the contractor prior to commencement but post consent.

Inset Figure 12.3: Waste Hierarchy



Impacts will be minimised, through sound design and good practice in procurement. In particular, the implementation of a 'just in time' materials procurement policy. There are increasing numbers of soil recovery sites across the country and these will be used as source of materials wherever possible.

All Sites: Operation

The operation of all sites would require similar types of resource use and generate similar types and quantities of waste. General repair and maintenance of the roads and bridges, fences and landscaping will occur. It is impossible to quantify these amounts; however, it is anticipated that they would be negligible in magnitude and so any effects would be imperceptible and therefore Not significant.

12.4 Chapter 16 Cross Cutting Themes

This chapter describes the likely significant effects on the environment arising from a number of environmental aspects considered to be 'cross-cutting' and complex. These environmental aspects include:

- Risk of major accidents and disasters;
- Material Assets; and
- Climatic factors.

12.4.1 Risk of Major Accidents and Disasters

Baseline

For the purposes of this assessment the baseline environment will be largely informed by the other chapters within Volume 3 of the EIAR. Consideration will also be given to 'climatic' factors which is outlined further below.

The assessment of major accidents and disasters will be entirely desk-based, with the other assessments being carried out as part of the EIA to inform the assessment of risk as a result of accidents or disasters.

Potential Effects

The assessment set out potential risk during the construction phase and operational phase of the proposed Project. However, the identified risks may not be applicable to a number of sites throughout the proposed Project. These risks have been evaluated using criteria that includes the identification of MANDs (i.e. unplanned incidents such as a power failure, accidental release to surface water and road or rail accident) and assessing the consequent impacts and significance of such impacts in relation to the environmental, social and economic receptors that may be affected.

All Sites Do Nothing

In absence of the proposed Project, the level crossing would continue to operate and the existing safety risk at the interface between road and rail would remain, which, whilst low the proposed Project seeks to permanently remove.

All Sites Construction Phase

Potential Major Accidents and Natural Disasters during construction could include:

- Damage to high voltage overhead lines that cross the Proposed Project;
- Damage to Gas Infrastructure
- ;
- Falls due to Working from Heights;
- Road Traffic Accidents;
- Fire;
- Accidental releases of polluting and noxious substances to surface water ;
- Contaminated land;
- Prolonged Drought;
- Prolonged flooding;
- Spread of livestock diseases; and
- Spread of invasive species.

All Sites Operational Phase

Potential Major Accidents and Natural Disasters during the operational phase include:

- prolonged flooding (embankment failure) in the event of extreme weather conditions at XC201 Thomastown, XC211 Newtown, XC212 Ballycoskery, XC215 Shinanagh and XC219 Buttevant; and
- Power failure, damage to power infrastructure and subsidence/land collapse at XC210 Thomastown, XC211 Newtown, XC212 Ballycoskery, XC215 Shinanagh and XC219 Buttevant.

12.4.2 Material Assets

Baseline

Material assets of human origin (e.g. existing properties, recreational facilities, public utilities and road/rail/canal infrastructure) have been taken into consideration and identified by desktop assessment and engineering site visits and walkovers where applicable as well as information gathered from Volume 3 EIAR Chapters. Material assets of a natural origin have also been taken into consideration informed by chapters within the EIAR.

Potential Effects

To determine the effects on material assets, the following issues are considered:

- Utilisation of land required for the construction of the proposed Project;
- Effects of the proposed Project on road/rail/canal network and pedestrian ways;
- Public Utilities and the need to provide adequate protection to them during construction activities; and
- Use of raw materials and availability of same.

Effects on properties and land use are address in the Population & Health assessment.

Effects on roads, railways, canals (navigation) and footpaths are addressed in the Traffic & Transport assessment.

The use of raw materials is addressed in the Resource Use & Waste assessment.

This assessment therefore focuses on third party utilities and services.

All Sites Do Nothing

Should the construction of the proposed Project not occur, there will be no impact on any of the major utilities and natural features nearby.

Therefore, the potential impact of the do-nothing scenario is neutral

All Sites Construction Phase

Potential negative effects on public utilities could arise due to severing of existing utility networks during the construction phase of the proposed Project. The potential effects are considered to be temporary significant negative during the construction phase. Specific focus in this rural area will be on overhead electricity lines, underground gas networks and drainage.

