

The background is a vibrant yellow. It is decorated with several abstract geometric shapes in shades of blue, teal, and white. These include circles, semi-circles, and rounded rectangular shapes, some of which are layered or overlapping. The shapes are scattered across the page, with a concentration in the top right and bottom left corners.

Chapter 22

Summary of Mitigation & Monitoring Measures

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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 Blanchardstown 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 either the:

- Pre-construction Phase: Activities such as investigative surveys (e.g. pre-construction invasive species survey) 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 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 with the Construction Environmental Management Plan (CEMP) in Volume 4 of this EIAR (note that the CEMP summarises the Construction Phase mitigation only). Where appropriate the location to which the mitigation relates to is identified and where the mitigation measure is scheme wide the location is given as 'throughout (as required)'. Note that in certain instances, a mitigation measure may be relevant to more than one environmental aspect (e.g., Mitigation Number WT1 is also a mitigation measure used in relation of Biodiversity).

22.3 General Mitigation Requirements

Table 22.1: General Mitigation Measures

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

22.4 Traffic and Transport

Table 22.2: Traffic and Transport Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
TT1	6.5.1	Throughout (as required)	<p>A Construction Environmental Management Plan (CEMP) has been prepared (included as Appendix 5.1 in Volume 4 of this EIAR) and will be implemented (and developed further as required) by the appointed contractor.</p> <p>A detailed Construction Traffic Management Plan (CTMP) will be prepared, included in the CEMP and implemented by the appointed contractor.</p> <p>The appointed contractor will also prepare, implement and include in the CEMP a Construction Stage Mobility Management Plan (CSMMP), to actively encourage personnel to travel to site by sustainable means.</p>	Construction

22.5 Air Quality

Table 22.3: Air Quality Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
AQ1	7.5.1	Construction Compounds and throughout (as required)	<p>A series of mitigation measures will be implemented by the appointed contractor to minimise dust nuisance impacts:</p> <ul style="list-style-type: none"> Public roads affected by the Proposed Scheme will be regularly inspected for soiling associated with the construction activities and cleaned as necessary; Material handling systems and stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays (or similar dust suppression methods) will be used as required if particularly dusty activities associated with the Construction Compounds are necessary during dry or windy periods; During movement of dust generating materials both on and off-site, trucks will be covered with tarpaulin and before entrance onto public roads, trucks will be checked to ensure the tarpaulins are properly in place; The appointed contractor will provide a site hoarding of 2.4m height along noise sensitive boundaries, at a minimum, at the Construction Compounds, which will assist in minimising the potential for dust impacts off-site; and The appointed contractor will keep the effectiveness of the mitigation measures under review and revise them as necessary. In the event of dust nuisance 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 Stage
CL1	8.7.1	Throughout (as required)	<p>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:</p> <ul style="list-style-type: none">• The replacement, where practicable, of concrete containing Portland cement with concrete containing ground granulated blast furnace slag (GGBFS);• Where practicable, materials will be reused within the extent of the Proposed Scheme; and• Where practicable, materials will be sourced locally to reduce the embodied emissions associated with transport.	Construction

22.7 Noise and Vibration

Table 22.5: Noise and Vibration Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
NV1	9.5.1.1	Throughout (as required)	<p>The appointed contractor will be required to take specific noise abatement measures to the extent required and comply with the recommendations of BS 5228–1 (BSI 2014a) and European Communities Noise Emissions by Equipment for Use Outdoors (Amendment) Regulations 2006 (S.I. No 241 of 2006). The mitigation measures outlined below for the Construction Phase have also been included in the Construction and Environmental Management Plan (Appendix A5.1 in Volume 4 of this EIAR).</p> <p>These measures will ensure that:</p> <ul style="list-style-type: none"> • During the Construction Phase, the appointed contractor will be required to manage the works to comply with the limits detailed in Section 9.2.4.1 in Chapter 9 of this EIAR using methods outlined in BS 5228–1 (BSI 2014a); and • The best means practicable, including proper maintenance of plant and equipment, will be employed to minimise the noise produced by on site operations. 	Construction
NV2	9.5.1.1	Throughout (as required)	<p>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 9.10 and Table 9.13 in Chapter 9 of this EIAR. Reference to Table 9.54 in Chapter 9 of this EIAR indicates that intrusive works occurring within 60m of NSLs will need specific noise control measures to reduce impacts depending on time period over which they will occur, i.e. daytime or evening.</p>	Construction
NV3	9.5.1.1.1	Throughout (as required)	<p>The potential for any item of plant or equipment to result in exceedance of construction noise thresholds (Table 9.10 and Table 9.13 in Chapter 9 of this EIAR) will be assessed prior to the item being brought onto the site. The least noisy item of plant or equipment will be selected wherever practicable (e.g., plant or equipment items with sound attenuation incorporated). Should a particular item of plant or equipment already on the site be found to exceed the construction noise levels, the first action will be to identify whether or not the item can be replaced with a quieter alternative.</p>	Construction
NV4	9.5.1.1.2	Construction Compounds and throughout (as required)	<p>The following measures will be implemented by the appointed contractor to control noise levels at source in order to remain below the threshold values for noise set out in Table 9.10 in Chapter 9 of this EIAR, which relate to specific site considerations:</p> <ul style="list-style-type: none"> • For mobile plant items such as dump trucks, planers, excavators and loaders, the installation of an acoustic exhaust, utilising an acoustic canopy to replace the normal engine cover and/or maintaining enclosure panels closed during operation can reduce noise levels by up to 10 dB; • For percussive tools such as pneumatic concrete breakers and tools a number of noise control measures include fitting muffler or sound reducing equipment to the breaker 'tool' and ensuring any leaks in the air lines are sealed; • Construction Compounds are located in close proximity to NSLs (refer to Table 9.39 in Chapter 9 of this EIAR) and will incorporate a strict noise control policy relating to materials handling. 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 potential to exceed the construction noise thresholds, these will be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation; and • Resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds, while other noise nuisance can be controlled by fixing resilient materials in between the surfaces in contact. 	Construction
NV5	9.5.1.1.3	Throughout (as required)	<p>Erection of localised demountable enclosures or screens will be used around breakers or drill bits, as required, when in operation in proximity to NSLs boundaries with the potential to exceed the construction noise thresholds. Annex B of BS 5228–1 (BSI 2014a) (Figures</p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			B1, B2 and B3) provide typical details for temporary and mobile acoustic screens, sheds and enclosures that can be constructed on site from standard materials.	
NV6	9.5.1.1.3	Construction Compounds	The appointed contractor will provide a site hoarding of 2.4m height along noise sensitive boundaries, at a minimum, at the Construction Compounds.	Construction
NV7	9.5.1.1.3	Construction Compounds	Careful planning of the Construction Compounds including the placement of site buildings and stores between the site and noise sensitive locations 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 9.54 in Chapter 9 of this EIAR) other construction activities will be scheduled to avoid 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 9.13 in Chapter 9 of this EIAR.	Construction
NV10	9.5.1.1.6	Throughout (as required)	During the Construction Phase the appointed contractor will carry out noise monitoring at representative NSLs to evaluate and inform the requirement and / or implementation of noise management measures. Noise monitoring will be conducted in accordance with ISO 1996-1 (ISO 2016) and ISO 1996-2 (ISO 2017). The selection of monitoring locations will be based on the nearest representative NSLs to the working area which will progress along the length of the Proposed Scheme.	Construction
NV11	9.5.1.2	Throughout (as required)	During the Construction Phase the appointed contractor will carry out vibration monitoring at buildings and structures where proposed works have the potential to be at or exceed the vibration limit values set out in Table 9.13 in Chapter 9 of this EIAR. Vibration from construction activities will be limited to the values set out in Table 9.13 in Chapter 9 of this EIAR to avoid any form of potential cosmetic damage to buildings and structures.	Construction
NV12	9.5.1.2	Throughout (as required)	The appointed contractor will implement the following mitigation measures during the Construction Phase: <ul style="list-style-type: none"> • A clear communication programme will be established by NTA to inform adjacent building occupants in advance of any potential intrusive works which may give rise to vibration levels likely to result in significant effects as per Table 9.14 in Chapter 9 of this EIAR; • Activities capable of generating significant vibration effects with respect to human response (as per Table 9.14 in Chapter 9 of this EIAR) will be restricted to daytime hours only, as far as practicable; and • Appropriate vibration isolation (such as resilient mounts to pumps and generators) will be applied, where required and where feasible. 	Construction

