



## Chapter 21

# Summary of Mitigation and Monitoring

## Contents

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<b>21.</b>	<b>Summary of Mitigation and Monitoring Measures</b>	<b>1</b>
21.1	Introduction	1
21.2	Summary of Mitigation and Monitoring Measures	1
21.3	General Mitigation Requirements	2
21.4	Traffic and Transportation	2
21.5	Landscape and Visual	3
21.6	Biodiversity	5
21.7	Noise and Vibration	12
21.8	Air Quality	13
21.9	Climate	14
21.10	Archaeology, Architectural and Cultural Heritage	15
21.11	Population and Human Health	15
21.12	Resources and Waste	15
21.13	Water	17
21.14	Land, Soils, Geology and Hydrogeology	19
21.15	Material Assets	22
21.16	Major Accidents and Natural Disasters	23
21.17	Cumulative and Interactive Impacts	23
21.18	References	24

## Tables

Table 21.1:	General mitigation measures	2
Table 21.2:	Traffic and Transportation mitigation and monitoring measures	2
Table 21.3:	Landscape and Visual mitigation and monitoring measures	3
Table 21.4:	Biodiversity mitigation and monitoring measures	5
Table 21.5:	Noise and Vibration mitigation and monitoring measures	12
Table 21.6:	Air Quality mitigation and monitoring measures	13
Table 21.7:	Climate mitigation and monitoring measures	14
Table 21.8:	Archaeology, Architectural and Cultural Heritage mitigation and monitoring measures	15
Table 21.9:	Population and Human Health mitigation and monitoring measures	15
Table 21.10:	Resources and Waste mitigation and monitoring measures	15
Table 21.11:	Water mitigation and monitoring measures	17
Table 21.12:	Land, Soils Geology and Hydrogeology mitigation and monitoring measures	19
Table 21.13:	Material Assets mitigation and monitoring measures	22
Table 21.14:	Major Accidents and Natural Disasters mitigation and monitoring measures	23
Table 21.15:	Cumulative and Interactive Impacts mitigation and monitoring measures	23

# 21. Summary of Mitigation and Monitoring Measures

## 21.1 Introduction

This chapter provides a summary of the proposed mitigation and monitoring measures associated with the Proposed Development during the Construction, Operational and Decommissioning Phases (as identified in **Chapters 7 to 20**).

The mitigation measures that have been established to minimise any likely significant negative effects arising from the Proposed Development during the Construction, Operational and Decommissioning Phases are summarised in **Section 21.2**, along with any planned monitoring measures, where required.

## 21.2 Summary of Mitigation and Monitoring Measures

Mitigation and monitoring measures have been identified as environmental commitments and overarching requirements which shall avoid, reduce or offset potential impacts.

A number of safeguards and management measures have been identified in order to mitigate negative environmental effects during the Construction, Operational and Decommissioning Phases as described in detail in **Chapters 7 to 20**. It should be noted that these generally exclude any inherent measures and elements that have been incorporated in the design as these design measures have been documented as part of **Chapter 4, Description of the Proposed Development**.

The following tables summarise the Construction, Operational and Decommissioning Phase mitigation outlined in the relevant EIAR technical assessments but should be read in conjunction with the mitigation outlined in the specific chapter and also with the Construction Environmental Management Plan (CEMP) which is included as **Appendix 5.1** in **Volume 4** of this EIAR (note that the CEMP summarises the Construction Phase mitigation only).

Where appropriate, the location to which the mitigation relates to is identified and where the mitigation measure is relevant to the entirety of the Proposed Development, the location is given as ‘throughout (as required)’.

## 21.3 General Mitigation Requirements

Table 21.1: General mitigation measures

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
GEN1	5.11	Throughout (as required)	The mitigation measures appropriate to the construction contract summarised in this chapter have been included in the Construction Environmental Management Plan (CEMP) (refer to <b>Appendix 5.1</b> in <b>Volume 4</b> of this EIAR).	<b>Construction</b>

## 21.4 Traffic and Transportation

Table 21.2: Traffic and Transportation mitigation and monitoring measures

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
TT1	7.5.1	N25 junction 2 eastbound	Overnight traffic management on N25 junction 2 eastbound off ramp slip lane to allow site clearance.	<b>Construction</b>
TT2	7.5.1	N25 junction 2 eastbound	Blocking a small area of only one lane on the eastbound off ramp for access for construction of the N25 span northern abutment for 6-10 weeks.	<b>Construction</b>
TT3	7.5.1	N25 junction 2 eastbound	Overnight land closures and traffic management on N25 junction 2 eastbound off ramp slip lanes and adjacent traffic lanes to facilitate erection of south span of the precast concrete portal frame structure over Irish Rail land. It is expected a single eastbound lane can remain open.	<b>Construction</b>
TT4	7.5.1	N25	Overnight / weekend closure of the N25 to allow for steelwork erection of the N25 span.	<b>Construction</b>
TT5	7.5.1	Irish Rail track	Weekend closure of Irish Rail track in agreement with Irish Rail to allow for construction of precast concrete portal frame structures.	<b>Construction</b>
TT6	7.5.1	N25	Providing a temporary bus service covering the same route and stops, in order to reduce the impact of closure of Irish Rail Track on a weekend, in consultation with Irish Rail and Bus Eireann.	<b>Construction</b>
TT7	7.5.1	L3004	A temporary road widening and right turn pocket will be provided along the L3004 Glounthaune Road for right turning construction traffic to / from Construction Compound 1	<b>Construction</b>
TT8	7.5.1	N25	Overnight partial closure of N25 for maintenance repainting of bridge soffit in a sequential fashion for 6-10 nights.	<b>Construction</b>
TT9	7.5.1	Construction compounds	Provision of adequate parking spaces during the Construction Phase in the construction compounds should be ensured.	<b>Construction</b>
TT10	7.5.1	Throughout (as required)	Parking restrictions and management measures at the Radisson Blu Hotel and Eastgate Business Park car parks will be reviewed and implemented as necessary in agreement with the local businesses and	<b>Construction</b>

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
			Cork County Council to ensure that the functioning of the car parks is maintained and to avoid any site parking overspill issues.	
TT11	7.5.1	Throughout (as required)	A Construction Traffic Management Plan (CTMP) will be developed by the contractor when updating the Construction Environmental Management Plan (CEMP) (refer to <b>Appendix 5.1</b> in <b>Volume 4</b> of this EIAR) and presented to Cork County Council for approval prior to commencement of the construction works	<b>Construction</b>
TT12	7.5.4.1	Throughout (as required)	The effectiveness of the CTMP will be continually monitored to ensure that impacts on traffic flows and road users on the surrounding public road network are minimised and additional mitigation measures are introduced, as required. The monitoring regime will consider all modes of traffic, including pedestrians, cyclists and public transport.	<b>Construction</b>

