

## **Appendix A5.1**

### **Construction Environmental Management Plan (CEMP)**

## TABLE OF CONTENTS

<b>5</b>	<b>CONSTRUCTION AND ENVIRONMENTAL MANAGEMENT PLAN .....</b>	<b>I</b>
	<b>TABLE OF CONTENTS .....</b>	<b>I</b>
5.1	Construction Environmental Management Plan .....	3
5.1.1	Introduction .....	3
5.1.2	Proposed Development Details .....	5
5.1.3	Planning Consent .....	5
5.1.4	Contact Sheets .....	5
5.1.5	Roles and Responsibility .....	5
5.1.6	Communications .....	6
5.1.7	Environmental Awareness Training .....	6
5.1.8	Compliance and Review .....	6
5.1.9	Environmental Commitments .....	7
5.2	Construction Traffic Management Plan .....	33
5.2.1	Introduction .....	33
5.2.2	Proposed Construction Activities .....	34
5.2.3	Construction Traffic Management Plan Contents .....	40
5.3	Invasive Species Management Plan .....	50
5.3.1	Introduction .....	50
5.3.2	Methodology .....	51
5.3.3	Results .....	52
5.3.4	General Measures to Control and Prevent the Spread of Non-Native Invasive Plant Species .....	52
5.3.5	Assessment of Management Options for Third Schedule Non-Native Invasive Species .....	56
5.4	Surface Water Management Plan .....	68
5.4.1	Introduction .....	68
5.4.2	Roles and Responsibilities .....	70
5.4.3	Environmental Incident Response Plan .....	70
5.4.4	Site Specific Control Measures .....	70
5.4.5	Control and Management Measures .....	71
5.4.6	Drainage Inspection and Surface Water Monitoring .....	75
5.5	Construction and Demolition Resource and Waste Management Plan .....	76
5.5.1	Introduction .....	76
5.5.2	Proposed Development Description .....	78
5.5.3	Roles and Responsibilities .....	78
5.5.4	Key Materials, Quantities and Costs .....	80
5.5.5	Waste Management .....	83
5.5.6	Proposed Development Infrastructure .....	87
5.6	Emergency Incident Response Plan .....	88
5.6.1	Introduction .....	88
5.6.2	Roles and Responsibility .....	89
5.6.3	Environmental Emergency Response Procedures .....	90
5.6.4	Corrective Action .....	93
5.7	Cultural Heritage Mitigation Plan (CHMP) .....	93
5.7.1	Introduction .....	93
5.7.2	Roles and Responsibility .....	93
5.7.3	Statutory requirements .....	94
5.7.4	Project Communications .....	94
5.7.5	Temporary Storage Facilities .....	95
5.7.6	Site Specific Measures .....	95
5.8	References .....	96

## List of Figures

Figure 5-1 Section of the Proposed Development .....	34
Figure 5-2 Work Area – Stage A .....	35
Figure 5-3 Work Area – Stage B .....	36
Figure 5-4 Lorry Movements for ‘Removal’ of Materials .....	37
Figure 5-5 Lorry Movements for ‘Delivery’ of Materials .....	38
Figure 5-6 Location of Proposed Construction Compound .....	42
Figure 5-7 Potential Construction Vehicle Access Routes .....	43

## List of Tables

Table 5-1 CEMP Contents .....	4
Table 5-2 Mitigation and Monitoring Measures (Construction Phase) .....	7
Table 5-3 Matrix of Mitigation Measures and Residual Impacts (from NIS) .....	32
Table 5-4 List of Sections .....	34
Table 5-5 Construction Programme for the Proposed Development .....	35
Table 5-6 Traffic Management Provisions at each Section .....	37
Table 5-7 Estimated Peak Daily Plant and Equipment Numbers .....	38
Table 5-8 List of Specific Receptors .....	39
Table 5-9 Assessment of Management Methods for Japanese Knotweed .....	57
Table 5-10 Assessment of Management Methods for Himalayan Knotweed .....	59
Table 5-11 Assessment of Management Methods for Giant Hogweed .....	60
Table 5-12 Assessment of Management Methods for Himalayan Balsam .....	62
Table 5-13 Assessment of Management Methods for Three-Cornered Garlic .....	64
Table 5-14 Assessment of Management Methods for New Zealand Pigmyweed .....	65
Table 5-15 Assessment of Management Methods for Canadian Waterweed and Nuttall's Waterweed .....	67
Table 5-16 C&D Waste Management Baseline for CUWR, 2020 (permitted, licensed and Article 27 notifications) .....	78
Table 5-17 Estimated Demolition Waste Types and Quantities .....	81
Table 5-18 Summary of Excavation Material Type and Quantities .....	81
Table 5-19 Estimated Quantities of Major Construction Materials Required by the Proposed Development .....	82
Table 5-20 Quantities of Proposed Material for Reuse and Recycling .....	85
Table 5-21 Environmental Incident Form Example .....	92

## 5.1 Construction Environmental Management Plan

### 5.1.1 Introduction

This document is the Construction Environmental Management Plan (CEMP) for the BusConnects Galway: Dublin Road Scheme (hereafter referred to as the Proposed Development).

The CEMP will be updated by the Galway City Council (the Employer for the construction works) prior to the commencement of the Construction Phase, so as to include any additional measures required pursuant to conditions attached to any decision to grant approval. GCC shall set out the Employer's Requirements in the Construction Contract including all applicable mitigation measures identified in this Environmental Impact Assessment Report (EIAR), as well as additional measures required pursuant to conditions attached to any decision to grant approval.

The CEMP describes the main activities that will be undertaken to deliver the Proposed Development and to provide a framework of the environmental protection measures that will be implemented prior to commencement of and throughout the construction of the Proposed Development. It is intended that the CEMP will be a "live" document which will be updated to include any additional measures required pursuant to conditions attached to An Bord Pleanála's decision. It will also be reviewed prior to and updated during construction according to site specific conditions on the project and to reflect current construction activities, manage environmental risks and mitigation.

The CEMP will need to be altered during the lifecycle of the Construction Phase to take account of monitoring results, permits, legislative changes, outcomes of third-party consultations etc. The appointed contractor will ensure that the CEMP remains up to date for the duration of the Construction Phase. The appointed contractor may propose modifications to the CEMP. However, any such modifications will not give rise to any impacts which are more significant than those already identified and assessed in the EIAR or NIS.

All of the measures set out in this CEMP will be implemented in full by the appointed contractor and its finalisation will not affect the robustness and adequacy of the information presented and relied upon in the EIAR and NIS.

#### 5.1.1.1 Purpose

The purpose of the CEMP is to set out the procedures, standards, work practices and management responsibilities required to deliver the environmental mitigation measures from the EIAR and NIS to ensure that potential environmental effects that may arise from construction of the Proposed Development are addressed.

The CEMP will be a key construction contract document and post planning. The appointed contractor will take ownership of the CEMP to ensure commitments included in the statutory approvals are adhered to and that it integrates the requirements of the CEMP. The mitigation measures, which are considered necessary to protect the environment will be implemented by the appointed contractor and sub-contractors working on the project.

This CEMP presents the minimum environmental management requirements to be adhered to by the contractor and all sub-contractors. The key environmental aspects associated with the construction of the Proposed Development, the appropriate mitigation and monitoring controls, are identified in this CEMP and its supporting documentation.

This document presents the approach and application of environmental management and mitigation for the construction of the Proposed Development. It aims to ensure that adverse effects from the construction phase of the Proposed Development, on the environment and the local communities, are avoided or minimised.

### 5.1.1.2 Reference Documents

The CEMP has been prepared as part of this EIAR and the NIS, and should be read in conjunction with the following Proposed Development specific documents:

- The EIAR, with particular reference to Chapter 5 (Construction) in Volume 2 of the EIAR;
- The NIS;
- The Construction Contract; and
- Copies of An Bord Pleanála's Order, Inspector's Report and associated documentation.

The appointed contractor will need to comply with all relevant environmental legislation and take account of published standards, accepted industry practice, national guidelines, and codes of best practice appropriate to the Proposed Development. The CEMP has been prepared in accordance with the following industry best practice guidance:

- Transport Infrastructure Ireland (TII) (formerly the National Roads Authority (NRA)) Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan (hereafter referred to as the TII Guidelines) (TII 2007); and
- Construction Industry Research and Information Association (CIRIA) in the UK, Environmental Good Practice on Site Guide, 4th Edition (CIRIA 2015).

### 5.1.1.3 Scope

This CEMP defines the approach to environmental management implementation. Compliance with the CEMP, the procedures, work practices and controls will be adhered to by all personnel employed during the Construction Phase of the Proposed Development.

Table 5-1 provides the contents of the CEMP, and where details can be found in this document.

**Table 5-1 CEMP Contents**

Content	Section of CEMP
Introduction	5.1.1
Proposed Development Details	5.1.2
Planning Consents	5.1.3
Contact Sheets	5.1.4
Roles and Responsibilities	5.1.5
Communications	5.1.6
Environmental Awareness Training	5.1.7
Compliance and Review	5.1.8
Environmental Commitments	5.1.9
Construction Traffic Management Plan	5.2
Invasive Species Management Plan	5.3
Surface Water Management Plan	5.4
Construction and Demolition Resource and Waste Management Plan	5.5
Environmental Incident Response Plan	5.6
Cultural Heritage Management Plan	5.7

## 5.1.2 Proposed Development Details

Information on the Proposed Development will be included in this Section of the CEMP. This information will assist those without detailed knowledge of the Proposed Development in quickly familiarising themselves with the key elements of the project and will also assist those who have a need to examine, review or audit the CEMP.

Details will include a description of the key elements of the Proposed Development, an overview of the main works required at each section, the construction programme, construction methodology, construction plant and equipment requirements, details on the Construction Compounds, construction traffic management measures, and interfaces with other projects.

[GCC / appointed contractor shall insert Proposed Development details].

## 5.1.3 Planning Consent

If planning permission is granted for the Proposed Development, the entire contents of the planning consent will be inserted at this location.

[GCC / appointed contractor shall insert planning consent details].

## 5.1.4 Contact Sheets

Contact details of relevant personnel are required to ensure the efficient reporting of environmental incidents. It is essential that these contact details be frequently reviewed to ensure they are up to date. Contact details will include the organisation, position title, name, mobile phone number and email address of relevant personnel.

[GCC/ appointed contractor shall insert contact details for the relevant personnel]

## 5.1.5 Roles and Responsibility

Procurement of the appointed contractor by GCC (the Employer for the construction works), will involve the determination that the appointed contractor is competent to carry out the works, including the effective implementation of the mitigation measures. The appointed contractor will be required to plan and construct the Proposed Development construction works in accordance with the Employer's Requirements, and GCC will employ an Employer's Representative team with appropriate competence to administer and monitor the Construction Contract for compliance with the Employer's Requirements.

Information on the appointed contractor's organisational structure / duties and responsibilities will be provided in this Section in the CEMP.

The assignment and communication of duties and responsibilities to individual named members will help ensure the successful implementation of the CEMP.

The TII Guidelines (TII 2007) outline a typical organisational structure / roles that may be adopted. It is recognised that the actual titles used by the appointed contractor may vary, however, the appointed contractor should assign relevant duties and responsibilities to the appropriate equivalent person.

One of the roles identified in the TII Guidelines is that of an Environmental Manager (EM). The EM, or equivalent, will be suitably qualified, with sufficient training, experience and knowledge appropriate to the nature of the task to be undertaken. The EM will be responsible for co-ordinating the day-to-day management of environmental impacts during the Construction Phase and for assisting and advising the appointed contractor when programming construction activities and devising methodologies, taking cognisance of the Environmental Commitments. The EM will be responsible for performing inspections as deemed necessary. In addition, the EM will deal with licencing and permit issues, keep up to date with relevant environmental best practice and legislative changes, engage in personnel training, manage responses to environmental incidents and engage environmental contractors as and when required.

[GCC / appointed contractor shall insert the appointed contractor's organisational structure / duties and responsibilities].

### 5.1.6 Communications

The procedures adopted for internal and external communication of information regarding the specific elements of the Proposed Development will be agreed between the GCC and the appointed contractor prior to construction as set out in the Construction Contract.

The appointed contractor will put in place a Communications Plan in accordance with the Employer's Requirements. The Communications Plan will provide a mechanism for members of the public to communicate with the GCC and the appointed contractor, and for the GCC and the appointed contractor to communicate important information on various aspects of the Proposed Development to the public. The Communications Plan will include procedures to inform members of the community directly affected by the Construction Phase on schedules for any activity of a particularly disruptive nature which is likely to impinge on their property such as boundary works, road closures and diversions, and any mitigating actions that are being taken to minimise such disruption.

### 5.1.7 Environmental Awareness Training

Copies of the CEMP will be made available to all personnel. All appointed contractor personnel and subcontractors involved on site will be given a comprehensive induction prior to commencement of the works which will include environmental awareness training. The environmental training and awareness procedure will ensure that staff are familiar with the principles of the CEMP, the environmental aspects and impacts associated with their activities, the procedures in place to control these impacts and the consequences of departure from these procedures.

Where a specific management plan has been devised for a works activity (e.g. working in an area where invasive species are present), all appointed contractor personnel involved in that activity will be given a toolbox talk outlining the relevant Environmental Commitments.

Nobody will work on site without first receiving environmental induction. A record will be kept of a signed register on the project files of all attendees of the environmental induction and other trainings.

Site briefings and talks will be carried out on a regular basis to ensure that construction staff have an adequate level of knowledge on environmental topics and community relations and can effectively follow environmental control procedures throughout construction.

### 5.1.8 Compliance and Review

The EM or equivalent, will carry out environmental inspections at appropriate intervals throughout the Construction Phase. The environmental inspections will ensure that the works are undertaken in compliance with the CEMP and all other planning application documents. Where appropriate, and if required, the EM may arrange to be accompanied on these environmental inspections by suitably qualified professionals (e.g. arborist, ecologist, archaeologist). The CEMP will be developed further by the appointed contractor to include further details of inspection procedures.

The Construction Contract documents will require the appointed contractor to further develop the CEMP within 28 days after receiving notice of Commencement of Works from GCC. The EM, and GCC will carry out audits of the CEMP at designated intervals, to determine whether the CEMP is effective in ensuring that the appointed contractor meets all the Environmental Commitments. All changes to the CEMP will be made by the EM and approved by GCC.

Following these inspections / audits the EM will produce a report detailing the findings which will be provided to the Employer's Representative and reviewed at the monthly project meeting.



This CEMP should also be revised between audits as deemed appropriate, particularly with an update of environmental control measures or environmental legislation.

### 5.1.9 Environmental Commitments

The Schedule of Environmental Commitments will comprise the following:

- The Construction Phase mitigation and monitoring measures as outlined in Chapter 6 (Traffic & Transport) to Chapter 20 (Cumulative Impacts & Environmental Interactions) of this EIAR, summarised in Chapter 21 (Summary of Mitigation & Monitoring Measures) of this EIAR, and in Table 5-2;
- The Construction Phase mitigation measures and residual impacts, as outlined in the NIS, summarised in
- Table 5-3 which identifies the relevant section of the NIS / CEMP;
- Any commitments arising during the statutory planning process up to and including the Oral Hearing;
- Any commitments set out in the Construction Contract documents; and
- Any conditions and / or modifications imposed by An Bord Pleanála, should they grant approval for the Proposed Development.

The CEMP will include the Schedule of Environmental Commitments together with the relative specification, evidence, and responsibilities of how each commitment will be met, where necessary. The appointed contractor will be required to comply with all Environmental Commitments, and all applicable legislation, including relevant standards, codes of best practice and guidelines.

The final CEMP will provide a framework for compliance auditing and inspection to ensure that these construction practices and mitigation measures, as set out in the EIAR and NIS and the conditions in the planning approval, are adhered to.

#### 5.1.9.1 Mitigation and Monitoring Schedule

Table 5-2 summarises the Construction Phase mitigation (i.e., which the appointed contractor will implement), outlined in the relevant EIAR technical assessment chapters.

Table 5-2 should be read in conjunction with the relevant technical assessment chapter. Where appropriate, the specific location to which the mitigation relates to is identified and where the mitigation measure may be applicable along the extent of the Proposed Development, 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.

Table 5-3 provides the matrix table from the NIS which identifies the relevant European sites, the potential impacts, and references the relevant sections in the NIS or CEMP for the mitigation to be applied.

**Table 5-2 Mitigation and Monitoring Measures (Construction Phase)**

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment
Chapter 6 (Traffic & Transport)	TT1	6.6.1	Throughout (as required)	<p>A Construction Environmental Management Plan (CEMP) has been prepared (i.e. this document) and will be implemented (and developed further as required) by the appointed contractor.</p> <p>A detailed Construction Traffic Management Plan has been prepared (Section 5.2) and will subsequently be updated by the appointed contractor prior to construction, including Temporary Traffic Management arrangements.</p>



				The appointed contractor will also prepare (and include in the CEMP) and implement a Construction Stage Mobility Management Plan (CSMMP), to actively encourage personnel to travel to site by sustainable means.
Chapter 7 (Air Quality)	AQ1	7.5.1.1	Construction Compound and throughout (as required)	<p>A series of mitigation measures will be implemented. In summary by the appointed contractor to minimise dust nuisance impacts:</p> <ul style="list-style-type: none"> <li>Fully enclose structures with screens during demolition to minimise dust dispersion;</li> <li>Public roads outside the Proposed Development will be regularly inspected for cleanliness and cleaned as necessary;</li> <li>Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays (or similar dust suppression methods) will be used as required if particularly dusty activities associated with the construction contract are necessary during dry or windy periods;</li> <li>During movement of dust-generating or potentially hazardous materials both on and off-site, trucks will be covered with tarpaulin and before entrance onto public roads, trucks will be checked to ensure the tarpaulins are properly in place; and</li> <li>The appointed contractor will provide a site hoarding of 2.4m height along boundaries where works are taking place adjacent to ecological sensitive receptors and at the main construction compound which will assist in minimising the potential for dust impacts off-site.</li> </ul> <p>The appointed contractor will keep the effectiveness of the mitigation measures under daily review and revise them as necessary. In the event of dust nuisance occurring outside the works boundary associated with the Proposed Development, movements of materials likely to raise dust will be curtailed and satisfactory procedures implemented to rectify the problem.</p>
	AQ2	7.5.1.1	Construction Compounds and Throughout (as required)	In terms of construction traffic, a Traffic Management Plan has been prepared (and included in Appendix A5.1 CEMP in Volume 4 of this EIAR) and will be implemented by the appointed contractor (s) to deliver the following mitigation measures on a location-specific basis in advance of the works commencing on-site:

				<ul style="list-style-type: none"><li>▪ A designated delivery route shall be used for all materials to/from the site for all drivers, as overseen by the Project Supervisor for Construction Stage (PSCS) to be appointed by GCC;</li><li>▪ The use of low emissions vehicles within the haulage fleet will be included within the Contract Documents; and</li><li>▪ The use of private vehicles by construction staff to access the site will be minimised through the encouragement of use of public transport, encouragement of car sharing, and maximising use of local labour to reduce transport emissions. To implement this, the contractor shall prepare a Mobility Management Plan for site staff and Construction Plant.</li></ul>
	AQ3	7.5.1.1	Construction Compounds and Throughout (as required)	<p>To reduce emissions from compounds and mobile plant the following mitigation is recommended:</p> <ul style="list-style-type: none"><li>▪ For electricity generation at the construction compounds, hydrogen generators or electrified plant shall be utilised over traditional diesel generators. This should also apply to lower powered mobile plant as appropriate;</li><li>▪ A regular maintenance schedule for all construction plant machinery shall be undertaken to maintain optimum machinery efficiency; and</li><li>▪ Engines will be turned off when machinery is not in use.</li></ul>
	AQ4	7.5.1.2	Construction Compounds and Throughout (as required)	<p>The following monitoring measures will be implemented for the construction phase:</p> <ul style="list-style-type: none"><li>▪ The contractor will undertake on-site and off-site inspections, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to Galway City Council on request. The frequency of the inspections will be increased during site activities with a high potential to produce dust are being carried out.</li><li>▪ Dust monitoring will be undertaken at the three nearest sensitive receptors (with agreement from the landowner) to the works during the construction phase. The TA Luft dust deposition limit values of 350 mg/m2/day applied as a 30-day average.</li></ul>
Chapter 8 (Climate)	CL1	8.6.1	Throughout (as required)	<p>A series of mitigation measures have been incorporated into the Proposed Development with the goal of reducing the embodied carbon associated with the</p>

				<p>Construction Phase. These mitigation measures include:</p> <ul style="list-style-type: none"> <li>▪ The replacement, where practicable, of concrete containing Portland cement with concrete containing ground granulated blast furnace slag (GGBFS);</li> <li>▪ The Proposed Development will minimise wastage of materials due to poor timing or over ordering on site thus helping to minimise the embodied carbon footprint of the Proposed Development;</li> <li>▪ Where practicable, materials will be reused within the extent of the Proposed Development; and</li> <li>▪ Where practicable, materials will be sourced locally to reduce the embodied emissions associated with transport.</li> </ul>
Chapter 9 (Noise)	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: 2009 +A1 2014 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise and S.I. No. 241/2006 - European Communities (Noise Emissions by Equipment for Use Outdoors) (Amendment) Regulations 2006. The mitigation measures outlined below for the Construction Phase have also been included in the Construction and Environmental Management Plan (CEMP) in Appendix A5.1 in Volume 4 of this EIAR.</p> <p>These measures will ensure that:</p> <ul style="list-style-type: none"> <li>▪ During the Construction Phase, the appointed contractor will be required to manage the works to comply with the limits detailed in Section 9.2.4.1 in Chapter 9 (Noise &amp; Vibration) in Volume 2 of this EIAR using methods outlined in BS 5228-1:2009 +A1 2014 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise; and</li> <li>▪ The best means practicable, including proper maintenance of plant and equipment, will be employed to minimise the noise produced by on-site operations.</li> </ul>
	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 9-6 and Table 9.9 in Chapter 9 (Noise &amp; Vibration) in Volume 2 of the EIAR. Table 9-31 in Chapter 9 (Noise &amp; Vibration) in Volume 2 of the EIAR indicates that intrusive</p>

				works occurring within 50m of Noise Sensitive Locations (NSLs) will need specific noise control measures to reduce impacts depending on time period over which they will occur.
	NV3	9.5.1.1.1	Throughout (as required)	<p>The potential for any item of plant to result in exceedance of construction noise thresholds will be assessed prior to the item being brought onto the site. The least noisy item of plant will be selected wherever practicable (e.g. plant items with sound attenuation incorporated). Should a particular item of plant already on the site be found to exceed the construction noise thresholds, the first action will be to identify whether the item can be replaced with a quieter alternative.</p> <p>The appointed contractor will evaluate the choice of excavation, breaking or other working method taking into account various ground conditions and site constraints. Where alternative lower noise generating equipment are available that will provide equivalent structural / excavation / breaking results, these will be selected to control noise within the relevant thresholds, where it is practicable to do so.</p>
	NV4	9.5.1.1.2	Throughout (as required) and Construction Compound	<p>The following measures will be implemented, if required, by the appointed contractor to control noise at source in order to remain below the threshold values for noise set out in Table 9.6 in Chapter 9 (Noise &amp; Vibration) in Volume 2 of the EIAR, which relate to specific site considerations:</p> <ul style="list-style-type: none"> <li>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;</li> <li>For percussive tools such as pneumatic concrete breakers and tools a number of noise control measures include fitting a muffler or sound reducing equipment to the breaker 'tool' and ensuring any leaks in the air lines are sealed;</li> <li>A strict noise control policy relating to materials handling will be applied at the proposed Construction Compound. Noisy items of plant will be sited away from noise sensitive boundaries.</li> <li>Where compressors, generators and pumps are located in proximity to NSLs and have the potential to exceed the construction noise thresholds, these will be surrounded by acoustic lagging or</li> </ul>

				<p>enclosed within acoustic enclosures providing air ventilation; and</p> <ul style="list-style-type: none"> <li>Resonance effects in panel work or cover plates can be reduced through stiffening or the application of damping compounds, while other noise nuisance can be controlled by fixing resilient materials in between the surfaces in contact.</li> </ul>
	NV5	9.5.1.1.3	Throughout (as required)	Erection of localised demountable enclosures or screens will be used around breakers or drill bits, as required, when in operation in proximity to NSL boundaries with the potential to exceed the construction noise thresholds. Annex B of BS 5228–1: 2009+A1:2014 (Figures B1, B2 and B3) provide typical details for temporary and mobile acoustic screens, sheds and enclosures that can be constructed on-site from standard materials. A well placed and designed mobile temporary screen around a breaker or excavation can effectively reduce noise emissions by 10 dB(A).
	NV6	9.5.1.1.3	Construction Compound	The appointed contractor will provide a site hoarding of 2.4m height along noise sensitive boundaries, at a minimum, at the Construction Compound.
	NV7	9.5.1.1.3	Construction Compound	Careful planning of the Construction Compounds including the placement of site buildings and stores between the site and NSLs will be considered by the appointed contractor.
	NV8	9.5.1.1.4	Throughout (as required)	It is envisaged that generally construction working hours will be between 07:00hrs and 19:00hrs on weekdays and between 08:00hrs and 14:00hrs on Saturdays. Evening or Night-time and Sunday working may be required during certain periods to facilitate street works that cannot be undertaken under daytime / evening time conditions. The planning of such works will take consideration of sensitive receptors, in particular any nearby residential areas.
	NV9	9.5.1.1.4	Throughout (as required)	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 9.31 in Chapter 9 (Noise & Vibration) in Volume 2 of the EIAR)), other construction activities will be scheduled to not result in significant cumulative noise levels.