Gas networks have been avoided through careful siting and design of the proposed Project across all sites. Overhead electricity lines have largely been avoided but a short section will be diverted at XC215 Shinanagh, which may cause a short-term disruption to supply in the area during the connection of the diverted line. Drainage systems will be temporarily disrupted during connections of the drainage system for the proposed Project into them. This will be very short term and will not be a significant impact.

All Sites Operational Phase

No significant impacts are identified for the operational phase. The overhead electricity lines will face no further outages from the proposed Project once connected; the physical connection into the drainage systems and the rate of flows into them have been designed so there will be no impact.

12.4.3 Climatic Factors

Baseline

Climate Impacts

In terms of vulnerability and resilience, the study area for impact assessment is the footprint of the proposed Project and the immediate surrounding road and rail network. In terms of baseline, however, current

observations on the climate and predicted changes are at an Ireland level as these are not provided at a local level.

Observed impacts to date, of relevance to the proposed Project, include a rise in mean air temperature, an increase in the number of 'warm' days, an increase in rainfall and also an increase in the frequency and duration of drought. The number and intensity of storms has also increased. These trends are predicted to continue and increase under all emissions scenarios.

Greenhouse Gas Emissions

Green House Gas (GHG) emissions have the potential to impact Ireland's commitments and targets under various EU Climate Agreements and other international agreements. Therefore, the study area can be classed as Ireland in terms of GHGs for both baseline and impact assessment

Ireland's GHG emissions increased in the period from 1990 to 2001 where it peaked at 70,475 kt CO₂ equivalent, before displaying a downward trend to 2014. Emissions have increased by 3.7% and 3.5%, respectively in the years, 2015 and 2016 and decreased by 0.9 per cent in 2017. In 2017 total national GHG emissions amounted to 60,744 kt CO₂ equivalent, which is 9.6 per cent higher than 1990 emissions

Potential Effects

All Sites Do Nothing

It is anticipated that the proposed Project will help to improve the efficiency of the Dublin-Cork Railway Line and facilitate the eventual electrification of the line. Should the proposed Project not proceed, this potential benefit would not occur and GHG emissions from the now diesel-fuelled railway line would continue to be emitted with a negative impact on the GHG target for Ireland. It is not possible to quantify this and a precise level of significance, however any increase in GHG emissions needs to be avoided if possible

All Sites Construction and Operational Phases

Vulnerability to Climate Impacts

Flooding, high winds (storms) and storm surges which may also lead to landslides and subsidence are high priority risks from climate change identified for the land-based transport sector in Ireland.

The Flood Risk Assessment (FRA) at EIAR Volume 5, Appendix 9A, concluded that six of the seven sites are considered to be 'less vulnerable development' (local transport infrastructure) and are at low risk of flooding from all sources. The baseline assessment of flood risk showed that XC219 Buttevant is high for fluvial flood risk and low from all other sources.

In response to this, the hydraulic design of the new bridge over the Pepperhill tributary has been developed to design out increase in flood risk to the area.

In addition, the introduction of new impermeable areas could potentially increase the volume and peak flow of surface runoff reaching watercourses and could therefore contribute to an increase in flood risk. This potential impact has been assessed and designed out (embedded mitigation) through the proposed drainage strategy, which includes extensive use of Sustainable Drainage Systems in the form of swales at all locations except XC187 (no works proposed) and XC209 (no additional impermeable area proposed)

Greenhouse Gas Emissions

There are no current estimates of the energy likely to be saved by the improved efficiency and electrification of the railway line and so this has not been taken into account in calculating the predicted GHGs from the proposed Project, however it is likely to have a positive, mitigating effect on the GHGs associated with the proposed Project.

Impacts are predicted for the construction phase of the proposed Project only. There are no additional traffic movements during operation and embodied energy is accounted for as part of the construction phase. There are no other sources of GHGs

To determine impacts Transport Infrastructure Ireland (TII)'s Carbon Assessment tool was used. Construction transport was identified to be minor and so was scoped out. The vast majority of carbon emissions are associated with embodied carbon, from the use of materials required to construct the project. In total, the embodied carbon in the proposed Project was calculated to be 2.7Mt CO₂eq. Taken over the predicted lifespan of the infrastructure, of 100 years, this amounts to approximately 0.03MtCO₂eq per annum.

