Chapter 22
Summary of Mitigation & Monitoring Measures

Contents

22. Summary of Mitigation & Monitoring Measures

22.1 Introduction

The purpose of this Chapter is to collate the mitigation and monitoring measures identified in the Environmental Impact Assessment Report (EIAR) that are considered necessary to protect the environment, prior to the commencement of, and throughout the duration of the Construction and / or Operational Phases of the Liffey Valley to City Centre Core Bus Corridor Scheme (hereafter referred to as the Proposed Scheme).

The design of the Proposed Scheme has evolved through comprehensive design iteration, with particular emphasis on minimising the potential for environmental impacts, where practicable, whilst ensuring the objectives of the Proposed Scheme are attained. In addition, feedback received from the comprehensive consultation programme undertaken throughout the option selection and design development process has been incorporated, where appropriate.

As described throughout this EIAR, the design of the Proposed Scheme has been progressed taking account of environmental constraints and considerations that have been identified in assessments. This has enabled the avoidance of potential environmental impacts, wherever possible.

22.2 Mitigation and Monitoring Schedules

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

Mitigation and monitoring measures specified within the EIAR technical assessments are also provided in Chapter 6 to Chapter 21 of this EIAR.

The timing and implementation of the mitigation and monitoring measures are indicated within this Chapter as either during the:

- Pre-Construction Phase: Activities such as investigative surveys (e.g. bat surveys) that need to be undertaken in advance of the construction works;
- Construction Phase: The undertaking of physical works to construct elements of the Proposed Scheme, as outlined in Chapter 4 (Proposed Project Description); and
- Operational Phase: When the Proposed Scheme commences operation, as well as any ongoing maintenance.

The following tables summarise the Construction and Operational 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) in Appendix A5.1 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 scheme wide the location is given as ‘throughout (as required)’. Note that in certain instances, a mitigation measure may be relevant to more than one environmental aspect (e.g. Mitigation Number WT1 is also a mitigation measure used in relation to Biodiversity).

22.3 General Mitigation Requirements

Table 22.1: General Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
GEN1	5.10	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) and its associated management plans (provided in Appendix A5.1 in Volume 4 of this EIAR).	Construction

22.4 Traffic and Transport

Table 22.2: Traffic and Transport Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
TT1	6.5.1	Throughout (as required)	A Construction Environmental Management Plan (CEMP) has been prepared (included as Appendix A5.1 in Volume 4 of this EIAR) and will be implemented (and developed further as required) by the appointed contractor. A detailed Construction Traffic Management Plan will be prepared (and included in the CEMP) and will be implemented by the appointed contractor. The appointed contractor will also prepare (and include in the CEMP) and implement a Construction Stage Mobility Management Plan (CSMMP), to actively encourage personnel to travel to site by sustainable means.	Construction

22.5 Air Quality

Table 22.3: Air Quality Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
AQ1	7.5.1	Construction Compounds and throughout (as required)	A series of mitigation measures will be implemented by the appointed contractor to minimise dust nuisance impacts: • Public roads affected by the Proposed Scheme works will be regularly inspected for soiling associated with the construction activities and cleaned as necessary; • Material handling systems and stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays (or similar dust suppression methods) will be used as required if particularly dusty activities associated with the construction contract are necessary during dry or windy periods; • During movement of dust generating materials both on and off-site, trucks will be covered with tarpaulin, and before entrance onto public roads, trucks will be checked to ensure the tarpaulins are properly in place; and • The appointed contractor will provide a site hoarding of 2.4m height along noise sensitive boundaries, at a minimum, at the Construction Compounds, which will assist in minimising the potential for dust impacts off-site. The appointed contractor will keep the effectiveness of the mitigation measures under review and revise them as necessary. In the event of dust nuisance occurring associated with the Proposed Scheme occurring outside the works boundary, movements of materials likely to raise dust will be curtailed and satisfactory procedures implemented to rectify the problem.	Construction

22.6 Climate

Table 22.4: Climate Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
CL1	8.7.1	Throughout (as required)	A series of mitigation measures have been incorporated into the Proposed Scheme with the goal of reducing the embodied carbon associated with the Construction Phase. These mitigation measures include: • The replacement, where feasible, of concrete containing Portland cement with concrete containing ground granulated blast furnace slag (GGBFS); • Where practicable, materials will be reused within the extent of the Proposed Scheme; and • Where practicable, materials will be sourced locally to reduce the embodied emissions associated with transport.	Construction

22.7 Noise and Vibration

Table 22.5: Noise and Vibration Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
NV1	9.5.1.1	Throughout (as required)	The appointed contractor will be required to take specific noise abatement measures to the extent required and comply with the recommendations of BS 5228–1 (BSI 2014a) and European Communities Noise Emissions by Equipment for Use Outdoors (Amendment) Regulations 2006 (S.I. No 241/2006). The mitigation measures outlined below for the Construction Phase have also been included in the Construction and Environmental Management Plan (Appendix A5.1 in Volume 4 of this EIAR). These measures will ensure that: • During the Construction Phase, the appointed contractor will be required to manage the works to comply with the limits detailed in Section 9.2.4.1 in Chapter 9 of this EIAR using methods outlined in BS 5228–1 (BSI 2014a); and • The best means practicable, including proper maintenance of plant and equipment, will be employed to minimise the noise produced by on site operations	Construction
NV2	9.5.1.1	Throughout (as required)	The appointed contractor will put in place the most appropriate noise control measures depending on the level of noise reduction required at individual working areas, i.e. based on the construction threshold values for noise and vibration set out in Table 9.8 and Table 9.11 in Chapter 9 of this EIAR. Table 9.38 in Chapter 9 of this EIAR indicates that intrusive works occurring within 75m of Noise Sensitive Locations (NSLs) will need specific noise control measures to reduce impacts depending on time period over which they will occur, i.e. daytime or evening.	Construction
NV3	9.5.1.1.1	Throughout (as required)	The potential for any item of plant to result in exceedance of construction noise thresholds (Table 9.8 and Table 9.11 in Chapter 9 of this EIAR) will be assessed prior to the item being brought onto the site. The least noisy item of plant will be selected wherever practicable (e.g. plant items with sound attenuation incorporated). Should a particular item of plant already on the site be found to exceed the construction noise thresholds, the first action will be to identify whether the item can be replaced with a quieter alternative.	Construction
NV4	9.5.1.1.2	Throughout (as required)	The following measures will be implemented by the appointed contractor to control noise at source in order to remain below the threshold values for noise set out in Table 9.7 in Chapter 9 of this EIAR, which relate to specific site considerations: • For mobile plant items such as dump trucks, planers, excavators and loaders, the installation of an acoustic exhaust, utilising an acoustic canopy to replace the normal engine cover and/or maintaining enclosure panels closed during operation can reduce noise levels by up to 10 dB; • For percussive tools such as pneumatic concrete breakers and tools a number of noise control measures include fitting muffler or sound reducing equipment to the breaker 'tool' and ensuring any leaks in the air lines are sealed; • Construction Compound LV2 and Construction Compound LV3 are in close proximity to NSLs (refer to Table 9.34 in Chapter 9 (Noise & Vibration) of this EIAR). Noisy items of plant or equipment will be sited away from noise sensitive boundaries; • Where compressors, generators and pumps are located in proximity to NSLs and have potential to exceed the construction noise thresholds, these will be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation; and • Resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds, while other noise nuisance can be controlled by fixing resilient materials in between the surfaces in contact.	Construction
NV5	9.5.1.1.3	Throughout (as required)	Erection of localised demountable enclosures or screens will be used around breakers or drill bits, as required, when in operation in proximity to NSLs boundaries with the potential to exceed the construction noise thresholds. Annex B of BS 5228–1 (BSI 2014a) (Figures B1, B2 and B3) provide typical details for temporary and mobile acoustic screens, sheds and enclosures that can be constructed on site from standard materials.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
NV6	9.5.1.1.3	Throughout (as required)	The appointed contractor will provide a site hoarding of 2.4m height along noise sensitive boundaries, at a minimum, at the Construction Compounds.	Construction
NV7	9.5.1.1.3	Throughout (as required)	Careful planning of the Construction Compounds including the placement of site buildings and stores between the site and NSLs will also be considered by the appointed contractor.	Construction
NV8	9.5.1.1.4	Throughout (as required)	Construction activities will be scheduled in a manner that reflects the location of the site and the nature of neighbouring properties. Construction activities / plant or equipment items will be considered with respect to their potential to exceed construction noise thresholds at NSLs and will be scheduled according to their noise level, proximity to sensitive locations and possible options for noise control. In situations where an activity with potential for exceedance of construction noise thresholds is scheduled (e.g. road widening and utility diversions or activities with similar noise levels identified in Table 9.24 in Chapter 9 of this EIAR), other construction activities will be scheduled to not results in significant cumulative noise levels.	Construction
NV9	9.5.1.1.5	Throughout (as required)	The NTA will establish clear forms of communication that will involve the contractor and NSLs in proximity to the works so that residents or building occupants are aware of the likely duration of activities likely to generate noise or vibration that are potentially significant as set out in Table 9.7 and Table 9.10 in Chapter 9 of this EIAR.	Construction
NV10	9.5.1.1.6	Throughout (as required)	During the Construction Phase the appointed contractor will carry out noise monitoring at representative NSLs to evaluate and inform the requirement and/or implementation of noise management measures. 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 NSLs to the working area which will progress along the length of the Proposed Scheme.	Construction
NV11	9.5.1.2	Throughout (as required)	During the Construction Phase the appointed contractor will carry out vibration monitoring at buildings and structures where proposed works have the potential to be at or exceed the vibration limit values in Table 9.11 in Chapter 9 of this EIAR. Vibration from construction activities will be limited to the values set out in Table 9.11 in Chapter 9 of this EIAR to avoid any form of potential cosmetic damage to buildings and structures.	Construction
NV12	9.5.1.2	Throughout (as required)	The appointed contractor will implement the following mitigation measures during the Construction Phase: • A clear communication programme will be established by NTA to inform adjacent building occupants in advance of any potential intrusive works which may give rise to vibration levels likely to result in significant effects as per Table 9.12 in Chapter 9 of this EIAR; • Activities capable of generating significant vibration effects with respect to human response (as per Table 9.12 in Chapter 9 of this EIAR) will be restricted to daytime hours only, as far as practicable; and • Appropriate vibration isolation (such as resilient mounts to pumps and generators) will be applied to plant and equipment, where required and where feasible.	Construction

