Cork Line Level Crossings

Volume 2, Chapter 3: Project Description

Iarnród Éireann

March 2021

Cork Line Level Crossings

Project No:	3211100
Document Title:	Volume 2, Chapter 3: Project Description
Document No.:	3
Revision:	A05
Date:	March 2021
Client Name:	Iarnród Éireann
Project Manager:	Alex Bradley
Author:	Various

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

Document history and status

Revision	Date	Description	Author	Checked	Reviewed	Approved
A01	December 2019	Draft for Comment	SJ	HC	RM	AB
A02	May 2020	Amendments following Client Review	Various	HC	RM	AB
A03	October 2020	Design Updates	Various	HC	RM	AB
A04	December 2020	For Legal Comment	Various	RM	RM	AB
A05	March 2021	For Issue to An Bord Pleanála	Various	RM	RM	AB

Table of Acronyms

Acronym	Meaning
AADT	Annual Average Daily Traffic
ABP	An Bord Pleanála
ALO	Adjacent Line Open
CA	Competent Authority
CCTV	Closed Circuit Television
CIÉ	Coras Iompair Éireann
EC	European Commission
EEC	European Economic Community
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
Ha	Hectares
HGV	Heavy Goods Vehicles
IÉ	Iarnród Éireann
LC	Level Crossing
m	Metres
PRoW	Public Right of Way
SAC	Special Area of Conservation
TTM	Temporary Traffic Management Procedures
TMG	Traffic Management Group
yd	Yard

3. Project Description

3.1 Introduction

This chapter provides a description of the existing conditions at each level crossing; and the proposed solutions for the relief at the seven level crossings. Table 3. 1 below sets out the name, co-ordinate location, crossing type, road type and relevant local authority for each level crossing.

Table 3. 1: Existing Condition of Level Crossings which are the subject of the proposed Project

Level Crossing	Co-ordinates	Crossing Type	Road Type	Local Authority
XC187- Fantstown	E: 563962 N:628368	C – Type (Gates normally CLOSED to road traffic)	Local	Limerick City & County
XC201- Thomastown	E:557627 N:624583	C – Type (Gates normally CLOSED to road traffic)	Local	Limerick City & County
XC209- Ballyhay	E:555182 N:619940	CD – Type (Gates normally OPEN to road traffic by DAY and normally closed at other times)	Local	Cork County Council
XC211- Newtown	E:554787 N:617982	CD – Type (Gates normally OPEN to road traffic by DAY and normally closed at other times)	Local	Cork County Council
XC212- Ballycoskery	E: 554646 N:617659	CD – Type* (Gates normally OPEN to road traffic by DAY and normally closed at other times)	Local	Cork County Council
XC215- Shinanagh	E:553565 N:614500	CD – Type* (Gates normally OPEN to road traffic by DAY and normally closed at other times)	Local	Cork County Council
XC219- Buttevant	E:553331 N:609848	CX - Type (Gates normally OPEN to road traffic)	Regional	Cork County Council

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

3.1.1 Site Location(s) for the Proposed Project

The seven level crossings are within a 24km section of the Dublin – Cork Railway line between Limerick Junction and Mallow straddling the Cork/Limerick county boundary.

Level crossings XC187 Fantstown and XC201 Thomastown are in County Limerick, lying directly south of Limerick City close to the Cork-Limerick border, while the remaining sites are located in County Cork, directly north of Mallow.

Urban areas in close proximity to the sites are Kilmallock, which lies between existing crossings XC187 Fantstown and XC201 Thomastown; Charleville, which lies to the south-west of XC201 Thomastown and north of crossing XC209 Ballyhay; and Buttevant which is directly southeast of crossing XC219 Buttevant.

For all the sites, the immediate context of the site and its wider surrounds is that of a rural landscape comprising flat to gently undulating terrain. XC212 Ballycoskery has the greatest number of residential receptors located

nearby (to the immediate north in the Beechwood Housing Estate). The surrounding areas of all of the other sites are sparsely populated with a prevailing agricultural land use in the immediate area.

The Blackwater River (Cork/Waterford) Special Area of Conservation (SAC) (Site Code 002170) is the nearest designated site to the proposed Project (approximately 300m to the north of XC219 Buttevant). The SAC is designated for a wide range of habitats and species, including freshwater pearl mussel, white-clawed crayfish, sea, brook and river lamprey, Atlantic salmon, twaite shad and otter (NPWS, 2012).

The overall site area (hectares (ha)) encompassing the land take within the red line boundary for each of the seven sites is approximately:

- XC187: 0.01ha.
- XC201: 2.07ha.
- XC209: 0.098ha.
- XC211: 2.101ha.
- XC212: 2.462ha.
- XC215: 5.716ha.
- XC219: 2.572ha.

Volume 4, Figures 1 – 80 provide site location plans, site layouts and elevations for all proposed infrastructure at each site location.

3.2 Current Railway Line Usage

The permitted line speed of trains at the level crossing locations varies between 90-100mph and the level crossings are located mid-section between stations, so trains are travelling at their full line speed when they pass through. The majority of the trains passing through the level crossings are locomotive hauled express services to and from Cork , weighing up to 440 tonnes and capable of carrying up to 420 passengers. The timetable for scheduled trains along the railway line for Dublin (Heuston) to Cork (Kent) services is as follows:

- 29 time-tabled Southbound (DOWN) trains that pass through one or more of the level crossings daily; and
- 27 time-tabled Northbound (UP) trains that pass through one or more of the level crossings daily.

The above train movements include Intercity Railcars (ICRs), Locomotive hauled Mark 4 Trains, empty passenger trains, light engines among other vehicles. In addition to the above movements, there can be non-timetabled Engineering Trains (e.g. Tampers, Sandite Machine, Ballast Cleaner, Track Recording Vehicles, Inspection Car etc), Freight and Specials Trains that can be signalled along the line.

3.2.1 First Trains

The first timetabled UP train that travels through the level crossings is the 05.50 hrs Cork (Kent) to Dublin (Heuston). The scheduled time it travels between Mallow and Limerick Junction is from 06.13hrs – 06.44hrs.

The first timetabled DOWN train that travels through the level crossings is the 07.00 hrs Dublin (Heuston) to Cork (Kent). The scheduled time that it travels between Limerick Junction and Mallow is from 08.35hrs to 09.05hrs. It should be noted that there are three other train paths included in Iarnród Éireann's 'Working Timetable' which occur prior to these train movements. Non-passenger trains may take place in those earlier train paths. If trains are arranged to run in these train paths, this information is published weekly in an internal weekly circular.

3.2.2 Last Trains

Last timetabled DOWN train that travels through the level crossings is the 21.00hrs Dublin (Heuston) to Cork (Kent). The scheduled time that it travels between Limerick Junction and Mallow is from 22.35hrs to 23.05hrs. It should be noted that there are three other train paths in Iarnród Éireann's 'Working Timetable' which occur after this train movement. Non-passenger trains may take place in those later train paths. If trains are arranged to run in these train paths, this information is published weekly in an internal weekly circular; and

Last timetabled UP train that travels through the level crossings is the 20.25hrs Cork (Kent) to Dublin (Heuston). The scheduled time that it travels between Limerick Junction and Mallow is from 20.51hrs to 21.22hrs. It should be noted that there are four other train paths in Iarnród Éireann's 'Working Timetable' which occur after this train movement. Non-passenger trains may take place in those later train paths. If trains are arranged to run in these train paths, this information is published weekly in an internal weekly circular.

In summary, in addition to the above scheduled train movements, there can be up to ten unscheduled train movements, which could be engineering trains, freight trains, or other track recording vehicles which occur either before or after scheduled passenger services operate through the crossings. On average, there are approximately one – two time-tabled trains per hour in both directions.

3.3 Existing Conditions of Level Crossings

3.3.1 Crossing Times

With regard to existing crossing times, in general, the gate for each of the subject level crossings would close approximately five minutes before the train passes. Typically the delay to road traffic as a result of a single train passing the crossing can be between 9 and 14 minutes. In the worst case scenario, where a second train approaches the level crossing in the opposite direction just as a train is leaving the section, the delay can be up to 14 minutes.

On receiving the notification of an approaching train, the gatekeeper closes the gates to road traffic which typically takes approximately 1½ - 2 minutes. The gates are typically closed 4 - 5 minutes before the approaching train arrives at the level crossing. It then takes 30 seconds for the train to pass and a further 30 seconds for the train to clear the section. The gatekeeper then opens the gates to road traffic which typically takes approximately 1½-2 minutes.

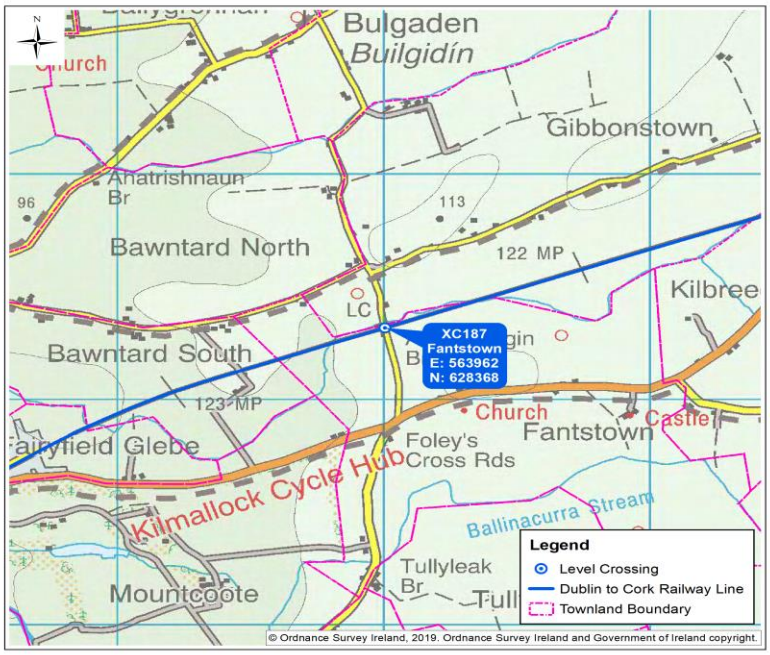
3.3.2 Existing Structures and Maintenance

There is ongoing Chief Civil Engineering Department inspection/maintenance and Signalling and Telecoms Department inspection/maintenance at each of the level crossings. As a result, whilst manually operated gated level crossings are an obsolete technology, they are currently serviceable and satisfy operational requirements.

XC187 Fantstown

The level crossing is located on local road LS 8514, 3km to the east of Kilmallock in the townland of Fantstown. The surrounding area for the crossing is characterised as a dispersed rural area with low density individual housing. See Inset Figure 3.1.

Inset Figure 3.1: XC187 Fantstown

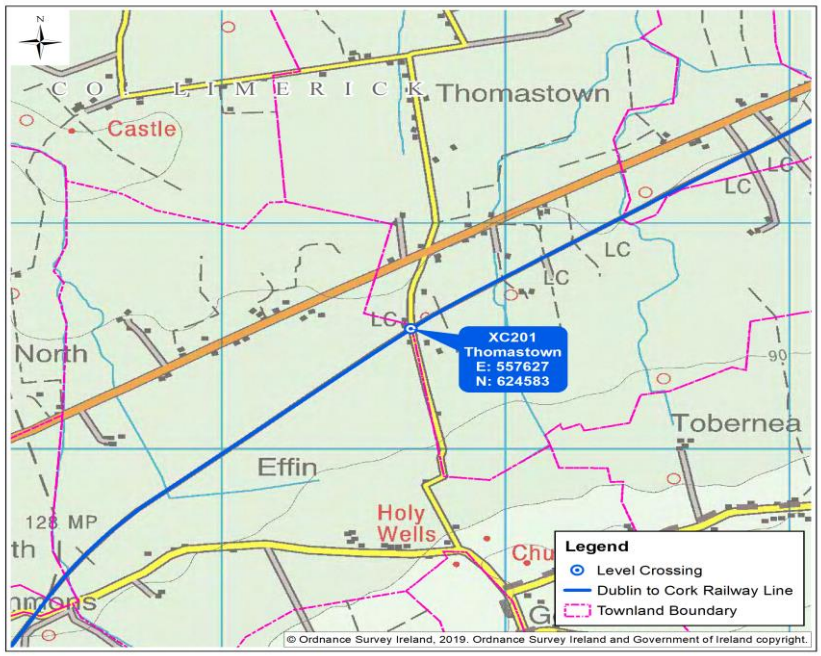


The level crossing is manned 07.30hrs-23.30hrs and the gates are normally closed to road traffic, with the gate keeper opening the gates as required. The crossings are closed to road traffic from 23.30hrs until 07.30hrs. Similar to XC201 Thomastown, the length of time that the road user is waiting depends on when they arrive at the gate and if a train has left Limerick Junction or Charleville. The road user has to wait until they pass.