22.8 Population

Table 22.6: Population Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
P1	n/a	n/a	No additional mitigation or monitoring measures are considered necessary beyond those already identified in other environmental assessments	n/a

22.9 Human Health

Table 22.7: Human Health Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
HH1	11.5.1	Throughout (as required)	Mitigation for adverse psychosocial responses to the Construction Phase will include providing the public with sufficient information to enable people to plan their days, journeys and activities around the construction works and take control of their options to some extent. The appointed contractor will put in place a Communications Plan in accordance with the NTA requirements. The Plan will provide a mechanism for members of the public to communicate with the NTA and the appointed contractor, and for the NTA and the appointed contractor to communicate important information on various aspects of the Proposed Scheme to the public. This will include timely communication to the local community on the planned works activities, timings and traffic management. These requirements are set out in the CEMP (Appendix A5.1 in Volume 4 of this EIAR).	Construction
HH2	11.5.1	Connolly Hospital	In advance of construction works in the vicinity of Connolly Hospital, the appointed contractor will liaise with the Hospital to inform them of the proposed construction traffic management arrangements.	Construction

22.10 Biodiversity

Table 22.8: Biodiversity Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
BD1	12.5.1	Throughout (as required)	Where deemed necessary a suitably experienced and qualified ecologist will be employed by the appointed contractor. The ecologist will advise the appointed contractor on ecological matters during construction, communicate all findings in a timely manner to the NTA and statutory authorities, acquire any licenses / consents required to conduct the work, and supervise and direct the ecological measures associated with the Proposed Scheme.	Construction
BD2	12.5.1.2.1	Throughout (as required)	<p>Habitat Loss & Fragmentation</p> <p>Where practicable, areas of vegetation, including habitats of Local Importance (Higher Value), (i.e., mixed broadleaved woodland, mixed broadleaved conifer woodland, scattered trees and parkland, immature woodland, 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.</p> <p>The areas of vegetation to be retained are shown on the Landscaping General Arrangement drawings (BCIDC-ARP-ENV_LA-0005_XX_00-DR-LL-9001) in Volume 3 of this EIAR.</p> <p>These areas will be protected by the appointed contractor for the duration of construction works and fenced off at an appropriate distance.</p>	Construction
BD3	12.2.1.2.1	Throughout (as required)	<p>Habitat Loss & Fragmentation</p> <p>To mitigate the loss of habitat, proposed planting incorporated into the Proposed Scheme will be implemented by the appointed contractor listed below and displayed on the Landscaping General Arrangement drawings (BCIDC-ARP-ENV_LA-0005_XX_00-DR-LL-9001) in Volume 3 of this EIAR:</p> <ul style="list-style-type: none"> • 793 street trees planted; • 9,661m² woodland trees planted; • 1,119m (linear metre) of proposed hedgerow; • 6,373m² of proposed species rich grassland; • 5,485m² of proposed ornamental planting; • 1,358m² of proposed native planting; and • 36,753m² of proposed grassland planting. 	Construction
Refer to WT1-WT4 in Table 22.9	-	Construction Compounds and throughout (as required)	<p>Habitat Degradation – Surface Water Quality</p> <p>In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme.</p> <p>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.</p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			<p>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:</p> <ul style="list-style-type: none"> • Construction Compound management including the storage of fuels and materials; • Control of Sediment; • Use of Concrete; • Management of vehicles and plant including refuelling and wheel wash facilities (if necessary); and • Monitoring. <p>Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality at the Construction Compounds, Tolka River Bridge widening, Mill Road Bridge widening and the Pedestrian ramps at Mill Road are outlined in WT2 to WT7.</p>	
Refer to LGSH8 and LGSH9 in Table 22.10	-	Throughout (as required)	<p><u>Habitat Degradation –Groundwater</u></p> <p>The mitigation measures which will be applied by the appointed contractor with regard to the control pollution of soil and groundwater during the Construction Phase are outlined in LGSH8 and LGSH9 in Table 22.10 of this Chapter of the EIAR.</p>	Construction
Refer to AQ1 in Table 22.3	-	Construction Compounds and throughout (as required)	<p><u>Habitat Degradation –Air Quality</u></p> <p>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.</p>	Construction
BD4	12.5.1.2.6	Throughout (as required)	<p><u>Habitat Degradation –Invasive Species</u></p> <p>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.</p>	Pre-Construction / Construction
BD5	12.5.1.2.6	Throughout (as required)	<p><u>Habitat Degradation –Invasive Species</u></p> <p>Where a pre-construction invasive species re-survey identifies newly established non-native invasive species within the footprint of the Proposed Scheme, the non-native ISMP produced will provide a description of the infestations (e.g. approximate area of the respective colonies (m²), where feasible; approximate total number of stems, pattern of growth and information on other vegetation present), and where necessary, include calculations of volumes of infested soils to be excavated.</p> <p>The ISMP will be finalised following the pre-construction survey as advised by a suitably qualified specialist, with regard to the Transport Infrastructure Ireland (2020a and 2020b) The management of Invasive Alien Plant species on National Roads – technical guidance; and standard, and other species-specific guidance documents including those listed in the ISMP, as necessary.</p>	Construction
BD6	12.5.1.2.6	Throughout (as required)	<p><u>Habitat Degradation –Invasive Species</u></p> <p>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</p>	Pre-Construction / Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			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.	
BD7	12.5.1.4.1.1	Site specific	<p><u>Bats</u></p> <p><u>Protection of Bats during Vegetation Clearance</u></p> <p>Four trees were identified as PRF's within the footprint of the Proposed Scheme (permanent and temporary land-take) during the multidisciplinary surveys (see Figure 12.8.2 in Volume 4 of this EIAR). These trees will not be removed during the Construction Phase of the Proposed Scheme, and the following mitigation measures will be implemented by the appointed contractor:</p> <ul style="list-style-type: none"> 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 the British Standard Institution (BSI) British Standard (BS) 5837:2012 Trees in relation to design, demolition and construction – Recommendations will be implemented; and These PRFs trees will be protected by the appointed contractor in advance of any works commencing in the area and for the duration of construction works associated with the Proposed Scheme. <p>In addition to the above the following bat specific mitigation measures (in relation to vegetation clearance) will be implemented by the appointed contractor:</p> <ul style="list-style-type: none"> 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 – refer to Arboricultural Impact Assessment (refer to Appendix A17.1 in Volume 4 of this EIAR)), these will be notified to the appointed ecologist to be surveyed to confirm if these trees are PRF's (as done for the pre-construction surveys outlined in Section BD8). 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 BD8; 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. 	Construction