22.8 Population

Table 22.6: Population Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation 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	N/A

22.9 Human Health

Table 22.7: Human Health Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
HH1	11.5.1	Throughout (as required) St James's Hospital	Access to all hospitals will be maintained. In accordance with the CEMP (Appendix A5.1 in Volume 4 of this EIAR) the appointed contractor shall ensure that access is provided to all emergency vehicles along all routes and accesses. In advance of construction works in the vicinity of St. James's Hospital, the appointed contractor will liaise with the hospital to inform them of the proposed construction traffic management arrangements.	Construction
HH2	11.5.1	Throughout (as required)	Mitigation for adverse psychosocial responses to the Construction Phase will include providing the public with sufficient information to enable people to plan their days, journeys and activities around the construction works and take control of their options to some extent. The appointed contractor will put in place a Communications Plan in accordance with NTA requirements. The Plan will provide a mechanism for members of the public to communicate with the NTA and the appointed contractor, and for the NTA and appointed contractor to communicate important information on various aspects of the Proposed Scheme to the public. This will include timely communication to the local community on the planned work activities, timings and traffic management.	Construction

22.10 Biodiversity

Table 22.8: Biodiversity Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
BD1	12.5.1	Throughout (as required)	Where deemed necessary a suitably experienced and qualified ecologist will be employed by the appointed contractor. The ecologist will advise the appointed contractor on ecological matters during construction, communicate all findings in a timely manner to the NTA and statutory authorities, acquire any licenses / consents required to conduct the work, and supervise and direct the ecological measures associated with the Proposed Scheme.	Construction
BD2	12.5.1.2.1	Throughout (as required)	Habitat Loss / Fragmentation Where practicable, areas of vegetation including habitats of Local Importance (Higher Value), such as mixed broadleaved woodland, scattered trees and parkland, treelines and hedgerow habitat types, which lie within the footprint, or along the boundary of the Proposed Scheme, will be retained. The areas of vegetation to be retained are shown on the Landscaping General Arrangement drawings (BCIDB-JAC-ENV_LA-0007_XX_00-DR-LL-9001) in Volume 3 of this EIAR. These areas will be protected by the appointed contractor for the duration of construction works and fenced off at an appropriate distance.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
BD3	12.5.1.2.1	Throughout (as required)	Habitat Loss / Fragmentation To mitigate the loss of habitat, proposed planting incorporated into the Proposed Scheme will be implemented by the appointed contractor. This planting is listed below and displayed on the Landscaping General Arrangement (BCIDB-JAC-ENV_LA-0007_XX_00-DR-LL-9001) in Volume 3 of this EIAR. • 354 street trees planted; • 220m of proposed hedgerow; • 5092m^2 of proposed species rich grassland; • 1971m^2 of proposed ornamental planting; and • 1958m^2 of proposed amenity grassland planting	Construction
Refer to WT1 – WT2 in Table 22.9	12.5.1.2.2	Construction Compounds and throughout (as required)	Habitat Degradation – Surface Water Quality In terms of mitigation a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, in Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme. It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval. At a minimum, all the control and management measures set out in the SWMP will be implemented by the appointed contractor. This includes measures relating to: • Construction Compound management including the storage of fuels and materials; • Control of Sediment; • Use of Concrete; • Management of vehicles and plant including refuelling and wheel wash facilities (if necessary); and • Monitoring. Specific mitigation measures which the appointed contractor will implement in relation to surface water quality at Construction Compound LV3 are outlined in WT2.	Construction
BD4	12.5.1.2.3	Throughout (as required)	Habitat Degradation – Groundwater The mitigation measures which will be applied by the appointed contractor to control pollution of soil and groundwater during the Construction Phase are outlined in LSGH7, LSGH8 and LSGH 9 in Table 22.10 in this Chapter of the EIAR.	Construction
Refer to AQ1 in Table 22.3	12.5.1.2.4	Construction Compounds and throughout (as required)	Habitat Degradation – Air Quality The mitigation measures which will be applied by the appointed contractor to control dust emissions during the Construction Phase are outlined in Table 22.3 of this Chapter of the EIAR.	Construction
BD5	12.5.1.2.5	Throughout (as required)	Habitat Degradation – Invasive Species The NTA will ensure that a confirmatory pre-construction invasive species survey will be undertaken by a suitably qualified specialist to confirm the absence and/or extent of all Third Schedule invasive species within the footprint of the Proposed Scheme. Where an infestation is confirmed / identified within the footprint of the Proposed Scheme, this will require the implementation of a Non-Native Invasive Species Management Plan (ISMP) (refer to the Plan contained in the CEMP in Appendix A5.1 of Volume 4 of this EIAR). Following the confirmatory pre-construction survey, mitigation measures outlined in BD6 and BD7 will be implemented, as required.	Pre-Construction / Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
BD6	12.5.1.2.5	Throughout (as required)	Habitat Degradation – Invasive Species Where a pre-construction invasive species re-survey has confirmed the presence of previously identified Third Schedule non-native invasive species, or identifies newly established non-native invasive species within the footprint of the Proposed Scheme, the ISMP produced will provide a detailed description of the infestations (e.g. approximate area of the respective colonies (m^2), where feasible; approximate total number of stems, pattern of growth and information on other vegetation present), and where necessary, include calculations of volumes of infested soils to be excavated. The ISMP will be finalised following the pre-construction survey as advised by a suitably qualified specialist, with regard to The Management of Invasive Alien Plant Species on National Roads – Technical Guidance (TII 2020a) and Standard (TII 2020b) and other species-specific guidance documents including those listed in the ISMP, as necessary.	Pre-Construction / Construction
BD7	12.5.1.2.5	Throughout (as required)	Habitat Degradation – Invasive Species The NTA will ensure that all control measures specified in the Proposed Scheme ISMP shall be implemented by a suitably qualified and licensed specialist prior to the construction of the Proposed Scheme to control the spread of non-native invasive species within the footprint of the Proposed Scheme. Furthermore, the appointed contractor will adhere to control measures specified within the ISMP throughout the Construction Phase of the Proposed Scheme. The site will be monitored by the appointed contractor after control measures have been implemented. Any re-growth will be subsequently treated as detailed in the Proposed Scheme ISMP.	Pre-Construction / Construction
BD8	12.5.1.4.1.1	Grattan Crescent (Refer to Figure 12.7.2 in Volume 3 of this EIAR)	**Bats** Protection of Bats During Vegetation Clearance A total of two trees with Potential Roosting Features (PRFs) were identified within the footprint of the Proposed Scheme. These will not be removed during the Construction Phase of the Proposed Scheme, and the following mitigation measures will be followed: • Retained trees with PRFs will be fenced off at the outset of works and for the duration of construction to avoid structural damage to the trunk, branches, or root system of the tree which could disturb roosting bats. Temporary fencing will be erected at a sufficient distance from the tree so as to enclose the Root Protection Area (RPA) of the tree. The RPA will be defined based upon the recommendation of a qualified arborist; • Where fencing is not feasible due to insufficient space, protection for the tree will be afforded by wrapping hessian sacking (or suitable equivalent) around the trunk of the tree and strapping stout buffer timbers around it; • The area within the RPA will not be used for vehicle parking or the storage of materials (including soils, oils and chemicals). The storage of hazardous materials (e.g. hydrocarbons) or concrete washout areas will not be undertaken within 10m of any retained trees, hedgerows and treelines; • A qualified arborist engaged by the appointed contractor will assess the condition of, and advise on any repair works necessary to, any trees which are to be retained or that lie outside of the Proposed Scheme footprint but whose RPA is impacted by the works; • Where works are required within the RPA, the mitigation measures as set out in the method statement within the Arboricultural Impact Assessment (refer to Appendix A17.1 in Volume 4 of this EIAR) will be implemented; and • There will be no additional lighting within 5m of the PRF during the Construction Phase of the Proposed Scheme to avoid disturbance to roosting bats.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
BD9	12.5.1.4.1.2	Throughout (as required)	**Bats** Habitat Loss and Fragmentation Planting of treeline, hedgerow and grassland habitats within the Proposed Scheme footprint will be carried out by the appointed contractor, as detailed in the landscape drawings which will provide suitable habitat for the bat species recorded within the study area (Refer to the Landscaping General Arrangement drawings (BCIDB-JAC-ENV_LA-0007_XX_00-DR-LL-9001) in Volume 3 of this EIAR).	Construction
BD10	12.5.1.4.1.3	Throughout (as required)	**Bats** Disturbance of Flight Patterns / Foraging Routes as a Result of Lighting The appointed contractor in liaison with the suitably qualified licensed ecologist(s) will ensure that lighting at the construction compounds, and active work areas in proximity to known bat activity, will be designed to minimise light spill and be cognisant of light-spill onto these areas. Mitigation measures to reduce light spill will include the following: • The use of sensor / timer triggered lighting; • LED luminaires to be used where practicable; • Column heights to be considered to minimise light spill; and • Accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only where needed.	Construction
BD11	12.5.1.4.1.3	Throughout (as required)	**Bats** Measures to Prevent Disturbance / Displacement Where night time works are required the appointed contractor will liaise with the engaged suitably qualified and licensed ecologist(s) and implement measures to mitigate the impact of such works (especially works carried adjacent to watercourses with known bat activity).	
