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 Ballymun / Finglas 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 Scheme Description); and
- Operational Phase: When the Proposed Scheme comes into operation (i.e. any mitigation associated with the planned maintenance).

The following tables summarise the Construction and Operational Phase mitigation outlined in the relevant EIAR technical assessments, but should be read in conjunction with the mitigation outlined in the specific chapter and also within 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 measures 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 WT1 is also a mitigation measure used in relation to Biodiversity).

22.3 General Mitigation Requirements

Table 22.1: General Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
GEN1	5.10	Throughout (as required)	The mitigation measures appropriate to the construction contract summarised in this Chapter have been included in the Construction Environmental Management Plan (CEMP) and its associated management plans (provided in Appendix A5.1 in Volume 4 of this EIAR).	Construction

22.4 Traffic and Transport

Table 22.2: Traffic and Transport Mitigation Measures

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

22.5 Air Quality

Table 22.3: Air Quality Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
AQ1	7.5.1	Construction Compounds and throughout (as required)	A series of mitigation measures will be implemented by the appointed contractor to minimise dust nuisance impacts: • Public roads affected by the Proposed Scheme works will be regularly inspected for soiling associated with construction activities and cleaned, as necessary; • Material handling systems and site 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 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 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 occurring outside the works boundary associated with the Proposed Scheme, 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 Phase
CL1	8.7.1	Throughout (as required)	A series of mitigation measures have been incorporated into the Proposed Scheme with the goal of reducing the embodied carbon associated with the Construction Phase. These mitigation measures include: • The replacement, where 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 Phase
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 the British Standard Institute (BSI) British Standard (BS) 5228-1:2009 +A1 2014 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise (hereafter referred to as BS 5228–1) (BSI 2014a) and S.I. No. 241/2006 - European Communities (Noise Emissions by Equipment for Use Outdoors) (Amendment) Regulations 2006. The mitigation measures outlined below for the Construction Phase have also been included in the Construction and Environmental Management Plan (CEMP) in Appendix A5.1 in Volume 4 of this EIAR. These measures will ensure that: • During the Construction Phase, the appointed contractor will be required to manage the works to comply with the limits detailed in Section 9.2.4.1 in Chapter 9 (Noise & Vibration) of the EIAR using methods outlined in BS 5228–1 (BSI 2014a); and • The best means practicable, including proper maintenance of plant and equipment, will be employed to minimise the noise produced by on-site operations.	Construction
NV2	9.5.1.1	Throughout (as required)	The appointed contractor will put in place the most appropriate noise control measures depending on the level of noise reduction required at individual working areas (i.e. based on the construction threshold values for noise and vibration set out in Table 9.11 and Table 9.14 in Chapter 9 (Noise & Vibration) of this EIAR). Reference to Table 9.50 in Chapter 9 (Noise & Vibration) indicates that intrusive works occurring within 75m of Noise Sensitive Receptors (NSLs) will need specific noise control measures to reduce impacts depending on time period over which they will occur (i.e. daytime or evening).	Construction
NV3	9.5.1.1.1	Throughout (as required)	The potential for any item of plant to result in exceedance of construction noise thresholds (Table 9.11 and Table 9.14 in Chapter 9 (Noise & Vibration) of this EIAR) will be assessed prior to the item being brought onto the site. The least noisy item of plant will be selected wherever practicable (e.g. plant items with sound attenuation incorporated). Should a particular item of plant already on the site be found to exceed the construction noise thresholds, the first action will be to identify whether the item can be replaced with a quieter alternative.	Construction
NV4	9.5.1.1.2	Construction Compounds and throughout (as required)	The following measures will be implemented, if required, by the appointed contractor to control noise at source in order to remain below the threshold values for noise set out in Table 9.11 in Chapter 9 (Noise & Vibration) of this EIAR, which relate to specific site considerations: • For mobile plant items such as dump trucks, planers, excavators and loaders, the installation of an acoustic exhaust, utilising an acoustic canopy to replace the normal engine cover and / or maintaining enclosure panels closed during operation can reduce noise levels by up to 10 dB; • For percussive tools such as pneumatic concrete breakers and tools a number of noise control measures include fitting a muffler or sound reducing equipment to the breaker 'tool' and ensuring any leaks in the air lines are sealed;	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			• The Construction Compounds are in close proximity to NSLs (refer to Table 9.40 in Chapter 9 (Noise & Vibration) in this EIAR) and a strict noise control policy relating to materials handling will be applied. Noisy items of plant will be sited away from noise sensitive boundaries. • Where compressors, generators and pumps are located in proximity to NSLs and have the potential to exceed the construction noise thresholds, these will be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation; and • Resonance effects in panel work or cover plates can be reduced through stiffening or the application of damping compounds, while other noise nuisance can be controlled by fixing resilient materials in between the surfaces in contact.	
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 NSL boundaries with the potential to exceed the construction noise thresholds. Annex B of BS 5228–1 (BSI 2014a) (Figures B1, B2 and B3) provide typical details for temporary and mobile acoustic screens, sheds and enclosures that can be constructed on-site from standard materials.	Construction
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 stores between the site and NSLs will also be considered by the appointed contractor.	Construction
NV8	9.5.1.1.4	Throughout (as required)	Construction activities will be scheduled in a manner that reflects the location of the site and the nature of neighbouring properties. Construction activities / plant items will be considered with respect to their potential to exceed construction noise thresholds at NSLs and will be scheduled according to their noise level, proximity to sensitive locations and possible options for noise control. In situations where an activity with potential for exceedance of construction noise thresholds is scheduled (e.g. road widening and utility diversions or activities with similar noise levels identified in Table 9.50 in Chapter 9 (Noise & Vibration) in this EIAR). Other construction activities will be scheduled to not result in significant cumulative noise levels.	Construction
NV9	9.5.1.1.5	Throughout (as required)	The NTA will establish clear forms of communication that will involve the 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 9.10 and Table 9.15 in Chapter 9 (Noise & 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 1996-1:2016 Acoustics - Description, measurement and assessment of environmental noise. Part 1: Basic quantities and assessment procedures (hereafter referred to as ISO 1996 – 1) (ISO 2016) and ISO 1996-2:2017 - Description, measurement and assessment of environmental noise - Part 2: Determination of sound pressure levels (hereafter referred to as 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

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
NV11	9.5.1.2	Throughout (as required)	During the Construction Phase, the appointed contractor will carry out vibration monitoring at identified sensitive buildings, where proposed works have the potential to be at or exceed the vibration limit values in Table 9.14 in Chapter 9 (Noise & 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 9.15 in Chapter 9 (Noise & Vibration) of this EIAR. The nature and duration of the works will be clearly set out in all communication circulars as necessary; • Activities capable of generating significant vibration effects with respect to human response (as per Table 9.15 in Chapter 9 (Noise & Vibration) of this EIAR) will be restricted to daytime hours only, as far as practicable; and • Appropriate vibration isolation shall be applied to plant (such as resilient mounts to pumps and generators), where required and where feasible.	Construction