BD8	12.5.1.4.1.2	Throughout (as required)	<p><u>Bats</u></p> <p><u>Roost Loss</u></p> <p>The NTA will ensure that a confirmatory pre-construction survey of all trees identified as containing PRFs or not to be removed within the boundary of the Proposed Scheme will be rechecked for Potential Roost Features (PRFs) by suitably qualified ecologist engaged by the NTA as part of the pre-construction surveys. The survey will:</p> <ul style="list-style-type: none"> Confirm that previously identified PRF's which are to be retained are still standing; and 	Pre-Construction / Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			<ul style="list-style-type: none"> Identify whether new PRF features (if any) may have developed owing to damage or management change to PRF in the intervening period between the original surveys and grant of planning. <p>In the unlikely event that PRF's are detected during the pre-construction survey it is recommended that:</p> <ul style="list-style-type: none"> In advance of any clearance all trees deemed to be PRF which are 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 within the footprint of the Proposed Scheme 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 National Parks and Wildlife Service 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 Only then will PRF trees be felled which will be undertaken 'in sections' where the section can be handled to avoid sudden movements or jarring of the sections. 	
BD9	12.5.1.4.1.2	Throughout (as required)	<p><u>Bats</u></p> <p><u>Roost Loss- Installation of Bat Boxes</u></p> <ul style="list-style-type: none"> In addition to mitigation proposals that may arise as result of the pre-construction 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: Standard Schwegler 1FFH (2 number) and 3FF boxes (1 number) for all PRF trees to be removed; The boxes will be installed 3 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 3-5 and firmly fixed to tree trunk; Where practicable, the bat boxes will 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 be labelled and data (reference number, GPS location and photographic record) will be supplied to Bat conservation Trust (BCT), Local Authority Biodiversity Officer and NPWS. 	Construction
BD10	12.5.1.4.1.3	Throughout (as required)	<p><u>Bats</u></p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			<p><u>Habitat Loss and Fragmentation</u></p> <p>Where practicable, 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 Landscaping General Arrangement drawings (BCIDC-ARP-ENV_LA-0005_XX_00-DR-LL-9001) in Volume 3 of this EIAR.</p>	
BD11	12.5.1.4.1.4	Throughout (as required)	<p><u>Bats</u></p> <p><u>Disturbance of Flight Patterns as a Result of Lighting during Construction</u></p> <p>The appointed contractor in liaison with the suitably qualified licensed ecologist(s) will ensure that lighting at the construction compounds, and active work areas in proximity to known bat activity, will be designed to minimise light spill and be cognisant of light-spill onto these areas.</p> <p>Mitigation measures to reduce light spill may include the following:</p> <ul style="list-style-type: none"> • the use of sensor / timer triggered lighting; • LED luminaires to be used where practicable; • column heights to be considered to minimise light spill; and, • accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only where needed. <p>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).</p>	Construction
BD12	12.5.1.4.2.1	Throughout (as required)	<p><u>Badgers</u></p> <p><u>Disturbance / Displacement</u></p> <p>The NTA will ensure that a confirmatory pre-construction check of all suitable badger habitat will be completed within the 12 month period prior to any construction works commencing. The presence of any new setts or significant badger activity will be treated and / or protected in accordance with the Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes (NRA, 2005b).</p>	Pre-Construction
BD13	12.5.1.4.2.2	Throughout (as required)	<p><u>Badgers</u></p> <p><u>Protection of Badgers from Accidental Harm During Construction (Excavations)</u></p> <p>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.</p> <p>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.</p>	Construction
BD14	12.5.1.4.1.3	Construction Compounds and active works in	<p><u>Badgers</u></p> <p><u>Lighting</u></p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
		proximity to known badger activity	<ul style="list-style-type: none"> See BD11 which relates to lighting mitigation measures 	
BD15	12.5.1.4.3	Throughout (as required)	<p>Otter</p> <p><u>Loss of Breeding / Resting sites</u></p> <p>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.</p> <p>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).</p>	Pre-Construction
BD16	12.5.1.4.3	River Tolka	<p>Otter</p> <p><u>Measures to Prevent Injury / Mortality Impacts</u></p> <ul style="list-style-type: none"> The appointed contractor will engage a suitably qualified and / or licensed ecologist(s) to oversee and advise works at watercourse crossings. Where a new or reactivated holt is encountered, within 150 metres (up and downstream) of the watercourse crossing, the qualified ecologist(s) will consult with the NPWS in conjunction with the NTA and appointed contractor. The qualified ecologist will review method statements; oversee works; provide instruction 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 Compound and other working areas which are in close proximity to significant watercourses and have suitable roaming territory for otter. 	Construction
BD17	12.5.1.4.3	Throughout (as required)	<p>Otter</p> <p><u>Measures to Prevent Disturbance / Displacement</u></p> <p>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 adjacent to watercourses with known otter activity).</p>	Construction
BD18	12.5.1.4.3	River Tolka	<p>Otter</p> <p><u>Measures to Prevent Disturbance / Displacement</u></p> <p>Site set up near watercourse crossings shall be undertaken in a timely manner to reduce impacts to otter.</p> <p>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</p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			<p>ecologist that no otter holt is located within 200m of BR01 Tolka River Bridge. 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.</p> <p>Once sheet piling is installed behind the existing basket gabions, the appointed contractor will provide site hoarding of 2.4m height between the sheet piles and the watercourse to mitigate potential impacts associated with otter.</p> <p>The hoarding will be installed to retain the existing maintenance access path under the bridge. This will ensure that dry otter commuting territory can be retained on the downstream side of the watercourse and minimise severance.</p>	
BD19	12.5.1.4.3	River Tolka and throughout (as required)	<p><u>Otter</u> <u>Habitat Degradation / Reduced Prey Availability – Water Quality</u></p> <p>In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme.</p> <p>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.</p> <p>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:</p> <ul style="list-style-type: none"> • Construction Compound management including the storage of fuels and materials; • Control of Sediment; • Use of Concrete; • Management of vehicles and plant including refuelling and wheel wash facilities (if necessary); and • Monitoring. <p>Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality at the Construction Compounds, Tolka River Bridge widening, Mill Road Bridge widening and the Pedestrian ramps at Mill Road are outlined in WT2 to WT7.</p>	Construction
