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 Ringsend 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 have 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 occurring 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 comes into operation (i.e., any mitigation associated with planned maintenance).

The following tables summarised 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 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 measures 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	Section 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 5.1 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 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	7.5.1.1	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 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; • 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; and • The appointed contractor will keep the effectiveness of the mitigation measures under review and revise them as necessary. In the event of dust nuisance 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	8.7.1.1	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 practicable, 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). The measures will ensure that: • During the Construction Phase, the appointed contractor will be required to manage the work to comply with the limits detailed in Section 9.2.4.1 in Chapter 9 (Noise and vibration) of this EIAR using methods outlined in BS 5228-1 (BSI 2014a). • 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 Tables 9.8 and 9.11 in Chapter 9 (Noise and Vibration) of this EIAR. Reference to Table 9.49 and Table 9.50 in Chapter 9 (Noise and vibration) of this EIAR indicates that intrusive works occurring within 25 to 45m 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 or equipment to result in exceedance of construction noise thresholds (see Table 9.8 in Chapter 9 of this EIAR) will be assessed prior to the item being brought onto the site. The least noisy item of plant or equipment will be selected wherever practicable (e.g., plant or equipment items with sound attenuation incorporated). Should a particular item of plant or equipment already on the site be found to exceed the construction noise levels, the first action will be to identify whether or not the item can be replaced with a quieter alternative.	**Construction**
NV4	9.5.1.1.2	Construction Compounds and throughout (as required)	The following measures will be implemented by the appointed contractor to control noise levels at source in order to remain below the threshold values for noise set out in Table 9.7 in Chapter 9 (Noise and vibration) of the 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, utilizing 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 mufflers or sound reducing equipment to the breaker 'tool' and ensuring any leaks in the air lines are sealed; • The Construction Compounds are in close proximity to NSLs (refer to Table 9.34 in Chapter 9 (Noise and vibration) of this EIAR) and will incorporate a strict noise control policy relating to materials handling. 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 enclosures providing air ventilations; 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)	**Construction**

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			(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.	
NV6	9.5.1.1.3	Construction Compounds	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	Construction Compounds and throughout (as required)	Careful planning of the Construction Compounds including the placement of site buildings and store 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 threshold is scheduled (e.g., road widening and utility diversions or activities with similar noise levels identified in Table 9.49 in Chapter 9 (Noise and vibration) of this EIAR). Other construction activities associated with the Proposed Scheme will be scheduled to avoid significant cumulative noise levels.	**Construction**
NV9	9.5.1.1.5	Throughout (as required)	The NTA will establish clear form of communication that will involve the appointed 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 9.10 in Chapter 9 (Noise and vibration) 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 value in Table 9.11 in Chapter 9 (Noise and vibration) of this EIAR. Vibration from construction activities will be limited to the values set out in Table 9.11 in Chapter 9 (Noise and vibration) 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 the 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 (Noise and vibration) of this EIAR; • Activities capable of generating significant vibration effects with respect to human response (as per Table 9.11 in Chapter 9 (Noise and vibration) of this EIAR) will be restricted to daytime hours, as far as practicable; and • Appropriate vibration isolation (such as resilient mounts to pumps and generators) will be applied to plant and equipment, were 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	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 the 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 the 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 works 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), (i.e., mixed broadleaved woodland, scattered trees and parkland, tree line 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 (BCIDC-ROD-ENV_LA-0016_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 loss of habitat, the 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 drawings (BCIDC-ROD-ENV_LA-0016_XX_00-DR-LL-9001) in Volume 3 of this EIAR: • 133 street trees planted; • Approximately 211m^2 of proposed ornamental planting; and • Approximately 1709m^2 of proposed amenity grassland planting.	**Construction**
BD4	12.5.1.2.2	Throughout (as required)	**Habitat Degradation – Groundwater** In the unlikely event that groundwater is encountered during the proposed works and temporary pumping is required an appropriate dewatering system and groundwater management system specific to the site conditions will be designed and implemented by the appointed contractor. These will include measures to minimise any surface water inflow into the excavation. The following mitigation measures will be implemented with regard to pollution of soil and groundwater: • The construction management of the site by the appointed contractor will take account of the recommendations of the CIRIA Guidance Control of Water Pollution from Construction Sites – Guidance for consultants and contractors (Masters Williams et al., 2001) to minimize as far as possible the risk of soil groundwater and surface water contamination; and, • Measures to be implemented by the appointment contractor to minimise the risk of spills and contamination of soil and waters include: o Employing only competent and experiences workforce, and site specific training of site managers, foremen, and workforce, including all sub-contractors, in pollution risks and preventative measures; o 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 rill-over bund, raised kerb ramps or stepped access; o The location of any fuel storage facilities shall be considered in the design of the Construction Compounds. These are to be designed in accordance with relevant guidelines and codes of best practice and will be fully bunded; o Good housekeeping at the site (daily site clean ups, use of disposal bins, etc.) during the entire Construction Phase; o Potential pollutants to be adequately secured against vandalism; o Provision of proper containment of potential pollutants according to codes of best practice; o Thorough control during the ensure Construction Phase to ensure that any spillage is identified at the earliest stage and subsequently effectively contained and managed; and o Spill kits will be provided and kept close to the storage area. Staff to be trained on how to use spill kits correctly.	**Construction**
Refer to WT1 – WT5 in Table 22.9	-	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, 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;	**Construction**

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			• Use of Concrete; • Management of vehicles and plant including refueling and wheel wash facilities (if necessary); and • Monitoring. Specific mitigation measures which the appointed contractor will implement in relation to surface water quality at the Custom House Boardwalk, Scherzer Bridges and DPTOB, Construction Compounds at the DPTOB are outlined in WT2, WT3, WT4 and WT5.	
Refer AQ1 in Table 22.3	-	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 5.1 of Volume 4 of this EIAR). Following the confirmatory pre-construction survey, mitigation measures outlined in BD5 and BD6 will be implemented, as required.	**Pre-construction / construction**
BD6	12.5.1.2.5	Throughout (as required)	**Habitat Degradation – Invasive Species** Where a pre-construction invasive species re-survey 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 (m2), 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 newly established 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**
Refer to WT1 – WT5 in Table 22.9	-	Throughout (as required)	**Rare and Protected Plant Species** Habitat Degradation – Surface Water Quality In terms of mitigation, 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. Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality at the Custom House Boardwalk, Scherzer Bridges and DPTOB, Construction compounds at the DPTOB are outlined in WT2, WT3, WT4 and WT5.	**Construction**