22.8 Population

Table 22.6: Population Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
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 Phase
HH1	11.5.1	Throughout (as required)	Mitigation for adverse psychosocial responses to the Construction Phase will include providing the public with sufficient information to enable people to plan their days, journeys and activities around the construction works and take control of their options to some extent. The NTA will manage and take responsibility for community liaison and engagement. This will include timely communication to the local community on the planned works activities, timings and traffic management. A point of contact will be provided by the NTA where residents and other interested parties may have their concerns and queries addressed. This will help allow for any shift workers to make arrangements when works are likely to be close by their premises. These requirements are set out in the CEMP.	Construction
HH2	11.5.1	Mater Misericordiae Hospital	In advance of construction works in the vicinity of the Mater Misericordiae Hospital, the appointed contractor will liaise with the Hospital to inform them of the proposed construction traffic management arrangements. Access to the Mater Misericordiae Hospital will be maintained by the appointed contractor.	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 Phase
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.	Pre-Construction / Construction
BD2	12.5.1.2.1	Throughout (as required)	**Habitat Loss / Fragmentation** Where practicable, areas of vegetation including habitats of Local Importance (Higher Value), such as mixed broadleaved woodland, scattered trees and parkland, treeline 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 (BCIDD-ROT-ENV_LA-0304_XX_00-DR-LL-9001) in Volume 3 of this EIAR. These areas will be protected for the duration of construction works and fenced off at an appropriate distance.	Construction
BD3	12.5.1.2.1	Throughout (as required)	**Habitat Loss / Fragmentation** To mitigate the loss of habitat, proposed planting incorporated into the Proposed Scheme will be implemented by the appointed contractor, as listed below and displayed on the Landscaping General Arrangement drawings (BCIDD-ROT-ENV_LA-0304_XX_00-DR-LL-9001) in Volume 3 of this EIAR: • 515 street trees planted; • 2,478m of proposed hedge; • 71m^2 of proposed species rich grassland; • 6,884m^2 of proposed native planting; • 3,562m^2 of proposed ornamental planting; and • 1,969m^2 of proposed amenity grassland planting.	Construction
Refer to WT1 – WT3 in Table 22.9	12.5.1.2.2	Throughout (as required) and Construction Compound B2 and Royal Canal	**Habitat Degradation – Surface Water Quality** In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP in Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme. It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval. At a minimum, all the control and management measures set out in the SWMP will be implemented by the appointed contractor. This includes measures relating to: • Construction Compound management including the storage of fuels and materials; • Control of sediment; • Use of concrete; • Management of vehicles and plant including 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 Construction Compound B2 at St. Mobhi Drive and the proposed cycle / pedestrian bridge crossing of the Royal Canal are outlined in WT2 and WT3.	
Refer LSGH7 –LSGH8 in Table 22.10	12.5.1.2.4	Throughout (as required)	**Habitat Degradation – Groundwater Quality** The following mitigation measures will be implemented with regard to pollution of soil and groundwater: • The construction management of the site will be implemented by the appointed contractor and 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 minimise as far as possible the risk of soil, groundwater and surface water contamination; and • Measures to be implemented by the appointed contractor to minimise the risk of spills and contamination of soils and waters include: ○ Employing only competent and experienced workforce, and site-specific training of site managers, foremen and workforce, including all subcontractors, in pollution risks and preventative measures; ○ Ensure that all areas where liquids (including fuel) are stored, or cleaning is carried out, are in designated impermeable areas that are isolated from the surrounding area and within a secondary containment system (e.g. by a roll-over bund, raised kerb, ramps or stepped access); ○ The location of any fuel storage facilities will 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; ○ Good housekeeping at the site (daily site clean-ups, use of disposal bins, etc.) during the entire Construction Phase; ○ All concrete mixing and batching activities will be located in areas away from watercourses and drains; ○ Potential pollutants to be adequately secured against vandalism in containers in a dedicated secured area;	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			○ Provision of proper containment of potential pollutants according to codes of best practice; ○ Thorough control during the entire Construction Phase to ensure that any spillage is identified at an early stage and subsequently effectively contained and managed; and ○ Spill kits will be provided and will be kept close to the storage area. Staff will be trained on how to use spill kits correctly.	
Refer AQ1 in Table 22.3	12.5.1.2.5	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
BD4	12.5.1.2.6	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
BD5	12.5.1.2.6	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 (m^2), where feasible; approximate total number of stems, pattern of growth and information on other vegetation present); and where necessary, include calculations of volumes of infested soils to be excavated. The ISMP will be finalised following the pre-construction survey as advised by a suitably qualified specialist, with regard to the Management of Invasive Alien Plant Species on National Roads - Technical Guidance (TII 2020a) and Standard (TII 2020b) and other species-specific guidance documents including those listed in the ISMP, as necessary.	Pre-Construction / Construction
BD6	12.5.1.2.6	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 licenced 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
BD7	12.5.1.3.1	Throughout (as required)	**Rare and Protected Plant Species** Habitat Loss / Fragmentation	Pre-Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			The NTA will engage a suitably qualified ecologist who will undertake a pre-construction survey during the appropriate botanical season to confirm presence / absence of opposite-leaved pondweed *Groenlandia densa*. Where this species is confirmed to be within an area of disturbance or habitat loss, works will not be undertaken at that section of the Royal Canal until such time that an approved and licenced translocation process is put in place. A licence application (under Section 21 of the Wildlife Acts) will be submitted by the suitably qualified ecologist engaged by the appointed contractor in consultation with the NTA to the Wildlife Licensing Unit of the NPWS to enable translocation of the species. The application will include a detailed strategy as to the excavation and relocation of the plant and follow-on management measures for the plant.	
Refer to WT1 – WT3 in Table 22.9	12.5.1.3.2	Throughout (as required) and Construction Compound B2 and Royal Canal	**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 in Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme. It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval. At a minimum, all the control and management measures set out in the SWMP will be implemented by the appointed contractor. This includes measures relating to: • Construction Compound management including the storage of fuels and materials; • Control of sediment; • Use of concrete; • Management of vehicles and plant including 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 Construction Compound B2 at St. Mobhi Drive and the proposed cycle / pedestrian bridge crossing of the Royal Canal are outlined in WT2 and WT3.	Construction
BD8	12.5.1.4.1	Throughout (as required)	**Bats - Protection of Bats during Vegetation Clearance** Six PRFs (comprising individual trees or clusters of trees) were identified within the footprint of the Proposed Scheme (permanent and temporary land take) during the multidisciplinary surveys (see Figure 12.7.2 in Volume 3 of this EIAR). Five of these PRFs will be removed during the Construction Phase of the Proposed Scheme and the following mitigation measures will be implemented by the appointed contractor: • Where works are required within the Root Protection Area (RPA) of trees (including those trees identified as PRFs), the mitigation measures as set out in the method statement within the Arboricultural Impact Assessment (refer to Appendix A17.1 in Volume 4 of this EIAR) and which follow the requirements of	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			the British Standard Institution (BSI) British Standard (BS) 5837:2012 Trees in relation to in relation to design, demolition and construction – Recommendations will be implemented; and • These PRF trees will in advance of any works commencing in the area be protected by the appointed contractor for the duration of construction works associated with the Proposed Scheme. In addition to the above, the following bat specific mitigation measures (in relation to vegetation clearance) will be implemented by the appointed contractor: • Where the qualified arborist engaged by the appointed contractor is required to assess the condition of, and advise on any repair works necessary to, any trees which are to be retained (including PRF-containing trees or category U trees), these will be notified to the appointed ecologist to be surveyed to confirm if these trees are PRFs (as done for the pre-construction surveys outlined in Section 12.5.1.4.1.2 of Chapter 12 (Biodiversity)). Where these previously identified or new PRF(s) require works including removal for example due to poor condition, they will be subject to mitigation as described in Section 12.5.1.4.1.2 of Chapter 12 (Biodiversity); and • There will be no additional lighting within 5m of any PRF during the Construction Phase of the Proposed Scheme to avoid potential disturbance to roosting bats.	
BD9	12.5.1.4.2	Throughout (as required)	**Bats - Roost Loss** Potential Roost Feature Re-Appraisal (first step of Preconstruction Survey) All trees, identified as PRFs or not, to be removed within the boundary of the Proposed Scheme shall be rechecked for PRFs by an experienced bat specialist engaged by the NTA as part of a pre-construction survey. The appraisal, will: • Confirm that previously identified PRFs which are to be removed are still standing; and • Identify whether new PRF features (if any) may have developed owing to damage or management changes to PRF(s) in the intervening period between the original surveys and grant of planning. Preconstruction Survey In respect of those areas where individual or clusters of PRF clearance cannot be avoided, it is recommended that: • In advance of any clearance all trees deemed to be a PRF, and which are also subject to felling / clearance will be checked for the presence of bats by a suitably qualified / licenced bat specialist (using an endoscope under a separate licence held by that individual); • In the unlikely event that bats are found on the Proposed Scheme site during construction works such as vegetation clearance, works will immediately cease in that area and the local NPWS Conservation Ranger will be contacted; • An application will then be made to the NPWS for a derogation licence to permit actions affecting bats or their roosts that would normally be prohibited by law; • After licence approval from the NPWS (which may include the necessity for additional mitigation measures to those recommended here) bats may be removed by a bat specialist licenced to handle bats and released in the area in the evening following capture; and	Pre-Construction / Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			• Only then will PRF trees be felled and this should be undertaken 'in sections' where the section can be handled to avoid sudden movements or jarring of the sections. Installation of Bat Boxes In addition to mitigation proposals that may arise as result of a bat specialist preconstruction survey (e.g. emergence surveys and confirmation of roost), it is proposed to install generalist / self-cleaning bat boxes for each PRF that is confirmed to be removed (identified as part of the original surveys in support of the application or additional PRFs identified during the pre-construction survey) that is to be removed: • Standard Schwegler 1FFH (2 number) and 3FF boxes (1 number) for all previously identified PRF trees to be removed (if extant) and any new PRF tree identified during the pre-construction reappraisal; • The boxes will be installed three months in advance of felling of any PRF and in public spaces managed by the local authority as close as possible to areas of the PRF to be felled and which overlap with areas of bat activity confirmed during activity surveys undertaken as part of the EIAR; • The boxes will be installed on the tree at a height of 3m to 5m and firmly fixed to tree trunk; • Where practicable, the bat boxes should be installed in an east, south and west orientation and protected from undue disturbance by selective placement away from light spill and at a height >3.5m; • There will be 1m clearance (e.g. no overhanging branches or ivy encroachment near installed box) around each bat box opening; and • Installed bat boxes will labelled and data (reference number, GPS location and photographic record) will be supplied to Bat Conservation Trust (BCT), the Local Authority Biodiversity Officer and the NPWS.	
BD10	12.5.1.4.1.3	Throughout (as required)	**Bats** Habitat Loss and Fragmentation Where possible, habitats of importance to bats such as scattered trees and parkland, treeline 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 the Landscape General Arrangement drawings (BCIDD-ROT-ENV-LA-0304_XX_00-DR-LL-9001) in Volume 3 of this EIAR. Planting of treeline, hedgerow and grassland habitats within the Proposed Scheme footprint will be carried out by the appointed contractor, as detailed in the landscape drawings (refer to the Landscape General Arrangement drawings (BCIDD-ROT-ENV-LA-0304_XX_00-DR-LL-9001) in Volume 3 of this EIAR.	Construction
BD11	12.5.1.4.1.4	Throughout (as required)	**Bats** Disturbance of Flight Patterns / Foraging Routes as a Result of Lighting The appointed contractor in liaison with the suitably qualified licensed ecologist(s) will ensure that lighting at the Construction Compounds, and active works areas in proximity to known bat activity (including watercourses), will be designed to minimise light spill and be cognisant of light spill onto these areas. Mitigation measures to reduce light spill may include the following:	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			• 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 can 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).	
BD12	12.5.1.4.2.1	Throughout (as required)	**Badgers** Disturbance / Displacement The NTA will ensure that a confirmatory pre-construction check of all suitable badger habitat will be completed within 12 months prior to any construction works commencing. The presence of any new setts or significant badger activity will be treated and / or protected in accordance with the Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes (NRA 2005b).	Pre-Construction
BD13	12.5.1.4.2.2	Throughout (as required)	**Badgers** Protection of Badgers from Accidental Harm During Construction (Excavations) To protect badgers from indirect harm during construction, where practicable, open excavations will be covered when not in use and backfilled as soon as practicable by the appointed contractor. Excavations will also be covered at night, where practicable, and any deep excavations which must be left open will have appropriate egress ramps in place to allow mammals to safely exit should they fall in.	Construction