XC201 Thomastown

The level crossing is located on a local road, 5km to the east of Charleville in the townland of Thomastown. Like XC187 Fantstown, the crossing is located rurally and conforms to the same hours of operation, 07.30hrs-23.30hrs. See Inset Figure 3.2.

Inset Figure 3.2: XC201 Thomastown



The crossing is manned 07.30hrs-23.30hrs and the gates are normally closed to road traffic, with the gate keeper opening the gates as required. The crossing is closed to road traffic from 23.30hrs until 07.30hrs. Similar to XC187 Fantstown, the length of time that the road user is waiting depends on when they arrive at the gate and if a train has left Limerick Junction or Charleville. The road user has to wait until they pass.

XC209 Ballyhay

The crossing is located on a local road in the townland of Ballyhay. 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. See Inset Inset Figure 3.3.

Inset Figure 3.3: XC209 Ballyhay

The crossing is usually open to road traffic during the day, with the gatekeeper closing the gates to facilitate train movements. It is manned 07.30hrs-23.30hrs; at night the crossing is closed to road traffic . 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.

XC211 Newtown and XC212 Ballycoskery

These level crossings run along the eastern side of Ballyhea Village in County Cork. XC211 Newton is located on a local road, 0.5km to the north of Ballyhea Village in the townland of Newtown, 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). See Inset Figure 3.4.

Inset Figure 3.4: XC211 Newtown and XC212 Ballycoskery

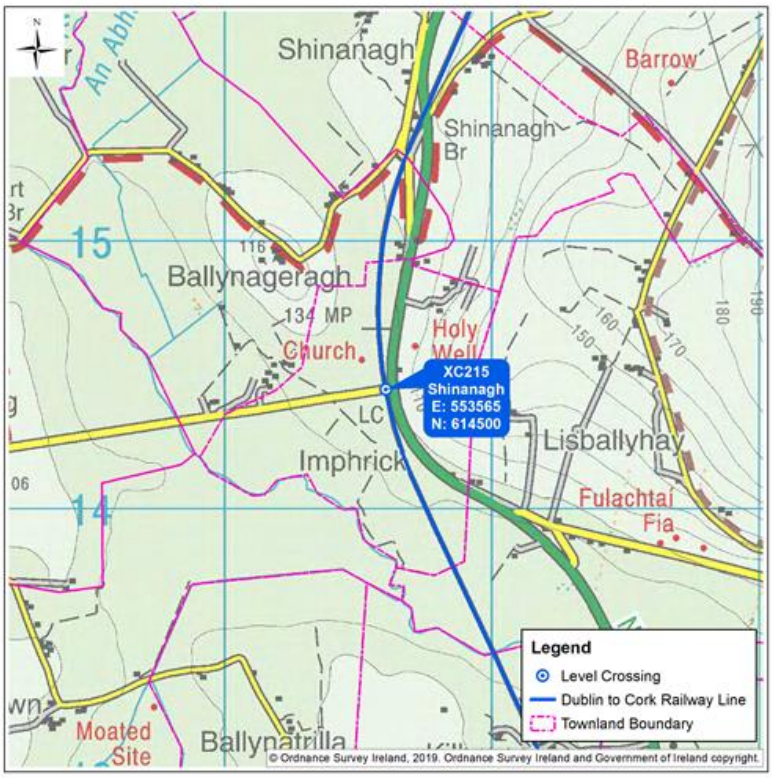
XC211 Newtown is manned 07.30hrs-23.30hrs and the gates are normally open to road traffic during the day when not required to close to facilitate the movement of trains. During night-time, the crossing is closed to road traffic.

XC212 Ballycoskery is designated as a 'CD-Type' level crossing which should mean gates normally open to road traffic by day and night and only closed to road traffic to facilitate the movement of trains. It is operated as a 'CX-Type' level crossing and is therefore manned on a 24-hour basis. There are also pedestrian wicket gates at the crossing, but these are permanently locked.

XC215 Shinanagh

The XC215 Shinanagh level crossing is located at in the townland of Imphrick, County Cork, approximately 3.5km north-east of the village of Churchtown. 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. See Inset Figure 3.5.

Inset Figure 3.5: XC215 Shinanagh



XC215 Shinangh is designated a 'CD-Type' level crossing but it has been operated as a 'CX-Type' level crossing for over 25 years and similar to XC212 Ballycoskery is manned on a 24-hour basis. Its operation as a 'CX-Type' crossing results in the gates being normally open to road traffic with the gate keeper closing the gates as required for rail traffic.

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. The existing level crossing is directly adjacent to the former Buttevant Station. See Inset Figure 3.6.

Inset Figure 3.6: XC219 Buttevant

The level crossing is a CX type, it is manned on a 24-hour basis and the gates are normally open to road traffic with the gate keeper closing the gates as required for rail traffic.

3.4 Proposed Solutions - Infrastructural Elements

3.4.1 Overview

A summary of the proposed solutions for each crossing is provided in Table 3.2.

Table 3.2: Proposed Solutions at each Crossing

Location	Infrastructure	Description
XC187 Fantstown	N/A	Closure of existing level crossing: Divert traffic along existing roads to existing overbridge approximately 3 kilometres to the north east;
XC201 Thomastown	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	CCTV solution	Upgrade existing level crossing to a 4-barrier CCTV controlled level crossing;
XC211 Newtown	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;

Location	Infrastructure	Description
XC212 Ballycoskery (Ballyhea Village)	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	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	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.

3.4.2 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.

Volume 4 (Drawings and Figures) incudes graphics and plans supporting the EIAR Chapters, illustrating the proposed Project.

3.4.3 XC187 Fantstown

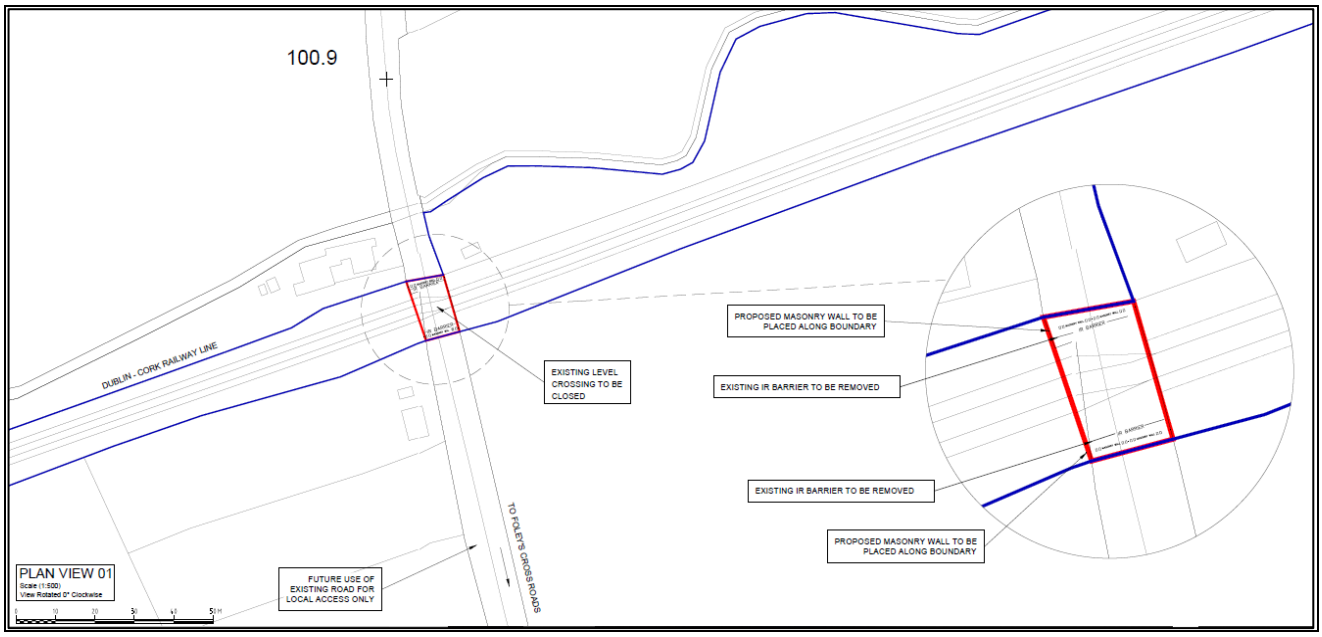
The proposed solution for the elimination/upgrade of the XC187 Fantstown, is through the extinguishment of the public right of way across the level crossing. Road users would be diverted to the east to an existing road-over-rail bridge. See Inset Figure 3.7 and Volume 4, Figures 2A – 2D.

Key elements of the proposed Project include:

- Removal of the existing level crossing infrastructure comprising level crossing gates and all ancillary works in relation to the extinguishment of the public right of way across the level crossing;
- Construction of 2.4m high block wall on both sides of the existing level crossing to stop up access across the Dublin – Cork Railway Line;
- Signage and all ancillary works; and
- Access to existing Iarnród Éireann compound on the north side of the level crossing to be retained.

For the 'stopping up' of the level crossing, there will be block walls on both sides, with access to an existing IE compound to the north of the crossing being retained.

Inset Figure 3.7: XC187 Fantstown Proposed Solution



3.4.4 XC201 Thomastown

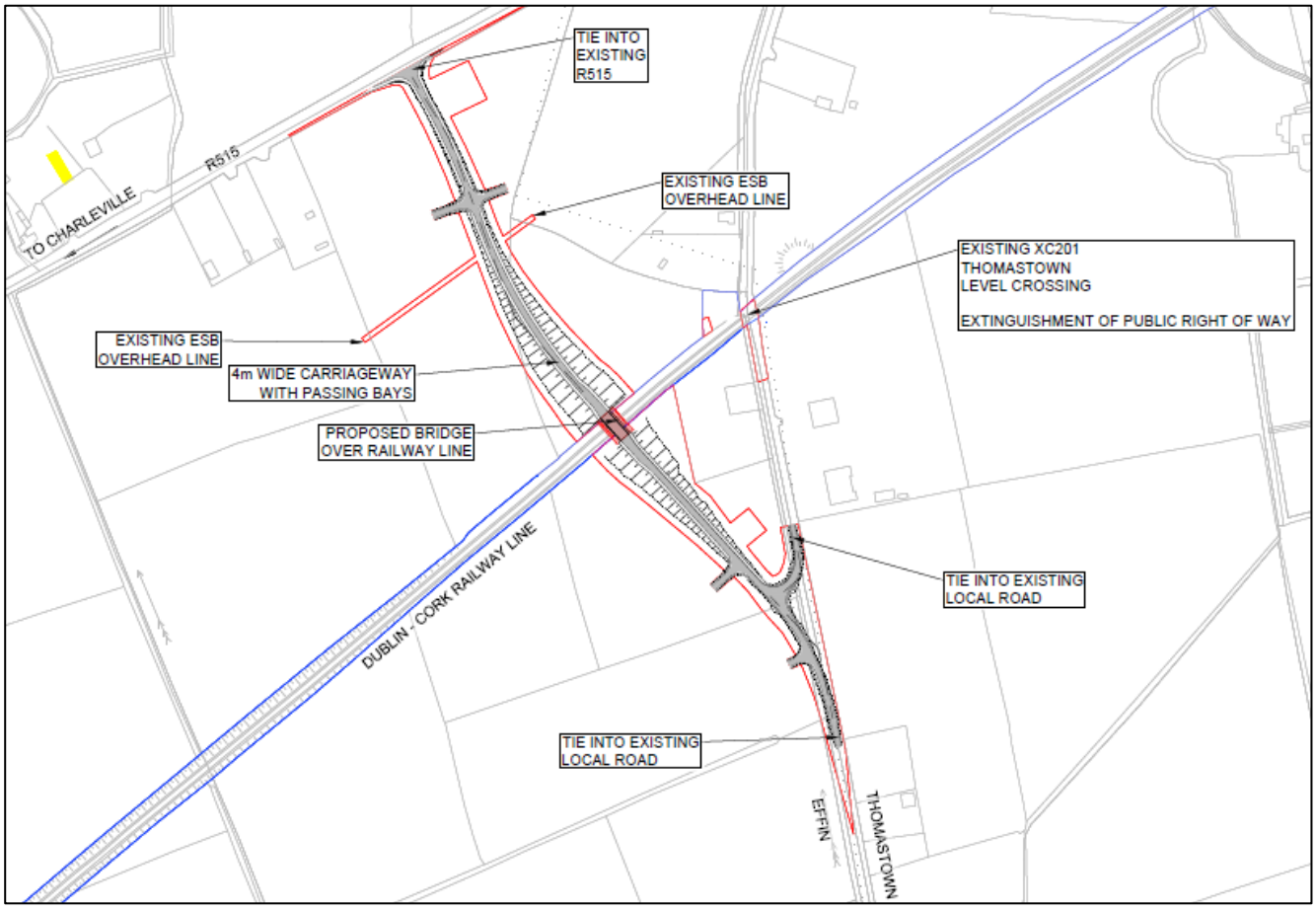
It is proposed to extinguish the public right of way, to close the existing XC201 Thomastown Level Crossing and realign the local road. The proposed realignment will have a new road-over-rail bridge to the south west of the closed level crossing, and a new junction onto the Regional Road R515, to the west of the existing junction. The remaining sections of the existing local road pavement to the south of the closed level crossing will be broken up and removed as this will no longer be required for access. See Inset Figure 3.8 and Volume 4, Figures 3A-3R.