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
BD8	12.5.1.4.1.1	SPRC building	**Bats** Roost Loss The SPRC building will be surveyed immediately prior to demolition by a suitably qualified ecologist engaged by the appointed contractor to assess whether bats are present. A dusk and dawn survey will be completed on the night and morning immediately prior to the demolition of the structure. Where a bat roost is encountered as part of the pre-demolition survey, all relevant works will cease and an application for a derogation licence must be completed by the suitably qualified ecologist in liaison with the appointed contractor and submitted to the NPWS to permit removal of the roost.	**Pre-construction**
BD9	12.5.1.4.1.2	Throughout (as required)	**Bats** Habitat Loss & Fragmentation Where possible, habitats of importance to bats such as scattered trees and parkland, tree line and hedgerow habitat types, which lie within the footprint, or along the boundary of the Proposed Scheme, that are not directly impacted by the Proposed Scheme will be retained. These areas will be protected for the duration of construction works and fenced off at an appropriate distance. Vegetation to be retained is shown on Landscaping General Arrangement drawings (BCIDC-ROD-ENV_LA-0016_XX_00-DR-LL-9001) in Volume 3 of this EIAR. Planting of tree line 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 (BCIDC-ROD-ENV_LA-0016_XX_00-DR-LL-9001) in Volume 3 of this EIAR.	**Construction**
BD10	12.5.1.4.1.2	Construction Compounds, and active works areas.	**Bats** Disturbance of Flight Patterns / Foraging Routes as a result of Lighting Impacts 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; • Accessories such as baffles, hoods, or louvres to be used to reduce light spill and direct it only where needed; and • Where night time works are required, the appointed contractor will liaise with the engaged suitably experienced and qualified ecologist(s) and implement measures to mitigate the impact of such works (especially works carried adjacent to watercourses with known bat activity).	**Construction**
BD11	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 the 12-month period 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**
BD12	12.5.1.4.3.1	Throughout (as required)	**Otter** Habitat Loss The NTA will ensure that a confirmatory pre-construction check of all suitable otter habitat will be completed within 12 months prior to any construction works commencing. The presence of any new holt/couch or activity at the previously established holt site at MV Cill Airne 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, 2006b).	**Pre-construction / construction**

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			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).	
Refer to WT1 – WT5 in Table 22.9	-	Throughout (as required)	**Otter** Habitat Degradation / Reduced Prey Availability- Water Quality 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. Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality at the Custom House Boardwalk, Scherzer Bridges and DPTOB, Construction Compounds at the DPTOB are outlined in WT2, WT3, WT4 and WT5.	**Construction**
BD13	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). The appointed contractor will engage a suitably qualified and/or licensed ecologist(s) to oversee and advise works at watercourse crossings/works. • Where a new or reactivated holt is encountered, within 150 metres (up and downstream) of the watercourse crossing, the qualified ecologist(s) will consult with the NPWS in conjunction with the NTA and appointed contractor; • The qualified ecologist will review method statements; oversee works; provide advice to the appointed contractor(s), deliver toolbox talks and temporarily halt works, if, and as, necessary, having conferred with the NTA; • To protect otters 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; and • Fencing requirements as per the Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (NRA 2008) will be erected around the Construction Compounds and other working areas which are in close proximity to significant watercourses and have suitable roaming territory for otter.	**Pre-construction**
BD14	12.5.1.4.3.4	Throughout (as required)	**Otter** Measures to Prevent Disturbance / Displacement Where night time works are required adjacent to the Liffey Estuary Lower appointed contractor will liaise with the engaged suitably experienced and qualified ecologist(s) and implement measures to mitigate the impact of such works. The Construction Compounds proposed to be established at Sir John Rogerson's Quay and Thorncastle Street will be surrounded by suitable fencing / hoarding fencing to exclude as far as is practical otter ingress into these areas. Where necessary, consideration of mammal-proof fencing as outlined in Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (NRA, 2008c) should be made and as advised by the ECoW after the pre-construction survey.	**Construction**
BD15	12.5.1.4.3.4	Construction within water course at Custom House	**Marine Mammals** • A qualified and experienced marine mammal observer (MMO) (DAHG, 2014) shall be appointed by the appointed contractor to monitor for marine mammals and to log all relevant events using standardised data forms (NPWS, undated); • Pile driving activity shall not commence if marine mammals are detected within a 1,000m radial distance of the pile driving sound source, i.e., within the Monitored Zone;	**Construction**

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
		Boardwalk and DPTOB	• Pile driving activities shall only commence in daylight hours where effective visual monitoring, as determined by the MMO, has been achieved. Where effective visual monitoring, as determined by the MMO, is not possible the sound-producing activities shall be postponed until effective visual monitoring is possible; • An agreed and clear on-site communication signal must be used between the MMO and the appointed contractor as to whether the relevant activity may or may not proceed, or resume following a break. It shall only proceed on positive confirmation with the MMO; • The MMO shall conduct pre-start-up constant effort monitoring at least 30 minutes before the sound-producing activity is due to commence. Sound-producing activity shall not commence until at least 30 minutes have elapsed with no marine mammals detected within the Monitored Zone by the MMO; • The prescribed Pre-Start Monitoring shall subsequently be followed by an appropriate Ramp-Up Procedure which should include continued monitoring by the MMO; • In commencing a pile driving or other noise generating operation where the output peak sound pressure level (in water) from any source including equipment testing exceeds 170 dB re: 1µPa @1m an appropriate Ramp-up Procedure (i.e., "soft-start") must be used. The procedure for use should be informed by the risk assessment undertaken giving due consideration to the pile specification, the driving mechanism, the receiving substrate, the duration of the activity, the receiving environment, and species therein, and other information; • Where it is possible according to the operational parameters of the equipment and materials concerned, the underwater acoustic energy output shall commence from a lower energy start-up (i.e., a peak sound pressure level not exceeding 170 dB re: 1µPa @1m) and thereafter be allowed to gradually build up to the necessary maximum output over a period of 20-40 minutes; • The controlled buildup of acoustic energy output shall occur in consistent stages to provide a steady and gradual increase over the ramp-up period; • Where the measures outlined in steps above are not possible, alternatives must be examined whereby the underwater output of acoustic energy is introduced in a consistent, sequential, and gradual manner over a period of 20-40 minutes prior to commencement of the full necessary output; • In all cases where a Ramp-Up Procedure is employed the delay between the end of the ramp-up and the necessary full output must be minimised to prevent unnecessary high-level sound introduction into the environment; • Once an appropriate and full Ramp-Up Procedure commences, there is no requirement to halt or discontinue the procedure at night-time (if permitted), nor if weather or visibility conditions deteriorate nor if marine mammals occur within a 1,000m radial distance of the sound source, i.e., within the Monitored Zone; • If there is a break in pile driving sound output for a period greater than 30 minutes (e.g., due to equipment failure, shut-down or location change) then all Pre-Start Monitoring and a subsequent Ramp-up Procedure (where appropriate following Pre-Start Monitoring) must be undertaken; and • For higher output pile driving operations which have the potential to produce injurious levels of underwater sound as informed by the associated risk assessment, there is likely to be a regulatory requirement to adopt shorter 5-10 minute break limit after which period all Pre-Start Monitoring and a subsequent Ramp-up Procedure (where appropriate following Pre-Start Monitoring) shall recommence as for start-up.	
Refer to WT1 – WT5 in Table 22.9	-	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, 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.	**Construction**