## 21.5 Landscape and Visual

Table 21.3: Landscape and Visual mitigation and monitoring measures

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
LV1	8.5.1	Throughout (as required)	Temporary site hoarding will be erected around areas that adjoin public or private land that may be impacted by the works. This includes the: <ul style="list-style-type: none"> <li>North, east and western site boundary with the L3004 Glounthaune Road, access road to Little Island train station and public green space, respectively; and</li> <li>Boundaries with the existing public car park at East Gate Road and The Radisson Blu Hotel car park.</li> </ul>	<b>Construction</b>
LV2	8.5.1	Throughout (as required)	Additional protective fencing that will be erected at the boundary of proposed works areas to protect retained landscape, planting, features etc. The trees remaining trees along the railway line embankments, N25 road corridor and the woodland block between the N25 and Radisson Blue Hotel will be protected with fencing in accordance with BS5837:2012: Trees in relation to in relation to design, demolition and construction – recommendations (BSI, 2012) and TII's Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, During and Post Construction of National Road Schemes (TII, 2006). All necessary measures will be taken to avoid non-native, invasive species establishing in the area.	<b>Construction</b>
LV3	8.5.1	Throughout (as required)	Site machinery will only operate within the Proposed Development area.	<b>Construction</b>

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
LV4	8.5.1	Throughout (as required)	Storage of materials and temporary stockpiling will only be permitted at the bridge assembly area and construction compounds located at the northern and southern ends of the Proposed Development site.	<b>Construction</b>
LV5	8.5.1	Throughout (as required)	Proposed construction which uses the optimum number and arrangement of pile foundations, support columns and bridge abutments to minimise Construction Phase impacts on the landscape, particularly existing trees and woodland blocks.	<b>Construction</b>
LV6	8.5.1	Throughout (as required)	Location, arrangement and design of construction and assembly zones so that they use existing hard standing areas and / or minimise construction within existing landscape areas which will require removal and subsequent reinstatement as landscape.	<b>Construction</b>
LV7	8.5.1	Throughout (as required)	Design and construction that minimises the requirement for future access under the structure and within woodland / landscape areas, thereby minimising potential disturbance to reinstated landscape areas.	<b>Construction</b>
LV8	8.5.1.2	Throughout (as required)	During the construction works, a professionally qualified Arboriculturist is recommended to be retained by the principal contractor or site manager to monitor and advice on any works within the root protection area (RPA) of retained trees to ensure successful retention and planning compliance.	<b>Construction</b>
LV9	8.5.1.2	Throughout (as required)	Copies of the tree clearance and tree constraints plans and BS 5837:2012: Trees in Relation to Design, Demolition and Construction (BSI, 2012) should be kept available on-site during the construction works. All works are to be in accordance with these documents.	<b>Construction</b>
LV10	8.5.1.2	Throughout (as required)	On the completion of the construction works, all trees vegetation retained is to be reviewed by the project Arboriculturist and any necessary remedial tree surgery works required to promote health and safety are to be implemented.	<b>Construction</b>
LV11	8.5.2	Throughout (as required)	Selection of a route corridor for the proposed bridge and access ramps that minimises the impact on the existing landscape whilst achieving universal access.	<b>Operation</b>
LV12	8.5.2	Throughout (as required)	High quality architectural design of the bridge with a shallow deck and a single span double arch with lattice supports to minimise apparent mass in views towards the structure from east and west.	<b>Operation</b>
LV13	8.5.2	Throughout (as required)	Enhancement of existing landscape within and adjacent the works area to include new tree planting, amenity paths and linkages to active travel and public transport and grassland diversification to enhance the local landscape for nature and amenity for people.	<b>Operation</b>

## 21.6 Biodiversity

Table 21.4: Biodiversity mitigation and monitoring measures

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
BD1	9.5.1.1	Throughout (as required)	All construction staff, including all sub-contracted workers, will be notified of the sensitive nature of onsite habitats, the Kilcoolishal Stream and nearby designated sites and will be made aware that no construction waste of any kind (rubble, soil, etc.) is to be deposited in these protected areas and that care must be taken with liquids or other materials to avoid spillage.	Construction
BD2	9.5.1.1	Throughout (as required)	All personnel involved with the Proposed Development will receive an onsite induction relating to construction and operations and the environmentally sensitive nature of habitats on and adjacent to the Proposed Development site and to re-emphasise the precautions that are required as well as the precautionary measures to be implemented. Site managers, foremen and workforce, including all subcontractors, will be suitably trained in pollution risks and preventative measures.	Construction
BD3	9.5.1.1	Throughout (as required)	All staff and subcontractors have the responsibility to: <ul style="list-style-type: none"> <li>Understand the importance of mitigating pollution onsite, including noise and dust, and how to respond in the event of an incident to avoid or limit environmental impact;</li> <li>Respond in the event of an incident to avoid or limit environmental impact;</li> <li>Report all incidents immediately to the project manager;</li> <li>Monitor the workplace for potential environmental risks and alert the site manager if any are observed; and</li> <li>Co-operate as required, with site inspections.</li> </ul>	Construction
BD4	9.5.1.2	Throughout (as required)	<b><u>Water quality</u></b> A Surface Water Management Plan will be incorporated into the CEMP by the contractor. Specific controls / mitigation measures will be put in place to manage runoff and minimise pollution to receiving waterbodies during the Construction Phase.	Construction
BD5	9.5.1.2	Kilcoolishal Stream	<b><u>Water quality</u></b> <ul style="list-style-type: none"> <li>Works in the vicinity of the stream will be carried out in the summer months, when water levels and flows within the stream are minimal. In the eventuality that the stream is not dry, construction works to the section of the Kilcoolishal stream crossing the construction boundary (approximately 28m) will be bunded on either side with earthen bunds and silt screens. Water would be over pumped in the flow direction. Environmental control measures will be implemented during construction in line with standard guidelines (i.e., 'The Control of Water Pollution from Construction Sites' (CIRIA, 2001) and 'The Control of Water Pollution from Linear Construction Projects' (CIRIA, 2006)) for best practice measures for controlling water pollution. The Report for Screening for AA submitted as part of the planning application concluded that the proposed project, in the absence of mitigation, and either alone or in - combination with other plans and/or</li> </ul>	Construction

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
			<p>projects, does not have the potential to significantly affect any European Site, in light of their conservation objectives. The environmental control measures which will be implemented relate to the minimisation of localised potential impacts;</p> <ul style="list-style-type: none"> <li>• Apart from the area of the Kilcoolishal Stream directly affected by the bridge construction (i.e., Irish Rail portal frame), a buffer strip of 10m will be implemented around the stream with no works taking place in this area. Where this is not possible, in particular for the construction of the Irish Rail portal frame, the streambed and stream banks of the Kilcoolishal Stream in this location will be reprofiled and reinstated following construction and the bunds and silt traps removed;</li> <li>• No plant or tools will be washed in the stream, should it contain water; and</li> <li>• Spill kits will be permanently on hand and kept close to the works areas. Staff will be trained in how to use the spill kits correctly.</li> </ul>	
BD6	9.5.1.3	Throughout (as required)	<p><b><u>Noise and vibration</u></b></p> <p>The employment of good construction management practice, as described in the CEMP and in <b>Chapter 10, Noise and Vibration</b>, will minimize the risk of adverse impacts from the noise and vibration.</p>	<b>Construction</b>
BD7	9.5.1.3	Throughout (as required)	<p><b><u>Noise and vibration</u></b></p> <p>Mitigation measures will be employed to ensure that potential noise and vibration impacts at nearby sensitive receptors due to construction activities are minimized. The preferred approach for controlling construction noise is to reduce source levels where possible.</p>	<b>Construction</b>
BD8	9.5.1.4	Throughout (as required)	<p><b><u>Lighting</u></b></p> <p>Lighting mitigation measures will follow Bats &amp; Lighting Guidance notes for: Planners, engineers, architects, and developers (Bat Conservation Ireland, 2010).</p>	<b>Construction</b>
BD9	9.5.1.4	Throughout (as required)	<p><b><u>Lighting</u></b></p> <p>Site lighting will typically be provided by tower mounted temporary portable construction floodlights. The floodlights will be cowled and angled downwards to minimise spillage to surrounding properties. The following measures will be applied in relation to site lighting:</p> <ul style="list-style-type: none"> <li>• Lighting will be provided with the minimum luminosity sufficient for safety and security purposes. Where practicable, precautions will be taken to avoid shadows cast by the site hoarding on surrounding footpaths, roads and amenity areas;</li> <li>• Where possible, construction lights will be switched off when not in use; and</li> <li>• Lighting will be positioned and directed so that it does not to unnecessarily intrude on adjacent ecological receptors and structures used by protected species. The primary area of concern is the potential impact on woodland on the southern and northern boundary of the</li> </ul>	<b>Construction</b>



Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
			N25. There will be no directional lighting focused on these sensitive habitats and cowlings and focusing lights downwards will minimise light spillage.	
BD10	9.5.1.4	Throughout (as required)	<b>Lighting</b> Core construction works will take place during hours of daylight to minimise disturbance to any nocturnal mammal species.	<b>Construction</b>
BD11	9.5.1.5	Throughout (as required)	<b>Protection of habitats</b> Site clearance including demolition and vegetation clearance will be undertaken within the Proposed Development boundary and in accordance with the CEMP (refer to <b>Appendix 5.1</b> in <b>Volume 4</b> of this EIAR).	<b>Construction</b>
BD12	9.5.1.5	Throughout (as required)	<b>Protection of habitats</b> Trees and vegetation will not be removed between 1st March and 31 <sup>st</sup> August, to avoid direct impacts on nesting birds. Tree removal will be carried out in accordance with the Arboricultural Impact Assessment Report (refer to <b>Appendix 8.1</b> in <b>Volume 4</b> of this EIAR). Trees to be retained will be identified and protected to avoid accidental damage during construction works.	<b>Construction</b>
BD13	9.5.1.5	Construction compounds	<b>Protection of habitats</b> Site drainage will be provided at the construction compounds to collect surface water runoff, which will be directed into the existing local drainage network.	<b>Construction</b>
BD14	9.5.1.5	Construction compounds	<b>Protection of habitats</b> Surface water or contaminants within the site compounds will not be released from the site to any waters or the bed and banks of any waters (including ground water).	<b>Construction</b>
BD15	9.5.1.5	Throughout (as required)	<b>Protection of habitats</b> To prevent incidental damage by machinery or by the deposition of spoil during site works, woodland, hedgerow, tree and scrub vegetation which are located in close proximity to working areas will be clearly marked and fenced off to avoid accidental damage during excavations and site preparation. Tree protection measures are included in the Arboricultural Impact Assessment Report (refer to <b>Appendix 8.1</b> in <b>Volume 4</b> of this EIAR). The project ecologist will specify appropriate protective fencing where required.	<b>Construction</b>
BD16	9.5.1.5	Kilcoolishal Stream	<b>Protection of habitats</b> The streambed and banks of the Kilcoolishal Stream will be reprofiled / reinstated once the construction works are complete.	<b>Construction</b>
BD17	9.5.1.5	Throughout (as required)	<b>Protection of habitats</b>	<b>Construction</b>

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
			Habitats that are damaged and disturbed will be reinstated and landscaped once construction is complete.	
BD18	9.5.1.6	Throughout (as required)	<p><b><u>Invasive species</u></b></p> <p>Prior to the commencement of construction works an invasive species survey will be undertaken within the Proposed Development boundary by a competent expert to determine if invasive species listed under Part 1 of the Third Schedule of S.I No. 477 of 2011 have established in the area in the period between pre-planning and post consent. In the event that invasive species are identified within the works area, a site-specific Invasive Species Management Plan (ISMP) will be developed and implemented by a competent specialist on behalf of the contractor.</p>	<b>Construction</b>
BD19	9.5.1.6	Throughout (as required)	<p><b><u>Invasive species</u></b></p> <p>In addition, in order to comply with Regulations 49 and 50 of the European Communities (Birds and Natural Habitat) Regulations (2011), biosecurity measures will be implemented throughout the Construction Phase to ensure that the introduction and translocation of invasive species is prevented. The appointed project ecologist will carry out a toolbox talk which will identify invasive species and will also implement biosecurity measures such as the visual inspection of vehicles for evidence of attached plant or animal material prior to entering and leaving the works area. Stringent biosecurity measures will be implemented throughout the works. The best practice principles of Check-Clean-Dry guidance of the Non-Native Species Secretariat (NNSS, 2017), IFI biosecurity protocols (IFI, 2010) and Waterways Ireland Marine Notice No. 39/2017 shall be followed during these works to ensure that invasive non-native species are not introduced into the Proposed Development site.</p>	<b>Construction</b>
BD20	9.5.1.6	Throughout (as required)	<p><b><u>Invasive species</u></b></p> <p><b><u>Japanese knotweed</u></b></p> <p>The following site hygiene measures will be implemented for the contaminated area:</p> <ul style="list-style-type: none"> <li>• Understand the potential extent of the rhizome (root) system underground – up to seven metres horizontally and three metres vertically;</li> <li>• Where possible, the contaminated area will be avoided and fenced off, or the extent of the rhizomes clearly marked;</li> <li>• If possible, the use of machinery with tracks will avoid contaminated areas. Movement of machinery between contaminated and non-contaminated areas must be controlled and adequate power washing measures implemented;</li> <li>• Areas where contaminated soil is to be stockpiled on site will be clearly identified and marked out;</li> <li>• Designated entry and exit points will be identified for personnel on foot and for small mobile equipment. A delineated access track, to be maintained free of Japanese Knotweed, will be</li> </ul>	<b>Construction</b>

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
			<p>established through the site to minimise the spread of Knotweed species by permitted vehicles accessing the site;</p> <ul style="list-style-type: none"> <li>• Vehicles, including footwear and tools, leaving the site will be inspected for any plant material and washed down (using a pressure washer) in a dedicated vehicular wheel wash down facility, which will drain into a contained area within the site. Particular care is required with tracked machines;</li> <li>• Vehicles used in the transport of contaminated material will be visually checked and washed down into a contained area before being used for any other work, either in the same area or on a different site;</li> <li>• Only vehicles required for essential works, including site investigation works, will be brought on site and the number of visits minimised as much as practicable;</li> <li>• Material gathered in the dedicated wash down contained areas will be appropriately disposed of off-site;</li> <li>• For any subsoil or topsoil entering the site, the supplier will be required to provide an assurance that it is free of Japanese Knotweed;</li> <li>• All site personnel will be made aware of measures to be taken and will be informed of the requirements of the ISMP; and</li> <li>• Site hygiene signage, in relation to the management of invasive species, will be erected.</li> </ul>	
BD21	9.5.1.6	Throughout (as required)	<p><b><u>Invasive species</u></b></p> <p>All staff involved in the application of herbicides / pesticides will have received appropriate training, which may include achieving competency certification in the safe use of herbicides / pesticides through a National Proficiency Tests Council registered assessment centre or achieving an appropriate FETAC award in this area.</p>	<b>Construction</b>
BD22	9.5.1.6	Throughout (as required)	<p><b><u>Invasive species</u></b></p> <p>The contractor will follow the detailed recommendations of the following documents for the control of invasive species and noxious weeds:</p> <ul style="list-style-type: none"> <li>• Chapter 7 and Appendix 3 of the TII Publication: The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (NRA, 2010);</li> </ul>	<b>Construction</b>