BD20	12.5.1.4.3	Construction Compounds and active works in proximity to known otter activity	<p><u>Otter</u> <u>Lighting</u></p> <ul style="list-style-type: none"> • See BD11 which relates to lighting mitigation measures. 	Construction
Refer to WT1 in Table 22.9	12.5.1.4.4 / 12.5.1.4.5	Throughout (as required)	<p><u>Marine Mammals / Other Mammal Species</u> <u>Habitat and Food Source Degradation – Water Quality</u></p> <p>In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing</p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			<p>any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme.</p> <p>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.</p> <p>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:</p> <ul style="list-style-type: none"> • Construction Compound management including the storage of fuels and materials; • Control of Sediment; • Use of Concrete; • Management of vehicles and plant including refuelling and wheel wash facilities (if necessary); and • Monitoring. <p>Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality at the Construction Compounds, Tolka River Bridge widening, Mill Road Bridge widening and the Pedestrian ramps at Mill Road are outlined in WT2 to WT7.</p>	
BD21	12.5.1.5	Throughout (as required)	<p>Breeding Birds</p> <p><u>Habitat Loss and Fragmentation</u></p> <p>Where practicable, habitats of importance to birds such as scattered trees and parkland, treeline and hedgerow and scrub - 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 appropriately.</p>	Construction
BD22	12.5.1.5	Throughout (as required)	<p>Breeding Birds</p> <p><u>Habitat Loss and Fragmentation</u></p> <p>Planting of treeline, hedgerow and grassland habitats within the Proposed Scheme footprint will be carried out by the appointed contractor, as detailed in the Landscaping General Arrangement drawings (BCIDC-ARP-ENV_LA-0005_XX_00-DR-LL-9001) in Volume 3 of this EIAR.</p>	Construction
BD23	12.5.1.5	Throughout (as required)	<p>Breeding Birds</p> <p><u>Mortality Risk</u></p> <p>Where practicable, vegetation (e.g., hedgerows, trees, scrub, bankside vegetation and grassland) will not be removed, between the 01 March and the 31 August, to avoid direct impacts on nesting birds.</p> <p>Where the construction programme does not allow this seasonal restriction to be observed, then these areas will be inspected by a suitably qualified ecologist for the presence of breeding birds prior to clearance.</p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			Areas found not to contain nests will be cleared within three days of the nest survey, otherwise repeat surveys will be required. Vegetation clearance will not commence where nests are present, works will resume when birds have fledged and nests are no longer in use, or an agreement is reached with NPWS.	
BD24	12.5.1.5	Tolka River bridge widening	<p><u>Breeding Birds (Kingfisher)</u></p> <p><u>Disturbance / Displacement</u></p> <p>Following the installation of sheet piling, the appointed contractor will provide site hoarding of 2.4m height between the sheet piles and the watercourse to mitigate potential impacts associated with protected species. The hoarding will be installed to retain the existing maintenance access path under the bridge.</p>	Construction
BD25	12.5.1.5	Throughout (as required)	<p><u>Breeding Birds (Kingfisher)</u></p> <p><u>Disturbance / Displacement</u></p> <p>To mitigate disturbance and / or displacement to breeding birds including kingfisher from noise and vibration activities the relevant mitigation measures as described in Table 22.5 in this Chapter will be implemented by the appointed contractor.</p>	Construction
BD26	12.5.1.5 / 12.5.1.8 / 12.5.1.9	Throughout (as required)	<p><u>Breeding Birds / Wintering Birds / Amphibians/Fish</u></p> <p><u>Habitat Degradation - Water Quality</u></p> <p>In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme.</p> <p>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.</p> <p>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:</p> <ul style="list-style-type: none"> • Construction Compound management including the storage of fuels and materials; • Control of Sediment; • Use of Concrete; • Management of vehicles and plant including refuelling and wheel wash facilities (if necessary); and • Monitoring. <p>Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality at the Construction Compounds, Tolka River Bridge widening, Mill Road Bridge widening and the Pedestrian ramps at Mill Road are outlined in WT2 to WT7.</p>	Construction
BD27	12.5.1.8	Throughout (as required)	<p><u>Amphibians</u></p> <p><u>Habitat Loss, Disturbance and Mortality Risk</u></p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			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 BD28 to BD31 will be completed before works recommence.	
BD28	12.5.1.8	Throughout (as required)	In the case of common frog, any frog spawn, tadpoles, juvenile or adult frogs present will be captured, under a licence from NPWS and removed from affected habitat by hand net and translocated to the nearest area of available suitable habitat, beyond the Zone of Influence (ZoI) of the Proposed Scheme.	Construction
BD29	12.5.1.8	Throughout (as required)	In the case of smooth newt, individuals will be captured, under a licence from NPWS, and removed from affected habitat either by hand net or by trapping and translocated to the nearest area of available suitable habitat, beyond the ZoI of the Proposed Scheme. If used, the type and design of traps shall be approved by the NPWS. This is a standard and proven method of catching and translocating smooth newt.	Construction
BD30	12.5.1.8	Throughout (as required)	If the size or depth of the habitat feature is such that it cannot be determined by a visual survey whether all amphibians have been captured, the suitably qualified ecologist engaged by the appointed contractor will advise on the appropriate course of action to confirm that no amphibian species remain. If drainage of the habitat feature is deemed to be the appropriate course of action, any mechanical pumps used will have a screen fitted, and be sited, such that no amphibian species can be sucked into the pump mechanism.	Construction
BD31	12.5.1.8	Throughout (as required)	Any capture and translocation works shall be undertaken immediately in advance of site clearance/construction works commencing.	Construction
BD32	12.5.2.1.2.1	Throughout (as required)	<p><u>Designated Areas for Nature Conservation</u></p> <p><u>Habitat Degradation – Surface Water Quality</u></p> <p>The proposed SuDS drainage system, as shown in Surface Water Drainage Works drawings (BCIDC-ARP-DNG_RD-0005_XX_00-DR-CD-9001) in Volume 3 of this EIAR, will be installed by the appointed contractor during the Construction Phase.</p> <p>In the Operational Phase the maintenance regime for these SuDS will be carried out by the local authorities and will be subject to their management procedures. No additional mitigation is required.</p>	Operation
BD33	12.5.2.2.2 / 12.5.2.3	Throughout (as required)	<p><u>Habitats/Rare and Protected Plant Species</u></p> <p><u>Habitat Degradation – Surface Water Quality</u></p> <p>Once the Proposed Scheme is in operation, the local authorities will implement a maintenance and inspection regime (and / or emergency repairs if necessary) for the surface water drainage network, subject to their management procedures. No additional mitigation is required.</p>	Operation
BD34	12.5.2.2.4	Throughout (as required)	<p><u>Habitats</u></p> <p><u>Habitat Degradation- Non-Native Invasive Plant Species</u></p> <p>Once the Proposed Scheme is in operation, the local authorities will implement a maintenance and inspection regime subject to their management procedures, where any introduction of non-native invasive plant species will be managed. No additional mitigation is required.</p>	Operation