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality at the Custom House Boardwalk, Scherzer Bridges and DPTOB, Construction Compounds at the DPTOB are outlined in WT2, WT3, WT4 and WT5.	
BD16	12.5.1.7.1	Throughout (as required)	**Breeding Birds** Habitat Loss, Loss of Breeding / Resting Sites **Protection of Vegetation** Where possible, habitats of importance to breeding birds such as scattered trees and parkland, tree line and hedgerow habitat types, which lie within the footprint, or along the boundary of the Proposed Scheme, that are not directly impacted will be retained. These areas will be protected for the duration of construction works and fenced off at an appropriate distance. Vegetation to be retained is shown on the Landscaping General Arrangement drawings (BCIDC-ROD-ENV_LA-0016_XX_00-DR-LL-9001) in Volume 3 of this EIAR. Planting of tree line, 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 (BCIDC-ROD-ENV_LA-0016_XX_00-DR-LL-9001) in Volume 3 of this EIAR for locations.	**Construction**
BD17	12.5.1.7.1	DCC Docklands Offices at Custom House Quay Boardwalk, the North Wall Quay Boardwalk, and the quay walls surrounding the Proposed DPTOB.	**Breeding Birds** Habitat Loss, Loss of Breeding / Resting Sites **Nesting Bird Checks** Where the proposed DPTOB and proposed boardwalk construction works are undertaken within the breeding bird season (March to June inclusive), a pre-construction check of suitable habitat for nesting birds will be carried out by a suitably qualified ecologist in advance of the breeding season (before 1st March) at the DCC Docklands Offices at Custom House Quay Boardwalk, the North Wall Quay Boardwalk, and the quay walls surrounding the proposed DPTOB. Where it can be confirmed that there are no nesting birds present, the appointed contractor in liaison with the suitably qualified ecologist will securely attach a protective screening material (in the form of heavy duty closely woven mesh or equivalent) as necessary to areas of the quay walls that may be suitable for nesting sites, prior to the breeding bird season. The protective screening will remain in place until the construction works are completed after which it will be carefully removed by the contractor. Only areas of suitable nesting habitat (e.g., the quay walls above the high water mark) where direct impacts will occur will need to be covered with the screening material. These areas have been identified as: • Proposed North Wall Quay boardwalk; • Suitable habitat either side of the quay walls at the proposed DPTOB site. The area along Custom House Quay at which the proposed pedestrian boardwalk is proposed is not deemed to contain suitable nesting habitat due to the high levels of disturbance which are likely to be present there and the narrow body of water between the quay wall and the pontoon associated with The Jeanie Johnston. Therefore, no mitigation is required in relation to the works for this boardwalk. The mesh should be attached from the uppermost area of the quay wall such that it hangs down over the necessary sections. The mesh should be secured at the base to prevent it from blowing up during windy weather. Should it not be feasible to install the protective screening material the following alternative mitigation measure will be implemented by the appointed contractor. The suitably qualified ecologist engaged by the contractor will undertake daily monitoring (3 hour surveys each morning) to confirm that no nests are present and to watch for signs of breeding birds in areas where direct impacts are likely to occur (e.g., quay walls at the locations of proposed new boardwalks and the immediate vicinity of the proposed DPTOB), for the duration of works in these areas. Should any signs of breeding birds be detected within the works area, works in that area will have to cease immediately and will not be able to recommence until either the end of the breeding bird season or until all breeding birds are no longer using the area for breeding purposes (e.g., the young have fledged and have left the nest). Once works are completed the constant watch can be terminated.	**Construction**
BD17	12.5.1.7.1	DCC Docklands	**Breeding Birds** Habitat Loss, Loss of Breeding / Resting Sites	**Pre-construction**

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
		Offices at Custom House Quay Boardwalk, the North Wall Quay Boardwalk, and the quay walls surrounding the Proposed DPTOB.	**Monitoring for Nesting Birds Prior to Construction** The NTA will ensure that a three year monitoring programme prior to the works is undertaken within breeding bird season to confirm if the quay walls at the proposed DPTOB and proposed boardwalks are used for breeding. If breeding is identified during surveys a minimum of 10 temporary black guillemot nesting boxes (unless otherwise advised by the suitably qualified ecologist based on the results of the 3 year monitoring programme) will be installed in the vicinity of the Tom Clarke East Link Bridge to provide alternative nesting sites for displaced birds during the Construction Phase. In order to allow birds to return to the area post construction, 10 permanent nest boxes, constructed from durable materials to ensure their longevity, will be installed in suitable locations, as the appointed contractor in liaison with the suitably qualified ecologist. Nest boxes must be located 2m above the high water mark. Examples of suitable locations may include appropriate areas of the quay walls and sips of the Tom Clarke East Link Bridge, but ultimately the locations will be determined by the project ecologist in collaboration with the appointed contractor. Monitoring of use of the prescribed bird boxes will take place annually, to check for nesting activity, and for 3 years post-completion of the development. Monitoring will consist of visual checks by means of vantage point surveys to identify any breeding activity. Three monitoring surveys will be undertaken each year; the first survey will be undertaken in early April, the second in early May and the final survey in early June.	**&** **Post Construction**
BD18	12.5.1.7.2	Throughout (as required)	**Breeding Birds** Direct Injury / Mortality Prior to the Construction Phase of the Proposed Scheme, where practical, vegetation (e.g., hedgerows, trees, scrub, bankside vegetation and grassland) will not be removed, between the 01 March and the 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 three 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. During the Construction Phase of the Proposed Scheme, construction machinery, when not in use, such as cranes and cherry pickers will not overhang the aquatic environment. Where this measure cannot be implemented fully (i.e., due to health and safety issues), UV lighting or UV paint will be used on construction machinery to illuminate extendable parts (such as the arm of cranes) which may overhang the aquatic environment. The objective of this is to make these lattice structures more detectable for birds that may fly at dusk or at night. The UV decoys will be installed prior to the erection of construction machinery at night.	**Construction**
Refer to WT1 – WT5 in Table 22.9	-	Throughout (as required)	**Breeding Birds** Habitat and Food Resource Degradation – Water Quality In terms of mitigation, 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. Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality at the Custom House Boardwalk, Scherzer Bridges and DPTOB, Construction Compounds at the DPTOB are outlined in WT2, WT3, WT4 and WT5.	**Construction**
BD19	12.5.1.8.1	Throughout (as required)	**Wintering Birds** Direct Injury / Mortality Construction machinery, when not in use, such as cranes and cherry pickers will not overhang the aquatic environment. Where this measure cannot be implemented fully (i.e., due to health and safety issues), UV lighting or UV paint will be used on construction machinery to illuminate extendable parts (such as the arm of cranes) which may overhang the aquatic environment. The objective of this	**Construction**

