

13. Noise & Vibration

13.1 Legislation, Policy & Guidelines

Appendix C includes key legislation and policy that will be taken into consideration as part of the noise and vibration assessment.

13.2 Proposed Methodology

13.2.1 [Assessment](#)

The NRA Guidelines prescribe the use of CRTN for the calculation of road traffic noise levels, which is a valid method where daily traffic flows exceed 1000 vehicles per day. The roads affected by some elements of the proposed Project have flows of less than 1000 vehicles per day, therefore changes in traffic noise between the Do-Minimum and Do-Something scenarios shall be determined by estimating the change in noise level due to changes in road alignment. Additional changes in noise at receptors due to changes in traffic flow shall then be estimated using the 'Basic Noise Level' defined on Chart 3 of CRTN.

A change in road traffic noise of 1 dB(A) in the short-term is the smallest that is considered perceptible. In the long term, a 3 dB(A) change is considered perceptible. The classification of noise impact in terms of magnitude, from HD 213/11 (Highways Agency, 2011) shall be used to classify the noise impact in the short term and long term respectively.

The likely levels of noise and vibration due to the construction works will be predicted in accordance with BS 5228-1: 2009+A1 2014 and BS 5228-2:2009+A1:2014. The noise predictions will be prepared based on typical construction activities and heavy plant associated with highway construction projects. The significance of the predicted construction noise levels will be assessed using the 'ABC' method detailed in Annex E of BS 5228-1:2009+A1 2014. It is considered reasonable to assume that baseline noise at this location is sufficiently quiet to adopt Category 'A' threshold values.

Vibration predictions will be compared against relevant thresholds for human disturbance and building damage contained in BS 5228-2:2009+A1 2014.

13.2.2 [Desktop Study](#)

As part of an initial review desktop study undertaken to inform this Screening and Scoping study, the following data sources have been reviewed:

- Mapping of the local area supplied by OSI;
- Preliminary design drawings; and
- Preliminary traffic flow information.

13.2.3 [Survey Requirement](#)

The National Roads Authority Guidelines for the Treatment of Noise and Vibration in National Roads Schemes (TII (formerly NRA) 2004) states the following in relation to noise surveys:

'Noise surveys should be conducted in order to quantify the existing noise environment on both the existing (to be bypassed) and proposed routes. The noise surveys should be conducted generally in accordance with the guidance set out in ISO1996-1: 1982: Part 16.' (Section 6.3)

It is however recognized that this guidance is primarily intended for the assessment of noise and vibration from National Primary Routes and National Secondary Routes for which the National Roads Authority (NRA) are responsible. The roads affected by the scheme proposals have considerably lower traffic flows and speeds than National Routes.

The noise change at local properties would be determined through the comparison of calculated Do-Minimum and Do-Something noise levels, and measured noise levels would not be required to inform the assessment of operational traffic noise.

Therefore, the requirement for a baseline noise survey shall be evaluated when the proposed Project design, and traffic flow parameters for the Do-Minimum and Do-Something scenarios have been finalised. A survey of local noise levels shall be undertaken only if the scheme could give rise to an increase in traffic noise of 1dB(A) or greater at any local receptor (any increase less than this would not be perceptible). The outcome of this review shall then be discussed and agreed with Limerick/Cork County Councils in advance of preparation of the EIA.

13.2.4 [Consultation](#)

No specific consultation in relation to noise and vibration has been undertaken to inform this scoping report.

13.3 Baseline Conditions

For the most part, the seven crossings are located in rural areas dominated by farmland and with occasional, scattered residential properties. A noise survey has not

been undertaken at this stage though the main noise sources are expected to be from road traffic on the R515, the N20, R522 and R580 and surrounding roads, railway noise on the Dublin-Cork line and noise from agricultural machinery.

Table 13.1 shows the number of residential receptors within 600m of each of the crossings. Two of the sites have non-residential receptors: at XC211 – Newtown & 212 - Ballycoskery, there is a school, pre-school and church; at XC219 - Buttevant there is a school.

Table 13.1 Receptors within 600m

Distance from scheme	Residential receptors					
	XC187	XC201	XC209	XC211 & 212	XC215	XC219
0-50m	3	3	1	2	1	0
50-100m	1	2	0	20	0	2
100-150m	0	0	0	14	0	0
150-200m	1	1	1	11	0	2
200-300m	1	0	1	8	0	1
300-600m	21	15	9	26	15	32
Total	27	21	12	81	16	37

13.4 Potential Impacts

13.4.1 Construction Phase

Construction noise impacts are likely to be associated with various construction activities including earthworks, demolition, breakout of existing road surfaces, and the creation of new road surfaces and structures, and increased traffic on the local road network during the construction period. Vibration effects could be associated with demolition, piling works, and ground compaction works. Potential effects are summarised for each site in Table 13.2.

Table 13.2 Potential Impacts Construction Phase

Crossing	Potential Effects
XC187 Fantsown	- The emerging preferred solution seeks to divert traffic along existing roads, so at present, no realignment works may be required at this location therefore no construction impacts are expected.

Crossing	Potential Effects
XC201 Thomastown	- There are noise sensitive receptors within about 300m of the emerging preferred solution 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.
XC209 Ballyhay	- There is no construction phase to the proposed Project at this location and so there will be no effects from construction.
XC211 Newtown & XC212 Ballycoskery	- There are noise sensitive receptors within 300m of the Green and Blue Route Options 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.
XC215 Shinanagh	- There are noise sensitive receptors within about 300m of the emerging preferred solution 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.
XC219 Buttevant	- There are noise sensitive receptors within approximately 300m of the emerging preferred solution 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.

13.4.2 Operational Phase

Changes in operational road traffic noise at local receptors could occur due to either:

- Physical alterations to the carriageways' horizontal and/or vertical alignment;
- Changes in flow parameters of traffic using the local road network (e.g. speed, daily traffic movements, of the percentage of heavy vehicles); or
- Changes in the road surface.

Potential effects during the operational phase for each site are summarised in Table 13.3.

Table 13.3 Potential Impacts Operational Phase

Crossing	Potential Effects
XC187 - Fantstown	The emerging preferred solution seeks to be diverted along existing roads there is the potential for an increase in traffic flows along the existing road network. However, based on the preliminary review of the available information for XC187 - Fantstown, it is considered unlikely that increases in road traffic noise of 1dB(A) or greater could occur at any noise sensitive receptor.
XC201- Thomastown	The emerging preferred solution for XC201 - Thomastown realign the road by around 100m to the south-west of the existing road thereby reducing noise levels at receptors located around the existing crossing. The emerging preferred solution brings the traffic noise source closer to some receptors on the R515. However, based on the preliminary review of the available information for XC201 - Thomastown, it is considered unlikely that increases in road traffic noise of 1dB(A) or greater could occur at any noise sensitive receptor.
XC209 - Ballyhay	No effects are anticipated during operation as a result of the changes proposed at this location.
XC211 - Newtown & XC212 - Ballycoskery	<p>The Green route Option for XC211 - Newtown links Beechwood Grove to an unnamed road north of the existing crossing so there is potential for an increase in traffic volumes on Beechwood Grove and therefore an increase in traffic noise levels at receptors in Beechwood Grove.</p> <p>The Blue Route Option for XC211 - Newtown links two unnamed roads to the east of the railway line so there is potential for an increase in traffic volumes and therefore an increase in traffic noise levels at properties in close proximity to the proposed alignment.</p> <p>The emerging preferred solution for XC212 - Ballycoskery seeks to realign the road to the south of the existing road by around 30m, thereby potentially reducing noise levels at receptors in this area which includes Ballyhea National School.</p> <p>In terms of noise mitigation opportunities, the use of best practice construction methodology will be required. The road should also be kept as far from noise sensitive receptors as possible and there is potential for an earth bund between the road and the school in order to screen noise.</p>

Crossing	Potential Effects
XC215 - Shinanagh	The emerging preferred solution for XC215 – Shinanagh seeks to realign the existing road bringing it closer to some receptors, thereby potentially resulting in traffic noise increases at the closest receptors.
XC219 - Buttevant	The emerging preferred solution for XC219 – Buttevant seeks to realign Station Road around 50m to the south of the existing road thereby resulting in potential noise increases at the closest receptors.

14. Traffic & Transport

14.1 Legislation, Policy & Guidelines

Appendix C includes key legislation and policy that will be taken into consideration as part of the traffic and transport assessment.

14.2 Proposed Methodology

For the purposes of this assessment and in accordance with the criteria set out within the IEMA guidelines, the scale (magnitude) of any increase in traffic flows on a particular section of the road network as a result of the proposed Project construction activities will determine the significance of any effects associated with such increases. For example, an increase in traffic flows of more than 90% on a particular section of the road network, will likely have a major effect on the road section being assessed.

The IEMA Guidelines identify that the following environmental effects may be considered when assessing the traffic related to developments:

- Accidents and safety;
- Air pollution;
- Driver delay;
- Dust and dirt;
- Hazardous loads;
- Noise;
- Pedestrian amenity;
- Pedestrian delay;
- Severance (of communities);
- Heritage and conservation;
- Visual effects;
- Ecological effects; and
- Vibration.

The impact of the proposed Project construction activities in relation to the above environmental effects will be considered within the assessment.

14.2.1 [Traffic Impact Assessment](#)

The potential traffic effects of the proposed Project will be assessed utilising the following approach:

- The road sections likely to be affected by the proposed Project will be identified;

- The existing character of the road network will be determined;
- Existing traffic levels on the road network will be determined;
- The additional traffic generated by the proposed Project will be estimated;
- The effect of the additional traffic will be assessed; and
- An appropriate mitigation strategy will be prepared in order to ensure that any potential traffic effects are kept to a minimum.

The proposed level crossing replacements are not predicted to have a perceivable increase in traffic e.g. where a level crossing is removed and replaced by an overbridge that maintains vehicular access across the railway line.

In the cases where the number of crossings are being rationalised and existing roads are being stopped up the proposed crossing of the railway line may carry higher levels of daily traffic than the baseline level. Similarly, any stopped up roads will no longer be through roads and therefore carry lower levels of traffic than the baseline level. This will be considered for the proposed Project where relevant.

The volume of construction traffic added to the baseline may be significantly higher than that associated with daily operational traffic therefore the assessment of impacts is predicted to focus on the construction element of the proposed Project.

The traffic effects of the additional traffic generation associated with the proposed Project can be categorised as:

- Additional traffic volumes associated with the proposed Project construction programme travelling on the existing road network;
- Delays to non-development related journeys as a result of slow-moving vehicles i.e. abnormal loads; and
- Changes to traffic volumes (additional and reductions) due to the rationalisation of level crossings.

The assessment will aim to identify the types of vehicle needed to transport loads associated with the construction activities and potential transportation routes, where possible. The volume of all construction traffic movements will then be quantified along with the projected schedule of movements. This will then be used to determine daily vehicle numbers.

Until supply contracts have been placed for the materials needed on site, details of the origin of construction vehicles and the route they will take will not be known for certain unless stipulated by the client. To account for this, robust assumptions will be made regarding the proportion of construction vehicles using any particular route, most notably that 100% of construction traffic will pass all assessed locations on the local road network.

Construction vehicle volumes will then be assessed against existing baseline traffic levels, the data for which will be obtained from local authority traffic surveys and commissioned traffic surveys, if required. This will be used to determine the impact of the traffic associated with construction of the proposed Project in terms of increases in traffic flows on the local road network.

Survey Requirements

The June 2011 Traffic Counts will be updated as part of the EIAR but do provide a baseline in the absence of updated counts. The June 2011 counts took place over a 24-hour period.

Receptors

The key benefit of the proposed Project is that it requires minimal works due to the level crossing being closed and a diversion being put in place. Sensitive receptors that will need to be considered for the EIAR include nearby dwellings.

14.3 Baseline Conditions

14.3.1 XC187 - Fantstown

Desktop Study

The Average Annual Daily Traffic (AADT) usage of the level crossing was calculated at 15 following a 24-hour traffic count in June 2011 (see Table 14.1)

Table 14.1 XC187 - Fantstown 2011 Traffic Counts

	Description	North bound	South bound	Total / Average
Pedestrians	Adult	2	0	2
	Children	0	0	0
	Total	2	0	2
Vehicles	PCL/MCL	0	2	2
	Cars and LGVs	7	6	13

	Description	North bound	South bound	Total / Average
	HGVs	0	0	0
	Buses	0	0	0
	Total AADT	7	8	15
Speeds	Max	30.6	35.8	33.2
	Min	8.2	11.5	9.85
	Mean	22	24.3	23.15
	85% Speed	0	0	0

14.3.2 XC201 - Thomastown

Desktop Study

The Average Annual Daily Traffic (AADT) usage of the level crossing was calculated at 31 following a 24-hour traffic count in June 2011. See Table 14.2

Table 14.2 XC201 – Thomastown 2011 Traffic Counts

	Description	North bound	South bound	Total / Average
Pedestrians	Adult	6	9	15
	Children	0	1	1
	Total	6	10	16
Vehicles	PCL/MCL	1	0	1
	Cars and LGVs	16	14	30
	HGVs	0	0	0
	Buses	0	0	0
	Total AADT	17	14	31
Speeds	Max	31.2	26.9	29.0
	Min	7.7	3.9	5.8
	Mean	17.7	18.2	17.9
	85% Speed	25.6	23.0	24.3

14.3.3 XC209 - Ballyhay

Data shown in Table 14.3 is from a 24 hour traffic count carried out in June 2011.

Table 14.3 24 hour Traffic Count June 2011

#P	Description	East bound	West bound	Total / Average
Pedestrians	Adult	8	5	13
	Children	0	0	0
	Total	8	5	13
Vehicles	PCL/MCL	1	1	2
	Cars and LGVs	160	141	301
	HGVs	9	14	23
	Buses	0	0	0
	Total AADT	170	156	326
Speeds	Max	62.1	62.4	62.25
	Min	0.0	15.0	7.5
	Mean	40.7	40.0	40.35
	85% Speed	50.0	48.2	49.1

14.3.4 [XC211 - Newtown & XC212 - Ballycoskery](#)

Desktop Study

A desktop study has been undertaken. The traffic counts that took place in 2011 (see Table 14.4) and will be updated as part of the EIAR process.

Table 14.4 XC211- Newtown & XC212 - Ballycoskery Traffic Counts 2011

	Description	East bound	West bound	Total / Average
Pedestrians	Adult	23	16	39
	Children	45	1	46
	Total	68	17	85
Vehicles	PCL/MCL	4	4	12
	Cars and LGVs	478	458	936
	HGVs	17	10	27
	Buses	43	40	83
	Total AADT	542	512	1058
Speeds	Max	65	80	72.5
	Min	5	5	5
	Mean	36.5	39.5	38.0
	85% Speed	48.6	56.5	53.3

Receptors

Sensitive receptors for XC211 - Newton that will need to be considered for the EIAR include the residential properties at Ballyhea village. While for XC212 - Ballycoskery, the residential properties at Ballyhea village along with Ballyhea National School and St Mary's Roman Catholic Church will need to be considered.

Survey Requirements

The October 2010 Traffic Counts will be updated as part of the EIAR but do provide a baseline in the absence of updated counts. The October 2011 counts took place over a 24hour period and included a total of 80 northbound and 80 southbound vehicular movements at the level crossing.

14.3.5 [XC215 - Shinanagh](#)

Desktop Study

A desktop study has been undertaken. The traffic counts took place in 2011 and will be updated as part of the EIAR process (see Table 14.5).

Table 14.5 24 hour Traffic Counts 2011

	Description	East bound	West bound	Total / Average
Pedestrians	Adult	0	1	1
	Children	0	0	0
	Total	0	1	1
Vehicles	PCL/MCL	12	7	19
	Cars and LGVs	478	503	981
	HGVs	32	20	52
	Buses	0	1	1
	Total AADT	522	531	1053
Speeds	Max	68.3	62.3	65.3
	Min	7.9	0.9	4.4
	Mean	43.4	37.6	40.5
	85% Speed	54.0	46.1	50.1

14.3.6 [XC219 - Buttevant](#)

Desktop Study

A desktop study has been undertaken. The traffic counts took place in 2011 and will be updated as part of the EIAR process (see Table 14.6).

Table 14.6 24 Hour Traffic Counts June 2011

	Description	East bound	West bound	Total / Average
Pedestrians	Adult	0	0	0
	Children	0	0	0
	Total	0	0	0
Vehicles	PCL/MCL	10	8	18
	Cars and LGVs	956	1002	1958
	HGVs	101	98	199
	Buses	5	5	10
	Total AADT	1072	1113	2185
Speeds	Max	109.7	84.7	97.2
	Min	8.5	12.5	10.5
	Mean	63.0	56.6	59.8
	85% Speed	78.1	67.0	72.6

14.4 Potential Impacts

As set out in Section 3.3 further above, the 2019 IÉ Feasibility Study included an options appraisal which considered that the proposed Project has the potential to increase transport efficiency on both the rail and road networks by removing delays. There are potential impacts during construction and operation on journey times for pedestrians and on the local road network, all of these impacts will be assessed in the EIAR. XC187 - Fantstown

Potential Construction Phase Impacts

There is no construction phase to the proposed Project at this location and so there will be no effects from construction.

Potential Operational Phase Impacts

Operational issues include increased distance on route and associated journey times due to diversion however, impacted traffic flow is very low.

14.4.1 [XC201 - Thomastown](#)

The benefits associated with the emerging preferred solution are that it is separated from nearby properties. Traffic can still access same roads with new alignment. Rerouting is unlikely and there would be no delays at level the crossing.