The key elements of the proposed Project include;

- Removal of existing level crossing infrastructure comprising level crossing gates and all ancillary works in relation to the extinguishment of the public right of way across the level crossing;
- Construction of 2.4m high palisade gate to the Up (north) side of railway line for retained track access and 2.4m high block wall to the Down (south) side to stop up access across the Dublin – Cork Railway Line;
- Construction of a new road-over-rail bridge to the south west of the existing Level Crossing and all ancillary works to provide alternative access across the Dublin – Cork Railway Line;
- Realignment of the local road L8572;
- Construction of a new approximately 0.57km long, around 4m wide carriageway with a maximum height of 88.65m AOD road-over-rail bridge to the south west of the closed level crossing;
- New junction onto the Regional Road R515, to the west of the existing junction, a new junction onto local road L8572;
- Earthworks with a maximum height of 7.6m and maximum width of approximately 39.5m;
- Private access provision to four fields immediately adjacent to the road-over rail bridge and provision of two passing bays;

- Sections of the existing local road pavement will be broken up, removed and landscaped where no longer required;
- Undergrounding of existing ESB overhead electricity line; and
- Associated landscaping, fencing, drainage, surfacing, signage, temporary construction compound areas, bird boxes and all ancillary works.

Inset Figure 3.8: XC201 Thomastown Proposed Route Alignment



The current carriageway cross section is approximately 4m wide with 1m verges. It is proposed to provide a 4m wide carriageway with 1m verges, to tie-in with existing cross section. Verges will be widened as required for safety barrier set-back and working width. Passing bays will also be provided, as per Section 10.9 of DN-GEO-03031.

The majority of the road carriageway will be over the edge drainage to swales running along the edge of the roadway, discharging into existing drainage systems such as ditches or roadside drains. Where local access roads / agricultural access is required, a short section of culvert will be provided to connect the swales either side of the junction. For the bridge deck, gully drainage will be used, with a pipe connection down to the swales. The swales will attenuate and treat the runoff.

The overall site area within the Red Line Boundary is 2.07ha and the nearest residential property is 80m to the road tie-in (see Volume 4, Figure 3B (i) and 3B (ii)).

The maximum height of the proposed bridge, at the mid-point of the crossing over the existing railway line, is at 88.65m AOD. The lowest point of the proposed Scheme is at 80.04m AOD. The full length of the proposed Scheme is 567m (see Volume 4, Figure 3B (i) and 3B (ii)).

Bridge Dimensions:

- Precast H4a parapet with 1800mm high feature finish.
- 1500mm – Raised Verge.
- 7000mm – Carriageway.
- 600mm – Raised Verge.
- 10165mm – Concrete bankseat support.

Proposed surfacing and materials used comprise asphalt concrete surfacing. The earthworks reach a maximum height of 7.6m adjacent to structure and maximum width of approx. 39.5m. (see Volume 5, Figure 3E).

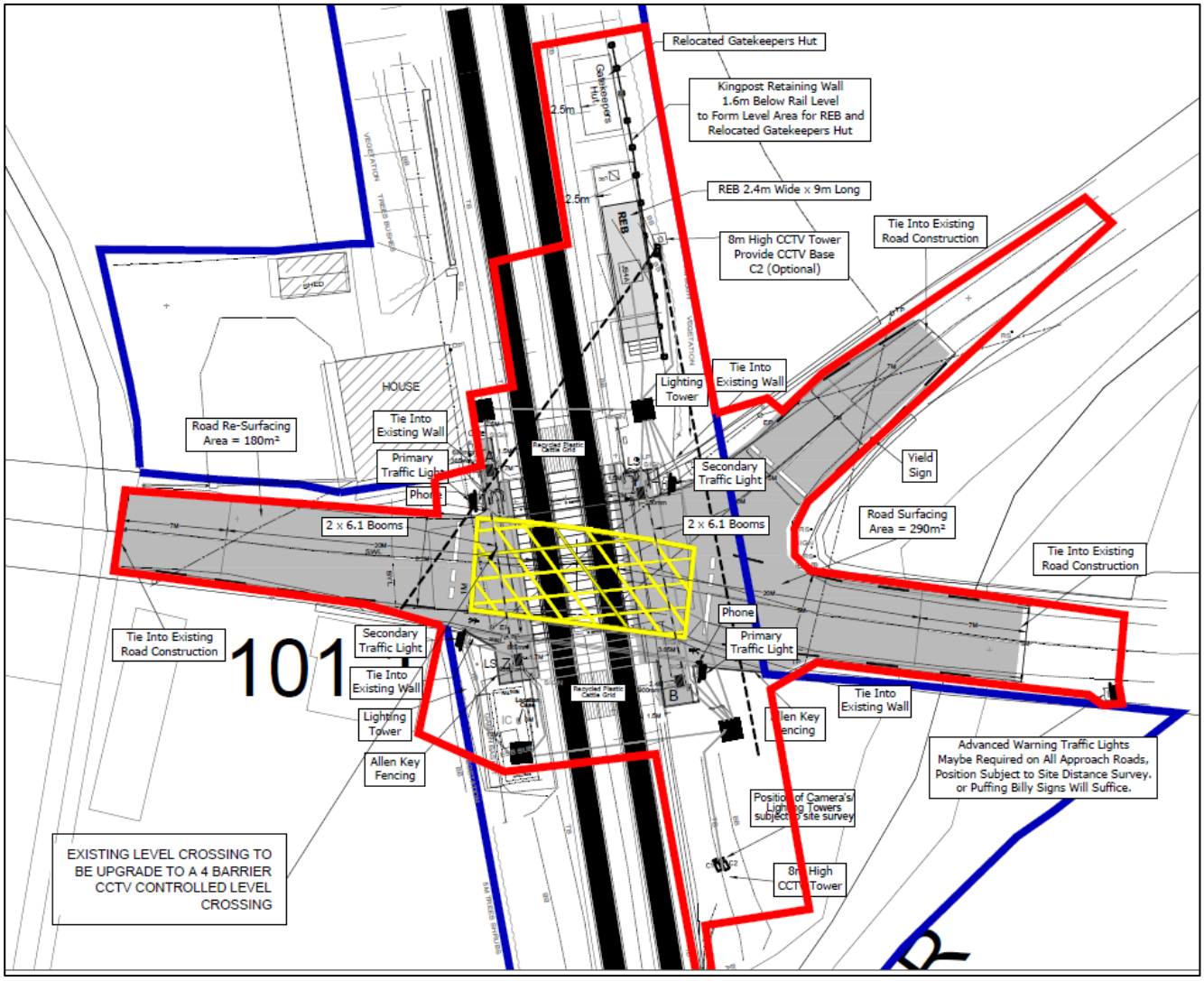
Foundation details (see Volume 4, Figure 3C and 3D) comprise:

- 600mm x 19345mm – TY9/TYE9 Precast Concrete beams.
- Concrete coping.
- Timber maintenance protection barrier fixed to coping to reinforced earth abutment and wing wall.
- Modular concrete panels linked to geotechnical reinforcement layers.
- 580mm x 150mm – Mass concrete levelling pad.
- Integral concrete bankseat pad foundation.
- Section 1 – 565mm x 1100mm.
- Section 2 – 625mm x ≈3400mm x 650mm.

3.4.5 XC209 Ballyhay

The proposed solution for XC209 Ballyhay is to retain the existing level crossing function and convert it to a CCTV controlled level crossing.

Inset Figure 3. 9: XC209 Ballyhay CCTV Upgrade



A CCTV level crossing would be manually controlled by the Level Crossing Control Centre (for XC209 this would be the control centre in Mallow). CCTV cameras mounted in close proximity to the crossing enables the signaller to monitor the road closure and to determine the crossing is clear, before releasing the protecting signals. The key elements of the proposed CCTV upgrade to XC209 Ballyhay include:

- Removal of existing level crossing gates and installation of a 4-barrier CCTV controlled level crossing comprising:
- Construction of single storey REB building 2.4m wide x 9m long;
- 2No. 6.1m wide barriers to replace the existing level crossing gates;
- 4No. Traffic lights and 1No. advanced warning traffic light;
- 2No. 10m high lighting tower;
- 2No. 8m high CCTV towers and bases;
- Relocation of existing gate keepers hut;

- Allen key fencing;
- Road resurfacing;
- Underground electrical cable ducting;
- Undergrounding of existing ESB overhead electricity line;
- 2No. recycled plastic cattle grids; and
- All associated fencing, drainage surfacing, signage and all ancillary works.

The operation of the CCTV requires a Relocatable Electrical Building (REB) in close proximity to the level crossing. It will be located where the current gatekeeper's accommodation hut is. The REB unit (See Figure 4C) dimensions are approximately 9m long, 2.4m wide and 3.5m high (on top of a plinth which is approximately 0.75m high). Ducting will be used along the road verge to the advance warning sign. This will be within the footprint of the existing road and no loss of trees or other vegetation will occur. There will be retaining walls and a levelling of the road within or immediately adjacent to the existing level crossing. An existing ESB overhead line will be undergrounded, under the railway line. The road will be resurfaced on completion, This will up to 20m from the nearest rail on all three approach roads. No works are proposed to the existing bridge 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.

Proposed surfacing and materials used comprise asphalt concrete surfacing.