BD14	12.5.1.4.2.3	Throughout (as required)	**Badgers** Lighting See BD11 which relates to lighting mitigation measures.	Construction
BD15	12.5.1.4.3.1	Throughout (as required)	**Otter** Loss of Breeding / Resting Sites The NTA will ensure that a confirmatory pre-construction check of all suitable otter habitat will be completed by a suitably qualified ecologist within the 12-month period prior to any construction works commencing. The presence of any new holt / couch sites will be treated and / or protected in accordance with the Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes (NRA 2006b).	Construction
BD16	12.5.1.4.3.2	River Tolka and Royal Canal crossing and Throughout (as required)	**Otter** Measures to Prevent Injury/ Mortality Impacts The appointed contractor will engage a suitably qualified and / or licensed ecologist(s) to oversee and advise works at watercourse crossings:	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			• Where a new or reactivated holt is encountered, within 150m (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 2006b) 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.	
BD17	12.5.1.4.3.3	Throughout (as required)	**Otter** Measures to Prevent Disturbance / Displacement Where night-time works are required, the appointed contractor will liaise with the engaged suitably qualified and licenced ecologist(s) and implement measures to mitigate the impact of such works (especially works carried out adjacent to watercourses with known otter activity). Site set up near watercourse crossings shall be undertaken in a timely manner to reduce impacts to otter. The works area will be delineated from the watercourse with hoarding by the appointed contractor to obscure the site from otter and prevent access. The construction works will commence following confirmation from the suitably qualified ecologist that no otter holt is located within 200m of the proposed cycle / pedestrian bridge over the Royal Canal. Should an otter holt be found to be present, the suitably qualified ecologist will advise, in discussion with the NTA and the appointed contractor on the appropriate actions to be taken. Where night-working adjacent to watercourses known to support otter is required, owing to practical considerations of traffic restrictions etc., the advice of a suitably qualified ecologist must be sought by the appointed contractor and a derogation licence, if necessary, may be sought from the NPWS permitting such works in close proximity of a new holt. By virtue of the loss of a terrestrial riparian territory, corresponding to the construction of an abutment on one side of the Royal Canal, and the relocation of the existing mooring point, the appointed contractor will install planter boxes / a precast concrete trough to contain soil for aquatic plants along the water edge in front of the ramp wall.	Construction
BD18	12.5.1.4.3.4	Throughout (as required) and Construction	**Otter** Habitat Degradation – Surface Water Quality	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
		Compound B2 and Royal Canal	In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP in Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme. It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval. At a minimum, all the control and management measures set out in the SWMP will be implemented by the appointed contractor. This includes measures relating to: • Construction Compound management including the storage of fuels and materials; • Control of sediment; • Use of concrete; • Management of vehicles and plant including 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 Construction Compound B2 at St. Mobhi Drive and the proposed cycle / pedestrian bridge crossing of the Royal Canal are outlined in WT2 and WT3.	
BD19	12.5.1.4.3.5	Throughout (as required)	**Otter** Lighting See BD11 which relates to lighting mitigation measures.	Construction
Refer to WT1 – WT3 in Table 22.9	12.5.1.4.3.5	Throughout (as required)	**Marine Mammals** Habitat and Food Resource Degradation – Water Quality In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP in Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme. It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval. At a minimum, all the control and management measures set out in the SWMP will be implemented by the appointed contractor. This includes measures relating to: • Construction Compound management including the storage of fuels and materials; • Control of sediment;	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			• 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 Construction Compound B2 at St. Mobhi Drive and the proposed cycle / pedestrian bridge crossing of the Royal Canal are outlined in WT2 and WT3.	
BD20	12.5.1.5.1.1	Throughout (as required)	**Breeding Birds** Habitat Loss and Loss of Breeding / Resting Sites Where possible, habitats of importance to birds such as scattered trees and parkland, treeline 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 the Landscape General Arrangement drawings (BCIDD-ROT-ENV_LA-0304_XX_00-DR-LL-9001) in Volume 3 of this EIAR. Planting of treeline, hedgerow and grassland habitats within the Proposed Scheme footprint will be carried out by the appointed contractor, as detailed in the landscape drawings (refer to the Landscape General Arrangement drawings (BCIDD-ROT-ENV_LA-0304_XX_00-DR-LL-9001) in Volume 3 of this EIAR for locations).	Construction
BD21	12.5.1.5.1.2	Throughout (as required)	**Breeding Birds** Mortality Risk Where practicable, vegetation (e.g. hedgerows, trees, scrub, bankside vegetation and grassland) will not be removed, between 1 March and 31 August, to avoid direct impacts on nesting birds. Where the construction programme does not allow this seasonal restriction to be observed, then these areas will be inspected by a suitably qualified ecologist as engaged by the appointed contractor, for the presence of breeding birds prior to clearance. Areas found not to contain nests will be cleared within 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 the NPWS.	Construction
BD22	12.5.1.5.1.3	Throughout (as required)	**Breeding Birds** Disturbance / Displacement The appointed contractor will implement the noise mitigation measures described in NV4, NV6 and NV7 in Table 22.5 in this Chapter.	Construction
Refer to WT1 – WT3 in Table 22.9	12.5.1.5.1.4	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 in Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding,	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme. It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval. At a minimum, all the control and management measures set out in the SWMP will be implemented by the appointed contractor. This includes measures relating to: • Construction Compound management including the storage of fuels and materials; • Control of sediment; • Use of concrete; • Management of vehicles and plant including 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 Construction Compound B2 at St. Mobhi Drive and the proposed cycle / pedestrian bridge crossing of the Royal Canal are outlined in WT2 and WT3.	
BD23	12.5.1.5.2.1	Throughout (as required)	**Wintering Birds** Measures to Reduce Mortality and Disturbance / Displacement Impacts to SCI Birds Due to Vegetation Loss During Construction In the absence of any other ecological requirement / constraint, the removal of any screening vegetation, if present adjacent to potential open territory that might be used by SCI bird species, shall be undertaken outside of the statutory breeding bird season (1 March to 31 August) and before the arrival of wintering birds. Thus, vegetation clearance in these areas shall be scheduled for September. This includes the area of vegetation removal along the boundary of R108 St. Mobhi Road and the Na Fianna CLG / Home Farm Football Club sports pitches. However, where the construction programme does not allow these seasonal restrictions to be observed, then these areas will be inspected by a suitably qualified ecologist as engaged by the appointed contractor, for the presence of wintering birds prior to clearance. Where wintering birds are observed the suitably qualified ecologist will, in discussion with the appointed contractor, advise how works will be appropriately undertaken. Vegetation which is not to be removed but is in close proximity to any works within the footprint of the Proposed Scheme shall be fully protected and fenced off from works activity in accordance with accepted landscaping protocols in BS 5837:2012 Trees in relation to design, demolition and construction. Recommendations (BSI 2012).	Construction
Refer to WT1 – WT3 in Table 22.9	12.5.1.5.2.2	Throughout (as required)	**Wintering Birds** Habitat and Food Resource Degradation – Water Quality	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP in Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme. It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval. At a minimum, all the control and management measures set out in the SWMP will be implemented by the appointed contractor. This includes measures relating to: • Construction Compound management including the storage of fuels and materials; • Control of sediment; • Use of concrete; • Management of vehicles and plant including 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 Construction Compound B2 at St. Mobhi Drive and the proposed cycle / pedestrian bridge crossing of the Royal Canal are outlined in WT2 and WT3.	
BD24	12.5.1.7.1	Throughout (as required)	**Amphibians** Habitat Loss, Disturbance and Mortality Risk If vegetation clearance works by the appointed contractor are to begin during the season where frogspawn or tadpoles may be present (i.e. February to mid-summer), or where breeding adult newts, their eggs or larvae may be present (i.e. mid-March to September), a pre-construction survey of suitable habitat will be undertaken by a suitably qualified ecologist engaged by the appointed contractor to determine whether breeding amphibians are present. Where amphibians are present, mitigation measures outlined 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 the 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 the NPWS, and removed from affected habitat either by hand net or by trapping, and translocated to the nearest area of available suitable habitat, beyond the ZoI of the Proposed Scheme. If used, the type and design of traps shall be approved by the NPWS. This is a standard and proven method of catching and translocating smooth newt;	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			• 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.	
Refer to WT1 – WT3 in Table 22.9	12.5.1.7.2	Throughout (as required)	**Amphibians** Habitat and Food Resource Degradation – Water Quality In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP in Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme. It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval. At a minimum, all the control and management measures set out in the SWMP will be implemented by the appointed contractor. This includes measures relating to: • Construction Compound management including the storage of fuels and materials; • Control of sediment; • Use of concrete; • Management of vehicles and plant including 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 Construction Compound B2 at Sr. Mobhi Drive and the proposed cycle / pedestrian bridge crossing of the Royal Canal are outlined in WT2 and WT3.	Construction
BD25	12.5.1.8.1	Throughout (as required)	**Fish** Habitat Loss / Severance and Barrier Effect Instream works are proposed for the Royal Canal, which will result in a narrowing of the channel for the duration of the construction of the proposed Royal Canal pedestrian / cycle bridge. In this regard, the design calls for the localised lowering of the water levels in the Royal Canal followed by the emplacement of a precast concrete shell formwork in the canal in a timely manner so as to ensure working in the dry and to retain as much uninterrupted canal channel (see Chapter 5 (Construction) for further details). This	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			should not present an impediment to fish passage as fish can swim to suitable areas subject to no interference. No further mitigation is proposed in respect of the physical alteration of the canal.	
Refer to WT1 – WT3 in Table 22.9	12.5.1.8.2	Throughout (as required)	**Fish** Habitat and Food Resource Degradation – Water Quality In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP in Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme. It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval. At a minimum, all the control and management measures set out in the SWMP will be implemented by the appointed contractor. This includes measures relating to: • Construction Compound management including the storage of fuels and materials; • Control of sediment; • Use of concrete; • Management of vehicles and plant including 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 Construction Compound B2 at St. Mobhi Drive and the proposed cycle / pedestrian bridge crossing of the Royal Canal are outlined in WT2 and WT3.	Construction
BD26	12.5.1.9.1	Throughout (as required)	**Invertebrates – Freshwater Molluscs** Habitat Loss and Fragmentation The NTA will ensure that a pre-construction mollusc survey will be undertaken by a suitably qualified ecologist during the appropriate season to confirm presence / absence of the species. Where this species is confirmed to be within an area of disturbance or habitat loss, works will not be permitted at that section of the Royal Canal until such time that an approved process is put in place to enable translocation of the species. The suitably qualified ecologist will, in discussion with the NTA, advise on the appropriate course of action to be followed.	Pre-Construction
Refer to WT1 – WT3 in Table 22.9	12.5.1.9.2	Throughout (as required)	**Invertebrates** Habitat and Food Resource Degradation – Water Quality In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP in Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval. At a minimum, all the control and management measures set out in the SWMP will be implemented by the appointed contractor. This includes measures relating to: • Construction Compound management including the storage of fuels and materials; • Control of sediment; • Use of concrete; • Management of vehicles and plant including 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 Construction Compound B2 at St. Mobhi Drive and the proposed cycle / pedestrian bridge crossing of the Royal Canal are outlined in WT2 and WT3.	
BD27	12.5.2.1.2.1	Throughout (as required)	**National Sites** Habitat Loss / Fragmentation Following the completion of the proposed Royal Canal pedestrian / cycle bridge, the water levels in the canal will be returned to their preconstruction levels, and with the exception of the narrow loss along one bank, the channel beneath the newly installed bridge will be returned to its pre-construction condition by the appointed contractor. Concrete wetland planter boxes will be installed at the base of the abutment ramp which will be filled with canal mud and planted with riparian vegetation by the appointed contractor. The proposed planting incorporated into the Proposed Scheme will be implemented by the appointed contractor. Refer to the Landscape General Arrangement drawings (BCIDD-ROT-ENV_LA-0304_XX_00-DR-LL-9001) in Volume 3 of this EIAR. The appointed contractor will carry out annual post construction monitoring, over a two year period to ensure the successful re-establishment of vegetation within the Proposed Scheme.	Operational
BD28	12.5.2.1.2.3	Throughout (as required)	**National Sites** 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.	Operational
BD29	12.5.2.2.3	Throughout (as required)	**Habitats** Habitat Degradation - Non-Native Invasive Plant Species	Operational