	NV10	9.5.1.1.5	Throughout (as required)	GCC will establish clear forms of communication that will involve the contractor and NSLs in proximity to the works so that residents or building occupants are aware of the likely duration of activities likely and timing to generate noise or vibration that are potentially significant.
	NV11	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 Development
	NV12	9.5.1.2	Throughout (as required)	During the Construction Phase the appointed contractor will carry out vibration monitoring at identified sensitive buildings, in the event that proposed works have the potential to be at or exceed the vibration limit values in Table 9-9 in Chapter 9 (Noise & Vibration) in Volume 2 of the EIAR.
	NV13	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"> <li>▪ A clear communication programme will be established by GCC 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. In so far as possible the timing of such work will be scheduled to cause minimal disruption;</li> <li>▪ Activities capable of generating significant vibration effects with respect to human response will be restricted to daytime hours only, as far as practicable; and</li> <li>▪ Appropriate vibration isolation (such as resilient mounts to pumps and generators) will be applied to plant and equipment, where required and where feasible.</li> </ul>
Chapter 11 (Human Health)	HH1	11.5	Throughout (as required)	Access to all hospitals and schools will be maintained throughout the Construction Phase. Refer to the Construction Traffic Management Plan (Section 5.2).
	HH2	11.5	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

				<p>construction works and take control of their options to some extent. The appointed contractor will put in place a Communications Plan in accordance with GCC requirements. The Plan will provide a mechanism for members of the public to communicate with the GCC and the appointed contractor, and for the GCC and appointed contractor to communicate important information on various aspects of the Proposed Development to the public. This will include timely communication to the local community on the planned work activities, timings and traffic management.</p>
Chapter 12 (Biodiversity)	BD1	12.6.1.1	Designated Sites	<p>During construction, water quality protection measures will be employed, including following the Surface Water Management Plan (SWMP) included in Appendix A5.1 CEMP in Volume 4 of this EIAR. An Environmental Emergency Response Plan will also be prepared and communicated to personnel prior to commencement of work. Following mitigation measures will be implemented:</p> <p>Existing surface water infrastructure will be inspected and deemed to be in good working order prior to works starting.</p> <p>All fuels, oils and construction fluids will be stored in the designated construction compound on lands adjacent to the existing Connacht Hotel and stored in bunds of 110% capacity in a secure area away from any drains or watercourses.</p> <p>All equipment and machinery will be checked for leaks prior to usage on site and on a daily basis.</p> <p>Any cement mixing where required will be undertaken away from surface water drainage systems, whether temporary during construction, or permanent and any washout from vehicles, machinery or tools will be stored securely in the construction compound and appropriately removed from site.</p> <p>Sediment barriers such as silt fencing will be used and checked daily for effectiveness.</p> <p>Construction will take cognisance of weather conditions and the duration that subsoil layers are exposed will be minimised.</p> <p>Waste will be managed appropriately on site.</p>
	BD2	12.6.1.1	Designated Sites	<p>An Invasive Species Management Plan (ISMP) has been prepared (Section 5.3). A pre-construction survey for invasives will be carried out to determine the status of invasives on site prior to commencement of works. High-risk species Himalayan</p>



				knotweed will be removed and monitoring undertaken. All equipment will be steam cleaned prior to and after use on site.
	BD3	12.6.1.2.1	Throughout (as required)	<p><u>Habitat loss and fragmentation</u></p> <p>Vegetation clearance will be kept to a minimum as required during the construction phase and in compliance with the conditions of any Derogation Licence, felling licence, statutory limits (including temporal) and the provisions of the Development plan on removing vegetation. Vegetation will only be cleared where required, and efforts made to retain vegetation wherever possible. Tree felling will also only be carried out where necessary to facilitate the development. Efforts will be made to retain trees where possible, and measures employed to limit any potential damage to retained trees, including root systems.</p> <p>Trees selected for planting have taken cognisance of existing species in the study area. A minimum height of 4 m will be achieved for all planted trees. Emphasis will be given to include a majority of native species, including pollinator-friendly and diverse plant species.</p> <p>The Landscaping Plan includes for hedge and native shrub mixes, ornamental shrub planting, groundcover planting, seasonal bulbs and grassy verges. Other landscaping elements such as earth banks should also be considered which would improve insect production, to act as prey items for fauna. Care will be taken to ensure that plants and seed mixes used are regulated and quality controlled from the supplier to ensure no inadvertent non-native invasive species are present. Plants should be sourced from organic growers who produce stock free from insecticides and invasive species.</p> <p>In areas where temporary works are required along the southern edge of the Meadow fields, it should be considered that reseeded be undertaken using seeds from the existing Meadows. Seeds from the Meadows could be harvested three years prior to year of opening (e.g., 2025) calendar year and stored for reseeded once temporary works areas are no longer needed. This would ensure that the species assemblage already present, including genetics, would be consistent.</p> <p>The design of the Proposed Development is such that buffer zones are present between the new Proposed Development layout and existing baseline habitats, by way of additional planting and retention of existing trees and vegetation. This would</p>

				<p>ensure appropriate buffer zones and will mitigate fragmentation impacts.</p> <p>The Landscaping General Arrangement Drawings (BCGDR-BTL-ENV_LA-XX-DR-CE-00001- 00011) also indicate Root Protection Areas (RPAs) for each tree to be retained, obtained from the Arboricultural Impact Assessment (Barton Hyett Associates, 2024). The temporary RPAs should be fenced off from the works where possible. No storage of materials, or vehicle access should be allowed within the RPAs. No storage of hazardous materials within 10m of any retained trees is permitted. Should works be required within an RPA, a qualified arborist will be consulted, and mitigation measures included in the Arboricultural Impact Assessment will be followed (Barton Hyett Associates, 2024).</p>
	BD4	12.6.1.2.1	Construction Compound	<p>The trees inside the construction compound area and their root zones will to be properly protected and no entry by individuals or machinery into the root protection zone will be permitted while the site is in use. The root protection area will not be used for storage of any kind. The tree protection fencing will be in place prior to commencement.</p>
	BD5	12.6.1.2.2	Throughout (as required)	<p><u>Invasive species</u></p> <p>Prior to the commencement of works, a pre-construction survey for invasive species should be carried out along the length of the Proposed Development.</p> <p>An Invasive Species Management Plan (ISMP) has been prepared and is included in Appendix A5.1 - CEMP of Volume 4 of this EIAR). Measures outlined in the ISMP will be implemented by a suitability qualified specialist prior to the commencement of construction to ensure non-native invasive species are controlled. The high-risk invasive species Himalayan knotweed should be appropriately removed to prevent further spread.</p> <p>All equipment working on Site will be steam cleaned prior to and after use on Site and wastewater will be appropriately dealt with as in the Inland Fisheries Ireland (IFI,2010) 'Biosecurity Protocol for Field Survey Work' and CIRIA C811 (2023) 'Environmental Good Practice on Site Guide'. During works on Site, vehicles and machinery will be regularly inspected for plant material, such as roots or seeds, and if found, will be removed and safely disposed of in the construction compound.</p>

	BD6	12.6.1.2.3	Throughout (as required)	<p><u>Habitat Degradation – Surface Water Quality</u></p> <p>In terms of mitigation a Surface Water Management Plan (SWMP) has been prepared (Section 5.4), 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 Development.</p> <p>While there are no watercourses on the site, potential impacts were identified in relation to surface water run-off near the Meadow grassland fields in the HSE lands at Merlin Park. At a minimum, the works area will be fenced off from the Meadow fields during construction. Silt fences and sediment filter socks will be deployed along this fence to ensure no overland flows into the grassland. Monitoring of silt fencing and sediment filter socks will take place weekly and after heavy rainfall for the course of the works to ensure effectiveness. No storage of hazardous materials, fuel or stockpiling of materials should occur along this stretch, and ideally, will be kept to the temporary construction compound. No waste will be stored along this stretch and no refuelling should take place adjacent to the Meadow fields. Refuelling should only be undertaken in a designated area, with appropriate bunding, within the temporary construction compound.</p>
	BD7	12.6.1.3.1	Throughout (as required)	<p><u>Non-Volant Mammals</u></p> <p>While there are no guidelines for timeframes in Ireland, it is recommended in this case that surveys take place no later than 4 weeks prior to clearance works. This will be undertaken to ensure that no mammal dwellings are present immediately prior to construction, that may have been created in the time elapsed between the current surveys and the commencement of works.</p> <p>All vegetation clearance works should be undertaken slowly to allow mammals and other animals sufficient time to escape if needed. Any excavations will be covered when not in use and backfilled as soon as possible to reduce the potential for mammals to get trapped or potentially harmed. Excavations will also be covered at night where practicable. To reduce disturbance, vibration during the construction works will be regularly monitored and will comply with standards to ensure this is kept to a minimum.</p>
	BD8	12.6.1.3.2	Throughout (as required)	<p><u>Bats</u></p>

				<p>A suitably qualified bat ecologist will be present on site for any tree felling works and setting up roost protection areas for retained trees with Potential Roost Features (PRFs). This ecologist should undertake a pre-construction survey of the affected trees. This pre-construction survey may determine that further PRFs have formed in the interim or give a confirmation of whether these trees are being used by bats. A derogation licence is required as there is potential for bats to be present in suitable trees at any point of time. While the Derogation Licence applied for is not a mitigation measure per se, it will have conditions attached to it which must be complied with. The Derogation licence application submitted on behalf of GCC committed to undertaking certain measures detailed in Section 12.6.1.3.2 in Chapter 12 (Biodiversity) of this EIAR. The suitably qualified bat ecologist in conjunction with the NPWS will ensure there are no bats in the trees prior to felling.</p> <p>National Roads Authority 'Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes' will be followed as relevant (NRA, 2006). Tree felling is best undertaken from late August to late October / early November, during which time all bats are capable of flight, but are not yet in hibernation. Trees with PRFs should be felled using a first warning, nudging the tree two or three times with a pause in between, to warn bats that may be present. Trees should be felled in sections, undertaken carefully, cutting from the canopy of the tree first and removing and checking each section for bats. As a precaution, cut tree sections should be left overnight before mulching. If any bats are found throughout this process, commitments provided in the application for the Derogation licence must be complied with, works must stop, NPWS will be notified.</p> <p>Due to the required loss of some mature trees with PRFs for bats, alternative accommodations for bats should be provided. A bat box scheme will be included.</p> <p>The bat boxes will be erected on mature trees in the study area, a season prior to the felling of trees, ideally prior to construction. An ecologist will advise on the location and orientation of the bat boxes on site based on relevant guidelines. However, a minimum height of 4 m should be obtained and a preferred aspect of south-east or south-west and away from any light spill (Bat Conservation Ireland, 2015). A</p>
--	--	--	--	--

				total of 3 boxes per PRF tree removed is recommended.
	BD9	12.6.1.3.2	Throughout (as required)	<p><u>Bats</u></p> <p><u>Disturbance of Flight Patterns / Foraging Routes as a Result of Lighting</u></p> <p>Measures are proposed to reduce the potential for light spill impacts from temporary construction lighting, along hedgerows, treelines, scrub and grassland habitats:</p> <ul style="list-style-type: none"> <li>▪ Motion sensors / timer triggers used where possible;</li> <li>▪ Column heights kept to a minimum as practicable;</li> <li>▪ Lighting directed only to areas where lighting is needed (avoid unnecessary light spill);</li> <li>▪ Luminaires used to prevent light spill;</li> <li>▪ Warm colour temperatures used where possible (2700K or less);</li> <li>▪ Cowls, louvres, hoods or baffles used to direct lighting; and</li> <li>▪ No upward facing lighting.</li> </ul>
	BD10	12.6.1.3.3	Throughout (as required)	<p><u>Birds</u></p> <p>Vegetation clearance works should also be undertaken outside the bird nesting season, from 1st March to 31st August (as per S40(1) Wildlife Act 1976, as amended (which prohibits cutting vegetation growing on land (not cultivated between) 1st March and 31st August).</p> <p>In areas where this cannot be observed, should S40(2)(e) not be applied (disapplies to the clearance of vegetation in the course of road or other construction works), a pre-construction survey of vegetation to be removed will be undertaken in advance of construction by a suitably qualified ecologist. If any active nests are identified, these areas will be appropriately fenced off and no vegetation removal will be undertaken in these areas until birds have fledged and nests are no longer in use.</p> <p>Bird boxes will be installed within the study area prior to the clearance of vegetation. Generalist bird boxes of a durable material will be used, and an ecologist consulted prior to installation for location and orientation.</p>
	BD11	12.6.3.1	Throughout (as required)	<p>An Ecological Clerk of Works (EcOW) will be employed to ensure ecological mitigation measures are adhered to. All vegetation removal will be supervised by the EcOW.</p> <p>An initial site environmental induction and ongoing training will be provided by the EcOW to communicate the main provisions of this environmental plan to all site</p>

				<p>personnel. Two-way communication will be encouraged to promote a culture of environmental protection.</p> <p>Prior to any works, all personnel will receive an on-site induction relating to operations adjacent to the environmentally sensitive areas and to re-emphasise the precautions that are required as well as the construction management measures to be implemented. Galway City Council will also ensure that the engineer setting out the works is fully aware of the ecological constraints and construction management requirements.</p>
	BD12	12.6.3.2	Throughout (as required)	<p><u>Designated Sites</u></p> <p>Checks should be made for invasive species during road maintenance, and if found, plans should be put in place for management and eradication of the invasive species recorded.</p>
	BD13	12.6.3.3	Throughout (as required)	<p><u>Habitat and Flora</u></p> <p>Monitoring of the Annex I habitat in the HSE lands within Merlin Park will be undertaken annually, over a period of three years and will involve consultation with the HSE that undertake management of these lands. This should be undertaken by a suitably qualified ecologist / botanist. Any negative changes noted in the baseline of these fields should be recorded and mitigation amended (air quality and/ or surface water) to reduce further impacts.</p> <p>Monitoring will be undertaken by way of habitat surveys to record vegetation structure and changes. This should be undertaken at least once a year, at the same period each year. This is to reduce seasonal variation effects on the results. The first visit should be undertaken to form a baseline prior to enhancement measures listed in section 12.7.2.2.1 in Chapter 12 (Biodiversity). Results will be analysed after each survey to compare with baseline results and indicator species targets in BSBI (2021) and O'Neill et al., (2013) to establish efficacy of enhancement measures. Areas used for temporary works will be allowed to naturally regenerate, to include reseeding with seed harvested from the existing fields, the success of which should be monitored to establish efficacy of seeding measures. Any additional measures deemed required by the ecologist after the first year of monitoring will be considered.</p>
	BD14	12.6.3.4	Throughout (as required)	<p><u>Fauna</u></p>

				<p>Bat boxes installed as part of the construction phase of the Proposed Development, should be monitored according to guidelines (Bat Mitigation Guidelines for Ireland - v2, Marnell et al., 2022).</p> <p>The bird boxes installed as part of the construction phase of the Proposed Development will also be monitored. Monitoring should include one check annually for two years.</p>
Chapter 13 (Water)	WT1	13.5.1.1	Throughout (as required)	A Surface Water Management Plan (SWMP) has been developed (Section 5.4), which details the measures to be put in place to avoid, prevent and reduce any significant adverse impacts on the surrounding water environment during the Construction Phase of the Proposed Development
	WT2	13.5.1.1	Throughout (as required)	<p>The mitigation measures proposed for the management of surface water runoff were formulated with due regard for the following guidance documents and should be adhered to during the construction near water bodies:</p> <ul style="list-style-type: none"> <li>▪ CIRIA C648 (2006) Control of Water Pollution from Linear Construction Projects;</li> <li>▪ CIRIA C532 (2001) Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors; and</li> <li>▪ Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters (IFI 2016).</li> </ul> <p>At a minimum, all of the control and management measures detailed within the SWMP will be implemented, including measures related to:</p> <ul style="list-style-type: none"> <li>▪ Control of sediment (use of silt fences and silt sacs);</li> <li>▪ Use of concrete (precast concrete products to be used, where possible);</li> <li>▪ The incorporation of SUDS measures (i.e. petrol interceptor) before the discharge of surface water generated during construction;</li> <li>▪ The establishment of an Emergency Incident Response Plan (EIRP);</li> <li>▪ Environmental monitoring;</li> <li>▪ Construction Compound management (including the storage of materials); and</li> <li>▪ Management of refuelling and wheel wash facilities (containment) to prevent release to the surrounding surface waters.</li> </ul>



	WT3	13.5.1.2	Throughout (as required) and Construction Compound	<p>Method Statements for responding to accidental spillages will be prepared by the appointed contractor.</p> <p>To reduce the potential risk of spillages, all oil, fuel, solvent and paints used during the Construction Phase of the Proposed Development will be stored in temporary bunded areas. Oil and fuel storage will include bunds capable of providing 110% of the capacity of the largest tank within the bunded area, including an allowance of 30mm for rainwater ingress. Any drummed fuel is to be stored in a dedicated chemical storage cabinet that features internal bunding. All drums are to be clearly labelled to allow for prompt, appropriate remedial action in the event of a spillage.</p> <p>Hydraulic oil / lubricant will only be added to vehicles / plant at the designated refuelling area within the Construction Compound. Where it is not possible for refuelling to take place within the designated refuelling area, fuel will be transported in a mobile double skinned tank. A spill kit and drip tray must be present in this scenario.</p> <p>Spill kits shall include 10 hour terrestrial oil booms (80mm ø x 1000mm) and a plastic sheet, as a minimum. In the event of a spill, any contaminated soil is to be transferred on to the plastic sheet to prevent contaminants leaching to groundwater.</p> <p>Concrete ready-mix will be delivered to site by truck on a 'just in time' basis to minimise the potential exposure time for leaks / spills. A concrete slump test will be completed to ensure the consistency of the concrete is not too watery / soupy in order to reduce the risk of alkaline wastewaters entering the storm water drain or contaminated storm water reaching the underlying subsoil. Concrete transporting vehicles will be directed back to their depot for washout.</p>
	WT4	13.5.1.3	Throughout (as required)	<p>Once the new infrastructure has been constructed, a specialist saw will be used to expose the internal portion of the drainage system. A dry cutting blade must be used, in combination with a dust extractor or vacuum to remove dust. Wet cutting methods should be avoided as the water combines with the dust to create a concrete slurry.</p>
	WT5	13.5.1.4	Construction Compound	<p>As the proposed Construction Compound currently consists of permeable surfacing (grassed playing fields) an area of hardstanding with its own drainage network will be installed to facilitate refuelling, washing and servicing of vehicles / plant. As it is proposed that this area will be</p>

				drained to a soakaway, the soakaway is considered an adequate treatment for hydrocarbons as soil-borne microbes within the organic rich layers provide a degradation mechanism for hydrocarbons. As the organic rich layers are present close to the surface, the soakaway system for this area of hardstanding should consist of a broad and shallow system rather than a deep and narrow system. An example of a suitable system is an infiltration pond.
	WT6	13.5.1.5	Throughout (as required)	As detailed within the SWMP, the appointed contractor shall carry out visual monitoring of surface water control measures (settlement tanks, silt fences, fuel storage areas, etc.) on a daily basis. In addition, weekly visual inspections of waterbodies in proximity to the Proposed Development will be carried out by the appointed contractor.  If hydrocarbons are observed or other water quality parameters are suspected to have been exceeded, as a result of an incident but where a visual inspection may not provide sufficient information to conclude, an investigation will be carried out to determine whether any element of the construction of the Proposed Development could be causing the contamination. A record of incidents will be kept aiming to prevent reoccurrence.
Chapter 14 (Land, Soils, Geology & Hydrogeology)	LSGH1	14.5.1.1 14.5.1.2	Lough Atalia area	The following mitigation measures will be implemented to avoid the impact into the Regionally Important Aquifer: <ul style="list-style-type: none"> <li>▪ The appointed contractor will be required to ensure that the excavation footprint shall be kept to a minimum, using shoring or trench boxes where appropriate.</li> <li>▪ If ground is suspected of contamination, samples will be taken and tested for contamination by the appointed contractor immediately or without delay. Ground excavated from areas found to be contaminated will be disposed of to a suitably licensed or permitted sites in accordance with the current Irish waste management legislation.</li> <li>▪ Silt traps will be installed by the appointed contractor to prevent silt and other fine particles from migrating off-site.</li> <li>▪ The drainage network will be sealed throughout the Proposed Development to prevent surface runoff entering the Regionally Important Karstified Aquifer.</li> <li>▪ Any dewatering shall be designed by the appointed contractor to mitigate against the mobilisation of fines/</li> </ul>

				contaminants into the surrounding environment.
	LSGH2	14.5.1.3	Throughout (as required)	<p>Measures to be implemented to minimise the risk of spills and contamination of soils and waters include:</p> <ul style="list-style-type: none"> <li>▪ 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;</li> <li>▪ The location of any fuel storage facilities shall be considered in the design of the Construction Compound. These are to be designed in accordance with relevant guidelines and codes of best practice and will be fully bunded;</li> <li>▪ Good housekeeping at the site (daily site clean-ups, use of disposal bins, etc.) during the entire Construction Phase;</li> <li>▪ All concrete mixing and batching activities will be located in areas away from watercourses and drains;</li> <li>▪ Potential pollutants to be adequately secured against vandalism;</li> <li>▪ Provision of proper containment of potential pollutants according to codes of best practice;</li> <li>▪ Thorough control during the entire Construction Phase to ensure that any spillage is identified at an early stage and subsequently effectively contained and managed; and</li> <li>▪ Spill kit to be provided and to be kept close to the storage area. Staff to be trained on how to use spill kits correctly.</li> </ul>
	LSGH3	14.5.1.3	Throughout (as required)	<p>An Environmental Incident Response Plan has been prepared (Section 5.6) detailing actions to be taken in the event of a pollution incident.</p> <p>In addition, the appointed contractor will develop a Sediment Control Plan (SCP) prior to construction commence.</p>
Chapter 15 (Cultural Heritage)	CH1	15.6.1	Throughout (as required)	<p>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 GCC and statutory authorities, to acquire any licenses / consents required to conduct the work, and to supervise and direct the</p>

				<p>archaeological measures associated with the Proposed Development.</p> <p>Any required statutory notifications for proposed works on or near to recorded archaeological monuments will require two months' notice to the Minister of Housing, Local Government &amp; Heritage under Section 12 of the National Monuments (Amendment) Act 1994.</p>
	CH2	Appendix A15.5 - CHMP	Throughout (as required)	<p>A Cultural Heritage Management Plan has been prepared (Appendix A15.5 – CHMP in Volume 4 of this EIAR) and it includes the mitigation measures to be implemented to avoid or mitigate the impacts on cultural heritage receptors.</p>
	CH3	15.6.1	Throughout (as required)	<p>Archaeological monitoring under licence will take place during the initial stages of construction at all greenfield areas (including the temporary construction compound) and for all works within the Zone of Notification of the recorded milestone monument <b>CH002</b>. In the event of an archaeological feature being identified, if preservation <i>in situ</i> is not feasible, preservation by record through a programme of archaeological excavation and recording will be completed prior to construction and subject to consultation and liaison by the Project Archaeologist with the Project Manager and National Monuments Service/National Museum of Ireland (NMI).</p>
	CH4	15.6.1	Throughout (as required)	<p>Preservation by avoidance is the principle mitigatory measure applicable to the Cultural Heritage resource. Where avoidance in whole or in part via design refinement has been exhausted, recourse to preservation in situ or preservation by record shall be the primary applicable mitigation measures, subject to statutory agreement.</p> <p>Where the cultural heritage receptor cannot be avoided but can be incorporated into the proposed development footprint, without additional ground reduction, drainage measures, or amenity impact such that preservation in situ can avoid or reduce the level of impact, this measure shall be adopted (subject to statutory agreement). In principle, given the continued sub-surface site preservation (although altered site context), this shall provide a lesser residual significance of effect on same.</p> <p>Where the cultural heritage receptor cannot be incorporated into the proposed development footprint, preservation by record shall be adopted (subject to statutory agreement). This shall involve a full and detailed licenced archaeological investigation and/or built heritage survey</p>

				records (written, drawn and photographic). In principle, given the creation of a full and detailed archaeological and built heritage record, the results of which shall be publicly accessible and disseminated, this shall provide a lesser residual significance of effect on same.
	CH5	15.6.1.2 Table 15-16	CH001 Boundary wall (townland boundary)	Installation of protective barrier via Heras fencing to avoid any inadvertent damage during works (vehicular/machine movements) and careful construction of Proposed Development design that abuts the upstanding feature (no tie-in).
	CH6	15.6.1.2 Table 15-16	CH002 Milestone (RMP & RPS)	An RMP and RPS asset. Buffer/exclusion area to be installed around stone during works (heras fencing), and on-site archaeological monitoring of adjacent groundworks during construction stage (subject to NMS statutory approval). Limestone surface treatment to east ward side as a connection link to green area, together with appropriate lighting and interpretative signage
	CH7	15.6.1.2 Table 15-16	CH003 Renmore estate building façade and original entrance – location only	Full built heritage record prior to removal (written, photographic, drawn) and salvage of any dressed/cut stone for re-use in rebuilding of boundary wall to sufficient height (+700mm), Retention and repair of any sections not directly affected.
	CH8	Table 15-16	CH004 Renmore House (RPS)	Works at the former entrance area to Rinmore House (RPS) (CH013) and former building façade (CH003) at the Brothers of Charity complex, where feasible, should be prioritised in the overall project programme in order to reduce any potential temporary disruption.
	CH9	Table 15-16	CH005 Modern roadside memorial	Careful removal and placement in secure storage for safe-keeping during works, with careful reinstatement/ re-siting as close to current location as possible.
	CH10	Table 15-16	CH006 Boundary wall/townland boundary & former gated entrance	All cut and dressed stone to be recorded (written, drawn, photographic) prior to and after removal. All stone to be salvaged and re-used in re-built (as like) boundary by suitably qualified stonemasons in accordance with best conservation practice (masonry numbering, use of lime for pointing etc.).
	CH11	Table 15-16	CH007 Cast-iron vent pipe	Careful removal and placement in secure storage for safe-keeping during works, with careful reinstatement/ re-siting as close to current location as possible together with cleaning and re-painting per best conservation practice.
	CH12	Table 15-16	CH008 Modern roadside memorial	Careful removal and placement in secure storage for safe-keeping during works, with

				careful reinstatement/ re-siting as close to current location as possible.
	CH13	Table 15-16	CH009 Boundary walling & vernacular gate	Wall and gate to be recorded (written, photographic) before removal and gate reinstated post-works. Wall to be rebuilt incorporating existing features (pillars, gate, width, height, coursing etc.) in the arrangement as they currently exist
	CH14	Table 15-16	CH010 Dressed stone	Cut stone and wall to be recorded (written, drawn, photographic) before removal. Cut stone to be reinstated into rebuilt wall and all stone to be salvaged and re-used in rebuilt (as like) boundary
	CH15	Table 15-16	CH011 Former quarry (SMR)	Given the close proximity to the Study Area, archaeological monitoring during works (subject to statutory approval) per mitigation set out for CH014 Merlin Park will also apply (and be extended) to this area
	CH16	Table 15-16	CH012 Cast-iron vent pipe	Sited close to edge of Proposed Development and will be cleaned, and painted in accordance with best conservation practice None required
	CH17	Table 15-16	CH013 Renmore House - NIAH Garden Survey	Full written, drawn and photographic record per measures for CH003.
	CH18	Table 15-16	CH014 Merlin Park - NIAH Garden Survey	Archaeological monitoring during works (subject to statutory approval).
	CH19	Table 15-16	CH015 Glenina House - NIAH Building Survey	Full written, drawn and photographic record per measures for CH006.
	CH20	Table 15-16	CH016 Wellpark - NIAH Garden Survey	Installation of protective barrier via Heras fencing to avoid any inadvertent damage to boundary wall CH001 during works
	CH21	15.6.1.2	Throughout (as required)	The archaeological monitoring will involve the stripping of topsoil/removal of overburden in a controlled manner down to the uppermost archaeological horizon, natural subsoil or formation level, whichever is encountered first. The topsoil/overburden will be removed using a mechanical excavator fitted with a toothless bucket under the constant supervision of a suitably qualified archaeologist. A systematic programme of manual archaeological excavation of all revealed features of archaeological potential will then be carried out in accordance with a method statement submitted to the NMS as part of the licence application process. This will include the manual excavation of all identified archaeological features, the compilation of written, drawn and photographic records, the retrieval of archaeological objects and a programme of environmental sampling, as required.