Potential Construction Phase Impacts

The majority of construction associated with the emerging preferred solution will take place 'offline' i.e. off the public road, which will reduce impact to the road network. There is potential for some disruption/delays when tying into existing roads. Also, increased volume of traffic and HGVs will bring temporary environmental impacts.

Potential Operational Phase Impacts

Traffic will still be able to access the same roads as existing with the proposed alignment; rerouting is therefore unlikely and there will be reduced traffic delays through the removal of the level crossing. Potential adverse impacts could occur as a result of the additional junction formed on the R515 which has the potential to increase conflict risk.

14.4.2 [XC209 - Ballyhay](#)

Potential Construction Phase Impacts

There is no construction phase to the proposed Project at this location and so there will be no effects from construction.

Potential Operational Phase Impacts

There is unlikely to be a significant change in traffic as a result of changing this crossing to being CCTV controlled.

14.4.3 [XC211 - Newtown & XC212 - Ballycoskery](#)

For the Green Route Option, no additional junctions will be required at XC211 Newtown.

For the Blue Route Option, a new junction would be formed at the minor road to the north of Dooley's crossroads to accommodate the emerging preferred solution on the east side of the railway line due to the closure of at XC211 Newtown.

At XC212 - Ballycoskery, the emerging preferred solution seeks to rationalise Dooley's crossroads to a safer right to left stagger. Rerouting is unlikely and there should be no delays at this level crossing.

Potential Construction Phase Impacts

Likely construction impacts at XC211 - Newtown for consideration within the EIAR include the majority of the construction associated with either the Green or Blue Options being offline thereby reducing impacts to the road network. In addition, there is potential for some disruption/delays when tying into existing roads. The works are likely to be done in conjunction with XC212 - Ballycoskery to reduce impacts and delays. Furthermore, increased traffic and HGVs bring temporary environmental impacts.

At the XC212 - Ballycoskery crossing, likely construction impacts of the emerging preferred solution for consideration within the EIAR include the majority of construction being offline thereby reducing impacts to the road network. In addition, there is potential for some disruption/delays when tying into existing roads. The works are likely to be done in conjunction with XC211 - Newtown to reduce impacts and delays. Furthermore, increased traffic and HGVs bring temporary environmental impacts as well as dangers associated with proximity to the school.

Potential Operational Phase Impacts

The Green Route Option for XC211 could cause operational issues for XC212 in that a Link road would result in traffic routing via existing residential area with frontage (Beechwood Grove) however, traffic flows are low. In addition, there is an increased distance of route due to diversion.

The Blue Route Option will result in a small increase in traffic on the existing overbridge to the north and a new junction just to the east of the overbridge.

No significant operational issues are anticipated at the XC212 - Ballycoskery site.

14.4.4 [XC215 Shinanagh](#)

Potential Construction Phase Impacts

Likely construction impacts for consideration within the EIAR as a result of the emerging preferred solution include the majority of construction being offline thereby reducing impacts to the road network. There is potential for some disruption/delays when tying into existing roads. In addition, increased traffic and HGVs bring temporary environmental impacts. In regard to the N20 tie in, there is likely disruption/delays as construction works change the alignment to the existing road.

Potential Operational Phase Impacts

The emerging preferred solution seeks to improve the road network and alignment as well as the use of the current overbridge. In regard to the N20 tie in, this will improve the junction with better alignment and safety. Operational adverse impacts include a significant increase in the distance of route due to diversion (potentially approx. 2km). Also, increased traffic at the existing overbridge/N20 tie-in.

14.4.5 [XC219 - Buttevant](#)

The emerging preferred solution is in close proximity to the existing crossing. Rerouting is unlikely and there would be no delays at the level crossing.

Potential Construction Phase Impacts

Likely construction impacts for consideration within the EIAR include the majority of construction being offline thereby reducing impacts to the road network. There is potential for some disruption/delays when tying into existing roads. In addition, increased traffic and HGVs bring temporary environmental impacts.

Potential Operational Phase Impacts

Operational issues include the potential requirement for three crossings (one railway and two watercourses).

15. Cultural Heritage

15.1 Proposed Methodology

The proposed methodology for the assessment of the likely effects on cultural heritage is outlined below. This methodology will be agreed in consultation with NMS, National Museum of Ireland (NMI) and the Local Authority as required. Key elements of the methodology include:

- Desktop study to obtain and analyse more detailed baseline information including but not limited to the Sites and Monuments Record (SMR) of the Archaeological Survey of Ireland, National Museum of Ireland Topographical Files, historical maps, aerial photography, documentary sources and the findings of previous archaeological assessments/built heritage surveys undertaken (Flynn 2010; Flynn 2011; Goodbody 2012);
- An archaeological survey to be carried out by a suitably qualified and experienced archaeologist in order to confirm the existence, location, extent and condition of previously recorded archaeological sites that may be affected by the proposed works, in particular enclosure LI048-001, and to identify any previously unrecorded sites or features. The aims of this survey should be to:
 - ascertain the character, condition and extent of any archaeological features/deposits or objects likely to be affected by the proposed works, including any associated temporary works, and the likely impact of the proposed works on these remains;
 - accurately locate these archaeological features/deposits or objects and present the findings in map form;
 - describe same and discuss their likely provenance;
 - recommend appropriate measures for the avoidance of these remains or, where this cannot be achieved, measures to mitigate the impact of the works; and
 - incorporate all of the above into the cultural heritage chapter of the EIAR.
- An underwater archaeological assessment may be required within the stream at [XC219 Buttevant](#) if it is determined there is a potential for underwater archaeological remains to be significantly impacted. Such assessments should be carried out by a suitably qualified and

experienced underwater archaeologist under licence from the NMS where required;

- A geophysical survey of the land affected by the proposed works, to be carried out by a suitably qualified and experienced specialist under licence from the DCHG;
- Archaeological test trenching by a suitably qualified and experienced archaeologist under licence from the DCHG and in line with an agreed method statement informed by the results of the geophysical survey;
- An architectural heritage survey by a suitably qualified and experienced specialist to identify and ascertain the significance of any buildings, structures or features of architectural heritage interest that may be affected;
- Assessment of the likely cultural impacts including direct and indirect effects, both positive and negative during construction and operational phases, in line with the EIA methodology; and
- Development of mitigation measures to be included in the Schedule of Commitments accompanying the EIAR to avoid, reduce and/or remedy likely significant effects on cultural heritage.

Consultation

The consultation process for the EIA is outlined in Chapter 7. The statutory consultees with respect to heritage include the Department of Culture, Heritage and the Gaeltacht (DCHG) which will be consulted in relation to the archaeological matters and requirements via the National Monuments Service (Planning and Licensing Unit) and for architectural heritage the Architectural Heritage Advisory Unit (AHAU). The Architectural Conservation Officers/Heritage Officers of Limerick and Cork County Councils will also be consulted in relation to architectural heritage.

15.2 Baseline Conditions

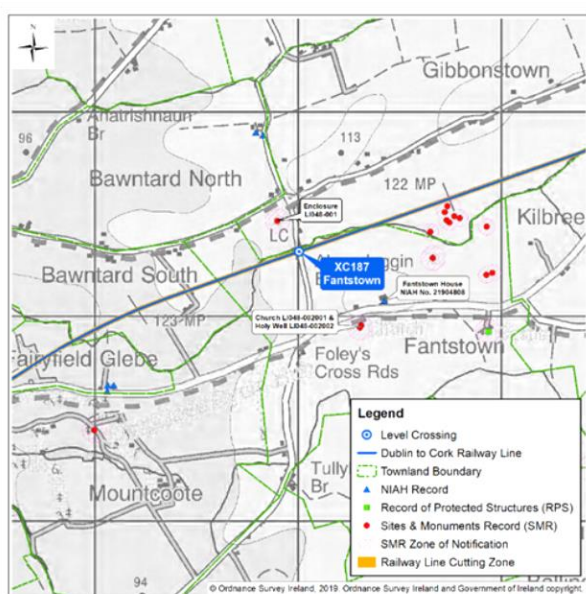
15.2.1 [XC187 - Fantstown](#)

Desktop Study

There is an enclosure (LI048-001) in close proximity to the existing crossing XC187 - Fantsown in Gibbonstown townland (see Figure 15.1). This monument is listed on the Record of Monuments and Places (RMP) for Co. Limerick and is protected under Section 12 of the National Monuments (Amendment) Act 1994. The Zone of Notification (ZoN) for this

monument is approximately 57m to the north of the proposed works. There is also a church (LI048-002001) and a holy well (LI048-002002) listed on the RMP approximately 300m to the southeast. There is a relatively high potential for the presence of previously unrecorded aboveground and subsurface archaeological remains in greenfield areas within the scheme design extents.

Figure 15.1 Cultural Heritage Points of Interest in the vicinity of XC187 - Fantstown



Fantstown House, which is located approximately 450m to the southeast of XC187 - Fantstown, is included on the National Inventory of Architectural Heritage (NIAH 21904808). There are no other previously recorded architectural heritage sites in close proximity to XC187. However, the existing rail line follows the nineteenth-century Great Southern and Western Railway and the railway cutting/embankments and the level crossing itself may be of, and/or have features that are, of architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. Historical maps dating to around the turn of the twentieth century depict a named bridge (Ahnagluggin Bridge) and various other structures in the vicinity of the crossing. There are also townland boundaries in the vicinity of the crossing dividing the townlands of Fantstown, Gibbonstown, Bawntard North, Bawntard South and Mountcoote.

Survey Requirements

An archaeological survey is required to confirm the location and extent of the upstanding remains of

enclosure LI048-001 and to identify any other visible archaeological features within or in close proximity to the proposed works. Given the close proximity of a Recorded Monument, a geophysical survey followed by archaeological test trenching will be carried out as part of the EIA. An underwater archaeological assessment (wade survey) may also be necessary for the stream. These requirements will be confirmed following consultation with the National Monuments Service (NMS) of the Department of Culture, Heritage and the Gaeltacht (DCHG).

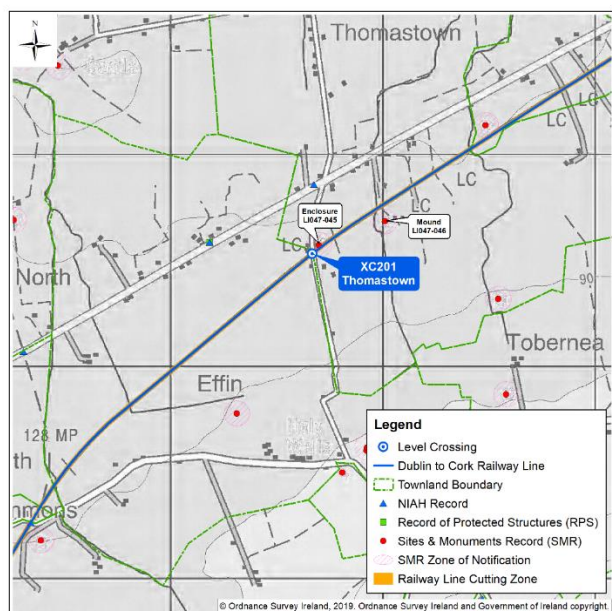
An architectural heritage survey will also be required to determine whether the railway cutting/embankments, the level crossing, Ahnagluggin Bridge and any other structures in the vicinity of the crossing are of architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest.

15.2.2 XC201 - Thomastown

Desktop Study

The emerging preferred solution at XC201 - Thomastown encroaches on the constraints area/Zone of Notification (ZoN) for an enclosure (LI047-045) listed on the Record of Monuments and Places (RMP) for Co. Limerick. This Recorded Monument is protected under Section 12 of the National Monuments (Amendment) Act 1994. There is also a mound (LI047-046) listed on the RMP approximately 90m to the east of the proposed works. There is a relatively high potential for the presence of previously unrecorded aboveground and subsurface archaeological remains in greenfield areas within the scheme design extents. See Figure 15.2.

Figure 15.2 Cultural Heritage in the vicinity of XC201 - Thomastown



There appears to be a Protected Structure (RPS No. 38 thatched dwelling) in proximity to the works, if it is the same structure as that listed on the National Inventory of Architectural Heritage (NIAH) as NIAH 21904709 approximately 480m to the west of XC201. The NIAH also lists a water pump (NIAH 21904708) located 14m from the proposed works opposite the tie-in with the existing road.

There are no other previously recorded architectural heritage sites in close proximity to XC201 - Thomastown. However, the existing rail line follows the nineteenth-century Great Southern and Western Railway and the railway cutting/embankments and the level crossing itself may be of, and/or have features that are, of architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. Historical maps dating to the mid-nineteenth and turn of the twentieth century indicate that the railway line directly impacted enclosure LI047-045 and depict a number of structures in the vicinity of the crossing. The crossing also lies on the townland boundary between Thomastown and Effin.

Survey Requirements

An archaeological survey is required to confirm the location and extent of the upstanding remains of enclosure LI047-045 and to identify any other visible archaeological features within or in close proximity to the proposed works. Given the close proximity of a Recorded Monument, a geophysical survey followed

by archaeological test trenching will be undertaken as required. These requirements will be confirmed following consultation with the National Monuments Service (NMS) of the Department of Culture, Heritage and the Gaeltacht (DCHG).

An architectural heritage survey will also be carried out to confirm the location, extent and condition of the thatched dwelling (RPS No. 38/NIAH 21904709) and water pump (NIAH 21904708) and to determine whether the railway cutting/embankments, the level crossing and any other buildings, structures or features in the vicinity of the crossing are of architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest.

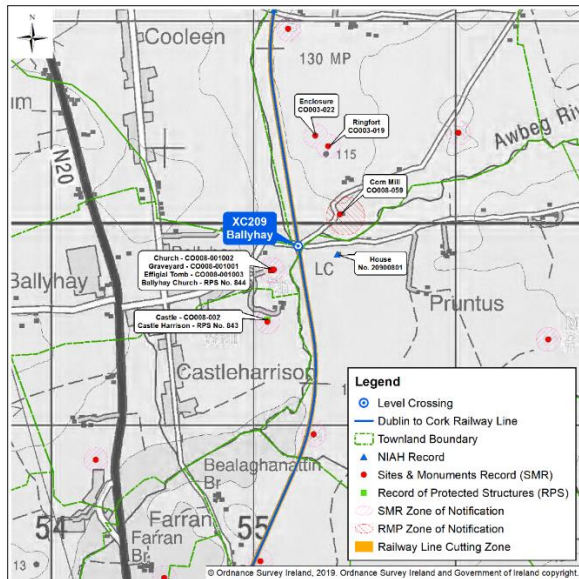
15.2.3 XC209 - Ballyhay

Desktop Study

There are six previously recorded archaeological sites within approximately 500m of XC209 including a castle (CO008-002), church (CO008-001002) and graveyard (CO008-001001) with effigial tomb (CO008-001003), a corn mill (CO008-059), a ringfort (CO003-019) and an enclosure (CO003-022) (see Figure 15.3).

There are two Protected Structures within approximately 500m of XC209- Ballyhay: Castle Harrison (RPS No. 843) and Ballyhay Church (RPS No. 844). There is also a house listed on the NIAH (20900801) in Pruntus townland approximately 165m to the east of XC209 - Ballyhay.

Figure 15.3 Heritage Assets in the vicinity of XC209 – Ballyhay



The existing rail line follows the nineteenth-century Great Southern and Western Railway and the railway cutting/embankments and the level crossing itself may be of, and/or have features that are, of architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. Historical maps dating to the mid-nineteenth and turn of the twentieth century depict a number of structures and features of potential heritage interest in the vicinity of the crossing, including a millrace/tailrace for the mill (CO008-059) and areas of marsh which could be areas of archaeological potential for burnt mounds and other features.

There are several townland boundaries in the vicinity of XC209 - Ballyhay separating the townlands of Rahmorgan, Cooleen, Ballyhay, Castleharrison and Pruntus.

Survey Requirements

The emerging preferred solution at XC209 – Ballyhay comprises a technical upgrade to a CCTV controlled level crossing and therefore limited ground disturbance will be required. Archaeological and architectural heritage site inspections will, however, be undertaken to confirm the location and extent of previously recorded sites, monuments and structures surrounding the crossing and to determine whether the railway cutting/embankments, the level crossing and any other structures in the vicinity of the crossing are of architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest.

15.2.4 XC211 - Newtown & XC212 - Ballycoskery

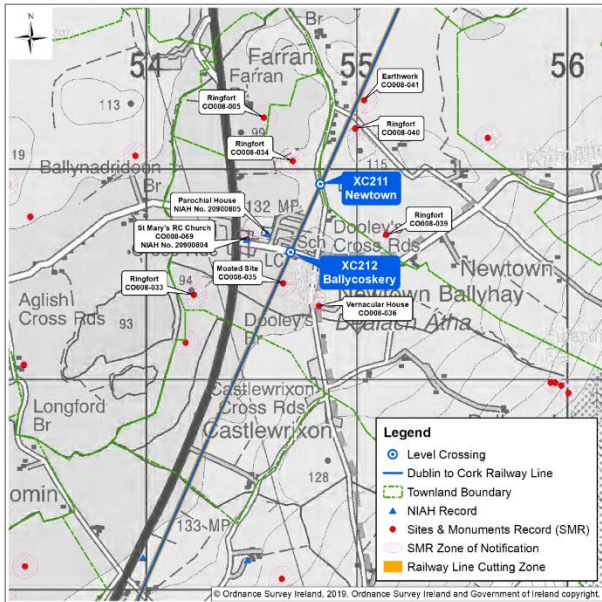
Desktop Study

There are nine previously recorded archaeological sites within approximately 500m of XC211 - Newtown & XC212 - Ballycoskery, including five ringforts (CO008-005, CO008-033, CO008-034, CO008-039, CO008-040), a moated site (CO008-035), a vernacular house (CO008-036), Saint Mary's RC Church (CO008-069) and an earthwork (CO008-041). See Figure 15.4.