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
			<ul style="list-style-type: none"> <li>Best Practice Management Guidelines for Japanese Knotweed (Invasive Species Ireland, 2015); and</li> <li>Circular Letter NPWS 2/08 Use of Herbicide Spray on Vegetated Road Verges (NPWS, 2008).</li> </ul>	
BD23	9.5.1.6	Throughout (as required)	<p><b><u>Invasive species</u></b></p> <p>Refer to Section 9.5.1.6 of <b>Chapter 9, Biodiversity</b> for detailed management options for invasive species.</p>	<b>Construction</b>
BD24	9.5.1.7	Throughout (as required)	<p><b><u>Bats</u></b></p> <p>During the site works, general mitigation measures for bats will follow Marnell <i>et al.</i> (2022), Kelleher and Marnell (2006) and NRA (2005c). All mitigation measures including detailed method statements will be agreed with the National Parks and Wildlife Service (NPWS) prior to commencement of works, which could affect any bat populations on site.</p>	<b>Construction</b>
BD25	9.5.1.7	Throughout (as required)	<p><b><u>Bats</u></b></p> <p>Mature and immature trees will be removed prior to construction. Although mature trees with the potential to be of significant value as bat roosts are absent from the site, the following precautionary measures will be implemented during the removal of semi-mature and mature trees:</p> <ul style="list-style-type: none"> <li>The project ecologist will work with the contractor to ensure that trees earmarked for retention are adequately protected;</li> <li>Tree-felling will ideally be undertaken in the period September to late October / early November. During this period, bats are capable of flight and may avoid the risks of tree-felling if proper measures are undertaken;</li> <li>Felled trees will not be mulched immediately. Such trees will be left lying several hours and preferably overnight before any further sawing or mulching. This will allow any bats within the tree to emerge and avoid accidental death. The bat specialist will be on-hand during felling operations to inspect felled trees for bats. If bats are seen or heard in a tree that has been felled, work will cease and the local NPWS Conservation Ranger will be contacted;</li> <li>Tree will be retained where possible and no 'tidying up' of dead wood and spilt limbs on tree specimens will be undertaken unless necessary for health and safety;</li> <li>Treelines outside the Proposed Development area but adjacent to it, and thus at risk, will be clearly marked by a bat specialist to avoid any inadvertent damage;</li> </ul>	<b>Construction</b>

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
			<ul style="list-style-type: none"> <li>During construction, directional lighting will be employed to minimise light spill onto adjacent areas. Where practicable during night-time works, there will be no directional lighting focused on watercourses or boundary habitats and focusing lights downwards will be utilised to minimise light spillage; and</li> <li>If bats are recorded by the bat specialist within any trees no works will proceed without a relevant derogation licence from the NPWS.</li> </ul>	
BD26	9.5.1.8	Throughout (as required)	<p><b><u>Birds</u></b></p> <p>Where practicable, vegetation will be removed outside of the breeding season and in particular, removal during the peak-breeding season (April-June inclusive) will be avoided. If works are carried out during the breeding season, a pre-construction survey will be carried out by the project ecologist and if birds are detected appropriate mitigation measures will be implemented.</p>	<b>Construction</b>
BD27	9.5.1.9	Drainage ditches and Kilcoolishal Steam	<p><b><u>Common frog</u></b></p> <p>As a precautionary measure, a visual search of the drainage ditches and the Kilcoolishal Stream will be carried out in the days prior to commencement of construction works and any frogs will be removed to alternative habitats elsewhere within the landholding. This will be carried out under licence from the NPWS and under supervision of the project ecologist.</p>	<b>Construction</b>
BD28	9.5.2.1	Throughout (as required)	<p><b><u>Lighting</u></b></p> <ul style="list-style-type: none"> <li>LED type lanterns, of the warm white type, have been specified, with a Colour Temperature of 3000 kelvin, as these are considered least disruptive to the emergence of bats from roosts at dusk, and subsequent movement from habitats to foraging locations;</li> <li>LED luminaires have been specified due to their sharp cut-off, lower intensity, good colour rendition and dimming capability;</li> <li>Lanterns are of the fully cut off type with no light output above the horizontal plane; and</li> <li>Screening by existing trees and newly planted trees will limit light spillage onto boundary habitats.</li> </ul>	<b>Operation</b>
BD29	9.5.2.2	Throughout (as required)	<p><b><u>Biodiversity enhancement</u></b></p> <p>Disturbed areas will be planted using appropriate native woodland and hedgerow mixes.</p>	<b>Operation</b>
BD30	9.5.2.2	Throughout (as required)	<p><b><u>Biodiversity enhancement</u></b></p> <p>It is proposed that four bat boxes will be installed at the Proposed Development site i.e., bat box pro or similar. These bat boxes will be located along mature woodland at the south of the site and within the wet willow woodland at the north of the site.</p>	<b>Operation</b>

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
BD31	9.5.2.2	Throughout (as required)	<b><u>Biodiversity enhancement</u></b> It is proposed that six bird nesting boxes (various types including open fronted, entrance hole and kestrel nest boxes) will be installed at the Proposed Development site. These will be located on mature and suitable semi-mature trees within the Proposed Development site boundary.	<b>Operation</b>
BD32	9.5.2.2	Throughout (as required)	<b><u>Biodiversity enhancement</u></b> Log piles are suitable for invertebrates, small mammals and birds, and can be easily installed in wooded areas of parks or open spaces. These stacks of logs are piled up and allowed to rot down. Left undisturbed, they will support a good range of biodiversity. These will be positioned within newly landscaped areas within the Proposed Development site.	<b>Operation</b>
BD33	9.5.2.2	Throughout (as required)	<b><u>Biodiversity enhancement</u></b> Natural recolonisation should also be allowed to proceed outside of the planted areas.	<b>Operation</b>