BD12	12.5.1.4.2.1	Throughout (as required)	**Badgers** Disturbance / Displacement The NTA will ensure that a confirmatory pre-construction check of all suitable badger habitat will be completed within 12 months prior to any construction works commencing. The presence of any new setts or significant badger activity will be treated and / or protected in accordance with the Guidelines for the Treatment of Badgers during the Construction of National Road Schemes (NRA 2005b).	Pre-Construction
BD13	12.5.1.4.2.2	Throughout (as required)	**Badgers** Protection of Badgers from Accidental Harm During Construction (Excavations) To protect badgers from indirect harm during construction, where practicable open excavations will be covered when not in use and backfilled as soon as practicable by the appointed contractor. Excavations will also be covered at night, where practicable, and any deep excavations which must be left open will have appropriate egress ramps in place to allow mammals to safely exit should they fall in.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
Refer to WT1 – WT2 in Table 22.9	12.5.1.4.3.1	Construction Compounds and throughout (as required)	**Otter** Habitat Degradation / Reduced Prey Availability – Water Quality In terms of mitigation a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, in Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme. It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval. At a minimum, all the control and management measures set out in the SWMP will be implemented by the appointed contractor. This includes measures relating to: • Construction Compound management including the storage of fuels and materials; • Control of Sediment; • Use of Concrete; • Management of vehicles and plant including refuelling and wheel wash facilities (if necessary); and • Monitoring. Specific mitigation measures which the appointed contractor will implement in relation to surface water quality at Construction Compound LV3 are outlined in WT2.	Construction
BD14	12.5.1.4.3.2	Throughout (as required)	**Otter** Loss of Breeding / Resting Sites The NTA will ensure that a confirmatory pre-construction check of all suitable otter habitat will be completed within the 12-month period prior to any construction works commencing. The presence of any new holt / couch sites will be treated and/or protected in accordance with the Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes (NRA 2008c).	Pre-Construction
BD15	12.5.1.4.3.3	Throughout (as required)	**Otter** Measures to Prevent Injury / Mortality Impacts Prior to construction works commencing, the appointed contractor will engage the services of a suitably qualified ecologist to conduct a pre-construction otter survey of the Proposed Scheme in accordance with Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (NRA 2008c).	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
Refer to WT1 – WT2 in Table 22.9	12.5.1.4.4.1	Construction Compounds and throughout (as required)	**Marine Mammals** Habitat and Food Resource Degradation – Water Quality In terms of mitigation a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, in Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme. It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval. At a minimum, all the control and management measures set out in the SWMP will be implemented by the appointed contractor. This includes measures relating to: • Construction Compound management including the storage of fuels and materials; • Control of Sediment; • Use of Concrete; • Management of vehicles and plant including refuelling and wheel wash facilities (if necessary); and • Monitoring. Specific mitigation measures which the appointed contractor will implement in relation to surface water quality at Construction Compound LV3 are outlined in WT2.	Construction
BD16	12.5.1.5.1.2	Throughout (as required)	**Breeding Birds** Mortality Risk Where feasible, vegetation (e.g. hedgerows, trees, scrub and grassland) will not be removed, between 01 March and 31 August, to avoid direct impacts on nesting birds. Where the construction programme does not allow this seasonal restriction to be observed, then these areas will be inspected by a suitably qualified ecologist as engaged by the appointed contractor, for the presence of breeding birds prior to clearance. Areas found not to contain nests will be cleared within 3 days of the nest survey, otherwise repeat surveys will be required. Vegetation clearance will not commence where nests are present, works will resume when birds have fledged and nests are no longer in use, or an agreement is reached with NPWS.	Construction
BD17	12.5.1.5.1.3	Throughout (as required)	**Breeding Birds** Disturbance / Displacement The appointed contractor will implement the noise mitigation measures described in NV4, NV6 and NV7 in Table 22.5 in this Chapter.	Construction
BD18	12.5.1.5.1.4	Throughout (as required)	**Breeding Birds** Habitat Loss and Fragmentation Planting of treeline, hedgerow and grassland habitats within the Proposed Scheme footprint will be carried out by the appointed contractor, as detailed in the landscape drawings. Refer to the Landscaping General Arrangement drawings (BCIDB-JAC-ENV_LA-0007_XX_00-DR-LL-9001) in Volume 3 of this EIAR for locations.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
BD19	12.5.1.5.2.2	Throughout (as required)	**Wintering Birds** Measures to Prevent Disturbance and Displacement Impacts During Construction The following mitigation measures will be put in place at the Construction Compounds by the appointed contractor to minimise disturbance to SCI bird species: • The appointed contractor will undertake the establishment of the Construction Compounds outside of the wintering bird season (October to March), where practicable. However, where the construction programme does not allow this seasonal restriction to be observed, then the Construction Compounds will be inspected by a suitably qualified ecologist as engaged by the appointed contractor, for the presence of wintering birds prior to establishment. Where wintering birds are observed the suitably qualified ecologist will, in discussion with the appointed the contractor, advise how works will be appropriately undertaken. • Hoarding of the Construction Compounds will be in place prior to the arrival of wintering birds and will be retained on all sides of the compound for the duration of the works. • In addition to lighting at the Construction Compounds aligning with BD10, the lighting column heights will be considered by the appointed contractor, so as not to act as an obstacle to birds.	Construction
Refer to WT1 – WT2 in Table 22.9	12.5.1.5.1.1 & 12.5.1.5.2.1	Construction Compounds and throughout (as required)	**Breeding Birds / Wintering Birds** Habitat Degradation – Water Quality In terms of mitigation a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, in Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme. It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval. At a minimum, all the control and management measures set out in the SWMP will be implemented by the appointed contractor. This includes measures relating to: • Construction Compound management including the storage of fuels and materials; • Control of Sediment; • Use of Concrete; • Management of vehicles and plant including refuelling and wheel wash facilities (if necessary); and • Monitoring. Specific mitigation measures which the appointed contractor will implement in relation to surface water quality at Construction Compound LV3 are outlined in WT2.	Construction
BD20	12.5.1.7.1	Throughout (as required)	**Amphibians** Habitat Loss, Disturbance and Mortality Risk If vegetation clearance works by the appointed contractor are to begin during the season where frogspawn or tadpoles may be present (i.e. February to mid-summer), or where breeding adult newts, their eggs or larvae may be present (i.e. mid-March to September), a pre-construction survey of suitable habitat will be undertaken by a suitably qualified ecologist engaged by the appointed contractor to determine whether breeding amphibians are present. Where amphibians are present, mitigation measures outlined in BD21, BD22 and BD23 will be completed before works recommence.	Construction
BD21	12.5.1.7.1	Throughout (as required)	In the case of common frog, any frog spawn, tadpoles, juvenile or adult frogs present will be captured, under a licence from NPWS, and removed from affected habitat by hand net and translocated to the nearest area of available suitable habitat, beyond the Zone of Influence (ZoI) of the Proposed Scheme.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
BD22	12.5.1.7.1	Throughout (as required)	In the case of smooth newt, individuals will be captured, under a licence from NPWS, and removed from affected habitat either by hand net or by trapping and translocated to the nearest area of available suitable habitat, beyond the ZoI of the Proposed Scheme. If used, the type and design of traps shall be approved by the NPWS. This is a standard and proven method of catching and translocating smooth newt.	Construction
BD23	12.5.1.7.1	Throughout (as required)	If the size or depth of the habitat feature is such that it cannot be determined by a visual survey whether all amphibians have been captured, the suitably qualified ecologist engaged by the appointed contractor will advise on the appropriate course of action to confirm that no amphibian species remain. If drainage of the habitat feature is deemed to be the appropriate course of action, any mechanical pumps used will have a screen fitted, and be sited, such that no amphibian species can be sucked into the pump mechanism. Any capture and translocation works shall be undertaken immediately in advance of site clearance / construction works commencing.	Construction
Refer to WT1 – WT2 in Table 22.9	12.5.1.7.2 & 12.5.1.8.1	Construction Compounds and throughout (as required)	**Amphibians / Fish** Habitat Degradation – Surface Water Quality In terms of mitigation a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, in Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme. It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval. At a minimum, all the control and management measures set out in the SWMP will be implemented by the appointed contractor. This includes measures relating to: • Construction Compound management including the storage of fuels and materials; • Control of Sediment; • Use of Concrete; • Management of vehicles and plant including refuelling and wheel wash facilities (if necessary); and • Monitoring. Specific mitigation measures which the appointed contractor will implement in relation to surface water quality at Construction Compound LV3 are outlined in WT2.	Construction
BD24	12.5.2.2.1	Throughout (as required)	Habitat Degradation – Surface Water Quality The proposed SuDs drainage system, as shown in Proposed Surface Water Drainage Works drawings (BCIDB-JAC-DNG_RD-0007_XX_00-DR-CD-9001) in Volume 3 of this EIAR, will be installed by the appointed contractor during the Construction Phase. In the Operational Phase the maintenance regime for SuDS will be carried out by the Local Authorities and will be subject to their management procedures. No additional mitigation is required.	Operational
BD25	12.5.2.2.2	Throughout (as required)	Habitat Degradation – Invasive Species Once the Proposed Scheme is in operation, the local authorities will implement a maintenance and management regime subject to their management procedures, where any introduction of non-native invasive plant species will be managed. No additional mitigation is required.	Operational