The Blue Route Option for XC211 Newtown crosses the constraints area/Zone of Notification (ZoN) for one of these sites (ringfort CO008-040). This site is listed on the Record of Monuments and Places (RMP) for Co. Cork, and as such it is protected under Section 12 of the National Monuments (Amendment) Act 1994. Available information indicates that the upstanding remains of the ringfort were partially cleared in the 1980s; however subsurface remains could still be present.

The proposed works for XC212 - Ballycoskery extend into the constraints area/Zone of Notification (ZoN) for the church CO008-069, which is listed on the Record of Monuments and Places (RMP) for Co. Cork. This Recorded Monument is protected under Section 12 of the National Monuments (Amendment) Act 1994. Saint Mary's Church is also listed on the National Inventory of Architectural Heritage (NIAH) as NIAH 20900804, along with the parochial house (NIAH 20900805). The design is also in close proximity to the RMP constraints area for the moated site (CO008-035) and vernacular house (CO008-036). There is a relatively high potential for the presence of previously unrecorded aboveground and subsurface archaeological remains in greenfield areas within the scheme design extents.

Figure 15.4 Heritage Assets in the vicinity of XC211 - Newtown and XC212 - Ballycoskery



The existing rail line follows the nineteenth-century Great Southern and Western Railway and the railway cutting/embankments and the level crossings themselves may be of, and/or have features that are, of architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. For example, there is a house at crossing XC212 - Ballycoskery that may be associated with the railway. Historical maps dating to the mid-nineteenth and turn of the twentieth century indicate that the railway line directly impacted the moated site (CO008-035) and depict a number of structures and features in the vicinity of the crossings that, if still extant, may be of heritage interest including a signal post, signal box, milestone and Ordnance Survey benchmarks.

XC211 - Newtown lies on the townland boundary between Newtown and Ballycoskery.

Survey Requirements

An archaeological survey is required to identify any visible archaeological features within or in close proximity to the proposed works. Given the close proximity of a number of Recorded Monuments, a geophysical survey followed by archaeological test trenching will be undertaken as required in the vicinity of ringfort CO008-040 and moated site CO008-035. These requirements will be confirmed following consultation with the National Monuments Service (NMS) of the Department of Culture, Heritage and the Gaeltacht (DCHG).

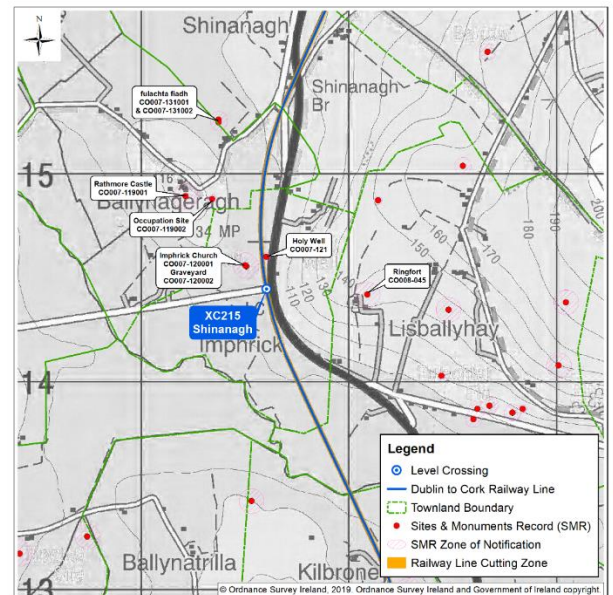
An architectural heritage survey will also be required to establish whether any architectural features associated with St Mary's Catholic Church extend into the works area, and to determine whether the railway cutting/embankments, the level crossing and any other structures in the vicinity of the crossing are of architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest.

15.2.5 XC215 - Shinanagh

Desktop Study

There are 8 previously recorded archaeological sites within approximately 500m of the proposed Project including the site of Rathmore Castle (CO007-119001), an occupation site discovered nearby in the 1980s and subsequently excavated (CO007-119002), Imprick church and graveyard (CO007-120001 and CO007-120002), a holy well (CO007-121), two *fulachta fiadh* (CO007-131001 and CO007-131002) discovered during the construction of Bruff-Mallow gas pipeline in 1988, and a ringfort (CO008-045). See Figure 15.5.

Figure 15.5 Heritage assets in the vicinity of XC215 - Shinanagh



The emerging preferred solution includes a new access road and junction onto the L1320 traverses the RMP constraints area/Zone of Notification (ZoN) for the church and graveyard (CO007-120001 and CO007-120002) and the holy well (CO007-121), which are Recorded Monuments listed on the Record of Monuments and Places (RMP) for Co. Cork and protected under Section 12 of the National Monuments

(Amendment) Act 1994. Given the concentration of recorded sites and monuments in the area, and proximity of a watercourse and marshland (which have the potential to contain further *fulachta fiadh* or burnt mound sites as well as other site types), there is a relatively high potential for unrecorded archaeological remains to exist within greenfield areas of the scheme design both above and below the surface.

There are no Protected Structures or buildings, or structures listed on the National Inventory of Architectural Heritage (NIAH) in close proximity to the proposed works. The nearest NIAH listing is a house in Castlewrixson South which is located approximately 540m north of the works. However, the railway bridge in XC215 - Shinanagh (OBC 306), although not currently listed on the RPS or NIAH, could be of architectural heritage interest. The existing rail line follows the nineteenth-century Great Southern and Western Railway and the railway cutting/embankments and the level crossing itself may be of, and/or have other features that are, of architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. Historical maps dating to the mid-nineteenth and turn of the twentieth century depict a number of other structures and features in the vicinity of the rail line that, if still extant, may be of heritage interest including mileposts and a level crossing in the location of the Option 1 design.

The proposed design overlies the townland boundaries between Shinanagh, Ballynageragh and Imphrick.

Survey Requirements

An archaeological survey is required to confirm the location and extent of the previously recorded sites and monuments and to identify any other visible archaeological features within or in close proximity to the proposed works. Given the close proximity of several Recorded Monuments, including a church and graveyard (CO007-120001 and CO007-120002) and holy well (CO007-121), and the demonstrated archaeological potential of the area as evidenced by the *fulachta fiadh*, a geophysical survey followed by archaeological test trenching will be undertaken in consultation with the National Monuments Service (NMS) of the Department of Culture, Heritage and the Gaeltacht (DCHG).

An architectural heritage survey will also be carried out to assess the architectural heritage values of the railway bridge in XC215 - Shinanagh (OBC 306) and to determine whether the railway cutting/embankments, the level crossings and any other structures or features in the vicinity are of architectural, historical,

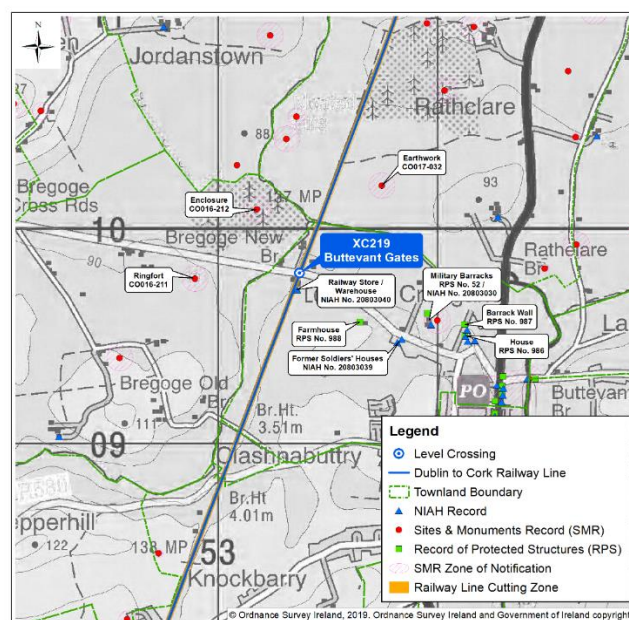
archaeological, artistic, cultural, scientific, social or technical interest.

15.2.6 XC219 - Buttevant

Desktop Study

There are 3 previously recorded archaeological monuments within approximately 500m of XC219 - Buttevant comprising a ringfort (CO016-211, approximately 125m to the west of the design), an enclosure (CO016-212, approximately 190m to the north) and an earthwork (CO017-032, approximately 450m to the northeast) (See Figure 15.6). The Zone of Archaeological Potential (ZAP) for the historic town of Buttevant (CO017-053) lies approximately 645m to the southeast. Given the existence of these known sites, coupled with the proximity of a watercourse and marshland (which have the potential to contain *fulachta fiadh* or burnt mound sites as well as other site types), there is a potential for unrecorded archaeological remains to exist within greenfield areas of the scheme both above and below the surface.

Figure 15.6 Heritage Assets in the vicinity of XC219 - Buttevant



There are several Protected Structures within approximately 500m of XC219 - Buttevant, including a military barracks (RPS 52/NIAH 20803030), barrack wall (RPS No. 987), house (RPS No. 986) and farmhouse (RPS No. 988), which is the nearest Protected Structure at approximately 150m southeast of the design. The railway store/warehouse to the south

of XC219 - Buttevant is listed on the National Inventory of Architectural Heritage (NIAH 20803040), as is a terrace of 26 former soldiers' houses (NIAH 20803039) located approximately 295m to the southeast of the design.

The railway store/warehouse (NIAH 20803040) is just one element of the nineteenth-century station complex that survives. Other surviving elements include boundary walls, the remains of a second goods shed on the western side (within which are a number of cast iron columns), the station platforms, a passenger shelter, a small single-storey structure (former post office) attached to the now-demolished station house, a signal box and the remains of an iron footbridge. The existing rail line follows the nineteenth-century Great Southern and Western Railway and the railway cutting/embankments and the level crossing itself may be of, and/or have features that are, of architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. Historical maps dating to the mid-nineteenth and turn of the twentieth century depict a bridge labelled '*Bregoge New Bridge*' on the historical OS maps located approximately 115m to the west of XC219 - Buttevant that may be of architectural heritage interest, though it is not currently listed on either the RPS or NIAH.

There is also a memorial to the victims of the Buttevant Rail Disaster, which occurred at Buttevant Railway Station on 1 August 1980, and was one of Ireland's worst ever rail accidents. The memorial comprises a bronze sculpture in the shape of two crossing train tracks set within a small area of partly walled public open space with seating, bollards and landscaping.

The proposed design crosses the townland boundary between Bregoge and Creggange.

Survey Requirements

An archaeological survey is required to identify any visible archaeological features within or in close proximity to the proposed works. A geophysical survey followed by archaeological test trenching may also be required. These requirements will be confirmed following consultation with the National Monuments Service (NMS) of the Department of Culture, Heritage and the Gaeltacht (DCHG).

An architectural heritage survey will be carried out to confirm the location, extent and condition of surviving elements of the nineteenth-century railway station, Bregoge Bridge and any other buildings, boundary walls, structures or architectural features in the vicinity of the crossing that are of potential architectural,

historical, archaeological, artistic, cultural, scientific, social or technical interest.

15.3 Potential Impacts

15.3.1 [XC187 - Fantstown](#)

Potential Construction Phase Impacts

No construction works are proposed, therefore there would be no effects on cultural heritage receptors during the 'construction phase' of the proposed Project at this location.

Potential Operational Phase Impacts

Potential operational impacts could occur as a result of the introduction of any new infrastructure into the setting of enclosure LI048-001, the church (LI048-002001) and holy well (LI048-002002), and Fantstown House (NIAH 21904808). The significance of such impacts will be assessed during the EIA.

15.3.2 [XC201 - Thomastown](#)

Potential Construction Phase Impacts

The emerging preferred solution has the potential to directly impact surface and subsurface archaeological remains associated with enclosure LI047-045, as well as currently unknown sites and features if any exist. The potential effect of this impact could be significant. The archaeological surveys outlined above would aim to provide further clarity on this potential. There could also be an impact on the townland boundary between Thomastown and Effin, though the effect is not predicted to be significant.

The emerging preferred solution could also have direct and indirect negative impacts on structures or features of architectural heritage interest, which could include the railway cutting/embankment and level crossing itself. The significance of such impacts will be assessed during the EIA following the architectural heritage survey.

Potential Operational Phase Impacts

Potential operational impacts could occur as a result of the introduction of any new infrastructure into the setting of enclosure LI047-045, the mound (LI047-046), thatched dwelling (RPS No. 38/NIAH 21904709) and water pump (NIAH 21904708). The significance of such impacts will be assessed during the EIA.

15.3.3 [XC209 - Ballyhay](#)

Potential Construction Phase Impacts

No significant impacts are predicted to known archaeological or architectural heritage sites from the proposed upgrade to a CCTV controlled level crossing. However, if ground disturbance is required (e.g. new service trenches for electrical cables), there may be the potential for subsurface archaeological remains to be impacted.

Potential Operational Phase Impacts

At this stage, no significant impacts are predicted to cultural heritage during the operational phase. This will be confirmed as the design progresses as part of the EIA.

15.3.4 [XC211 - Newtown & XC212 - Ballycoskery](#)

Potential Construction Phase Impacts

The Blue Route Option for XC211 Newtown has the potential to directly impact subsurface archaeological remains associated with ringfort CO008-040, potentially resulting in a significant negative impact. A geophysical survey followed by targeted archaeological test-trenching is required to more accurately assess this potential. There would be no direct impact on any known archaeological monuments as a result of the Green Route, though subsurface archaeological features may be encountered.

The emerging preferred solution for XC212 has the potential to directly impact surface and subsurface archaeological remains and architectural features associated with Saint Mary's RC Church (CO008-069), potentially resulting in an impact of moderate significance. The Recorded Monuments located in this area, including a moated site (CO008-035) and several ringforts, collectively reflect a concentration of settlement since at least the Middle Ages, and there is a relatively high potential for further remains to be encountered. The archaeological surveys outlined above, which include geophysical surveys and targeted test-trenching where required, would aim to provide further clarity on this potential. However, the significance of such impacts cannot be determined at this stage.

There would potentially be an impact on the townland boundary between Newtown and Ballycoskery; however, this is not predicted to be significant.

The emerging preferred solution could also have direct and indirect negative impacts on structures or features of architectural heritage interest, which could include the house at crossing XC212 - Ballycoskery, the railway cutting/embankment and level crossings themselves, as well as Saint Mary's Church (NIAH 20900804). The significance of such impacts will be assessed during the EIA following the architectural heritage survey.

Potential Operational Phase Impacts

Potential operational impacts could occur as a result of the introduction of any new infrastructure into the setting of built heritage features such as Saint Mary's RC Church (CO008-069/NIAH 20900804), parochial house (NIAH 20900805), moated site (CO008-035) ringforts CO008-034 and CO008-040 and other monuments. The significance of such impacts will be assessed during the EIA.

15.3.5 [XC215 - Shinanagh](#)

Potential Construction Phase Impacts

The emerging preferred solution to the north of XC215 - Shinanagh has the potential to directly impact surface and subsurface archaeological remains associated with the church and graveyard (CO007-120001 and CO007-120002) and holy well (CO007-121), and to directly impact a railway bridge which may be of architectural heritage interest, resulting in moderate to very significant adverse effects. Both options have the potential to directly impact currently unknown sites and features, including subsurface archaeological remains. The archaeological and architectural heritage surveys outlined above would aim to provide further clarity on this potential. However, the significance of such impacts cannot be accurately determined at this stage. There may also be a slight negative impact on the townland boundaries between Shinanagh, Ballynageragh and Imphrick.

Potential Operational Phase Impacts

Potential operational impacts could occur as a result of the introduction of any new infrastructure into the setting of Imphrick church and graveyard (CO007-120001 and CO007-120002), the holy well (CO007-121) and Shinanagh railway bridge (OBC 306). In the case of the bridge, this impact could be positive as it would remove traffic from the bridge, reducing the risk of potential accidental damage and allowing better appreciation of its architectural values.

15.3.6 [XC219 - Buttevant](#)

Potential Construction Phase Impacts

The emerging preferred solution would have no direct impacts on any previously recorded archaeological sites or monuments. However, there is a potential to directly impact currently unknown archaeological sites and features, including surface and subsurface remains. The significance of such impacts cannot be determined at this stage. There could potentially be a slight negative impact on the townland boundary between Bregoge and Creggange.

There could also potentially be impacts on the railway store/warehouse (NIAH 20803040), Bregoge Bridge and other buildings and features associated with Buttevant Station. Such impacts could be significant to very significant in the event that a structure(s) of architectural heritage significance cannot be retained, and every effort will be made in the design to avoid such an outcome. There would be no direct impact to the Buttevant Rail Disaster memorial.

Potential Operational Phase Impacts

Potential operational impacts could occur as a result of the introduction of any new infrastructure into the setting of Buttevant Station and the Protected Structures located to the southeast. In the case of '*Bregoge New Bridge*', a positive impact could potentially occur through removal of traffic from the bridge, reducing the risk of accidental damage and allowing better appreciation of its architectural value, if any.