## 21.7 Noise and Vibration

Table 21.5: Noise and Vibration mitigation and monitoring measures

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
NV1	10.5.1	Throughout (as required)	Vehicles and mechanical plant used for the purpose of the works will be fitted with effective exhaust silencers, maintained in good and efficient working order and operated in such a manner as to minimise noise emissions. The contractor will ensure that all plant complies with the relevant statutory requirements.	<b>Construction</b>
NV2	10.5.1	Throughout (as required)	Machines in intermittent use will be idling or throttled down to a minimum when not in use.	<b>Construction</b>
NV3	10.5.1	Throughout (as required)	Compressors will be fitted with properly lined and sealed acoustic covers which will be kept closed whenever in use. Pneumatic percussive tools will be fitted with mufflers or silencers.	<b>Construction</b>
NV4	10.5.1	Throughout (as required)	Equipment which breaks concrete, brickwork, or masonry by bending, bursting, or "nibbling" will be used in preference to percussive tools. Where possible, the use of impact tools will be avoided where the site is close to occupied premises.	<b>Construction</b>
NV5	10.5.1	Throughout (as required)	Rotary drills and bursters activated by hydraulic, chemical, or electrical power will be used for excavating hard or extrusive material.	<b>Construction</b>
NV6	10.5.1	Throughout (as required)	Wherever possible, equipment powered by mains electricity will be used in preference to equipment powered by internal combustion engine or locally generated electricity.	<b>Construction</b>
NV7	10.5.1	Throughout (as required)	No part of the works nor any maintenance of plant will be carried out in such a manner as to cause unnecessary noise except in the case of an emergency when the work is absolutely necessary for the saving of life or property or the safety of the works.	<b>Construction</b>

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
NV8	10.5.1	Throughout (as required)	Plant will be maintained in good working order so that extraneous noise from mechanical vibration, creaking and squeaking is kept to a minimum.	<b>Construction</b>
NV9	10.5.1	Throughout (as required)	Noise emitting machinery which is required to run continuously will be housed in a suitable acoustically lined enclosure.	<b>Construction</b>
NV10	10.5.1	Throughout (as required)	During the Construction Phase, the appointed contractor will carry out noise and vibration monitoring at representative noise and vibration sensitive receptors to evaluate and inform the requirement and / or implementation of noise and vibration management issues. Noise monitoring will be conducted in accordance with ISO 1996-1 (ISO, 2016) and ISO 1996-2 (ISO, 2017). The selection of monitoring locations will be based on the nearest representative noise and vibration sensitive receptors to the working area.	<b>Construction</b>
NV11	10.5.1	Throughout (as required)	It is recommended that an acoustic barrier be installed as mitigation for all working areas, which will reduce noise levels overall by 10 dB.	<b>Construction</b>

## 21.8 Air Quality

Table 21.6: Air Quality mitigation and monitoring measures

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
AQ1	11.5.1.1	Throughout (as required)	During very dry periods when dust generation is likely, construction areas will be sprayed with water.	<b>Construction</b>
AQ2	11.5.1.1	Throughout (as required)	Exhaust emissions from vehicles operating within the site, including trucks, excavators, diesel generators and other plant equipment, will be controlled by the contractor through regular servicing of machinery.	<b>Construction</b>
AQ3	11.5.1.1	Throughout (as required)	Vehicle speeds will be limited in the construction site.	<b>Construction</b>
AQ4	11.5.1.1	Throughout (as required)	Wheel-wash facilities may be provided, if required. Wheel-wash facilities will have rumble grids to remove excess mud from wheels. These facilities will be located at the exit from the construction compounds and away from sensitive receptors, where possible.	<b>Construction</b>
AQ5	11.5.1.1	Throughout (as required)	Surrounding roads used by trucks to access to and egress from the site will be cleaned regularly using an approved mechanical road sweeper. Roads will be cleaned on a daily basis, or more regularly, as required.	<b>Construction</b>
AQ6	11.5.1.1	Throughout (as required)	Areas where materials will be handled and stockpiled will be designed to minimise their exposure to wind – all temporary stockpiles shall be kept to the minimum practicable height with gentle slopes.	<b>Construction</b>
AQ7	11.5.1.1	Throughout (as required)	Material drop heights from plant to plant or from plant to stockpile will be minimised.	<b>Construction</b>
AQ8	11.5.1.1	Throughout (as required)	Where practicable, truck loads will be covered when carrying material likely to generate dust.	<b>Construction</b>

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
AQ9	11.5.1.1	Throughout (as required)	The following measures shall also be implemented to minimise off-site dust impacts: <ul style="list-style-type: none"> <li>Provision of hoarding around the site;</li> <li>Locating plant likely to generate emissions away from sensitive receptors; and</li> <li>Any stockpiled material will be covered / dampened during periods of dry weather to prevent the spreading of dust</li> </ul>	<b>Construction</b>
AQ10	11.5.1.1	Throughout (as required)	In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust will be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.	<b>Construction</b>
AQ11	11.5.2.1	Throughout (as required)	The contractor will undertake on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to Cork County Council on request. The frequency of the inspections will be increased during site activities which have a high potential to generate dust.	<b>Construction</b>

## 21.9 Climate

Table 21.7: Climate mitigation and monitoring measures

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
CL1	12.5.1.1	Throughout (as required)	The Proposed Development will use low carbon construction materials, such as recycled aggregate, where practicable.	<b>Construction</b>
CL2	12.5.1.1	Throughout (as required)	Where practicable, opportunities for materials reuse will be incorporated within the extent of the Proposed Development.	<b>Construction</b>
CL3	12.5.1.1	Throughout (as required)	Where practicable, materials will be sourced locally to reduce the embodied emissions associated with transport.	<b>Construction</b>
CL4	12.5.1.1	Throughout (as required)	The Proposed Development will minimise wastage of materials due to poor timing or over ordering on site thus helping to minimise the embodied carbon footprint of the Proposed Development.	<b>Construction</b>



## 21.10 Archaeology, Architectural and Cultural Heritage

Table 21.8: Archaeology, Architectural and Cultural Heritage mitigation and monitoring measures

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
AACH1	13.5.1	Throughout (as required)	Licensed archaeological monitoring of all ground works will be undertaken during construction. If features of archaeological significance are identified further mitigation will be required following consultation with the County Archaeologist and National Monuments Service. Such features will be fully resolved to professional standards of archaeological practice either by preservation <i>in situ</i> or preservation by record, as outlined in the Policy and Guidelines on Archaeological Excavation (Department of Arts, Heritage, Gaeltacht and the Islands, 1999).	Construction

## 21.11 Population and Human Health

Table 21.9: Population and Human Health mitigation and monitoring measures

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
PHH1	-	Throughout (as required)	It should be noted that Construction and Operational Phase mitigation measures relating to those factors under which population and human health impacts may occur have been addressed elsewhere in this EIAR, under the environmental factors for traffic and transportation, landscape and visual, noise and vibration, air quality, climate and water. Other than the mitigation measures outlined separately in this EIAR for these environmental factors, no further mitigation measures are proposed with respect to population and human health	Construction / Operation

## 21.12 Resources and Waste

Table 21.10: Resources and Waste mitigation and monitoring measures

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
RW1	15.5.1	Throughout (as required)	A Construction Resource and Waste Management Plan (CRWMP) has been prepared and this will be implemented (and updated as necessary) by the appointed contractor - refer to <b>Appendix 5.1</b> in <b>Volume 4</b> of this EIAR.	Construction
RW2	15.5.1	Throughout (as required)	Where waste generation cannot be avoided, waste disposal will be minimized.	Construction
RW3	15.5.1	Throughout (as required)	Opportunities for reuse of materials, by-products and wastes will be sought throughout the Construction Phase of the Proposed Development.	Construction
RW4	15.5.1	Throughout (as required)	Possibilities for reuse of clean non-hazardous excavation material as fill on the site or in landscaping works will be considered following appropriate testing to ensure material is suitable for its proposed end use.	Construction