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			is to make these lattice structures more detectable for birds that may fly at dusk or at night. The UV decoys will be installed prior to the erection of construction machinery at night.	
BD20	-	Throughout (as required)	**Wintering Birds** Habitat and Food Resource Degradation – Water Quality In terms of mitigation, 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. Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality at the Custom House Boardwalk, Scherzer Bridges and DPTOB, Construction Compounds at the DPTOB are outlined in WT2, WT3, WT4 and WT5.	**Construction**
BD21	12.5.1.10.1	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 below will be completed before works recommence. 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 ZoI of the Proposed Scheme; 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; 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; and Any capture and translocation works shall be undertaken immediately in advance of site clearance / construction works commencing.	**Construction**
Refer to WT1 – WT5 in Table 22.9	-	Throughout (as required)	**Fish** Habitat Degradation – Surface Water Quality In terms of mitigation, 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. Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality at the Custom House Boardwalk, Scherzer Bridges and DPTOB, Construction Compounds at the DPTOB are outlined in WT2, WT3, WT4 and WT5.	**Construction**
BD22	12.5.1.11.2	DPTOB	**Fish** Direct Injury / Mortality There is a risk that fish may become trapped within cofferdams during their construction. In order to prevent the death of fish, they should be removed from the cofferdam during dewatering. Where necessary, any fish that are present behind the coffer dam/sheet piles will be removed by the appointed contractor by the appropriate means in liaison with the suitably qualified ecologist before dewatering is complete. It is assumed any rescuing of fish would be done prior	**Construction**

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			to this and that removal of any fish could be undertaken using, for example, a 'fish-friendly' pump would be used to ensure any that any fish that remain are not harmed. A suitably qualified licensed ecologist(s), engaged by the appointed contractor will ensure that this activity is undertaken in accordance with IFI requirements.	
BD23	12.5.2.2.1	Throughout (as required)	**Habitats** Habitat Degradation - Surface Water Quality The proposed SuDS drainage system, as shown in Proposed Surface Water Drainage Works drawings (BCIDC-ROD-DNG_RD-0016_XX_00-DR-CD-9001 in Volume 3 of this EIAR), will be installed by the appointed contractor during the Construction Phase. Once the Proposed Scheme is in operation, the Local Authorities will be required to implement a maintenance and inspection regime for SuDS which will be subject to their management procedures. No additional mitigation is required.	**Operation**
BD24	12.5.2.2.2	Throughout (as required)	**Habitats** Habitat Degradation - Non-Native Invasive Plant 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	**Operation**
BD25	12.5.2.4.1	Ringsend Park and DPTOB	**Bats** Indirect Disturbance of Flight Patterns Due to Operational Lighting Excess light spill from the Proposed Scheme may result in avoidance behaviour from bats within the vicinity of the Proposed Scheme. Where practical, operational lighting will be kept to a minimum and light spill avoided. A total of two areas were identified within the footprint of the Proposed Scheme to involve the installation of additional lighting in previously dark / poor lighting areas (i.e., Ringsend Park and at the proposed DPTOB). Lighting mitigation has been built into the lighting design under the guidelines outlined in Section 4.1.1 of Chapter 4 in Volume 4 of the EIAR. The lighting design at Ringsend Park will ensure that light spill on the surrounding tree lines will be kept below one lux, with lux levels rising temporarily to a maximum of 5 where lighting sensors are triggered by human activity. The proposed DPTOB lighting design will be developed at the detailed design stage the guidelines outlined in Section 4.1.1 of Chapter 4 in Volume 4 of the EIAR and in consultation with DCC. It will be ensured that where practical lighting is not focused onto areas of ecological sensitivity including onto the Liffey Estuary Lower and the lighting design provides for low levels of lateral light spillage to avoid unwanted areas of illumination. This will not fully mitigate the disruption to foraging / commuting due to additional navigation lighting requirements illuminating sections of the water level.	**Operation**
Refer to WT1 – WT5 in Table 22.9	-	Throughout (as required)	**Rare and Protected Plant Species** Habitat Degradation – Surface Water Quality In terms of mitigation, 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. Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality at the Custom House Boardwalk, Scherzer Bridges and DPTOB, Construction Compounds at the DPTOB are outlined in WT2, WT3, WT4 and WT5.	**Construction**

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	13.5.2.1	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 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 Compounds management including the storage of fuels and materials; • Control of Sediment; • Use of Concrete; • Management of vehicles and plant including refueling and wheel wash facilities (if necessary); and • Monitoring.	**Construction**
WT2	13.5.2.2.1	Custom House Boardwalk	For associated works to the quay wall to secure the boardwalk to the DCC building, sheeting will be attached below the area of works to catch any debris. In-channel and river bank working general principles as set out in the SWMP will apply: • The steel piles may be driven from the land if feasible, reducing the need for machinery in the water; • All construction machinery operating within or close to any waterbody will be mechanically sound to avoid leaks; • The area of disturbance of the watercourse bed and bank will be the absolute minimum required for the installation of the piles.	**Construction**
WT3	13.5.2.2.2	Scherzer Bridges	The pouring of concrete will take place in dry weather only. Silt fences or similar will be installed by the appointed contractor to prevent overland flow into the canal or the Liffey Estuary Lower. In-channel and river bank working general principles will apply as set out in the SWMP.	**Construction**
WT4	13.5.2.2.3	Dodder Public Transport Opening Bridge (DPTOB)	The coffer dams and area behind the sheet piling will be dewatered via silt-buster tanks (or similar) and discharged directly to the estuary. The appointed contractor will liaise with the suitably qualified ecologist and / or environmental specialist engaged by them to ensure that any required permits / licences are obtained. Any requirement to rescue fish or other fauna during this process will be carried in a manner as specified in Chapter 12 (Biodiversity). As the water level approaches the estuary bed, there is a greater risk of disturbing sediments; at this point the rate of emptying will be slowed to allow the silt-buster tanks to continue to operate efficiently. The dynamic nature of the waterbody in this area i.e., estuarine would result in varied level of suspended solids depending on the time of year and weather conditions. Therefore, the NTA will ensure that monitoring will be carried out monthly for a period of at least six months prior to the commencement of construction at this location, in the manner and of a frequency necessary to inform any applications for permits or licenses to discharge that may be required. The NTA will also ensure that any discharges form the coffer dam will be comply with conditions set out in all relevant permits and licenses.	**Construction**
WT5	13.5.2.2.3	Construction Compounds	Construction compounds R1 and R2 have limited ability to impact upon nearby water bodies. The general measures for the Construction Compounds as set out in the SWMP are sufficient to control these potential impacts and no additional measures are required. Activities within the Construction Compounds on either side of the DPTOB (R3A, R3B and R4) will be largely controlled as set out in general measures in the SWMP. In addition, all surface water drains in the vicinity will be identified and either stopped up or bunded on the side	**Construction**

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			closest to both Construction Compounds. A cutoff drain or equivalent measure and a silt fence will be installed along the estuary side of the Construction Compounds. The appointed contractor will ensure that appropriate spill control equipment is available (e.g., a suitably sized floating boom), to control any spillages to the river should a spillage occur. The CEMP includes an Environmental Incident Response Plan, which will apply for the management of any incidents that may occur.	
WT6	13.5.3	Throughout (as required)	In the Operational Phase, the infrastructure (including the maintenance regime for SuDS) will be carried out by the local authority and will be subject to their management procedures.	**Operational**