16. Landscape

16.1 Landscape

16.1.1 Legislation, Policy & Guidelines

Appendix C includes key legislation and policy that will be taken into consideration as part of the landscape and visual impacts assessment.

In line with the guidance at Appendix C, the assessment will cover potential impacts from a landscape and visual perspective and will describe the existing conditions and the likely potential impacts associated with the construction and operation of the proposed Project. The impact assessment process will involve:

- Assigning landscape sensitivity and visual receptor sensitivity;
- Identifying and characterising the magnitude of landscape impacts and visual impacts separately; and
- Assessing the significance of any residual landscape effects and visual effects after mitigation.

16.2 Proposed Assessment Methodology

16.2.1 Data Collection, Research and Baseline Establishment

- Review of Limerick County Development Plan, particularly in relation to the county Landscape Character Assessment and designated scenic routes and views.
- The study area from which to examine the landscape and visual impacts of the proposed Project will be determined on the extents of likely visibility of the various aspects of the Project (1km radius around crossing sites);
- Identify sensitive visual receptors potentially affected by the proposed Project;
- Develop a project specific landscape character assessment (finer scale than county based LCA);
- Review of the Zone of Theoretical Visibility (ZTV) map, which indicate areas from which the proposed Project is potentially visible in relation to the terrain which the study area;
- Selection of potential Viewshed Reference Points (VRPs) from key visual receptors to be

investigated during fieldwork to determine actual visibility and sensitivity; and

- Preparation of an initial VRP selection map.

16.2.2 Fieldwork, Viewshed Reference Point Selection and Photo Capture

- Investigate potential VRP locations selected at the desk study stage and confirm those that are to be used for the visual impact appraisal.
- Prepare a Viewshed Reference Point (VRP) selection report, which will outline the rationale for selecting or rejecting every VRP that was investigated during fieldwork. This will be used for consultation with the planning authorities to ensure they are satisfied with the final set of VRPs to be used for the appraisal.
- Capture of high resolution, panoramic photography with grid reference coordinates for all VRP locations to be used for the preparation of panoramic photography and/or photomontages.
- Record site notes in relation to the general landscape within the study area and in relation to the views afforded from each VRP.

16.2.3 Appraisal of Landscape and Visual Impacts

- Description of the geographic location and landscape context of the Project.
- General landscape description concerning essential landscape character and salient features of the study area, discussed with respect to:
 - Landform and drainage;
 - Vegetation and land use;
 - Centres of population and houses;
 - Transport routes; and
 - Tourism, heritage and amenity and facilities.
- Discussion of any design guidance as well as the planning context and relevant landscape designations.
- Appraisal of the significance of predicted landscape impacts (physical impacts on landform and land cover as well as impacts on landscape character). This will be done using professional judgement and in accordance with the 'Guidelines for Landscape and Visual Impact assessment (2013)'. Significance is determined on balance of

receptor sensitivity versus the magnitude of landscape impact.

- Appraisal of predicted visual impacts using the ZTV map and the photomontages prepared from each of the selected VRP locations. Again, this will be done using professional judgement and in accordance with the '*Guidelines for Landscape and Visual Impact assessment (2013)*'. Significance is determined on balance of receptor sensitivity versus the magnitude of visual impact.
- Description and discussion of proposed mitigation measures.
- Appraisal of residual landscape and visual impacts following the implementation and establishment of mitigation measures.

Appraisal of cumulative impacts in relation to any existing or future developments within the study area that might be relevant to the Project. This will be done using professional judgement and in accordance with the '*Guidelines for Landscape and Visual Impact Assessment (2013)*'. Significance is determined on balance of receptor sensitivity versus the magnitude of cumulative impact.

16.3 Baseline Conditions

16.3.1 [Desktop Study](#)

Desktop baseline studies will involve a comprehensive review of the Limerick County Development Plan, policy documents and map data. In terms of the landscape baseline, this will principally focus on the Limerick Landscape Character Assessment.

Zone of Theoretical Visibility (ZTV) maps will be produced in relation to permanent built structures to identify from where in the surrounding landscape of the study area views of the project are potentially afforded (bare-ground scenario).

Visual baseline studies will focus on designated scenic views, settlements, major transport routes and amenity areas. This will inform the later selection of representative viewpoints from which photomontages will be prepared to aid the visual impact appraisal. An initial viewpoint selection map will be generated for use during fieldwork where viewpoint selection will be refined.

An on-line and literature review of the area will also be undertaken in order to identify important tourist and amenity features within the area. This will include the provision of the likes of way-marked walking trails and tourist facilities.

16.3.2 [Survey Requirements](#)

Following the desktop phase, fieldwork will be undertaken to inform the project specific landscape character assessment. Fieldwork will also be used to identify sensitive landscape features and visual receptors and to refine the viewpoint set that will form the basis of the visual impact appraisal. High quality 360° photography will be captured during clear viewing conditions for use in the preparation of photomontages.

16.3.3 [Consultation](#)

It is considered that consultation on the landscape and visual impact assessment will be undertaken with the Local Authority, Limerick County Council, along with local residents.

16.3.4 [Study Area](#)

For all the sites, the immediate context of the site and its wider surrounds is that of a rural landscape comprising of flat to gently undulating terrain and therefore the proposed Project is likely to be difficult to discern beyond approximately 500m – 1000m due to screening afforded by intervening vegetation. Even if discernible from greater distances it is not likely to give rise to significant landscape or visual impacts beyond this threshold. As a result, a 1km radius study area is used in this instance. Nonetheless, there will be a particular focus on local receptors contained within 500m of the site.

16.4 Potential Impacts

16.4.1 [Construction Phase](#)

At crossing XC187 - Fantstown and XC209 - Ballyhay, no construction works are proposed, therefore there would be no effects on landscape and visual receptors during the 'construction phase' of the proposed Project at this location.

At the remaining crossings, there would be construction of overbridges and roads and a number of typical effects could occur. These are described and would apply to all of the sites.

The following is a list of potential construction phase impacts relevant to the Landscape and Visual Assessment;

- Visual impacts from the movement of traffic and machinery along site access points surrounding the proposed Project;
- Landscape and visual impacts arising from the movement of construction materials;
- Landscape and visual impacts arising from ancillary construction requirements; for example, power and lighting, construction fencing/hoarding, site facilities, etc.; and
- The duration of landscape and visual impacts from construction.

16.4.2 Operational Phase

Typical landscape and visual impacts for Transport Infrastructure Projects

- Landscape and visual impacts arising from permanent buildings/structures;
- Landscape and visual impacts – both positive and negative – arising from the implementation of any landscape screening proposals surrounding the proposed crossing;
- Visual impacts arising from additional signage and lighting; and
- Visual impacts arising from the movement of traffic at a higher elevation than the existing roadway, including privacy issues for residential properties relating to views from new elevated roads.

Site Specific Impacts

For XC187 - Fantstown and XC209 - Ballyhay, the closure of the existing crossing means there would be very few effects on the landscape or views; there are potential visual effects as a result of additional signage and lighting.

XC201 - Thomastown

- Landscape and visual impacts arising from the emerging preferred solution including the proposed road alignments new intersection with the R515 regional road;
- Landscape and visual impacts arising from the potential loss of existing hedgerow vegetation along existing agricultural field boundaries;

- Landscape and visual impacts arising from any the proposed crossings associated elevated roadside embankments; and
- Landscape and visual impacts arising from the nearest dwellings to west of the emerging preferred solution along the R515 regional road and nearest residential dwellings along the local road to the east of the proposed road alignment.

XC211 - Newtown & XC212 - Ballycoskery

- **For the Green Route Option**, landscape and visual impacts arising from the emerging preferred solutions proposed slip road connecting to local road at XC211 Newton at archaeological feature to the northwest of the proposed alignment.
- **For the Green Route Option** Landscape and visual impacts arising from the proposed crossing for the emerging preferred solution and associated embankment at nearest dwellings in Beechwood Residential Estate north of any proposed overbridge on the western side of the existing railway line and at local school and residential dwellings on the eastern side of railway line.
- **For the Blue Route Option**, landscape and visual impacts arising from the any potential loss of mature sections of hedgerow along the north and south end of the proposed alignment and to the west of the proposed alignment where a dense area of hedgerow and scrub occurs.
- **For the Blue Route Option**, landscape and visual impacts arising from the proposed alignment at the single residential dwelling to the east and at several residential dwellings to the west of the existing railway line.
- Landscape and visual impacts arising from any potential loss of mature vegetation and sections of hedgerow bordering local roads and hedgerows/treelines along the existing railway line corridor.
- Landscape and visual impacts arising from the emerging preferred solution crossing at Kilmallock Cycle Hub Route 1 located along local roads immediately east of proposed crossing.

XC215 - Shinanagh

- Landscape and visual impacts arising from the emerging preferred solution along sections of Ballyhoura Way national waymarked trail that occur immediately north and west of proposed alignment.

- Landscape and visual impacts arising from the emerging preferred solution at dwellings along local road to the west.
- Landscape and visual impacts arising from the emerging preferred solution at new intersection with N20 – potential for minor loss of vegetation.
- Landscape and visual impacts arising from the emerging preferred solution at archaeological feature (Imphrick church and graveyard ruins) situated northwest of intersection of L1320 local road at N20.

XC219 - Buttevant

- Landscape and visual impacts arising from emerging preferred solution and associated embankments at nearest dwellings north of the emerging preferred solution on the western side of existing railway line.
- Landscape and visual impacts arising from emerging preferred solution and associated embankments at nearest dwelling to the east of the proposed alignment.
- Landscape and visual impacts arising from any loss of mature hedgerow vegetation along R522 regional road and loss of vegetation along existing railway line embankments.

17. Cross-cutting Themes

17.1 Overview

A number of environmental aspects are considered to be 'cross-cutting' and complex as such are best addressed as a single assessment for all seven sites.

Included within these for the proposed Project are the following topics, assessment for which follow:

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

17.2 Risk of Major Accidents & Disasters

17.2.1 [Introduction](#)

This section describes the scope of work and methods to be applied in the identification and assessment of the effects on the environment arising from the vulnerability of the proposed Project to the risk of major accidents and disasters. A high-level overview of the baseline conditions is included, together with the proposed methodology and a scope of work likely to be required to undertake such an assessment of the proposed Project.

Policy, Plan and Guideline Context

The assessment will require a comprehensive policy, plan and strategy review, including (but not limited to) the documents listed in Chapter 3, and the EIA Directive (2014/52/EU) lists the factors which must be assessed with respect to environmental impact in Paragraph 1. Paragraph 2 of Article 3 states:

'The effects referred to in paragraph 1 on the factors set out therein shall include the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned.'

Annex III of the directive lists the characteristics of a project to be considered as part of the EIAR, including:

'(f) the risk of major accidents and/or disasters which are relevant to the project concerned, including those caused by climate change, in accordance with scientific knowledge.'

Description of the Study Area

The study area for the purposes of identifying risk of major accidents and disasters is the proposed Project extent, as well as any haul routes to and from the proposed Project during the construction phase. The assessment will look at the current risk profile with respect to natural disasters, transportation accidents, construction accidents, and security.

Regard will also be had to sites that have potential for major accident hazard under the Chemical Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 9S.I. No.209 of 2015).

Ireland does not tend to experience many of the most destructive types of natural disasters that are seen in some other countries. Ireland is volcanically inactive, relatively stable seismically, and does not tend to experience frequent destructive weather events such as hurricanes or tornadoes. The most common type of natural disaster which is experienced in Ireland is flooding. Flood risk assessment for the proposed Project will be presented in the EIAR.

With respect to the railway safety baseline for Ireland, the Commission for Railway Regulation (CRR) is responsible for regulating Ireland's railways. According to the CRR's *'Railway Safety Performance in Ireland Report 2017'*, there were no major accidents or fatalities recorded in 2016 (the last year reported on), except for incidences of apparent self-harm. This was true across all railway types for which the CRR are responsible, namely heavy rail, light rail, public highway interfaces with industrial rail systems, and heritage railways. According to the Railway Safety in the European Union Safety Overview 2017 Report (European Union Agency for Railways 2017), Ireland has reported a zero passenger fatality risk for the whole ten year reporting period from 2006 to 2015. With respect to road safety, Ireland is currently ranked 4th safest EU country and is targeting a further 22% reduction in road deaths by 2020.

With respect to current safety trends in the construction sector, the HSA publishes annual statistics in their Summary of Workplace Injury, Illness and Fatality Statistics report (HSA 2017). The most recent of these was published in 2017 and provides statistics for the period of 2015-2016. In 2016, the construction sector reported the second highest number of fatalities after the agriculture, forestry and fishing sector, with nine fatalities recorded.

In 2016 there were also 601 reported injuries related to the construction sector. Since 2009, there have been 69 fatalities recorded in the construction sector.

With respect to Ireland's safety and security, the threat of terrorism is categorised as possible but unlikely. Ireland is ranked 10th place on the Global Peace Index 2018, and 6th in Europe. This is an annual ranking of 163 independent states and territories based on 23 qualitative and quantitative indicators including relations with neighbouring countries, role in conflicts, political instability, level of perceived criminality, level of violent crime, impact of terrorism, and ease of access to small arms.

17.2.2 [Baseline Information](#)

Baseline information for the purposes of this assessment will be largely informed by the other chapters, in particular climate, population and human health, socio-economics, biodiversity, traffic and transport, hydrology, hydrogeology, and land, soils and geology.

Desktop Study

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

- National Risk Assessment 2017 Overview of Strategic Risks (Department of the Taoiseach 2017);
- Guidance on Assessing and Costing Environmental Liabilities (EPA 2014a);
- A Guide to Risk Assessment in Major Emergency Management (Department of the Environment, Heritage and Local Government (DoEHLG) 2010);
- A Guide to the Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015) (HAS 2015);
- Railway Safety Performance in Ireland (CCR 2017);
- Iarnród Éireann Safety Report 2016 (Iarnród Éireann 2017);

- Flood Risk Management Plans for Shannon Estuary South River Basin (UOM24) and Blackwater (Munster) River Basin (UOM18) (OPW 2018); and
- A National Risk Assessment for Ireland 2017 (Department of Defence (DoD) 2017).

17.2.3 [Survey Requirements](#)

Sufficient information will be obtained from desktop studies and surveys completed for other chapters to inform the assessment.

17.2.4 [Consultation](#)

The development of the EIAR will be informed by comprehensive consultation that will be undertaken with statutory consultees (prescribed bodies), other stakeholders and the public. Specific consultation will be undertaken as required with the following bodies:

- Health and Safety Authority (HAS);
- Office of Public Works (OPW);
- Commission for Railway Regulation (CRR); and
- Major Emergency Planning Units for Cork and Limerick County Councils.

Further details of consultation can be found in Chapter 5 of this report.

17.2.5 [Potential Impacts](#)

For the purposes of the assessment of risk of major accidents and disasters, the assessment will assume a worst-case scenario.

Potential Construction Phase Impacts

Key risks during construction in the absence of any mitigation measures could include occurrences such as:

- Damage to high voltage lines which cross the proposed Project;
- Fire in any works areas during construction;
- Flooding; and
- Road traffic collisions involving construction vehicles or as a result of temporary traffic

management measures put in place as a result of construction activities, or vehicular collisions within the construction sites.

Potential Operational Phase Impacts

Key risks during operation of the proposed Project could include:

- Fire within the trains;
- Loss of power to the rolling stock causing operation to halt;
- Train derailment or collision; and
- Security incidents occurring on trains.

17.2.6 Proposed Methodology and Assessment

It is proposed that the risk assessment will be carried out in three stages:

- Identification and Screening – identify potential unplanned risks that the proposed Project may be vulnerable to, and screen them with respect to whether they are already addressed elsewhere (e.g. other EIAR chapters, within the design or covered by legislation), or where the incident cannot be plausibly linked to the proposed Project (e.g. volcanic activity).
- Risk Classification – evaluation of each identified risk with regard to the likelihood of occurrence (as per Table 2 of DoEHLG 2010). and the potential impact (as per Table 3 of DoEHLG 2010). As per those tables, the likelihood is ranked from 1 (extremely unlikely) to 5 (very likely), and potential impact is ranked from 1 (minor) to 5 (catastrophic).
- Risk Evaluation – risks will be subject to a risk matrix to determine the level of significance of each risk based on the multiplication of their likelihood and impact rankings, grouped into three categories, high risk (score from 15 to 25), medium risk (score of 8 to 12), and low risk (score of 1 to 6).

Following identification, classification and evaluation of each identified risk; mitigation will be proposed for any occurrences which are categorised as medium or high risk. New scoring for the likelihood and consequence post-mitigation will be assessed in order to give a post-mitigation score.

17.3 Material Assets

17.3.1 Overview

The EIA Regulations (S.I. No. 296, 2018) require the inclusion of an assessment of the effects of a project on 'Material Assets'. There is no definition of this term in the legislation, either at a national or EU level.

EU Guidance on information to be included in EIARs provides some guidance as follows:

Section 2: Description of Environmental Factors likely to be affected by the Project

Have any material assets in the area that may be affected by the Project been described? (including buildings, other structures, mineral resources, water resources)

Section 3: Description of the likely Significant Effects of the Project

Have the direct, primary effects on material assets and depletion of natural resources (e.g. fossil fuels, minerals) been described?

For the most part, these aspects of the environment are assessed as part of the topic-specific assessments, in particular:

- Traffic & Transport: road and rail infrastructure;
- Water: water resources, flood defences;
- Cultural heritage: cultural and archaeological assets;
- Population & Health: land use, property, amenity;
- Soils & Geology: soils and minerals, private and public water supplies, public and private wastewater treatment systems;
- Resource Use & Waste Management: materials use;
- Climatic factors: energy consumption;
- Landscape & Visual: above ground structures, e.g. electricity and telecommunications lines, being moved or altered.