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			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.	
BD30	12.5.2.3.1	Throughout (as required)	**Rare and Protected Plant Species** Habitat loss / Fragmentation In the event that opposite-leaved pondweed *Groenlandia densa* is reported confirmed within the works area as per the pre-construction survey detailed in BD7 and is located within land that is required to be altered / used during construction, the mitigation strategy described in BD7 will be followed by the appointed contractor.	Operational
BD31	12.5.2.4.1.1	Throughout (as required)	**Bats** Habitat Loss and Loss of Breeding / Resting Sites Planting of treeline, hedgerow and grassland habitats within the Proposed Scheme footprint will be carried out by the appointed contractor during the Construction Phase. Refer to the Landscape General Arrangement drawings (BCIDC-ARP-ENV_LA-0304_XX_00-DR-LL-9001) in Volume 3 of this EIAR. The appointed contractor will carry out annual post construction monitoring, over a two year period to ensure the successful re-establishment of vegetation within the Proposed Scheme.	Operational
BD32	12.5.2.4.1.1	Throughout (as required)	**Bats** **Monitoring of Bat Boxes** Where bat boxes are installed as part of the Construction Phase of the Proposed Scheme, monitoring is required under best practice guidance (e.g. Marnell et al. 2022 (Bat mitigation guidelines for Ireland (NPWS 2022)). The level of post-installation monitoring will be dependent on the roost type and the number of bats present. A precautionary approach will be assumed on the basis that bats using these PRFs reflect species that were typically noted during the activity surveys and are occasionally identified from urban transport corridors. The NTA will ensure that annual inspections of installed bat boxes will be undertaken for two years or as advised by a suitably qualified ecologist, to confirm occupancy. Where no occupancy is noted in year 1, the boxes will be relocated to another mature tree and details communicated with the BCT, the Local Authority Biodiversity Officer and the NPWS.	Operational
BD33	12.5.2.5.1.1	Throughout (as required)	**Breeding Birds** Habitat Loss / Loss of Breeding / Resting Sites, Disturbance / Displacement The appointed contractor will carry out annual post construction monitoring, over a two year period to ensure the successful re-establishment of vegetation within the Proposed Scheme.	Operational
BD34	12.5.2.5.2.1	Throughout (as required)	**Wintering Birds** Measures to Reduce Impacts to SCI Birds due to Vegetation Loss	Operational

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			Planting of treeline, hedgerow and grassland habitats within the Proposed Scheme footprint will be carried out by the appointed contractor. Re-establishment of vegetation, including re-grassing, at these areas is to be done outside of the wintering bird season, but as soon as practicable after completion of a section of works. The appointed contractor will carry out annual post construction monitoring, over a two year period to ensure the successful re-establishment of vegetation within the Proposed Scheme.	
BD35	12.5.2.1.2.2 12.5.2.2.2 12.5.2.3.2 12.5.2.4.3 12.5.2.4.4.1 12.5.2.5.1.2 12.5.2.5.2.2 12.5.2.7.1 12.5.2.8.2 12.5.2.9.1	Throughout (as required)	**National Site, Habitats, Rare and Protected Plant Species, Otter, Marine Mammals, Breeding Bird, Wintering Birds, Amphibians, Fish and Invertebrates** Habitat Degradation- Surface Water The proposed Sustainable Drainage System (SUDS), as shown in Proposed Surface Water Drainage Works drawings (BCIDD-ROT-DNG_RD-0304_XX_00-DR-CD-9001 in Volume 3 of this EIAR), will be installed by the appointed contractor during the Construction Phase.	Operational