22.11 Water

Table 22.9: Water Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
WT1	13.5.2	Construction Compounds and throughout (as required)	A Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme. It will be a condition within the Employer's Requirements that the successful contractor(s), immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval. At a minimum, all the control and management measures set out in the SWMP will be implemented by the appointed contractor. This includes measures relating to: • Construction Compounds management including the storage of fuels and materials • Control of Sediment; • Use of concrete; • Management of Vehicles and Plant, including refuelling and wheel wash facilities (if necessary); and • Monitoring	Construction
WT2	13.5.2.2	Construction Compound LV3	Activities within Construction Compound LV3 will be largely controlled as set out in the general measures in the SWMP. In addition, all surface water drains in the vicinity will be identified by the appointed contractor and either stopped up or bunded on the side closest to the Construction Compound. The perimeter wall along the pavement significantly reduces the risk of any silty water runoff or spillages reaching the surface water drains in the road; this will be retained in so far as is reasonably practicable. Where it is required to be removed, for example to facilitate access to the site, this will be done as far from the surface water gullies as is practicable. Protection measures as set out above will reduce the risk of contaminants reaching the surface water system. The appointed contractor will ensure that appropriate spill control equipment is available, to control any spillages to the gullies should a spillage occur. The CEMP includes an Environmental Incident Response Plan, which will apply for the management of any incidents that may occur.	Construction

22.12 Land, Soils, Geology and Hydrogeology

Table 22.10: Land, Soils, Geology and Hydrogeology Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
LSGH1	14.5.1.1	Throughout (as required)	Loss or Damage of Topsoil Excavated topsoils will be stockpiled by the appointed contractor 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.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
LSGH2	14.5.1.1	Throughout (as required)	Loss or Damage of Topsoil All topsoil or subsoil shall be assessed for re-use within the Proposed Scheme by the appointed contractor ensuring the appropriate handling, processing and segregation of the material. Where practical the removal of topsoil from the Proposed Scheme 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 to allow maximum opportunity for the reuse of materials on site.	Construction
LSGH3	14.5.1.2	Throughout (as required)	Excavation of Potentially Contaminated Ground The appointed contractor will ensure that excavations shall be kept to a minimum, using shoring or trench boxes where appropriate. For more extensive excavations, a temporary works designer shall be appointed by the appointed contractor to design excavation support measures in accordance with all relevant guidelines that minimises the excavation of contaminated ground.	Construction
LSGH4	14.5.1.2	Throughout (as required)	Excavation of Potentially Contaminated Ground The appointed contractor will be responsible for regular testing of excavated soils to monitor the suitability of the soil for reuse.	Construction
LSGH5	14.5.1.2	Throughout (as required)	Excavation of Potentially Contaminated Ground Samples of ground suspected of contamination will be tested for contamination by the appointed contractor during the detailed ground investigation and ground excavated from these areas will be disposed of to a suitably licensed or permitted site in accordance with the current Irish waste management legislation.	Construction
LSGH6	14.5.1.2	Throughout (as required)	Excavation of Potentially Contaminated Ground Any dewatering in areas of contaminated ground shall be designed by the appointed contractor to minimise the mobilisation of contaminants into the surrounding environment.	Construction
LSGH7	14.5.1.3	Throughout (as required)	Pollution of Soil and Groundwater Good construction management practices as outlined in the CIRIA guidance Control of Water Pollution from Construction Sites – Guidance for consultants and contractors (Masters-Williams et al. 2001) will be employed by the appointed contractor to minimise the risk of transmission of hazardous materials as well as pollution of adjacent watercourses and groundwater. The construction management of the site will take account of these recommendations to minimise as far as possible the risk of soil, groundwater and surface water contamination.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
LSGH8	14.5.1.3	Throughout (as required)	Pollution of Soil and Groundwater Measures to be implemented to minimise the risk of spills and contamination of soils and waters include: • Employing only competent and experienced workforce, and site-specific training of site managers, foremen and workforce, including all subcontractors, in pollution risks and preventative measures; • Ensure that all areas where liquids (including fuel) are stored, or cleaning is carried out, are in 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; • The location of any fuel storage facilities shall be considered in the design of all Construction Compounds. These are to be designed in accordance with relevant guidelines and codes of best practice and will be fully bunded; • Good housekeeping at the site (daily site clean-ups, use of disposal bins, etc.) during the entire Construction Phase; • Potential pollutants to be adequately secured against vandalism; • Provision of proper containment of potential pollutants according to codes of best practice; • Thorough control during the entire Construction Phase to ensure that any spillage is identified at early stage and subsequently effectively contained and managed; and • 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.	Construction
LSGH9	14.5.1.3	Throughout (as required)	Pollution of Soil and Groundwater An Environmental Incident Response Plan, as described in the CEMP (Appendix A5.1 CEMP in Volume 4 of this EIAR). 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.	Construction
LSGH10	14.5.1.3	Throughout (as required)	Pollution of Soil and Groundwater Sediment control methods are outlined in the Surface Water Management Plan within the CEMP (Appendix A5.1 in Volume 4 of this EIAR), and these will be implemented by the appointed contractor.	Construction