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	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**
LSGH2	14.5.1	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 6000 Earthworks (TII 2013) and project specific earthworks specifications ensuring that all excavated material and imported material is classified using the same methodology so as to allow maximum opportunity for the reuse of materials on site.	**Construction**
LSGH3	14.5.1.2	Throughout (as required)	Excavation of Potentially Contaminated Land The appointed contractor will ensure that excavations will 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 Land 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 Land Samples of ground suspected of contamination will be tested for contamination by the appointed contractor during the 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 Land Any dewatering in areas of contaminated ground will 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 Soils 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	**Construction**

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			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.	
LSGH8	14.5.1.3	Throughout (as required)	Pollution of Soil and Groundwater Measures to be implemented by the appointed contractor to minimise the risk of spills and contamination of soils and waters would include: • Employing only a competent and experienced workforce, and site-specific training of site managers, foremen and workforce, including all sub-contractors, 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 the Construction Compounds. These are to be designed in accordance with relevant guidelines and codes of best practice at the time of construction 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 measures during the entire Construction Phase to ensure that any spillage is identified at early stage and subsequently contained and managed effectively; and • Spill kit to be provided and to be kept close to the designated storage area. Staff to be trained on how to use spill kits correctly.	**Construction**
LSGH9	14.5.1.3	Throughout (as required)	An Environmental Incident Response Plan, as described in the CEMP (Appendix A5.1 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 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)	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	N/A	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 excavations 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 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	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 the Construction Phase to communicate all findings in a timely manner to the NTA and statutory authorities, to acquire any licences / 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	DPTOB, Tom Clarke East Link Bridge	In the case of cellars, coal cellars, tunnels, and / or basements, the appointed contractor in consultation with the archaeologist engaged by them will make provision for a geodetic survey and recording of each individual structure which will be subject to impact. This survey and recording will be carried out in advance of any construction works on the cellar, coal cellar, and / or basement.	**Construction**
ACH7	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. Other consents may include a Dive Survey Licence to conduct archaeological dive work, a Detection Device Licence to use a metal-detector or to carry out a non-invasive geophysical survey.	**Construction**
ACH8	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**
ACH9	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 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 archaeologist and will be a matter for discussion between the NTA and the licensing authorities.	**Construction**
ACH10	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**
ACH11	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**
ACH12	15.5.1.1.2	Throughout (as required)	Features of 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**

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
ACH13	15.5.1.3.1.2	Talbot Memorial Bridge to Tom Clarke East Link Bridge (RMP DU018-020, DU018-0020152, DU018-0200564, RMP DU018-020479, RMP DU018-020201)	The appointed contractor will ensure that archaeological monitoring under licence will take place at the following locations: • In areas of archaeological potential, namely within the designated ZAP for the Historic City of Dublin (RMP DU018-020) which encompasses the recorded archaeological sites DU018-0020152 (glasshouse site of), DU018-0200564 (quay), RMP DU018-020479 (quay) and RMP DU018-020201 (quay) (Figure 15.1, Sheets 1, 2 and 3 of 5 in Volume 3 of this EIAR); It is in these areas that there is a possibility to disturb intact archaeological layers and material and so these areas will require investigation by monitoring.	**Construction**
ACH14	15.5.1.3.1.2	Talbot Memorial Bridge to Tom Clarke East Link Bridge	Should any subsurface archaeological stratigraphy be encountered, an appropriate ameliorative strategy will be implemented by the appointed contractor in liaison with the archaeologist as described in ACH5. This will entail licensed archaeological excavation, in full or in part, of any identified archaeological remains (preservation by record) or preservation in situ.	**Construction**
ACH15	15.5.1.3.1.2	Talbot Memorial Bridge to Tom Clarke East Link Bridge (Custom House Quay and junction of Excise Walk and North Wall Quay)	The appointed contractor will ensure that archaeological monitoring under licence will take place during the preparatory works to the quay walls and when any interventions are planned, this will allow an assessment and full recording of any internal fabric of the quay structures should they be exposed during the course of the proposed works.	**Construction**
ACH16	15.5.1.3.1.2	Talbot Memorial Bridge to Tom Clarke East Link Bridge (Scherzer Bridges (RMP DU018-020, DU018-020564))	At the Scherzer Bridges, ground reduction work has the potential to impact on below ground archaeological remains (associated with the history city of Dublin (RMP DU018-020) and the historic quay (DU018-020564) and subsurface features associated with the workings of the Scherzer Bridges). The appointed contractor in liaison with the archaeologist as described in ACH5 will ensure that mitigation in the form of recording and monitoring will take place.	**Construction**
ACH17	15.5.1.3.1.2	Talbot Memorial Bridge to Tom Clarke East Link Bridge (Scherzer Bridges (RMP DU018-020, DU018-020564))	The appointed contractor will ensure that a full and complete photographic and detailed industrial heritage record survey will be undertaken (the scope of the record survey will be identified through liaison between the appointed contractor and the archaeologist and architectural heritage specialist engaged by the appointed contractor).	**Construction**
ACH18	15.5.1.3.1.3	Talbot Memorial Bridge to Tom Clarke East Link Bridge (Non-designated archaeological heritage sites, DCIHR (DCC 2003 to 2009))	The appointed contractor will ensure that archaeological monitoring under licence will take place at the following locations: • At all undesignated archaeological heritage sites identified from historic mapping and the DCIHR (DCC 2003 to 2009), as listed in Table 15.7 and shown in Figure 15.1, Volume 3 of this EIAR). It is in these areas that there is a possibility to disturb intact archaeological layers and material and so these areas will require investigation my monitoring. Should any subsurface archaeological stratigraphy be encountered, an appropriate ameliorative strategy will be implemented. This will entail licensed archaeological excavation, in full or in part, of any identified archaeological remains (preservation by record) or preservation in situ. Potential impacts will be ameliorated through preservation by record or in situ. Once these strategies are employed, this will result in any archaeological remains being identified, recorded, and excavated out of the ground or being left in situ as a design solution resulting in no potential impacts, post mitigation.	**Pre-Construction / Construction**