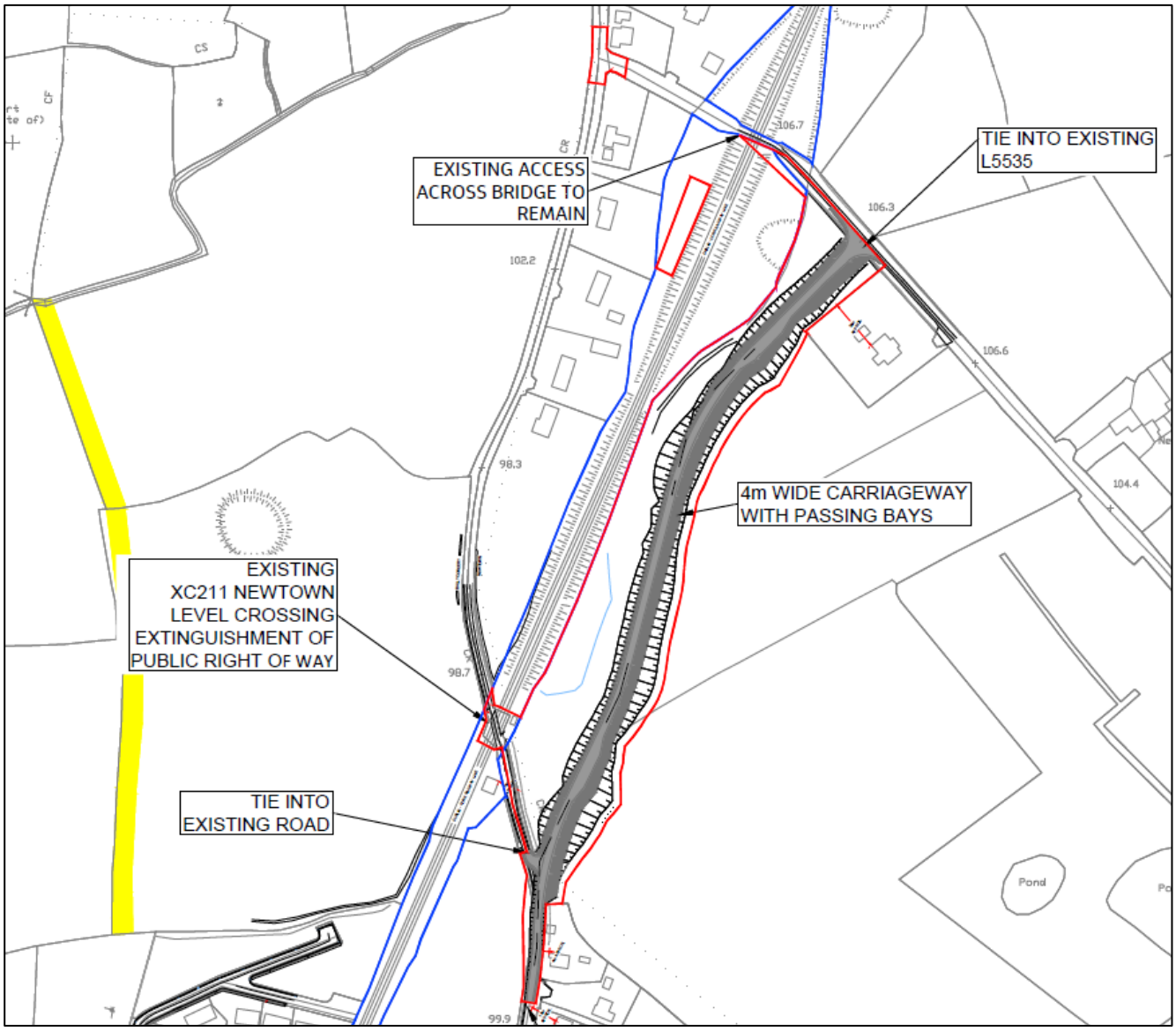
The overall site area within the Red Line Boundary is around 0.098ha.

3.4.6 XC211 Newtown

The proposed solution involves provision of a new link road to the east of the railway corridor, immediately east of the existing road-over-rail bridge north of XC211 Newtown, to connect the local road at the east side of XC211 Newtown. See Inset Figure 3.10 below and Volume 4, 5A-50.

It is proposed to extinguish the public right of way and close the existing XC211 Newtown level crossing. The 'stopping up' of the existing level crossing will be via a block wall to the Up (west) side and a 2.4m high palisade gate to the Down (east) side for retained track access.

Inset Figure 3.10 XC211 Newtown Proposed Alignment



The key elements of the proposed Project include:

- Removal of existing level crossing infrastructure comprising level crossing gates and all ancillary works in relation to the extinguishment of the public right of way across the level crossing;
- Construction of 2.4m high block wall to Up (west) side and 2.4m high palisade gate to Down (east) side for retained track access to stop up access across the Dublin – Cork Railway Line;
- Construction of a new approximately 0.477km and 4m wide link road, to the east of the closed level crossing;
- The maximum height of the proposed road alignment is at 109.5m AOD;
- Earthworks with a maximum height of 3.19m and maximum width of 36m;

- The proposed access toad will be 'cut' into the existing topography to the east along its length and for a short distance to the west at its northernmost point, up to a maximum height of 5m, to allow for the vertical alignment to be designed to TII standards;
- To the west of the proposed access road, embankments will be created, up to a maximum height of 5m from existing levels, to allow for the vertical alignment to be designed to TII standards;
- Private access provision to 1no. field immediately adjacent to the link road and provision of 2No. passing bays;
- Sections of the existing local road pavement will be broken up, removed and landscaped where no longer required; and
- Associated landscaping, fencing, new pond area, bird boxes, drainage, surfacing, signage and all ancillary works.

The overall site area within the Red Line Boundary is 2.101ha and the nearest residential property is 30m to the road tie-in (See Volume 4, Figure 5B (i) and 5B (ii)).

The highest point of the proposed road alignment is at 109.5m AOD while the lowest point is at 97.85m AOD. The full length of the proposed Project is 477m.

The majority of the road carriageway will be over the edge drainage to swales which will primarily run alongside the east side of the road. The swales will attenuate and treat the runoff. For the majority of the roadway, the swales discharge into a culvert which will carry runoff under the road and discharge into an existing pond adjacent to the railway line. For short sections of the northern and southern ends of the road alignment, the swales discharge into existing road drains.

Proposed surfacing and materials used comprise asphalt concrete surfacing.

The maximum road level difference above existing level is 1.66m, the maximum road level difference below existing level is 3.3m. The earthworks have a maximum width of 36m (see Volume 4, Figure 5C (i) and 5C (ii)).

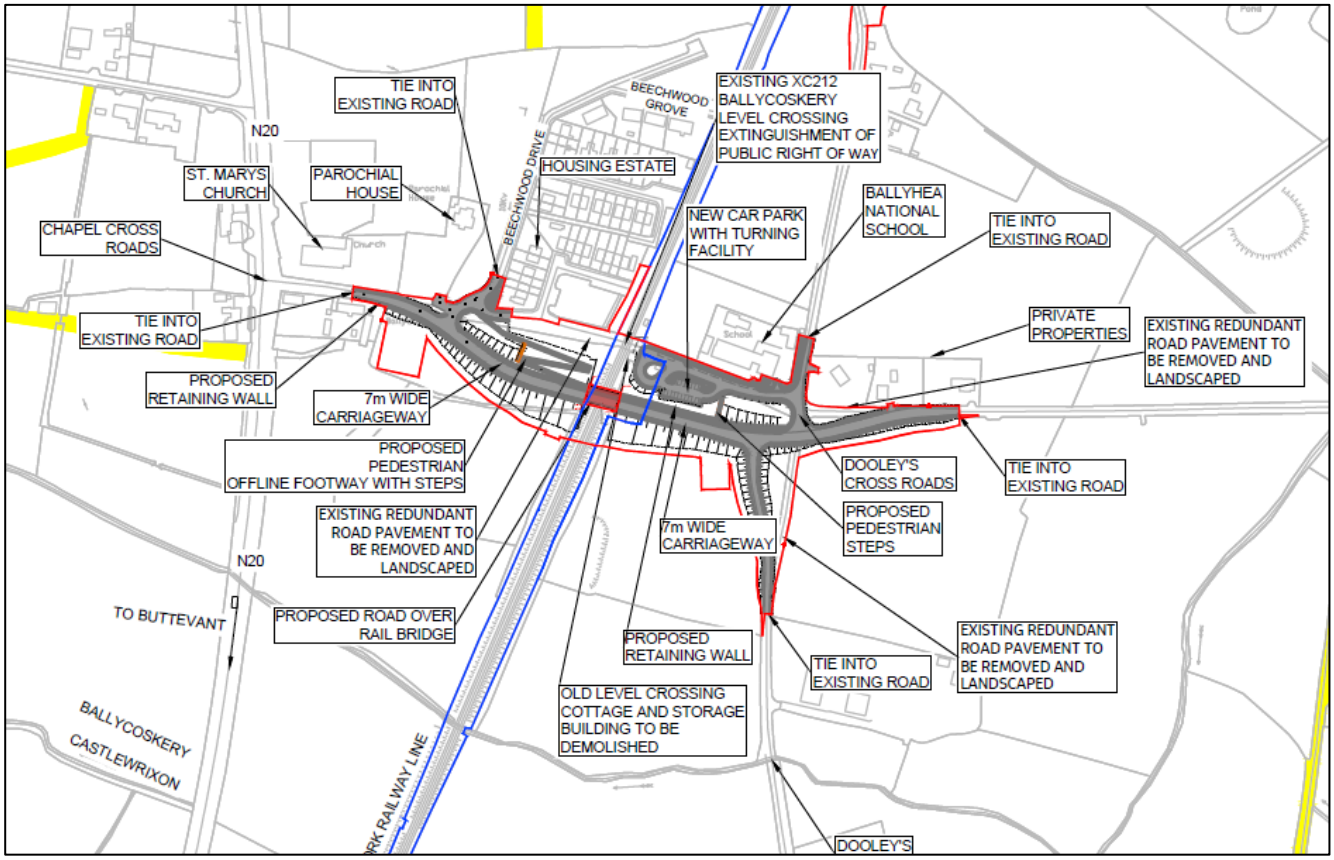
3.4.7 XC212 Ballycoskery

The proposed solution for the elimination/upgrade of the Level Crossing XC212, Ballycoskery is through the provision of alternative access across the railway line via a new road-over-rail bridge.

The existing XC212 Ballycoskery Level Crossing will be closed and the L1533 local road realigned, with a new road-over-rail bridge to the south of the closed level crossing, tying in before the N20 national road junction and after the existing Ballyhea National School and crossroads to the east. It is proposed to change the existing crossroads to the east of the level crossing to a right-left stagger junction to improve safety. See Inset Figure 3.11 below and Volume 4, Figures 6A-6O.

It is proposed to extinguish the public right of way and close the existing XC212 Ballycoskery level crossing. The 'stopping up' of the existing level crossing will be via a 2.4m high block wall on both sides of the track.

Inset Figure 3.11: XC212 Ballycoskery Proposed Alignment



The proposed Project will separate those vehicles associated with school drop off from those just seeking to travel west and will create a dedicated turning and parking area that will improve safety for children and parents accessing the school and for that of road users. The remaining sections of the existing local road pavement to the west of the closed level crossing will be broken up and removed as no longer required.

A Type 1 Single carriageway is proposed along the mainline, with 3m lanes and 0.5m hard strips. The road cross section tapers back to existing widths at tie in points. A 2m wide footpath is proposed along the north side of the carriageway. This footpath will be online to the east of the bridge and taken offline to the west of the bridge in order to provide desirable gradient of 5% along the footpath. Footpath is located outside the line of the road safety barrier to allow it to be taken offline without inserting a break in the barrier. Verges will be widened as required for safety barrier set-back and working width. On the local road link to the south, it is proposed to provide a 4m carriageway with 1m verge, tapering down to 3m at the tie-in. See Volume 4, Figure 6C (i) and 6C (ii).

For drainage, see Volume 4, Figure 6I (i) and 6I (ii). There are two catchments, west and east of the railway line. Both catchments adopt the same approach. On the north side of the road, gully drainage and carrier drains will drain the paved / surfaced areas (including the bridge deck), outfalling into culverts which carry runoff under the roadway to the south side. The south side will be over the edge drainage to swales running along the edge of the roadway, discharging into existing ditches. The swales will also pick up the drainage from the aforementioned new gully network in the north. The swales will provide attenuation and treatment.

An existing ditch is located to the west of the railway line. A new culvert will be constructed to ensure the capacity and function (draining residential areas to the north) of this ditch is retained. (see Volume 4, Figure 6C (i) and 6C (ii)).

Key elements of the proposed Project include:

- Removal of existing level crossing infrastructure comprising level crossing gates and all ancillary works in relation to the extinguishment of the public right of way across the level crossing;
- Construction of 2.4m high block wall on both sides of the existing level crossing to stop up access across the Dublin – Cork Railway Line;
- Realignment of the L1533 local road to the South of the closed level crossing, and all ancillary works;
- Construction of a new approximately 0.46km, around 7m wide road with 1m verge over rail bridge with a maximum height of about 105.3m AOD to the south of the closed level crossing, forming part of local road L1533, tying in before the N20 national road junction to the west and tying in after the existing school and crossroads to the east, and all ancillary works;
- Reconfiguration of the existing crossroads junction to the east of the level crossing to a right-left stagger junction;
- Provision of a new 5m – 10.8m maximum height by 85m long retaining wall;
- Provision of new pedestrian walkway to the south of Beechwood Drive across the road-over-rail bridge ending outside Ballyhea National School;
- Construction of a car park and turning area to the immediate south of Ballyhea National School;
- Private access provision to existing dwellings;
- Earthworks with a maximum height of 9m and maximum width of 54m;
- Demolition of former level crossing gate keepers building and ancillary single storage building;
- Sections of the existing local road pavement will be broken up, removed and landscaped where no longer required; and
- Associated landscaping, fencing, lighting, drainage, surfacing, signage, temporary construction compound areas, ecological translocation area, bird boxes and all ancillary works.