22.13 Archaeological and Cultural Heritage

Table 22.11: Archaeological and Cultural Heritage Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
ACH1	15.5.1.1	Throughout (as required)	The NTA will procure the services of a suitably-qualified archaeologist as part of its Employer's Representative team administering and monitoring the works.	Pre-Construction
ACH2	15.5.1.1	Throughout (as required)	The appointed contractor will make provision for archaeological monitoring to be carried out under licence to the Department of Housing, Local Government and Heritage (DHLGH) and the National Museum of Ireland (NMI), and will ensure the full recognition of, and the proper excavation and recording of, all archaeological soils, features, finds and deposits which may be disturbed below the ground surface. All archaeological issues will be resolved to the satisfaction of the DHLGH and the NMI.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
ACH3	15.5.1.1	Throughout (as required)	The appointed contractor will ensure that the archaeologist as described in ACH5 will have the authority to inspect all excavation to formation level for the proposed works and to temporarily halt the excavation work, if, and as necessary, having conferred with the NTA. They will be given the authority to ensure the temporary protection of any features of archaeological importance identified, having conferred with the NTA. The archaeologist will be afforded sufficient time and resources to record and remove any such features identified in accordance with the licensing requirements agreed.	Construction
ACH4	15.5.1.1	Throughout (as required)	The appointed contractor will make provision to allow for the necessary archaeological monitoring, inspection and excavation works that may arise on the site during the Construction Phase.	Construction
ACH5	15.5.1.1.1	Throughout (as required)	An experienced and competent licence-eligible archaeologist will be employed by the appointed contractor to advise on archaeological and cultural heritage matters during construction, to communicate all findings in a timely manner to the NTA and statutory authorities, to acquire any licenses / consents required to conduct the work, and to supervise and direct the archaeological measures associated with the Proposed Scheme.	Construction
ACH6	15.5.1.1.1	Throughout (as required)	Licence applications are made by the licence-eligible archaeologist to the National Monuments Service at the DHLGH. In addition to a detailed method statement, the applications must include a letter from the NTA that confirms the availability of adequate funding. There is a prescribed format for the letter that must be followed.	Construction
ACH7	15.5.1.1.1	Throughout (as required)	The archaeologist will be provided with information on where and when the various elements and ground disturbance will take place.	Construction
ACH8	15.5.1.1.1	Throughout (as required)	Once the presence of archaeologically significant material is established, full archaeological recording of such material is recommended in accordance with the licensing requirements. If it is not possible for the construction works to avoid the material, full excavation of the archaeologically significant material will be recommended. The extent and duration of excavation will be advised by the client's archaeologist and will be a matter for discussion between the NTA and the licensing authorities.	Construction
ACH9	15.5.1.1.1	Throughout (as required)	Secure storage for artefacts recovered during the course of the monitoring and related work will be provided by the appointed contractor.	Construction
ACH10	15.5.1.1.1	Throughout (as required)	During construction all construction traffic and the management of materials will be restricted where practicable by the appointed contractor so as to avoid any newly revealed archaeological or cultural heritage sites and their environs to ensure no damage to a site of archaeological interest.	Construction
ACH11	15.5.1.2	Throughout (as required)	Features of a cultural heritage interest that are required to be removed on a temporary basis or for a short-term period, will be removed under archaeological supervision and in accordance with a method statement in consultation with the NTA and the relevant statutory authorities.	Construction
ACH12	15.5.1.4.2	Le Fanu Road to Sarsfield Road Statue (CBC0007CH001)	The statue (CBC0007CH001) will be removed to protect it from any adverse impacts and will be re-erected as part of the public realm works to the front of the Church of Our Lady of the Assumption.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
ACH13	15.5.1.5.1.1	Sarsfield Road to City Centre National Monuments (St. James's Gate City Defences - RMP DU018-020001; Cornmarket City Defences - RMP DU018-020001)	With regard to ground-breaking works, excavation, or earth-moving works at the sites of the City Defences (St James's Gate) and City Defences (Cornmarket) (RMP DU018-020001, national monument), archaeological consent is required from the Minister of HLGH. Archaeological monitoring of the works will require Ministerial Directions from the Minister under the terms of the National Monuments (Amendment) Act 2004. The appointed contractor will, in liaison with the experienced and competent licence-eligible archaeologist, ensure that the archaeological consent is applied for.	Construction
ACH14	15.5.1.5.1.2	Sarsfield Road to City Centre RMP / SMR Sites (DU018-020; DU018-020289; DU018-020233; DU018-020228; DU018-020229; DU018-020374; DU018-020056; DU018-020139; DU018-020135; DU018-020222; DU018-020272; DU018-020346; DU018-020074; DU018-020672; DU018-020620; DU018-020223; DU018-020338; DU018-020652; DU018-020556; DU018-020062; DU018-020070; DU018-020410; DU018-020216; DU018-020218; DU018-020224; DU018-020872; DU018-020936; DU018-020227; DU018-020570; DU018-020585; DU018-020587; DU018-445; DU018-446; DU018-447; DU018-448; DU018-449; DU018-451; DU018-452)	Archaeological monitoring (as defined in Section 15.5.1.1 in Chapter 15 of this EIAR) under licence will take place, where any preparatory ground-breaking or ground reduction works are required (as defined in section 15.4.1 in Chapter 15 of this EIAR), at the following locations: • Within the designated ZAP for the Historic City of Dublin (DU018-020); • At the following RMP / SMR sites which lie within the Proposed Scheme: the sites of four bridges (DU018-020289, 020233, -020228, -020229), two watercourses (DU018-020374, -020056), a house - 16th/17th century (DU018-020139), a shambles (DU018-020135), a house - indeterminate date (DU018-020222); and • Where the Proposed Scheme runs alongside the following RMP / SMR sites, where associated features may survive below ground within the Proposed Scheme: a burial site (DU018-020272), the sites of two churches (DU018-020346, -020074), a watercourse (DU018-020672), a riverine revetment (DU018-020620), four houses of indeterminate date (DU018-020223, -020338, -020652, -020556), a hospital (DU018-020062), a chapel (DU018-020070), a prison (DU018-020410) six medieval houses (DU018-020216 to -020218, -020224, -020872, -020936), an unclassified mill (DU018-020227), and at three habitation sites (DU018-020570, -020585, -020587), two 18th century houses (DU018-445, -446), and four 17th / 18th century houses (DU018-447, -448, -449, -451, -452). It is in these areas that there is a possibility to disturb intact archaeological layers and material. Licensed archaeological excavation, in full or in part, of any identified archaeological remains (preservation by record) or preservation in situ will be undertaken.	Construction
ACH15	15.5.1.5.1.3	Sarsfield Road to City Centre Non-Designated Sites (CBC0809AH002; DCIHR 18-10-038; DCIHR 18-11-002; CBC0007AH001; DCIHR 18-11-210; DCIHR 18-11-211)	Archaeological monitoring (as defined in section 15.5.1.1 in Chapter 15 of this EIAR) under licence will take place, where any preparatory ground-breaking or ground reduction works are required (as defined in section 15.4.1 in Chapter 15 of this EIAR), at the following locations: • On James's Street, Thomas Street West and Thomas Street (CBC0809AH002), from Chainage B7740 (and K100) to B8720, where there are intact archaeological remains of medieval and post-medieval date surviving below the existing road and pavement surfaces; and • Along the route of the former tramline from Emmet Road to High Street (DCIHR 18-10-038 and 18-11-002, from Chainage B5720 to B9000), at the site of the bridge at Emmet Road (CBC0007AH001), and at the sites of the Glib Market and Corn Market House that once stood on Thomas Street (DCIHR 18-11-210 and 18-11-211). It is in these areas that there is a possibility to disturb intact archaeological layers and material. Licensed archaeological excavation, in full or in part, of any identified archaeological remains (preservation by record) or preservation in situ will be undertaken.	Construction
ACH16	15.5.1.5.2	Sarsfield Road to City Centre Guinness Tunnel (NIAH 50080142)	With regard to the Guinness Tunnel (NIAH 50080142) that runs beneath James's Street, while there is no potential impact, the location of the tunnel is marked on Figure 15.1 in Volume 3 of this EIAR and will be included in the Construction Strategy by the appointed contractor to ensure that the archaeologist monitoring the Proposed Scheme is aware of its presence.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
ACH17	15.5.1.6.1	Construction Compounds and Attenuation Ponds	Archaeological monitoring (as defined in Section 15.5.1.1 in Chapter 15 of this EIAR) will take place at the early stages of construction, where any preparatory ground-breaking or ground reduction works are required (as defined in Section 15.4.1 in Chapter 15 of this EIAR) at Construction Compounds LV2 and LV3. This will be undertaken in order to establish the presence or absence, as well as the nature and extent, of any archaeological deposits, features or sites that may be present in these areas.	Construction