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
ACH19	15.5.1.3.1.4	Talbot Memorial Bridge to Tom Clarke East Link Bridge (Areas of Archaeological Potential; CBC0016AH004 and CBC0016AH006)	The appointed contractor will ensure that archaeological monitoring under licence will take place at the following locations: • At the two areas identified as having an archaeological potential to reveal below ground industrial heritage features and finds as identified previously from historic mapping and investigations at CBC0016AH004 and CBC0016AH006 (as listed in Table 15.7 and Figure 15.1, Volume 3 of this EIAR). It is in these areas that there is a possibility to disturb intact archaeological layers and material and so these areas will require investigation my monitoring. Should any subsurface archaeological stratigraphy be encountered, an appropriate ameliorative strategy will be implemented. This will entail licensed archaeological excavation, in full or in part, of any identified archaeological remains (preservation by record) or preservation in situ. Potential impacts will be ameliorated through preservation by record or in situ. Once these strategies are employed, this will result in any archaeological remains being identified, recorded, and excavated out of the ground or being left in situ as a design solution resulting in no potential impacts, post mitigation.	**Construction**
ACH20	15.5.1.3.2	Talbot Memorial Bridge to Tom Clarke East Link Bridge (Famine memorial (NIAH Ref. 50010002), the statue of Matt Talbot (CHC0016CH009), the statue of Admiral William Brown (CBC0016CH009))	Sculptures and memorials namely the famine memorial (NIAH Ref. 50010002), the statue of Matt Talbot (CHC0016CH009), the statue of Admiral William Brown (CBC0016CH009), will be protected in accordance with the mitigation measures set out in Chapter 16 (Architectural Heritage) (i.e., AH3).	**Construction**
ACH21	15.5.1.4.1.2	Dodder Public Transport Opening Bridge (Dublin City (RMP DU018-020), Sir John Rogerson's Quay (DU018-020201), and sea wall (DU018-066))	The appointed contractor will ensure that archaeological monitoring under licence will take place: • Within the ZAP for the historic settlement of Dublin City (RMP DU018-020), the ZAP for Sir John Rogerson's Quay (DU018-020201) and the ZAP for the sea wall (DU018-066) (Figure 15.1, Sheets 3 and 4 of 5, Volume 3 of this EIAR), to include the full extent of land take for the Proposed Scheme. The monitoring of ground breaking and reduction works, and excavation works across this whole area will be carried out as an archaeological exercise.	**Construction**
ACH22	15.5.1.4.1.3	Dodder Public Transport Opening Bridge (River Dodder (CBC0016AH003); Britain Quay (CBC0016AH001); and Thorncastle Street / York Road (CBC0016AH002))	The appointed contractor will ensure that archaeological monitoring under licence will take place: • Within the River Dodder and the area of archaeological potential (CBC0016AH003), archaeological monitoring will take place within the riverine environment for all works on the riverbed, on the quayside of Britain Quay (CBC0016AH001) and in the proposed reclamation area at Thorncastle Street / York Road (CBC0016AH002). Full provision will be made for the resolution of any features and deposits that are revealed as a result of the work (Figure 15.1, Volume 3 of this EIAR);	
ACH23	15.5.1.4.1.3	Dodder Public Transport Opening Bridge (Britain Quay (CBC0016AH001), Unnamed quay (CBC0016AH002))	In order to create a record of the features of the quay and quay wall on Britain Quay (CBC0016AH001) and of the unnamed quay – Thorncastle Street / York Road (CBC0016AH002), a photogrammetry survey will be undertaken by the appointed contractor prior to the commencement of construction works. Potential impacts will be ameliorated through preservation by record, design or in situ. Once these strategies are employed, this will result in any archaeological remains being identified, recorded, and excavated out of the ground or being left in situ.	**Construction**

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
ACH24	15.5.1.4.2	Dodder Public Transport Opening Bridge (Maritime memorial (CBC0016CH017) and a decorative buoy (CBC0016CH018))	Sculptures and memorials namely; the maritime memorial (CBC0016CH017) and a decorative buoy (CBC0016CH018) will be protected in accordance with the mitigation measures set out in Chapter 16 (Architectural Heritage) (i.e., AH3).	**Construction**
ACH25	15.5.1.5.1.2	Tom Clarke East Link Bridge to Sean Moore Road (Ringsend (DU018-054), Irishtown (DU018-053), the south wall (DU018-066))	The appointed contractor will ensure that archaeological monitoring under licence will take place, where any preparatory ground breaking or ground reduction works are required at the following locations: • Within the ZAP for the settlement clusters for Ringsend (DU018-054) and Irishtown (DU018-053) (Figure 15.1, Sheets 3 and 5 of 5 in Volume 3 of this EIAR) and In the vicinity of the south wall (DU018-066), a recorded monument and linear structure that extends from Ringsend to Poolbeg Light House Figure 15.1 in Volume 3 of this EIAR). It is in this area 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**
ACH26	15.5.1.5.2	Tom Clarke East Link Bridge to Sean Moore Road (CBC0016CH019)	The sculpture (CBC0016CH019) (Figure 15.1 in Volume 3 of this EIAR) will be protected in accordance with the mitigation measures set out in Chapter 16 (Architectural Heritage) (i.e., AH3).	**Construction**
ACH27	15.5.1.5.2	Tom Clarke East Link Bridge to Sean Moore Road (Ringsend Park (CBC0016CH021))	At Ringsend Park (CBC0016CH021 (Figure 15.1 in Volume 3 of this EIAR), should any subsurface archaeological stratigraphy associated with a heritage asset be encountered, an appropriate ameliorative strategy will be implemented. This will entail licensed archaeological excavation in full or in part, of any identified archaeological remains (preservation by record). A full measured, written, drawn and photographic survey of any features of a cultural heritage significance will be undertaken prior to removal by the archaeologist engaged by the appointed contractor.	**Construction**
ACH28	15.5.1.6.1.2	Construction Compounds	The appointed contractor will ensure that a programme of archaeological monitoring under licence will take place at the preconstruction and early stages of construction as appropriate, during the site preparation and earthmoving works, in built-up sites, and where any preparatory ground reduction works are required at the proposed locations of the Construction Compounds. This will be designed 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 within the Proposed Scheme. It is in this area 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**

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	Throughout (as required) (Custom House Quay (DCC RPS 8829); North Wall Quay (DU018-020564); George's Quay (DU018-020458); City Quay (DU018-020479); Sir John Rogerson's Quay (DU018-020201); Britain Quay (DCC RPS 8808); Scherzer Bridges – at George's Dock (DCC RPS 896); Scherzer Bridges – at Royal Canal (DCC RPS 912); York Road (DU018-066); CIE Goods Depot, North Wall Quay (DCC RPS 5836); Store / Warehouse, North Wall Quay (DCC RPS 5837); 58-59 North Wall Quay (DCC RPS 5838); 73 North Wall Quay (DCC RPS 5840); 81 North Wall Quay (DCC RPS 5841); 82 North Wall Quay (DCC RPS 5842); 3Arena, North Wall Quay (DCC RPS 5843); 9 City Quay (DCC RPS 1853); 10-12 City Quay (DCC RPS 1854); 21-22 City Quay	Twenty-five protected structures were identified in the study area which are within the site boundary, front onto, or have boundaries along it. The proposed mitigation is the recording, protection and monitoring of the sensitive fabric 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
		(DCC RPS 1855-56); 2 Sir John Rogerson's Quay (DCC RPS 7543); 4-5 Sir John Rogerson's Quay (DCC RPS 7544-5); 14-15 Sir John Rogerson's Quay (DCC RPS 7546); 20-24 Sir John Rogerson's Quay (DCC RPS 7547); 30-32 Sir John Rogerson's Quay (DCC RPS 7548); and 35-36 Sir John Rogerson's Quay (DCC RPS 7549-50) (see Appendix A16.2 (Inventory of Architectural Heritage Sites) for further information on these features).		
AH2	16.5.1.1	George's Dock Scherzer Bridges (DCC RPS 896); Custom House Quay (DCC RPS 8829); North Wall Quay (RMP DU018-020564); Royal Canal Scherzer Bridges (DCC RPS 912); Embedded rail tracks (CBC0017BTH029; DU018-020564; and CBC0016BTH033 / DU018-020201); Quay Wall (Britain Quay) (DCC RPS 8808); and sea wall (DU018-066)	Seven locations were identified where the Proposed Scheme would directly impact on sensitive fabric associated with a Protected Structure. These are: • The Scherzer Bridges spanning the George's Dock (DCC RPS 896) will be relocated and a new fixed four-lane road bridge will be constructed by the appointed contractor. The proposed mitigation is for an architectural heritage specialist engaged by the appointed contractor to oversee the protection, labelling, safe storage, repair and reinstatement of the bridges, the affected kerbs, winches, and historic masonry. The affected quay walls (DCC RPS 3173) fabric will be made available by the appointed contractor to the Local Authority for salvage or re-use. Works to historic fabric will be carried out 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; • A pedestrian boardwalk will be added to Custom House Quay (DCC RPS 8829) between Sean O'Casey Bridge and just east of Commons Street by the appointed contractor. The recommended mitigation is for an architectural heritage specialist engaged by the appointed contractor to oversee the recording of the existing masonry in position prior to the works (at low tide) and protection of the surrounding fabric. Works to historic fabric will be carried out 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; • A boardwalk is proposed to be added to North Wall Quay (DU018-020564), at the junction of North Wall Quay and Excise Walk. The proposed mitigation is for an architectural heritage	**Construction**