				<p>The archaeological excavations where possible shall be undertaken in advance of the main construction works at the relevant areas, in order to allocate adequate time to appropriately excavate and record the archaeological deposits/features, should they be identified.</p> <p>Following the completion of excavations, a post-excavation phase of works, involving analysis, reporting and dissemination to the relevant authorities will be undertaken off site. The level of the post-excavation analysis and reporting will be commensurate with the level of archaeology excavated on site.</p>
	CH22	CHMP Section 1.4.4.4	CH005 and CH008	Consultation meetings/correspondence will be required in advance of pre-works stage and at construction stage both immediately prior to and after reinstallation.
	CH23	CHMP Section 1.4.4.4	Renmore House (RPS) (CH013) Former building façade (CH003) at the Brothers of Charity complex	Works at the former entrance area to Rinmore House (RPS) (CH013) and former building façade (CH003) at the Brothers of Charity complex, where feasible, should be prioritised in the overall project programme in order to reduce any potential temporary disruption.
Chapter 16 (Landscape & Visual)	LV1	16.5	Merlin Park Boundary	<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 Development. These measures include:</p> <p>The proposed planting has allowed for species similar to those on site and to those removed and is specified to be planted at an advanced heavy-standard size.</p> <p>It is recommended for the proposed trees to be planted along the Merlin Park boundary immediately after the felling of existing trees and in advance of construction works. This provides an immediate replacement between existing and proposed visual amenity and reduces the duration of impact. This should be carried out in any location along the Merlin Park boundary where changes in levels are not required.</p>
	LV2	16.5	Throughout (as required)	<p>The newly planted trees should be monitored by the appointed landscape contractor for their successful establishment. A 'no-dig' detail, as advised by the Arborist and Landscape Architect, should be implemented to all existing trees in proximity to new footpaths, to ensure the protection of the existing root system. Standard horticultural operations and other operations mentioned in the planting schedule must be adhered to.</p>



Chapter 17 (Waste & Resources)	WR1	17.6.1	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 in advance of construction commencing.
	WR2	17.6.1	Throughout (as required)	<p>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 Development and to contribute to achieving the objectives set out in the National Waste Action Plan as follows:</p> <ul style="list-style-type: none"> <li>▪ Stockpiling of existing sub-base, capping layer and topsoil material generated on-site for direct reuse in the Proposed Development where practicable in the proposed construction compound (subject to material quality testing to ensure it is suitable for its proposed end use); and</li> <li>▪ Recycled aggregates and reclaimed bituminous mixtures will be specified in the Proposed Development where practicable. For example, suitable recycled aggregates and appropriate site won material may be specified in the proposed road base / binder layers, sub-base layers under footpaths / cycle tracks, and capping layer material within the road, footpath and cycle track pavement, subject to testing to ensure material is suitable for its proposed use.</li> </ul>
	WR3	17.6.1	Throughout (as required)	<p>The following management measures will be implemented in so far as reasonably practicable:</p> <ul style="list-style-type: none"> <li>▪ Where waste generation cannot be avoided, waste disposal will be minimised;</li> <li>▪ Opportunities for reuse of materials, by-products and wastes will be sought throughout the Construction Phase of the Proposed Development;</li> <li>▪ 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;</li> <li>▪ Where excavated material cannot be reused within the Proposed Development works, material will be sent for recovery or recycling;</li> <li>▪ 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</li> </ul>

				<p>site to a permitted/licensed facility for recycling;</p> <ul style="list-style-type: none"> <li>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 Development, where practicable, or appropriately reused (in accordance with Article 27 of the EC Waste Directive Regulations) 2011, as amended, recovered, recycled or disposed of off site, as arranged by the appointed contractor; and</li> <li>Any hazardous waste arising will be managed by the appointed contractor in accordance with the applicable legislation.</li> </ul> <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 will be delivered will be recorded along with the quantity to each facility. Records will show which material is recovered, which is recycled and which is disposed of.</p> <p>Where Article 27 of S.I. No. 126/2011 EPA notifications are required in relation to the Proposed Development, the appointed contractor will complete and submit these Article 27 notifications to the EPA for by-product reuse.</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. 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>
Chapter 18 (Material Assets)	MA1	18.5.1	Throughout (as required)	Where there are interfaces with existing utility infrastructure, the appointed contractor will ensure that protection in place or diversion as necessary will be carried out to prevent long-term interruption to the provision of the affected services.
	MA2	18.5.1	Throughout (as required)	All possible precautions will be taken by the appointed contractor to avoid unplanned interruptions to any services during the Construction Phase of the Proposed Development. Proposed utility works are based on available records, and preliminary site investigations. Prior to excavation works being commenced, localised confirmatory surveys will be undertaken by the appointed contractor to verify the

				<p>results of the pre-construction assessments undertaken and reported in this EIAR.</p> <p>Where works are required in and around known utility infrastructure, precautions will be implemented by the appointed contractor to protect the infrastructure from damage, in accordance with best practice methodologies and the requirements of the utility companies, where practicable. Protection measures during construction will include warning signs and markings indicating the location of utility infrastructure, safe digging techniques in the vicinity of known utilities, and in certain circumstances where possible, isolation of the section of infrastructure during works in the immediate vicinity.</p>
	MA3	18.5.1	Throughout (as required)	<p>All utility companies for which diversions are proposed will continue to be consulted when designing any diversions to ensure that proposed diversions conform to the utility provider's requirements, where practicable, and to ensure that service interruptions are kept to a minimum</p>
	MA4	18.5.1	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 advance by the appointed contractor. Required service interruptions will generally only occur for a set period of time per day (a set number of hours not exceeding eight hours where reasonably practicable) and will generally not be continuous for full days at a time.</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 interruptions is minimised in so far as is practicable.</p>
	MA5	18.5.1.1	Throughout (as required)	<p>Consideration will be given to the sustainability of material being sourced for the construction of the Proposed Development by the appointed contractor.</p> <p>In so far as is reasonably practicable, materials required for the construction of the Proposed Development 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</p>

				specification, production and transport costs, and the availability of the material. Only quarries which are included in Local Authority quarry registers will be used by the appointed contractor to source any quarried material.
	MA6	18.5.1.1	Throughout (as required)	Construction materials will be managed on site by the appointed contractor in such a way as to prevent over-ordering and waste. Materials will be stored in appropriate storage areas or receptacles to reduce the potential for damage requiring replacement. 'Just-In-Time' ordering principles will be implemented by the appointed contractor where practicable to reduce the potential for over-ordering.
Chapter 20 (Cumulative Impacts & Environmental Interactions)	CI&EI1	20.5.1	Throughout (as required)	Other major infrastructure projects could directly interface with the construction of the Proposed Development. Interface liaison will take place on a case-by-case basis through the GCC, 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 Development works and that any additional construction traffic mitigation measures required to deal with cumulative impacts are managed appropriately.

**Table 5-3 Matrix of Mitigation Measures and Residual Impacts (from NIS)**

European Site	Potential Impacts						Any Adverse Effect on the Integrity of European Sites (Post Mitigation)
	Construction						
	Habitat Loss and Fragmentation	Hydrology	Hydrogeology	Invasive Species	Air Quality	Disturbance / Displacement	
Galway Bay Complex SAC	X	✓ Section 5.4 (Section 5.1.5 in NIS)	X	✓ Section 5.3 (Section 5.1.5 in NIS)	X	X	No
Inner Galway Bay SPA	X	✓ Section 5.4 (Section 5.1.5 in NIS)	X	✓ Section 5.3 (Section 5.1.5 in NIS)	X	X	No
Lough Corrib SAC	X	X	X	X	X	X	No

Lough Corrib SPA	X	X	X	X	X	X	No
------------------	---	---	---	---	---	---	----

## 5.2 Construction Traffic Management Plan

### 5.2.1 Introduction

The Construction Traffic Management Plan (hereafter referred to as the CTMP) has been prepared to demonstrate the manner in which the interface between the public and construction-related traffic will be managed and how vehicular movement will be controlled.

#### 5.2.1.1 Purpose

The purpose of this CTMP is to demonstrate that the residual impacts to public road network during the Construction Phases of the Proposed Development, which have been identified in the application documentation, can be minimised and that transport related activities are carried out as safely as possible and with the minimum disruption to other road users. The CTMP has also been prepared for the purpose of identifying feasible, appropriate and safe methods of access for construction traffic to the Proposed Development.

#### 5.2.1.2 Objectives

The objectives of the CTMP are to:

- Outline minimum road safety measures to be undertaken, including site access / egress locations, during the works and including approaches to such access/egress locations;
- Provide measures that respond to all road user needs, including public transport, pedestrians, cyclists and vehicular traffic;
- Ensure disruption is minimised, with access to houses and businesses maintained as is reasonably practicable in delivering the Proposed Development;
- Demonstrate to Galway City Council (GCC), the appointed contractor and suppliers the need to adhere to the relevant guidance documentation for such works;
- Identify objectives and measures for inclusion in the management, design and construction of the Proposed Development to control the traffic impacts of construction insofar as it may affect the environment, local residents and the public in the vicinity of the construction works; and
- Provide the basis for the preparation of a finalised CTMP by the Contractor appointed to carry out the works.

#### 5.2.1.3 Scope

This CTMP illustrates a potential traffic management design for the transportation of construction materials, equipment and personnel along the public road network to facilitate the construction of the Proposed Development. Light vehicles, such as cars and vans, are used by operatives travelling to and from the works areas. Lorries deliver general construction materials, such as concrete, to/from/around the works areas.

Based on this CTMP, the appointed contractor will develop the Construction Traffic Management Plan in the event An Bord Pleanála decides to grant approval for the Proposed Development.

The CTMP will address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned by An Bord Pleanála.

The CTMP remains a live document that will be reviewed by the Contractor and expanded upon, where necessary, throughout the Construction Phase of the project, in order to produce a finalised CTMP. This CTMP should be read in conjunction with Chapter 5 (Construction) and Chapter 6 (Traffic and Transport) of the EIAR.

## 5.2.2 Proposed Construction Activities

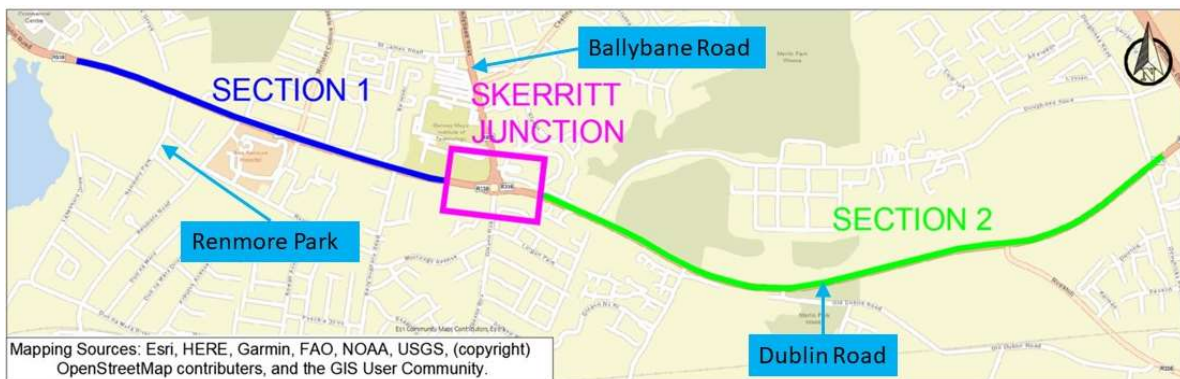
### 5.2.2.1 Overview

Construction activities to be carried out as part of the Proposed Development are illustrated in Chapter 5 (Construction) of this EIAR. The Proposed Development is located in Galway City and extends along the Dublin Road from the east of Moneenageisha Junction to Doughiska Road Junction. The total distance is approximately 3.9km and includes areas such as Roscam, Doughiska, Murrough, Renmore, Merlin Park and Wellpark. Pavement operations are expected to be a key activity on the Proposed Development, and shall include planning, excavation, temporary stockpiling (if required), installing, disposal, import and haulage. The Construction Phases of the Proposed Development shall require movements of materials to/from/around the works areas. Most of the materials leaving the works areas will consist of road plantings.

To facilitate construction, the Proposed Development has been divided into sections as described in Section 5.2 of Chapter 5 (Construction of this EIAR and as detailed in Table 5-4 and Figure 5-1 below.

**Table 5-4 List of Sections**

Section Reference	Section Description	Length
<b>Section 1</b>	East of Moneenageisha Junction to Skerritt Junction	Approximately 1,500 metres
<b>Skerritt Junction</b>	Skerritt Junction	Approximately 140 metres
<b>Section 2</b>	Skerritt Junction to Doughiska Road Junction	Approximately 2,360 metres



**Figure 5-1 Section of the Proposed Development**

### 5.2.2.2 Construction Programme

A programme for the Proposed Development is provided in Section 5.3 in Chapter 5 (Construction) of this EIAR. It is expected that construction will commence in 2026, subject to funding and approval. The construction works are anticipated to take approximately 24 months. However, the construction duration could potentially be reduced with additional resources. The appointed contractor will be responsible for determining the final programme.

In order to achieve the overall programme duration, it will, for the most part, be necessary to work on more than one section/sub-section at any one time. The programme has been prepared with a view to providing as much separation as practicable between sections under construction at any given time. This has been done in order to minimise traffic disruption and facilitate the ease of movement of sustainable modes, bus services and goods along the Proposed Development.

The staging of construction and associated temporary traffic management measures has considered the receiving environment when developing the schedule of works.



An estimated programme for the Proposed Development is provided in Table 5-5. It is envisaged that Skerritt Junction will be constructed during summer months insofar as possible in order to minimise traffic disruption.

**Table 5-5 Construction Programme for the Proposed Development**

Section Reference	Duration (Months)	Month																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Section 1	13																								
Skerritt Junction	6																								
Section 2	11																								

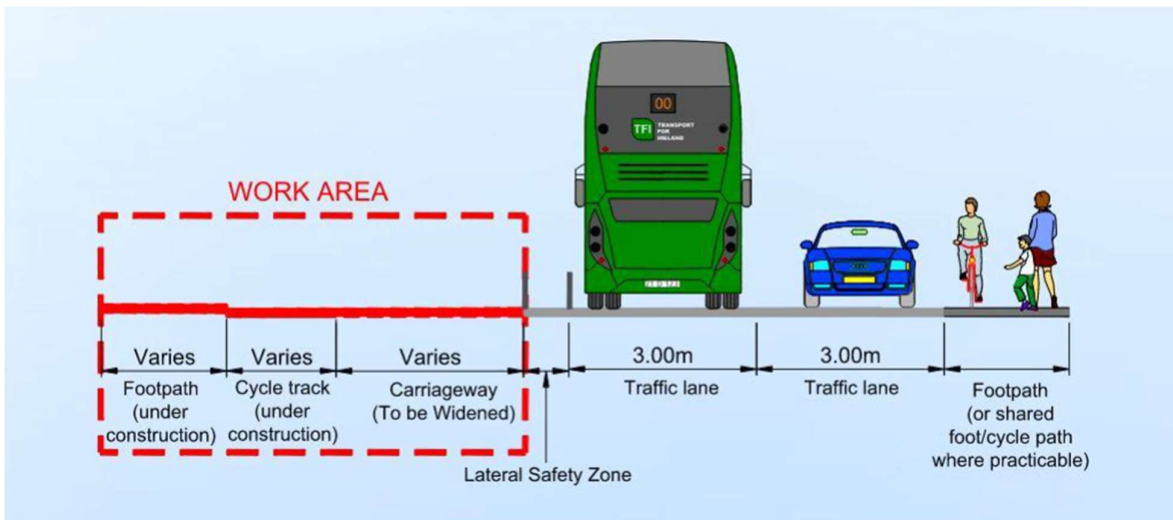
### 5.2.2.3 Temporary Traffic Management Designs

In the event that An Bord Pleanála decides to grant approval for the Proposed Development, Temporary Traffic Management designs (drawings and method statements) will be prepared by the appointed contractor in accordance with the requirements of the 'Traffic Signs Manual (Chapter 8 – Temporary Traffic Measures and Signs for Roadworks)' published by the Department of Transport in August 2019 and the "Temporary Traffic Management Design Guidance" 3rd Edition 2019 published also by the Department of Transport, to facilitate the safe and efficient construction of the Proposed Development.

To minimise the traffic impacts to the public during the Construction Phase, the works along public roads (i.e. R338 - Dublin Road) will be phased so as to first complete the demolition works and road alignment works outside the existing roads. After that, more space can be provided to facilitate the construction works and the existing traffic lanes can be shifted to the new space in order to maintain the number of traffic lanes as far as possible. To facilitate the works, the traffic will be split into three traffic management stages (Stage A to Stage C) as follows:

#### Stage A – Construction works on the northern side, traffic reduced to a single lane in each direction, and realigned to the south

To carry out Stage A works safely, traffic management will be implemented as shown in Figure 5-2, by means of narrowing the existing lanes carrying public transport and general traffic to 3.0m. A lateral safety zone will be implemented between the carriageway and the works area, with an appropriate safe distance in accordance with the Traffic Signs Manual (Chapter 8 – Temporary Traffic Measures and Signs for Roadworks).



**Figure 5-2 Work Area – Stage A**

#### Stage B – Construction works on the southern side, traffic reduced to a single lane in each direction, and realigned to the north



Stage B commences following the completion of Stage A. Public transport, general traffic, pedestrians and cyclists will be transferred to the opposite side of the carriageway to facilitate Stage B works. This stage will include the same methodology as outlined in Stage A, however carried out on the opposite side of the carriageway, as shown in Figure 5-3.

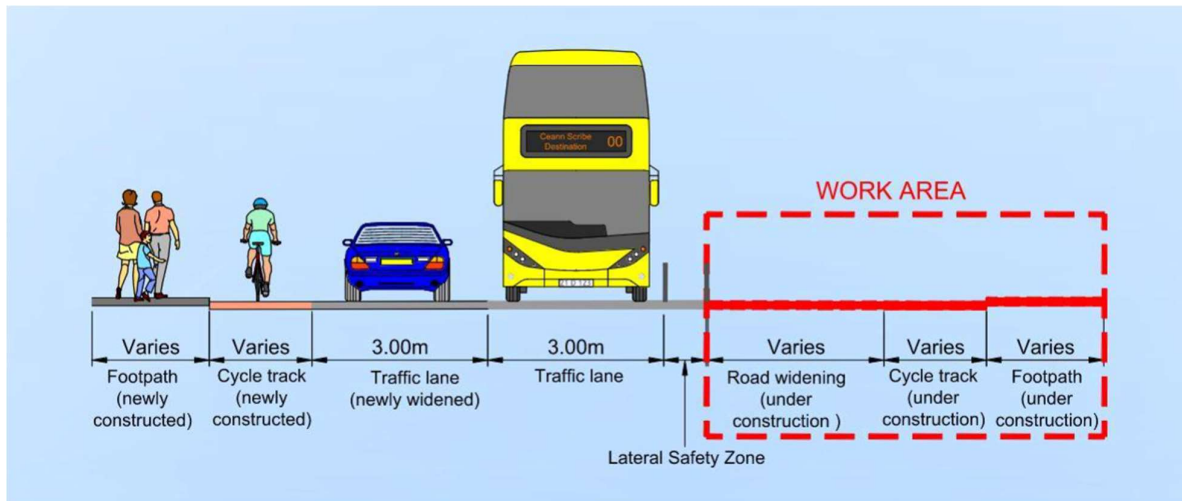


Figure 5-3 Work Area – Stage B

### Stage C – Finishing works undertaken out-of-hours, traffic reduced to a single lane shuttle working

Once Stage B is complete, Stage C will entail completion of the proposed final road surfacing. To maintain traffic movement at this stage, lane closures, road closures, or diversions will be implemented, as appropriate.

Temporary construction traffic management provisions are provided in Section 5.7 in Chapter 5 (Construction) of this EIAR. These provisions have been developed using works areas for the purpose of safety, to minimise disruption and to facilitate the smooth operation of construction activities. The temporary traffic management schemes will be implemented phase by phase to facilitate the works. The roads and streets along the Proposed Development, will remain open to general traffic wherever practicable during the Construction Phase. However, lane closures, road closures and diversions will be necessary to facilitate construction of the works.

These measures will be minimised wherever possible, they are likely to be short lived and only required for limited activities. Where necessary, road closures and diversions will take into consideration the impact on road users, residents, businesses, etc. Road closures and diversions will be carried out with regard to the Traffic Signs Manual (Chapter 8 – Temporary Traffic Measures and Signs for Roadworks). All road closures and diversions will be determined by Galway City Council, in consultation with An Garda Síochána, as necessary. Access will be maintained for emergency vehicles along the Proposed Development, throughout the Construction Phase.

Temporary construction traffic management provisions for each section are set out in Table 5-6.

**Table 5-6 Traffic Management Provisions at each Section**

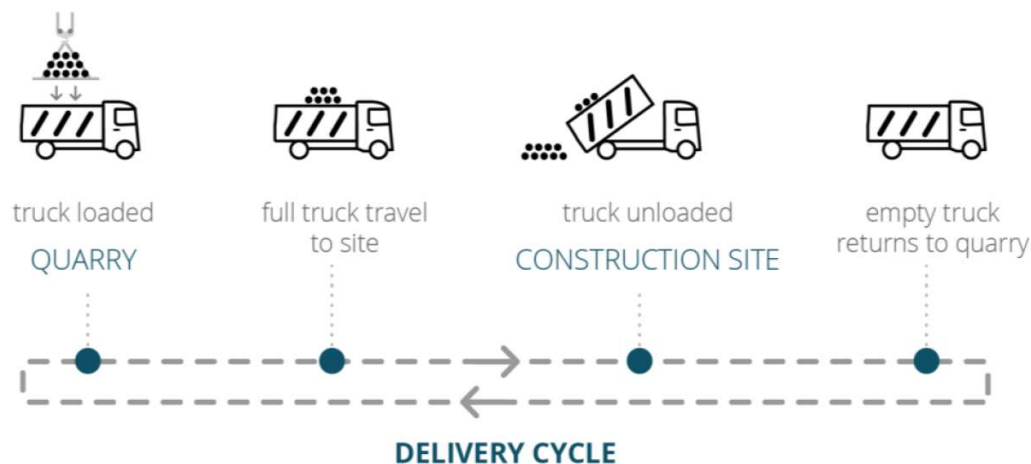
Section Ref.	Estimated Construction Duration	Traffic Management Provision
Section 1	13	<ul style="list-style-type: none"> <li>- One lane of traffic in each direction will be maintained along the Dublin Road</li> <li>- Phased lane closures as required (i.e. lane narrowing or realignment of lanes) to facilitate the works.</li> </ul>
Skerritt Junction	6	<ul style="list-style-type: none"> <li>- Phased lane closures as required, such as lane narrowing or single lane closure, to facilitate the works (i.e. demolition of central island of roundabout and traffic islands, utilities / cable duct laying works, installation of kerb / tracks, etc.).</li> </ul>
Section 2	11	<ul style="list-style-type: none"> <li>- One lane of traffic in each direction will be maintained along the Dublin Road</li> <li>- Phased lane closures as required (i.e. lane narrowing or realignment of lanes) to facilitate the works.</li> </ul>

#### 5.2.2.4 Envisaged Construction Traffic Generation

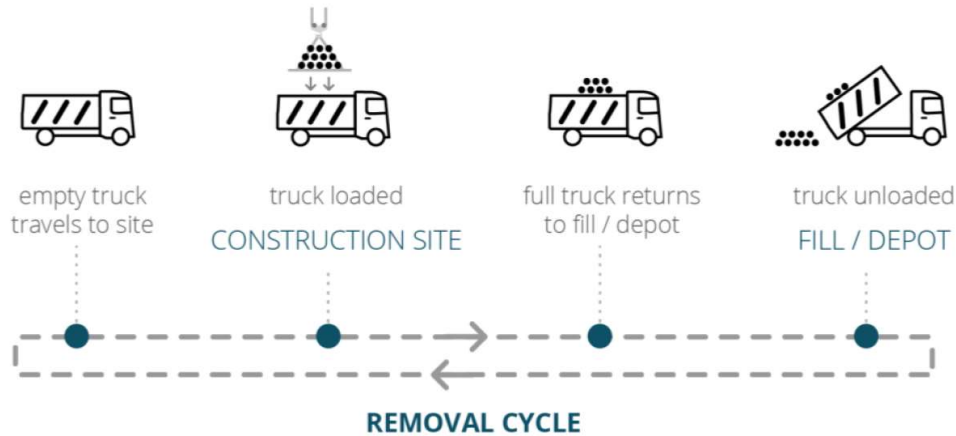
Traffic will be generated during the Construction Phase of the Proposed Development. Construction traffic can be expected to comprise of trips for the following purposes:

- Journeys by construction personnel to and from the Proposed Development;
- Delivery and removal of materials to and from the Proposed Development:
  - Clearance of existing material and waste;
  - Deliveries of construction material; and
  - Removal of construction waste material.

Construction activities associated with the Proposed Development typically follow a work sequence that is repeated in smaller works areas. The movement of construction vehicles to and from the Proposed Development is determined by this work sequence; materials either being 'removed from' or 'delivered to' site. There is also stationary dwell time as material is being unloaded or loaded at either end of a journey. Lorry movements for typical construction activity cycles are shown in Table 5-4 and Table 5-5.