The overall site area within the Red Line Boundary is 2.462ha and the nearest residential properties are 10m to the road tie-in (see Volume 4, Figure A).

The highest point of the proposed road alignment is at 105.3m AOD while the lowest point is at 97.8m AOD. The full length of the proposed Project is 452m.

Bridge Details (see Volume 4, Figure 6C (i) and 6C (ii)):

- 11695mm concrete bankseat support;
- 350mm H4a concrete parapet with feature finish;
- 600mm Raised Verge;
- 7000mm Carriageway;
- 600mm Raised Verge;
- 350mm Precast H4a parapet with 1800mm high feature finish;
- 2600mm Footway; and

- Steel sheeted pedestrian guard rail.

Proposed surfacing and materials used comprise asphalt concrete surfacing.

The earthworks reach a maximum height of approximately 9m and maximum width of approximately 54m (See Volume 4, Figure 6E).

Foundation details (see Volume 4, Figure 6C (i) and 6C (ii)) comprise:

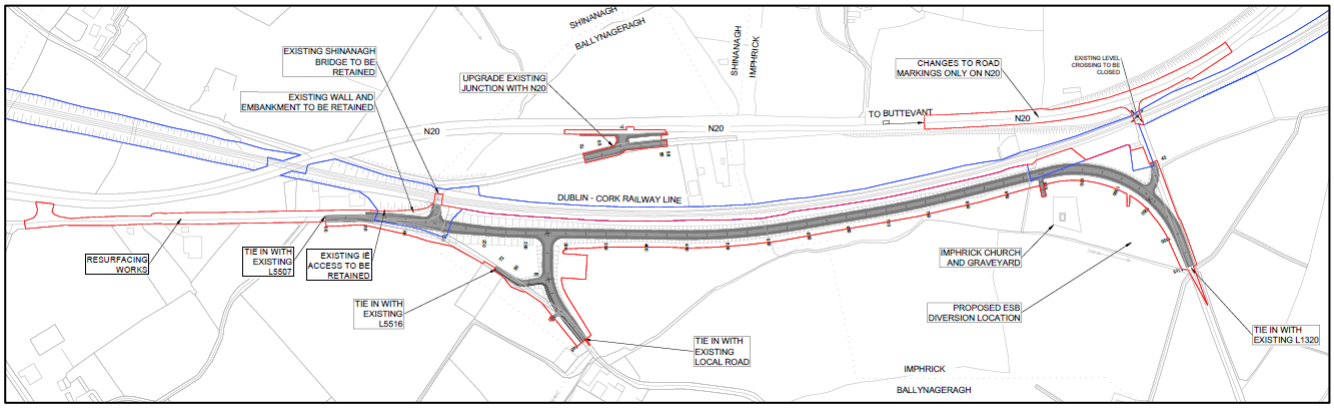
- 600mm x 19345mm – TY9/TYE9 Precast Concrete beams.
- 580mm x 150mm – Mass concrete levelling pad.
- Reinforced earth abutment and wing walls precast concrete panel facing.
- Integral concrete bankseat pad foundation.
    - Section 1 – 565mm x 1100mm.
    - Section 2 – 625mm x ≈3400mm x 650mm.

3.4.8 XC215 Shinanagh

The proposed solution for the elimination of the Level Crossing XC215, Shinanagh is through provision of a new road alignment diverting traffic to an existing road-over-rail bridge, it also involves the upgrade of the existing junction onto the N20 carriageway and removal of existing N20 junction at level crossing. See Inset Figure 3. 12 below and Volume 4, Figures 7A-7Q.

It is proposed to extinguish the public right of way and close the existing XC215 Shinanagh level crossing. The 'stopping up' of the existing level crossing will be via a 2.4m high block wall on both sides. Access to an IE compound on the west side of crossing will be retained.

Inset Figure 3. 12: XC215 Shinanagh Proposed Alignment and Elevation



The proposal involves closing the crossing and diverting traffic along a new section of local road to an existing road-over-rail bridge to the north. This tie into the existing bridge will improve on the existing arrangements at this location. The existing link from the N20 to this existing bridge will also be improved, with the N20 junction shifting north to increase length of existing left-turn lane and improve junction sightlines. The existing N20 junction at the level crossing will be removed. N20 road marking and signage will be updated and the redundant section of pavement to the east of the level crossing will be broken up and removed as no longer required.

The current carriageway cross sections at mainline are approximately 6m wide at the southern tie-in, 5m wide at the northern tie-in and 4m wide at the side road tie-in. It is proposed to provide a 5.5m wide carriageway with 3m verges, tapering back to existing carriageway widths at tie-ins.

For drainage, see Volume 4, Figure 7K. The majority of the road carriageway will be over the edge drainage to swales running along the edge of the roadway, discharging into existing drainage systems such as ditches or roadside drains. Where local access roads / agricultural access is required, a short section of culvert will be provided to connect the swales either side of the junction. At the northern end, an existing concrete channel section and gully drains the road. This will be reinstated on completion of the works. The swales will attenuate and treat the runoff. The section of existing road to be repaved will utilise existing drainage.

Key elements of the proposed Project include:

- Removal of existing level crossing infrastructure comprising level crossing gates and all ancillary works in relation to the extinguishment of the public right of way across the level crossing;
- Construction of 2.4m high block wall on both sides of the existing level crossing to stop up access across the Dublin – Cork Railway Line;
- Construction of a new approximately 1.14km up to 5.5m wide with 3m verges section of local road on the west side of the railway, connecting local road L1320 to an existing road-over-rail bridge to the north;
- Upgrade of the existing tie-in to the existing bridge including upgraded junction to the local road L5507;
- Resurfacing of the local road;
- Upgrade of the existing junction of the local road L5507 onto N20 national road;
- Earthworks with a maximum height of 5m and maximum width of approximately 32m;
- Sections of the existing local road pavement will be broken up and removed and landscaped where no longer required;
- Diversion of existing ESB overhead electricity line;
- Relocation of field accesses; and
- Associated landscaping, fencing, drainage, surfacing, signage temporary construction compound areas, bird boxes and all ancillary works.

The overall site area within the Red Line Boundary is 5.716ha and the nearest residential property is 30m to the road tie-in (see Volume 4, Figure 7B).

The highest point of the proposed road alignment is at 106.1m AOD while the lowest point is at 91.7m AOD. The full length of the proposed full depth pavement is 1140m.

Proposed surfacing and materials used comprise asphalt concrete surfacing.

Earthworks reach a maximum height of 5m and maximum width of approximately 32m (see Volume 4, Figure H and Figure I).

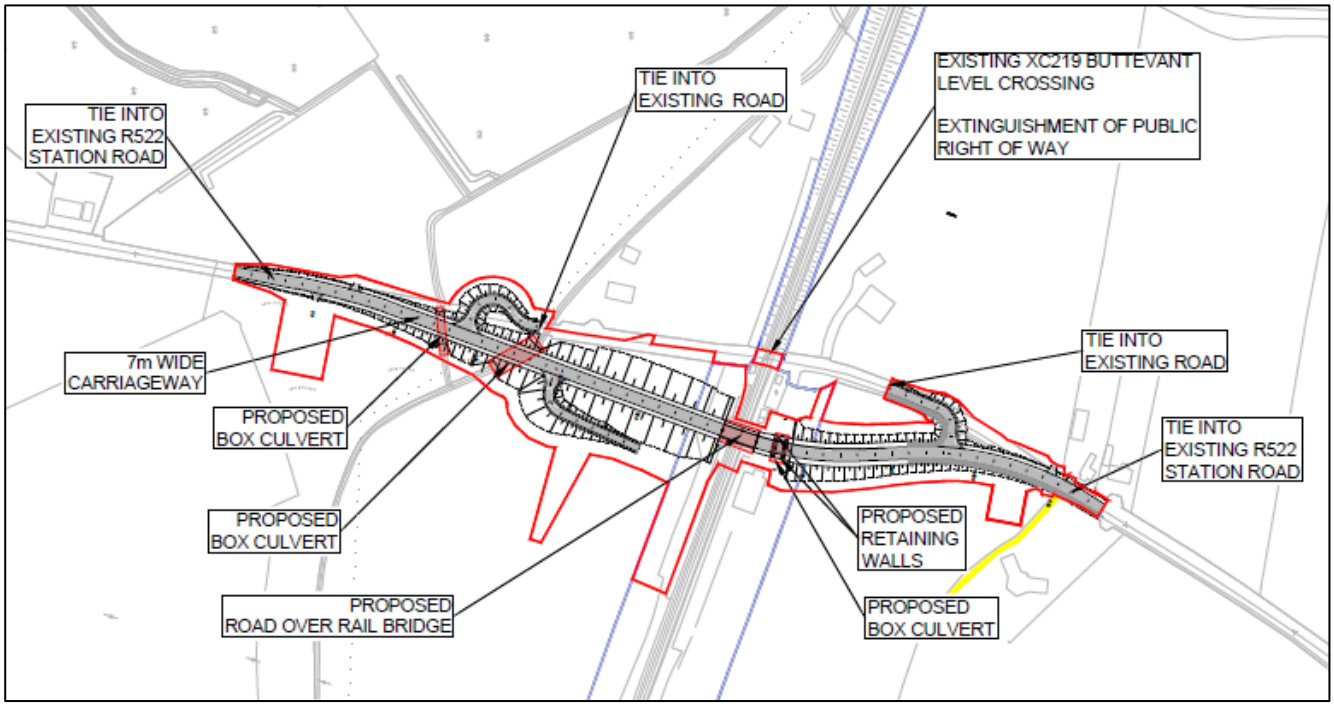
3.4.9 XC219 Buttevant

The proposed solution for the elimination/upgrade of XC219 Buttevant, is through the provision of alternative access across the railway line via a new road-over-rail bridge. It is proposed to close the existing XC219 Buttevant Level Crossing and realign the R522 Regional Road. The proposed realignment will have a new road-over-rail

bridge to the south of the closed level crossing, tying back into the existing regional road to the east and west. The new alignment will cross an existing stream and a culvert is therefore proposed at this location. See Inset Figure 3.13 below and Volume 4, Figures 8A-8O).

It is proposed to extinguish the public right of way and close the existing XC219 Buttevant level crossing. The 'stopping up' of the existing level crossing will be via a 2.4m block wall on both sides. Access to an IE compound to the east side will be retained.

Inset Figure 3.13: XC219 Buttevant Proposed Realignment



The remaining sections of the existing local road pavement to the north and south of the closed level crossing will be retained as they are required for access.

The current carriageway cross sections are approximately 6m wide. A Type 1 Single carriageway is proposed along the mainline, with 3m lanes and 0.5m hard strips. The road cross section tapers back to existing widths at tie in points. (see Volume 4, Figure 8C (i) and 8C ii)). There is an existing footpath on the southern side of the eastern tie-in which joins the town with a memorial site on the eastern side of the level crossing, a short section of footpath is proposed, to keep this link between the town and the memorial site. Verges will be widened as required for safety barrier set-back and working width or tie back into existing widths.

For drainage see Volume 4, Figure 8I. There will be two catchments, separated by the railway line. The majority of the road carriageway will be over the edge drainage to swales running alongside the road on both sides. Where local access roads / agricultural access is required, a short section of culvert will be provided to connect the swales either side of the junction. For the bridge deck, gully drainage will be used, with a pipe connection to the swales. The swales will discharge into existing ditches and, to the west, directly into the Pepperhill River. The swales will attenuate and treat the runoff.

In the west catchment, swales will not be provided within the fluvial floodplain of the Pepperhill River due to risk of inundation resulting in untreated runoff entering the watercourse. Gully drainage and carrier drains will drain the roadway into existing ditches via an interceptor upstream of the outfall.