22.11 Water

Table 22.9: Water Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
WT1	13.5.2.1	Construction Compounds and throughout (as required)	A Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP in Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme. It will be a condition within the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval. At a minimum, all the control and management measures set out in the SWMP will be implemented by the appointed contractor. This includes measures relating to: • Construction Compound management including the storage of fuels and materials; • Control of Sediment • Use of Concrete; • Management of vehicles and plant including refueling and wheel wash facilities; and • Monitoring.	Construction
WT2	13.5.2.2.1	Construction Compound B2 at St. Mobhi Drive	The following construction methods will be implemented by the appointed contractor: • No connections between the temporary Construction Compound and the existing surface water drainage system in St Mobhi Drive will be made; • The existing low wall along the southern boundary of the site will be retained, as far as is practicable, to provide protection to the Tolka_060 from overland flows; • Fuel storage will be located on the western boundary of the Construction Compound, as far as possible from the surface water drain at the eastern end of St Mobhi Drive. All fuel will be stored in accordance with the SWMP in Appendix A5.1 CEMP in Volume 4 of this EIAR; • Construction vehicles will be fuelled using a mobile fuelling bowser system on a temporary stand that is self-contained, such that any spillage is trapped into a small tank for pumping back into the bowser, or by using a flat-bed trailer base with a folding gate to be closed behind the vehicle being fuelled; • Storage of other materials will be located on the western boundary of the Construction Compound, as far as possible from the surface water drains; • All storage areas will be covered; • Any cement and concrete mixing / batching will be located as far as possible from the surface water drain;	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			• Wheel wash areas will be closed-cycle. There will be no discharge of wheel wash water to surface water drains. Off site disposal of contaminated and silty water and sludge will be required; and • Wastewater from cabins will be contained. Where discharge to the local sewer is required, consent from the local authority will be obtained (i.e. a temporary permit).	
WT3	13.5.2.2.2	Proposed Cycle / Pedestrian Bridge Crossing of the Royal Canal	The following site-specific mitigation measures will be implemented by the appointed contractor: • Silt fences will be used along the southern bank to reduce the likelihood of silty water runoff during construction of the cycle ramp; • Any water collected will be dewatered via siltbusters, or similar, before being discharged back into the canal; • Prefabricated concrete will be used for the structure, wherever reasonably practicable, or where new concrete is batched at Construction Compounds, it will be cleaned prior to installation; and • No plant will be refuelled within 10m of the canal.	Construction
WT4	13.5.3	Throughout (as required)	In the Operational Phase, the infrastructure (including the maintenance regime for Sustainable Drainage Systems (SUDS)) will be carried out by the local authorities 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 Phase
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 reuse within the Proposed Scheme by the appointed contractor, ensuring the appropriate handling, processing and segregation of the material. Where practical, the removal of topsoil from the Proposed Scheme will be avoided. All earthworks will be undertaken in accordance with TII Specification for Road Works (SPW) Series 600 Earthworks (TII 2013) and project-specific earthworks specifications ensuring that all excavated material and imported material is classified using the same methodology to allow maximum opportunity for the reuse of materials on-site.	Construction
LSGH3	14.5.1	Throughout (as required)	Excavation of Potentially Contaminated Ground The appointed contractor will ensure that excavations shall be kept to a minimum, using shoring or trench boxes, where appropriate. For more extensive excavations, a temporary works designer shall be appointed by the appointed contractor to design excavation support measures in accordance with all relevant guidelines that minimises the excavation of contaminated ground.	Construction
LSGH4	14.5.1	Throughout (as required)	Excavation of Potentially Contaminated Ground The appointed contractor will be responsible for regular testing of excavated soils to monitor the suitability of the soil for reuse.	Construction
LSGH5	14.5.1	Throughout (as required)	Excavation of Potentially Contaminated Ground Samples of ground suspected of contamination will be tested for contamination by the appointed contractor during the detailed ground investigation and ground excavated from these areas will be disposed of, to suitably licensed or permitted sites, in accordance with the current Irish waste management legislation.	Construction
LSGH6	14.5.1	Throughout (as required)	Excavation of Potentially Contaminated Ground Any dewatering in areas of contaminated ground shall be designed by the appointed contractor to minimise the mobilisation of contaminants into the surrounding environment.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
LSGH7	14.5.1	Throughout (as required)	Pollution of Soils and Groundwater Good construction management practices, as outlined in the Construction Industry Research and Information Association (CIRIA) guidance Control of Water Pollution from Construction Sites – Guidance for consultants and contractors (Masters-Williams *et al*. 2001) will be employed by the appointed contractor to minimise the risk of transmission of hazardous materials, as well as pollution of adjacent watercourses and groundwater. The construction management of the site will take account of these recommendations to minimise, as far as possible, the risk of soil, groundwater and surface water contamination.	Construction
LSGH8	14.5.1	Throughout (as required)	Pollution of Soils and Groundwater Measures to be implemented to minimise the risk of spills and contamination of soils and waters shall 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 all 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 on-site (daily site clean-ups, use of disposal bins, etc.) will be applied during the entire Construction Phase; • All concrete mixing and batching activities will be located in areas away from watercourses and drains; • Potential pollutants will be adequately secured against vandalism in containers in a dedicated secured area; • Provision of proper containment of potential pollutants according to codes of best practice; • Thorough control will be implemented during the entire Construction Phase to ensure that any spillage is identified at an early stage and subsequently effectively contained and managed; and • Spill kits will be provided and will be kept close to the storage area and staff will be trained on how to use spill kits correctly.	Construction
LSGH9	14.5.1	Throughout (as required)	Pollution of Soils and Groundwater An Environmental Incident Response Plan, as described in the CEMP (AppendixA5.1 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 such aspects as containment measures, emergency discharge routes, a list of appropriate equipment and clean-up materials and notification procedures to inform the relevant environmental protection authority (refer to Appendix A5.1 CEMP in Volume 4 of this EIAR).	Construction
LSGH10	14.5.1	Throughout (as required)	Pollution of Soils and Groundwater	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			Sediment control methods are outlined in the Surface Water Management Plan in Appendix A5.1 CEMP in Volume 4 of this EIAR, and these will be implemented by the appointed contractor.	
LSGH11	14.5.2	Throughout (as required)	In the Operational Phase, the infrastructure will be maintained by the local authority, and will be subject to their management procedures, to ensure that the correct measures are taken in the event of any accidental spillages and this will reduce the potential for any impact.	Operational