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			specialist engaged by the appointed contractor to oversee the recording of the existing masonry in position prior to the works (at low tide) and protection of the surrounding fabric. Works to historic fabric will be carried out 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; • The Scherzer bridges (DCC RPS 912) spanning the Royal Canal at Guild Street. The proposed mitigation is for an architectural heritage specialist engaged by the appointed contractor to oversee further pre-construction surveying, condition assessments and recording of the structures prior to their careful dismantling and to oversee the protection. labelling, safe storage, repair and reinstatement of the bridges, the affected kerbs (CBC0016BTH030), winches, and historic masonry. Works to historic fabric will be carried out 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; • The removal of embedded rail tracks (CBC0017BTH029) at the east end of North Wall Quay (DU018-020564), and on the east end of Sir John Rogerson's Quay (CBC0016BTH033 and DU018-020201) would result in the loss of historic fabric. The proposed mitigation is for an architectural heritage specialist engaged by the appointed contractor to oversee the recording of the existing fabric in position prior to its careful removal. The rails and any historic paving stones will be made available by the appointed contractor to the Local Authority for possible re-use on the quays; • The quay wall on Britain Quay (DCC RPS 8808) will be altered to accommodate the DPTOB over the mouth of the River Dodder by the appointed contractor. Mitigation has been embedded in the Proposed Scheme design through the proposal to raise the deck of the bridge, minimizing the disruption required to the historic fabric. However, a short section of the quay wall (approximately 19m) will be removed to accommodate the bridge structure. The architectural heritage specialist engaged by the appointed contractor will oversee the recording of the existing masonry in position prior to the works (at low tide) and protection of the surrounding fabric. The affected masonry shall be salvaged for use within the proposed landscaping design by the appointed contractor, where practicable, or offered to the Local Authority. Consolidation or repair of surrounding masonry will be carried out 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; and • A short section of the sea wall (DU018-066), visible at the very end of Thorncastle Street will be incorporated into land reclamation to accommodate the DPTOB by the appointed contractor. A section of wall to the east of the St. Patrick's Rowing Club (SPRC) on York Road will also be removed to accommodate the tying in of existing and proposed cycle and foot paths over the new DPTOB. The proposed mitigation is for an architectural heritage specialist engaged by the appointed contractor to oversee the recording of the existing masonry in position prior to the works and protection of the surrounding fabric. Sections of sea wall which will be incorporated in the land reclamation will be retained in situ, though buried. Masonry which is removed will be salvaged for re-use in consolidating the retained sea wall. Consolidation or repair of surrounding masonry will be carried out by the appointed contractor in accordance with the methodology	

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			provided in Appendix A16.3 (Methodology for Works affecting Sensitive and Historic Fabric) in Volume 4 of this EIAR.	
AH3	16.5.1.3	Throughout (as required) The famine memorial (NIAH 50010002) (direct impact); The Triumphal Arch (NIAH 50011219); ESB sub-stations (NIAH 50011185) and campshire warehouses (NIAH 50020466)	4 NIAH structures were identified in the study area which are within the Proposed Scheme boundary front onto or have boundaries along it. There is potential for damage to these features during the construction works. The proposed mitigation to offset the risk of damage is as follows: • The famine memorial (NIAH 50010002) - The architectural heritage specialist engaged by the appointed contractor will oversee the recording of the feature in position prior to the works, the labelling of the affected fabric prior to its careful dismantling and removal to safe storage, and their reinstatement in their existing positions subsequent to the works. Works to historic fabric will be carried out 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; and • The Triumphal Arch (NIAH 50011219); ESB sub-stations (NIAH 50011185) and campshire warehouses (NIAH 50020466) - The architectural heritage specialist engaged by the appointed contractor will oversee the recording, protection and monitoring of the sensitive fabric prior to, and for the duration of the Construction Phase 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**
AH4	16.5.1.4	Quay Wall, Thorncastle Street (CBC0016BTH038)	One location was identified where there will be a direct impact on the fabric of a Structure of Architectural Heritage Interest during the Construction Phase. Construction of the DPTOB includes land reclamation to the north of the existing quay wall, (CBC0016BTH038), visible at the very end of Thorncastle Street. A short section of quay wall will be incorporated in land reclamation and will be obscured from view. The proposed mitigation is for an architectural heritage specialist engaged by the appointed contractor to oversee the recording of the existing masonry in position prior to the works (at low tide) and the protection of the fabric for the duration of the construction works. Sections which will be incorporated in the land reclamation will be retained in situ, though buried.	**Construction**
AH5	16.5.1.4	Ringsend Park (CBC0016BTH025), 1-2 Seaview (CBC0016BTH027), Pembroke Cottages (CBC0016BTH016), 1-44 Pigeon House Road (CBC0016BTH019), 1-4 City Quay (CBC0016BTH013), Mission Hall (CBC0016BTH017), 12 York Road (CBC0016BTH018), 46-51 Pigeon House Road, Bayview Terrace (CBC0016BTH020), and 62-63 Pigeon House Road (CBC0016BTH037)	Nine Structures of Built-Heritage Interest share a boundary with the Proposed Scheme boundary. The proposed mitigation is for an architectural heritage specialist engaged by the appointed contractor to oversee the recording, protection and monitoring of the sensitive fabric prior to, and for the duration of the Construction Phase 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
AH6	16.5.1.5.1	Custom House Quay / North Wall Quay (CBC0016LP001)	Two locations were identified where lamp posts of architectural heritage significance may be impacted by the Proposed Scheme: • Twelve existing lamp-posts along Custom House Quay and North Wall Quay (CBC0016LP001) will be repositioned. The proposed mitigation for these features is for an architectural heritage specialist engaged by the appointed contractor to oversee 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 by the appointed contractor. Works to historic fabric will be carried out 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; and • The remaining identified lamp posts will be retained in position. The proposed mitigation for these lamp posts is for an architectural heritage specialist engaged by the appointed contractor to oversee the recording, protection and monitoring prior to, and during the Construction Phase. Works to historic fabric will be carried out by the appointed contractor in accordance with the methodology provided in Appendix A.16.3 (Methodology for Works affecting Sensitive and Historic Fabric) in Volume 4 of this EIAR.	**Construction**
AH7	16.5.1.5.2	Paving/surface treatments of architectural heritage interest at: Custom House Quay (CBC0016BTH031); City Quay (CBC0016BTH032); and paving in front of 30-32 Sir John Rogerson's Quay (CBC0016BTH034).	Three locations were identified where paving, or surface treatments of architectural heritage interest may be indirectly impacted by the Proposed Scheme. The proposed mitigation is for an architectural heritage specialist engaged by the appointed contractor to oversee the recording, protection and monitoring prior to, and during the Construction Phase. Works to historic fabric will be carried out 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**