**Figure 5-4 Lorry Movements for 'Removal' of Materials**



**Figure 5-5 Lorry Movements for 'Delivery' of Materials**

Pavement operations are expected to be a key activity on the Proposed Development where this sequence will take place. This activity shall involve some or all of the following steps including planning, excavation, temporary stockpiling (if required), installing, disposal, import and haulage. Other activities such as traffic signal installation, signage and line marking, do not require lorry movements. Lorries are not always required to facilitate construction activities.

Likely traffic generation associated with construction site activities is described further in Section 5.2.2.4.1 and Section 5.2.2.4.2 below.

#### 5.2.2.4.1 Removal and Delivery of Materials

An estimate of construction plant and equipment that will be necessary to construct the Proposed Development is provided in Section 5.5 in Chapter 5 (Construction) of this EIAR. Of the plant and equipment in operation during construction, lorries use the public road network for delivery and removal of materials to and from the Proposed Development.

In order to assess a reasonable worst-case Construction Phase impact scenario, an estimate of construction plant and equipment that will be necessary to construct the Proposed Development has been prepared. The estimated peak daily numbers of principal items of plant and equipment working within a section is indicated in Table 5-7. It should be noted that these are peak daily numbers.

**Table 5-7 Estimated Peak Daily Plant and Equipment Numbers**

Plant/Equipment	Section 1	Skerritt Junction	Section 2
Lorry	6	3	6
Backhoe Mounted Hydraulic Breaker	2	1	2
8t Excavator	2	1	2
13t (Rubber Wheeled) Excavator	1	1	1
16t (Rubber Wheeled) Excavator	2	1	2
6t Dumper	2	2	2
Road Planer	1	1	1
Road Sweeper	1	1	1
Asphalt Paver	1	1	1
Asphalt Roller	1	1	1
3t Roller	1	1	1

Plant/Equipment	Section 1	Skerritt Junction	Section 2
Mini Digger	2	1	2
Vibratory Roller	1	1	1
<b>Total</b>	<b>23</b>	<b>16</b>	<b>23</b>

Construction vehicle movements will be managed during the periods of 07:00 to 09:00 and 17:00 to 19:00 to minimise the impact of construction related traffic on peak-hour general traffic.

Night-time and Sunday working will be required during certain periods to minimise the impact on road traffic movements during the daytime, for example at busy road junctions and in commercial areas, and for such works as pavement / road surfacing. The planning of such works will take consideration of sensitive receptors, in particular any nearby residential areas and specific receptors as shown in the Table 5-8.

**Table 5-8 List of Specific Receptors**

Specific Receptor	Type	Location
Lakeview School	Mixed Special Education	Woodlands, Renmore, Galway
Rosedale School	Mixed Special Education	Woodlands Centre, Dublin Road, Renmore, Galway
Scoil Chaitriona Junior	Mixed Primary School	Renmore Avenue, Renmore, Galway
Gealscoil Dara	Mixed Primary School	Ballyloughane Road, Galway
Radharc na Mara Primary School	Mixed Primary School	Walter Macken Road, Mervue, Galway
Scoil Áine (St Anne's School)	Mixed Primary School	Merlin Park, Galway
Merlin Woods Primary School	Mixed Primary School	Doughiska Road, Galway
Merlin College	Mixed Secondary School	Doughiska Road, Galway
Blackrock Clinic	Hospital	Doughiska, Galway
Merlin Park University Hospital	Hospital	EC5, Old Road, Galway
Galway Hospice Foundation	Specialist Palliative Care Services	Dublin Road, Renmore, Galway
Bon Secours Hospital Galway	Hospital	Renmore Road, Renmore, Galway

Construction vehicles will be directed to access work sections via the Proposed Development and dedicated routes on the National and Regional Road Network where practicable, to minimise use of the Local Road Network. The routes are outlined in Section 5.2.3.2 of this CTMP.

#### 5.2.2.5 Journeys by Construction Personnel to and from the Proposed Development

Personnel numbers for the Proposed Development are illustrated in Section 5.8 in Chapter 5 (Construction) of this EIAR. Throughout the Construction Phase, the construction workforce numbers will vary depending on the state of the Proposed Development. However, it is anticipated that there will be a construction workforce of approximately 50 personnel directly employed across the Proposed Development, rising to 70 personnel at peak construction. In addition, it is anticipated that there will be significant indirect employment supported by the Proposed Development, for example: in logistical support companies, material and plant suppliers, traffic management companies and in the local service industry.

The appointed contractor will prepare a Construction Stage Mobility Management Plan (CSMMP) to actively discourage personnel (including client, design teams and construction contractors involved in this project) from using private vehicles to travel to the Proposed Development. The CSMMP will promote the use of

public transport, cycling and walking by personnel. Private parking at the Construction Compounds will be limited. Vehicle-sharing will be encouraged, subject to public health guidelines, where travel by private vehicle is a necessity e.g. for transporting heavy equipment.

Typical work hours are envisaged between 07:00 and 19:00 on weekdays (excluding Bank and Public Holidays) and Saturdays between 08:00 and 14:00. This includes standard delivery hours to the construction sites and a half hour to prepare site at each end (i.e. giving 11 hours working on weekdays: 07:30 to 18:30).

A combination of CSMMP measures, as well as work shift patterns, means fewer than 10 trips by private vehicle are envisaged to and from site during peak periods.

### 5.2.3 Construction Traffic Management Plan Contents

The appointed contractor shall be responsible for developing a CTMP to effectively manage traffic and transport during the construction stage of the project. The appointed contractor shall address the following aspects, in addition to any other aspects identified by the appointed contractor during the preparation of the CTMP:

- Access and egress;
- Construction Compounds;
- Routing of construction vehicles;
- Pedestrian (including able-bodied pedestrians, wheel-chair users, mobility impaired pedestrians, pushchair users, etc.) and cyclist provisions;
- Public transport provisions;
- Parking and access;
- Lighting;
- Construction Stage Mobility Management Plan (CSMMP);
- Traffic management signage;
- Timings of material deliveries;
- Traffic management speed limits;
- Vehicle cleaning;
- Road condition;
- Road closures and diversions;
- Enforcement of Construction Traffic Management Plan;
- Interface with other projects;
- Emergency procedures during construction;
- Communication;
- Public Notices;
- Key Personnel and Organisations – Responsibilities; and
- Garda Síochána.

The CTMP must be submitted to GCC for review and agreed prior to work commencing and shall include drawings detailing all proposed arrangements including those listed below:

- The location and details of any proposed road closures including temporary diversions and duration of proposed closure;
- Details of lane width restrictions, footpath alterations, and proposed alterations to established traffic management systems;
- Details of lane width restrictions, footpath alterations, and proposed alterations to established traffic management systems;
- The location and details of all temporary signage to be erected by the PSCS/Contractor; and

- Details of any arrangements for the delivery and storage of plant, equipment, and materials.

A Road Opening License will be required from GCC prior to commencement of the works. All road opening licenses, temporary traffic management plans and method statements will be monitored, and GCC reserves the right to alter and amend in the interest of Traffic Management health and safety.

Where Shuttle Working is permitted under the approved traffic management plan, a one-way traffic system using 'STOP/GO' boards or temporary traffic signals may be implemented which shall comply with the specific Traffic Management Plan conditions. The Licensee/Contractor is advised that the use of regulatory traffic control (e.g. Stop/Go Boards; temporary traffic signals) is subject to the approval of An Garda Síochána and the Licensee/Contractor shall consult with An Garda Síochána prior to commencement of the works.

Outside the working hours agreed in the Traffic Management Plan and the roads authority T-consents, two-way traffic flow is to be maintained on the public road at all times.

The safe passage of pedestrians (including Mobility Impaired) and cyclists along the public road shall be maintained at all times during the period of the works and adequate signage for pedestrians will be provided.

In the event of excessive traffic disruption/congestion arising due to unforeseen circumstances/events, e.g. traffic collision, the Licensee shall, upon being so directed by GCC, suspend the works, save that any such suspension shall not apply to works/measures necessary to maintain the safety/security of the site or to prevent immediate loss/damage/injury to persons or property. The Licensee shall thereafter consult with the Operations and Technical Licensing division of the Transportation Department of GCC, regarding any variation or amendment to the works, their management or sequence that may be required prior to works recommencement.

Where, as a result of any such discussions, amendments to the Traffic Management Plan are proposed, the Licensee/Contractor shall apply to GCC for a variation/amendment to same as provided for above.

All signs and traffic management apparatus shall be removed promptly when not required and two-way traffic flow shall be restored on all roads outside of actual working hours. However, any signs/apparatus not causing an obstruction to traffic/pedestrians, and whose re-use is required in the very short-term (e.g. less than 24hrs), may be temporarily covered or otherwise masked.

The appointed contractor is required to programme/sequence the works to ensure that no works are undertaken on roads during periods when they are operating as diversion routes for works in other areas. In addition, the appointed contractor is required to programme/sequence the works to ensure that traffic impacts as a result of the works are kept to a minimum.

Road and junction upgrade and reinstatement works will be completed in a staged manner whereby traffic of all modes will be managed to ensure construction can continue while ensuring the safety of all road users, and personnel, and maintaining flow of all modes of transport so far as practicable.

The roadworks will require preparation of a comprehensive traffic management plan to facilitate safe construction and minimise the impact on pedestrian and vehicular traffic.

Further details on issues to be addressed are provided in Section 5.2.3.1 to Section 5.2.3.21.

#### **5.2.3.1 Access and Egress**

The appointed contractor shall provide advanced warning signs, in accordance with Chapter 8 of the Traffic Signs Manual, on approach to the proposed access locations, entry and exit points throughout the live working area.

The following provisions should be made in terms of traffic management at construction access points:



- Advance warning signage of construction access points must be adequately signed on the local road i.e. construction vehicle access ahead, uneven surface, and flagman control ahead;
- Construction access gates should remain closed when not in use;
- A site safety notice should be erected at construction access points;
- Temporary traffic management measures deployed during the hours of darkness should serve to highlight the precise location of the construction access. Such measures could include additional traffic cones, road danger lamps and/or reflectorised signage;
- Routine inspection should be carried out to ensure that signage and visibility splays are not obstructed;
- Control of dust generated by trucks; and
- Public roads outside the site should be regularly inspected for cleanliness and cleaned as necessary. Any damage to public roads caused by construction traffic should be repaired as necessary.

When roads and streets are being upgraded, there will be some temporary disruption / alterations to on street and off-street parking provision, and access to premises in certain locations along the Proposed Development. Local arrangements will be made on a case-by-case basis to maintain continued access to homes and businesses affected by the works, at all times, where practicable. Details regarding temporary access provisions will be discussed with homes and businesses prior to construction starting in the area.

### 5.2.3.2 Construction Compounds

It is anticipated that one construction compound will be utilised during the construction of the Proposed Development. The compound will be located on Dublin Road (next to The Connacht Hotel) as shown in Figure 5-6.



Figure 5-6 Location of Proposed Construction Compound

The appointed contractor's CTMP shall include measures for managing traffic accessing and egressing the Construction Compound. The Construction Compound will contain a site office, and welfare facilities for GCC personnel and contractor personnel. Limited car parking will be allowed at the Construction Compound, in line with the principles of the CSMMP. The Construction Compound will be used to store materials for reuse such as topsoil, subsoil, concrete, rock etc., together with materials delivered to site for use in the construction of the scheme, e.g. pipes and ducting. Items of plant and equipment will also be stored within the Construction Compounds.

Access to and egress from the Construction Compounds is envisaged to be along dedicated construction vehicle routes. It is assumed that all national roads and regional roads in the immediate vicinity of the Proposed Development would be used by construction vehicles.

- N6;
- N59;
- N83; and
- N84.

- R336;
- R338;
- R446; and
- R865.

[illegible]

**BARRY**  
TRANSPORTATION  
egis



### 5.2.3.4 Pedestrian and Cyclist Provisions

The measures set out in Section 8.2.8 of the Traffic Signs Manual will be implemented, wherever practicable, to ensure the safety of all road users, in particular pedestrians (including able-bodied pedestrians, wheelchair users, mobility impaired pedestrians, pushchair users) and cyclists. Therefore, where footpaths or cycle tracks are affected by construction, a safe route will be provided past the work area, and where practicable, provisions for matching existing facilities for pedestrians and cyclists will be made.

### 5.2.3.5 Public Transport Provisions

Existing public transport routes and bus stops (where possible, providing temporary facilities maybe required in agreement with bus providers) will be maintained throughout the duration of the Construction Phase of the Proposed Development (notwithstanding potential for occasional road closures / diversions as discussed in Section 5.2.3.15). Wherever practicable, bus services will be prioritised over general traffic. However, the temporary closure of sections of existing dedicated bus lanes will be required to facilitate the construction of new bus priority infrastructure that is being developed as part of the Proposed Development. Some existing bus stop locations will need to be temporarily relocated to accommodate the works. In such cases, bus stops will be safely accessible to all users and all temporary impacts on bus services will be determined in consultation with GCC and the service providers.

### 5.2.3.6 Parking and Access

When roads and streets are being upgraded, there will be some temporary disruption / alterations to on-street and off-street parking provision, and access to premises in certain locations along the Proposed Development. Local arrangements will be made on a case-by-case basis to maintain continued access to homes and businesses affected by the works, at all times, where practicable. Details regarding temporary access provisions will be discussed with homes and businesses prior to construction starting in the area. The duration of the works will vary from property to property, but access and egress will be maintained at all times, except for short durations to facilitate tie ins of services and road alignments.

### 5.2.3.7 Lighting

The majority of the Proposed Development is already artificially lit, however temporary lighting will be required at times along the Proposed Development at certain locations during the Construction Phase, where necessary. Where it is necessary to disconnect public lighting during the construction works or to undertake works outside of daylight hours where the existing lighting is low, appropriate temporary lighting will be provided. Temporary lighting will also be installed at the Construction Compounds for the duration of the Construction Phase.

The standard of temporary lighting installed during the Construction Phase will meet the standard of the existing carriageway and will be appropriate to the speed and volume of traffic during construction. Temporary construction lighting will generally be provided by tower mounted floodlights, which will be cowed and angled downwards to minimise spillage of light from the site.

### 5.2.3.8 Construction Stage Mobility Management Plan

The appointed contractor will prepare a CSMMP to actively discourage personnel (including client, design teams and construction contractors involved in this project) from using private vehicles to travel to the Proposed Development. The CSMMP will promote the use of public transport, cycling and walking by personnel. Appropriate measures may include, for example, provision of a minibus, provision of temporary accommodation, encouraging car-pooling or prescribing specific routes for journeys (including access arrangements, compounds, parking and public transport). The CSMMP may comprise the following headings, as well as other relevant topics identified by the appointed contractor:

- Introduction;
- Objectives and targets;
- Strategy of travel;
- Construction phase specific measures;

- Access and surrounding road network;
- Opportunities for car sharing;
- Implementation and co-ordination;
- Monitoring; and
- Adherence to public health guidelines.

#### 5.2.3.9 Traffic Management Signage

Temporary traffic management signage will be put in place in accordance with the requirements of the 'Traffic Signs Manual (Chapter 8 – Temporary Traffic Measures and Signs for Roadworks)' published by the Department of Transport in August 2019 and the "Temporary Traffic Management Design Guidance" 3rd Edition 2019 published also by the Department of Transport to warn road users of the works ahead and to advise of any changes to the carriageway layout. In addition to temporary traffic management signage, requirements may include:

- Provision of temporary signage indicating access route and locations for the appointed contractor and associated suppliers; and
- Provision of general information signage to inform road users and local communities of the nature and locations of the works, including contract details.

#### 5.2.3.10 Timings of Material Deliveries

The appointed contractor will seek to reduce the impact of material deliveries on local communities and residents adjacent to the Proposed Development during the Construction Phase, where practicable.

#### 5.2.3.11 Traffic Management Speed Limits

Adherence to posted / legal speed limits will be emphasised to all personnel / suppliers by the appointed contractor during induction training. The use of special speed limits for construction traffic in sensitive areas will be considered, such as 30km/hr at school locations. Recommended speed limits would only apply to construction traffic and not to general traffic. The sign posting of such speed limits is not expected in the interest of clarity for local road users.

The appointed contractor shall continually undertake a risk assessment of all temporary traffic management installations to assess if traffic speeds are inappropriate. If traffic speeds are deemed inappropriate, the appointed contractor is to provide measures to reduce such speeds to a level appropriate to the works.

The appointed contractor shall be wholly responsible for applying for any road works speed limit orders and any road closures that are required to fulfil his contractual obligations and shall allow for any and all notifications and approvals periods as required in his programming of the works.

#### 5.2.3.12 Vehicle Cleaning

Details and information on vehicle cleaning to be carried out during the Construction Phase of the Proposed Development is provided in the following:

- Vehicles and plant provided for use on the Proposed Development will be in good working order to ensure optimum fuel efficiency, and will be regularly inspected to ensure they are free from leaks and are promptly repaired when not in good working order;
- Spill kits will be carried on all vehicles;
- Vehicles and plant will not park near or over surface water drains or watercourses;
- Refuelling of vehicles and plant will be carried out on hard standing surfaces, using drip trays to ensure no fuel can contaminate the ground outside of the bunded areas;
- For deliveries and dispensing activities, the appointed contractor will ensure that:

- Site-specific procedures are in place for bulk deliveries;
  - Delivery points and vehicle routes are clearly marked; and
  - Emergency procedures are displayed, and a suitably sized spill kit is available at all delivery points, and staff are trained in these procedures and the use of spill kits.
- The appointed contractor will provide wheel washing facilities, and any other necessary measures to remove mud and organic material from vehicles, at the Construction Compound and egress from haul roads, where necessary. These will be located at least 10m away from any surface water drains or watercourses;
  - The cleaning of delivery trucks shall be carried out at the Construction Compound and shall not be undertaken at the works areas;
  - The surface run-off from vehicle washing areas will be directed to an on-site treatment system where possible; this also increases the potential for reusing the water. Such a treatment system would typically include:
    - A settlement tank to remove suspended solids such as mud and silt;
    - Catchpits or silt traps on drains and ensure that they are in place during cleaning. Empty them at regular intervals; and
    - Removal of oil, grease, petrol, and diesel from wash water by passing it slowly through an appropriately sized oil separator.
  - The use of detergents in the cleaning process will be minimised; where required, biodegradable and phosphate-free detergents will be used;
  - If detergents are used in the washing process, the wash water will not be directed through the oil separator as this will prevent it from working. It will be contained and disposed of off-site using a suitable licensed waste disposal operator, or if a foul or combined sewer is nearby, the surface runoff could be directed to it, with the permission of the sewerage undertaker; and
  - To further minimise water used for washing vehicles, trigger-operated spray guns will be used, with an automatic water supply cut-off.

#### 5.2.3.13 Road Cleaning

Roads being used for dedicated construction vehicle access routes shall be regularly inspected for cleanliness.

The appointed contractor will monitor for mud and debris on the roads as a result of the Construction Phase works and use a road sweeping vehicle for cleanliness if needed. The use of road cleaning sweepers should be considered as a last resort with prevention being the main objective.

#### 5.2.3.14 Road Condition

The extent of the lorry traffic movements and the nature of the payload may create problems of:

- Fugitive losses from wheels, trailers, or tailgates; and
- Localised areas of subgrade and wearing surface failure.

Activities which may reduce the impact on road condition are outlined below. They should be incorporated into the CTMP by the appointed contractor where practicable:

- Loads of materials leaving each works areas will be evaluated and covered if considered necessary to minimise potential dust impacts during transportation;
- Take all reasonable measures while transporting waste or any other materials likely to cause fugitive losses from a vehicle during transportation to and from the works areas, including but not limited to:
  - Covering of all waste or material with suitably secured tarpaulin / covers to prevent loss; and
  - Utilisation of enclosed units to prevent loss.
- Undertake pavement condition surveys along roads forming part of the construction traffic route, based on consultation with GCC and professional judgement regarding the condition of the route pre-

construction. These record the baseline structural condition of the road being surveyed immediately prior to construction; and

- Throughout the course of construction of the Proposed Development, undertake on-going visual inspections and monitoring of the construction traffic routes to ensure any damage caused by construction traffic is recorded. Arrangements can then be made to repair any such damage to an appropriate standard in a timely manner such that any disruption is minimised.

Upon completion of construction of the Proposed Development, the surveys carried out pre-construction shall be repeated, and a comparison of the pre-construction and post-construction surveys carried out.

It is anticipated that traffic may be running on temporary surfaces at isolated locations during the works prior to permanent reinstatement of road carriageway areas i.e. at road crossings, tunnel shafts and manholes temporarily reinstated.

All temporary and permanent reinstatements shall be in accordance with the DOE publication “Guidelines for the Opening, Backfilling and Reinstatement of Trenches in Public Roads” (known as the purple book). It is the duty of the Contractor/PSCS to ensure temporary signage is erected prior to permanent reinstatement of surfaces to ensure road users are aware of temporary surfaces.

The Contractor/PSCS shall also be responsible for the temporary restoration of the existing carriageways, in the event that they are damaged as a result of the works. No traffic shall be permitted to enter unrestored areas. Manholes and valve chambers should have permanent covers secured prior to permitting traffic to pass over reinstated areas.

In the event of any interference with road markings, the Contractor/PSCS shall arrange for immediate replacement with temporary markings and arrange with GCC to have permanent markings restored in conjunction with the permanent trench reinstatement.

#### **5.2.3.15 Road Closures and Diversions**

Road closures and diversions will need to be carried out during the Construction Phase of the Proposed Development; however, these measures will be minimised wherever possible. Where necessary, road closures and diversions will take into consideration the impact on road users, residents, businesses etc. Road closures and diversions will be carried out with regard to the ‘Traffic Signs Manual (Chapter 8 – Temporary Traffic Measures and Signs for Roadworks)’. All road closures and diversions will be consented to GCC, in consultation with the local authority and An Garda Síochána, as necessary.

Access will be maintained for emergency vehicles along the Proposed Development, throughout the Construction Phase.

The PSCS/Contractor shall ensure that no works shall take place on any route during the period where it is in use as a diversion route for any other works locations and shall programme the works accordingly.

With respect to making temporary alterations to an existing system of traffic management i.e. reversing the one-way system, the Contractor/PSCS must apply to the Council for a temporary road closure or temporary alteration to an existing system of traffic flow. Because of the time involved in the various processes to give legal status to the closure/alteration, 8 weeks is required as a minimum in order to arrange for the closure or alteration to an existing system of traffic management.

All advertising costs and road closure fees must be paid by the Licensee.

#### **5.2.3.16 Enforcement of Construction Traffic Management Plan**

The appointed contractor shall develop the CTMP for use throughout the Construction Phase. All personnel and material suppliers shall be required to adhere to the CTMP. The appointed contractor shall agree and implement monitoring measures to confirm the effectiveness of the CTMP and compliance shall be

monitored by Employer's Representative. Regular inspections / spot checks shall be carried out to ensure that all personnel and material supplies follow the agreed measures adopted in the CTMP.

#### **5.2.3.17 Interface with Other Projects**

The likely timelines of the Proposed Development construction works have considered the potential for simultaneous construction of, and cumulative impacts with other infrastructure projects and developments which are proposed along, or in the vicinity, of the Proposed Development. The likely significant cumulative impacts caused by the Proposed Development in combination with other existing or planned projects are identified and assessed in Chapter 20 (Cumulative Impacts & Environmental Interactions) of this EIAR.

Interface liaison will take place on a case-by-case basis through GCC, 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 Development works and that any additional construction traffic mitigation measures required to deal with cumulative impacts are managed appropriately.

#### **5.2.3.18 Emergency Procedures During Construction**

The appointed contractor shall ensure that unobstructed access is provided to all emergency vehicles along all routes and accesses. The appointed Contractor/PSCS shall provide to the local authorities and emergency services, contact details of the appointed contractor personnel responsible for construction traffic management.

In case of a construction traffic related emergency, the following procedure shall be followed:

- Emergency Services will be contacted immediately by dialling 112;
- Exact details of the emergency / incident will be given by the caller to the emergency line operator to allow them to assess the situation and respond in an adequate manner;
- The emergency will then be reported to the appointed contractor;
- All construction traffic shall be notified of the incident (where such occurs off site);
- Where required, appointed first aiders will attend the emergency immediately; and
- The appointed contractor will ensure that the emergency services are directed to and arrive at the emergency location.

#### **5.2.3.19 Communication**

The appointed contractor shall, through GCC, ensure that close communication with the relevant local authorities and the emergency services shall be maintained throughout the Construction Phase.

The appointed contractor shall, through GCC, also ensure that the local community, landowners, and strategic stakeholders are appropriately informed of proposed traffic management measures in advance of their implementation. Contact information for key points of contact will be provided for members of the public to obtain additional information and to provide additional knowledge such as local events, sports fixtures etc. which may conflict with proposed traffic management measures. The appointed contractor will liaise with landowners through the Communication Plan agreed with GCC, where access to their property is temporarily affected by works.

#### **5.2.3.20 Key Personnel and Organisations – Responsibilities**

In all aspects of the management of traffic, the PSCS shall liaise with the following parties:

- PSCS/Contractor;
- GCC;
- Garda Síochána;
- Emergency Services (i.e. Fire and Ambulance);
- Employer's Representative; and

- Project Supervisor for the Design Process (PSDP).

The PSCS/Contractor shall consult with all relevant authorities as listed above during the development of the Construction Stage Traffic Management Plan. The PSCS/Contractor shall co-ordinate the implementation of the Developed Traffic Management Plan throughout the duration of the work.

Where a problem arises with traffic management, the PSCS/Contractor shall consult with the PSDP and the Traffic Management Designer to revise or modify the traffic management plan as necessary, as per paragraph 3.5.2 of the “Temporary Traffic Management Design Guidance”.

The PSCS shall take into account the impact of the construction works on general traffic, business, and local property owners.

#### **5.2.3.21 Garda Síochána**

The Gardaí shall have final authority with regard to day-to-day traffic control. The PSCS/Contractor shall comply with all directions, instructions and requirements of the Garda Síochána.

## 5.3 Invasive Species Management Plan

### 5.3.1 Introduction

This Invasive Species Management Plan (hereafter referred to as the ISMP) for the Proposed Development contains management recommendations in respect of preventing the spread of and managing a range of non-native invasive species along the Proposed Development. Invasive Species (IS), Invasive Alien Species (IAS) or Invasive Alien Plant Species (IAPS) are terms sometimes referenced in legislation and or guidance. They are referred to as non-native invasive species in this ISMP but are interchangeable.