A Stage 3 Flood Risk Assessment (Volume 5, Appendix 9A) has been carried out to confirm maximum flood levels at the river bridge and the potential flood risk impact of the proposed Project. This has been used to inform the

design of the two culverts proposed at this site (see Volume 4, Figure 8C (i) and 8C (ii)). The largest of these crosses the Awbeg (Buttevant) (East)_020 water body (Pepperhill River). It is 6m wide, 3m high and approximately 39m length (width of the earthworks at this location). The second crosses a spur stream from the main water body. It is 3m wide, 2.5m high and approximately 14.5m length (width of the earthworks at this location). Both culverts will be embedded to allow for the natural river and stream beds to re-establish following installation.

Key elements of the proposed Project include:

- Removal of existing level crossing infrastructure comprising level crossing gates and all ancillary works in relation to the extinguishment of the public right of way across the level crossing;
- Construction of 2.4m high block wall on both sides of the existing level crossing to stop up access across the Dublin – Cork Railway Line;
- Access to Iarnród Éireann compound on the east side of the level crossing to be retained;
- Realignment of the R522 regional road south of the closed crossing;
- Construction of a new approximately 0.53km road-over-rail bridge to the south of the closed level crossing forming part of the realigned regional road R522, tying back into the existing regional road to the east and west of the crossing, and all ancillary works;
- Construction of an approximately 3m high by 6m wide by 14.5m in length river bridge structure and a 2.5m high by 3m wide by 14.5m in length box culvert across a tributary of the Awbeg River to the west of the crossing on the realigned regional road R522;
- Earthworks with a maximum height of around 8.5m and maximum width of about 47m;
- Sections of the existing local road pavement around the closed level crossing will be broken up and removed and landscaped where no longer required;
- Diversion of existing ESB overhead electricity line; and
- Associated landscaping, fencing, lighting, drainage, surfacing, signage temporary construction compound areas, ecological translocation area, bird boxes and all ancillary works.

The overall site area within the Red Line Boundary is 2.572ha and the nearest residential property is 5m to the road tie-in.

The highest point of the proposed road measures approximately 94.5m AOD and is at the mid-point of the crossing over the existing railway line. The full length of the proposed Project is 530m.

Bridge details (see Volume 4, Figure 8C (i) and 8C (ii) and 8H (i) (ii) and (iii)):

- H4a concrete parapet.
- 2000mm – 2225mm Raised Verge.
- 7000mm Carriageway.
- 600mm Raised Verge.
- H4a concrete parapet.

Proposed surfacing and materials used comprise asphalt concrete surfacing.

Earthworks reach a maximum height of 8.6m and maximum width of approx. 47m (see Volume 4, Figure 8H (i), (ii), (iii)).

Foundation details (see Volume 4, Figure 8C (i) and 8C (ii)) comprise:

- TY9/TYE9 Precast concrete beam.
- Concrete coping.
- Timber maintenance protection barrier fixed to coping to reinforced earth abutment and wing wall
- Modular concrete panels linked to geotechnical reinforcement layers.
- 580mm x 150mm – Mass concrete levelling pad.
- Integral concrete bankseat pad foundation.
    - Section 1 – 565mm x 1100mm.
    - Section 2 – 625mm x ≈3400mm x 650mm.

3.5 Ancillary Infrastructure

3.5.1 Traffic Signs, Road Markings and Lighting

The traffic signs and road markings for the proposed Project will be prepared to the relevant legislation and design standards. As set out in the Preliminary Design Report The detailed design will be undertaken by the appointed Design Contractor, and subject to compliance with the contract documents. As part of the design process, the Contractor will consult with TII and with the Roads Departments of Cork and Limerick City and County Councils.

Temporary site lighting during construction will be required as follows: at the Construction Contractor's compounds for security and safe movement of staff during winter mornings and evenings; along temporary access roads; at locations where there is currently no lighting, but lighting is required as a safety measure under temporary traffic management (e.g. at carriageway crossovers, contraflows etc); and for night time activities or winter afternoon activities.

The design of the proposed Project seeks to reduce or avoid excessive, unnecessary and obtrusive lighting by appropriate selection, location and arrangement of lighting elements, while adhering to the necessary safety and design standards.

To minimise light pollution from the proposed street lights, Light Emitting Diodes (LEDs) or similar which can be dynamically controlled according to traffic flows will be utilised. LEDs will also be used to prevent unnecessary glare or light spill from proposed lighting columns and fixtures. The use of LEDs improves the sustainability of the proposed Project by providing a significant reduction in energy use and carbon emission (based on the 25-year life span of an LED) compared to the existing situation (See Volume 3, Chapter 14: Cross Cutting Themes, Section 3 Climatic Factors).

3.5.2 Non-Motorised User (NMU) Provision

Footpaths have been provided in locations where existing footpaths are currently present.

XC212 Ballycoskery: the footpath runs across the structure and ties into Ballyhea National School on the east side of the railway and the existing footpath on west (offline section provided to allow for a maximum 5% gradient over entire footpath length). A shorter access route for pedestrians is also provided on both sides of the bridge; an access stair is also provided to the east; a 'zig zag' slope to the west (see Volume 4, Figure 6C (i) and 6C (ii)).

XC219 Buttevant: a footpath Is provided, linking the existing footpath to the east with the memorial site adjacent to level crossing.

Where a footpath is not provided, safety barriers are set back a minimum 1m from edge of pavement to allow Non-Motorised Users (NMUs) 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.

3.5.3 Fencing and Environmental Barriers

To secure the land area required for the implementation of the proposed Project, temporary fencing will be erected prior to the commencement of construction, where necessary. Whilst much of the agricultural land bounding the proposed Project is arable in nature, a requirement for stock-proofing may be necessary in some areas. On completion of the works, any permanent fencing required to denote the permanent road boundary will generally be a timber post and rail fence to TII standards (see Volume 4, Figure 10B and 10C).

Barriers will be erected within the Irish Rail boundary to prevent access to the railway. The barriers will consist of permanent concrete dividers and will be positioned within the Irish Rail boundary line.

Environmental barriers, including noise barriers (during construction) may be required to reduce the potential impacts of the proposed Project at specific locations. Where the requirement has been identified within this EIAR, environmental barriers will be incorporated. This may include ecological fencing required to provide protection for wildlife by preventing access onto the carriageway. The requirements for ecological fencing are given in Volume 3, Chapter 7: Biodiversity.

3.6 Construction Phase

3.6.1 Construction Hours

Construction hours will be 0800 – 1800 as standard with bridge beams being lifted in over Saturday nights (2200 – 0600) one for each bridge.

3.6.2 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.

A site by site programme is set out below and is based upon five day working weeks with eight-hour shifts (with the exception of rail possessions which will include Friday and Saturday night working).

Construction Phasing and an Indicative Programme for each site is provided in Tables 3.3 to 3.7. These should be considered in conjunction with the following Figures:

- XC201: Volume 5, Figures 3M and 3O;
- XC211: Volume 5, Figure 5O;
- XC212: Volume 5, Figure 6M;
- XC215: Volume 5, Figure 7R; and
- XC219: Volume 5, Figure 8M.

Table 3.3: Construction Phasing and Indicative Programme for XC201 Thomastown

XC201 Thomastown	Duration
Phase 1	
1. Strip/Excavate existing ground for new road formation	2 weeks
2. Form temporary road access to new bridge location for plant access (including temporary works crane mat)	2 weeks
3. Install temporary drainage and some permanent drainage where possible	1 week
Phase 2	
4. Install foundation piles and form capping beam	4 weeks
5. Install bridge support foundation using mobile crane	2 weeks
6. Install precast bridge beams and concrete infill during rail possession and apply bridge deck waterproofing	4 weeks
Phase 3	
7. Form new reinforced earth ramp approach roads on each side	17 weeks
8. Complete new road surface, marking and signage	7 weeks
9. Tie in new and existing roads	1 week
10. Level crossing to be decommissioned	1 week
11. Decant from site and open road to public	2 weeks
TOTAL	41 weeks

Table 3.4: Programme for XC211 Newtown

XC211 Newtown	Duration
Phase 1	
1. Strip/Excavate existing ground for new road formation	5 weeks
2. Close access Road to Residents	1 week
3. Install temporary drainage and some permanent drainage where possible	1 week
4. Form earthworks embankment for road construction	4 weeks
Phase 2	
5. Complete road surfacing	3 weeks
Phase 3	
6. Form new connection to tie into existing	2 week

XC211 Newtown	Duration
7. Tie in new and existing roads	1 week
8. Level Crossing to be decommissioned	1 week
9. Open new road	1 week
10. Decant from site and open road to public	2 weeks
TOTAL	20 weeks

Table 3.5: Programme for XC212 Ballycoskery

XC212 Ballycoskery	Duration
Phase 1	
1. Strip/Excavate existing ground for new road formation	4 weeks
2. Form temporary road access to new bridge location for plant access (including temporary works crane mat)	2 weeks
3. Install temporary drainage and some permanent drainage where possible	1 week
4. Construct Retaining Wall	4 weeks
Phase 2	
5. Install foundation piles and form capping beam	4 weeks
6. Install bridge support foundation using mobile crane	2 weeks
7. Install pre cast bridge beams and concrete infill during rail possession and apply bridge deck waterproofing	4 weeks
8. Demolish of Existing Buildings	2 weeks
Phase 3	
9. Form new reinforced earth ramp approach roads on each side	30 weeks
10. Complete new road surface, marking and signage	8 weeks
11. Tie in new and existing roads	1 week
12. Decant from site and open road to public	2 weeks
TOTAL	63 weeks

Table 3.6: Programme for XC215 Shinanagh

XC215 Shinangh	Duration
Phase 1	
1. Strip/Excavate existing ground for new road formation	13 weeks
2. Close access Road to Residents	1 week
3. Install temporary drainage and some permanent drainage where possible	1 week
4. Form earthworks embankment for road construction	15 weeks
Phase 2	
5. Complete road surfacing	11 weeks
Phase 3	
6. Form new connection to tie into existing	1 week
7. Tie in new and existing roads	1 week
8. Decant from site and open road to public	2 weeks
9. Decommission level crossing	1 week
TOTAL	44 weeks

Table 3.7: Programme for XC219 Buttevant

XC219 Buttevant	Duration
Phase 1	
1. Strip/Excavate existing ground for new road formation	2 weeks
2. Form temporary road access for residents and access to buildings/fields	2 weeks
3. Form temporary road access to new bridge location for plant access (including temporary works crane mat)	2 weeks
3. Install temporary drainage and some permanent drainage where possible	1 week
Phase 2	
4. West Side Install culvert over stream	3 weeks
5. Form temporary road to bridge structure	2 weeks
6. Install retaining wall (East)	1 week
7. Install foundation piles and form capping beam	4 weeks

XC219 Buttevant	Duration
8. Install bridge support foundation using mobile crane	2 weeks
9. Install pre cast bridge beams and concrete infill during rail possession and apply bridge deck waterproofing	4 weeks
Phase 3	
10. Form new reinforced earth ramp approach roads on each side	25 weeks
11. Complete new road surface, marking and signage	5 weeks
12. Tie in new and existing roads	1 week
13. Level Crossing to be decommissioned	1 week
14. Decant from site and open road to public	2 weeks
TOTAL	56 weeks

XC211 Newtown and XC212 Ballycoskery layout / proximity

Whilst each crossing location site can be treated as stand-alone project, it should be noted that at crossing XC212 Ballycoskery, this is located in close proximity geographically south from XC211 Newtown site (which is formed of a new road diversion) and the existing roads link the two sites/areas.

Phasing for these two sites will be considered during construction to minimise the effects on traffic coming into Ballycoskery/Ballyhea Village. Specifically, construction sequences proposed are to phase some of the worksite locations by dividing an 'east' and 'west' side to reduce impacts on local area and control vehicle movements/traffic management.

3.6.3 Lifting Operations

The use of a road mobile crane is proposed. However, consideration will be given to the use of rail mounted crane (Kirow for example) dependant on availability / suitability. Access can be by via the existing level crossing point for materials, work-at-height equipment and operatives.

It is assumed no overhead electric line is present on the railway line in terms of structural clearance and proximity for considerations to any lifting operations.

3.6.4 Craneage

Proposed mobile crane type/capacity has been assessed based on preliminary designs and self-weights of the individual pre-cast concrete beams. Crane location has been, where possible, positioned as near to the centre of the bridge (load) as possible.