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 Phase
ACH1	15.5.1.1	Throughout (as required)	The NTA will procure the services of a suitably qualified archaeologist as part of its Employer's Representative team administrating 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
ACH3	15.5.1.1	Throughout (as required)	The appointed contractor will ensure that the archaeologist as described in ACH6 will have the authority to inspect all excavation to the formation level for the proposed works and to temporarily halt the excavation work, if and as necessary, having conferred with the NTA. They will be given the authority to ensure the temporary protection of any features of archaeological importance identified having conferred with the NTA. The archaeologist will be afforded sufficient time and resources to record and remove any such features identified in accordance with the licensing requirements agreed.	Construction
ACH4	15.5.1.1	Throughout (as required)	The appointed contractor will make provision to allow for, the necessary archaeological monitoring, inspection and excavation works that may arise on the site during the Construction Phase.	Construction
ACH5	15.5.1.1	Throughout (as required)	An experienced and competent licence-eligible archaeologist will be employed by the appointed contractor to advise on archaeological and cultural heritage matters during construction, to communicate all findings in a timely manner to the NTA and statutory authorities, to acquire any 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	Throughout (as required)	In the case of cellars, coal cellars 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 cellars, coal cellars and / or basements.	Construction
ACH7	15.5.1.1	Throughout (as required)	Licence applications will be made by the licence-eligible archaeologist on behalf of the client to the National Monument Service at the DHLGH. In addition to a detailed method statement, the applications must include a letter from the NTA that confirms the availability of adequate funding. There is a prescribed format for the letter that must be followed.	Construction
ACH8	15.5.1.1	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	Throughout (as required)	Once the presence of archaeologically significant material is established, full archaeological recording of such material is recommended in accordance with the licensing requirements.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			If it is not possible for the construction works to avoid the material, full excavation 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.	
ACH10	15.5.1.1	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	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	15.5.1.2	Throughout (as required)	Features of a cultural heritage interest that are required to be removed on a temporary basis or for a short-term period, will be protected in accordance with the mitigation measures set out in Chapter 16 (Architectural Heritage) (i.e. AH4)	Construction
ACH13	15.5.1.3	Ballymun Road from St. Margaret's Road to Griffith Avenue Section	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: • In areas of archaeological potential, namely within the designated ZAP of Stormanstown House (RMP DU014-067001; DU014-067002); and • At all undesignated archaeological heritage sites identified from historic mapping and the DCIHR (DCC 2003 to 2009), namely DCIHR 14-15-003, Bridge (site of), CBC0304AH001, Lodge (site of) and CBC0304AH002, Walnut Grove House (site of). It is in these areas that there is a possibility to disturb intact archaeological layers and material. Licensed archaeological excavation, in full or in part, of any identified archaeological remains (preservation by record) or preservation in-situ will be undertaken.	Construction
ACH14	15.5.1.4	St. Mobhi Road and Botanic Road from Griffith Avenue to Hart's Corner	The appointed contractor will ensure that archaeological monitoring under licence will take place at the preconstruction and early stages of construction, where any preparatory ground-breaking or ground reduction works are required, at the following locations: • DU018-005, Ecclesiastical site (site of); • DU018-005001, Ecclesiastical site (site of); • DU018-005004, Burial ground (site of); • DU018-005011, Settlement cluster (site of); • DU018-005003, House – 18th / 19th century (site of); • DU018-005006, Burial ground (site of); • DU018-005010, Burial (site of); • DU018-005009, Castle – motte (site of); • CBC0304AH013, Enclosure (site of); • CBC0304AH003, River Tolka;	Pre-Construction / Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			• CBC0304AH004, Houses (site of); • CBC0304AH005, Fairfield House and lodge; • DCIHR 18-03-041, Tramway. It is in these areas that there is a possibility to disturb intact archaeological layers and material. Licensed archaeological excavation, in full or in part, of any identified archaeological remains (preservation by record) or preservation in-situ will be undertaken.	
ACH15	15.5.1.4	St. Mobhi Road and Botanic Road from Griffith Avenue to Hart's Corner	Given the results of previous geophysical survey and archaeological testing at the newly discovered enclosure site (CBC0304AH013), the appointed contractor will ensure that archaeological investigation in consultation with the DHLGH will be undertaken within the land take for the retaining wall on R108 St. Mobhi Road, prior to works.	Construction
ACH16	15.5.1.4	St. Mobhi Road and Botanic Road from Griffith Avenue to Hart's Corner	The cable markers (CBC0304CH001, CBC0304CH002) will be protected in accordance with the mitigation measures set out in Chapter 16 (Architectural Heritage) (i.e. AH4)	Construction
ACH17	15.5.1.5	Prospect Road, Phibsborough Road from Hart's Corner to Western Way	The appointed contractor will ensure that archaeological monitoring under licence will take place at the preconstruction and early stages of construction, where any preparatory ground-breaking or ground reduction works are required, at the following locations: • DCIHR 18-07-027; Tramway (site of); • CBC0304AH006; Houses (site of); • CBC0304AH007; Houses (site of); • CBC0304AH008; Area of archaeological potential; and • At Cross Guns Railway Tunnel in Phibsborough (MGWR) (NIAH 50060112).	Pre-Construction / Construction
ACH18	15.5.1.5	Prospect Road, Phibsborough Road from Hart's Corner to Western Way	Archaeological monitoring, followed by recording and excavation will take place at the following areas: • Along the course of the infilled Broadstone Branch of the Royal Canal (DCIHR 18-07-030), the site of Blaquiere Bridge (DCIHR 18-07-033) and the unnamed bridge at the junction with Geraldine Street (DCIHR 18-07-034); and • At the Royal Canal along Cross Guns Quay (DCIHR 18-03-001), where a 2m high graded ramp is required for the newly proposed cycle / pedestrian bridge over the Royal Canal to Royal Canal Bank, recording of the construction excavation process will take place on the south side of the Royal Canal bank in the vicinity of the proposed ramp and on the north side of the Royal Canal where works will take place along its edge. It is in these areas that there is a possibility to disturb intact archaeological layers and material. Licensed archaeological excavation, in full or in part, of any identified archaeological remains (preservation by record) or preservation in-situ will be undertaken.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
ACH19	15.5.1.5	Prospect Road, Phibsborough Road from Hart's Corner to Western Way	The memorials at Hart's Corner (CBC0304CH003), the cable marker (CBC0304CH004) and the memorial plaque (CBC0304CH005) will be protected in accordance with the mitigation measures set out in Chapter 16 (Architectural Heritage) (i.e. AH3)	Construction
ACH20	15.5.1.5	Prospect Road, Phibsborough Road from Hart's Corner to Western Way	Archaeological monitoring under licence will take place for works at the railway tunnel (NIAH 50060112).	Construction
ACH21	15.5.1.5	Prospect Road, Phibsborough Road from Hart's Corner to Western Way	Structural features associated with the 'River Run' garden (CBC0304CH006) will be protected in accordance with the mitigation measures set out in Chapter 16 (Architectural Heritage) (i.e. AH4)	Pre-Construction / Construction
ACH22	15.5.1.6	Constitution Hill and Church Street to Arran Quay	The appointed contractor will ensure that rchaeological monitoring under licence will take place at the preconstruction and early stages of construction, where any preparatory ground-breaking or ground reduction works are required, at the following locations: • DU18-020, Historic City of Dublin; • DU018-020613, Habitation site (site of); • DU018-020567, Enclosure / redundant record (site of); • DU018-020084, St. Michan's Church; • DU018-135, Riverine revetment (site of); • DU018-020569, Mill (site of); • DU018-020590, Building (site of); • DU018-020589, Watercourse (site of); • DU018-020770, Building (site of); • DU018-020050, Religious house – Dominican friars (site of); • DU018-020466, Courthouse (site of); • DU018-020064, Chapel (site of); • DU018-020236, Mill – unclassified (site of); • DU018-020459, Quay (site of); • DU018-020042, Bridge (site of); • DU018-020566, Watercourse – River Bradogue (site of); • DU018-020605, Habitation site (site of); • DCIHR 18-07-038, Foster Aqueduct (site of); • CBC0304AH009, River Bradogue (site of);	Pre-Construction / Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			• DCIHR 18-11-002, Tramway (site of). It is in these areas that there is a possibility to disturb intact archaeological layers and material. Licensed archaeological excavation, in full or in part, of any identified archaeological remains (preservation by record) or preservation in-situ will be undertaken.	
ACH23	15.5.1.7	Finglas Road from St. Margaret's Road to Wellmount Road	The appointed contractor will ensure that archaeological monitoring under licence will take place at the preconstruction and early stages of construction, where any preparatory ground-breaking or ground reduction works are required, at the following locations: • DU014-066, Historic town; • DU014-066013, Redundant record / Ecclesiastical enclosure; • DU014-066007, Redundant record / Bridge (site of); • DU014-066017, Graveyard; • CBC0304AH010, Area of archaeological potential; • DCIHR 14-14-011, Quarry. It is in these areas that there is a possibility to disturb intact archaeological layers and material. Licensed archaeological excavation, in full or in part, of any identified archaeological remains (preservation by record) or preservation in-situ will be undertaken.	Pre-Construction / Construction
ACH24	15.5.1.8	Finglas Road from Wellmount Road to Ballyboggan Road	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: • In areas of archaeological potential identified, namely the site of a former possible mound (RMP DU014-077), a mill site (RMP DU018-001) and a bridge site (RMP DU018-022); and • At all undesignated archaeological heritage sites identified from historic mapping and the DCIHR (DCC 2003-2009), namely CBC0304AH011, Demesne landscape (site of) and DCIHR 18-02-032, Finglas Bridge (Site of). It is in these areas that there is a possibility to disturb intact archaeological layers and material. Licensed archaeological excavation, in full or in part, of any identified archaeological remains (preservation by record) or preservation in-situ will be undertaken.	Pre-Construction / Construction
ACH25	15.5.1.9	Finglas Road from Ballyboggan Road to Hart's Corner	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 location: • At the undesignated area of archaeological potential (CBC0304AH012). 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.	Pre-Construction / Construction
ACH26	15.5.1.10	Construction Compound Locations	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:	Pre-Construction / Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			• At all sites and areas of archaeological potential (Construction Compound B1 (CBC0304AH014), Construction Compound B3 (DU018-020, Historic City) and Construction Compound F1 (CBC0304AH015, Buildings (site of))); identified for proposed Construction Compound and or proposed ancillary works; and • In all areas of greenfield potential (Construction Compound F2 (CBC0304AH016) and Construction Compound F3 (CBC0304AH012)) on sites proposed for Construction Compounds and ancillary works.	