These emissions were compared to Ireland's annual carbon budget and found to equate to 0.053% of the

budget during construction and 0.02 during operation. This is not significant.

13. Interactions and Cumulative Impacts

This section considers and assesses the potential cumulative impacts arising from the proposed Project when combined with other existing and/or approved projects. It also provides a summary of interacting impacts of the proposed Project between the environmental assessment topic areas.

13.1.1 Assessment of Environmental Interactions

A summary of potential interactions identified are:

- **Population and Human Health:** impacts from traffic, noise and dust. Interactions in the human environment are typically complex as there is the potential for receptors to be impacted in a number of ways in terms of employment, economy, tourism, land use and land-take, community severance and accessibility, and community and recreational amenity;
- **Biodiversity:** water quality, the physical character and water content of water bodies (hydromorphological) changes (e.g. to stream beds) and flow impacts have secondary/indirect impacts on aquatic ecosystems. There is also the potential for noise impacts to impact terrestrial and aquatic species, although no significant impacts were identified for these.
- **Soils, Geology and Hydrogeology:** the most significant interaction is that between groundwater and surface water; however, the geology of an area can also interact with surface water as it will determine the nature of any sediment that may run-off into water bodies in the absence of mitigation.
- **Water:** as set out above, water interacts with biodiversity receptors through aquatic ecosystems, both in terms of water quality, flows and hydromorphological aspects. There is a direct connection between groundwater and surface water and geological variations can affect the nature of silty water run-off.
- **Noise and Vibration:** interactions occur between this topic and traffic and transport primarily; potential increases in traffic could lead to increased noise impacts. In addition, as set out above, there is potential for interaction with terrestrial and aquatic species as a result of increased noise and vibration. In addition, noise impacts are a contributory factor to amenity impacts, assessed under Population and Human Health
- **Traffic and Transport:** this topic primarily interacts with air quality and noise; increased traffic can lead to increased impacts in both of these environmental aspects. In addition, traffic impacts are a contributory factor to amenity impacts, assessed under Population and Human Health
- **Cultural Heritage:** interactive impacts could potentially occur in relation to the landscape character and setting of cultural heritage assets; mitigation measures for archaeology e.g. trial trenching, can also impact upon biodiversity, water quality and groundwater
- **Landscape and Visual:** interactive impacts could potentially occur with biodiversity as a result of loss of habitats (hedgerows, trees, grassland, etc); in addition, visual impacts are a contributory factor to amenity impacts, assessed under Population and Human Health.
- **Resource Use and Waste Management:** the management of waste has the potential to interact with water quality and groundwater/land contamination. The resources used have a direct contribution to the embodied carbon within the proposed Project.
- **Air Quality:** increased levels of dust and emissions from construction plant and vehicles, particularly from activities in close proximity to each other; increased emissions from traffic could occur with any increased traffic movements in operation
- **Major Accidents and Risks:** any major accident could impact upon any of the other topics and this will be considered in the emergency preparedness plans that will be required from the Contractor. Flood risk has been specifically considered in the assessment; other risks are

also highlighted such as the spillage of pollutants like oil or chemicals.

- **Material Assets:** this is not likely to interact significantly with the other assessment areas
- **Climatic Factors:** this interacts with all topics indirectly, as climate change has the potential to affect all aspects of the environment, especially ecosystems, flood risk, water quantity and quality, air quality and the landscape. Specifically, there is a direct interaction with traffic and air quality impacts in relation to greenhouse gas emissions and resource use in the form of embodied carbon.

that have been identified for the M20. Consultation with the M20 project team has identified that the proposed Project improvements to the N20 at XC215 Shinanagh are potentially beneficial to any proposed N20 upgrade.

A matrix of the environmental interactions is presented in Table 17.1 of Volume 3, Chapter 17: Interactions and Cumulative Impacts.