The ISMP describes the options available to manage and prevent the spread of Third Schedule, non-native invasive plant species identified in the vicinity of the Proposed Development. Only non-native invasive species listed on the Third Schedule of S.I. No. 477 of 2011 – European Communities (Birds and Natural Habitats) Regulations 2011 (hereafter referred to as the Birds and Natural Habitats Regulations) are dealt with in this ISMP.

The ISMP is intended to be a working document and will be developed by the appointed Contractor prior to the commencement of any on-site works for the Proposed Development. Construction works can disturb stands of Third Schedule non-native invasive plants and/or soils contaminated with non-native invasive plant material, as well as potentially lead to a new infestation. Therefore, management measures which will be contained in the ISMP will be implemented to avoid any direct or indirect impacts to habitats and species contained within the locality or as a result of its introduction to the area.

#### 5.3.1.1 Introduction

The Birds and Natural Habitats Regulations contain specific provisions that govern control of listed invasive species. It is an offence to release or allow to disperse or escape, to breed, propagate, import, transport, sell or advertise species listed on the Third Schedule of the Birds and Natural Habitats Regulations without a Licence. The two regulations that deal specifically with this scheduled list of species are:

- Regulation 49: Prohibition of introduction and dispersal of certain species; and
- Regulation 50: Prohibition on dealing in and keeping certain species.

Following on from that, the following are strictly prohibited:

- Dumping invasive species cuttings anywhere other than in facilities licensed to accept them;
- Planting or otherwise causing to grow in the wild, hence the landowner (in respect of the Proposed Development, this being GCC and the appointed contractor) should be careful not to cause further spread);
- Disposing of invasive species at a landfill site without first informing the landfill site (that is licensed under Number 10 of 1996 – Waste Management Act, 1996 (as amended) (hereafter referred to as the Waste Management Act, as amended) to take such Third Schedule material (plant or soil) that the waste contains invasive species material (this action requires an appropriate licence);
- Moving soil which contains Third Schedule-specific non-native invasive species in the Republic of Ireland, unless under licence from the National Parks and Wildlife Service (NPWS) (this licence is separate from and does not discharge any person being in receipt of other necessary waste permits / licences, etc.); and
- Regulation (EU) No. 1143 of 2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species (hereafter referred to as the IAS Regulation) lists specific Species of Union Concern, some of which overlap with the Third Schedule species.

The IAS Regulation conveys the rules to prevent, minimise and mitigate the adverse impacts of the introduction and spread (both with and without intention) of IAS on biodiversity and the related ecosystem



services, as well as other adverse impacts on human health or the economy. Target 4.4 of Ireland's third National Biodiversity Action Plan 2017–2021 (Department of Culture, Heritage and the Gaeltacht (DCHG) 2017) requires that 'harmful invasive alien species are controlled and there is reduced risk of introduction and / or spread of new species'.

### 5.3.1.2 Limitations

It should be noted that any decision on efficacy of chemical treatments can only be provided by a registered pesticides advisor. A suitably qualified specialist will be appointed by the appointed contractor to monitor the treatment of non-native invasive species. This ISMP shall be updated as necessary by the specialist.

## 5.3.2 Methodology

### 5.3.2.1 Guidance

This ISMP and the mitigation strategies that are discussed relating to invasive plant species have been prepared with regard to the following guidance documents, where relevant:

- The Management of Invasive Alien Plant Species on National Roads – Technical Guidance (TII 2020a);
- The Management of Invasive Alien Plant Species on National Roads – Standard (TII 2020b);
- The Environment Agency (EA) Managing Japanese knotweed on Development Sites – the Knotweed Code of Practice (Version 3, amended in 2013, withdrawn from online publication in 2016) (EA 2013). (This document, although no longer supported by the EA, is nonetheless a practical document in determining the approach and control mechanisms for Japanese knotweed);
- Managing Invasive Non-Native Plants in or near Freshwater (EA 2010);
- Invasive Species Ireland (ISI) Best Practice Management Guidelines for Japanese knotweed (ISI 2008a);
- Best Practice Management Guidelines for Himalayan balsam (ISI 2008b);
- Best Practice Management Guidelines for Giant hogweed (ISI 2008c);
- Non-Native Species Secretariat (NNSS) *Allium triquetrum* (Three-cornered garlic) Great Britain Non-Native Organism Risk Assessment Scheme (NNSS 2011);
- Countryside Management Publications, Giant hogweed (Department of Agriculture and Rural Development (Northern Ireland) (2016);
- Good Practice Management, New Zealand pygmyweed (*Crassula helmsii*) Version 1, August 2018 (Animal and Plant Health Agency et al. 2018);
- Management Measures for Widely Spread Species (WSS) in Northern Ireland Nuttall's waterweed (*Elodea nuttallii*) (Northern Ireland Environment Agency 2021);
- Aquatic and Riparian Plant Management: Controls for Vegetation in Watercourses, Technical Guide (EA 2014); and
- Biosecurity Protocol for Field Survey Work (Inland Fisheries Ireland (IFI) 2010).

### 5.3.2.2 Surveys

Following on from a desk study review of the National Biodiversity Data Centre (NBDC) records, non-native invasive species surveys were undertaken for the Proposed Development in 2022, 2023 and 2024 within the appropriate botanical season (March to October) when species are readily observable and identifiable.

Non-native invasive species listed on the Third Schedule of the Birds and Natural Habitats Regulations were searched for within and adjacent to the Proposed Development. Surveys were carried out by the EIAR Ecologists, and all Third Schedule non-native species recorded were mapped and attributed a unique reference identifier. This data fed into the EIAR. Full details of the surveys are included in Chapter 12 (Biodiversity) in Volume 2 of the EIAR.



### 5.3.3 Results

There was one non-native invasive plant species listed on the Third Schedule of the Birds and Natural Habitats Regulations identified as occurring within the Site and study area, Himalayan knotweed (*Persicaria wallichii*). This was located behind a stonewall in an area of scrub to the north of the R338. Full details of the surveys are included in Chapter 12 (Biodiversity) in Volume 2 of this EIAR.

The desk study returned seventeen non-native invasive flora species with the 10km grid square M32 (NBDC, 2023). Species classified as high impact non-native invasive species as identified by Biodiversity Ireland and Kelly et al (2013) include Cherry Laurel (*Prunus laurocerasus*), Hybrid Knotweed (*Fallopia japonica x sachalinensis* = *F. x bohemica*), Giant Hogweed (*Heracleum mantegazzianum*), Japanese Knotweed (*Fallopia japonica*) and Common Rhododendron (*Rhododendron ponticum*).

It is recognised that other non-native invasive species, not listed in the Third Schedule, can and do occur within the study area of the Proposed Development. These are not ordinarily dealt with in non-native invasive species management plans, and there is separate legislation and guidance for the control of noxious weeds (e.g. No. 38 of 1936 Noxious Weeds Act, 1936 and S.I. No. 103 of 1937 Noxious Weeds (Thistle, Ragwort, and Dock) Order, 1937). The implementation of the general measures provided in Section 5.3.4 would minimise the risk of any spread of these species as a result of the construction of the Proposed Development.

### 5.3.4 General Measures to Control and Prevent the Spread of Non-Native Invasive Plant Species

#### 5.3.4.1 Pre-Construction Survey

During the interim between the original non-native invasive species surveys and the commencement of construction following grant of planning permission, it is possible that the existing stands of Third Schedule non-native invasive species may have expanded (if unmanaged) or decreased (if there is an active management regime in place), or that newly established Third Schedule non-native invasive species may have become established within the footprint of the Proposed Development.

A confirmatory pre-construction invasive species survey will be undertaken by a suitably qualified specialist, arranged by GCC, to confirm the absence, presence and / or extent of all Third Schedule non-native invasive species within the footprint of the Proposed Development. Where an infestation is confirmed / identified within the footprint of the Proposed Development, this will require the implementation of the ISMP.

Data collected as part of the pre-construction invasive species survey will include a detailed description of the infestation including the approximate area of the respective colonies (m<sup>2</sup>) (metres squared), where feasible, the approximate total number of stems, pattern of growth and information on other vegetation present. This information will enable calculations of volumes of infested soils to be excavated where necessary, as part of the measures outlined below.

Following on from the pre-construction invasive species survey, the ISMP will be updated, as advised by a suitably qualified specialist, with regard to the Management of Invasive Alien Plant Species on National Roads – Technical Guidance (TII 2020a) and Standard (TII 2020b) and other species-specific guidance documents including those listed in the ISMP, as necessary. The updated ISMP will detail the strategy that will be adopted during the Construction (and Operational) Phase in order to manage and prevent the spread of invasive plant species, and where Third Schedule non-native invasive species are encountered directly in the works area, the method of treatment / eradication.

##### 5.3.4.1.1 Invasive Species Management Plan (ISMP)

Following on from the pre-construction invasive species survey, the ISMP will be updated to detail the exact measures for any non-native invasive species population present within the footprint of the Proposed Development. Depending on the extent and nature of the works, a number of approaches / treatments may be approved, all following on from the measures in the ISMP.

GCC will ensure that all control measures specified in the ISMP shall be implemented by a suitably qualified and licensed specialist prior to the Construction Phase of the Proposed Development to control the spread of newly established non-native invasive species within the footprint of the Proposed Development. Furthermore, the appointed contractor will adhere to control measures specified within the ISMP throughout the Construction Phase of the Proposed Development. The site will be monitored by the appointed contractor after control measures have been implemented. Any regrowth will be subsequently treated.

All measures that are prescribed in the ISMP shall be equally applicable to advance works as to construction works. In the Operational Phase the management of the infrastructure will be the responsibility of the local authority, and the control of invasive species will be as per their plans and procedures, and responsibilities under The Birds and Natural Habitats Regulations.

#### **5.3.4.2 General Measures to Avoid the Spread of Non-Native Invasive Species**

The unintentional spread of non-native invasive species during construction works (within a construction site or unwittingly from outside of a site, such as through the importation of materials or poor biosecurity practices regarding plant and machinery) can be a significant issue, and if not managed properly, can result in the spread of non-native invasive species to uninfested areas (within or adjacent to works areas), which would increase the future cost and effort required to control the species and could pose further public health and safety risks (Japanese knotweed can cause damage to weaknesses in built environment, whilst giant hogweed is an environmental public health hazard).

The most common ways that invasive species can be spread is:

- Site and vegetation clearance, mowing, hedge-cutting or other landscaping activities;
- Spread of seeds or plant fragments during the movement or transport of soil;
- Spread of seeds or plant fragments through the local surface water and drainage network;
- Contamination of vehicles or equipment with seeds or plant fragments which are then transported to other areas;
- Importation of soil from off-site sources contaminated with invasive species plant material; and
- Leaving riparian corridors bare of vegetation thus allowing establishment of seed material from outside the site.

##### **5.3.4.2.1 Site Establishment**

During advance works and prior to the commencement of construction, any areas where Third Schedule non-native invasive species have been recorded by the pre-construction surveys must be clearly fenced off prior to and during construction (in order to avoid spreading seeds or plant fragments around or off the construction site) until such time that the mitigation measures are implemented and treatment has been completed, or that works in these areas are monitored in accordance with the requirements of the ISMP.

This includes the Construction Compound and the entirety of the Proposed Development footprint. Earthworks or machinery movement must be avoided in any areas where non-native invasive species have been identified during the pre-construction surveys, until the relevant stands have been eradicated.

##### **5.3.4.2.2 Biosecurity and Site Hygiene**

It is important to ensure that the spread of non-native invasive species, where present, is curtailed. It is also necessary to ensure that in areas where non-native invasive species are not present, that they are not unintentionally spread (e.g. through the importation of contaminated material being brought onto the site).

Unwashed construction equipment, plant, vehicles, and footwear can provide a vector for the spread of non-native invasive species within the Proposed Development and from areas outside the Proposed Development, where infestation is present or where vector material potentially containing seed / root material is attached to plant. The following hygiene measures shall be undertaken for the Proposed Development.

- Known or potentially infested areas within the working area of the Proposed Development shall be clearly fenced off in advance of works and access restricted until such time that treatment has commenced and/or construction works are monitored in accordance with the ISMP in the area. In relation to Japanese knotweed, the guidance recommends an exclusion buffer of 7m (metres) in all directions (within the works area and 3m vertically underground);
- Erection of clear signage at the Construction Compound, etc. and inclusion of detail during toolbox talks or similar (environmental induction) for construction staff in respect of the management of Third Schedule non-native invasive species. The signage and notification should be easily understood so that users are aware of the measures to be taken for known non-native invasive species, or what they should do in the case of suspected non-native invasive species identified. In particular the potential health risks posed by giant hogweed, where it is recorded from within or adjacent to a Proposed Development should be clearly notified to personnel;
- Identify dedicated access points into and out of fenced off areas. These shall not be breached until such time that eradication / removal of non-native invasive species is confirmed or monitoring of the treatment / eradication process is commenced;
- Where possible, the locations of dedicated footwear and wheel wash facilities should be identified in the ISMP. Where a dedicated / bespoke wheel wash cannot be installed owing to space limitations, the appointed contractor will ensure that no excavated loose material is allowed off site from within an exclusion zone. Similarly, where plant is used to excavate soils, it shall be visually checked for loose soil before movement to another part of site (where possible, the movements of tracked machinery should be restricted within the non-native invasive species exclusion zone). Loose soil shall be scraped off and disposed of, and a solution of Virkon® (or similar approved disinfectant) applied to machinery to ensure that no obscured seed / root material remains viable;
- Vehicular movements within the exclusion area shall be minimised as far as is practical;
- Machinery which has been used for the transport and / or excavation of infected / suspected infected vector material shall be thoroughly washed down, and the washings captured for disposal. All such machinery / plant shall not be permitted to commence work elsewhere on-site or off site until written confirmation of same has been undertaken;
- Dedicated wash down and solution capture should be set up in the Construction Compound. All washings should be stored in a quarantined bunded container that is rated for such storage until such time that they are removed off site for disposal and transferred to a facility that is authorised to accept such waste;
- Except in very particular circumstances, under the guidance of the specialist, there shall be no temporary storage of infected / suspected infected soils on-site. They must be removed off site as per the guidance in Section 5.3.4.2.3; and
- Where small volumes (e.g. volumes capable of being double bagged in quarantine bags such as cut plants, bulbs or loose soil) occur, it may be practical to bag the material and bring it to a clearly demarcated and dedicated quarantine area within the Construction Compounds until such time that the material is disposed of to an authorised facility, similar to the process of disposing of bulk excavated infected soil.

#### 5.3.4.2.3 Soil Excavation

No excavations within a clearly demarcated and fenced off buffer zone shall be permitted. For Japanese knotweed, guidance recommends a horizontal distance of up to 7m from the outside of the stand. This could include under built ground, should suitable areas of weakness or uncompacted ground be encountered by the plants' rhizomes. For other species there will be different buffer zones as guided by the specialist.

Where the excavation of soil containing Third Schedule non-native invasive species (vector material) is the preferred option, the operation shall be monitored for its entirety until the risk of spread of Third Schedule non-native invasive species is negated.

There should be no temporary storage on-site of bulk excavated infected material. Where the ISMP calls for shallow / deep burial, this material shall be removed from the excavated area and transported immediately to an approved receptor area on-site. Furthermore, the temporary storage of uninfected

material should not occur within a European or National designated site nor within 10m of any watercourse and any land within an identified flood zone. Where temporary stockpiles of infected material cannot for practical limitations, be situated away from a potential flood risk area, the appointed contractor will be required to include a Flood Response Plan within the Environmental Incident Response Plan (see Section 5.6) to ensure that any inundation of Construction Compounds does not result in a pollution event to nearby water bodies.

Plant and machinery used in the control, excavation and transport of invasive material shall also be subject to the recommendations described in Section 5.3.4.2.2.

The installation of industry-rated non-native invasive species-proof membrane before infilling construction of road / paths surface may be required. All waste arising out of this process which has been in contact with the excavated ground shall be treated as infected waste and disposed of at a facility that is authorised to accept such waste (See Section 5.3.4.2.4).

Where the movement of any Third Schedule non-native invasive species is required off site, a licence will be required from NPWS in advance of any movement to a site / facility licensed to accept such waste, as per the Birds and Natural Habitats Regulation. This licence is separate to and does not negate the need for licences / permits / authorisations required under waste legislation.

#### *5.3.4.2.4 Disposal of Material*

Where any non-native invasive plant material is collected (e.g. by hand-pulling or mowing), it is important that its disposal does not result in a risk of further spread. The movement of invasive plant material, off site, requires a licence from the NPWS, as per the Birds and Natural Habitats Regulations. Invasive species (particularly roots, flower heads or seeds) must be disposed of at licensed waste facilities or composting sites, appropriately buried, or incinerated having regard to relevant legislation (e.g. Waste Management Act, as amended – S.I. No. 10 of 1996 (hereafter referred to as the Waste Management Act), Section 4 of Number 6 of 1987 – Air Pollution Act, 1987, relevant local authority byelaws and any other relevant legislation). All disposals must be carried out in accordance with the relevant waste management legislation, as per guidance in the Guidelines for the Management of Waste from National Road Construction Projects (TII 2017).

It should be noted that some invasive species plant material or soil (vector material) containing residual herbicides may be classified as either 'hazardous waste' or 'non-hazardous waste' under the terms of the Waste Management Act, as amended, and both categories may require special disposal procedures or permissions. Advice should be sought from a suitably qualified waste expert regarding the classification of waste and the suitability of different disposal measures.

#### *5.3.4.2.5 Measurements to be Implemented during the Application of Herbicides*

Some of the control options may require the use of herbicides, which can pose a risk to human health, to non-target plants or to wildlife. In order to ensure the safety of herbicide applicators and of other public users of the site, a suitably qualified pesticides advisor, registered with the Department of Agriculture, Food and the Marine must be employed.

The appointed contractor is required to refer to the appropriate guidance documents, including but not limited to those listed in Section 5.3.2.1, which provide detailed recommendations for the control of invasive species and noxious weeds.

These documents include measures to aid the identification of relevant species, with details for the timing, chemicals and methodology for chemical control (if applicable), and for measures to avoid environmental damage during the use of herbicides. The appointed contractor (or the specialist as appropriate) will update the ISMP in accordance with the relevant guidelines before commencing works.

It should be noted that where a chemical treatment is to be used, there is a risk of contaminating a watercourse. The choice of herbicide is typically limited to formulations of Glyphosate or 2,4-D amine that are approved for use near water. Full details of any chemical used, where required and as advised by a

registered pesticides advisor, will be included in the ISMP prepared in advance of construction of the Proposed Development.

#### 5.3.4.2.6 *Importation of Soil and Other Material*

The bulk importation of material from off site could potentially result in the accidental spread of Third Schedule non-native invasive species, as it is uncertain if these site(s) are free from non-native invasive species. This is likely less of an issue for road building material. However, in terms of landscaping, if soil is imported to the site for landscaping, infilling or embankments, the appointed contractor shall seek documentation from suppliers confirming that the material is free from invasive species.

#### 5.3.4.2.7 *Post-Construction Monitoring*

Following the construction of the Proposed Development, there may be ongoing treatment programmes which extend for a number of years into the Operational Phase. In the Operational Phase, the management of the infrastructure will be the responsibility of the local authority, and the control of invasive species will be as per their plans and procedures, and responsibilities under The Birds and Natural Habitats Regulations.

The above measures are important for all Third Schedule non-native invasive species, and in particular Japanese knotweed, where it occurs, as maintenance works associated with landscaping, such as mowing and hedge cutting have the potential to spread this plant via the dispersal of very small amounts of shredded plant material. If invasive plants are found, then they shall be treated as per the measures outlined in the ISMP and any species-specific guidelines.

### 5.3.5 **Assessment of Management Options for Third Schedule Non-Native Invasive Species**

The general measures included in Section 5.3.4 are required to ensure good on-site practices in respect of known or potential Third Schedule non-native invasive species.

Section 5.3.5.1 to Section 5.3.5.7 further identify practical management controls. The colour scheme shown is a qualitative tool intended to assist the reader to focus on the most likely practical solutions. It is acknowledged that more than one potential control measure exists and that a single or combination of measures may be required. The recommendations presented in this ISMP provide the minimum requirements for the likely control measures and the measures outlined in this ISMP shall be developed (with further detail on methodology used at each location, timing, practical management, etc.) by the appointed contractor (or the specialist as appropriate).

The use of chemical treatments is recognised as a potential treatment option. However, the services of a registered pesticide advisor must be employed in the specifying of named chemicals including those rated for use adjacent to aquatic environments where required, treatment type, dosage, and timing, etc., and / or use of pesticides in the management of potential Third Schedule non-native invasive species within the Proposed Development.

The selected management control to be defined for each non-native invasive species stand within the Proposed Development will depend on:

- Results of the pre-construction survey; and
- Construction requirements – timing of works at specific locations, level of infestation and practical considerations such as reducing disturbance to road users / homeowners.

The ISMP, which will be updated following on from the pre-construction surveys, may require the utilisation of a number of controls that are described and assessed below.



### 5.3.5.1 Japanese Knotweed *Reynoutria Japonica*

Japanese knotweed is a high impact non-native invasive species that is particularly effective at colonising disturbed ground (e.g. construction sites) and can spread by the regrowth of cut fragments or root material, so if it is broken up during site clearance or other earthworks it can readily re-grow in new areas to which soil is moved. Japanese knotweed readily reproduces asexually (in Ireland, at least, as only Female plants have been recorded) and regrowth can occur from plant material weighing as little as 0.7g (grams) of viable material. It is acknowledged to be very difficult to effectively control and an even more difficult weed to fully eradicate.

Given the nature of Japanese knotweed, chemical treatments are often preferred over physical methods as they can, if implemented properly, reduce the disturbance of the plant / population, thus reducing the chances of its spread. If herbicide is applied as the treatment option, it will need to be reapplied for up to five years after the first application to ensure the plant control measures have been effective or monitored for a minimum of two years during which no regrowth is recorded.

Table 0-9 presents an assessment of potential treatment options available for the treatment of Japanese knotweed. The various methods are analysed and described in further detail as necessary. It should be noted that where it might occur within the Proposed Development, that a number of the measures described below may be applicable, depending on the nature of works, the timing, etc. These will be fully detailed in the ISMP after the recommended pre-construction survey of the Proposed Development.

**Table 0-9 Assessment of Management Methods for Japanese Knotweed**

Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Development
Physical	Dig and dispose offsite, under licence	This option requires that all plant material (above and below ground) is excavated along with soil and disposed of to a facility authorised to accept it. In addition to waste permits / authorisations, a wildlife licence issued by NPWS is required for the transport of Third Schedule non-native invasive species off site. Depending on the nature of the excavation the proximity of services, etc., the use of root barrier membrane (Section 5.3.5.1.1) could be required.	Likely – given the nature of the Proposed Development, there may be a need to excavate soil and plant material to enable construction works to go ahead in timely manner
	Dig and dispose onsite. - Shallow burial - Deep burial	A wildlife licence from NPWS is not ordinarily required if the burial of collected material is proposed for within the consented development site.  Shallow burial in a constructed cell such as a dedicated sealed cell within a constructed berm will allow for periodic monitoring and of easy chemical treatment of any regrowth.  Deep burial entails a dedicated sealed cell within a constructed excavation, that is at least 2m below the surface of the ground. The landscaping regime should not specify trees or scrub to be planted above.  Either shallow or deep option could require the use of root barrier membrane (Section 5.3.5.1.1). The use of chemical pre-treatment of deep / shallow cells could also be required.	Unlikely – given the lack of suitable lands within the largely developed metropolitan area.
	Screen onsite – remove fragments off	A control option that can be used to reduce the volume of soil / sediment to be moved elsewhere for burial, this option requires suitable plant, adequate space and volumes of soil to make the	Possible but unlikely given the space requirements for a screener (unless a bespoke

Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Development
	site and reuse soil	operation at a location cost effective. This option often requires the use of root barrier membrane (Section 5.3.5.1.1) owing to reuse of screened soil. The use of chemical pre-treatment of deep / shallow cells could also be required	small-scale screener is available).
	Cutting and / or Strimming	Not recommended and does not apparently diminish vigour of plants over time. Largely cosmetic and can result in considerable spread of viable vegetative material that can readily regenerate in suitable conditions.	Not recommended.
Chemical	Spot	Used for isolated plants – knapsack or weep sprayers. Chemical treatments for infestations near water should be rated for use near aquatic locations	Chemical treatments are often a preferred option for treating Japanese knotweed, but the process can take between three to five years before eradication can be guaranteed and requires at least two-year post implementation monitoring. However, given the nature of the Proposed Development, the use of chemical treatment alone is unlikely to be adequate unless treatment regime begins a number of years before construction commencement
	Spray	Used for isolated plants or large populations using knapsack or weep sprayers. In accessible areas including along riverbanks, lance sprayers can be used. Chemical treatments for infestations near water should be rated for use at or near aquatic locations. Can result in chemical drift.	
	Stem Injection	This method is considered very effective, if the injection is timed appropriately for growth phase. However, it is labour-intensive (sometimes requiring some cutting) and is usually only carried out on small / isolated populations. Chemical treatments for infestations near water should be rated for use at or near aquatic locations.	Possible and requires specialist equipment to enable working alongside the biohazardous plant – Despite some advantages over other conventional chemical treatments, e.g. reduces drift, not weather dependent.

#### 5.3.5.1.1 Root Barrier Membrane

Following on from the excavation of Japanese Knotweed, there may be a need to install a root barrier membrane. These are specialised products that can provide protection to structures / services, etc from regrowth within or outside a site, if suitably rated and properly installed. Thereafter, any small adjacent infestation can be more readily treated with chemical treatment for example.

#### 5.3.5.1.2 Reseeding Following Eradication

This is not strictly a control method. However, where treated ground is not being built upon, planting or resowing mixtures of native grass species helps to restore the original vegetation and aids post-control management of affected sites. A grass sward established in autumn will compete with germinating Japanese knotweed seedlings in the following spring.

#### 5.3.5.2 Himalayan Knotweed

Originating in the Indian Subcontinent, Himalayan Knotweed is very widespread across the country and enjoys the same growing conditions as Japanese Knotweed. Typically, Himalayan Knotweed emerges somewhat later in spring than Japanese Knotweed and also flowers later in the growing season.



Table 5-10 presents an assessment of potential treatment options available for the treatment of giant hogweed. The various methods are analysed and described in further detail as necessary.