This proposed method is indicative only; during detailed design, a full lifting plan and crane sizing / lifting method will be produced by a person appointed by the Contractor.

3.6.5 Buried services and overhead services

Third party buried services and utilities will be surveyed prior to commencement of the construction of the proposed Project. Overhead services will be stated and included in any method / lifting plans so they can be avoided.

The status of these services will be checked and verified from the utility owner and a certificate issued to confirm. If the infrastructure / cables of these services remain on site, appropriate safety notices and warnings will be displayed throughout the construction works. Where necessary a demarcation zone will be implemented to prevent operatives or plant coming into contact. Sufficient time will be allowed in the programme in advance of site works to allow such statutory authority searches / utility decommissioning or required diversions. Further details of effects on third party utilities are provided in Volume 3, Chapter 16: Cross Cutting Themes.

3.6.6 Rail Closures

The phasing of the rail line closures / possessions required for the bridge lift and installation will be considered and there will be early engagement with Iarnród Éireann's track access team to link the construction delivery programme to avoid unnecessary down time.

3.6.7 Earthworks and Construction Traffic

Table 3.8 provides estimated cut and fill volumes. In addition, likely construction traffic requirements have been calculated, based on a standard 15m^3 (20yd) haul wagon.

Table 3.8: Estimated Cut and Fill and Traffic Movements

Site	CUT (m3)	FILL (m3) (assumed unfactored)	Fill (m3) + 35% bulking factor	Comments (using standard 15m3 wagon)
XC187 - Fanstsown	n/a	n/a	n/a	Straight closure.
XC201 - Thomastown	240	23,672	23,432	wagon movements in excess of 1600no.
XC209 - Ballyhay	n/a	n/a	n/a	Convert to CCTV.
XC211 - Newtown	8,007.	2,775	5,231	Wagon movements 103no.
XC212 – Ballycoskery (without stairs and a footpath on the west side)	2,714	40,289	37,574	Wagon movements in excess of 3000no.
XC215 - Shinanagh	2,665	35,044	32,378	Wagon movements 1330no.
XC219 - Buttevant	551	41,101	41,549	Wagon movements in excess of 2460no.
	TOTAL 19,214	TOTAL 94,893	TOTAL 128,104	

3.6.8 Construction Traffic Management Plan (CTMP)

Due to the large volumes of import material and associated vehicle movements, a logistics sequence in line with the delivery capability in the region, will be established as part of the Construction Traffic Management Plan (CTMP) to be produced by the Construction Contractor. This will allow for each site-specific programme and safe

traffic management. Mitigation measures and an Outline CTMP are provided in Volume 3, Chapter 11: Traffic and Transport. The final CTMP will be drafted prior to commencement on site and in consultation with local Road and Planning Authorities.

The CTMP will include detail on the following:

- vehicle identification methods;
- use of prescribed construction route;
- a Traffic Management Group (TMG);
- restriction of HGV movements;
- use of Euro standard IV class HGVs;
- banksmen/presence of personnel at access;
- dispersed timings of HGV movements on the LRN
- banksmen vehicle movement monitoring;
- Incident Management Plan;
- PRoW Management Plan;
- vehicle wheel cleaning;
- road condition surveys;
- Temporary Traffic Management Procedures (TTM);
- distribution of communication and promotional material; and
- AIL Movements.

In addition to the mitigation outlined above, traffic routing and management agreements will be set out and agreed in advance with the relevant Local Authority. It is proposed that these will also take account of any other construction activities in the area to avoid potentially unacceptable cumulative adverse effects.

Furthermore, travel planning initiatives will be introduced throughout the proposed Project area. These are measures that will look to maximise plant and material delivery and encourage construction workers to arrive on-site together and not singularly. There is a Travel Planning section within Volume 3, Chapter 11: Traffic and Transport.

A number of additional mitigation measures will be introduced for abnormal load movements. These include:

- An Garda Síochána escorts and delivery programmes timed to cause minimal disruption;
- vehicles will be marked as abnormal or long vehicles and where necessary temporary warning signs will be placed at required locations along the roads being used by site traffic;
- it is also proposed to undertake a full condition survey before and after the delivery of any abnormal load. The condition of the carriageway will be reinstated to the same or better condition following the use of the route; and

- surveys where appropriate will be undertaken to an agreed methodology with the relevant Roads Authority.

3.6.9 Abnormal Loads and Construction Routes

The proposed pre-cast concrete beams will be reviewed alongside the logistics and transport options. At approx. 20m long, these are designated as 'abnormal loads' and require prior notice to local authority/An Garda Síochána for the movement of these items. It is proposed to deliver and store the pre cast beams locally to each site, that can be called off just in time for the possession / lifting installation.

Sourcing of import material required for the bulk earth ramps and the transport required will be coordinated with the overall proposed Project programme as it is a key element in the delivery phase. The routing from source to site and return journeys will be monitored to ensure traffic is controlled and there is not a queue at site or congestion of local roads. Also, times of such deliveries will be considered and/or any local restrictions at peak times or school drop off/pick up times.

Temporary road or proprietary matting (such as EVE trackway) will be required at the enabling works stage. Indicative transport routes have been identified (See Table 3.9). There may be need or possibility to incorporate these junctions into the permanent design so they can be used later, i.e. for end-of-life deconstruction and removal. For example, at XC201 Thomastown, access is proposed via the main regional road R515, this ties into the proposed new crossing approach road.

Table 3.9: Indicative Construction Traffic Routes

Site / Crossing	Indicative Transport Routing (road designation/name)
XC201 – Thomastown	N20 -R515
XC209 - Ballyhay	N20 – B / local road (note near to Lidl distribution centre
XC211 – Newtown	N20 – L1533 + Dooleys Cross Roads
XC212 – Ballycoskery	N20 – L1533 + Dooleys Cross Roads Note -coordinate sequence with XC211 Newtown
XC215 - Shinanagh	N20 – L5507, L1320
XC219 - Buttevant	N20- R522

3.6.10 Land Acquisition and Demolition

All construction work would take place within the limit of the land made available (LMA) to contractors as defined within the Railway Order Red Line Boundary (See Volume 4, Figures 2A, 3A, 4A, 5A, 6A, 7A and 8A. The land to be compulsorily acquired for the proposed Project includes land necessary to construct, operate and maintain the proposed Project and associated infrastructure and to undertake essential environmental mitigation measures as outlined in Volume 5, Schedule of Mitigation Measures.

3.6.11 Construction Compounds and Working Areas

Indicative locations for the site compounds are shown on the layout drawings (see Volume 4, Figure 2C, 3C and 3D, 4C, 5C (i) and 5C (ii), 6C (i) and 6C (ii)7C, 7D, 7E and 7F and 8C (i) and 8C (ii)). The main site compounds have been located, where practicable, away from residential properties to provide minimum disturbance. Access to/from the nearest main road, such as the National Road N20 has been considered as the main transports routing for the sites so as not to create congestion on the narrower minor roads. The compounds would facilitate enabling works, site clearance, materials storage, welfare, structure installation and road surfacing.

The setups as a minimum will consist of:

- Secure area;
- Site Offices;
- Welfare facilities;
- Changing facilities;
- Suitable parking for site vehicles;
- Secure storage areas, including COSHH;
- Delivery areas;
- Material lay down area / inspection area; and
- Plant storage and refuelling zones.

Additional smaller site storage areas may be required next to piling operations and the reinforced earth ramp face (Inc. modular concrete panels) installation area. Site storage areas will allow the Contractor to store materials next to the work face. For site compound and storage areas, vegetation and topsoil removal may be required and replaced with subbase stone to provide a level surface for facilities.

A section has been demarcated for potential mobile crane set up; similar to site compound areas, land would be cleared, and subbase laid and compacted. Contractors shall consult their temporary works engineers on the requirements for crane matting. It has been assumed an area of 10m by 10m would be sufficient to cater for a mobile crane.

A 'wheel washing' station at each site will be established as best practice to avoid unnecessarily soiling the local roads with mud/detritus from the site vehicles. Also, daily road cleaning may be required.

3.6.12 Construction Environmental Management Plan (CEMP)

The basis of the preliminary design and the feedback from the assessments in the EIAR is to avoid, reduce or mitigate potentially significant environmental effects as a result of the proposed Project. As part of this process, potential effects during construction are also considered.

An outline Construction and Environmental Management Plan (CEMP) (see Volume 5, Appendix 1I) has been prepared and accompanies the application. This provides the mitigation measures required during the construction phase to avoid or minimise harm to the environment. The measures are those set out in the relevant chapters of the EIAR and are required to ensure there are no significant effects on the environment.

The Contractor will be required to prepare a Project CEMP, and associated topic management plans, and implement all relevant environmental mitigation measures at the appropriate time, as set out in the CEMP.

3.7 Proportionality of Scheme

The following section sets out the rationale for the scale of 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 objective and effect of the proposed RO is the improvement of safety at level crossings in combination with the promotion of the efficient use and operation of public rail transport and consequential enhancement of the relevant road network at, and in proximity, to such crossings and thereby enhancing both safety and reducing delays. The proposed RO is in the public interest and gives effect to the common good in the provision of safe and efficient public transport.

For example, in the context of the compulsory and temporary acquisition of land identified, this application for a proposed RO is in accordance with the 2001 Act and has inter alia established that: there is a need that advances the common good which is to be met by the permanent and temporary acquisition of land identified in the application; the land identified in the application for a proposed RO is suitable to meet that need; alternative methods of meeting the needs have been considered; where applicable landowners whose land has been the subject of compulsory acquisition are entitled to be compensated in accordance with the provisions 2001 Act. Accordingly, there is a community need that is to be met by the acquisition of land identified in the proposed RO; the land identified is suitable to meet that community need; any alternative methods of meeting community needs have been considered but are not demonstrably preferable taking into account environmental effects where appropriate; the railway works and works to be carried out are in accordance with the Development Plans of Cork County Council and Limerick City and County Council.

In addition, 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.

Accordingly, in the context of inter alia the proposed engineering works, the preferred options, planning and environmental impacts and the compulsory acquisition of land, the proposed RO meets the threshold of proportionality, generally and specifically, having regard to the means chosen to achieve the improvement of safety at level crossings in combination with the promotion of the efficient use and operation of public rail transport and consequential enhancement of the relevant road network:

(i) The proposed RO is rationally connected to the objective of the RO and is not arbitrary, unfair or based on irrational considerations

Volume 2, Chapter 2: EIA Project Need and Alternatives sets out the rationale and need for the proposed Project. The proposed Project is driven primarily by the need to eliminate/reduce the health and safety risk associated with any interface between a railway line and a public road. Enhanced health and safety on the Dublin – Cork Railway Line is the key objective as it will help to protect both those using trains on the railway line as well as those communities that need to cross it. In this context, the proposed Project uses a combination of proposed bridges, diversions, new roads, CCTV controlled crossing and elimination of exiting level crossings to either eliminate or reduce the existing health and safety risk as a consequence of any rail/road interface. As such, the proposed solution is rationally connected to the objective and cannot be considered as arbitrary, unfair or based on irrational considerations. It is the duty of CIÉ to maintain the operational safety of the railway network and it is the policy of both CIÉ and IÉ to remove all level crossings in Ireland.

(ii) The proposed RO impairs rights as little as possible

Once the need to improve safety was established (as set out in Volume 2, Chapter 2: EIA Project Need and Alternatives) a number of potential solutions were identified. In the context of the above, the rights of those whose lands will be subject to a compulsory purchase order (CPO) as a consequence of the proposed Project and the inconvenience caused as a result of eliminating a level crossing or diverting a route have been carefully considered. A process was followed that looked at 1) the options available to address the health and safety issue; 2) a review of the options against each site taking forward that option which scores the highest; and 3) refinement of those options so as to reduce negative impacts generally and minimise the extent of land required to facilitate same.

A Feasibility Study was undertaken that considered options for each level crossing site. The outcome of that study formed the basis of the proposed Project. The options were then further refined as a result of a multi criteria analysis, consultation and environmental considerations. Furthermore, the scale of proposed infrastructure, once the solution for each site was determined was guided by the principles of design for bridges and alignments (as set out in Section 3.7.1 below).