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
BD35	12.5.2.4.1.1	Throughout (as required)	<p>Bats</p> <p><u>Monitoring of Bat Boxes</u></p> <ul style="list-style-type: none"> 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 2 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, Local Authority Biodiversity Officer and NPWS. 	Operation
BD36	12.5.2.4.1.2	Throughout (as required)	<p>Bats</p> <p><u>Habitat Loss and Loss of Breeding / Resting Sites</u></p> <p>In line with the maintenance contract, 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.</p>	Operation

22.11 Water

Table 22.9: Water Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
WT1	13.5.2.1	Construction Compounds and throughout as required	<p>A Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme.</p> <p>It will be a condition within the Employer’s Requirements that the successful contractor(s), immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval.</p> <p>At a minimum, all the control and management measures set out in the SWMP will be implemented. This includes measures relating to:</p> <ul style="list-style-type: none"> Construction Compound management including the storage of fuels and materials; Control of Sediment; Use of Concrete; Management of vehicles and plant including refuelling and wheel wash facilities (if necessary); and Monitoring. 	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
WT2	13.5.2.2.1	Construction Compound BL1	<p><u>Construction Compound BL1</u></p> <p>Silt curtains/bunding or infiltration trenches will be installed by the appointed contractor on the northern boundary of Construction Compound BL1 to prevent any silty water or spillages from reaching the waterbody.</p> <p>The appointed contractor will store fuels as close as possible to the southern boundary of Construction Compound BL1, where an existing low wall will be retained and act as a bund to protect surface water drains in the Old Navan Road to the south.</p> <p>Other construction activities that could be a potential risk to waterbodies or the storage of materials will similarly be located at the southern boundary of the site by the appointed contractor.</p>	Construction
WT3	13.5.2.2.1	Construction Compound BL2	<p><u>Construction Compound BL2</u></p> <p>At Junction 6 to the west of the M50, the existing wall will provide some measure of protection to any surface water connections within the car park; although it should be noted that a section of the wall will be removed and replaced with a new retaining wall by the appointed contractor.</p> <p>To the north of the compound site, the surface water system will be protected through the use of filter drains or silt curtains by the appointed contractor at locations where there is potential for silty water runoff to those drains (the grassed area slopes towards the drains for a short distance).</p> <p>In addition, the surface water manhole in the grassed area will be clearly marked and protected by the appointed contractor from any possible contamination through the use of bunding or temporary sealing.</p>	Construction
WT4	13.5.2.2.1	Construction Compound BL3	<p><u>Construction Compound BL3</u></p> <p>Surface water drains on the road will be identified clearly and banded on the side of the compounds by the appointed contractor, allowing the road to still drain freely.</p>	Construction
WT5	13.5.2.2.2	Tolka River Bridge (BR01)	<p>The following measures below, which are in line with IFI Guidelines on Protection of Fisheries During Construction Works Adjacent to Waters (2016) (IFI, 2016) on works adjacent to watercourses, will be implemented by the appointed contractor to minimise and avoid impacts:</p> <ul style="list-style-type: none"> • All necessary consents will be obtained from the relevant regulator (such as IFI, OPW or the local authority), as appropriate; • Works adjacent to watercourses will be conducted during forecast low flow periods where possible; • Bank stabilisation and erosion protection, if required, will be designed in consultation with the IFI and NPWS; • Operation of machinery in-stream will not be permitted. All construction machinery operating near to the water body will be mechanically sound to avoid leaks of oils, hydraulic fluid, etc. Machinery will be cleaned and checked prior to commencement of works; • The area of disturbance of the watercourse bed and bank will be the absolute minimum required; • Reinstatement of any banks affected during construction works near a watercourse will be reinstated back to pre-development conditions; • Any bank-side clearance in the immediate area of the crossing should be kept to a minimum and adequate measures should be put in place to control or minimize the risk of siltation. This may include such measures as: <ul style="list-style-type: none"> ○ bunding and diversion of site runoff to settlement ponds, ○ stripping of topsoil. See Soils in A Guide to Landscape Treatments for National Road Schemes in Ireland (National Roads Authority, 2005), and where necessary, surfacing of site with granular material; and, ○ covering of temporary stockpiles. 	Construction
WT6	13.5.2.2.2	Tolka Bridge (BR01)	<p>Sheet piling will be installed by the appointed contractor on the land side of the existing gabion baskets to protect the Tolka_040 from the construction works and to retain the existing bank during excavation works for the bridge foundations. The sheet piles will be driven</p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			<p>and installed by the appointed contractor in accordance with Inland Fisheries Ireland (IFI) Guidelines on Protection of Fisheries During Construction Works Adjacent to Waters (2016).</p> <p>Environmental mitigation measures including silt curtains and silt busters will be installed within the temporary working area by the appointed contractor, to mitigate potential impacts associated with surface water runoff on the River Tolka.</p>	
WT7	13.5.2.2.3	BR02 Mill Road Bridge and RW07A and RW07B Pedestrian Ramps at Mill Road	In order to avoid or minimise impacts, the appointed contractor will bund local surface water drains on the construction activity side and erect silt fences around the extent of the works to prevent accumulated silty water from leaving the site in the event of rainfall. All other generic measures relating to the storage of soil, materials and fuel as set out in the SWMP will be implemented by the appointed contractor.	Construction
WT8	13.5.3	Throughout (as required)	In the Operational Phase the infrastructure (including the maintenance regime for SuDS) will be carried out by the local authority and will be subject to their management procedures.	Operational

22.12 Land, Soils, Geology and Hydrogeology

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

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
LSGH1	14.5.1.1	Throughout (as required)	<p><u>Loss or Damage of Topsoil</u> Excavated topsoil 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.</p>	Construction
LSGH2	14.5.1.1	Throughout (as required)	<p><u>Loss or Damage of Topsoil</u> All topsoil or subsoil shall be assessed for re-use within the Proposed Scheme by the appointed contractor ensuring the appropriate handling, processing and segregation of the material. Where practical the removal of topsoil from the Proposed Scheme will be avoided. All earthworks will be undertaken in accordance with TII Specification for Road Works (SPW) Series 600 Earthworks (TII 2013) and project specific earthworks specifications ensuring that all excavated material and imported material is classified using the same methodology so as to allow maximum opportunity for the reuse of materials on site.</p>	Construction
LSGH3	14.5.1.2	Throughout (as required)	<p><u>Loss or Damage of Topsoil</u> The appointed contractor will ensure that excavations will be kept to a minimum, using shoring or trench boxes where appropriate. For more extensive excavations, a temporary works designer shall be appointed by the appointed contractor to design excavation support measures in accordance with all relevant guidelines that minimises the excavation of contaminated ground.</p>	Construction
LSGH4	14.5.1.2	Throughout (as required)	<p><u>Loss or Damage of Topsoil</u> The appointed contractor will be responsible for regular testing of excavated soils to monitor the suitability of the soil for reuse.</p>	Construction
LSGH5	14.5.1.2	Throughout (as required)	<p><u>Loss or Damage of Topsoil</u> Samples of ground suspected of contamination will be tested for contamination by the appointed contractor during the ground investigation and ground excavated from these areas will be disposed of to a suitably licensed or permitted site in accordance with the current Irish waste management legislation.</p>	Construction
LSGH6	14.5.1.2	Throughout (as required)	<p><u>Loss or Damage of Topsoil</u> Any dewatering in areas of contaminated ground will be designed by the appointed contractor to minimise the mobilisation of contaminants into the surrounding environment.</p>	Construction
LSGH7	14.5.1.3	Throughout (as required)	<p><u>Pollution of Soil and Groundwater</u> Good construction management practices, as outlined in the CIRIA guidance, Control of Water Pollution from Construction Sites – Guidance for consultants and contractors (Masters-Williams <i>et al.</i>, 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.</p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
LSGH8	14.5.1.3	Throughout (as required)	<p><u>Pollution of Soil and Groundwater</u></p> <p>The construction management of the site by the appointed contractor will take account of the recommendations of the CIRIA guidance Control of Water Pollution from Construction Sites – Guidance for consultants and contractors (Masters-Williams et al., 2001) to minimise as far as possible the risk of soil, groundwater and surface water contamination.</p>	
LSGH9	14.5.1.3	Construction Compounds and throughout (as required)	<p><u>Pollution of Soil and Groundwater</u></p> <p>Measures to be implemented by the appointed contractor to minimise the risk of spills and contamination of soils and waters include:</p> <ul style="list-style-type: none"> • Employing only competent and experienced workforce, and site-specific training of site managers, foremen and workforce, including all sub-contractors, in pollution risks and preventative measures; • Ensure that all areas where liquids (including fuel) are stored, or cleaning is carried out, are in designated impermeable areas that are isolated from the surrounding area and within a secondary containment system, e.g. by a roll-over bund, raised kerb, ramps or stepped access; • The location of any fuel storage facilities shall be considered in the design of the Construction Compounds. These are to be designed in accordance with relevant guidelines and codes of best practice and will be fully bunded; • Good housekeeping at the site (daily site clean-ups, use of disposal bins, etc.) during the entire Construction Phase; • Potential pollutants to be adequately secured against vandalism; • Provision of proper containment of potential pollutants according to codes of best practice; • Thorough control during the entire Construction Phase to ensure that any spillage is identified at early stage and subsequently effectively contained and managed; and • Spill kits will be provided and kept close to the storage area. Staff to be trained on how to use spill kits correctly. 	Construction
LSGH10	14.5.1.3	Throughout (as required)	<p>An Environmental Incident Response Plan, as described in the CEMP (Appendix A5.1 in Volume 4 of this EIAR), will be implemented by the appointed contractor, which will identify the actions to be taken in the event of a pollution incident. It will address containment measures, emergency discharge routes, a list of appropriate equipment and clean-up materials and notification procedures to inform the relevant environmental protection authority.</p>	Construction
LSGH11	14.5.1.3	Throughout (as required)	<p>Sediment control methods are outlined in the Surface Water Management Plan within the CEMP (Appendix A5.1 in Volume 4 of this EIAR) and these will be implemented by the appointed contractor.</p>	Construction