**Table 5-10 Assessment of Management Methods for Himalayan Knotweed**

Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Development
Physical	Dig and dispose offsite, under licence	This option requires that all plant material (above and below ground) is excavated along with soil and disposed of to a facility authorised to accept it. In addition to waste permits / authorisations, a wildlife licence issued by NPWS is required for the transport of Third Schedule non-native invasive species off site. Depending on the nature of the excavation the proximity of services, etc., the use of root barrier membrane (Section 5.3.5.1.1) and chemical pre-treatment could be required.	Likely – given the nature of the Proposed Development, there may be a need to excavate soil and plant material to enable construction works to go ahead in timely manner
	Dig and dispose onsite. - Shallow burial - Deep burial	A wildlife licence from NPWS is not ordinarily required if the burial of collected material is proposed for within the consented development site.  Shallow burial in a constructed cell such as a dedicated sealed cell within a constructed berm will allow for periodic monitoring and of easy chemical treatment of any regrowth.  Deep burial entails a dedicated sealed cell within a constructed excavation, that is at least 2m below the surface of the ground. The landscaping regime should not specify trees or scrub to be planted above.  Either shallow or deep option could require the use of root barrier membrane (Section 5.3.5.1.1). The use of chemical pre-treatment of deep / shallow cells could also be required.	Unlikely – given the lack of suitable lands within the largely developed metropolitan area.
	Screen onsite – remove fragments off site and reuse soil	A control option that can be used to reduce the volume of soil / sediment to be moved elsewhere for burial, this option requires suitable plant, adequate space and volumes of soil to make the operation at a location cost effective. This option often requires the use of root barrier membrane (Section 5.3.5.1.1) owing to reuse of screened soil. The use of chemical pre-treatment of deep / shallow cells could also be required	Possible but unlikely given the space requirements for a screener (unless a bespoke small-scale screener is available). Not many providers of this service in Ireland.
	Cutting and / or Strimming	Not recommended and does not diminish vigour of plants over time. Largely cosmetic and can result in considerable spread of viable vegetative material that can readily regenerate in suitable conditions.	Not recommended.
Chemical Treatment required over minimum 3 to 5 seasons depending	Spot	Used for isolated plants – weed-wiping knapsack or weed sprayers. Chemical treatments for infestations near water should be rated for use near aquatic locations	Chemical treatments are often a preferred option for treating Japanese knotweed, but the process can take between three to five years before eradication can be guaranteed and requires at least two-year post implementation
	Spray	Used for isolated plants or large populations using knapsack or weed sprayers. In accessible areas including along riverbanks, lance sprayers can be used. Chemical treatments for	

Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Development
on size of established plants then requires at least 2 years of no growth before insurance will be provided.		infestations near water should be rated for use at or near aquatic locations. Can result in chemical drift.  Care needed not to overdose as this could lead to dormancy rather than eradication.	monitoring. However, given the nature of the Proposed Development, the use of chemical treatment alone is unlikely to be adequate unless treatment regime begins a number of years before construction commencement
	Stem Injection	This method is considered very effective, if the injection is timed appropriately for growth phase. However, it is labour-intensive (sometimes requiring some cutting) and is usually only carried out on small / isolated populations. Chemical treatments for infestations near water should be rated for use at or near aquatic locations.	Possible and requires specialist equipment to enable working alongside the biohazardous plant – Despite some advantages over other conventional chemical treatments, e.g. reduces drift, not weather dependent.  Only 1 or 2 courses of treatment may be feasible as method only effective when stems are thick enough, minimum 8mm in diameter. Then spray method required.

#### 5.3.5.3 Giant Hogweed *Heracleum Mantegazzianum*

This is a high-risk invasive species that is also a biohazard in that it can pose a threat to humans. The chemistry of its sap is such that exposure to it on skin can result in prolonged photosensitizing reactions with blistering. Thus, a clearly demarcated exclusion buffer, in excess of 4m, is recommended for any individual / populations of this species before commencing works.

It spreads via heavy seeds which can easily be transported by water. Hence, it is often found along river corridors. While the plant favours riverbanks, it is known to be found on waste / derelict ground as well as railway lines for instance. Its presence can impact local biodiversity and undermine bankside integrity. The seedling stage is the most vulnerable. Mortality of seedlings is comparable to many other plants and its seed bank is considered to be persistent for a short number of years only. Since giant hogweed can only reproduce via seed, control measures applied before flowering and fruit set will limit subsequent generations (and even then, only with favourable conditions). The ideal time to control giant hogweed via chemical treatment is April, with follow on monthly applications targeting regrowth, although for this treatment options, it can require up to five years before successful eradication.

Table 5-11 presents an assessment of potential treatment options available for the treatment of giant hogweed. The various methods are analysed and described in further detail as necessary.

**Table 5-11 Assessment of Management Methods for Giant Hogweed**

Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Development
Physical	Above ground cutting	Not recommended. Largely cosmetic and prolongs flowering until such time that control halted. However, if digging is used, it is recommended that the removal be attempted in April / early May when the plant is usually less than 30cm tall. However, the root must be captured also.	Unlikely – requires specialist equipment to enable working alongside the biohazardous plant.

Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Development
	Root cutting	Individual plants may be killed by cutting at a 45-degree angle 15cm below ground level with a spade in April or May. Can be laborious unless small / isolated stands. Can be effective if combined with chemical treatment over four to five years.	Given the nature of the Proposed Development, could be used to remove biohazard plant and thereafter allow for chemical control against any regrowth. Requires specialist equipment to enable working alongside the biohazardous plant.
	Strimming	Not recommended owing to the spread of sap.	Not recommended.
	Ploughing	Can provide total control where seedlings and young plants encroach onto agricultural land. However not practical in metropolitan areas and isolated stand along riverbanks.	Unlikely given the locations that Giant hogweed is often found in.
	Grazing	Grazing should begin when early foliage appears in April and should continue until early autumn when re-sprouting stops. Eradication can take between 5 to 10 years so that seed bank and root stock is fully depleted of resources.	Not possible in metropolitan area.
	Pulling	Hand pulling is only suitable for small / immature plants (and with suitable Personal Protective Equipment (PPE) to protect exposure of bare skin). Potential remains for tap root to remain underground and regenerate.	Unlikely for mature plants. Requires specialist equipment to enable working alongside the biohazardous small / immature plants.
	Biological control	Other than natural soil biota, it is not currently permitted to introduce any organisms to areas to deal with giant hogweed. Research ongoing which would require permitting thereafter.	Not possible at present.
	Dig and dispose off-site, under license	This option requires that all plant material (above and below ground) is excavated along with soil and disposed of to a facility authorised to accept it. Given the phytotoxic nature of the plant, it should not be buried on-site nor disposed of with general construction and demolition (C&D) waste. In addition to waste permits / authorisations, a wildlife licence issued by NPWS is required for the transport of Third Schedule non-native invasive species off site.	Possible and depending on location may be required.
Chemical	Spot Treatment	Used for isolated plants – knapsack or weep sprayers. Chemical treatments for infestations near water should be rated for use near aquatic locations.	Most widely used method, but to be wholly effective, requires total control over ~5 years of treatments within a river catchment or the isolated location. Is weather dependent and can result in chemical drift to adjacent vegetation or watercourses.
	Spray	More suitable for large stands, where machine-mounted blanket sprays are used. Chemical treatments for infestations near water should be rated for use near aquatic locations.	Possible but unlikely owing to nature and size of population recorded on Proposed Development.
	Stem Injection	Can only be carried out on young stems. Due to difficulties with the timing of application and the	Possible and requires specialist equipment to enable working alongside the

Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Development
		potential safety risk of contact with the large leaves this method requires specialist safety equipment.	biohazardous plant – Despite some advantages over other conventional chemical treatments, e.g. reduces drift, not weather dependent.

#### 5.3.5.3.1 Temporary Storage of Collected Material

Given the phytotoxic nature of giant hogweed, cut material should not be discarded. Ideally it should be disposed of immediately with similar non-native invasive species waste to a facility authorised to accept such waste.

However, given the nature and relative sizes of Giant hogweed infestations it may be suitable to collect cut biomass (where not disposed of immediately to a facility authorised to accept such waste), and to double bag it for transport to a dedicated quarantine area (location to be approved as part of the ISMP) to decompose before disposal with similar non-native invasive species waste in a facility authorised to accept such waste.

#### 5.3.5.3.2 Reseeding Following Eradication

This is not strictly a control method. However, where treated ground is not being built upon, planting or resowing mixtures of native grass species helps to restore the original vegetation and aids post-control management of affected sites. A grass sward established in autumn will compete with germinating Giant hogweed seedlings in the following spring and retard its establishment.

#### 5.3.5.4 Himalayan Balsam *Impatiens Glandifera*

This high-risk invasive species is easily disturbed, particularly if in flower and readily becomes re-established along riparian corridors, which are annually subject to alluvial flooding. Unlike Japanese knotweed though, it does not reproduce asexually. Plants can produce in excess of 6,000 seeds, and it aggressively colonises bare ground along riverbanks, including wet woodlands, as well as waste ground where suitable conditions exist. Due to its rapid growth, it can outcompete most native species. While its seedbanks are viable for up to 18 months, the resupply of seed is often achieved through annual river flooding and riparian inundation with freshly deposited soil-laden alluvium.

Table 5-12 presents an assessment of potential treatment options available for the treatment of Himalayan balsam. The various methods are analysed and described in further detail as necessary. Control measures for Himalayan balsam should aim to prevent flowering and are therefore undertaken before June. However, eradication may take up to five years. It should be noted that successful localised management of Himalayan balsam is difficult along watercourses, as the spread of this non-native invasive species from upstream areas (e.g. outside of the Proposed Development) onto bare ground often occurs after winter flooding.

**Table 5-12 Assessment of Management Methods for Himalayan Balsam**

Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Development
Physical	Hand Pull	Small isolated and immature infestations, such as in gardens or roadsides can usually be readily pulled prior to flowering, e.g. care must be taken not to leave lower plant sections as these can regrow rapidly. Additionally, any flower heads (if present) should be covered by a tied bag before pulling to ensure no seed drop.	Possible – ideal for smaller areas adjacent to the likely works boundary.

Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Development
	Dig and dispose off-site, under licence	This option requires that all plant material (above and below ground) is excavated along with soil and disposed of to a facility authorised to accept it. In addition to waste permits / authorisations, a wildlife licence issued by NPWS is required for the transport of Third Schedule non-native invasive species off site.	Possible – given the nature of the Proposed Development, this may be an optimal control measure.
	Mechanical	Repeated cutting or mowing is effective for larger stands, but plants can regrow if the lower parts (above lowest node) are left intact. Regeneration can be further halted by ensuring full ground vegetative layer through reseeding.	Possible but unlikely main option given the nature of works along existing road infrastructure.
	Grazing	Regular grazing is said to suppress the plant over time.	Not practical – given the nature of the metropolitan landscape and nature of the Proposed Development.
Chemical	Spot / weed wiper	Can be used for smaller infestations in spring before flowering occurs, but as late as to allow germinating seedlings to have become established and thus be able to uptake the chemical treatment. Adjacent to the likely works boundary – chemical treatments for infestations near water should be rated for use near aquatic locations.	Possible – within the works boundary – Where ground is to be excavated, may require physical control also.
	Foliar spray	Can be applied to larger infestations via knapsack spray / lance spray, etc., in spring before flowering occurs, but as late as to allow germinating seedlings to have become established and thus be able to uptake the chemical treatment. Chemical treatments for infestations near water should be rated for use near aquatic locations	Possible – within the works boundary – Where ground is to be excavated, may require physical control also.

#### 5.3.5.4.1 Temporary Storage of Collected Material

Given the nature and relative extent of Himalayan balsam infestations in some urban situations, collected biomass (pulled stems / roots and bagged flower heads), where not disposed of immediately to a facility authorised to accept such waste, could be double bagged and put in dedicated quarantine areas (locations to be approved as part of the ISMP). Here, the material could be left to decompose before disposal with similar non-native invasive species waste at an authorised facility.

#### 5.3.5.4.2 Reseeding Following Eradication

Areas devoid of, or cleared of vegetative cover near watercourses, should be resown with appropriate riparian ground cover species in summer months to ensure that bare banks do not provide favourable conditions for Himalayan balsam to become re-established and to protect banks from accelerated erosion.

For any area of ground that is cleared of this non-native invasive species, and which is not subsequently constructed upon, follow-on mechanical cutting regimes and/or chemical treatments may be required to ensure the seed bank is fully exhausted.

#### 5.3.5.5 Three-Cornered Garlic *Allium Triquetrum*

A medium impact, rhizomatous species, three-cornered garlic is often planted and can become established in natural and semi-natural habitats, where it is reported to spread by ant-dispersed seed and division of

clumps (NNSS 2022). It can readily establish in suitable ground resulting in it posing a threat to biodiversity where the plant forms early season dense monocultural masses, particularly at protected sites.

Management of this species is relatively straightforward, although there is a requirement that it be visible above ground so as to delineate its likely extent and ensure efficacy of management. Infestations can be managed through chemical or physical-based options or a combination of both. However, given the possibility of some underground bulbs / seedbank remaining within the ground post-treatment, eradication may require a number of repeat treatments over a number of years to ensure effective treatment of all bulbs.

Table 5-13 presents an assessment of potential treatment options available for the treatment of three-cornered garlic. The various methods are analysed and described in further detail, as necessary.

**Table 5-13 Assessment of Management Methods for Three-Cornered Garlic**

Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Development
Physical	Hand dig	Hand-dig when small population present, ensuring that all biomass including bulbs collected. May also require a number of years of mechanical cutting to exhaust seed / bulb bank in wider subsurface environment.  In addition to waste permits / authorisations, a wildlife licence issued by NPWS is required for the transport of Third Schedule non-native invasive species off site.	Likely.
	Mechanical excavation	For larger areas of infestation only, soil can be screened, and bulbs removed. In addition to waste permits / authorisations, a wildlife licence issued by NPWS is required for the transport of Third Schedule non-native invasive species off site.	Unlikely given the nature and size of the identified populations.
Chemical	Spray	Chemical treatment can be made in the spring (when above ground vegetation visible) but before flowering. Multiple applications may be required due to persistence of bulbs and soil seed bank.	Possible – Where ground is to be excavated, may require physical control also.

#### 5.3.5.5.1 Temporary Storage of Collected Material

Given the nature and relative sizes of infestations of three-cornered garlic, bulbs and vegetative material, where not disposed of immediately to authorised facilities, could be double bagged and placed in dedicated quarantine areas to decompose before disposal with similar non-native invasive species waste at authorised facilities.

#### 5.3.5.5.2 Reseeding Following Eradication

For any area of ground that is cleared of three-cornered garlic, and is not constructed upon, a follow-on mechanical hand-pulling / cutting regime and/or chemical treatment may be required post construction to ensure full exhaustion of the bulb / seed bank.

#### 5.3.5.6 New Zealand Pigmyweed *Crassula Helmsii*

The trade and potential escape of New Zealand pigmyweed through the aquarium and garden industry is considered the principal vector for the introduction of this species into new locations, particularly discarded material. Once established, it can readily spread resulting in a threat to native biodiversity, where the plant can form monocultural masses. It does not reproduce from seed, but readily grows from small stem



fragments (~5mm (millimetres) in length). It does not like shaded areas, and where present, can thrive in open, slow-moving waters and ponds. It responds well to nutrient enrichment, particularly nitrate enhancement.

Three forms of the plant are recognised, namely submerged, emergent, and terrestrial, with emergent and terrestrial forms easily identified. It is considered to be extremely difficult and costly to control, particularly where large monodominant stands occur, and its ability to form new plants vegetatively from small fragments facilitates its spread to new locations. Management of infestations may be managed through a range of measures, although it is recognised that it is very difficult to fully eradicate unless a catchment-based approach is taken. It is also noted that physical / chemical management is avoided in late summer and autumn. Table 5-14 presents an assessment of potential treatment options available for the treatment of New Zealand pigmyweed.

**Table 5-14 Assessment of Management Methods for New Zealand Pigmyweed**

Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Development
Physical	Dredging	Dredging of material including soils (between October to March) followed by off-site composting or incineration. Up and downstream areas would need to be fully enclosed with fine net to capture released material.  In addition to waste permits / authorisations, a wildlife licence issued by NPWS is required for the transport of Third Schedule non-native invasive species and contaminated soil off site.	Possible but unlikely. Onerous to undertake and efficacy is considered low unless strictly applied, as it could result in further spread.
	Burying	Drying out the water body followed by burial (February to March) in excess of 20cm (centimetres) of collected dredged material.	Considered successful, when combined with chemical treatment but usually applied to ponds, etc. Not possible if canal navigation to be retained and other species of note, e.g. <i>Groenlandia densa</i> potentially present.
	Hand pulling	Up and downstream areas would need to be fully enclosed with fine net to capture released material. Collected material (All year – if plant is visible) could be composted off site or sent for incineration. In addition to waste permits / authorisations, a wildlife licence issued by NPWS is required for the transport of Third Schedule non-native invasive species and contaminated soil off site.	Only suitable for areas that can be contained, e.g. water flow unhindered despite area being netted. Submerged material may be overlooked.
	Covering site	Cover with black polythene or a similar material to shade the plant for at least three months, but preferably six. Has been demonstrated to work for other submerged species e.g. <i>Lagarosiphon</i> , but untested for <i>Crassula</i> .	Unlikely – given the nature of <i>Crassula</i> , treatment likely for small discrete infestation only. Would be very onerous to cover submerged infested area with jute /polythene to shade outgrowth for three months plus. Could locally alter the area to detriment of native biodiversity. Does not confirm that dormant submerged material would not become established after removal of covering.



Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Development
	Saltwater inundation	Flood affected areas with saltwater for a minimum of 31 days.	Only suitable for areas near the sea and where saline water can be prevented from flowing off. Not suitable in freshwater systems, where other native species would not tolerate saline conditions.
Chemical	Knapsack sprayer	Chemical treatment can be made in April to November. Multiple applications within a season are not usually required if applied at the appropriate time and no further physical disturbance of the treated population occurs.  Chemical treatments for infestations should be rated for use near aquatic locations.	Possible, but only captures emergent and terrestrial forms. Emergent form where present would remain untreated.
Environmental		Steepening banks, increasing the shading of the area and introducing fast growing, native species have all been shown to be effective in certain situations, particularly when used in conjunction with other methods above.	Unlikely given the nature of the Proposed Development.

Other options for which unconfirmed data is available or licensed to release biological controls are not yet approved and have been discounted from assessment as potential control methods. They include grazing by introduced grass carp (a non-native fish species), the release of gall forming mites (currently at EU approval stage), hot foam and hot water, and drying out the ground.

Although this species was not found present within the footprint of the Proposed Development during surveys, measures for addressing this species are covered within this ISMP on a precautionary approach, as it is known in the wider area, and in the event that it becomes established within the Proposed Development area between the surveys taking place and construction commencing.

A pre-construction survey will be required in advance of works. Given that the presence of submerged vegetation is difficult to note and can be overlooked if dormant, the ISMP will detail the measures that are applicable for all works affecting water bodies. The key element for the Proposed Development will be the avoidance, as far as practical, of unnecessary disturbance of water body edge and sediments. Thereafter, standard environmental measures will be applied. This will include rigorous application of biosecurity measures for all plant / equipment brought onto or near water bodies and again before moving to another area. No in-stream works will be permitted where this species is found present unless specific precautions and control measures have been clearly identified and implemented, to reduce for potential disturbance of riparian vegetation (where it occurs).

#### 5.3.5.6.1 Temporary Storage of Collected Material

If this non-native invasive species is found present, all material, where not disposed of immediately to authorised facilities, will be double bagged and placed in dedicated quarantine areas (away from watercourses) to decompose before disposal with similar non-native invasive species waste at authorised facilities.

#### 5.3.5.7 Canadian Waterweed *Elodea Canadensis* and Nuttall's Waterweed *Elodea Nuttallii*

Both species are regarded as perennials, overwintering in the deeper water, and reproducing asexually. Disturbance increases the dispersal of a considerable number of propagules and the vigorous regrowth is enhanced through changes in availability of nutrients. In Ireland, although both are ranked as a medium risk

plant, they are both ranked as highly invasive. Both species have a wide ecological tolerance and can grow relatively fast, resulting in displacement of native flora. The plant can form dense mats which outcompete native plant species and therefore decrease the biodiversity in an area, as well as interfering with navigation and recreational activities on watercourses.

Although, not considered as widespread as Canadian waterweed, Nuttall's waterweed is nonetheless spreading, and in the UK and Ireland is regarded as now displacing the former, possibly due to increased eutrophication. Nuttall's waterweed is also more tolerant of poorer water quality, disturbance, and poorly implemented management such as navigation clearance. Both share many of the same attributes and are usually found in deeper water, rooted in sediment, but these waterweeds can be free floating in water column if disturbed.

Table 5-15 presents an assessment of potential treatment options available for the treatment of both waterweeds.

**Table 5-15 Assessment of Management Methods for Canadian Waterweed and Nuttall's Waterweed**

Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Development
Physical	Draw down	Some studies indicate success where water levels can be dropped and sediments dried out, that this can be effective.	Not likely, given the nature of the Proposed Development and the likely occurrence of this species, which could result in later reestablishment.
	Cutting	By hand or on specially adapted barges. Best undertaken before July.  Repeat harvesting can result in nutrient depletion (if source of eutrophication into watercourse controlled).  This is a longer-term solution that would require careful implementation to ensure no unnecessary spread of material.	This long-term solution would require commitment from GCC and other stakeholders to undertake.
	Covering site	Cover with jute or a similar material to shade the plant. Has been demonstrated to work for other submerged species, e.g. Lagarosiphon, and a DCC sponsored project on the use of jute matting undertaken on parts of the River Liffey between Islandbridge and Chapelizod.	Possible but unlikely – given the nature of Elodea, and its potential distribution elsewhere could be onerous in terms of project timeframes and difficult to cover submerged infested area with jute to shade-out growth. Would not guarantee prevention of re-establishment and would require pollution sources to be addressed to reduce eutrophication.
Environmental	Water dyes	Both species can tolerate some shade of deeper water, but water dyes have been found to be effective in static waters. Additional landscape planting to increase shade are considered to be effective.	Not likely given the location of the Proposed Development in highly populated area unless a well-developed PR campaign is put in place to explain. Potential for landscape planting is also limited by virtue of location and space requirements.
Chemical	There is currently no herbicide product approved for treatment of submerged macrophytes such as <i>Elodea</i> spp.		

Other options for which unconfirmed data is available or licensed to release biological controls are not yet approved and have been discounted from assessment as potential control methods. They include biological control through the introduction of grass carp (a non-native fish) and other bottom feeders.

Although these species were not found present within the footprint of the Proposed Development during surveys, measures for addressing these species are covered within this ISMP on a precautionary approach, as they are known in the wider area and in the event that they become established within the Proposed Development area between the surveys taking place and construction commencing. A pre-construction survey shortly in advance of works will be required. Given that the presence of submerged vegetation is difficult to note and can be overlooked if dormant, the ISMP will detail the measures that are applicable for the duration of works at water body crossings. The key element for the Proposed Development will be the avoidance, as far as practical, of unnecessary disturbance of water body edge and sediments. Thereafter, standard environmental measures will be applied. This will include rigorous application of biosecurity measures for all plant / equipment brought onto or near a water-feature and again before moving to another area. No in-stream works will be permitted where these species are found present unless specific precautions and control measures have been clearly identified and implemented, to reduce for potential disturbance of riparian vegetation (where it occurs).

#### 5.3.5.7.1 Temporary Storage of Collected Material

If these non-native invasive species are encountered, all material, where not disposed of immediately to authorised facilities, will be double bagged and placed in dedicated quarantine areas (away from watercourses) to decompose before disposal with similar non-native invasive species waste at authorised facilities.

## 5.4 Surface Water Management Plan

### 5.4.1 Introduction

This Surface Water Management Plan (hereafter referred to as the SWMP) for the Proposed Development details the control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase.

The control and management measures are best practice approaches that can be used to protect surface water during the Construction Phase of the Proposed Development.

#### 5.4.1.1 Objectives

The objectives of the SWMP are to:

- Ensure sediment and pollution control requirements can be built into the design stage and land requirements for the Proposed Development as far as practicable;
- Minimise, and where possible, avoid potential for sediment, silty water, and other contaminants such as oil, fuel, concrete, cement, and other materials to discharge to a watercourse;
- Minimise the area and duration of exposed ground which has the potential to create runoff; and
- Minimise any potential impacts in the event of an accidental spillage or site runoff by providing appropriate control and containment measures on-site and by maintaining sediment and pollution controls throughout the Construction Phase of the Proposed Development.

#### 5.4.1.2 Legislation and Guidance

The SWMP and the control and management measures relating to surface water management have been prepared with regard to the following legislative and guidance documents, where relevant:

- Bathing Water Quality Regulations 2008 (S.I. 79 of 2008);
- EC Environmental Objectives (Groundwater) Regulations 2009 (S.I. 9 of 2010 and SI 366 2016);
- EC Environmental Objectives (Surface Waters) Regulations (S.I. 272 of 2009);

- EU Water Framework Directive (WFD) 2000/60/EC;
- European Communities (Marine Strategy Framework) Regulations 2011 (S.I. 249 of 2011);
- European Communities (Quality of Salmonid Waters) Regulations 1998 (S.I. 293 of 1998);
- European Communities (Water Policy) Regulations 2003-2005 (S.I. 722 of 2003);
- Groundwater Directive (2006/118/EC);
- Local Government (Water Pollution) Acts 1977 – 1990;
- S.I. No. 9 of 2010 European Communities Environmental Objectives (Groundwater) Regulations 2010; and
- Urban Wastewater Treatment (UWWT) Regulations (S.I. 254 of 2001) as amended.

Control and mitigation measures have been identified with reference to the following guidelines:

- Construction Industry Research and Information Association (CIRIA) Control of Water Pollution from Construction Sites. Guidance for Consultants and Contractors (C532) (CIRIA 2001);
- Best Practice Guide BPGCS005 – Oil Storage Guidelines (Enterprise Ireland 2003);
- PUB C650 Environmental Good Practice on Site, 2nd Edition (CIRIA 2005);
- Control of Water Pollution from Linear Construction Projects. Technical Guide (C648) (CIRIA 2006a);
- Control of Water Pollution from Linear Construction Projects. Site Guide (C649) (CIRIA 2006b);
- Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes (NRA 2006);
- S.I. No. 291 of 2013 – Safety, Health and Welfare at Work (Construction) Regulations 2013;
- Design Manual for Roads and Bridges Part 3 DN-DNG-03022 (NRA HD 33/15) (Including Amendment No. 1) (TII 2015a);
- Road Drainage and the Water Environment DN-DNG-03065 (TII 2015b); and
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI 2016).