Elimination of all seven level crossings would remove the road/rail interface and the health and safety risks associated with same. However, this option was only taken forward for XC187 Fantstown as at all other sites the resultant community severance would be too significant.

(iii) The proposed RO is such that its effects on rights is proportional to the objective of the RO

The key objective of the proposed Project is to improve safety through the elimination/upgrade of the subject level crossings. It is considered that the enhanced safety for both local communities and the existing as well as future railway line traffic as a direct consequence of the proposed Project should take priority over the inconvenience caused to the local community and individual landowners.

In summary, therefore, the proposed RO is:

(a) proportionate having regard to is nature – the nature of the proposed Project is driven primarily by the need to eliminate/reduce the health and safety risk associated with any interface between a railway line and a public road. The nature/character of the immediate area is partly comprised of railway and roads infrastructure and the proposed Project will integrate within this context. Health and safety is overriding and where it is possible to improve it without causing significant negative impacts upon other considerations the proposed works should be taken forward;

(b) proportionate to its location – the location is primarily rural and in all cases includes the Dublin – Cork Railway Line in the baseline which is one of the most heavily trafficked rail routes in Ireland. The presence of the railway line sets the subject sites apart from a typical rural location. The proposed infrastructure required includes bridges, roads, diversions and CCTV, all of which are not out of place in these rural locations or adjacent to an existing railway line. The proposed solution at each site was determined following the options appraisal which was informed to a large extent on the existing and potential future use of the crossing; where continued access is considered to be paramount, a bridge is proposed to facilitate this.

(c) proportionate as to its size – as set out in Volume 2, Chapter 2: EIA Project Need and Alternatives and further below, a combination of factors have helped to shape the final size of infrastructure proposed at each site. The size and nature of each proposed solution is based upon the existing and potential future use, the topography and the need to safely cross over a live railway line;

(d) proportionate to the significance of the effects on the environment of the development – Environmental considerations, which are set out in the entire of this EIAR, have shaped the proposed Project design. Furthermore, the entire of the EIAR considers environmental impacts associated with the scheme and where necessary proposes mitigation. The EIAR has found that there are no significant negative impacts as a consequence of the proposed Project that cannot be mitigated.

The review against both a legal and planning interpretation of proportionality, as set out above and in the EIAR as a whole, has found that the proposed Project is proportional having regard to health and safety objectives, the

scale of proposed infrastructure at each of the level crossing sites, the preferred options, and the engineering works arising in the context of planning and environmental impacts. In compliance with its EU and domestic legal requirements, the proposed Project is applied in a non-discriminatory manner; is justified by public interest objectives and is in the common good; is suitable and appropriate for securing the attainment of the objectives set out in the proposed RO; does not go beyond what is necessary in order to attain those objective and is accordingly predicated upon the principle of proportionality in managing the risks involved and in reducing safety incidents for the operation of the railway.

3.7.1 Principles of Design for Bridges and Alignments

Where a bridge has been deemed necessary a number of criteria go into the design of the structure and road alignment over same.

Criteria for the minimum road level over the bridge structure include:

A) Minimum clearance from top of rail line to underside of bridge slab (5.3m clearance from code+0.025m live load deflection allowance = 5.325m, (allowance from Irish Rail for 5.125m at XC212 Ballycoskery from Feasibility Stage).
B) Minimum depth of bridge beam and concrete deck required (0.8m+0.15m = 0.95m).
C) Minimum depth of road pavement required (0.13m).
D) Minimum road level across top of bridge deck (a+b+c = 6.405m above high rail level under structure).
E) Minimum clear span for bridge across rail line (4.5m clearance from outer rail+1.75m abutment detail = 19m clear span).
F) Minimum span across top of bridge deck (21m).
G) Length over which minimum road level applies (= f, 21m).

The combination of above criteria results in a minimum carriageway level over any point of the bridge structure. Allowance for road cross fall and longitudinal fall over the bridge slab are also taken into account as the road alignment will not be completely flat across the slab. Calculation of same is taken from the road alignment geometry specific to each location's design speed and cross section in accordance with TII Rural Road Link Design, DN-GEO-03031.[1]

The bridge cross section is designed as: carriageway width plus a minimum 0.6m raised verge on one side (clearance from parapet while driving), and 2m raised verge on the other side (to allow for informal pedestrian access across the bridge) where footpath is not provided.

Grassed embankments at a ratio of 1(Vertical (V)):2(Horizontal (H)) are used to help the bridge blend into the existing landscape; a retaining wall is used where space is not available for embankment.

3.7.2 Proposed Design at Each Location

XC201 – Thomastown

The design speed was proposed to be consistent with anticipated vehicle speeds and existing road alignment.

- Current AADT: 24 (2.4% HGV's) (June 2019 Traffic Counts).
- Current 85% Speed: 24.3km/h.
- Proposed Design Speed: 50km/h.

[1] TII Rural Road Link Design, DN-GEO-03031

The current carriageway cross section is approximately 4m wide with 1m verges. It is proposed to provide a 4m wide carriageway with 1m verges, to tie-in with existing cross section. Verges will be widened as required for safety barrier set-back and working width. Passing bays will also be provided, as per Section 10.9 of DN-GEO-03031.

The bridge cross section is a 4m carriageway width plus min 0.6m raised verge on the south side (clearance from parapet while driving), and 2m raised verge on the north side (to allow for informal pedestrian access across bridge). A footpath is not proposed along alignment as there is no existing footpath and there were minimal pedestrian numbers observed during the traffic survey.

The maximum gradient will be up to 7% on the north and south approach to the new rail bridge. The minimum gradient will be 1% to prevent any water ponding on the proposed pavement. These are within the desirable maximum and minimum gradients permitted under Section 4.1 of DN-GEO-03031. Grassed embankments at 1(V):2(H) will be used.

XC211 – Newtown

No bridge structure is proposed at this location.

The design speed was proposed to be consistent with anticipated vehicle speeds and existing road alignment.

- Current AADT: 95 (2.5% HGV's) (June 2019 Traffic Counts).
- Current 85% Speed: 49.5km/h.
- Proposed Design Speed: 50km/h.

The current carriageway cross section is approximately 3m wide at the northern tie-in and approximately 5.5m wide at the southern tie-in. It is proposed to provide a 4m wide carriageway with 1.5m verges, tapering to 3m at the northern tie-in and tapering to 5.5m at the southern tie-in. Passing bays will also be provided, as per Section 10.9 of DN-GEO-03031.

A footpath is not proposed along alignment as there is no existing footpath and there were minimal pedestrian numbers observed during the traffic survey.

XC212 – Ballycoskery

The design speed was proposed to be consistent with anticipated vehicle speeds and existing road alignment.

- Current AADT: 935 (5.3% HGV's) (June 2019 Traffic Counts).
- Current 85% Speed: 53.3km/h.
- Proposed Design Speed: 50km/h (currently sign posted at 50km/h).

The current carriageway cross sections at mainline tie-in points are 5m carriageway with 1m footpath to the west and 4.5m carriageway to the east. The local road to the south currently has a 3m carriageway. It is proposed to provide a 6m wide carriageway for the mainline (in response to consultation with Cork County Council), tapering down to the existing cross sections at tie-in points.

It is proposed to provide a 4m carriageway with 1m verge on the local road to the south, tapering down to 3m at the tie-in. A 2m wide footpath is proposed along the north side of the bridge. This footpath will be online to the east of the bridge and taken offline to the west of the bridge in order to provide compliant gradient of 5% along the footpath. Verges will be widened as required for safety barrier set-back and working width.

The bridge cross section is a 6m carriageway width plus a minimum 0.6m raised verge on south side (clearance from parapet while driving), and 2m footpath behind the safety barrier on raised verge on north side.

A relaxation in the vertical gradient to 8% is required on the western approach to the bridge tie back into the existing housing estate entrance. The maximum gradient for the rest of the scheme is 5% on the eastern approach (to accommodate the online footpath). The minimum gradient will be 1.7% to prevent any water ponding on the proposed pavement. These are within the desirable maximum and minimum gradients permitted under Section 4.1 of DN-GEO-03031.

Grassed embankments at 1(V):2(H) will be used where space is available. A retaining wall is proposed where space is required for the proposed parking/vehicle drop off area.

XC215 – Shinanagh

No bridge structure proposed at this location, however, a raised embankment is required to tie into the existing bridge structure.

The design speed was proposed to be consistent with anticipated vehicle speeds and existing road alignment.

- Current AADT: 1004 (4.5% HGV's) (June 2019 Traffic Counts).
- Current 85% Speed: 50.1km/h.
- Proposed Design Speed: 50km/h.

The current carriageway cross sections at mainline are approximately 6m wide at the southern tie-in, 5m wide at the northern tie-in and 4m wide at the side road tie-in. It is proposed to provide a 5.5m wide carriageway with 3m verges, tapering back to existing carriageway widths at tie-ins.

A footpath is not proposed along the alignment as there is no existing footpath and minimal pedestrian numbers were observed in the traffic survey. Grassed embankments at 1(V):2(H) used.

XC219 – Buttevant

The design speed was proposed to be consistent with anticipated vehicle speeds and existing road alignment.

- Current AADT: 2097 (4.5% HGV's) (June 2019Traffic Counts).
- Current 85% Speed: 72.6km/h.
- Proposed Design Speed: 50km/h.

The current carriageway cross sections are approximately 6m wide. It is proposed to provide a 6m wide carriageway. There is a footpath on the southern side of the eastern tie-in which joins the town with a memorial site on the southern side of the level crossing, a short section of footpath is proposed, to keep this link between the town and the memorial site. Verges will be widened as required for safety barrier set-back and working width or tie back into existing widths.

Bridge cross section is a 6m carriageway width plus min 0.6m raised verge on the south side (clearance from parapet while driving), and 2m raised verge on the north side (to allow for informal pedestrian access across bridge). Footpath not proposed along alignment as no existing footpath to the west, extent of footpath to match existing.

The maximum gradient will be up to 6% on the approach to the new rail bridge. The minimum gradient will be 1% to prevent any water ponding on the proposed pavement. These are within the desirable maximum and minimum gradients permitted under Section 4.1 of DN-GEO-03031.

Grassed embankments at 1(V):2(H) will be used where space is available. A retaining wall is proposed where space is required within the current Irish Rail yard.

3.7.3 Traffic Counts Comparison

Table 3.10 below provides a comparison of the traffic counts that were undertaken in June 2011 with those undertaken for each site in October 2019.

Table 3.10: Traffic Counts Comparison

June 2011 AADT				October 2019 AADT			Difference		
Crossing	**Northbound / Eastbound**	**Southbound / Westbound**	**Total**	**Northbound / Eastbound**	**Southbound / Westbound**	**Total**	**Northbound / Eastbound**	**Southbound / Westbound**	**Total**
XC187 Fantstown	7	8	15	10	9	19	3	1	4
XC201 Thomastown	17	14	31	14	10	24	-3	-4	-7
XC209 Ballyhay	170	156	326	77	99	176	-93	-57	-150
XC211 Newtown	46	44	90	52	43	95	6	-1	5
XC212 Ballycoskery	542	512	1054	445	490	935	-97	-22	-119
XC215 Shinanagh	522	531	1053	495	509	1004	-27	-22	-49
XC219 Buttevant	1072	1113	2185	1053	1045	2097	-19	-68	-88

The comparison has shown that the highest levels of vehicular usage are at XC219 Buttevant, XC215 Shinanagh, and XC212 Ballycoskery. It also shows that the level of usage at XC209 Ballyhay has almost halved while the usage at XC187 Fantstown and XC201 Thomastown has remained consistently low.

In general, the scale of the proposed infrastructure is comparable to the volume of usage. At opposite ends of the scale, XC187 Fantstown records the lowest usage, it is proposed to have a straight closure of that level crossing with no infrastructure, in contrast, Buttevant records the highest level of usage and includes a 0.53km road-over-rail bridge with ancillary infrastructure.

The volume of usage is a further indication that the proportionality of the proposed Project is considered to be appropriate for the 'needs' of the local community and the traffic utilising the level crossing points. Clearly, traffic volumes is only one consideration of many that has contributed to the shaping of the proposed Project.

3.7.4 Summary of Proportionality

As set out above, a proportionality 'test' has been applied to the proposed Project. Furthermore, 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.

3.8 References

TII Rural Road Link Design, DN-GEO-03031