22.14 Architectural Heritage

Table 22.12: Architectural Heritage Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
AH1	16.5.1.1	Protected Structures: Former De La Salle School, Ballyfermot Road (DCC RPS 8784) – affected railings, gates and gate posts.	Mitigation consists of recording of the entrance piers and investigative / opening up works to determine the construction before being taken down, labelling the affected railings, gates, gate posts, prior to their careful removal to safe storage, and their reinstatement on new lines, which faithfully reinstate the existing details, and the relationships between the entrances and the historic buildings. Recording is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee any labelling, taking-down and reinstatement of the affected gates, railings, piers and plinths. Works to historic fabric will be carried out in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH2	16.5.1.1	Protected Structures throughout (as required): Nine structures of National Importance and High Sensitivity (DCC RPS 856; DCC RPS 8786; RMP DU018020074; RMP DU018020062; RMP DU018020001; RMP DU018020075 (Nat. Mon. No. 34); DCC RPS 3822; RMP DU018020270; RMP DU018020342)	Mitigation to offset the risk of damage will include recording, protection and monitoring of the adjoining structures or boundaries prior to, and for the duration of the Construction Phase. Recording, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH3	16.5.1.1	Protected Structures throughout (as required): 92 structures of Regional Importance and Medium Sensitivity (as listed in Appendix A16.2 Inventory of Architectural Heritage Sites in Volume 4 of this EIAR)	Mitigation to offset the risk of damage will include recording, protection and monitoring of the structures or boundaries (as relevant) prior to, and for the duration of the Construction Phase. Recording, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
AH4	16.5.1.2	Architectural Conservation Areas: Thomas Street Architectural Conservation Areas	Mitigation to offset the risk of damage will include recording, protection and monitoring of the adjoining structures or boundaries prior to, and for the duration of the Construction Phase. Recording, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH5	16.5.1.3	Conservation Areas of Local Importance, Low Sensitivity: Grattan Crescent Conservation Area and the Camac Conservation Area	Mitigation to offset the risk of damage will include recording, protection and monitoring of the boundaries prior to, and for the duration of the Construction Phase. Recording, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH6	16.5.1.3	Conservation Areas of National Importance, High Sensitivity: James's Street Conservation Area, Cornmarket Conservation Area, Bridge Street Conservation Area and High Street Conservation Area	Mitigation to offset the risk of damage will include recording, protection and monitoring of the adjoining structures or boundaries prior to, and for the duration of the Construction Phase. Recording, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH7	16.5.1.4	NIAH Structures: Mount La Salle, Ballyfermot Road (NIAH 50080372) – affected railings, gates and gate posts.	Mitigation consists of recording the of the entrance piers and investigative / opening up works to determine the construction before being taken down, labelling the affected railings, gates, gate posts, prior to their careful removal to safe storage, and their reinstatement on new lines, which faithfully reinstate the existing details, and the relationships between the entrances and the historic buildings. Recording is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee any opening up works, labelling, taking-down and reinstatement of the affected gates, railings, piers and plinths. Works to historic fabric will be carried out in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH8	16.5.1.4	NIAH Structures throughout (as required): 55 NIAH structures of Regional Importance, Medium Sensitivity (as listed in Appendix A16.2 Inventory of Architectural Heritage Sites in Volume 4 of this EIAR)	Mitigation to offset the risk of damage will include recording, protection and monitoring of the structures or boundaries (as relevant) prior to, and for the duration of the Construction Phase. Recording, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH9	16.5.1.4	NIAH Structures throughout (as required): 23 NIAH structures of Local Importance, Low Sensitivity (as listed in Appendix A16.2 Inventory of Architectural Heritage Sites in Volume 4 of this EIAR)	Mitigation to offset the risk of damage will include recording, protection and monitoring of the structures or boundaries (as relevant) prior to, and for the duration of the Construction Phase. Recording, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
AH10	16.5.1.5	Designed Landscapes: Markievicz Park (CBC0007BTH154) on Ballyfermot Road	Mitigation consists of careful recording before the boundary railings are taken down. Recording is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee any opening up works, labelling, taking-down and reinstatement of the affected railings and plinths. If possible, the materials are to be retained for reuse. The boundary is to be rebuilt like for like. Works to historic fabric will be carried out in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH11	16.5.1.5	Designed Landscapes: Grattan Crescent Park (CBC0007BTH138)	Mitigation to offset the risk of damage will include recording, protection and monitoring of the adjoining structures or boundaries prior to, and for the duration of the Construction Phase. Recording, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH12	16.5.1.6	Other Structures: St Raphael's, St Gabriel's and St Michael's National School, Ballyfermot Road (CBC0007BTH008) – boundary plinth and boundary railings	Mitigation consists of recording of the boundary plinth and railings before the boundary railings are taken down, labelling the affected railings, prior to their careful removal to safe storage, and their reinstatement on new lines, which faithfully reinstate the existing details, and the relationships between the entrances and the historic buildings. Recording is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee any opening up works, labelling, taking-down and reinstatement of the affected railings and plinths. If possible, the materials are to be retained for reuse. The boundary is to be rebuilt like for like. Works to historic fabric will be carried out in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH13	16.5.1.6	Other Structures throughout (as required): 65 structures of Regional Importance, Medium Sensitivity (as listed in Appendix A16.2 Inventory of Architectural Heritage Sites in Volume 4 of this EIAR)	Mitigation to offset the risk of damage will include recording, protection and monitoring of the structures or boundaries (as relevant) prior to, and for the duration of the Construction Phase. Recording, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH14	16.5.1.6	Other Structures throughout (as required): 34 structures of Local Importance, Low Sensitivity (as listed in Appendix A16.2 Inventory of Architectural Heritage Sites in Volume 4 of this EIAR)	Mitigation to offset the risk of damage will include recording, protection and monitoring of the structures or boundaries (as relevant) prior to, and for the duration of the Construction Phase. Recording, overseeing of protective measures and monitoring of the relevant structures is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
AH15	16.5.1.7.1	Post Boxes: Ballyfermot Road (NIAH 50080371) post box	Mitigation consists of the recording of the post box in position prior to the works, the labelling of the affected fabric prior to its careful removal to safe storage, and its reinstatement in a new position in close proximity (within 20m) of its existing position. Recording is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee the labelling, taking-down and reinstatement. The works to the historic fabric will be carried out in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH16	16.5.1.7.1	Post Boxes: Five post boxes (NIAH 50080457, NIAH 50080458, NIAH 50080442, NIAH 50080384, CBC0007PB006)	Mitigation consists of the recording, protection and monitoring prior to and during the Construction Phase. Recording, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor and in accordance with the methodology provided in Appendix A.16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of the EIAR.	Construction
AH17	16.5.1.7.2	Lamp Posts: Five locations with lamp posts of Regional Importance, Medium Sensitivity (James's Street (CBC0007LP023); Cornmarket (CBC0007LP063); Junction of High Street, Cornmarket and Bridge Street (CBC0007LP072, CBC0007LP073); High Street (CBC0007LP076))	Mitigation consists of the recording of the lamp posts in position prior to the works, the labelling of the affected fabric prior to its careful removal to safe storage, and their reinstatement in new positions in close proximity (within 2m) of their existing positions. Recording is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee the labelling, taking-down and reinstatement. The works to the historic fabric will be carried out in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH18	16.5.1.7.2	Lamp Posts throughout (as required): 79 lamp posts of Regional Importance, Medium Sensitivity (as listed in Appendix A16.2 Inventory of Architectural Heritage Sites in Volume 4 of this EIAR)	Mitigation consists of the recording, protection and monitoring prior to and during the Construction Phase. Recording, overseeing of protective measures and monitoring is to be undertaken on relevant lamp posts by an appropriate architectural heritage specialist engaged by the appointed contractor and in accordance with the methodology provided in Appendix A.16.3 in Volume 4 of the EIAR.	Construction
AH19	16.5.1.7.2	Lamp Posts throughout (as required): Four lamp posts of Local Importance, Low Sensitivity (CBC0007LP001, CBC0007LP002, CBC0007LP003, CBC0007LP085)	Mitigation consists of the recording, protection and monitoring prior to and during the Construction Phase. Recording, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor and in accordance with the methodology provided in Appendix A.16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of the EIAR.	Construction
AH20	16.5.1.7.3	Statuary and Street Furniture: The Marian Statue at the junction of Ballyfermot Road and Kylemore Road (CBC007BTH137)	Mitigation consists of the recording of the statue in position prior to the works, the labelling of the affected fabric prior to its careful removal to safe storage, and reinstatement. Recording is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee any labelling, taking-down and reinstatement of the affected statue. Works will be carried out in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
AH21	16.5.1.7.3	Statuary and Street Furniture: Late 19th or early 20th century electrical control box (CBC007BTH158) in Grattan Crescent and the drinking fountain, sundial, obelisk and associated bollards (DCC RPS 4054, NIAH 50080307) in James's Street	Mitigation consists of the recording, protection and monitoring prior to and during the Construction Phase. Recording, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor and in accordance with the methodology provided in Appendix A.16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of the EIAR.	Construction
AH22	16.5.1.7.4	Paving and Surface Treatments: A granite edged Cellar Hatch at 27 James's Street (CBC007BTH176); a granite edged Cellar Hatch at 31 James's Street (CBC007BTH177); granite kerb stones to the edge of footpath between 33 and 34 James's Street (CBC007BTH178); granite edged glazed light at 133 James's Street (CBC007BTH182); granite kerb stones to the edge of footpath on the north side of High Street (CBC007BTH233); narrow granite stones to the edge of footpath in St Michael's Lane (CBC007BTH234)	Mitigation consists of the retention of the various kerb stones, cellar hatches and cellar lights in-situ, and their integration into the proposed new paving design. Additional mitigation will be to record, protect and monitor the kerb stones, cellar hatches and cellar lights for the duration of the Construction Phase. Recording, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor and in accordance with the methodology provided in Appendix A.16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of the EIAR.	Construction
AH23	16.5.1.7.4	Paving and Surface Treatments: Narrow granite kerb stones to the edge of footpath between 97 and 131 Inchicore Road (odd numbers only) (CBC007BTH164); a granite edged cellar hatch at the Black Lion Pub, Grattan Crescent (CBC007BTH139); an Iron grille / hatch at 193 Emmet Road Inchicore (CBC007BTH165); a granite edged cellar hatch at 189 Emmet Road Inchicore (CBC007BTH142); granite kerb stones to edge of footpath at 97 to 177 (odd numbers only) Emmet Road Inchicore (CBC007BTH140); a granite edged cellar light at 153 Emmet Road Inchicore (CBC007BTH141); two grilles / hatches which has become obscured by concrete paving at 119 Emmet Road Inchicore (CBC007BTH143, CBC007BTH144); granite kerb stones to edge of footpath at 109 to 117 (odd numbers only) Emmet Road Inchicore (CBC007BTH168); granite kerb stones to edge of footpath at 97 to 99 (odd numbers only) Emmet Road Inchicore (CBC007BTH169).	Mitigation consists of the retention of the various kerb stones, cellar hatches and cellar lights in-situ, and their integration into the proposed new paving design. Additional mitigation will be to record, protect and monitor the kerb stones, cellar hatches and cellar lights for the duration of the Construction Phase. Recording, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor and in accordance with the methodology provided in Appendix A.16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of the EIAR.	Construction