#### 5.4.1.3 Potential Sources of Water Pollution

The main activities / areas where sediment and surface water runoff and pollution generation have the potential to arise include the following:

- Earthworks – including planning, excavation and processing, transportation of materials (within and outside of the Proposed Development), and deposition of materials and temporary stockpiling (if required). The most significant area of concern regarding sediment control for the Proposed Development is when existing low porosity surfaces (existing roads and footpaths) are removed, and the underlying granular layers are disturbed and exposed. Typically, these surfaces are likely to be exposed during the following activities associated with the Proposed Development:
  - The preparatory and site clearance works, particularly topsoil stripping; and
  - Tracking of machinery.
- Construction of structures and concreting activities – concrete, grout and other cement-based products which would typically be used in the construction of structures, and carriageway and pavement works are highly alkaline and can generate very fine, highly alkaline silt (11.5pH);
- Watercourse crossings, in-stream works, and riverbank works – there is a higher likelihood of impacts on water quality when construction is taking place over or near surface waters (e.g. silty water can more easily find a pathway either via drains or overland to the water body and impact on its water quality); and
- Construction Compounds and machinery refuelling areas.

Section 5.4.4 details mitigation measures which will be implemented where practicable to reduce the likelihood of the pollution events occurring during the Construction Phase.

## 5.4.2 Roles and Responsibilities

The roles and responsibilities of key stakeholders are discussed in Section 5.1.5. The EM, or equivalent, will ensure the successful development, implementation, and maintenance of the SWMP.

## 5.4.3 Environmental Incident Response Plan

An Environmental Incident Response Plan (EIRP) has been prepared in Section 5.6 to ensure that, in the unlikely event of an incident, response efforts are prompt, efficient, and suitable for the particular circumstances. The EIRP includes measures to address surface water related incidents such as accidental spillages of noxious substances (e.g. oil and significant releases of sediment or concrete washings). The EIRP details are not repeated in this Section of the CEMP. However, it should be read in conjunction with the general measures set out in the SWMP.

## 5.4.4 Site Specific Control Measures

### 5.4.4.1 Surface Water Protection Measures

The Proposed Development generally maintains the existing road profile so that the existing drainage system remains mostly unchanged. In areas where widening takes place, flows from the extra impermeable surface area will be attenuated before discharging to existing drainage system.

Following implementation of the general mitigation measures, the majority of impacts will be not significant. However, the potential for Significant Effects exists with regards to some of the existing drain outfalls which do not have oil interceptors and thus have the potential to act as a vector for surface water emissions.

In order to prevent any silty water or hydrocarbons entering the waterbody during construction it is proposed to use 'silt sacs' or the equivalent in every gully along the entire length of the Proposed Development as construction progresses. These will capture any silt in the surface water. During the connection of the new kerbside edge drains into the existing surface water system, there is a higher risk of contamination. This connection will only be carried out in dry weather. All refuelling will be carried out at the Construction Compound only and adhere to the control measures outlined in the SWMP.

New petrol interceptors will be provided at the existing Lough Atalia outfall pipe, at the outfall pipe to Mutton Island WWTP and at the connection to the existing network at Ballyloughane Road. As hydrocarbons can be carried long distances in surface water drains, whereas silt in water tends to drop out of suspension in a shorter distance, no mobile plant is to be refuelled within 10m of a surface water drain. Where possible, refuelling should predominately take place within the Construction Compound.

There is potential for significant sediment generation associated with the widening of the existing footpath running at the south side of the Dublin Road, very close to Lough Atalia. The following measures are recommended to minimise sediment runoff:

- Soil stripping shall be undertaken under dry weather conditions;
- Stockpiling soil and aggregate shall be at appropriate location with adequate setback;
- Heavy vehicular movement shall be restricted and kept away as far as possible;
- The concrete will be poured in dry weather only; and
- A sediment trap shall be located immediately downstream of the works to prevent silt discharging into Lough Atalia.

The appointed contractor is responsible for contacting the Environmental Protection Agency (EPA) and IFI to ensure these measures are in line with the requirements of these agencies. Method Statements for the upgrade of the outfalls shall be agreed with IFI prior to construction.

### 5.4.4.2 Groundwater Vulnerability

The bedrock aquifer beneath the project site is a regionally important aquifer - Karstified (conduit). According to the GSI website (accessed in November 2023), the project site's groundwater vulnerability is moderate

to extreme, which indicates that overburden depth is particularly shallow in places along the Proposed Development, reaching a maximum of approximately 5m.

There may be a requirement for groundwater dewatering due to the site's proximity to Lough Atalia. All construction dewatering water shall be stored for removal off site for treatment and disposal should this apply.

## 5.4.5 Control and Management Measures

### 5.4.5.1 Construction Compound

#### 5.4.5.1.1 Construction Compound Establishment

The main Construction Compound will be located on the Dublin Road (adjacent to the Connacht Hotel). The compound will be used for material stockpiling, loading / unloading, fuel and machinery store, canteens, site office, toilet facilities, etc. Further details on the Construction Compound are provided in Chapter 5 (Construction) of Volume 2 of this EIAR.

All surface water runoff will be intercepted and directed to appropriate treatment systems / settlement facilities for the removal of pollutants prior to discharge. Further information on the Construction Compound is provided in Section 5.6 in Chapter 5 (Construction) in Volume 2 of the EIAR.

#### 5.4.5.1.2 Security

The Construction Compound will be fenced off, lit (during working hours) and secured with Closed-Circuit Television (CCTV), to ensure safe storage of all material, plant and equipment, if required, to prevent acts of vandalism that could result in leaks or spills from materials.

#### 5.4.5.1.3 Welfare and Sanitary Facilities

The Construction Compound will be engineered with appropriate services as discussed in Section 5.6 in Chapter 5 (Construction) in Volume 2 of the EIAR. Water and wastewater disposal, etc., will be organised by the appointed contractor. At work areas along the Proposed Development, where permanent provisions (for the duration of the construction programme) are not practicable, appropriate temporary provisions will be made. Temporary welfare facilities will need to be used, for example, portable toilets in the vicinity of works. Welfare facilities will discharge wastewater either to an existing sewer, with the permission of the sewerage undertaker, or will be collected and disposed of in an appropriate manner to a suitably licensed facility off site to prevent water pollution and in accordance with the relevant statutory requirements.

#### 5.4.5.1.4 Fuel Storage

With regards to fuel storage, the following control and management measures are to be employed:

- All hydrocarbons used during the Construction Phase will be appropriately handled, stored, and disposed of in accordance with recognised standards as laid out by the EPA;
- All chemical and fuel filling locations will be contained within signposted, designated bunded areas, a minimum of 10m from any surface water drain or watercourse;
- At the Construction Compound, where the site is pervious, an area of hard standing will be installed in a demarcated area for refuelling, and vehicle / plant cleaning and service areas. This area will be drained to a soak away if possible, or to local surface water drains, with the permission of the asset owner;
- Suitable precautions will be taken to prevent spillages from equipment containing small quantities of hazardous substances (for example, chainsaws and jerry cans) including:
  - Each container or piece of equipment will be stored in its own drip tray made of a material suitable for the substance being handled;
  - Spill kits and drip trays will be provided for all equipment and at locations where any liquids are stored and dispensed, and staff will be trained on the procedures to be followed; and
  - Containers and equipment will be stored on a firm, level surface.



- Procedures and contingency plans will be in place at each works area to address the cleaning up of small spillages as well as dealing with an emergency incident (see Section 5.6). A stock of absorbent materials such as sand, spill granules, absorbent pads and booms will be kept at each work site, on plant working near water and particularly at refuelling areas and where fuel or oil is stored;
- When working in or in close proximity to watercourses, an absorbent containment boom will be installed across the watercourse or around the works, securely and closely anchored to the banks or working platform;
- The storage of fuels, other hydrocarbons and other chemicals within the Construction Compound shall be in accordance with relevant legislation and best practice. In particular:
  - Fuel tanks, drums, and mobile bowsters (and any other equipment that contains oil and other fuels) will be housed within a bund of at least 110% capacity of the fuel tank itself or at least 25% of the total volume of the containers, whichever is greatest. The fuel tank will be double skinned. There will be no passive drainage from the bund; any water collected within it will be pumped out and removed off site for disposal; and
  - Any designated area or areas for oils, fuel, chemicals, hydraulic fluids, etc., storage and refuelling will be set up at least 10m from any surface water drains or watercourses (as per CIRIA guidance listed in Section 5.4.1.2) and the storage location within the Construction Compounds shall be organised so as to be as far away from surface water drains or watercourses as is practicable to minimise risks from leaks and spills.
- Storage areas will be covered, wherever possible, to prevent rainwater filling the bunded areas;
- Fuel fill pipes will not extend beyond the bund wall and will have a lockable cap secured with a chain; and
- Where fuel is delivered through a pipe permanently attached to a tank or bowser:
  - The pipe will be fitted with a manually operated pump or a valve at the delivery end which closes automatically when not in use;
  - The pump or valve will be fitted with a lock;
  - The pipe will be fitted with a lockable valve at the end where it leaves the tank or bowser;
  - The pipework will pass over and not through bund walls;
  - Tanks and bunds will be protected from vehicle impact damage;
  - Tanks will be labelled with contents, capacity information and hazard warnings; and
  - All valves, pumps and trigger guns will be turned off and locked when not in use. All caps on fill pipes will be locked when not in use.

#### 5.4.5.1.5 Storage of Materials and Waste

The Construction Compound will operate a 'Just-in-time' approach, where practicable, for material deliveries to minimise the amount required to be stored. Where material is required to be stored:

- Storage areas will be at least 10m from surface water drains or watercourses;
- Storage areas for solid materials, including waste soils (where applicable), will be designed and managed to prevent deterioration of the materials and their escape (via surface runoff or wind blow);
- Storage areas will be kept secure to prevent acts of vandalism that could result in leaks or spills;
- All containers of any size will be correctly labelled indicating their contents and any hazard warning signs; and
- A register of all hazardous substances, which will either be used on-site or expected to be present (in the form of soil and/or groundwater contamination) will be established and maintained. This register will be available at all times and shall include as a minimum:
  - Valid Material Safety Data Sheets (MSDS);
  - Health and safety and environmental controls to be implemented when storing, handling, using and in the event of spillage of materials;
  - Emergency response procedures / precautions for each material; and



- The Personal Protective Equipment (PPE) required when using the material.

Waste may be stored at the Construction Compound for a limited amount of time to help to limit the number of vehicle movements to and from site, as far as possible, to minimise effects on the local roads. Where waste is required to be stored:

- It will be stored in secure designated areas, in enclosures or containers to prevent material being dispersed by the wind;
- Designated areas will be sited at least 10m away from surface water drains or watercourses to limit the risk of escape and contamination of watercourses;
- Waste storage containers will be labelled with their waste type and their List of Waste (LoW) code. Any labelling will be consistent with Industry Best Practice at the time construction commences and reviewed annually;
- Liquid wastes will be stored in containers within bunded zones with secondary containment of at least 110% capacity of the largest container or at least 25% of the total tank capacity inside the bunded zone (whichever is the greatest); and
- Incompatible or hazardous wastes will be stored and handled in accordance S.I. No. 324 of 2011 – European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011.

#### 5.4.5.2 Control of Sediment

There are a number of sources of sediment or silt-laden water on a construction site, including silty 'runoff' from stripped soils; and the stockpiling of soils. The appointed contractor shall develop a Sediment Control Plan (SCP) before construction commences. The Contractor will monitor the suspended solids and turbidity levels to ensure sediment concentrations are appropriate prior to discharge. The SCP shall, as a minimum, contain information on items discussed in the following sub-sections.

##### 5.4.5.2.1 Construction Sequencing – Installation of Drainage Features

In order to protect water bodies from potential impacts, such as increased volumes of runoff, silty water and accidental spills, temporary drainage control measures will be installed at the outset, prior to any site clearance works. This will include measures such as construction of cut-off ditches, silt fences erected and the set-up of settlement tanks.

##### 5.4.5.2.2 Silty Water Runoff

The following measures will be implemented to reduce the potential for silty water runoff:

- Clearing and stripping of topsoil or existing roads and footpaths exposing underlying granular layers at each phase of works will be delayed as long as possible, being carried out shortly before construction begins;
- Cut-off ditches, berms or diversion channels will be utilised around working area boundaries, where possible, to limit surface water entering the excavated areas and silty water running off the site into surface water drains or watercourses;
- Silt fences will be installed / erected along the boundary of the Construction Compounds and around surface water drains or watercourses to prevent any silt laden runoff from impermeable surfaces; and
- Weather conditions will be taken into account by the appointed contractor when planning construction activities to minimise the risk of silty water runoff from the site.

##### 5.4.5.2.3 Stockpiling Material

The following measures will be implemented during stockpiling:

- Clearing and stripping of topsoil or existing roads and footpaths exposing underlying granular layers at each phase of works will be delayed as long as possible, being carried out shortly before construction begins rather than stripping the whole site many months before construction;

- Where an excavation contains a combination of acceptable and non-acceptable material for reuse, the excavation will be conducted so that the acceptable material is excavated and stockpiled separately without contamination by the unacceptable material;
- Temporary stockpiles will be located away from surface water drains or watercourses at a minimum distance of 10m;
- The topsoil, and upper level of subsoil, will be stripped and stockpiled in identified locations;
- For watercourse crossings, stockpiles will not be located anywhere within the crossing working area;
- No stockpiles will be located within a European or National designated site or within a floodplain area; and
- Management of stockpiles to prevent siltation of watercourse systems through runoff during rainstorms will be required with the final measures to be determined by the appointed contractor. These will include the following measures or equivalent measures:
  - Allowing the establishment of vegetation on the exposed soil;
  - Providing silt fences or straw barriers at the toe of the stockpile to mitigate runoff during rain events;
  - Surrounding stockpiles with cut-off ditches to contain runoff;
  - Directing any runoff to the site drainage system or filter drains along the construction working width and to the settlement pond (or other) treatment systems; and
  - Providing bunds or another form of diversion to keep runoff from entering the stockpile area.

#### 5.4.5.3 Use of Concrete

Concrete will be used to construct kerbs, footpath, manholes, etc. The use of concrete will be minimised as much as possible. However, if the use of concrete is unavoidable, the following measures shall be employed:

- The use and management of concrete in or close to watercourses will be carefully controlled to avoid spillage. Alternate construction methods are encouraged, for example, the use of pre-cast concrete or permanent formwork will reduce the amount of in situ concreting required;
- Weather conditions will be taken into account when planning construction activities which require the use of wet concrete to minimise the risk of the runoff of concrete 'washout' from site;
- Where concrete batching is proposed by the appointed contractor, this activity will be carried out at least 10m from surface water drains or watercourses. Washout from such mixing plant will be carried out only in a designated contained impermeable area;
- Batching and mixing activities and material storage areas will be located at least 10m (as per CIRIA guidance listed in Section 5.4.1.2) away from surface water drains or watercourses;
- Chute washout will be carried out at designated locations only, at least 10m from surface water drains or watercourses. These locations will be signposted throughout the construction works areas. Chute washout locations will be provided with appropriate designated, contained impermeable areas and treatment facilities including adequately sized settlement tanks;
- The clear water from the settlement tanks shall be pH corrected prior to discharge to any surface water drains or watercourses;
- There will be no hosing of concrete, cement, grout, or similar material spills into surface water drains or watercourses. Such spills shall be contained immediately, and runoff prevented from entering the watercourse; and
- Discharge of washout water to wastewater (foul) sewer will only be carried out with the express permission of the sewerage undertaker and will be treated to the standard required, for example, because of its high pH (alkalinity), washout water may need treatment before disposal to the foul sewer.

#### 5.4.5.4 Vehicles and Plant

With regard to vehicles and plant provided for use on the Proposed Development, the following measures will be employed:

- Vehicles and plant provided for use on the Proposed Development will be in good working order to ensure optimum fuel efficiency, and will be regularly inspected to ensure they are free from leaks and are promptly repaired when not in good working order;
- Spill kits will be carried on all vehicles;
- Vehicles and plant will not park near or over surface water drains or watercourses;
- Refuelling of vehicles and plant will be carried out on hard standing surfaces, using drip trays to ensure no fuel can contaminate the ground outside of the bunded areas;
- For deliveries and dispensing activities, the appointed contractor will ensure that:
  - Site-specific procedures are in place for bulk deliveries;
  - Delivery points and vehicle routes are clearly marked; and
  - Emergency procedures are displayed, and a suitably sized spill kit is available at all delivery points, and staff are trained in these procedures and the use of spill kits.
- The appointed contractor will provide wheel washing facilities, and any other necessary measures to remove mud and organic material from vehicles, at the Construction Compounds, where necessary. These will be located at least 10m away from any surface water drains or watercourses;
- The cleaning of delivery trucks shall be carried out at the Construction Compounds and shall not be undertaken at the works areas;
- The surface runoff from vehicle washing areas will be directed to an on-site treatment system where possible. This will also increase the potential for reusing the water. Such a treatment system would typically include:
  - A settlement lagoon to remove suspended solids such as mud and silt; and
  - Catchpits or silt traps on drains, ensuring that they are in place during cleaning and that they are emptied at regular intervals;
  - The use of detergents in the cleaning process will be minimised, where required. Biodegradable and phosphate-free detergents will be used;
  - Where detergents are used in the washing process, the wash water will be contained in a containment tank prior to disposal off site using a suitable licensed waste disposal operator, or if a foul or combined sewer is nearby, the surface runoff could be directed to it, with the permission of the sewerage undertaker; and
  - To further minimise water used for washing vehicles, trigger-operated spray guns will be used, with an automatic water supply cut-off.

## 5.4.6 Drainage Inspection and Surface Water Monitoring

### 5.4.6.1 Drainage Inspections

The effectiveness of the drainage system must be monitored periodically by the ECoW during construction to minimise the risk of discharging silt-laden water into the receiving waters. The monitoring frequency is best aligned with changing weather events and drainage conditions, as the project progresses.

Event based inspections by the ECoW are as follows:

- >10mm/hr;
- >25mm in a 24-hour period; or
- Rainfall depth greater than monthly average in 7 days.

### 5.4.6.2 Surface Water Quality Monitoring

The appointed contractor shall carry out visual monitoring of surface water control measures (settlement tanks, silt fences, fuel storage areas, etc.) on a daily basis. In addition, weekly visual inspections in proximity to the Proposed Development will be carried out by the appointed contractor.

Indicators that water pollution may have occurred include the following:

- Change in water colour;
- Change in water transparency;
- Increases in the level of silt in the water;
- Oily sheen to water surface;
- Floating detritus, or scums and foams; and
- Suspended solids and turbidity will also be monitored.

If hydrocarbons are observed or other water quality parameters are suspected to have been exceeded, as a result of an incident but where a visual inspection may not provide sufficient information to conclude, an investigation will be carried out to determine whether any element of the construction of the Proposed Development could be causing the contamination. If any potential sources of contamination are observed, appropriate actions will be taken (depending on the source and nature) to prevent further contamination and the incident shall be recorded and investigated in more detail to prevent a recurrence. If required, the relevant regulatory authorities will be informed.

## 5.5 Construction and Demolition Resource and Waste Management Plan

### 5.5.1 Introduction

This Construction and Demolition Resource and Waste Management Plan (CDRWMP) has been prepared to ensure that waste arising during the Construction Phase and Demolition Phase of the Proposed Development, will be managed and disposed of in a way that ensures compliance with the provisions of the Waste Management Act, as amended, and associated Regulations to ensure that optimum levels of reduction, reuse and recycling are achieved. The purpose of this CDRWMP is to facilitate reuse and recycling and divert waste from landfill.

The CDRWMP is consistent with best practice management practices and any relevant mitigation measures as contained within the EIAR. The content and headings used in this CDRWMP comply with the EPA Best Practice Guidelines for the Preparation of Resource Management Plans for Construction and Demolition Projects (EPA 2021a).

This CDRWMP is based on the estimated quantities of waste generation and the proposed management measures from the Proposed Development at planning stage.

#### 5.5.1.1 Legislation, Policy and Guidance

Resource and waste management takes place in a legislative and policy framework. Applicable legislation, policy and best practice guidance was reviewed during the preparation of the CDRWMP. The key components of European Union (EU), national and local policy, legislation, and guidance relevant to proposed construction and demolition (C&D) waste are summarised as follows:

- Prevention and minimisation of waste is the preferred option;
- Where C&D waste is generated, it should be source separated to facilitate reuse and recycling and to maximise the diversion of waste from landfill;
- Where waste may not be prevented or recycled, it should be transported and disposed of in accordance with applicable legislation and without causing environmental pollution; and
- Waste may only be transferred by a waste collection permit holder and delivered to an authorised waste facility.

##### 5.5.1.1.1 Legislative Context

The EPA Best Practice Guidelines for the Preparation of Resource Management Plans for Construction and Demolition Projects (EPA 2021a) states that a plan is mandatory for all C&D projects, as best practice to inform the planning consent process. At planning stage, it is estimated that the Proposed Development will

generate more than 100m<sup>3</sup> (metres cubed) in volume of C&D waste, through demolition. Therefore, to comply with these guidelines, a Tier 2, bespoke C&D Plan has been prepared (this CDRWMP).

#### 5.5.1.1.2 Guidance

An overview of relevant legislation, policy and best practice guidance related to waste management is presented in Appendix A18.1 Legislation and Policy in Volume 4 of the EIAR. However, the main guidance documents used in the preparation of the CDRWMP were:

- Connacht-Ulster Waste Region (CUWR) (2016). Connacht Ulster Region Waste Management Plan;
- EU Construction & Demolition Waste Management Protocol (European Commission 2018);
- Construction & Demolition Waste Soil and Stone Recovery / Disposal Capacity (Update Report 2020) (Regional Waste Management Offices 2020);
- The Department of Communications, Climate Action and Environment (DCCAE) A Waste Action Plan for a Circular Economy, Ireland's National Waste Policy 2020–2025 (DCCAE 2020);
- Circular Economy Action Plan, For a Cleaner and More Competitive Europe (European Commission 2020);
- Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction and Demolition Projects (Draft for Public Consultation) (EPA 2021a);
- The Circular Economy Programme 2021–2027 (EPA 2021b);
- Department of Environment, Climate and Communications (DECC) Whole of Government Circular Economy Strategy 2021–2022 (Pre-Consultation Draft) (DECC 2021a); and
- Whole of Government Circular Economy Strategy 2022–2023 'Living More, Using Less' (DECC 2022).

#### 5.5.1.1.3 Sustainable Resource and Waste Management Principles

As stated in Section 17.2 in Chapter 17 (Waste & Resources) in Volume 2 of the EIAR, the principal objective of sustainable resource and waste management is to use resources more efficiently, where the value of products, material and resources is maintained in the economy for as long as possible such that the generation of waste is minimised. To achieve resource efficiency there is a need to move from a traditional linear economy to a circular economy.

As stated in the Waste Action Plan for a Circular Economy, Ireland's National Waste Policy 2020–2025:

*'In a circular economy the value of products and materials is maintained for as long as possible; waste and resource use are minimised, and resources are kept within the economy when a product has reached the end of its life, to be used again and again to create further value' (DCCAE 2020).*

The Circular Economy Action Plan, For a Cleaner and More Competitive Europe notes that:

*'the EU needs to accelerate the transition towards a regenerative growth model that gives back to the planet more than it takes, advance towards keeping its resource consumption within planetary boundaries, and therefore strive to reduce its consumption footprint and double its circular material use rate in the coming decade' (European Commission 2020).*

However, where residual waste generation is unavoidable, it will be dealt with in a way that follows the waste hierarchy (as shown in Section 17.2.2 in Chapter 17 (Waste & Resources) in Volume 2 of the EIAR). The waste hierarchy supports the need to achieve efficient use of material resources, minimise the amount of waste produced (or otherwise increase its value as a resource) and reduce, as far as possible, the amount of waste that is disposed to landfill.

The Whole Government Circular Economy Strategy 2022–2023 (DECC 2022), sets out a policy framework for transitioning to a circular economy, including measures to reduce the circularity gap, raise awareness and support investment into circular initiatives and to identify barriers.

#### 5.5.1.1.4 Waste Management Target

Ireland achieved 81% material recovery of C&D waste in 2022 (EPA 2024). Under Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives and Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste (hereafter referred to as the Waste Framework Directive), EU Member States must achieve 70% of material recovery of non-hazardous and non-soil-and-stone C&D waste by 2020.

Every effort will be made to achieve the required level of material recovery of C&D waste as part of the Proposed Development. A baseline of available waste capacity for 2024 was calculated in Chapter 17 (Waste & Resources) in Volume 2 of the EIAR and summarised in Table 5-16. This data has been used to establish a baseline for 2024. The available C&D waste and by-product capacity in CUWR for 2023 is approximately 1,930,606 million tonnes based on the following assumptions:

- Using the minimum available capacity for permitted facilities for C&D wastes within the CUWR (only including facilities that accept a single waste type in order to avoid double counting capacity and excluding Donegal and Monaghan);
- Including only licensed facilities accepting soil and stones; and
- Including all Article 27 notifications dated 2024 in the CUWR.

**Table 5-16 C&D Waste Management Baseline for CUWR, 2020 (permitted, licensed and Article 27 notifications)**

C&D Waste Management Baseline for 2020	Capacity / Annual Intake (Tonnes)
Minimum permitted capacity (Local Authority Waste Facility Register, 2024)	1,569,994
Licensed annual intake (soil and stone facilities) (EPA 2024b)	90,000
Article 27 (by-product) notifications (EPA 2024d)	270,612
<b>Total</b>	<b>1,930,606</b>

## 5.5.2 Proposed Development Description

Information on the Proposed Development will be included in this Section of the CDRWMP. This information will assist those without detailed knowledge of the Proposed Development in quickly familiarising themselves with the key elements of the Proposed Development and will also assist those who have a need to examine, review or audit the CDRWMP.

Details will include a description of the key elements of the Proposed Development, an overview of the main works required at each section, the construction programme, construction methodology, plant and equipment requirements, details on the Construction Compounds, construction traffic management measures, and interfaces with other projects.