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
RW5	15.5.1	Throughout (as required)	Where non-hazardous excavation material cannot be reused within the Proposed Development works, material will be sent for recycling or recovery, where practicable.	<b>Construction</b>
RW6	15.5.1	Throughout (as required)	Excavations of made ground will be monitored by an appropriately qualified person to ensure that any hotspots of possible contamination are properly identified, with the contaminated material segregated and disposed of appropriately. Any potential contaminated material identified will be segregated and stored in an area where there is no possibility of runoff generation or infiltration to ground or surface water drainage. Care will be taken to ensure that the hotspot does not cross contaminate clean soils elsewhere throughout the site.	<b>Construction</b>
RW7	15.5.1	Throughout (as required)	If encountered, any potential asbestos during the Construction Phase will be managed using standard health and safety measures as outlined in 'Asbestos-containing Materials (ACMs) in Workplaces: Practical Guidelines on ACM Management and Abatement' (HSA, 2013). This document states that <i>"removal of asbestos from contaminated soil will require a specialist asbestos contractor for any friable asbestos to be removed"</i> and <i>"a risk assessment by an independent competent person should determine the most appropriate control measures and remediation strategies"</i> (HSA, 2013).	<b>Construction</b>
RW8	15.5.1	Throughout (as required)	Only a suitably experienced contractor shall be used to carry out the excavation works. During construction, they shall employ standard practices to manage risk from contaminated soils. These will be determined by the contractor depending on their construction practices but are likely to include the use of gloves, dust masks and potentially disposable overalls. These and other appropriate measures will minimise the exposure of site workers and members of the public.	<b>Construction</b>
RW9	15.5.1	Throughout (as required)	The site will be maintained to prevent litter and regular litter picking will take place throughout the site.	<b>Construction</b>
RW10	15.5.1	Throughout (as required)	'Just-in-time' delivery will be used, where practicable, to minimise material wastage.	<b>Construction</b>
RW11	15.5.1	Throughout (as required)	Paints, sealants and hazardous chemicals will be stored in secure, bunded locations.	<b>Construction</b>
RW12	15.5.1	Throughout (as required)	All staff on-site will be trained on how to minimise waste (i.e., training, induction, inspections and meetings).	<b>Construction</b>
RW13	15.5.1	Throughout (as required)	Materials on-site will be correctly and securely stored.	<b>Construction</b>
RW14	15.5.1	Throughout (as required)	Where possible, recyclable material will be segregated and removed off site to a permitted / licensed facility for recycling. Waste stream colour coding and photographs will be used to facilitate segregation.	<b>Construction</b>
RW15	15.5.1	Throughout (as required)	On-site municipal waste arising will be source separated at least into dry mixed recyclables, biodegradable and residual wastes.	<b>Construction</b>
RW16	15.5.1	Throughout (as required)	Waste bins, containers, skip containers and storage areas will be clearly labelled with waste types which they should contain, including photographs as appropriate.	<b>Construction</b>
RW17	15.5.1	Throughout (as required)	Segregated skips will be used within a designated waste segregation area to be located in the on-site construction compound (particularly for hazardous, inert waste and general waste).	<b>Construction</b>
RW18	15.5.1	Throughout (as required)	The appointed contractor will record the quantity in tonnes and types of waste and materials leaving the site during the Construction Phase. The name, address and authorisation details of all facilities and locations to which waste and materials are delivered will be recorded along with the quantity of waste in tonnes delivered to each facility. Records will show material which is recovered, which is recycled and which is disposed of.	<b>Construction</b>

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
RW19	15.5.1	Throughout (as required)	Waste generated on-site will be removed as soon as practicable following generation for delivery to an authorised waste facility.	<b>Construction</b>
RW20	15.5.1	Throughout (as required)	The appointed contractor will ensure that any off-site interim storage facilities for excavation material have the appropriate waste licences or waste facility permits in place.	<b>Construction</b>
RW21	15.5.1	Throughout (as required)	Where Article 27 notifications are required in relation to the Proposed Development, the appointed contractor will complete and submit these Article 27 notifications to the EPA for by-product reuse.	<b>Construction</b>
RW22	15.5.1	Throughout (as required)	The relevant appropriate waste authorisation will be in place for all facilities that wastes are delivered to (i.e., EPA Licence, Waste Facility Permit or Certificate of Registration).	<b>Construction</b>
RW23	15.5.2	Throughout (as required)	All project related C&D waste generated from the maintenance works during the Operational Phase will be transferred from site by a waste collection permit holder and delivered to an authorised waste facility (i.e., a facility which holds a Certificate of Registration, Waste Facility Permit or Waste Licence) for the specific waste types it receives.	<b>Operation</b>
RW24	15.5.3	Throughout (as required)	All project related C&D waste generated during the Decommissioning Phase will be transferred from site by a waste collection permit holder and delivered to an authorised waste facility (i.e., a facility which holds a Certificate of Registration, Waste Facility Permit or Waste Licence) for the specific waste types it receives.	<b>Decommissioning</b>

## 21.13 Water

**Table 21.11: Water mitigation and monitoring measures**

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
WT1	16.5.1.1	Throughout (as required)	Earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe run-off and prevent ponding and flooding.	<b>Construction</b>
WT2	16.5.1.1	Throughout (as required)	Run-off will be controlled to minimise the water effects in outfall areas.	<b>Construction</b>
WT3	16.5.1.1	Throughout (as required)	All concrete mixing and batching activities will be in areas away from watercourses and drains.	<b>Construction</b>
WT4	16.5.1.1	Throughout (as required)	Collection systems will be used to prevent any contaminated drainage entering surface water drains, watercourses or groundwater, or draining onto the land.	<b>Construction</b>
WT5	16.5.1.1	Throughout (as required)	The use of cleaning chemicals will be minimized.	<b>Construction</b>
WT6	16.5.1.1	Throughout (as required)	Good housekeeping (site clean-ups, use of disposal bins, etc.) will be implemented on the site.	<b>Construction</b>
WT7	16.5.1.1	Throughout (as required)	Careful consideration will be given to the location of any fuel storage facilities. All vehicles and plant will be regularly inspected for fuel, oil and hydraulic fluid leaks. Suitable equipment to deal with spills will be maintained on site.	<b>Construction</b>
WT8	16.5.1.1	Throughout (as required)	Where dewatering may be required, it will be overseen and approved by a qualified hydrogeologist and treated appropriately in a site water treatment facility before being discharged to the local drainage network. No outfall will be permitted into existing watercourses.	<b>Construction</b>