Information on investigative works into third party utilities will be included in the EIAR as part of the Project Description chapter, specifically in relation to the works required during the construction phase of the proposed Project. This will include any mitigation required to minimise effects on said utilities.

17.4 Resource Use and Waste

17.4.1 [Introduction](#)

This section describes the scope of work and methods to be applied in the identification and assessment of impacts with respect to resource and waste management associated with the proposed Project. In this context, the term 'waste' refers to unusable or unwanted materials that may arise during the active construction of infrastructure and operation of the proposed Project.

17.4.2 [Policy & Plan Context](#)

The examination of policy and plan context in terms of construction waste management will involve a combination of local and national policy documents. The following documents will be referred to:

- The EU Waste Framework Directive (2008/98/EC);
- Waste Management Act 1996 (No.10 of 1996) as amended;
- National Hazardous Waste Management Plan 2014- 2020 (EPA 2014b);
- Southern Region Waste Management Plan 2015-2021;
- Relevant County Development Plans; and
- Relevant Local Area Plans.

17.4.3 [Study Area](#)

This proposed Project covers an extensive study area made up of 7 locations at each of the railway crossings concerned including, XC187 - Fantstown and XC201 - Thomastown in Co Limerick, and XC209 - Ballyhay, XC211 - Newtown, XC212 - Ballycoskery, XC215 - Shinanagh and XC219 - Buttevant in Co. Cork.

The study area for the purposes of waste management is the footprint of the proposed Project including associated soil storage areas and compound sites. The study area also expands to the wider Southern Region (and beyond if required) for the purposes of identifying suitable materials and waste management facilities and locations. The assessment will encompass all materials used and waste generated as a result of the proposed Project.

17.4.4 [Baseline Information](#)

A desktop study will be undertaken to identify materials and wastes that will be used and produced and potentially require management as a result of the proposed Project once outline design information is available. Management plans for materials and waste will identify opportunities to minimise materials use and waste production and will also identify suitable re-use opportunities for the materials (as a by-product) as well as waste management facilities licensed by the EPA and facilities holding waste facility permits or certificates of registration from Local Authorities. Documentation pertaining to the above-mentioned facilities will be studied to estimate capacity and usability of the facility for the proposed Project.

Desktop Study

The latest waste statistics for Ireland available are from 2014. EPA reported 3,314 ktonnes of construction & demolition waste were finally treated (recovered or disposed) in 2014; soil & stones accounted for 74% of the total quantity and mineral waste (concrete, bricks, gypsum) accounted for 12% of the total quantity.

Under the Waste Framework Directive (2008/98/EC) there is a target for Member States to achieve 70 per cent material recovery of non-hazardous, non-soil & stones C&D wastes by 2020. Ireland achieved 68 per cent recovery in 2014. The Waste Framework Directive target only applies to a portion of all Construction & Demolition wastes generated, as hazardous wastes and soil & stones wastes are excluded from the calculation.

17.4.5 [Survey Requirements](#)

Sufficient information will be obtained from desktop studies and surveys completed for other chapters e.g. ground investigations to inform the assessment.

17.4.6 [Proposed Methodology & Assessment Scope](#)

It is proposed that an assessment of waste generation will be carried out in accordance with the EPA's current EIS guidance documents as well as the below guidelines and established best practice, and will be tailored accordingly based on professional judgement and local circumstance:

- The Management of Waste from National Road Construction Projects (TII 2017a);
- 'Guidance on Soil and Stone ByProducts' (EPA 2019) (Guidance on classification and notification of soil and stone as a by-product in the context of

article 27 of the European Communities (Waste Directive) Regulations 2011 (EPA 2017a);

- Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Waste Projects (DoEHLG, 2006); and
- CIRIA publication 133 Waste Minimisation in Construction (CIRIA 1997).

In line with the above guidance, the assessment will cover potential impacts of waste generation and will describe the existing conditions and the likely potential impacts associated with the construction and operation of the proposed Project. The impact assessment process will involve:

- Assigning the receptor sensitivity;
- Identifying and characterising the magnitude and significance of any potential impacts;
- Incorporating measures to avoid and mitigate (reduce) these impacts; and
- Assessing the significance of any residual effects after mitigation.

This assessment will cover potential impacts with respect to resource and materials / waste management and will describe the existing conditions and the likely potential effects associated with the construction and operation of the proposed Project. The assessment process will aim to identify and quantify the following:

- The types and quantities of materials required for the proposed Project;
- The quantities of material to be generated during the construction and operational phase of the proposed Project;
- The types and quantities of waste arising from the proposed Project, including the identification of any potentially hazardous wastes;
- Opportunities for re-use of materials within the proposed Project;
- Waste requiring treatment and/or disposal off site;
- The impacts that will arise in relation to the generation, re-use and disposal of materials and waste;
- Measures to mitigate and monitor these impacts; and
- Significance of any residual effects after mitigation.

The assessment will identify whether impacts are positive or negative, permanent or temporary, and direct or indirect. Professional judgement will be used with regard to assessing significance of resource and waste management effects, taking into account the volumes of materials used and the properties of any wastes.

17.4.7 [Potential Impacts](#)

The majority of the waste to be produced by the proposed Project will be through the excavation for the construction of bridges. It is anticipated that the majority of this will be clean, uncontaminated soil and stone material, which will be suitable for reuse, recycling or recovery. However, there may be areas of contaminated land in which excavation will be required, which will not be suitable for reuse, and will require handling and disposal in accordance with current legislative requirements and best practice.

Potential Construction Phase Impacts

Potential impacts during construction may include:

- Production of additional spoil material, arising from excavating material unsuitable for reuse such as vegetation, and contaminated soils;
- Debris and waste from the site could be a source of nuisance to neighbouring communities as well as having a negative impact on the appearance of the site;
- Excavation of possible contaminated lands and materials which would require disposal off site at a suitably licensed facility;
- Waste generation from construction may cause a number of direct and indirect impacts on other environmental topics such as air quality (dust, odours), traffic, noise, soils (contaminated land), geology, water, health, etc.; and
- Surplus materials and waste may occur where material supply exceeds material demand.

Potential Operational Phase Impacts

It is envisaged that, once the proposed Project is operational, the only waste types expected to be developed are quantities of mixed municipal waste, mixed dry recyclables, and food waste from public and staff using the route daily, as well as waste associated with maintenance activities at the crossings, depots, stations and bridges. The operational phase waste will be insignificant in comparison to the likely construction phase waste quantities.

17.4.8 Mitigation

In accordance with the waste hierarchy principle and best practice, the proposed Project will operate in accordance with the requirement of preventing the generation of waste where possible. Measures to be implemented across the site to achieve these aims will include, but are not limited to, the following:

- Re-use of excavated materials on site where possible;
- Ordering of appropriate quantities of materials using the 'just in time' philosophy;
- Appropriate storage facilities for materials will be identified and provided on site;
- Appropriate handling procedures for materials will be developed to prevent damage; and
- Co-ordination between contractors in the supply of materials and services to avoid repeated and/or redundant deliveries or excavations.

Measures that will be taken to ensure the site and surroundings are maintained to a high standard of cleanliness, include but are not limited to the following;

- A regular program of site tidying will be established to ensure a safe and orderly site;
- Debris netting to be erected to prevent materials and equipment being scattered by the wind; and
- Food waste will be strictly controlled on all parts of the site.

In the event of any litter or debris escaping the site, it will be collected immediately and removed to storage on site, and subsequently disposed of in the normal manner.

Materials Management Plan (MMP) should set out the objectives relating to the use of the materials and should accompany the Design Statement. It should bring together all the relevant information to demonstrate that all following four key factors will be met:

- Protection of human health and protection of the environment;
- Suitability for use;
- Certainty of Use;
- Quantity of Material.

The MMP should include a tracking system and contingency arrangements. A Verification Plan will be

set out in the Materials Management Plan identifying how the placement of materials will be recorded and the quantity of material to be used. Once the proposed Project has been completed a Verification Report must be produced that demonstrates that the materials have been located in the correct place within the proposed Project or dealt with appropriately.

An appropriate Waste Management Plan will be developed and will assist in the development of waste management policies and procedures for the overall proposed Project. This will include details on the management of staff (canteen waste), waste materials generated by the proposed Project, packaging waste, off cuts etc. The plan will describe methods for the storage, segregation and reuse/recovery of waste materials where possible. Prior to the works commencing, any by-product to be produced should be accounted for and accurately described in the plan. The EPA should be notified of the by-product decision made by an economic operator. A register of by-product notifications will be maintained and will be available for public inspection online to include details of origin and destination sites for soil and stone by-product.

Waste streams arising from the construction and operational phases of the proposed Project will be identified in addition to identifying required waste management measures for each waste stream. Significant volumes of excavated material will be generated during the construction phase of the main infrastructure sites. The volumes of excavated material and construction waste material will be calculated and the potential and options for re-use of the material will be assessed, with a view to maximising re-use on site. In the event that material is not suitable for reuse, recommendations for disposal will be provided. The permitting and licensing requirements under the Waste Management Acts 1996 – 2011 will be considered and adhered to.

17.5 **Climatic Factors**

17.5.1 Introduction

The approach to the inclusion of the Climate change, or 'climatic factors' as it is described in the legislation, in EIA has been varied. This is because climate change is a cross-cutting and complex issue and to include it in EIA requires the consideration of both the causes of climate change and the resultant effects of a changing climate.

Directive 2014/52/EU¹ Article 13 sets out the required approach:

'In this regard, it is appropriate to assess the impact of projects on climate (for example greenhouse gas emissions) and their vulnerability to climate change'

The EPA² describe it thus:

'impacts of climate change on a project as well as impacts of a project on climate change'

The causes of climate change are well documented and associated with the emissions of greenhouse gases; this is generally referred to as 'Climate Mitigation'. The consequences of climate change are wider ranging and have the potential to affect not only the project under assessment but the future baseline of all environmental aspects being assessed within an EIA. This is generally referred to as 'Climate Adaptation'.

17.5.2 Climate Change Impacts and Ireland's Climate

The Department of Communication, Climate Action and the Environment (DCCAE)³ describes the state of the climate of Ireland.

'Research at national level has shown that changes in Ireland's climate are in line with global trends. Even if GHG emissions fall to levels required to stop the worst impacts of climate change some changes are still likely to occur. This is because the climate system is slow to react, and some changes are already locked in.'

For Ireland, climate change impacts are expected to increase over the coming decades and could include the following;

- sea level rise;
- more intense storms and rainfall events;
- increased likelihood and magnitude of river and coastal flooding;
- water shortages in summer;
- increased risk of new pests and diseases
- adverse impacts on water quality; and

- changes in distribution and phenology (the timing of lifecycle events) of plant and animal species on land and in the oceans.

17.5.3 Baseline Conditions

Study Area

Due to the nature of climatic effects, if significant emissions occur, they will 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; however, the impacts of Climate change are experienced at a local as well as global level. For the proposed Project, it is anticipated that flooding will be a key issue affecting the study area. Some of the sites are within areas of existing and potential future flooding as a result of climate change. Further details of the flood extents will be shown in the Flood Risk Assessment (FRA) which will accompany the EIAR.

Greenhouse Gas Emissions

Ireland has signed up to several Climate agreements including the '2030 Climate and Energy Policy Framework' (EC 2014) which aims to reduce GHG emissions by 40% compared with 1990 levels by 2030.

In 2017, total emissions of greenhouse gases in Ireland, including indirect emissions from solvent use were 60,743.73 kt CO₂ equivalent, which is 9.6 per cent higher than emissions in 1990⁴.

The National Inventory Report describes the trends in greenhouse gases since 1990. There was a steady rise from 1990 to 2001, with a 27% rise in the total emissions from the GHG reported upon, from 55,417.1 kt CO₂ eq in 1990 to 70,475.3 kt CO₂ eq. 2001 represents the highest level of GHG emissions ever reported in Ireland.

Following the peak in 2001, emission levels plateaued somewhat, until 2008 when began a sharp decrease to 56,989.2 kt CO₂ eq in 2011. Emissions then plateaued again between 2011 and 2014.

¹ Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.

² Guidelines on the Information to be contained in Environmental Impact assessment reports. Draft August 2017. EPA Ireland.

³ <https://www.dccae.gov.ie/en-ie/climate-action/Pages/default.aspx>

⁴ Ireland's National Inventory Report 2019. Greenhouse Gas emissions 1990-2017. EPA. April 2019.

There was a rise in emissions between 2014 and 2015 of 3.7 per cent and there was a further increase between 2015 and 2016 of 3.5 per cent which is the third largest annual growth rate ever reported in Ireland.

Total emissions in 2017 were 9.6 per cent higher than in 1990, although 13.8 per cent lower than the peak level in 2001.

The changing trends are largely a result of changing economic growth and employment. While Ireland had been in compliance with its EU 2020 target for a number of years, the Climate Change Advisory Council has now advised in their Annual Review 2018 that Ireland is not on track to meet its 2020 targets (20% reduction by 2020 compared to 2005 levels) or its 2030 targets, due to greenhouse gas emissions rising, rather than falling (Climate Change Advisory Council 2018).

Climate Change Adaptation

Ireland's first statutory National Adaptation Framework (NAF) was published January 2018. The NAF:

'sets out the national strategy to reduce the vulnerability of the country to the negative effects of climate change and to avail of positive impacts.'

The NAF was developed under the Climate Action and Low Carbon Development Act 2015. It identifies a number of sectoral impacts as a result of Climate Change; those of relevance to the proposed Project are summarised as follows:

- **Agriculture:** The main impacts will result from changes in air and soil temperatures, changes in rainfall patterns and extreme events. Key impacts could include water stress for crops, heat stress for animals, plant diseases which are currently rare may occur more frequently and the mobility of machinery on fields may be affected due to increased levels of winter rainfall.
- **Biodiversity:** Increasing temperatures will impact on the geographical range and phenology (the timing of lifecycle events) of native species. Projected shifts in climate, temperature and precipitation, may result in the increased occurrence of invasive species and competitive pressures for Ireland's native species.
- **Critical infrastructure:** Water, energy, communications, transport, emergency services are at risk from a range of projected changes including sea level rise, increasing temperatures, changing rainfall patterns and extreme weather

events. Ireland's ports will be placed at increased risk due to storm surges.

- **Water management:** Climate change will pose significant risks to water management and will exacerbate existing pressures in terms of water supply, quality and flooding.

In the past four years, Ireland has seen its:

- *'wettest winter in Ireland in a time series from 1850'* (2015/16), resulting in an €8 million cost for rail network: speed restrictions were imposed and in some places rail lines were closed due to flooding. There were instances of fallen trees and debris blocking railway tracks and high winds caused problems with automatic level crossings barriers.

And, in contrast:

- One of the hottest, driest summers on record (2018). The Met Éireann records show:
 - 32.0°C recorded at Shannon Airport, Co Clare in June 2018, the highest temperature ever recorded at a synoptic station in Ireland.
 - 109.5mm, total summer rainfall for Cork Airport, driest summer for 56 years;
 - Absolute drought conditions recorded at 21 Met Éireann stations between May and July 2018.

In response to these conditions and the consequential risks to the transport system in Ireland, the transport sector has produced its own adaptation strategy. The Draft Statutory Climate Change Adaptation Plan for the Transport Sector Public Consultation July 2019 was published in July 2019, and states:

The transport sector must... put in place adaptation measures to address the unavoidable consequences and associated costs of climate change, as well as maximising any potential opportunities, by facilitating the development of climate resilience within key transport networks, infrastructure and services.

Adaptation measures should enable continued services and maintained infrastructure as well as safeguarding new assets from longer term impacts by ensuring that current design specifications will adequately address future infrastructure needs

17.5.4 [Proposed Method and Approach](#)

Overview

It is proposed that an assessment of climate will be carried out in accordance with the EPA guidance as well as the following guidance and established best practice and will be tailored accordingly based on professional judgement and local circumstance. The following guidelines will be employed:

- Transport Infrastructure Ireland document entitled Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes (NRA 2011).
- Assessing Greenhouse Gas emissions and Evaluating their Significance (IEMA. 2017).
- Guidelines on the Information to be contained in Environmental Impact assessment reports. Draft August 2017 (EPA 2017).

In line with the above guidance, the assessment will cover potential impacts to climate and will describe the existing conditions and the likely potential impacts associated with the construction and operation of the proposed Project.

In general, the impact assessment process will involve:

- Identifying and characterising the magnitude and significance of any potential impacts;
- Incorporating measures to avoid and mitigate (reduce) these impacts; and
- Assessing the significance of any residual effects after mitigation.

Greenhouse Gas Emissions

In determining the potential GHG emissions that could be produced and/or reduced or avoided as a result of the proposed Project, the following stages are considered (in accordance with IEMA 2017):

- Before:
 - Pre-construction stages
 - Product stage
 - Construction process stage
- Use;
- End of life; and
- Beyond asset: benefits and loads beyond the system boundary.

Activities within these stages, associated with the proposed Project, will be identified and GHG emissions calculated.

In terms of determining significance, current guidance (IEMA 2017) is that all GHG emissions are considered to be significant and the proposed Project will be designed to address any occurrence by taking mitigating action.