22.15 Landscape (Townscape) and Visual

Table 22.13: Landscape (Townscape) and Visual Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
LV1	17.5.1	Throughout (as required)	Mitigation and management measures are proposed to avoid, reduce or remediate, wherever practicable significant negative landscape (townscape) and visual effects of the Construction Phase of the Proposed Scheme. These measures will be carried out by the appointed contractor and are to be applied across the Proposed Scheme wherever necessary to avoid disturbance of landscape features or characteristics to be retained. Trees and vegetation to be retained within and adjoining the works area will be protected in accordance with the British Standard Institution (BSI) British Standard (BS) 5837:2012 'Trees in relation to design, demolition and construction - Recommendations' (BSI 2012). Works required within the root protection area (RPA) of trees to be retained will follow a project-specific arboricultural methodology for such works, which will be prepared by a professional qualified arborist. For details of trees to be retained refer to Tree Protection Plans in the Arboricultural Impact Assessment (Appendix A17.1 in Volume 4 of this EIAR).	Construction
LV2	17.5.1	Throughout (as required)	Wherever practicable, trees and vegetation will be retained within the Proposed Scheme. Trees and vegetation identified for removal will be removed in accordance with 'BS 3998:2010 Tree Work – Recommendations' (BSI 2010) and best arboricultural practices as detailed and monitored by a professional qualified arborist. For details of trees and vegetation to be removed refer to Tree Protection Plans in the Arboricultural Impact Assessment (Appendix A17.1 in Volume 4 of this EIAR) and Landscape General Arrangements (BCIDB-JAC-ENV_LA-0007_XX_00-DR-LL-9001 in Volume 3 of this EIAR).	Construction
LV3	17.5.1	Throughout (as required)	The Arboricultural Assessment prepared for the Proposed Scheme will be fully updated by the appointed contractor at the end of the Construction Phase and made available, with any recommendations for on-going monitoring of retained trees during the Operational Phase.	Construction
LV4	17.5.1	Throughout (as required)	Where properties are subject to permanent and / or temporary acquisition (as listed in Section 17.4.3.2.8 and Section 17.4.4.2.8 in Chapter 17 of this EIAR), an inventory of boundary details and accesses, planting, paving, and other features that may be disturbed or removed will be prepared by the appointed contractor prior to commencement of construction works.	Construction
LV5	17.5.1	Throughout (as required)	Where properties are subject to permanent and / or temporary acquisition (as listed in Section 17.4.3.2.8 and Section 17.4.4.3.8 in Chapter 17 of this EIAR), appropriate measures will be put in place by the appointed contractor to provide for protection of features, trees and vegetation to be retained, for continued access during construction and for adequate security and screening of construction works. All temporary acquisition areas will be fully decommissioned and reinstated at the end of the Construction Phase or at the earliest time after the reinstatement works are completed to the satisfaction of the NTA. Where boundary features, gates, railings, archways of heritage importance (and which contribute to landscape value) are to be affected by the works, mitigation measures should follow those outlined in Chapter 16 (Architectural Heritage).	Construction
LV6	17.5.1	Throughout (as required)	Appropriate access to amenities and public open spaces will be maintained by the appointed contractor.	Construction