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
WT9	16.5.1.1	Throughout (as required)	Where practicable, soil excavation will be completed during dry periods.	<b>Construction</b>
WT10	16.5.1.1	Throughout (as required)	No materials will be stored in floodplains or in areas which would impede flood flow paths (northern side of the Proposed Development site).	<b>Construction</b>
WT11	16.5.1.1	Throughout (as required)	To prevent the accidental release of hazardous materials (fuels, cleaning agents, etc.), all hazardous materials will be stored within secondary containment designed to retain at least 110% of the storage contents. Temporary bunds for oil / diesel storage tanks will be used on the site during the Construction Phase of the project. Safe materials handling of all potentially hazardous materials will be emphasised to all construction personnel employed during this phase of the Proposed Development.	<b>Construction</b>
WT12	16.5.1.1	Kilcoolishal Stream	<ul style="list-style-type: none"> <li>Works in the vicinity of the stream will be carried out in the summer months, when water levels and flows within the stream are minimal. In the eventuality that the stream is not dry, construction works to the section of the Kilcoolishal stream crossing the construction boundary (approximately 28m) will be bunded on either side with earthen bunds and silt screens. Water would be over pumped in the flow direction. Environmental control measures will be implemented during construction in line with standard guidelines (i.e., 'The Control of Water Pollution from Construction Sites' (CIRAI, 2001) and 'The Control of Water Pollution from Linear Construction Projects' (CIRIA, 2006)) for best practice measures for controlling water pollution. The Report for Screening for AA submitted as part of the planning application concluded that the proposed project, in the absence of mitigation, and either alone or in - combination with other plans and/or projects, does not have the potential to significantly affect any European Site, in light of their conservation objectives. The environmental control measures which will be implemented relate to the minimisation of localised potential impacts;</li> <li>Apart from the area of the Kilcoolishal Stream directly affected by the bridge construction (i.e., Irish Rail portal frame), a buffer strip of 10m will be implemented around the stream with no works taking place in this area. Where this is not possible, in particular for the construction of the Irish Rail portal frame, the streambed and stream banks of the Kilcoolishal Stream in this location will be reprofiled and reinstated following construction and the bunds and silt traps removed;</li> <li>No plant or tools will be washed in the stream, should it contain water; and</li> <li>Spill kits will be permanently on hand and kept close to the works areas. Staff will be trained in how to use the spill kits correctly.</li> </ul>	<b>Construction</b>
WT13	16.5.2.1	Throughout (as required)	Visual monitoring will be undertaken as part of the regular site audits during the construction of the Proposed Development to ensure existing surface water runoff is draining from the site and is not exposed to any contaminants.	<b>Construction</b>
WT14	16.5.2.1	Throughout (as required)	The contractor will be required to ensure that the sanitary facilities for the site personnel are maintained as per the CEMP (refer to <b>Appendix 5.1</b> in <b>Volume 4</b> of this EIAR) and that effluent storage is regularly emptied and disposed of appropriately.	<b>Construction</b>
WT15	16.5.2.1	Throughout (as required)	The contractor will be required to ensure that the water supply to the site is maintained as per the CEMP (refer to <b>Appendix 5.1</b> in <b>Volume 4</b> of this EIAR) and that it is free of contaminants.	<b>Construction</b>
WT16	16.5.2.1	Throughout (as required)	The contractor is required to monitor the weather forecasts to inform the programming of earthworks and stockpiling of materials so as to minimise the risk of flooding.	<b>Construction</b>

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
WT17	16.5.1.2	Throughout (as required)	The Proposed Development will incorporate appropriate surface water drainage features which will appropriately collect and discharge surface water, thereby reducing the risk of flooding from surface water. Surface water drainage from the main span of the bridge will be captured in drainage channels and discharged into the N25 or railway line drainage system, as appropriate.	Operation
WT18	16.5.1.3	Throughout (as required)	Should decommissioning activities occur, the proposed works will be undertaken in a safe and manner by minimising interaction with the nearby watercourse. As such, mitigation measures will be limited to ensuring no temporary works are placed in nearby watercourses during the Decommissioning Phase. No materials will be deposited in nearby watercourses during the Decommissioning Phase.	Decommissioning

## 21.14 Land, Soils, Geology and Hydrogeology

Table 21.12: Land, Soils Geology and Hydrogeology mitigation and monitoring measures

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
LSGH1	17.8.1.1	Throughout (as required)	<b><u>Earthworks management</u></b> Excavated topsoil will be stockpiled using appropriate methods to minimise the effects of weathering. Care will be taken in reworking this material to minimise dust generation, groundwater infiltration and generation of runoff. Any surplus suitable material excavated that is not required elsewhere for the Proposed Development, will be reused for other projects where possible, subject to appropriate approvals / notifications or removed off site to a suitable licensed facility	Construction
LSGH2	17.8.1.1	Throughout (as required)	<b><u>Earthworks management</u></b> In order to reduce the compaction and erosion of topsoil outside the areas of direct construction, haul routes will be along predetermined routes within the Proposed Development and deliveries will be along predetermined routes outside the Proposed Development. Where compaction occurs due to truck movements and other construction activities on unfinished surfaces, remediation works will be undertaken to reinstate the ground to its original condition. Where practical, compaction of any soil or subsoil which is not part of the works or to remain <i>in situ</i> within the Proposed Development will be avoided.	Construction
LSGH3	17.8.1.1	Throughout (as required)	<b><u>Earthworks management</u></b> The contractor will ensure that any topsoil or subsoil is assessed for re-use within the Proposed Development, ensuring the appropriate handling, processing and segregation of the material. Where practical the removal of soil from the Proposed Development will be avoided. All earthworks will be undertaken in accordance with TII Specification for Road Works (SPW) Series 600 Earthworks (TII, 2013) and project specific earthworks specifications ensuring that all excavated material and imported material is classified using the same methodology so as to allow maximum opportunity for the reuse of materials on site.	Construction

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
LSGH4	17.8.1.1	Throughout (as required)	<p><b><u>Contaminated land management</u></b></p> <p>Excavations in made ground will be monitored by an appropriately qualified person to ensure that any potential hotspots of encountered contamination are properly identified, segregated and disposed of appropriately. Any identified hotspots will be segregated and stored in an area where there is no possibility of runoff generation or infiltration to ground or surface water drainage. Care will be taken to ensure that the hotspot does not cross contaminate clean soils elsewhere throughout the site.</p>	Construction
LSGH5	17.8.1.2	Throughout (as required)	<p><b><u>Contaminated land management</u></b></p> <p>In areas with the potential to encounter asbestos containing materials the following measures will apply:</p> <ul style="list-style-type: none"> <li>• During construction, the potential risk to site users and member of the public from contaminated dust will be managed using standard health and safety measures as outlined in the Health and Safety Authority (HSA) guidance document, Asbestos-containing Materials (ACMs) in Workplaces: Practical Guidelines on ACM Management and Abatement (HSA, 2013). This document states that <i>“Removal of asbestos from contaminated soil will require a specialist asbestos contractor for any friable asbestos to be removed”</i> and <i>“A risk assessment by an independent competent person should determine the most appropriate control measures and remediation strategies.”</i>;</li> <li>• Control measures for the Construction Phase will be devised based on a risk assessment carried out by the contractor prior to the commencement of the construction works and will be specific to the construction methods. Such methods could include the prompt removal of excavated soils to avoid stockpiling on site of material or dampening down of soil to prevent dust generation. In the rare instances where stockpiles are required, they will not be allowed in the areas which are identified as public interfaces; and</li> <li>• Only suitably experienced contractors shall be used to carry out the excavation work. During construction, they shall employ standard practices to manage risk from contaminated soils. These will be designed by the contractor dependent on his construction practices and are likely to include the use of gloves, dust masks and potentially disposable overalls. These and other appropriate measures will minimise the exposure of the site workers and member of the public.</li> </ul>	Construction
LSGH6	17.8.1.2	Throughout (as required)	<p><b><u>Contaminated land management</u></b></p> <p>If a potential soil and water pollution are identified, this will be minimised by the implementation of good construction practices. Such practices will include adequate bunding for oil containers, wheel wash and dust suppression on site roads, and regular plant maintenance.</p>	Construction
LSGH7	17.8.1.2	Throughout (as required)	<p><b><u>Contaminated land management</u></b></p> <p>Any dewatering in areas of contaminated ground will be designed to minimise the mobilisation of contaminants into the surrounding environment. Where dewatering in such areas is unavoidable, the water will be adequately treated prior to discharge. Good construction management practices will be employed to minimise the risk of transmission of hazardous materials as well as pollution of adjacent watercourses and groundwater.</p>	Construction