22.13 Archaeological and Cultural Heritage

Table 22.11: Archaeological and Cultural Heritage Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
ACH1	n/a	Throughout (as required)	The NTA will procure the services of a suitably-qualified archaeologist as part of its Employer's Representative team administering and monitoring the works.	Pre-Construction
ACH2	15.5.1.1	Throughout (as required)	The appointed contractor will make provision for archaeological monitoring to be carried out under licence to the Department of Housing, Local Government and Heritage (DHLGH) and the National Museum of Ireland (NMI), and will ensure the full recognition of, and the proper excavation and recording of, all archaeological soils, features, finds and deposits which may be disturbed below the ground surface. All archaeological issues will be resolved to the satisfaction of the DHLGH and the NMI.	Construction
ACH3	15.5.1.1	Throughout (as required)	The appointed contractor will ensure that the archaeologist as described in ACH5 will have the authority to inspect all excavation to formation level for the proposed works and to temporarily halt the excavation work, if, and as, necessary, having conferred with the NTA. They will be given the authority to ensure the temporary protection of any features of archaeological importance identified having conferred with the NTA. The archaeologist will be afforded sufficient time and resources to record and remove any such features identified in accordance with licensing requirements agreed.	Construction
ACH4	15.5.1.1	Throughout (as required)	The appointed contractor will make provision to allow for archaeological monitoring, inspection and excavation works that may arise on the site during the Construction Phase.	Construction
ACH5	15.5.1.1.1	Throughout (as required)	An experienced and competent licence-eligible archaeologist will be employed by the appointed contractor to advise on archaeological and cultural heritage matters during construction to communicate all findings in a timely manner to the NTA and statutory authorities, to acquire any licenses / consents required to conduct the work, and to supervise and direct the archaeological measures associated with the Proposed Scheme.	Construction
ACH6	15.5.1.1	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 the cellar, coal cellar and/or basement.	Construction
ACH7	15.5.1.1.1	Throughout (as required)	Licence applications are made by the licence-eligible archaeologist to the National Monuments Service at the DHLGH. In addition to a detailed method statement, the applications must include a letter from the NTA that confirms the availability of adequate funding. There is a prescribed format for the letter that must be followed. Other consents may include a Detection Device licence to use a metal-detector or to carry out a non-invasive geophysical survey.	Construction
ACH8	15.5.1.1.1	Throughout (as required)	The archaeologist will be provided with information on where and when the various elements and ground disturbance will take place.	Construction
ACH9	15.5.1.1.1	Throughout (as required)	Once the presence of archaeologically significant material is established, full archaeological recording of such material is recommended. If it is not possible for the construction works to avoid the material, full excavation will be recommended.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			The extent and duration of excavation will be advised by the client's archaeologist and will be a matter for discussion between the NTA and the licensing authorities.	
ACH10	15.5.1.1.1	Throughout (as required)	Secure storage for artefacts recovered during the course of the monitoring and related work will be provided by the appointed contractor.	Construction
ACH11	15.5.1.1.1	Throughout (as required)	During construction all construction traffic and the management of materials will be restricted where practicable by the appointed contractor so as to avoid any newly revealed archaeological or cultural heritage sites and their environs to ensure no damage to a site of archaeological interest.	Construction
ACH12	15.5.1.2	Throughout (as required)	Features of cultural heritage interest that are required to be removed on a temporary basis or for a short-term period, will be removed under archaeological supervision and in accordance with a method statement in consultation with the NTA and the relevant statutory authorities.	Construction
ACH13	15.5.1.3.1	N3 Blanchardstown Junction to Snugborough Road	<p>The appointed contractor will ensure that archaeological monitoring under licence will take place:</p> <ul style="list-style-type: none"> At the undesignated archaeological heritage site CBC0005AH001 (the site of a house identified on historic mapping). <p>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.</p>	Construction
ACH14	15.5.1.4.1	Snugborough Road to N3 / M50 Junction	<p>The appointed contractor will ensure that archaeological monitoring under licence will take place:</p> <ul style="list-style-type: none"> Within the ZAP for the recorded mill at Mill Road (RMP DU013-035; Figure 15.1 in Volume 3 of this EIAR). <p>It is in this area that there is a possibility to disturb intact archaeological layers and material.</p> <p>Licensed archaeological excavation, in full or in part, of any identified archaeological remains (preservation by record) or preservation in situ will be undertaken.</p>	Construction
ACH15	15.5.1.5.1	N3 / M50 Junction to Navan Road / Ashtown Road Junction	<p>The appointed contractor will ensure that archaeological monitoring under licence will take place:</p> <ul style="list-style-type: none"> Within the Phoenix Park (DU018-007001); At the undesignated archaeological heritage sites identified from historic mapping (CBC0005AH001 to CBC0005AH003). <p>It is in these areas that there is a possibility to disturb intact archaeological layers and material.</p> <p>Licensed archaeological excavation, in full or in part, of any identified archaeological remains (preservation by record) or preservation in situ will be undertaken.</p>	Construction
ACH16	15.5.1.5.2	N3 / M50 Junction to Navan Road / Ashtown Road Junction	<p>The memorial (CBC0005CH001) will be protected from any adverse impacts during construction works and if necessary for its protection, it will be removed under archaeological supervision by the appointed contractor. This will be undertaken in accordance with a method statement in consultation with the NTA and the statutory authorities.</p> <p>It will be returned to its current setting and as close as possible to its current location following completion of the works by the appointed contractor.</p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
ACH17	15.5.1.6.1	Navan Road / Ashtown Road Junction to Navan Road / Old Cabra Road Junction	<p>The appointed contractor will ensure that archaeological monitoring under licence will take place:</p> <ul style="list-style-type: none"> At the undesignated archaeological heritage sites identified from historic mapping (CBC0005AH005, CBC0005AH006 and CBC0005AH007). <p>It is in these areas that there is a possibility to disturb intact archaeological layers and material.</p> <p>Licensed archaeological excavation, in full or in part, of any identified archaeological remains (preservation by record) or preservation in situ will be undertaken.</p>	Construction
ACH18	15.5.1.7.1	Navan Road / Old Cabra Road Junction to Ellis Quay	<p>The appointed contractor will ensure that archaeological monitoring under licence will take place:</p> <ul style="list-style-type: none"> Within the designated ZAP for the Historic City of Dublin (DU018-020); At the site of a Bowling Green (RMP DU018-020310) which lies within the Proposed Scheme; Adjacent to the sites of an 18th to 19th century house (RMP DU018-020251) and a 17th century bridge (RMP DU018-020312), where associated features may survive below ground within the Proposed Scheme; and At all undesignated archaeological heritage sites identified from the DCIHR (DCC 2003 to 2009) listed in Table 15.18 in Chapter 15 of this EIAR. <p>It is in these areas that there is a possibility to disturb intact archaeological layers and material.</p> <p>Licensed archaeological excavation, in full or in part, of any identified archaeological remains (preservation by record) or preservation in situ will be undertaken.</p>	Construction
ACH19	15.5.1.7.2	Navan Road / Old Cabra Road Junction to Ellis Quay	<p>The monument and plaque (CBC0005CH002) will be protected from any adverse impacts during construction works and if necessary for its protection, it will be removed under archaeological supervision by the appointed contractor. This will be undertaken in accordance with a method statement in consultation with the NTA and the statutory authorities.</p> <p>It will be relocated as part of the relandscaping of the Prussia Street / Aughrim Street / Manor Street junction, as close as possible to its current location following completion of the works by the appointed contractor.</p>	Construction