Climate Effects and Adaptation

Each of the environmental topics within the EIAR will include a consideration of Climate Change, both in terms of the future baseline for that topic and the requirement from EIA regulations to consider the likely future evolution of the baseline without the proposed Project, and in terms of the effects of Climate Change on and from the proposed Project. The proposed Project represents critical infrastructure and as such it is required to be designed so as to be resilient to a changing climate. This will be considered as part of each topic, as appropriate.

17.5.5 [Potential Impacts](#)

Construction Impacts

Construction traffic is expected to be the dominant source of GHG emissions as a result of the proposed Project. GHG emissions from construction traffic will increase Ireland's GHG emissions potentially having a climate change effect. These will be calculated and assessed in the EIAR to determine whether there is a significant effect during construction.

The construction phase is temporary and is unlikely to have a significant effect on adaptation. However, there may be climate change related weather effects to manage during the construction phase. The potential for these and the consequential effects, for example of flooding and increased silty water runoff, will be considered in the relevant topics.

Operational Impacts

It is likely that GHG emissions from local traffic will not change as result of the proposed Project; the replacement of a level crossing with a bridge is unlikely to change the number of vehicles making the crossing to any significant degree. There is potential for an effect from the diversions being put in place; this will be assessed in the EIAR following completion of the Traffic Impact Assessment.

At a macro level, GHGs may be reduced during the operational phase due to an increased use of the rail network as travel times between the major cities are reduced following the removal of the level crossings. The planned eventual electrification of the Dublin-Cork line will also benefit from the removal of the level crossings. This will be considered as part of the assessment.

The new bridges and diverted accesses will need to be resilient to climate change and not affect the ability of their 'host communities' to adapt. The design of the proposed Project will be assessed to determine its potential effects in these regards.

18. Interactions and Cumulative Impacts

18.1 Introduction

The EPA (EIA Guidance 2017) define cumulative impacts as:

'The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.'

This chapter will look at the total impact of the proposed Project arising from the following:

- Interactions or Secondary effects (i.e. combined effect with another topic);
- Intra-project effects (i.e. combined effects of the seven sites); and
- Inter-project effects (i.e. in combination with other development activities nearby).

EPA guidance states that the EIAR must consider... *'the potential for cumulative significant effects to arise from multiple non-significant effects.'* A minor impact caused by the proposed Project could have a more significant effect when combined with the same impact from another development in the same geographical area. It is therefore not only important to look at the impacts caused specifically by the project being assessed, but also the impact in the wider context of similar impacts from unrelated projects in the area.

The cumulative impact section of the EIAR will be prepared in accordance with the *'Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions'*, prepared for the European Commission (EC 1999). Cumulative impacts will take consideration of all existing and/or approved projects which will be deemed to be likely to cause cumulative impacts.

18.1.1 Policy & Plan Context

The EC Directive (85/337/EEC) (as amended) sets the requirements for assessing cumulative impacts.

- Article 3 states the *'environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case and in accordance with the Articles 4 to 11, the direct and indirect effects of a project on the following factors:*
 - *human beings, fauna and flora,*

- *soil, water, air, climate and the landscape,*
- *material assets and cultural heritage,*
- *the inter-action between the factors mentioned in the first and second indents.'*

- Annex III Selection Criteria Referred to in Article 4 (3) states *'the characteristics of projects must be considered having regard in particular to:*
 - *the size of the project,*
 - *the cumulation with other projects,*
 - *the use of natural resources;*
 - *the production of waste; pollution and nuisances;*
 - *risk of accidents, having regard in particular to substances or technologies used.'*
- Annex IV Information Referred to in Article 5 (1) 3 states *'a description of the aspects of the environment likely to be significantly affected by the proposed project... should cover the direct effects and any indirect, secondary, cumulative, short, medium and long term, permanent and temporary, positive and negative effects of the project.'*

The examination of policy and plan context in terms of cumulative impacts will involve a combination of relevant guidelines for each environmental topic and European and national guidance documents. The following documents will be referred to:

- European Union, (1999). Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions;
- Planning Inspectorate, (2015). Advice Note 17. Cumulative Effects Assessment; and
- Guidelines on Information to be contained in an EIAR Draft August 2017. EPA

18.1.2 Study Area

This proposed Project covers an extensive study area made up of 7 locations at each of the railway level crossings concerned including, XC187 - Fantstown and XC201 - Thomastown in Co Limerick, and XC209-Ballyhay, XC211 - Newtown, XC212 - Ballycoskery, XC215 - Shinanagh and XC219 - Buttevant in Co. Cork. The study area for the purposes of the cumulative impacts is dictated by the study area set for each environmental topic.

18.1.3 [Baseline Information](#)

Interactions

For each environmental aspect there will be certain interactions or interdependencies with other environmental topics. These interactions will become evident following the assessment of impacts for each environmental topic.

Intra-project Cumulative Impacts between the seven sites

There may be combined impacts on the same receptor or overall environmental topics as a result of activities at two or more of the proposed sites. These in combination impacts will become evident following the assessment of impacts at each site.

Cumulative Impacts with Other Projects

Initially a desktop exercise to identify all other relevant projects in proximity to the proposed Project will be conducted in order to determine the developments with the potential to cause cumulative effects.

Sufficient information will also have been obtained from desktop studies, surveys and assessments completed for other chapters to inform the assessment of cumulative impacts.

18.2 Potential Impacts

Cumulative Impacts result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project. For example, the European Commission has identified some examples of potential impacts in its Guidelines:

- Incremental noise from a number of separate developments during construction;
- Combined effect of individual impacts, e.g. noise, dust and visual, from one development on a particular receptor;
- Several developments with insignificant impacts individually but which together have a cumulative effect, e.g. development of a golf course may have an insignificant impact, but when considered with several nearby golf courses there could be a significant cumulative impact on local ecology and landscape.

18.3 Proposed Methodology & Assessment Scope

Cumulative Impact Assessment will involve the following:

- Identifying where cumulative impacts will potentially occur;
- Identifying the pathway of each impact;
- Determining the magnitude and significance of the impacts;
- Developing mitigation measures to address the impacts; and
- Developing monitoring programmes to measure the impacts and monitor the adequacy of mitigation developed.

The scope of cumulative impact assessment is an iterative process. As the proposed Project develops from feasibility to outline detailed design and development of mitigation measures, the potential for cumulative impacts will be reviewed as required. Further cumulative impacts may become apparent during the project planning with more research, speaking to stakeholders during consultation stages or as mitigation measures are designed and resultant indirect impacts may become evident.

19. Conclusion

An Environmental Impact Assessment Report (EIAR), Appropriate Assessment Screening and potentially a Natura Impact Statement (NIS) will be prepared for the proposed Project which will present the findings of the described assessments and will accompany the Railway Order Application to An Bord Pleanála in Q1/Q2 2020. It will be subject to a period of statutory consultation during which the public is afforded the opportunity to provide comments or feedback. Following this period, the An Bord Pleanála will determine whether consent should be granted.

CIÉ and IÉ are now inviting submissions specifically on the Blue Route Option for XC211 Newtown. The consultation period will run for 4 weeks from Tuesday 21st January 2020 to Tuesday 18th February 2020 . We welcome all relevant submissions on this specific consultation exercise.

To make a submission please use the following contact details:

Email: CLLC@irishrail.ie

Postal Address: Cork Line Level Crossings Project, c/o Jacobs Engineering, Mahon Industrial Estate, Cork, T12 HY54

Website: www.irishrail.ie/CorkLineLevelCrossings

Appendix A. Acronym List

Acronym	Meaning
AADT	Annual Average Daily Traffic
AC	Alternating Current
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
CBTC	Communications-Based Train Control
CCTV	Closed Circuit Television
CFRAM	Catchment Flood Risk Assessment and Management
CIEEM	Chartered Institute of Ecology and Environmental Management
CIRIA	Construction Industry Research and Information Association
COD	Chemical Oxygen Demand
CRR	Commission for Railway Regulation
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
DCCAE	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
EMC	Electromagnetic Compatibility
EMF	Electromagnetic Field
EMI	Electromagnetic Interference
EMRA	Eastern & Midlands Regional Assembly

Update to Environmental Impact Assessment Screening & Scoping Report

Acronym	Meaning
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
HGV	Heavy Goods Vehicle
HAS	Health & Safety Authority
HSE	Health Service Executive
IAQM	Institute of Air Quality Management
ICNIRP	International Commission on Non-Ionising Radiation Protection
IEMA	Institute of Environmental Management and Assessment
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
LGV	Large Goods Vehicle
MRI	Magnetic Resonance Imaging
NACE	Nomenclature Statistique des Activités Économiques
NHA	Natural Heritage Area
NPWS	National Parks and Wildlife Service
NRA	National Roads Authority
NTA	National Transport Authority
O&M	Operations & Maintenance
OCS	Overhead Contact System
OPW	Office of Public Works
OSI	Ordnance Survey Ireland
PFRA	Preliminary Flood Risk Assessment
pNHA	proposed Natural Heritage Area

Update to Environmental Impact Assessment Screening & Scoping Report

Acronym	Meaning
PPHPD	Passengers Per Hour Per Direction
PRAI	Property Registration Authority of Ireland
PSD	Platform Screen Door
RF	Radiofrequency
RMP	River Management Plan
RPA	Railway Procurement Agency
RSES	Regional Spatial Economic Strategy
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
VOC	Volatile Organic Compound
WFD	Water Framework Directive
WHO	World Health Organisation
Zol	Zone of Influence

Appendix B. References

Iarnród Éireann (2011). 2030 Rail Network Strategy Review Final Report

Association of Acoustic Consultants of Ireland (2019). Environmental Noise Guidance for Local Authority Planning & Enforcement Departments.

Bat Conservation Trust (2016). Bat Surveys for Professional Ecologists – Good Practice Guidelines. 3rd Edition. Collins

British Standard Institution (BSI) (2008a). BS 5228-1:2009+A1:2014 – Code of Practice for Noise and Vibration Control on Construction and Open Sites Part 1: Noise

British Standard Institution (BSI) (2008b). BS 5228-2:2009+A1:2014 - Code of Practice for noise and vibration control of construction and open sites - Part 2: Vibration

Central Statistics Office (CSO) (2013). Regional Population Projections 2016-2031

Central Statistics Office (CSO) (2016). Census 2016

Chartered Institute of Ecology and Environmental Management (CIEEM) (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal

Climate Change Advisory Council (2018). Annual Review 2018

Commission for Railway Regulation (CRR) (2017). Railway Safety Performance in Ireland Report 2017
Construction Industry Research and Information Association (CIRIA) (1997). CIRIA Special Publication 133: Waste Minimisation in Construction – Site Guide

Construction Industry Research and Information Association (CIRIA) (2001). C532 - Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors

Cork County Council (2014). Cork County Development Plan

Cork County Council (2019). Cork Metropolitan Area Draft Transport Strategy 2040

Department of Communications, Climate Action & Environment (DCCA) (2013). Climate Action and Low Carbon Development – National Policy Position Ireland

Department of Communications, Climate Action & Environment (DCCA) (2018). National Adaptation Framework

Department of Communications, Climate Action & Environment (DCCA) (2017). National Mitigation Plan

Department of Culture, Heritage & the Gaeltacht (DCHG) (2017). National Biodiversity Plan 2017-2021

Department of Defence (DoD) (2017). A National Risk Assessment for Ireland 2017

Department of Environment, Heritage and Local Government (DoEHLG) (2006). Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Waste Projects

Department of Environment, Heritage and Local Government (DoEHLG) (2010). A Guide to Risk Assessment in Major Emergency Management

Update to Environmental Impact Assessment Screening & Scoping Report

Department of Environment, Community & Local Government (DoECLG) (2012). Our Sustainable Future: A Framework for Sustainable Development in Ireland

Department of Finance (2005). Guidelines for the Appraisal and Management of Capital Expenditure Proposals in the Public Sector

Department of Housing, Planning and Local Government (DHPLG) (2017). Project Ireland 2040: National Planning Framework

Environment Heritage and Local Government (DoEHLG) (2010). A Guide to Risk Assessment in Major Emergency Management (Department of the Environment, Heritage and Local Government)

Department of Public Expenditure and Reform (DPER) (2015). Building on Recovery: Infrastructure and Capital Investment 2016-2021

Department of Public Expenditure and Reform (DPER) (2018). Project Ireland 2040: National Development Plan 2018-2027

Department of the Taoiseach (2017). National Risk Assessment 2017 Overview of Strategic Risks

Department of Transport, Tourism and Sport (DTTS) (2009). Smarter Travel: A Sustainable Transport Future: A New Transport Strategy for Ireland 2009-2020

Department of Transport, Tourism and Sport (DTTS) (2016). Common Appraisal Framework for Transport Projects and Programmes

Department of Transport, Tourism and Sport (DTTS) (2019). Common Appraisal Framework

Department for Transport and the Welsh Office (1988). Calculation of Road Traffic Noise (CRTN).

Environmental Protection Agency (2002). Guidelines on the Information to be Contained in Environmental Impact Statements

Environmental Protection Agency (2017). Guidelines on the Information to be Contained in Environmental Impact Statements

Environmental Protection Agency (EPA) (2019). Ireland's National Inventory Report 2019. Greenhouse Gas emissions 1990-2017

Environmental Protection Agency (EPA) (2003). Advice Notes on Current Practice in the Preparation of Environmental Impact Statements

Environmental Protection Agency (EPA) (2014a). Guidance on Assessing and Costing Environmental Liabilities

Environmental Protection Agency (EPA) (2014b). National Hazardous Waste Management Plan 2014-2020

Environmental Protection Agency (EPA) (2015). Advice Notes for Preparing Environmental Impact Statements (Draft)

Environmental Protection Agency (EPA) (2017a). Guidance on classification and notification of soil and stone as a by-product in the context of article 27 of the European Communities (Waste Directive) Regulations 2011

Update to Environmental Impact Assessment Screening & Scoping Report

Environmental Protection Agency (EPA) (2017b). Guidelines on the Information to be Contained in Environmental Impact Statements Assessment Reports (Draft August 2017)

Environmental Protection Agency (EPA) (2018a). Water Quality in 2016

Environmental Protection Agency (EPA) (2018b). Next Generation EPA Maps [Online]. Available at <http://gis.epa.ie/SeeMaps>

Environmental Protection Agency (EPA) (2018c). Air Quality Data [Online]. Available at <http://www.epa.ie/air/quality/data/>

Environmental Protection Agency (EPA) (2019). Guidance on Soil and Stone By-products – Draft Proposed for Public Consultation

European Commission (EC) (1999). Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions

European Commission (EC) (2014). 2030 Climate and Energy Policy Framework

European Commission (EC) (2017a). Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment

European Commission (EC) (2017b). Guidance on Scoping

European Commission (EC) (2017c). Guidance on the EIA Report

European Union (2000). Climate Action Programme

European Union (2013). Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment

European Union Agency for Railways (2017). Railway Safety in the European Union Safety Overview 2017 Report

Fossitt, J. (2000). Guide to Habitats in Ireland. The Heritage Council.

Health & Safety Authority (HSA) (2017). Summary of Workplace Injury, Illness and Fatality Statistics

Highways Agency, The Scottish Executive Development Department, The National Assembly of Wales and The Department of the Environment for Northern Ireland (1993). The Design Manual for Roads and Bridges Volume 11 Environmental Assessment

Hundt, L. (2012). Bat Surveys: Good Practice Guidelines, 2nd edition.

Iarnród Éireann (2016). Safety Report 2016

Iarnród Éireann (2019). Elimination of 7 Manned Level Crossings on the Dublin to Cork Line – Feasibility Study

Institute for Economics & Peace (2018). Global Peace Index 2018: Measuring Peace in a Complex World

Institute of Air Quality Management's (IAQM) (2014). Management Guidance on the Assessment of Dust from Demolition and Construction

Institute of Highways and Transportation (IHT) (1994). Guidelines for Traffic Impact Assessment

Update to Environmental Impact Assessment Screening & Scoping Report

Interorganizational Committee on Guidelines and Principles for Social Impact Assessment (1995). Guidelines and principles for social impact assessment (pp. 11-43)

International Organisation for Standardisation (ISO) (2016). ISO 1996-1:2016 Acoustics - Description, Measurement and Assessment of Environmental Noise. Part 1 2016: Basic Quantities and Assessment Procedures

King J. J. and Linnane S. M. (2004). The status and distribution of lamprey and shad in the Slaney and Munster Blackwater SACs

King, J.J., & Roche, W.K. (2008). Aspects of anadromous Allis shad (*Alosa Linnaeus*) and Twaité shad (*Alosa fallax Lacépède*) biology in four Irish Special Areas of Conservation (SACs): status, spawning indications and implications for conservation designation.

Landscape Institute (LI) and Institute of Environmental Management and Assessment (IEMA) (2013). Guidelines for Landscape and Visual Impact Assessment (GLVIA3)

Landscape Institute (LI) and Institute of Environmental Management and Assessment (IEMA) (2018). Health Impact Assessment in EIA

Limerick County Council (2010). Limerick County Development Plan 2010-2016

Mind-West Regional Authority (2010). Mid-West Regional Planning Guidelines 2010-2022

National Parks & Wildlife Service (NPWS) (2018). NPWS Map Viewer [Online] Available at <http://webgis.npws.ie/npwsviewer/>

National Parks & Wildlife Service (NPWS) (2012). Blackwater River (Cork/Waterford) SAC (site code: 2170) Conservation objectives supporting document - marine habitats

National Roads Authority (NRA) (2004). Guidelines for the Treatment of Noise and Vibration in National Road Schemes, Revision 1

National Roads Authority (NRA) (2008). Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes

National Roads Authority (NRA) (2009a). Guidelines for Assessment of Ecological Impacts of National Road Schemes

National Roads Authority (NRA) (2009b). Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes

National Roads Authority (NRA) (2011). Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes

National Transport Authority (NTA) (2011). 'Project Management Guidelines'.