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 Phase
AH1	16.5.1.1	Protected Structure: Former Players Factory on Botanic Road (DCC RPS 855)	The following mitigation measures will be implemented: • Recording the existing boundary in position prior to the works; • Labelling the affected railings, gates, gate posts, capping stones and historic masonry, prior to its careful removal to safe storage; and • Reinstatement of the removed items on new lines, including maintaining the relationship between the gate and the front entrance to the building. Recording will be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee the labelling, taking-down and reinstatement of the affected gates, railings, piers and masonry. Works to historic fabric will be carried out in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH2	16.5.1.1	All Other Protected Structures (as listed in Appendix A16.2 in Volume 4 of this EIAR)	The architectural heritage specialist will record, protect and monitor the boundaries (as relevant) prior to, and for the duration of the Construction Phase. Recording, overseeing of protective measures and monitoring will be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR	Construction
AH3	16.5.1.2	Irish Volunteer Memorial (NIAH 50060267) and Phibsboro Library (DCC RPS 8884) boundary in the Phibsborough Centre Architectural Conservation Area (ACA)	Mitigation will include recording and labelling the affected sections of the boundary treatments and the memorial in detail prior to the works. Removed historic fabric will be stored safely for reuse in the reinstatement by the appointed contractor. Recording will be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee the labelling, taking-down and reinstatement of the affected boundary walls, railings, piers, bricks and masonry and the memorial. Works to historic fabric will be carried out in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH4	16.5.1.2	Protected structures, NIAH and other structures which front onto, or have boundaries on Doyle's Corner and North Circular Road within the Phibsborough Centre ACA	Mitigation to offset the risk of damage will include 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 will 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 Phase
AH5	16.5.1.3	Royal Canal Conservation Area	Mitigation will include the recording of the bridge prior to the works, developing the detailed design to minimise the removal and alteration of historic fabric and to include the reuse of affected fabric within the altered bridge, where practicable. Recording will be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee the labelling, taking-down and reinstatement of the affected gates, railings, piers, bricks and masonry. Works to historic fabric will be carried out in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH6	16.5.1.4	National Inventory of Architectural Heritage (NIAH) Structures: Dean Swift Bridge on St. Mobhi Road (NIAH 50130053)	Mitigation to offset the risk of damage will include recording, protection and monitoring prior to, and for the duration of the Construction Phase. Recording, overseeing of protective measures and monitoring will be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR	Construction
AH7	16.5.1.4	NIAH Structures: Irish Volunteer's Memorial (NIAH 50060267) at Blaquiere Bridge	Mitigation will include the recording of the memorial and its component parts prior to the works, labelling the affected fabric prior to its careful dismantling and removal to safe storage by the appointed contractor, and the reinstatement of the memorial in Broadstone Park. Recording is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee the labelling, taking-down and reinstatement of the memorial. Works to historic fabric will be carried out in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH8	16.5.1.4	NIAH Structures: NIAH 50070279 Charles Street West	Mitigation to offset the risk of damage will include 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 will be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR	Construction
AH9	16.5.1.5	Other Structures of Architectural Heritage Interest: Railway bridge on Prospect Road (CBC0304BTH117)	Mitigation will include the recording of the bridge prior to the works, developing the detailed design to minimise the removal and alteration of historic fabric and to include the reuse of affected fabric within the altered bridge, where practicable. During the construction works, historic fabric will be labelled prior to its careful removal to safe storage before reinstatement. Recording will be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee the labelling, taking-down and reinstatement of the affected gates, railings, piers, and masonry. Works to historic fabric will be carried out in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR	Construction
AH10	16.5.1.5	Other Structures of Architectural Heritage Interest: 34, 36 and 38 Bengal Terrace (CBC0304BTH105)	Mitigation will include recording the surviving boundaries in position prior to the works. The design of the new boundary treatments will be agreed in consultation with affected householders and the NTA. Recording will be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee the labelling, taking-down and reinstatement of the affected gates, railings, piers, and masonry. Works to fabric will be carried out in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH11	16.5.1.6	Street Furniture: Seven Post Boxes	Mitigation will include recording, protection and monitoring prior to and during the Construction Phase. Recording, overseeing of protective measures and monitoring will be undertaken by an appropriate architectural heritage	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			specialist engaged by the appointed contractor in accordance with the methodology provided in Appendix A16.3 Methodology for Works.	
AH12	16.5.1.6	Street Furniture: Lamp Post CBC0304LP001	Mitigation will include the recording of the lamp-post in position prior to works, the labelling of the affected fabric prior to its careful removal to safe storage, and its reinstatement in a new position in close proximity (within 2m) of its existing position. Recording will be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee the labelling, taking-down and reinstatement of the affected lamp post. Works to historic fabric will be carried out in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH13	16.5.1.6	Street Furniture: Lamp Post CBC0304BTH009	Mitigation will include the recording of the lamp post in position prior to works, the labelling of the affected fabric prior to its careful removal to safe storage, and its reinstatement in a new position in close proximity (within 2m) of its existing position. Recording will be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee the labelling, taking-down and reinstatement of the affected lamp posts. Works to historic fabric will be carried out in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR	Construction
AH14	16.5.1.6	Street Furniture: Lamp Posts - CBC0304LP003 to CBC0304LP005,CBC 0304LP006 to CBC0304LP008, CBC0304LP011, CBC0304LP012, CBC0304LP013 to CBC0304LP018, CBC0304LP019 and CBC0304LP020	Mitigation will include recording, protection and monitoring prior to and during the Construction Phase. Recording, overseeing of protective measures and monitoring will 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
AH15	16.5.1.6	Statuary and Street Furniture: Stone boundary marker on Blaquiere Bridge (CBC0304BTH106), cast iron bollards along the facade of the Chancery Street Fruit Market on St. Michan's Street (CBC0304BTH121) and cast iron water pump with granite drinking trough on	Mitigation will include recording, protection and monitoring prior to and during the Construction Phase. Recording, overseeing of protective measures and monitoring will 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 Phase
		Finglas Main Street (CBC0304BTH099)		
AH16	16.5.1.6	Paving and Surface Treatments: Narrow granite kerb stones of architectural significance (CBC0304BTH035, CBC0304BTH053, CBC0304BTH080, CBC0304BTH107).	Mitigation will include the retention of the kerbs in-situ, and their integration into the proposed new paving design where paths are to be widened, where practicable by the appointed contractor. Where paths are to be narrowed, kerbs will need to be repositioned by the appointed contractor. If kerbs need to be repositioned, the mitigation will be to record the kerbs in position prior to the works, labelling the affected fabric prior to their removal to safe storage, and the reinstatement of the kerbs on the new line. Recording will be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee the labelling, careful removal, storage and reinstatement of the affected kerbs. Works to kerbs will be carried out in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH17	16.5.1.6	Paving and Surface Treatments: Ground surfaces around Doyle's Corner (CBC0304BTH065, CBC0304BTH070 and CBC0304BTH071)	Mitigation will include the retention of the surface finishes in-situ, and their integration into the proposed new paving design. Additional mitigation to record, protect and monitor the of surface finishes for the duration of the Construction Phase will be implemented. Recording, overseeing of protective measures and monitoring will 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
AH18	16.5.1.6	Paving and Surface Treatments: Cobble or setts on May Lane (CBC0304BTH118) and Cuckoo Lane (CBC0304BTH098).	Mitigation will include the retention of the cobble or setts in-situ. Additional mitigation to record, protect and monitor the cobble or setts for the duration of the Construction Phase will be implemented. Recording, overseeing of protective measures and monitoring will 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
AH19	16.5.1.6	Paving and Surface Treatments: Mohan's DCC RPS 6734, Doyle's Corner DCC RPS 6735, McGeough's DCC RPS 8714, 64 to 65 Phibsborough Road DCC RPS 8715 and Inns Quay DCC RPS 3667-9	Mitigation to offset the potential risk of damage to the protected structures and their associated pavement lights and / or access hatches will include the retention of the various cellar hatches and cellar lights in-situ, and their integration into the proposed new paving design by the appointed contractor. Additional mitigation to record, protect and monitor the grilles, cellar hatches and cellar lights for the duration of the Construction Phase will be implemented. Recording, overseeing of protective measures and monitoring will 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