22.14 Architectural Heritage

Table 22.12: Architectural Heritage Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
AH1	16.5.1.1	<p>Protected Structures: Sensitive fabric associated with the following:</p> <ul style="list-style-type: none"> Blue Coat School / Law Society of Ireland on Blackhall Place (DU018-020177); and 18 locations where Protected Structures of medium sensitivity share a boundary with the Proposed Scheme 20 locations where Protected Structures of medium sensitivity front directly onto the Proposed Scheme. <p>All of the above are referenced in Appendix A16.2 Inventory of Architectural Heritage Sites (Section 2.1) in Volume 4 of this EIAR.</p>	<p>The proposed mitigation is the recording, protection and monitoring of the sensitive fabric prior to, and for the duration of the Construction Phase.</p> <p>Recording, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.</p>	Construction
AH2	16.5.1.2	<p>Conservations Areas: Blackhall Place Conservation Area</p>	<p>The proposed mitigation is the recording, protection and monitoring of the sensitive fabric prior to, and for the duration of the Construction Phase.</p> <p>Recording, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.</p>	Construction
AH3	16.5.1.3	<p>NIAH Structures: Sensitive fabric associated with the following:</p> <ul style="list-style-type: none"> Railway Bridge on Old Cabra Road (NIAH 50060148) which is located inside the Proposed Scheme boundary; 15 locations where an NIAH structure of medium sensitivity share a boundary to the Proposed Scheme; and 7 locations where an NIAH structure of medium sensitivity front directly onto the Proposed Scheme. <p>All of the above are referenced in Appendix A16.2 Inventory of Architectural Heritage Sites (Section 2.2) in Volume 4 of this EIAR.</p>	<p>The proposed mitigation is the recording, protection and monitoring of the sensitive fabric prior to, and for the duration of the Construction Phase.</p> <p>Recording, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.</p>	Construction
AH4	16.5.1.4	<p>Designed Landscapes: Road surfaces and traffic signals at Phoenix Park (NIAH2309), Ashtown Gate (DCC RPS 6770)</p>	<p>The proposed mitigation is the recording, protection and monitoring of the sensitive fabric prior to, and for the duration of the Construction Phase.</p> <p>Recording, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.</p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
AH5	16.5.1.5.1	<u>Street Furniture:</u> Direct impact on post boxes at Kempton Avenue (CBC0005PB001), Junction of Glenbeigh Road / Old Cabra Road (CBC0005PB002) and on Blackhall Place (CBC0005PB004)	The proposed mitigation is the recording of the post boxes in position prior to the works, the labelling of the affected fabric prior to its careful removal to safe storage, and their reinstatement in new positions in close proximity (within 2m) of their existing positions. Recording is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee the labelling, taking-down and reinstatement of the affected post boxes by the appointed contractor. Works to the historic fabric will be carried out in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH6	16.5.1.5.1	<u>Street Furniture:</u> Indirect impact on post boxes on Prussia Street (CBC0005PB003) and on 194 Navan Road (CBC0005PB005)	The proposed mitigation is the recording, protection and monitoring prior to and during the Construction Phase. Recording, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor and in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH7	16.5.1.5.2	<u>Street Furniture:</u> Repositioning of: <ul style="list-style-type: none"> One free-standing lamp post in front of 46-47 Manor Street (CBC0005LP004) 	The proposed mitigation is the recording of the lamp-posts position prior to the construction works, the labelling of the affected fabric prior to its careful removal to safe storage, and reinstatement by the appointed contractor in a new position in close proximity to the original position. Recording is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee the labelling, taking-down and reinstatement of the lamp post. Works to the historic fabric will be carried out in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH8	16.5.1.5.2	<u>Street Furniture:</u> Repositioning of: <ul style="list-style-type: none"> Four of the existing 18 heritage lamp posts on Manor Street (CBC0005LP005); four of the existing 12 heritage lamp posts on Stoneybatter (CBC0005LP006); and one of the existing 7 lamp posts at the junction of Blackhall Place and King Street North (CBC0005LP008) 	The proposed mitigation is the recording of the lamp-posts in position prior to the works, the labelling of the affected fabric prior to its careful removal to safe storage, and their reinstatement in new positions in close proximity (within 2m) of their existing positions. Recording is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee the labelling, taking-down and reinstatement of the lamp posts. Works to the historic fabric will be carried out in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
AH9	16.5.1.5.2	<u>Street Furniture:</u> Indirect impacts on three no. 4.5m swan neck lamp-posts (CBC0005LP003) of Medium sensitivity at the junction of Manor Street and Aughrim Street	The proposed mitigation is the recording, protection and monitoring prior to and during the Construction Phase. Recording, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor and in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH10	16.5.1.5.3	<u>Historic Paving & Surface Treatments:</u> Kerbs lining the footpath in front of 54-56 Old Cabra Road (CBC0005BTH010) are to be removed; Kerbs lining the footpath on King Street North (CBC0005BTH033) are to be repositioned.	Mitigation is the recording of the kerbs in position prior to the works, the labelling of the affected fabric prior to its careful removal to safe storage. Recording is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The kerbs lining the footpath on King Street North (CBC0005BTH033) are to be reinstated in new positions in close proximity (within 2m) of their existing positions by the appointed contractor. The kerbs lining the footpath in front of 54-56 Old Cabra Road (CBC0005BTH010) are to be reused in the new kerb detailing where practicable, and if not, are to be salvaged for repairs to kerbs elsewhere. The architectural heritage specialist will oversee the labelling, taking-down and reinstatement of the kerbs by the appointed contractor. The works to the historic fabric will be carried out in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH11	16.5.1.5.3	<u>Historic Paving & Surface Treatments:</u> Indirect impacts on cobbled surfaces of Medium sensitivity on Stanley Street (CBC0005BTH044) and Hendrick Place (CBC0005BTH037)	The proposed mitigation is the recording, protection and monitoring prior to and during the Construction Phase. Recording, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor and in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction

22.15 Landscape (Townscape) and Visual

Table 22.13: Landscape (Townscape) and Visual Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
LV1	17.5.1	Throughout (as required)	<p>Mitigation and management measures are proposed to avoid, reduce or remediate, wherever practicable significant negative landscape (townscape) and visual effects of the Construction Phase of the Proposed Scheme. These measures (LV1-LV5) will be carried out by the appointed contractor and are to be applied across the Proposed Scheme wherever necessary to avoid disturbance of landscape features or characteristics to be retained.</p> <p>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 by a professional qualified arborist. For details of trees to be retained refer to Tree Protection Plans in the Arboricultural Impact Assessment (Appendix A17.1 in Volume 4 of this EIAR).</p>	Construction
LV2	17.5.1	Throughout (as required)	Wherever practicable, trees and vegetation will be retained within the Proposed Scheme. Trees and vegetation identified for removal will be removed in accordance with 'BS 3998:2010 Tree Work – Recommendations' (BSI 2010) and best arboricultural practices as detailed and monitored by a professional qualified arborist. For details of trees and vegetation to be removed refer to Tree Protection Plans in the Arboricultural Impact Assessment (Appendix A17.1 in Volume 4 of this EIAR)) and Landscape General Arrangements (BCIDC-ARP-ENV_LA-0005_XX_00-DR-LL-9001) in Volume 3 of this EIAR).	Construction
LV3	17.5.1	Throughout (as required)	The Arboricultural Assessment prepared for the Proposed Scheme will be fully updated by the appointed contractor at the end of the Construction Phase and made available, with any recommendations for on-going monitoring of retained trees during the Operational Phase;	Construction
LV4	17.5.1	Throughout (as required)	Where properties are subject to permanent and / or temporary acquisition, an inventory of boundary details and accesses, planting, paving, and other features that may be disturbed or removed will be prepared by the appointed contractor prior to commencement of construction works.	Construction
LV5	17.5.1	Throughout (as required)	Where properties are subject to permanent and / or temporary acquisition, 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
LV6	17.5.1	Throughout (as required)	Appropriate access to amenities and public open spaces shall be maintained by the appointed contractor.	Construction

22.16 Waste and Resources

Table 22.14: Waste and Resources Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
WR1	18.6.1	Throughout (as required)	A Construction and Demolition Resource and Waste Management Plan (CDRWMP) has been prepared and this will be implemented (and updated as necessary) by the appointed contractor - refer to the CDRWMP within Appendix A5.1 Construction Environmental Management Plan (CEMP) in Volume 4 of this EIAR.	Construction
WR2	18.6.1	Throughout (as required)	The following measures will be implemented during construction, where practicable, by the appointed contractor, to ensure the maximum quantity of material is reused on the Proposed Scheme and to contribute to achieving the objectives set out in the National Waste Action Plan as follows: <ul style="list-style-type: none"> • Stockpiling of existing sub-base, capping layer and topsoil material generated on-site for direct reuse in the Proposed Scheme where practicable in the proposed construction compounds (subject to material quality testing to ensure it is suitable for its proposed end use); and • Recycled aggregates and reclaimed asphalt will be specified in the Proposed Scheme, where practicable. 	Construction
WR3	18.6.1	Throughout (as required)	The following management measures will be implemented by the appointed contractor in so far as reasonably practicable: <ul style="list-style-type: none"> • Where waste generation cannot be avoided, waste disposal will be minimised; • Opportunities for reuse of materials, by-products and wastes will be sought throughout the Construction Phase of the Proposed Scheme; • Possibilities for reuse of clean non-hazardous excavation material as fill on the site or in landscaping works will be considered following appropriate testing to ensure material is suitable for its proposed end use; • Where excavated material cannot be reused within the Proposed Scheme works, material will be sent for recovery or recycling; • Source segregation: Metal, timber, glass and other recyclable material will be segregated (and waste stream colour-coding will be used) during construction works and removed off site to a permitted / licensed facility for recycling; • Material management: 'Just-in-time' delivery, where practicable, will be used to minimise material wastage; • General construction waste and by-products will be reused within the Proposed Scheme, where practicable, or appropriately reused (in accordance with Article 27 of the Waste Directive Regulations), recovered, recycled or disposed of off-site, as arranged by the appointed contractor; and • Any hazardous waste arising will be managed by the appointed contractor in accordance with the applicable legislation. <p>Waste Auditing: The quantity and types of waste and materials leaving site during the Construction Phase will be recorded by the appointed contractor. The name, address and authorisation details of all facilities and locations to which waste and materials are delivered will be recorded along with the quantity to each facility. Records will show material, which is recovered, which is recycled and which is disposed of.</p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			<p>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.</p> <p>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.</p> <p>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).</p>	

22.17 Material Assets

Table 22.15: Material Assets Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
MA1	19.5.1.1	Throughout (as required)	Where there are interfaces with existing utility infrastructure, protection in place or diversion as necessary is proposed to prevent long-term interruption to the provision of the affected services.	Construction
MA2	19.5.1.1	Throughout (as required)	<p>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 location of all utility infrastructure within the working areas prior to the commencement of excavation works.</p> <p>Where works are required in and around 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.</p>	Construction
MA3	19.5.1.1	Throughout (as required)	All utility companies for which diversions are proposed will continue to be consulted with NTA oversight when designing any diversions to ensure that proposed diversions conform to the utility provider's requirements, where practicable and acceptable to the NTA, and to ensure that service interruptions are kept to a minimum.	Construction
MA4	19.5.1.1	Throughout (as required)	<p>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.</p> <p>Where this is the case, it will be planned in by the appointed contractor in consultation with each utility provider, as relevant. 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.</p> <p>Prior notification will be given to all impacted properties. This notification will include information on when interruptions and works are scheduled to occur and the duration of such interruption.</p> <p>Any required works will be carefully planned by the appointed contractor to ensure that the duration of interruption is minimised in so far as is practicable.</p>	Construction
MA5	19.5.1.2	Throughout (as required)	<p>Consideration will be given to the sustainability of material being sourced for the construction of the Proposed Scheme by the appointed contractor.</p> <p>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.</p> <p>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.</p> <p>Only quarries which are included in local authority quarry registers will be used by the appointed contractor to source any quarried material.</p>	Construction
MA6	19.5.1.2	Throughout (as required)	Construction materials will be managed on site by the appointed contractor in such a way as to prevent over-ordering and waste.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			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 in order to reduce over-ordering.	

22.18 Major Accidents

Table 22.16: Major Accidents Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
n/a	n/a	n/a	No additional mitigation or monitoring measures are considered necessary beyond those already identified in other environmental assessments and the CEMP (Appendix A5.1 in Volume 4 of this EIAR).	n/a

22.19 Cumulative Impacts

Table 22.17: Cumulative Impacts Mitigation Measures

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

22.20 References

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

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

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

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

EPA (2021). Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects [Online] Available from https://www.epa.ie/publications/circular-economy/resources/C_and_D_Guidelines-.pdf

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

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

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

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

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

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

Directives and Legislation

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

Waste Management Act 1996, as amended

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

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

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

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