National Transport Authority (NTA) (2016). Rail Review 2016 report

National Transport Authority (NTA) (2018) Draft Integrated Implementation Plan 2019-2024

The Office of Public Works (OPW) (2018). The Shannon RBMP 2009-2015, the South Eastern RBMP 2009-2015, and the Eastern RBMP 2009-2015 and their associated Water Management Unit Action Plans (various).

The Planning Inspectorate (2015). Advice Note Seventeen; Cumulative Effects Assessment Relevant to Nationally Significant Infrastructure Projects

Scottish Fisheries Co-ordination Centre (SFCC) (2007). Salmonid Fish Habitat.

The Southern Regional Assembly (2018). Draft Regional Spatial & Economic Strategy (RSES) for the Southern Region

The Southern Regional Assembly (2018). Draft Cork Metropolitan Area Strategic Plan (MASP) *in.* (2018). Draft Regional Spatial & Economic Strategy (RSES) for the Southern Region

The Southern Regional Assembly (2018). Draft Limerick- Shannon Metropolitan Area Strategic Plan (MASP) *in.* (2018). Draft Regional Spatial & Economic Strategy (RSES) for the Southern Region

South-West Regional Authority (2010). South-West Regional Planning Guidelines 2010-2022

Mind-West Regional Authority (2010). Mid-West Regional Planning Guidelines 2010-2022

(TII) (formerly NRA) (2014). The Good Practice for the Treatment of Noise during the Planning of National Road Schemes

Transport Infrastructure Ireland (TII) (2017a). The Management of Waste from National Road Construction Projects

Transport Infrastructure Ireland (2017b). Geometric Design of Junctions

UK Department for Environment, Food & Rural Affairs (UK DEFRA) (20016a). Part IV of the Environment Act 1995: Local Air Quality Management, LAQM.TG(16)

UK Department of Transport (1988). Calculation of Road Traffic Noise

UK Department of Transport (1993). Design Manual for Roads and Bridges (DMRB). Volume II Environmental Assessment

UK Department of Transport (1995). Calculation of Railway Noise

UK Highways Agency (2007). Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1 - HA207/07 (Document & Calculation Spreadsheet)

World Health Organisation (WHO) (1999). Guidelines for Community Noise

World Health Organisation (WHO) (2005). Air Quality Guidelines – Global Update 2005

World Health Organisation (WHO) (2009). Night Noise Guidelines for Europe

World Health Organisation (WHO) (2018). Environmental Noise Guidelines for the European Region.

Directives and Legislation

Air Pollution Act 1987 – No. 6 of 1987

Air Quality Standards Regulations 2002 - S.I No. 271 of 2002

Air Quality Standards Regulations 2011 -- S.I. No. 180 of 2011

Chemical Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 – S.I. No. 209 of 2015

Update to Environmental Impact Assessment Screening & Scoping Report

Climate Action and Low Carbon Development Act 2015 – No. 46 of 2015

Environmental Noise Regulations 2006 S.I. No. 140 of 2006

European Communities (Assessment and Management of Flood Risks) Regulations 2010 – S.I. No. 122 of 2010

European Communities (Birds and Natural Habitats) Regulations 2011 - S.I. No. 477 of 2011

European Communities (Drinking Water) (No. 2) Regulations 2007 - S.I. No. 278 of 2007

European Communities (Quality of Salmonid Waters) Regulations 1988 - S.I. No. 293 of 1988

European Communities Environmental (Quality of Surface Water Intended for Human Consumption) Regulations 1984 as amended. S.I. No. 81 of 1988,

European Communities (Water Policy) Regulations 2003 - S.I. No. 722 of 2003

European Communities Environmental Objectives (Surface Waters) Regulations 2009 - S.I. No. 272 of 2009

European Union (1992). Directive (92/43/EEC) of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive)

European Union (2000). Directive (2000/60/EC) of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (Water Framework Directive)

European Union (2001). Directive (2001/42/EC) of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment (EIA SEA Directive)

European Union (2007). Directive (2007/60/EC) of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks

European Union (2008). Directive (2008/98/EC) of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (Waste Framework Directive)

European Union (2009). Directive (2009/147/EC) of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (Birds Directive)

European Union (2014). (Water Policy) Regulations S.I. No. 350 of 2014

European Union (2014). Directive (2014/52/EU) of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (EIA Directive)

European Union (2018) (Planning and Development) (Environmental Impact Assessment) Regulations 2018 - S.I. No. 296 of 2018.

Flora (Protection) Order 2015 - S.I. No. 356 of 2015

Planning and Development Act 2000 (as amended)

Planning and Development (Amendment) Act 2017 – No. 20 of 2017

Update to Environmental Impact Assessment Screening & Scoping Report

Planning and Development Regulations 2001 (as amended) – S.I. No. 600 of 2001 (as amended)

Transport (Railway Infrastructure) Act 2001 (as amended)

Transport Act, 1950 (as amended)

Waste Management Act 1996 (as amended) – No. 10 of 1996

Wildlife Act 1976 (as amended) – No. 39 of 1976

Appendix C. Policy

C1. National, Regional and Local legislation, Policies and Transport Programmes

This section provides a high-level assessment of supporting national, regional and local legislation and policies for the project. The National Development Plan and other policy documents highlighted below demonstrate the Government's commitment to support investment in gaining the sort of service and journey time efficiencies within the rail network that the de-manning of the seven level crossings will deliver.

C1.1 Legislation & Guidance

The assessment of environmental impacts has been completed in accordance with, but not limited to, the following legislation and guidance:

- Planning and Development Act 2000 - 2018;
- Planning and Development Regulations 2001 - 2019;
- Transport (Railway Infrastructure) Act 2001, as amended;
- S.I. 296 of 2018 European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018;
- Directive 2014/52/EC amending Directive 2011/92/EU on the Assessment of the Effects of Certain Public and Private Projects on the Environment;
- Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (European Commission (EC) 1999);
- Guidance on Scoping (EC 2017b);
- Guidance on the EIA Report (EC 2017c);
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (EC 2013);
- The Planning Inspectorate, Advice Note Seventeen; Cumulative Effects Assessment Relevant to Nationally Significant Infrastructure Projects (December 2015);
- Guidelines on the information to be contained in Environmental Impact Statements (EPA 2002);
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EIS) (EPA 2003) and draft revised notes (September 2015) (EPA 2015); and
- Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA 2017).

Key documents that inform the examination of all environmental areas include:

- Project Ireland 2040: National Planning Framework;
- National Development Plan 2018 – 2027;
- National Mitigation Plan (2017);
- 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; and
- Relevant Local Area Plans.

Relevant Iarnród Éireann and railway infrastructure plans, and strategies include:

- 2030 Rail Network Strategy Review;
- Draft Cork Metropolitan Area Transport Strategy (CMATS) 2040;
- Building on Recovery: Infrastructure and Capital Investment 2016 – 2021;
- Rail Review: 2016 Report;
- Iarnród Éireann Safety Report 2017;
- Commission for Railway Regulation (CRR) in the Statement of Strategy 2018 – 2020; and
- Smarter Travel: A Sustainable Transport Future: Anew Transport Strategy for Ireland 2009 -2020.

C1.2 National Planning Policy Context

C1.2.1 Project Ireland 2040: National Planning Framework (NPF)

The NPF is the overarching national spatial policy and planning framework for social, economic and cultural development, and was formally adopted on the 29th May 2018. The NPF outlines broader policy principles and priorities to plan, in a more strategic, sustainable and coordinated manner, for future population and economic growth over the next 20 years.

The NPF vision highlights ‘*Enhanced Regional Accessibility*’, ‘*Strengthened Rural Economies and Communities*’ and ‘*Sustainable Mobility*’ as three of the 10 National Strategic Outcomes (NSO2, NSO3 and NSO4) (p.14);

- **NSO 2- Enhanced Regional Accessibility:** Increased accessibility between key urban population centres and their regions, ensuring they have a high degree of accessibility to Dublin and to each other. The proposed Project will contribute to the delivery of this NSO by delivering efficiencies in the transport network, thereby improving accessibility between Limerick, Cork and Dublin.
- **NSO 3- Strengthened Rural Economies and Communities:** Improved connectivity is highlighted as a pillar for strengthening rural economies and communities by ensuring the countryside remains and improves as a living and working community. The removal of the seven manned crossings will contribute towards achieving this by improving overall permeability throughout the countryside, providing better through-access for local road users.
- **NSO 4- Sustainable Mobility:** As Ireland moves towards the introduction of electric and hybrid traction systems for public transport fleets, it is considered essential to ensure that the long-term effective operation of such vehicles is facilitated through the optimisation of the existing rail network. The proposed Project removes line-speed bottlenecks in the effective operation of the rail network and provides an element of ‘future-proofing’, contributing towards achieving this aim. NSO 4 also notes the potential to develop ‘*the existing good quality rail links between Dublin and Belfast and Cork into an island rail spine through line speed and service enhancements*’. (P.142)

The NPF targets 50% growth within five key cities including Cork and Limerick. In regard to the Southern Region eight key policy priorities are outlined which range from enhancing the efficiency and effectiveness of transport links between cities and ongoing investment in transport.

Specifically, in regard to Cork a key ‘*future growth enabler*’ includes ‘*Improved rail journey times to Dublin and consideration of improved onward direct network connections.*’ (NPF, P.49)

In regard to Limerick the key future growth enablers include among others enhanced regional connectivity and development of public transport and infrastructure.

C1.2.2 National Development Plan (NDP) 2018 – 2027

The National Development Plan (NDP) is a detailed capital investment plan which aims to drive the country’s long-term economic, environmental and social progress over the next decade, and is integrated and aligned with the NPF and its objectives. It identifies the strategic important priorities and seeks to invest €116 billion over a ten-year period for public capital investment that will underpin the successful implementation of the NPF.

The review of the 2015 capital plan identified transport as a priority area, with the maintenance/upgrade of public transport being cited as necessary to, *'protect asset quality and value, meet demand forecast, ease congestion and to meet climate action objectives'* (NDP, p.14) The document also aligns with the ten NPF National Strategic Outcomes through specific investment priorities relating to each. A significant priority will be to maintain the existing network of road, rail and bus infrastructure to ensure acceptable levels of service to transport users given several years of under-investment. Funding for the inter-urban network linkages between Belfast, Dublin and Cork are a particular priority (NDP, p.41) and the Dublin–Limerick Junction/Cork rail lines will be subject to an examination to move to higher speeds leading to improved connectivity to regional cities through improved rail journey times.

C1.2.3 National Mitigation Plan (2017)

Published in 2017 by the Department of Communications, Climate Action and Environment the National mitigation Plan aims to set out a pathway to achieve decarbonisation of the economy to the level required by the Climate Action and Low Carbon Development Act (S.I. No.46 of 2015). The National Mitigation Plan contains measures to cover short-term goals to 2020, as well as beginning the process of developing medium and longer term options for addressing the climate change challenge. Chapter 5 of the National Mitigation Plan includes decarbonisation of transport, with Mitigation Measure T1; Public Transport Investment stating that investment in high quality public transport allow a modal shift and reduction in emissions (NMP, p.102). The eventual electrification of the Dublin-Cork Railway Line will help to meet this goal and the proposed Project is an ancillary part of that objective.

C1.3 Regional Planning Policy Context

The following are regional level planning policy documents which are of relevance to the proposed Project.

C1.3.1 Draft Regional Spatial & Economic Strategy (RSES) for the Southern Region

Three new Regional Assemblies came into effect on 1st January 2015; the Southern Regional Assembly, the Eastern and Midland Regional Assembly and the Northern and Western Regional Assembly. The Southern Regional Assembly has prepared a draft RSES for the Southern Region for the period 2019-2031. The RSES is at material amendments stage with adoption of the strategy expected in the fourth quarter of 2019.

The RSES supports the implementation of the NPF, it provides key principles for environmental, economic and social of the region resulting in Regional Planning Objectives (RPO). In regard to rail infrastructure it sets out *'The management, maintenance and improvement of the regions transport infrastructure is a key consideration to ensure that the safety, capacity and efficiency of the networks are maintained and factored into the capital funding process.'* (P.162). In addition to the above, RPO 162 outlines the following objective: *'To strengthen investment in the maintenance, improvement and strengthening of rail networks in the region...'* (RSES, p.162) This includes wide ranging investment priorities from rail network optimisation to improving journey times to modernisation of infrastructure.

RPO 151 (Steady State Investment) includes the objective: *'To strengthen Steady State Investment in our existing regional transport networks to ensure that existing networks are maintained to a high level to ensure quality levels of safety, service, accessibility and connectivity to transport users.'* (RSES, P.152).

In regard to the Role of Transport in the Southern Region, it outlines principles to inform the integration of land use and transport planning over the period of the RSES. This includes (inter alia):

- *'The strategic capacity and safety of the regions transport network should be protected';* and
- *'The safe travel requirements of all people irrespective of age or mobility should be met.'* (RSES, P.142)

The strategy aims to encourage improved connectivity, RPO 162 highlights the need to move the Dublin-Limerick Junction/Cork rail lines to higher speeds to improve connectivity to regional cities through improved rail journey times (RSES, p.163).

C1.3.2 South-West and Mid-West Regional Planning Guidelines (RPG) 2010 – 2022

The Regional Planning Guidelines were adopted in 2010, with the Mid-West RPG covering the counties Limerick, Clare and the northern part of Co. Tipperary and the South-West RPG covering Cork and Kerry. The RPG set out

recommendations to local authorities linked to national investment priorities. The RPGs generally support investment in public transport and improvement of mainline rail journey times.

The Mid-West RPG cites the need to improve rail linkages, particularly with regard to the Limerick to Cork section on the Dublin-Cork line. The South-West RPG emphasises the importance of continuing investment in the upgrade of railway tracks and infrastructure to improve mainline rail journey times and to compete with private cars.

Regional authorities were dissolved in 2014 with the formation of the Southern Regional Assembly, however the guidelines remain extant until the Regional Spatial & Economic Strategy (RSES) for the Southern Region comes into force.

C1.3.3 Draft Cork Metropolitan Area Strategic Plan (MASP)

The NPF requires that Metropolitan Area Spatial Plans (MASPs) be prepared for Dublin and Cork and their wider city regions, as well as the Limerick, Galway and Waterford Metropolitan areas. MASPs are high level strategic visions which identify priorities for the delivery of growth. The 2018 draft RSES for the Southern Region contains a draft MASP for the Cork and Limerick-Shannon metropolitan areas.

In line with the NPF, improved rail journey times to Dublin and consideration of improved onward direct network connections are identified as a key enabler for Cork. Cork MASP Policy Objective 8 states that a key strategic priority will be *'to enhance the commuter rail service by, inter alia, 'improving intercity journey times and the electrification of the fleet'* (RSES, p.225).

C1.3.4 Draft Limerick Shannon Metropolitan Area Strategic Plan (MASP)

The Draft Limerick MASP identifies the development and promotion of existing intercity rail and commuter links from Limerick to Dublin, Cork and Galway as a key sustainable transport objective under Policy Objective 6 (RSES, p.263).

C1.4 Local Planning Policy Context

C1.4.1 Cork County Development Plan (CCDP) 2014

The CCDP was published by Cork County Council (CCC) and was adopted in December 2014, coming into effect on 15th January 2015. It sets out the Council's planning and sustainable development strategy and associated planning policies for Cork County.

CCDP Objective TM 2-5 (Rail Transport) sets out that: *'The County Council will support and prioritise the following key rail transport initiatives (inter alia):*

- a) *Encourage the enhance of service provision in tandem with planned population and employment growth;*
- b) *Encourage greater use of the suburban rail network; support other agencies in delivering an appropriate integrated land-use and transportation framework in the hinterland of rail stations in the Cork City area including park and ride facilities.'* (CCDP, p.156)

C1.4.2 Limerick County Development Plan (LCDP) 2010-2016

The LCDP came into effect in 2010 with the stated aim of setting out a framework for the proper planning and sustainable development of the County.

Policy IN P6 (Protection of public transport assets and facilitation of public transport) states, *'It is Council policy to protect strategic public transport assets; to facilitate accessibility by public transport in development layouts; and to support the enhancement of public transport infrastructure and use through initiatives such as park and ride.'* (LDCP, p. 8-7).

Objective IN O5 (Protection of Rail Infrastructure) sets out a commitment to protect rail infrastructure within the county from inappropriate development that would, *'compromise their safe operation or long-term development'* (LDCP, p. 8-8).

Objective IN 06 (Improvement of Rail Infrastructure) outlines that it is an objective of the Council to, *'where feasible, work with Iarnród Éireann to promote improvements to extend the reach of passenger and commuter train services to more areas within the County and outlines three priorities involving railway infrastructure enhancement.'* (LDCP, p. 8-9).

C1.5 Iarnród Éireann & Other Strategies/Reports

C1.5.1 2030 Rail Network Strategy Review

In 2011, Iarnród Éireann conducted a review of future development requirements of the Iarnród Éireann InterCity Network (ICN) and regional services. It sets out a broad strategic goal for the rail network, as follows: *'To provide safe, accessible and integrated rail services that contribute to sustainable economic and regional development in an efficient manner.'* (RNSR, p.IX)

The review states that the Dublin-Cork corridor is the *'dominant corridor on the rail network'* and this is due to the *'significant level of inter-city movements.'* (RNSR, p.IX)

The document further outlines under the heading *'rehabilitation of infrastructure and other key investments'* (RNSR, p. 31) that major rehabilitation works have been carried out and the closure or upgrading of level crossings has formed an important part of the investment programme.