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 (LV1-LV5) 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.	**Construction**

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			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'. Works are required within the root protection area (RPA) of trees to be retained will follow a project specific arboricultural methodology for such works, prepared / approved by a professional qualified arborist. For details of trees to be retained refer to the Tree Protection Plans for the Proposed Scheme which are contained within the Arboricultural Impact Assessment documents Appendix A17.1 in Volume 4 of this EIAR).	
LV2	17.5.1	Throughout (as required) especially Ringsend Stadium and around Irishtown Stadium	Wherever practicable, trees and vegetation will be retained within the Proposed Scheme. This is of particular note where mature trees are a prominent and valuable asset within the urban realm such as within the grounds of Ringsend Park and around Irishtown Stadium. 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 engaged by the appointed contractor. For details of trees and vegetation to be removed refer to the Tree Protection Plans for the Proposed Scheme which are contained within the Arboricultural Impact Assessment documents (Appendix A17.1 in Volume 4 of this EIAR) and the Landscaping General Arrangement Drawings (BCIDD-ROT-ENV_LA-0016_ML_00-DR-LL-9001) in Volume 3 of this EIAR.	**Construction**
LV3	17.5.1	Throughout (as required)	The Arboricultural Impact Assessment prepared for the Proposed Scheme will be fully updated at the end of the Construction Phase by the appointed contractor 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) especially along sections of the campshires and the confluence of the River Dodder and the River Liffey (i.e., St. Patrick's Rowing Club (SPRC) and adjacent jetty), Trinity College Dublin (Stack B Building).	Where properties are subject to permanent and / or temporary acquisition (especially along sections of the campshires and the confluence of the River Dodder and the River Liffey (i.e., St. Patrick's Rowing Club (SPRC) and adjacent jetty), Trinity College Dublin (Stack B Building)) 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) especially along sections of the campshires and the confluence of the River Dodder and the River Liffey (i.e., St. Patrick's Rowing Club (SPRC) and adjacent jetty), Trinity College Dublin (Stack B Building).	Where properties are subject to permanent and / or temporary acquisition (especially along sections of the campshires and the confluence of the River Dodder and the River Liffey (i.e. St. Patrick's Rowing Club (SPRC) and adjacent jetty), Trinity College Dublin (Stack B Building) 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, 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 least 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	The campshires, Capital Dock Park, SPRC and adjacent lands, Ringsend Park, and other areas	Appropriate access to amenities and public open spaces including the campshires, Capital Dock Park, SPRC and adjacent lands, Ringsend Park, and other areas of open space at Irishtown Stadium and Sean Moore Road shall be maintained by the appointed contractor.	**Construction**

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
		of open space at Irishtown Stadium and Sean Moore Road		

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 & 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 Environmental Management Plan (CEMP) in Volume 4 of this EIAR.	**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 asphalt will be specified in the Proposed Scheme, where practicable.	**Construction**
WR3	18.6.1	Throughout (as required)	The following management measures will be implemented by the appointed contractor insofar as is reasonably practicable: • Where waste generation cannot be avoided, waste disposal will be minimised; • Opportunities for reuse of materials, by-products and waste 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;	**Construction**

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			• 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; • Any hazardous waste arising will be managed by the appointed contractor in accordance with the applicable legislation; and • 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).	
WR4	18.6.1	Dodder Public Transport Bridge (DPTOB)	Excavation material will be generated as a result of the construction of the Dodder Public Transport Opening Bridge (DPTOB). The appointed contractor will reuse the material generated, if practicable and appropriate, where it meets the required standards and regulations. Where the excavated material cannot be reused within the Proposed Scheme works, it will be sent for reuse, recovery, or recycling, where practicable by the appointed contractor. Where reuse, recycling and recovery are not possible the material will be disposed of to an authorised facility by the appointed contractor. Any hazardous waste arising will be managed by the appointed contractor in accordance with the applicable legislation. Where such material is transported within Ireland this will be undertaken in accordance with the European Communities (Shipments of Hazardous Waste Exclusively within Ireland) Regulations 2011 to authorised facilities (e.g., EPA licensed facilities), or exported to authorised facilities outside of Ireland in accordance with the Transfrontier Shipment Regulations 2007. Where there are sites with planning permission and required authorisations such as foreshore licences granted and to which the material can be delivered for placement, reuse, recovery, or disposal excavated material may also be delivered to these sites by the appointed contractor.	**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 is 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 excavations. 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 disruptions 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 disruptions will only be permitted for a set period of time per day (generally a set number of hours) and 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 practicable.	**Construction**
MA5	19.5.1.1	Royal Canal Scherzer Bridges	The proposed works at the mouth of the Royal Canal have been designed to minimise the impact on the canal itself as far as possible. Any disruption to the waterway will be planned in consultation with Waterways Ireland, and all Waterways Ireland requirements will be adhered to during the bridge works. Where works are to take place adjacent to and above the canal, precautions will be implemented by the appointed contractor to protect the canal banks, canal locks and the navigation channel itself from damage.	**Construction**
MA6	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 in order to reduce the amount of travelling required to get the material to the site. Key issues to be considered when sourcing materials	**Construction**

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			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.	
MA7	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 shall be implemented where practicable in order to reduce the potential for over-ordering.	**Construction**

22.18 Risk of Major Accidents and Disasters

Table 22.16: Major Accidents Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Phase of Impact (Construction / Operational Phase)
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: Cumulative Impacts Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Phase of Impact (Construction / Operational Phase)
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.

EPA (2021). Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and

Demolition Projects [Online] Available from https://www.epa.ie/publications/circulareconomy/resources/C_and_D_Guidelines-.pdf

European Commission (2018). 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.

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

TII (2020a). The Management of Invasive Alien Plant Species on National Roads – Technical Guidance

TII (2020b). The Management of Invasive Alien Plant Species on National Roads – Standard

Directives and Legislation

S.I. No. 126/2011 - European Communities (Waste Directive) Regulations 2011 as amended

Waste Management Act 1996, as amended

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

Regulations 2006

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

S.I. No. 820/2007 - Waste Management (Collection Permit) Regulations 2007, as amended.

S.I. No. 549/2018 – European Communities (Environmental Noise) Regulations 2018