13.1.2 Assessment of Cumulative Impacts from Other Projects

A 5km radius around each proposed Project site was considered in terms of the potential for a cumulative impact with other proposed developments. Of these developments, 33 were 'screened' for further assessment. Of those 33, only one was a significant project with the potential to interact with the proposed Project directly: the upgrading of the N20 to M20 motorway and taken forwards into a more detailed assessment of potential cumulative impacts by all of the topics. The M20 team have been consulted during the development of the design of the proposed Project and during the assessment of that design.

The construction programme for the M20 was considered for potential interaction with the proposed Project's construction programme. Current understanding is that the construction of the proposed Project is likely to commence before the application for consent for the M20 has been submitted; as a result, it is not likely that there will be any overlap or interactions. No cumulative impacts with the M20 were identified during the construction stage.

In operation, the only topic with the potential for a cumulative impact is Traffic & Transport. That assessment concluded that it is not likely that there would be any significant interactions between the two projects; however, XC215 Shinanagh and XC219 Buttevant are the closest to potential route corridors.

14. Conclusion

The Applicant Córas Iompair Éireann (CIÉ) seeks to eliminate where practicable and possible all level crossings on the rail network across Ireland. While the Applicant is CIÉ, Iarnród Éireann (IÉ), a wholly owned subsidiary of CIÉ, have developed the proposed Project from concept to application stage.

The proposed Project is located within a 24km section of the Dublin – Cork railway line between Limerick Junction and Mallow Stations where rail speeds can reach up to 160km/hr.

14.1.1 Project Need

The Need for the proposed Project is two-fold: to reduce the safety risk profile of the railway; and to increase operational reliability. Reducing risk and improving safety is the primary need for the proposed Project, however.

The removal of level crossings is at the core of IÉ's approach to building a safe and robust railway network. There is a significant volume of existing railway traffic along the railway line carrying passengers at high speed. The objective of the proposed Project is to remove the level crossings and to provide a safer environment for those using the crossing points.

The eventual electrification of the Dublin-Cork Railway line will allow for quicker train acceleration speeds, lower fuel costs and fewer CO₂ emissions.

The proposed elimination and upgrade with a bridge or alternative new road/diversion at five level crossings (generally with the most significant traffic use) will improve the operational efficiency of the Dublin – Cork Railway Line and remove driver and pedestrian/cyclist delay allowing unfettered movement 24 hours a day, seven days a week.

14.1.2 Alternatives and Preferred Solutions

A number of solutions for the proposed closure or upgrade of the existing level crossings were considered at all seven sites. This included straight closure, CCTV, overbridges, underbridges and alternative access roads.

The conclusion to the feasibility study followed by route options assessments was the following in terms of preferred solutions:

- XC187 Fantstown: Straight Closure
- XC201 Thomastown: Road-over-rail bridge
- XC209 Ballyhay: CCTV Solution
- XC211 Newtown: New access road
- XC212 Ballycoskery: Road-over-rail bridge
- XC215 Shinanagh: New access road
- XC219 Buttevant: Road-over-rail bridge

These preferred solutions were consulted upon, finalised and then taken forward as the proposed Project.

14.1.3 Environmental Impact Assessment

Detailed assessments were completed for each site to assess the effects of the proposed Project on potential sensitive receptors such as biodiversity, soils, hydrogeology, geology, water, traffic and transport, the visual landscape, local residents and a range of their interests including cultural heritage, noise, air quality and socio economic issues.

At XC187 Fantstown it is predicted that there will be no significant construction or operational effects as it is a straight closure of the level crossing.

Severance at this site for local residents and land users was raised during consultation; however the level of use of the existing level crossing, as identified in recent (2019 and 2020) traffic and non-motorised user surveys is very low and has been for many years. Furthermore, evidence provided at the Fantstown Oral Hearing in 2009 stated that *"there is little traffic using the road, even agricultural traffic, except at harvest time, and the latter would pose a high risk crossing a railway"*. This means the significance of this potential effect is likely to be slight.

At XC209 Ballyhay, almost all topics predicted no significant impacts during construction or operation without need for mitigation. Groundwater and water identified a potential impact during construction with the trenching for cable installation in a bridge over a watercourse. Mitigation will be implemented to manage the risks here and no significant impact is anticipated.