22.16 Waste and Resources

Table 22.14: Waste and Resources Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
WR1	18.6.1	Throughout (as required)	A Construction and Demolition Resource and Waste Management Plan (CDRWMP) has been prepared and this will be implemented (and updated as necessary) by the appointed contractor – refer to the CDRWMP within Appendix A5.1 Construction and Environmental Management Plan (CEMP) in Volume 4 of this EIAR. The appointed contractor will update the CDRWMP in advance of construction commencing.	Construction
WR2	18.6.1	Throughout (as required)	The following measures will be implemented during construction, where practicable, by the appointed contractor, to ensure the maximum quantity of material is reused on the Proposed Scheme and to contribute to achieving the objectives set out in the National Waste Action Plan for a Circular Economy as follows: • Stockpiling of existing sub-base, capping layer and topsoil material generated on-site for direct reuse in the Proposed Scheme where practicable (subject to material quality testing to ensure it is suitable for its proposed end use); and • Recycled aggregates and reclaimed bituminous mixtures will be specified in the Proposed Scheme, where practicable.	Construction
WR3	18.6.1	Throughout (as required)	The following management measures will be implemented insofar as is reasonably practicable: • Where waste generation cannot be avoided, waste disposal will be minimised; • Opportunities for reuse of materials, by-products and wastes will be sought throughout the Construction Phase of the Proposed Scheme; • 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; • Where excavated material cannot be reused within the Proposed Scheme works, material will be sent for recovery or recycling; • Source segregation: metal, timber, glass and other recyclable material will be segregated (and waste stream colour coding will be used) during construction works and removed off site to a permitted / licensed facility for recycling; • Material management: 'Just-in-time' delivery, where practicable, will be used to minimise material wastage; • General construction waste and by-products will be reused within the Proposed Scheme, where practicable, or appropriately reused (in accordance with Article 27 of the Waste Directive Regulations), recovered, recycled or disposed of off-site, as arranged by the appointed contractor; and • Any hazardous waste arising will be managed by the appointed contractor in accordance with the applicable legislation. Waste Auditing: The quantity and types of waste and materials leaving site during the Construction Phase will be recorded by the appointed contractor. 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 to each facility. Records will show material which is recovered, which is recycled and which is disposed of. Where Article 27 notifications are required in relation to the Proposed Scheme, the appointed contractor will complete and submit these Article 27 notifications to the EPA for by-product reuse. Any off-site interim storage or waste management facilities for excavated material will have the appropriate EPA licence, Waste facility permit or Certificate of Registration, as appropriate, in place. 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).	Construction

22.17 Material Assets

Table 22.15: Material Assets Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
MA1	19.5.1.1	Throughout (as required)	Where there are interfaces with existing utility infrastructure, the appointed contractor will ensure that protection in place or diversion as necessary will be carried out to prevent long-term interruption to the provision of the affected services.	Construction
MA2	19.5.1.1	Throughout (as required)	All possible precautions will be taken by the appointed contractor to avoid unplanned interruptions to any services during the Construction Phase of the Proposed Scheme. This will include appropriate investigation by the appointed contractor to identify the precise location of all utility infrastructure within the working areas prior to the commencement of excavation works. Where works are required in and around known utility infrastructure, precautions will be implemented by the appointed contractor to protect the infrastructure from damage, in accordance with best practice methodologies and the requirements of the utility companies, where practicable. Protection measures during construction will include warning signs and markings indicating the location of utility infrastructure, safe digging techniques in the vicinity of known utilities, and in certain circumstances where possible, isolation of the section of infrastructure during works in the immediate vicinity.	Construction
MA3	19.5.1.1	Throughout (as required)	All utility companies for which diversions are proposed will continue to be consulted with NTA oversight when designing any diversions to ensure that proposed diversions conform to the utility provider's requirements, where practicable and acceptable to the NTA, and to ensure that service interruptions are kept to a minimum.	Construction
MA4	19.5.1.1	Throughout (as required)	Where diversions, or modifications, are required to utility infrastructure, service interruptions and disturbance to the surrounding residential, commercial and/or community property may be unavoidable. Where this is the case, it will be planned in advance by the appointed contractor. Required service interruptions will generally only occur for a set period of time per day (a set number of hours not exceeding eight hours where reasonably practicable) and will generally not be continuous for full days at a time. Prior notification will be given to all impacted properties. This notification will include information on when interruptions and works are scheduled to occur and the duration of such interruption. Any required works will be carefully planned by the appointed contractor to ensure that the duration of interruptions is minimised in so far as is practicable.	Construction
MA5	19.5.1.2	Throughout (as required)	Consideration will be given by the appointed contractor to the sustainability of material being sourced for the construction of the Proposed Scheme. In so far as is reasonably practicable, materials required for the construction of the Proposed Scheme will be sourced locally to reduce the amount of travelling required to get the material to the site. Key issues to be considered when sourcing materials for the Construction Phase will include the source, the material specification, production and transport costs, and the availability of the material. For quarried material sourced within the State, only quarries which are included in local authority quarry registers will be used by the appointed contractor to source any quarried material.	Construction
MA6	19.5.1.2	Throughout (as required)	Construction materials will be managed on-site by the appointed contractor in such a way as to prevent over-ordering and waste. Materials will be stored in appropriate storage areas or receptacles to reduce the potential for damage requiring replacement. 'Just-In-Time' ordering principles will be implemented by the appointed contractor where practicable to reduce the potential for over-ordering.	Construction

22.18 Risk of Major Accidents and / or Disasters

Table 22.16: Major Accidents Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation 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 the CEMP (Appendix A5.1 in Volume 4 of this EIAR).	N/A

22.19 Cumulative Impacts

Table 22.17: Major Accidents Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
CI&EI1	21.4.2.1	Throughout (as required)	Other major infrastructure projects could directly interface with the construction of the Proposed Scheme. Interface liaison will take place on a case-by-case basis through the NTA, as will be set out in the Construction Contract, to ensure that there is coordination between projects, that construction access locations remain unobstructed by the Proposed Scheme works and that any additional construction traffic mitigation measures required to deal with cumulative impacts are managed appropriately.	Pre-Construction / Construction

22.20 References

British Standards Institution (BSI) (2010). BS 3998:2010 Tree Work – Recommendations

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

British Standards Institution (BSI) (2014). BS 5228-1:2009 +A1:2014 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise

CIRIA (2001). CIRIA C532: Control of Water Pollution from Construction Sites – Guidance for consultants and contractors

Department of Transport, Tourism and Sport (2019). Traffic Signs Manual

European Commission (2018). The EU Construction and Demolition Waste Protocol and Guidelines

ISO (2016). ISO 1996-1:2016 Acoustics - Description, measurement and assessment of environmental noise. Part 1: Basic quantities and assessment procedures

ISO (2017). ISO 1996-2:2017 - Description, measurement and assessment of environmental noise - Part 2: Determination of sound pressure levels

Masters-Williams H, Heap H, Kitts H, Greenshaw L, Davis S, Fisher P, Hendrie M and Owens D (2001) Control of water pollution from construction sites. Guidance for consultants and contractors (C532D), CIRIA, London

National Roads Authority (2005b). Guidelines for the Treatment of Badgers During the Construction of National Road Schemes

National Roads Authority (2008c). Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes

Transport Infrastructure Ireland (2013) Specification for Road Works Series 600 - Earthworks (including Erratum No. 1, dated June 2013) CC-SPW-00600

Transport Infrastructure Ireland (2020). The Management of Invasive Alien Plant Species on National Roads – Technical Guidance (GE-ENV-01105)

Directives and Legislation

European Communities Noise Emission by Equipment for Use Outdoors (Amendment) Regulations 2006 (S.I. No. 241/2006)

National Monuments (Amendment) Act 2004 (No. 22 of 2004)

Regulation (EC) no 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste

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

Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820 of 2007)

Waste Management (Shipments of Waste) Regulations 2007 (S.I. No. 419/2007) as amended