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
LSGH8	17.8.1.3	Throughout (as required)	<p><b><u>Spills from temporary storage of hazardous substances</u></b></p> <p>Measures to be implemented to minimise the risk of spills and contamination of soils and waters include:</p> <ul style="list-style-type: none"> <li>• Employing only a competent and experienced workforce, and site-specific training of site managers, foremen and workforce, including all subcontractors, in pollution risks and preventative measures;</li> <li>• Ensure that all areas where liquids (including fuel) are stored, or cleaning is carried out, are designated impermeable areas that are isolated from the surrounding area and within a secondary containment system, e.g., by a roll-over bund, raised kerb, ramps or stepped access;</li> <li>• The location of any fuel storage facilities shall be considered in the design of the construction compounds and bridge assembly area. These are to be designed in accordance with relevant guidelines and codes of best practice and will be fully bunded;</li> <li>• Good housekeeping at the site (daily site clean-ups, use of disposal bins, etc.) during the entire Construction Phase;</li> <li>• All concrete mixing and batching activities will be located in areas away from watercourses and drains;</li> <li>• Potential pollutants to be adequately secured against vandalism;</li> <li>• Provision of proper containment of potential pollutants according to codes of best practice.</li> <li>• Thorough control during the entire Construction Phase to ensure that any spillage is identified at early stage and subsequently effectively contained and managed; and</li> <li>• Spill kit to be provided and to be kept close to the storage area. Staff to be trained on how to use spill kits correctly.</li> </ul>	Construction
LSGH9	17.8.1.3	Throughout (as required)	<p><b><u>Spills from temporary storage of hazardous substances</u></b></p> <p>An Emergency Incident Response Plan will be implemented by the appointed contractor, which will identify the actions to be taken in the event of a pollution incident. It will address such aspects as containment measures, emergency discharge routes, a list of appropriate equipment and clean-up materials and notification procedures to inform the relevant environmental protection authority. Refer to the CEMP included as <b>Appendix 5.1</b> in <b>Volume 4</b> of this EIAR.</p>	Construction



Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
LSGH10	17.8.1.3	Throughout (as required)	<p><b><u>Spills from temporary storage of hazardous substances</u></b></p> <p>Sediment control methods will be outlined in the Surface Water Management Plan to be prepared by the contractor and included in the CEMP (refer to <b>Appendix 5.1</b> in <b>Volume 4</b> of this EIAR), and these will be implemented by the appointed contractor.</p>	Construction
LSGH11	17.8.1.4	Throughout (as required)	<p><b><u>Management of concrete during piling</u></b></p> <p>During the Construction Phase, concrete levels and volumes used will be monitored and compared against theoretical estimates to understand potential losses.</p>	Construction
LSGH12	17.8.1.4	Throughout (as required)	<p><b><u>Management of concrete during piling</u></b></p> <p>Before and during piling, it is proposed to monitor groundwater pH at the available groundwater monitoring points (trial wells and boreholes with standpipe installations). This will highlight any potential impacts on groundwater and surface water quality during piling. Where a change from baseline pH is identified, appropriate measures can then be adopted which may include an alternative grout / cement mix to limit migration or the use of temporary casing. The groundwater monitoring will utilise monitoring locations installed during the project specific ground investigation that are located outside the footprint of the Proposed Development. These monitoring locations will be maintained during the Construction Phase of the Proposed Development.</p>	Construction
LSGH13	17.8.1.4	Throughout (as required)	<p><b><u>Management of concrete during piling</u></b></p> <p>Where ground bearing foundations are being constructed, the formation will be inspected for potential features that may result in concrete losses. Appropriate earthwork details, developed during detailed design phases, will be applied to limit losses.</p>	Construction
LSGH14	17.8.1.5	Throughout (as required)	<p><b><u>Monitoring</u></b></p> <p>Soil, groundwater and surface water verification testing shall be carried out by the contractor during the Construction Phase to confirm the findings of the risk assessment</p>	Construction

## 21.15 Material Assets

**Table 21.13: Material Assets mitigation and monitoring measures**

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
MA1	18.5.1.1	Throughout (as required)	The contractor will be obliged to put measures in place to ensure that there are no interruptions to existing services and that all services and utilities are maintained, unless this has been agreed in advance with the relevant service provider and local authority. Where connections are required, the	Construction



Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
			contractor will apply to the relevant utility company for a connection permit and adhere to their requirements.	
MA2	18.5.1.1	Throughout (as required)	All works near existing services and utilities will be carried out with ongoing consultation with the relevant utility company or local authority and will follow any requirements or guidelines they may have.	Construction
MA3	18.5.1.1	Throughout (as required)	Surface water management measures, as detailed in the CEMP (refer to <b>Appendix 5.1 in Volume 4</b> of this EIAR), will be implemented at all working areas. These measures will prevent any silt-laden run-off, including that from temporary stockpiles, entering nearby watercourses. Silt traps and interceptor ditches will be constructed in advance of main earthworks to collect, treat and discharge all surface water run off during construction. Collection systems will be used to prevent any contaminants from entering surface water drains, watercourses or groundwater, or draining onto the land.	Construction

## 21.16 Major Accidents and Natural Disasters

Table 21.14: Major Accidents and Natural Disasters mitigation and monitoring measures

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
n/a	n/a	n/a	No additional mitigation or monitoring measures are considered necessary beyond those already identified in other environmental assessments and in the CEMP (refer to <b>Appendix 5.1 in Volume 4</b> of this EIAR).	n/a

## 21.17 Cumulative and Interactive Impacts

Table 21.15: Cumulative and Interactive Impacts mitigation and monitoring measures

Mitigation / monitoring number	EIAR section reference	Location	Description of mitigation and / or monitoring measure / environmental commitment	Implementation stage
n/a	n/a	n/a	No additional mitigation or monitoring measures are considered necessary beyond those already identified in other environmental assessments and in the CEMP (refer to <b>Appendix 5.1 in Volume 4</b> of this EIAR).	n/a

## 21.18 References

British Standards Institution (BSI) (2012). BS 5837:2012. Trees in relation to in relation to design, demolition and construction. Recommendations.

CIRIA (2001). The Control of Water Pollution from Construction Sites.

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Department of Arts, Heritage, Gaeltacht and the Islands (1999). Policy and Guidelines on Archaeological Excavation.

HSA (2013). Asbestos-containing Materials (ACMs) in Workplaces: Practical Guidelines on ACM Management and Abatement.

Masters Williams *et al.* (2001). Control and management of water pollution from construction sites in their publication Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors

Transport Infrastructure Ireland (TII, previously NRA) (2006). Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, During and Post Construction of National Road Schemes.