For the remaining sites, most topics only identified the potential for significant impacts during construction. Impacts include temporary loss of habitats, potential pollution of local watercourses and groundwater from silt, fuel or other substances present on construction sites. The potential for dust and noise impacts were also identified. In particular, noise impacts at XC212 Ballycoskery were predicted and high risk of water quality and biodiversity impacts identified at XC212 Ballycoskery and XC219 Buttevant where culverts will be installed into watercourses with short hydrological connections to the Blackwater SAC.

In regard to cultural heritage, construction stage impacts were identified (including for example removal of gatekeeper's house at XC212 Ballycoskery and some upstanding elements of XC219 Buttevant Station) and where necessary further archaeological testing will be required

Mitigation has been agreed with NMS and incorporated into Volume 3, Chapter 12: Cultural Heritage. Proposed mitigation includes a ranges of measures, for example: further archaeological testing at XC215 Imphrick/Shinanagh to the east, southeast and south of Imphrick Church and graveyard; standard test excavations over approximately 12% of testable greenfield areas, an underwater archaeological assessment at the stream crossings at XC219 Buttevant and the requirement for detailed buildings recording for all architectural heritage features that are to be removed or impacted. Residual impacts on eleven cultural heritage assets are predicted during construction and this is mostly attributed to the closure of the level crossings themselves.

Generic mitigation measures were identified for most topics, in particular biodiversity, groundwater, water, and air quality. These and site-specific bespoke mitigation measures and are included in the Outline CEMP (EIAR Volume 5, Appendix 1I) Bespoke measures were required for: XC209 Ballyhay for Groundwater and Water; XC212 Ballycoskery for noise, biodiversity and water; and XC219 Buttevant for biodiversity and water

In operation, no significant adverse impacts were identified for Population and Health, Geology, Noise, Traffic and Transport, or Air Quality. Beneficial impacts were identified for safety and access to local road networks

Potentially significant permanent impacts on biodiversity were identified at all sites where infrastructure is proposed, due to a loss of habitat. Replacement planting, identified in the Landscape Management Plans to mitigate landscape and visual impacts at all sites, but especially at XC212 Ballycoskery, will mitigate both sets of impacts resulting in no significant impacts. Further mitigation for biodiversity includes the translocation of Annex I habitats at XC212 Ballycoskery and XC219 Buttevant and the provision of bird boxes where mature trees are proposed to be lost.

Impacts on flood risk and water quality were identified for all sites where significant infrastructure is proposed. The drainage strategy for the proposed Project, including sustainable drainage systems (swales) and sizing of culverts means that no significant impact will occur on either flood risk or water quality This is especially critical at XC219 Buttevant for which a Stage 3 Flood risk Assessment was carried out, the findings of which were built into the design of the drainage system and culverts at that site

In conclusion, at all sites, following implementation of mitigation measures there are no significant residual effects in relation to the construction or operation of the proposed Project The mitigation measures for construction are provided in EIAR Volume 5, Appendix 1I CEMP and in EIAR Volume 4, Appendix 1L Schedule of Mitigation, which also includes mitigation required during operation

Appendix A. NTS Figures



Appendix B. list of Acronyms

Acronym	Meaning
AADT	Annual Average Daily Traffic
ABP	An Bord Pleanála
AC	Alternating Current
ALO	Adjacent Line Open
ATO	Automatic Train Operation
ATP	Automatic Train Protection
ATS	Automatic Train Supervision
BOD	Biological Oxygen Demand
BSI	British Standard Institution
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
C&D	Construction and Demolition
CA	Competent Authority
CBTC	Communications-Based Train Control
CCC	Cork County Council
CCTV	Closed Circuit Television
CFRAM	Catchment Flood Risk Assessment and Management
CIÉ	Córas Iompair Éireann
CIEEM	Chartered Institute of Ecology and Environmental Management
CIÉ GP	Córas Iompair Éireann Group Property
CIRIA	Construction Industry Research and Information Association
CRR	Commission for Railway Regulation
COD	Chemical Oxygen Demand
CSO	Central Statistics Office
DAHG	Department of Arts, Heritage and the Gaeltacht
DAHGI	Department of Arts, Heritage, Gaeltacht & the Islands
DART	Dublin Area Rapid Transit
DC	Direct Current
DCC	Dublin City Council
DCCAIE	Department of Communications, Climate Action & Environment
DCHG	Department of Culture, Heritage & the Gaeltacht
DCU	Dublin City University
DECHLG	Department of Environment, Community & Local Government
DEFRA	Department of Environment, Food and Rural Affairs
DEIA	Digital Environmental Impact Assessment
DHPLG	Department of Housing, Planning and Local Government
DLRCC	Dún Laoghaire - Rathdown County Council
DoD	Department of Defence
DoEHLG	Department of Environment, Heritage and Local Government
DPER	Department of Public Expenditure and Reform
DTTS	Department of Transport, Tourism and Sport
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report