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 Phase
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 are to be applied across the Proposed Scheme wherever necessary to avoid disturbance of landscape features or characteristics to be retained. Trees and vegetation to be retained within and adjoining the works area will be protected in accordance with the British Standard Institution (BSI) British Standard (BS) 5837:2012 Trees in relation to in relation to design, demolition and construction – Recommendations (BSI 2012). Works required within the root protection area (RPA) of trees to be retained will follow a project-specific arboricultural methodology for such works, which will be prepared / approved by a professional qualified arborist. For details of trees to be retained, refer to the Tree Protection Plans which are contained within Appendix A17.1 Arboricultural Impact Assessment in Volume 4 of this EIAR.	Construction
LV2	17.5.1	Throughout (as required), particularly on the grounds of King's Inns or generally along roads and within medians	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 King's Inn or generally along roads and within medians. Trees and vegetation identified for removal will be removed in accordance with BS 3998:2010 Tree Work – Recommendations (BSI 2010) and best arboricultural practices as detailed and monitored by a professional qualified arborist. For details of trees and vegetation to be removed, refer to the Tree Protection Plans within Appendix A17.1 Arboricultural Impact Assessment in Volume 4 of this EIAR and the Landscape General Arrangements (BCIDD-ROT-ENV_LA-0304_XX_00-DR-LL-9001 in Volume 3 of this EIAR).	Construction
LV3	17.5.1	Throughout (as required)	The Arboricultural Assessment prepared for the Proposed Scheme will be fully updated by the appointed contractor at the end of the Construction Phase and made available, with any recommendations for on-going monitoring of retained trees during the Operational Phase	Construction
LV4	17.5.1	Throughout (as required) (particularly Scoil Chaitríona on St. Mobhi Road, CLG Na Fianna Sports Ground on St. Mobhi Road, Home Farm Football Club pitch on St. Mobhi Road, Whitehall College of Further Education on St. Mobhi Road, 163 to 169 St. Mobhi Road (footpath area in front of	Where properties are subject to permanent and / or temporary acquisition (particularly Scoil Chaitríona on St. Mobhi Road, CLG Na Fianna Sports Ground on St. Mobhi Road, Home Farm Football Club pitch on St. Mobhi Road, Whitehall College of Further Education on St. Mobhi Road, 163 to 169 St. Mobhi Road (footpath area in front of businesses), Botanic Business Centre (former Cahill Printers) on Botanic Road, 21 / 22 Prospect Road, the forecourt area at The Bernard Shaw Public House on Prospect Road, Phibsborough Shopping Centre Car Park, the green area at former service station at Slaney Road and Finglas Road Junction and St. Vincent's School on Finglas Road), 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 the commencement of construction works	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
		businesses), Botanic Business Centre (former Cahill Printers) on Botanic Road, 21 / 22 Prospect Road, the forecourt area at The Bernard Shaw Public House on Prospect Road, Phibsborough Shopping Centre Car Park, the green area at former service station at Slaney Road and Finglas Road Junction and St. Vincent's School on Finglas Road)		
LV5	17.5.1	Throughout (as required) (particularly Scoil Chaitríona on St. Mobhi Road, CLG Na Fianna Sports Ground on St. Mobhi Road, Home Farm Football Club pitch on St. Mobhi Road, Whitehall College of Further Education on St. Mobhi Road, 163 to 169 St. Mobhi Road (footpath area in front of businesses), Botanic Business Centre (former Cahill Printers) on Botanic Road, 21 / 22 Prospect Road, the forecourt area at The Bernard Shaw Public House on Prospect Road, Phibsborough	Where properties are subject to permanent and / or temporary acquisition ((particularly Scoil Chaitríona on St. Mobhi Road, CLG Na Fianna Sports Ground on St. Mobhi Road, Home Farm Football Club pitch on St. Mobhi Road, Whitehall College of Further Education on St. Mobhi Road, 163 to 169 St. Mobhi Road (footpath area in front of businesses), Botanic Business Centre (former Cahill Printers) on Botanic Road, 21 / 22 Prospect Road, the forecourt area at The Bernard Shaw Public House on Prospect Road, Phibsborough Shopping Centre Car Park, the green area at former service station at Slaney Road and Finglas Road Junction and St. Vincent's School on Finglas Road), appropriate measures will be put in place by the appointed contractor to provide for protection of features, trees and vegetation to be retained, and for continued access during construction and for adequate security and screening of construction works. All temporary acquisition areas will be fully decommissioned and reinstated at the end of the Construction Phase or at the earliest time after the reinstatement works are completed to the satisfaction of the NTA. Where boundary features, gates, railings, archways of heritage importance (and which contribute to landscape value) are to be affected by the works, mitigation measures should follow those outlined in Chapter 16 (Architectural Heritage)	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
		Shopping Centre Car Park, the green area at former service station at Slaney Road and Finglas Road Junction and St. Vincent's School on Finglas Road)		
LV6	17.5.1	Throughout (as required)	Appropriate access to amenities and public open spaces shall be maintained by the appointed contractor, where possible	Construction

22.16 Waste and Resources

Table 22.14: Waste and Resources Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
WR1	18.6.1	Throughout (as required)	A Construction and Demolition Resource and Waste Management Plan (CDRWMP) has been prepared and this will be implemented (and updated as necessary) by the appointed contractor – refer to the CDRWMP within Appendix A5.1 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 subbase, capping layer and topsoil material generated on-site for direct reuse in the Proposed Scheme, where practicable (subject to material quality testing to ensure it is suitable for its proposed end use); and • Recycled aggregates and reclaimed bituminous mixtures will be specified in the Proposed Scheme, where practicable.	Construction
WR3	18.6.1	Throughout (as required)	The following management measures will be implemented 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 wastes will be sought throughout the Construction Phase of the Proposed Scheme; • Possibilities for reuse of clean non-hazardous excavation material as fill on the site or in landscaping works will be considered following appropriate testing to ensure material is suitable for its proposed end use; • Where excavated material cannot be reused within the Proposed Scheme works, material will be sent for recovery or recycling; • Source segregation: Metal, timber, glass and other recyclable material will be segregated (and waste stream colour coding will be used) during construction works and removed off site to a permitted / licensed facility for recycling; • Material management: 'Just-in-time' delivery, where practicable, will be used to minimise material wastage; • General construction waste and by-products will be reused within the Proposed Scheme, where practicable, or appropriately reused (in accordance with Article 27 of the Waste Directive Regulations), recovered, recycled or disposed of off site, as arranged by the appointed contractor; • 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	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			and locations to which waste and materials will be 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).	

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 Phase
MA1	19.5.1.1	Royal Canal cycle / pedestrian bridge	The proposed Royal Canal pedestrian / cycle bridge has been designed to minimise the impact on the Royal Canal itself, as far as possible. Any disruption to the waterway will be planned by the appointed contractor in consultation with Waterways Ireland, and Waterways Ireland requirements will be adhered to during the bridge works. Where works are to take place in, adjacent to and above the Royal Canal, precautions will be implemented to protect the canal banks and the navigation channel from damage. Where works are required within the Royal Canal, the existing canal infrastructure will be fully reinstated by the appointed contractor to allow for the return to normal operations of the Royal Canal on completion of the construction works in that area.	Construction
MA2	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
MA3	19.5.1.1	Throughout (as required)	All possible precautions will be taken by the appointed contractor to avoid unplanned interruptions to any services during the Construction Phase of the Proposed Scheme. This will include appropriate investigation by the appointed contractor to identify the precise location of all utility infrastructure within the working areas prior to the commencement of excavation works. Where works are required in and around known utility infrastructure, precautions will be implemented by the appointed contractor to protect the infrastructure from damage, in accordance with best practice methodologies and the requirements of the utility companies, where practicable. Protection measures during construction will include warning signs and markings indicating the location of utility infrastructure, safe digging techniques in the vicinity of known utilities, and in certain circumstances where possible, isolation of the section of infrastructure during works in the immediate vicinity.	Construction
MA4	19.5.1.1	Throughout (as required)	All utility companies for which diversions are proposed will continue to be consulted with National Transport Authority (NTA) oversight when designing any diversions to ensure that proposed diversions conform to the utility provider's requirements, where practicable and acceptable to the NTA, and to ensure that service interruptions are kept to a minimum.	Construction
MA5	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 shall be planned in advance by the appointed contractor. Required service interruptions will generally only occur for a set period of time per day (a set number of hours not exceeding eight hours where reasonably practicable), and will generally not be continuous for full days at a time. Prior notification will be given to all impacted properties. This notification will include information on when interruptions and works are scheduled to occur and the duration of such interruptions.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			Any required works will be carefully planned by the appointed contractor to ensure that the duration of interruptions is minimised, in so far as is possible.	
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 to reduce the amount of travelling required to get the material to the site. Key issues to be considered when sourcing materials for the Construction Phase will include the source, the material specification, production and transport costs, and the availability of the material. For quarried material sourced within the State, only quarries which are included in local authority quarry registers will be used by the appointed contractor to source any quarried material.	Construction
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 will be implemented by the appointed contractor, where practicable, 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	Implementation 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	Implementation Phase
CI&E1	21.5.1	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

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

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

BSI (2014a). BS5228-1:2009 +A1 2014 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise)

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

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

Masters-Williams et al. (2001). Control of Water Pollution from Construction Sites – Guidance for consultants and contractors

NRA (2005b). Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes

NRA (2006b). Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes

TII (2013). Specification for Road Works (SPW) Series 600 Earthworks

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

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

Directives and Legislation

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

Wildlife Acts, as amended