With regard to the Dublin-Cork line, the document states that *'a total of €232m will need to be spent on the Cork line over the next 20years with a €23m required after this period.'* (RNSR, p.194)

Section 12.4.2 (Structures and Level Crossings) sets out that *'Level crossings represent the single biggest rail safety risk. They also impact on journey times. Recent investment has seen a reduction in the number of level crossings from 2,000 to 1,100. Continuous investment is required to manage the safety risk associated with these assets and to provide more competitive journey times.'* It goes on to further state: *'It is envisaged that expenditure on level crossing of €10m per annum for the next ten years will be required, with €5m thereafter, giving a total of €150m over twenty years, rising to €180m when overheads are included.'* (RNSR, p.192)

C1.5.2 Draft Cork Metropolitan Area Transport Strategy (CMATS) 2040

The National Transport Authority (NTA) produced the draft CMATS in 2019 and it is currently under public consultation.

Dublin-Cork is highlighted as being the top performing InterCity line in the country for passenger numbers (CMATS, p.63). The strategy reiterates the proposed improvements in the National Development Plan (NDP) and Rail Review Report, including improvements in journey times and investment in high-speed rail, electrification and improving the journey time between Dublin and Cork to 2 hours. Building on Recovery: Infrastructure and Capital Investment 2016-2021.

This Capital Plan presents the Government's €42b framework for infrastructure investment in Ireland over the period 2016-2021, with such investment being identified as an important enabler of economic growth. The plan highlights the importance of transport in driving the economy, It sets out that, *'It is therefore essential that road, rail and public transport networks are developed and maintained to the standard required to ensure the safe and efficient movement of people and freight.'* (CMATS p.22)

C1.5.3 Iarnród Éireann Rail Review: 2016 Report

The 2016 Rail Review Report examined the network in terms of meeting travel demand and environmental objectives as well as operational funding for the existing network. A passenger demand and elasticity analysis indicated that improving Dublin-Cork journey time to at least 2 hours would significantly strengthen rail as a travel option and improve consistency and transparency. The report also states that for a relatively small investment, journey time gains can easily be delivered in the short term.

C1.5.4 Commission for Railway Regulation (CRR) Statement of Strategy 2018 – 2020

The Commission for Railway Regulation (CRR) was established in January 2006. The CRR is the National Safety Authority (NSA) for the railway sector in Ireland. It is an independent regulatory agency with oversight of the safety of all heavy and light rail organisations. The Statement of Strategy sets out the mandate, mission, vision and key priorities of the CRR to the end of 2020.

C1.5.5 Draft Integrated Implementation Plan 2019-2024

The National Transport Authority (NTA) published the Draft Integrated Implementation Plan in December 2018. This sets out an infrastructure investment programme as well as key objectives and outputs to be pursued by the NTA over the period of the plan. This includes important objectives such as the continued investment in the closure of level crossings.

C1.5.6 Smarter Travel, A Sustainable Transport Future: A New Transport Strategy for Ireland 2009-2020

The 2009 Smarter Travel strategy document by the then Department of Transport, currently Department of Transport, Tourism and Sport (DTTAS), sets out 49 actions to be taken with the aim of achieving sustainable transport in Ireland. These 49 actions are split into four overarching goals, two of which are aimed at providing alternatives to the private car through public transport and improving fuel efficiency in the current fleet (Smarter Travel, p.13).

Chapter 8 - Population & Human Health - Legislation, Policy and Guidelines

- 'European Union (planning and development) (Environmental Impact assessment) Regulations 2018' (S.I. no. 296 of 2018);
- 'Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development, Ireland' (2019);
- Cork County Development Plan 2014;
- Cork 2050 – Delivering a Bright Future for Cork (CCC);
- Limerick County Development Plan 2010 to 2016; and
- Limerick 2030 – An Economic and Spatial Plan for Limerick.

C1.6.1 Guidelines

The method to be applied for the amenity assessment draws upon existing sector-specific guidelines, relevant planning policy, and existing industry best practice, including examples from other nationally significant infrastructure projects, as well as available literature on ex-post (after the event) effects.

The method for the wider effects' assessment will be informed by the following documents (a number of which are guidance for roads, the principles of which can will be applied to this site specific and linear project):

- Guidelines on Information to be Contained in Environmental Impact assessment Reports (Draft), EPA, August 2017;
- Guidelines and Principles for Social Impact Assessment (*Environmental Impact Assessment Review* 15.1 (1995));
- Health Impact Assessment in EIA (UK), (IEMA, 2018); and
- Design Manual for Roads and bridges Volume 11 (UK) (1993).

Chapter 9 - Biodiversity - Legislation, Policy and Guidelines

- The Habitats Directive 92/43/EEC;

- The Birds Directive 2009/147/EC;
- The Water Framework Directive 2000/60/EC;
- The EIA Directive (2014/52/EU);
- Environmental Liabilities Directive (2004/35/EC);
- European Communities (Birds and Natural Habitats) Regulations 2011 S.I. 477 of 2011;
- The Wildlife Act 1976 as amended by the Wildlife (Amendment) Act, 2000 (as amended);
- The Flora (Protection) Order 2015 S.I 356 of 2015;
- Relevant fisheries legislation up to and including the Inland Fisheries Acts 1959 - 2010, as amended;
- Objectives relevant to ecology and biodiversity in the Cork County Development Plan 2014 – 2020 published in 2015;
- Bird species of medium and high conservation concern listed in the publication Birds of Conservation Concern in Ireland 2014 – 2019; and
- National Biodiversity Plan 2017-2021 produced by the Department of Culture, Heritage and the Gaeltacht.

C1.7.1 Guidelines

Surveys will have regard for best practice guidelines including but not limited to:

- Collins. (2016). Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition). Bat Conservation Trust, London;
- Fossitt, J. (2000). Guide to Habitats in Ireland. The Heritage Council;
- Hundt, L. (2012). Bat Surveys: Good Practice Guidelines, 2nd edition;
- National Roads Authority (2009). Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. National Roads Authority; and
- Scottish Fisheries Co-ordination Centre (SFCC) (2007). Salmonid Fish Habitat. Available at <http://www.sfcc.co.uk/resources/habitat-surveying.html>.

For the other sites, the methodology used to assess and mitigate potential impacts to biodiversity will be based on established best practice and as per the following guidelines:

- The Chartered Institute of Ecology and Environmental Management's (CIEEM) 2018 Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal and Marine; and
- The National Roads Authority (NRA) 2009a Guidelines for Assessment of Ecological Impacts of National Road Schemes.

In summary, in accordance with the 2018 CIEEM guidance, impacts will only be assessed for '*important ecological features*' (i.e. habitats, species or ecosystems,) that may be affected, with reference to a geographical context in which they are considered important. The identification of such features will be informed by the NRA's 2009 guidance, which identifies features warranting impact assessment as those '*both of sufficient value to be material in decision making [i.e. local value or higher], and likely to be affected significantly*'.

C1.8 Chapter 10 - Soils, Geology & Hydrogeology - Legislation, Policy and Guidelines

- CIRIA 5522: Contaminated Land Risk Assessment – A guide to good practice (CIRIA 2001).

C1.9 Chapter 11 - Water - Legislation, Policy and Guidelines

- EU Water Framework Directive (WFD) (2000/60/EC);
- S.I. No. 722 of 2003, European Communities (Water Policy) Regulations, as amended;
- S.I. No. 792 of 2009, European Communities Environmental Objective (Surface Water) Regulations 2009 as amended;
- S.I. No. 350 of 2014, European Union (Water Policy) Regulations 2014;
- The EU Floods Directive 2007/60/EC;
- S.I. No. 122 of 2010 European Communities (Assessment and Management of Flood Risks) Regulations; and
- S.I. No. 81 of 1988, European Community Environmental (Quality of Surface Water Intended for Human Consumption) Regulations 1984 as amended.

C1.9.1 Policy

- Cork County Development Plan 2014;
- Limerick County Development Plan 2010 – 20161;
- River Basin Management Plan 2018-2021; and
- The Shannon RBMP 2009-2015, the South Eastern RBMP 2009-2015, and the Eastern RBMP 2009-2015 and their associated Water Management Unit Action Plans (various).

C1.9.2 Guidelines

- Guidelines on Procedures for Assessment and treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (TII (then NRA), 2009b)² (TII Guidelines); and

Guidelines on the information to be contained in environmental impact statements. Draft (EPA, 2017).

C1.10 Chapter 12 - Air Quality - Legislation, Policy and Guidelines

- Air Quality in Ireland Report 2017
- National Roads Authority (NRA) Guidelines for the Treatment of Air Quality During the Planning and Construction of National Roads Schemes (NRA (now Transport Infrastructure Ireland (TII)), 2011)
- UK Institute of Air Quality Management (IAQM) guidance on the assessment of dust from demolition and construction (IAQM, 2016)
- UK Design Manual for Roads and Bridges (DMRB) Volume 11 Section 3 Part 1 HA207/07 Air Quality (DMRB HA207/07) (2007)
- UK Department for Environment, Food and Rural Affairs (Defra) Local Air Quality Management Technical Guidance (LAQM.TG(16)) (Defra, 2018)
- Air Quality Standards Regulations 2011

¹ https://www.limerick.ie/sites/default/files/media/documents/2018-04/Limerick%20County%20Development%20Plan%202010-2016%20%28with%20variation%201-3%2C%205%266%29_0.pdf

² The TII Guidelines' have been used to inform the scoping of this assessment; in the absence of specific guidance in relation to the assessment of the effects of railway projects on hydrology, the TII Guidance for roads schemes is considered to be a suitable alternative.

C1.11 Chapter 13 - Noise & Vibration – Legislation, Policy and Guidelines

- National Roads Authority Guidelines for the Treatment of Noise and Vibration in National Roads Schemes (TII (formerly NRA) 2004);
- Good Practice for the Treatment of Noise during the Planning of National Road Schemes (TII (formerly NRA) 2014);
- ISO 1996-1:2016: Acoustics – Description, Measurement and Assessment of Environmental Noise – Part 1: Basic Quantities and Assessment Procedures;
- BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Noise (BSI, 2018a);
- BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Vibration (BSI, 2018b);
- Calculation of Road Traffic Noise (CRTN). London: Her Majesty's Stationery Office (Department for Transport and the Welsh Office 1988);
- Environmental Noise Regulations 2006 (S.I. No. 1401 of 2006); and
- Environmental Noise Guidance for Local Authority Planning & Enforcement Departments. Association of Acoustic Consultants of Ireland June 2019

Where relevant, the guidance in the National Roads Authority Guidelines for the Treatment of Noise and Vibration in National Roads Schemes (TII (formerly NRA) 2004) and the Good Practice for the Treatment of Noise during the Planning of National Road Schemes (TII (formerly NRA) 2014) shall be used for the assessment of road traffic noise impacts.

C1.12 Chapter 14 - Traffic & Transport - Legislation, Policy and Guidelines

- Institute of Highways and Transportation (IHT) '*Guidelines for Traffic Impact Assessment*' (1994); and
- the Institution of Environmental Management and Assessment's (IEMA) '*Guidelines for the Environmental Assessment of Road Traffic*' (2005).

The impact of any increases in traffic flows associated with the proposed Project construction activities will be assessed in relation to the thresholds provided within the Institute of Environmental Management and Assessment (2005) Guidelines for the Environmental Assessment of Road Traffic. Two broad principles outlined within the IEMA guidelines are advised for use as a screening process to limit the scale and extent of the assessment. These are to:

- '*include highway links where traffic flows will increase by more than 30% (or the number of heavy goods vehicles will increase by more than 30%)*'; and
- '*include any other specifically sensitive areas where traffic flows will increase by 10% or more.*'

C1.13 Chapter 16 - Landscape - Legislation, Policy and Guidelines

- Environmental Protection Agency (EPA) Guidelines on the Information to be contained in the Environmental Impact Statement (EPA, 2002) and will follow all future revisions or finalised EIA guidelines as appropriate (draft published in 2017);
- EPA Advice notes on current practice in the preparation of Environmental Impact Statements (EPA, 2003) and will follow all future revisions or finalised EIA guidelines as appropriate (draft published in 2015); and
- Landscape Institute and the Institute of Environmental Management and Assessment publication entitled Guidelines for Landscape and Visual Impact Assessment (GLVIA-2013).

Appendix D. EIA Method

D1.1 Methodology

D1.1.1 Generic EIA Method and Approach

Each environmental topic has its own bespoke method for assessment, in accordance with published professional guidelines, details of which are provided within each Topic Chapter. Generic methods for EIA will also apply and the assessments will be conducted in accordance with the following EPA Guidance:

- Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA 2017c); and
- Draft Advice Notes for Preparing Environmental Impact Statements (EPA 2015).

In addition to the applicable EIA legislation and guidance, all EU Directives and national legislation relating to the specialist areas will also be considered as part of the process.

The purpose of the EIAR is to describe *'likely significant effects on the (environmental) factors'*. This description needs to cover *'direct effects, and any indirect, secondary, cumulative, transboundary, short-term, medium term and long term, permanent and temporary positive and negative effects of the proposed Project'* (S.I. no. 296 of 2018, Schedule 6).

The significance attributed to impacts (or effects) is generally understood to mean the importance of the consequence of the change to the baseline condition. Professional judgement by competent experts, as well as professional guidelines, has a role in determining significance. The EPA Guidelines (EPA 2017c) provides guidance on determining significance. This is reproduced in Table D1.1 and will form the basis of all topic assessments in the EIAR.

Table D1.1: Reproduction of Table 3.3 Description of Effects from the Draft EPA Guidelines (EPA 2017c)

Assessment Criteria	
Quality of Effects	
It is important to inform the non-specialist reader whether the effect is positive, negative or neutral.	<ul style="list-style-type: none"> • Positive Effects A change which improves the quality of the environment (for example, by increasing species diversity or improving the reproductive capacity of an ecosystem; or removing nuisances; or improving amenities)
	<ul style="list-style-type: none"> • Neutral Effects A change which does not affect the quality of the environment
	<ul style="list-style-type: none"> • Negative / Adverse Effects A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing a nuisance)
Significance of Effects	
'Significance' is a concept that can have different meanings for different topics – in the absence of specific definitions for the different topics the following definitions may be useful.	<ul style="list-style-type: none"> • Imperceptible An effect capable of measurement but without noticeable consequences
	<ul style="list-style-type: none"> • Not significant An effect which causes noticeable changes in the character of the environment but without noticeable consequences
	<ul style="list-style-type: none"> • Slight Effects An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
	<ul style="list-style-type: none"> • Moderate Effects An effect that alters the character of the environment in a manner that is consistent with existing and emerging trends
	<ul style="list-style-type: none"> • Significant Effects An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
	<ul style="list-style-type: none"> • Very Significant Effects An effect which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the environment
	<ul style="list-style-type: none"> • Profound Effects An effect which obliterates sensitive characteristics
Extent and Context of Effects	
Context can affect the perception of significance. It is important to establish if the effect is unique or, perhaps, commonly or increasingly experienced.	<ul style="list-style-type: none"> • Extent Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.
	<ul style="list-style-type: none"> • Context Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)
Probability of Effects	
Descriptions of effects should establish how likely it is that the predicted effects will occur – so that the CA can take a view of the balance of risk over advantage when making a decision.	<ul style="list-style-type: none"> • Likely Effects The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
	<ul style="list-style-type: none"> • Unlikely Effects The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Duration and Frequency of Effects	
'Duration' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful.	<ul style="list-style-type: none"> • Momentary Effects Effects lasting from seconds to minutes
	<ul style="list-style-type: none"> • Brief Effects Effects lasting less than a day
	<ul style="list-style-type: none"> • Temporary Effects Effects lasting less than a year
	<ul style="list-style-type: none"> • Short-term Effects Effects lasting one to seven years
	<ul style="list-style-type: none"> • Medium-term Effects Effects lasting seven to fifteen years
	<ul style="list-style-type: none"> • Long-term Effects Effects lasting fifteen to sixty years
	<ul style="list-style-type: none"> • Permanent Effects Effects lasting over sixty years
	<ul style="list-style-type: none"> • Reversible Effects Effects that can be undone, for example through remediation or restoration

In addition to the use of these criteria, the most common method employed to determine significance of effects is to compare the magnitude of the predicted effect with the sensitivity of the receiving environment. In this approach 'magnitude' and 'sensitivity' are used as descriptors of a wide range of different factors. 'Magnitude' includes the

spatial extent of the effect; the time period over which the effect will occur; and whether the effect is permanent or reversible. Sensitivity describes the value or importance placed upon a 'receptor'. The matrix shown in Table D1.2 is provided in the EPA Guidance (2017) as a method of combining magnitude and sensitivity to achieve a decision on significance. The use of these approaches improves the transparency and robustness of the professional judgement employed.

Table D1.2 Significance Matrix

		Magnitude of Impact			
		Negligible	Low	Medium	High
Sensitivity of Receptor	Extremely High	Not significant	Significant	Very significant	Profound
	Very High	Not significant	Moderate	Very Significant	Profound
	High	Not significant	Moderate	Significant	Very Significant
	Medium	Not significant	Slight	Moderate	Significant
	Low	Imperceptible	Slight	Slight	Moderate