Acronym	Meaning
EIS	Environmental Impact Statement
EMC	Electromagnetic Compatibility
EMF	Electromagnetic Field
EMI	Electromagnetic Interference
EMRA	Eastern & Midlands Regional Assembly
EMWMR	Eastern-Midlands Waste Management Region
EPA	Environmental Protection Agency
EPR	Emerging Preferred Route
ERBD	Eastern River Basin District
ERM	Eastern Regional Model
ESB	Electricity Supply Board
ETS	Emissions Trading System
FCC	Fingal County Council
FRA	Flood Risk Assessment
GDA	Greater Dublin Area
GHG	Greenhouse Gas
GI	Ground Investigation
GIS	Geographical Information System
GSI	Geological Survey of Ireland
GWB	Groundwater Body
GWDTE	Groundwater Dependent Terrestrial Ecosystems
Ha	Hectares
HAS	Health & Safety Authority
HGV	Heavy Goods Vehicle
HSE	Health Service Executive
IAQM	Institute of Air Quality Management
ICNIRP	International Commission on Non-Ionising Radiation Protection
IÉ	Iarnród Éireann
IEMA	Institute of Environmental Management and Assessment
IÉ NWD	Iarnród Éireann New Works Department
IÉ CCED	Iarnród Éireann Chief Civil Engineers Department
IÉ IMOD	Iarnród Éireann Infrastructure Management Operations Department
IÉ SETD	Iarnród Éireann Signalling, Electrical and Telecommunications Department
IFI	Inland Fisheries Ireland
IGI	Institute of Geologists of Ireland
IPH	Institute of Public Health
ISO	International Organisation for Standardisation
LA	Local Authority
LAP	Local Area Plan
LAQM	Local Air Quality Management
LC	Level Crossing
LCC	Limerick City and County Council
LGV	Large Goods Vehicle
m	Metres
MCA	Multi Criteria Analysis
MRI	Magnetic Resonance Imaging
NACE	Nomenclature Statistique des Activités Économiques
NHA	Natural Heritage Area
NIS	Natura Impact Statement

Acronym	Meaning
NPWS	National Parks and Wildlife Service
NRA	National Roads Authority
NTA	National Transport Authority
NTS	Non-Technical Summary
O&M	Operations & Maintenance
OCS	Overhead Contact System
OPW	Office of Public Works
OSI	Ordnance Survey Ireland
PCR	Planning Compliance Report
PDR	Preliminary Design Report
PFRA	Preliminary Flood Risk Assessment
pNHA	proposed Natural Heritage Area
PPHPD	Passengers Per Hour Per Direction
PRAI	Property Registration Authority of Ireland
PRoW	Public Right of Way
PSD	Platform Screen Door
RAIU	Railway Accident Investigation Unit
RF	Radiofrequency
RMP	River Management Plan
RPA	Railway Procurement Agency
RSES	Regional Spatial Economic Strategy
SAC	Special Area of Conservation
SCADA	Supervisory Control and Data Acquisition
SCL	Sprayed Concrete Lining
SEA	Strategic Environmental Assessment
SEM	Scanning Electron Microscope
STMP	Scheme Traffic Management Plan
TA	Transport Assessment
TBM	Tunnel Boring Machine
TDS	Total Dissolved Solids
TII	Transport Infrastructure Ireland
TKN	Total Kjeldahl Nitrogen
TPH	Trains Per Hour
TSS	Total Suspended Solids
TTA	Traffic and Transport Assessment
TMG	Traffic Management Group
VOC	Volatile Organic Compound
WFD	Water Framework Directive
WHO	World Health Organisation
yd	Yard
ZOL	Zone of Influence