## 5.5.3 Roles and Responsibilities

The roles and responsibilities of key stakeholders are discussed in Section 5.1.5. The appointed contractor will appoint a suitably qualified person to maintain the CDRWMP, who will be responsible for the following:

- Detailing and maintaining the CDRWMP, and updating it as appropriate;
- Following each update or revision of the CDRWMP, providing the CDRWMP to GCC, appointed contractor and all relevant personnel;



- Ensuring that all personnel are instructed about the objectives of the CDRWMP and informed of the responsibilities which fall upon them as a consequence of its provision. This will be carried out during the induction process for new personnel;
- Communicating the requirements of the CDRWMP using for example, toolbox talks, prominently displayed notices and audits as relevant;
- Implementing the CDRWMP throughout the Demolition, Excavation, and Construction Phases of the Proposed Development; and
- Ensuring, where training is required regarding the handling and management of wastes on-site, that this is provided, where required.

The appointed contractor and all personnel handling wastes must be in a position to:

- Distinguish reusable materials from material suitable for recycling;
- Ensure maximum segregation of waste and recyclables at source;
- Co-operate with the appointed contractor on best locations for stockpiling reusable material;
- Separate material for recovery; and
- Identify and liaise with operators of recovery outlets as appropriate.

Copies of the CDRWMP will be made available to all relevant personnel.

#### 5.5.3.1 Auditing

Resource audits will be conducted during the Construction Phase. The quantity and types of waste and materials leaving site during the Construction Phase will be recorded. 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.

These audits will cover work practices, record keeping, and off-site tracking as follows:

- Periodic audits and inspections of work practices to assess compliance with the CDRWMP. The audit protocol will be risk based and focus on key issues of concern;
- A review of all records of wastes and resources generated on-site and transported off site periodically throughout the Construction Phase. If waste movements are not accounted for, the reasons for this are to be established to understand why the record keeping system has not been maintained and implement corrective actions if needed;
- The resource records will be compared with established targets for the site (e.g. reuse of resource target or recycling of waste target);
- Examining material management on-site to determine where the largest percentage residual waste generation is occurring. The waste management methods for each material type will be reviewed in order to highlight how project contract targets can be achieved; and
- Issue corrective actions (training, penalties, etc.) as required to site operatives where deviations of the CDRWMP are observed.

#### 5.5.3.2 Tracking and Tracing

The appointed contractor is required to maintain records for all resource material which is used on-site and leaves the Proposed Development, either for reuse, recycling, energy recovery, backfilling or other recovery or disposal on third party sites. A recording system must be put in place to record residual waste and resources generated on the Proposed Development. The type of information to be recorded in the site tracking system is described below:

- For each movement of a resource off site, a signed docket / invoice will be obtained from the haulier / contractor detailing the following:



- A description of the resource stream;
  - LoW Code for each stream (where applicable); and
  - Validated quantity of material moved off site by the haulier / contractor (typically reported in tonnes).
- The name and authorisation of the haulier to transport the material. In the case of a 'waste' this requires a valid Waste Collection Permit (WCP). In the case of by-product or other materials that are not a waste, no WCP is required. In both cases the vehicle registration number should also be recorded for each load of material removed from site;
  - The name and authorisation of the destination site for the resource, again, for a 'waste' this requires a valid Cert of Registration, Waste Permit or Waste Licence, and in the case of a by-product, the relevant by-product determination;
  - The waste contractors must be required to provide details of end-use or waste treatment in waste reports;
  - This recording will be carried out for each resource type and the system will also be linked with the delivery records. In this way, the percentage of residual resource generated for each material can be determined; and
  - The system will allow the comparison of these figures with the targets established for the prevention, reuse and recovery of resources to highlight the successes or failures against these targets.

It is the obligation of the appointed contractor or their appointed person to ensure that all resources taken off site are in line with the relevant legislation and the key area relates to ensuring that hauliers and collection sites have the appropriate authorisations.

## 5.5.4 Key Materials, Quantities and Costs

### 5.5.4.1 Introduction

C&D waste is defined as waste which arises from construction, renovation and demolition activities. Typical C&D wastes which are likely to arise during the Construction Phase of the Proposed Development are set out in Appendix A17.2 List of Waste Codes for Construction and Demolition Wastes in Volume 4 of the EIAR, including EPA LoW codes.

The most environmentally sustainable means of managing excavated material is its prevention and minimisation. See Section 17.3.5 in Chapter 17 (Waste & Resources) in Volume 2 of the EIAR for the principles of waste management. The Appointed Contractor will be responsible for the implementation of these for the Proposed Development. In recent years there has been a shift in focus on best practice waste management and waste minimisation in construction and an increase in the reuse of construction by-products in projects.

It is expected that materials will be generated by the Proposed Development during the following activities:

- Demolition;
- Excavation; and
- Construction.

Likely materials that will be generated during each of these activities are discussed in further detail in Section 5.5.4.2 to Section 5.5.4.5.

### 5.5.4.2 Demolition Waste Generation

As described in Section 5.5 in Chapter 5 (Construction) in Volume 2 of the EIAR, the main structures to be demolished along the Proposed Development are:

- Two buildings at Brothers of Charity;
- The wall either side of the main entrance of Brothers of Charity; and

- The boundary wall outside the Connacht Hotel.

A large portion of demolition waste is expected to be inert waste such as concrete, brick and tiles, etc. Metal waste will also be generated from demolition. Segregated wood, glass and plastic will also be generated.

The estimated quantity and type of waste that will be generated by demolition activities in connection with the Proposed Development is provided in Table 5-17. The estimated 3,416 tonnes of demolition waste which will be generated as a result of the Proposed Development is equivalent to 0.17% of the C&D waste management baseline in the CUWR set out in Table 5-15.

**Table 5-17 Estimated Demolition Waste Types and Quantities**

Waste Type	Approximate Waste and Material Quantity (Tonnes)
Concrete, bricks, tiles and similar	3,390
Metals	20
Segregated wood, glass and plastic	6
<b>Total</b>	<b>3,416</b>

#### 5.5.4.3 Excavation Waste Generation

Excavation waste will arise from such activities as:

- Excavation of existing carriageways (e.g. road narrowing, removal of islands);
- Excavation of existing footpaths and cycle tracks and pedestrianised areas (e.g. widening, urban realm improvement); and
- Excavation for utility diversions and / or protections.

The waste types likely to be generated during the Construction Phase are set out in Table 5-18. The total forecast of surplus excavation material from the Proposed Development will be 13,161 tonnes and is equivalent to 0.68% of the C&D waste management baseline for the CUWR set out in Table 5-15.

**Table 5-18 Summary of Excavation Material Type and Quantities**

Materials from C&D Sources	Approximate Waste and Material Quantity (Tonnes)
Soil and stone	4,458
Concrete, bricks, tiles and similar	1,770
Bituminous mixtures	6,935
<b>Total</b>	<b>13,161</b>

#### 5.5.4.4 Construction Waste Generation

Construction works, site offices and temporary works facilities are also likely to generate waste. General construction waste can vary significantly from site to site but typically will include the following non-hazardous fractions:

- Soil and stone;
- Concrete, brick, tiles and ceramics;
- Bituminous mixtures;
- Metals;
- Wood;
- Municipal type wastes generated by construction employees; and

- Other.

The hazardous waste streams which could arise from construction activities include the following:

- Waste electrical and electronic equipment (WEEE) components;
- Batteries;
- Asbestos;
- Wood preservatives;
- Liquid fuels; and
- Contaminated soil.

Also included within this definition are surplus and damaged products and materials arising in the course of construction work or used temporarily during the course of on-site activities.

The Construction Phase will require the importation of a number of key construction materials for the Proposed Development works. This material will include items such as concrete, granular fill / aggregate, bituminous mixtures and structural steel. Table 5-19 provides an estimate of the quantities of the major materials required to complete the Construction Phase of the Proposed Development.

**Table 5-19 Estimated Quantities of Major Construction Materials Required by the Proposed Development**

Materials	Estimated Quantity (Tonnes)
Aggregates	10,490
Asphalt Products	10,490
Concrete	9,480

In the case of the Proposed Development, the most likely type and quantity of general construction waste will be surplus concrete and unusable or damaged pipe segments which may arise on-site. Quantities of these materials are estimated to be small; assumed to be approximately between 5% to 15% of construction material delivered to site, as stated in the Waste and Resources Action Programme (WRAP) Builders: Estimating Waste (WRAP 2014). There is adequate capacity for the management of such wastes (see Table 5-15). Segregation facilities will be provided to ensure that recovery and recycling of such wastes are maximised.

#### 5.5.4.5 Municipal Waste Generation

It is anticipated that there will be approximately 50, possibly up to 70 at peak, construction staff employed over the Construction Phase of the Proposed Development. Small volumes of general municipal wastes will be generated by construction staff during the Construction Phase (e.g., from offices and welfare facilities). Segregation facilities will be provided on the construction site to ensure that recovery and recycling of such wastes is maximised.

#### 5.5.4.6 Costs of Waste Management

While landfill disposal has been the most commonly used method for waste management in Ireland in the past, waste to energy incinerators are also now in operation at Poolbeg, Dublin 4 and in Carranstown, County Meath.

Typically, the current cost of disposal of waste to landfill in Ireland exceeds €170 per tonne. From 1 July 2013 in accordance with S.I. No. 194 of 2013 – Waste Management (Landfill Levy) (Amendment) Regulations 2013, the 'landfill levy' increased to €75 per tonne for waste disposed to landfill. Disposal of hazardous waste can cost from €350.

In addition to landfill operator fees and landfill levies there are additional costs included in the 'true cost of waste management' including:

- The purchase cost of waste materials (including imported soil);
- Handling costs;
- Storage and transportation costs; and
- Revenue generated from sales.

Therefore, in order to reduce costs associated with waste management, surplus material should be reused and recycled where possible and materials should be carefully stored and handled to minimise risk of damage.

## 5.5.5 Waste Management

### 5.5.5.1 Introduction

GCC is committed to implementing the principles of sustainable resource and waste management, as set out in Section 5.5.1.1.3. Waste from the Proposed Development will be managed in accordance with the principles of a circular economy and the waste hierarchy. Waste disposal will be minimised, in so far as is reasonably practicable, and opportunities for reuse of materials, by-products and wastes will be sought throughout the Construction Phase of the Proposed Development.

Following appointment, the contractor will be responsible for maintaining the CDRWMP. It will be at the discretion of the appointed contractor to determine how material from the Proposed Development will be managed. It is assumed, as a worst-case scenario, that all excavated soil will be managed or disposed of at an authorised facility, either in Ireland or abroad. However, all of the below options may also be used.

### 5.5.5.2 Demolition Waste Management

All material generated from the Proposed Development will be considered for reuse for construction within the Proposed Development or in other construction projects in accordance with Article 27 of S.I. No. 323 of 2020 – European Union (Waste Directive) Regulations 2020 (hereafter referred to as the Waste Directive Regulations). It will be the responsibility of the appointed contractor to review feasibility of reuse of materials and ensure that the necessary testing is undertaken to demonstrate compliance with Article 27, as appropriate.

Materials will require on-site segregation by waste classification, and if not suitable for reuse, will be delivered to an authorised recycling, recovery or disposal facility.

Where practicable and appropriate, and if in a reusable condition, street and roadside infrastructure such as bus stops, lighting poles, traffic signals, manhole access covers, and signs will be reused within the Proposed Development. If not reused, they will be delivered to appropriately authorised recycling or recovery facilities.

Where metal railings and gates are removed, they may have inherent value due to their metal content. These will be delivered for metal recycling to an authorised waste facility where not reused.

Some example facilities which are currently authorised to accept metal and electronic waste include:

- Irish Lamp Recycling Co. Ltd, Woodstock Industrial Estate, Kilkenny Road, Athy, Co. Kildare; and
- Hammond Lane Metal Company, Pigeon House Road, Dublin 4, Dublin.

The least preferable option is disposal to an authorised facility and will be considered by the appointed contractor when reasonable opportunities for reuse, recycling and recovery are unavailable.

### 5.5.5.3 Excavation Waste Management

In line with current practice in Ireland, surplus materials and wastes from the Proposed Development will be managed as follows:

- Where practicable, naturally occurring excavated material will be reused within construction in the Proposed Development in accordance with Article 2 of the Waste Directive Regulations, the Waste Framework Directive and Section 3 of the Waste Management Act, as amended;
- Excavation material will be used as engineering and landscaping material within the Proposed Development and on other projects requiring the types of materials generated, where practicable, through Article 27. Reuse of topsoil and excavated material within the Proposed Development is proposed, where practicable. The material will also be subject to testing to ensure it is suitable for its proposed end use;
- Should material meet the acceptance criteria set out in Article 28 of the Waste Directive Regulations, this material will be delivered to recovery or disposal facilities which are authorised to collect this material under the Waste Management Act, as amended (i.e. which hold a Certificate of Registration (CoR), Waste Facility Permit (WFP) or EPA Licence), should such recovery or disposal facilities become available by the time of commencement of construction of the Proposed Development;
- In accordance with the law, all excavation wastes requiring removal from site for recycling or recovery will be delivered to facilities which are authorised under the Waste Management Act, as amended (i.e. which hold a CoR, WFP or EPA Licence). Examples of recycling / recovery activities for excavation material include:
  - Processing of stone to produce construction aggregate;
  - Backfilling of quarries; and
  - Raising land for site improvement or development.
- Any hazardous waste arising will be managed by the appointed contractor in accordance with the applicable legislation; and
- In accordance with the law, all wastes removed from site will be transported by the holder of the appropriate waste collection permit, granted in accordance with S.I. No. 820 of 2007 – Waste Management (Collection Permit) Regulations 2007.

It will be the responsibility of the appointed contractor to secure agreements for acceptance of surplus excavation materials from the Proposed Development in authorised and regulated facilities, in accordance with the Waste Management Act, as amended, and associated regulations.

Where carriageway is removed it will be reused where possible within the Proposed Development through the implementation of the measures set out below.

Due to the nature of the works in an urban environment there are limited opportunities to achieve a cut / fill balance of materials that could be more readily accommodated on a greenfield project where earthworks embankments / bunds are more common. Material from the existing pavement layers will be temporarily stockpiled at the Construction Compound and sent to a suitable recovery facility for recycling and reuse as recycled aggregate material in the industry, as further described in Section 17.6 in Chapter 17 (Waste & Resources) in Volume 2 of the EIAR.

Material for excavation will need to be tested by the appointed contractor for quality and contamination and could potentially be reused as general fill or general landscape fill material in construction under the provisions of Article 27. Material which meets the necessary acceptance criteria will be delivered to an authorised soil recovery facility. Material which requires recycling will be sent to an authorised waste facility and may be used in accordance with Article 28 of the Waste Directive Regulations, as amended. Article 28 sets the criteria which must be complied with, and the EPA must use to determine a waste reaches 'end of waste' status and becomes a material.

Excavated materials such as capping, subbase, bituminous and concrete materials could be reused or recycled in line with TII specifications:

- Capping, subbase, bituminous and concrete materials could be reused or recycled in fill and capping materials (e.g. 6A, 6B, 6C, 6F, 6G, 6H, 6I, 6M, 6N) providing they comply with the Specification for Road Works Series 600 – Earthworks (CC-SPW-00600) (TII 2013a);
- Subbase, bituminous and concrete materials could be reused or recycled in subbase or base materials providing they comply with the Specification for Road Works Series 800 – Unbound and Hydraulically Bound Mixtures (CC-SPW-00800) (TII 2023a); and
- Subbase and bituminous materials could be recycled in base or binder materials (e.g. Asphalt Concrete base and binder products) providing they comply with Road Pavements – Bituminous Materials (CC-SPW-00900) (TII 2023b).

Information on quantities of potential material reuse or recycle is provided in Table 5-19. These pavement materials will either be removed directly from the Proposed Development or temporarily stored and removed at a later date as part of a spoil / waste management strategy having consideration of the intermittent nature of the street works construction activities.

#### 5.5.5.4 Construction Waste Management

The following measures will be implemented during construction, where practicable, to ensure the maximum quantity of material is reused on the Proposed Development and to contribute to achieving the objectives set out in A Waste Action Plan for a Circular Economy Ireland's National Waste Policy 2020–2025 (DCCAE 2020) as follows:

- Stockpiling of existing sub-base, capping layer and topsoil material generated on-site for direct reuse in the Proposed Development where practicable in the Construction Compounds (subject to material quality testing to ensure it is suitable for its proposed end use); and
- Recycled aggregates and reclaimed bituminous mixtures will be specified in the Proposed Development where practicable. For example, suitable recycled aggregates and appropriate site won material may be specified in the proposed road base / binder layers, sub-base layers under footpaths / cycle tracks, and capping layer material within the road, footpath and cycle track pavement, subject to testing to ensure material is suitable for its proposed use.

Information on the quantities of potential material reuse is provided in Table 5-20. It is estimated that potentially up to approximately 12,973 tonnes of recycled or reused materials could be incorporated into the Proposed Development. The waste management measures which will be implemented by the appointed contractor in so far as reasonably practicable are also set out in Table 5-19.

**Table 5-20 Quantities of Proposed Material for Reuse and Recycling**

Reuse or Recycle	Material for Reuse	Approximate Quantity (tonnes)	Reuse Specification for Example TII Series or Other Reuse Specification	Reuse Class (note: Class to be Provided in all Cases where TII Specification is used)
Recycle on Proposed Development	Bituminous materials	4,855	TII Series 800 and 900 (TII 2013b and TII 2015)	Bituminous plannings for recycle in sub-base material, base and binder layers
Reuse on Proposed Development	Subbase material	3,480	TII Series 800 (TII 2013b)	Sub-base material
Reuse on Proposed Development	Capping material	4,638	TII Series 800 (TII 2013a)	Capping material



#### 5.5.5.5 Article 27

Surplus excavation material may be declared a by-product (under Article 27 of the Waste Directive Regulations) for reuse in one or more known construction projects.

By-product notifications to the EPA provide an opportunity for reuse of surplus clean soil and stone material arising from construction activity. This can apply to locations other than authorised recovery facilities (e.g. quarries operating under planning permission, parks or other developments requiring earthworks and importation of clean soil and stone). This option can bring significant economic benefits while facilitating beneficial reuse of by-products. This plays a role in Ireland's implementation of Circular Economy principles.

An Article 27 notification to the EPA under Article 27 of the Waste Directive Regulations, is required to achieve by-product status for soil and stones. It is noted that the use of Article 27 is limited to clean soil and stone, and it must be demonstrated to the EPA that the following four conditions are met:

- Further use of the soil and stone is certain;
- The soil and stone can be used directly without any further processing other than normal industrial practice;
- The soil and stone is produced as an integral part of a production process; and
- Further use is lawful in that the soil and stone fulfil all relevant requirements for the specific use and will not lead to overall adverse environmental or human health impacts.

Where it is proposed to use an Article 27 EPA notification in relation to excavation material from the Proposed Development, the appointed contractor is responsible for submission of the Article 27 notification to the EPA. Where it is proposed to use soil from off site with an Article 27 notification, the appointed contractor is responsible for carrying out any necessary due diligence regarding the material and ensuring that all EPA guidelines relating to that Article 27 notification have been complied with before the soil is imported into the site. Where feasible, appropriate and available Article 27 materials arising from other sites will be used in the development of this site.

The appointed contractor is responsible for ensuring all applicable regulatory requirements under waste, planning and other laws are complied with prior to movement of excavation material. Any hazardous waste arising will be managed in accordance with the applicable legislation.

#### 5.5.5.6 Soil Recovery at Sites Holding CoR, WFP or EPA Waste Licence

Where removal of wastes from the Proposed Development is unavoidable, it will be delivered by the appointed contractor only to facilities which are authorised under the Waste Management Act, as amended, and which hold the appropriate CoR, WFP or EPA Waste Licence.

S.I. No. 821 of 2007 – Waste Management (Facility Permit and Registration) Regulations 2007, as amended sets out the classes of waste activity requiring CoR or WFP. The most relevant class of activity in relation to soil recovery facilities is:

Class 5 (Third Schedule, Part 1 of the Regulations) for the 'Recovery of excavation or dredge spoil, comprising natural materials of clay, silt, sand, gravel or stone and which comes within the meaning of inert waste, through deposition for the purposes of the improvement or development of land, where the total quantity of waste recovered at the facility is less than 100,000 tonnes.'

For CoR and WFP the capacity is typically a lifetime capacity, and when reached, the facility typically closes. CoR and WFP are granted to private operators by local authorities.

EPA licensed waste activities authorised to accept soil and stones for recovery and disposal include soil recovery sites, landfills, transfer stations and materials recovery facilities. These typically handle a larger tonnage of wastes than facilities holding CoR or WFP. EPA Waste Licences typically include an annual maximum intake capacity and a maximum lifetime capacity for the licensed facility.



Where the appointed contractor proposes to deliver excavated materials from the Proposed Development to facilities holding a CoR, WFP or EPA Waste Licence, the appointed contractor is responsible for ensuring the authorisation is valid and allows acceptance of the relevant LoW Code.

A copy of the authorisation will be included in the Plan and evidence will be provided that the proposed facility will have the capacity to accept the required quantity of waste from the Proposed Development.

## 5.5.6 Proposed Development Infrastructure

### 5.5.6.1 Construction Compounds

Construction Compound requirements to facilitate the Construction Phase of the Proposed Development are illustrated in Section 5.6 in Chapter 5 (Construction) of this EIAR. It is anticipated that one construction compound will be utilised during the construction of the Proposed Development. The compound will be located on Dublin Road (next to The Connacht Hotel) as shown in Figure 5-6.

The Construction Compound will contain a site office, and welfare facilities for GCC personnel and contractor personnel. Limited car parking will be allowed at the Construction Compounds. Materials such as topsoil, subsoil, concrete, rock etc., will be stored at the Construction Compound for reuse as necessary. Items of plant and equipment will also be stored within the Construction Compound. All necessary authorisations, under the Waste Management Act, as amended, will be obtained prior to undertaking temporary storage.

### 5.5.6.2 Waste Collection and Transportation

Waste from the Proposed Development will be transported by authorised waste collectors in accordance with S.I. No. 820 of 2007 – Waste Management (Collection Permit) Regulations 2007, as amended.

A list of currently authorised waste collectors used to transport waste during the Proposed Development will be maintained at the Construction Compound and updated by the appointed contractor. Copies of valid appropriate waste collection permits will also be held at the Construction Compound by the appointed contractor. A list of the currently authorised waste collectors is available on the following website: <https://www.nwcpc.ie/permitsearch.aspx>.

#### 5.5.6.2.1 Hazardous Wastes

The following steps must be taken where hazardous waste is being transported from the Proposed Development to a hazardous waste recovery or disposal facility within Ireland:

- Waste transfer forms shall be obtained by the waste producer from the local authority website, and completed online before the waste is collected;
- A copy shall be downloaded, printed and signed, accompanying the consignment of hazardous waste when it is in transit; and
- On the load's arrival, the operator of the recipient disposal or recovery facility shall log-in and complete the relevant details documenting the receipt of the waste.

Export of hazardous waste from the Proposed Development outside of Ireland is subject to a Europe-wide control system founded on Regulation (EC) No. 1013 of 2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste (known as the Transfrontier Shipment Regulations), as amended. This legislation is supplemented by S.I. No. 419 of 2007 – Waste Management (Shipments of Waste) Regulations 2007, as amended, which makes DCC responsible for the enforcement of this regulatory system throughout Ireland.

Export of hazardous waste from the Proposed Development outside Ireland should comply with the procedures set out in this legislation.

### 5.5.6.3 Waste Recovery and Disposal

Wastes will be delivered to authorised waste facilities in accordance with the Waste Management Act, as amended. The following authorisations are applicable:

- CoR from the local authority (issued to private sector);
- CoR from the EPA (issued to local authority);
- WFP from the local authority; and
- Waste Licence from the EPA.

A list of currently authorised (CoR or WFP) waste sites in each local authority is available on the following website: <http://facilityregister.nwcpc.ie/> . A list of sites currently licensed by the EPA (Waste Licence) is available on the following website: <https://epawebapp.epa.ie/terminalfour/waste/index.jsp> .

An up-to-date list of all waste facilities to which waste from the site will be delivered will be maintained on-site and updated by the appointed contractor. Copies of valid facility CoR, WFP, and EPA Waste Licences will be held onsite by the appointed contractor.

## 5.6 Emergency Incident Response Plan

### 5.6.1 Introduction

This Environmental Incident Response Plan (EIRP) has been prepared to ensure that in the unlikely event of an incident, response efforts are prompt, efficient, and suitable for the particular circumstances. The EIRP details the procedures to be undertaken in the event of a significant release of sediment into a watercourse, or a significant spillage of chemical, fuel or other hazardous substances (e.g. concrete), non-compliance incident with any permit or licence, or other such risks that could lead to a pollution incident, including flood risks. The EIRP will identify the on-site risks and appropriate responses. The focus of including the measures in this EIRP is on prevention of the incident arising in the first place.

#### 5.6.1.1 Objectives

The objectives of this EIRP are to:

- Ensure the health and safety of personnel and visitors along the Proposed Development;
- Minimise any impacts to the environment and ensure protection of water quality and the aquatic species dependent on it;
- Minimise any impacts on properties, services, etc.; and
- Establish procedures that could enable personnel to respond to incidents with an integrated multi-departmental effort and in a manner that minimises the possibility of loss and reduces the potential for affecting health, property, and the environment.

#### 5.6.1.2 Guidance

This EIRP has been prepared with regard to the following guidance documents, where relevant:

- Control of Water Pollution from Linear Construction Projects. Technical Guidance (C648) (CIRIA 2006a);
- Control of Water Pollution from Linear Construction Projects. Site Guide (C649) (CIRIA 2006b);
- Control of Water Pollution from Construction Sites. Guidance for Consultants and Contractors (C532) (CIRIA 2001); and
- Department of Housing, Local Government and Heritage (DHLGH) A Framework for Emergency Management (DHLGH 2021).

## 5.6.2 Roles and Responsibility

The EIRP will be reviewed and updated regularly so that it continues to apply to construction activities and is amended when applicable regulations are revised or when amendments are required by a regulatory authority. It will be the responsibility of the EM, or equivalent, as stipulated by the appointed contractor to maintain and change the EIRP as required. The EIRP may also require amendments from the various stakeholders or suppliers as the Proposed Development progresses.

The appointed contractor shall provide a full list, including the exact locations, of all pollution control plant and equipment. All such plant and equipment shall be maintained in place and in working order for the duration of the works.

As part of the development and management of the EIRP, the appointed contractor will:

- Assess the pollution risks and develop emergency and spill response procedures for specific construction activities;
- Obtain details of key people that may need to be contacted for help in the event of an incident;
- Provide equipment for dealing with pollution incidents;
- Identify emergency access routes along the Proposed Development;
- Train personnel to follow procedures and use equipment correctly;
- Audit the EIRP; and
- Take action following an incident to ensure it does not occur again.

### 5.6.2.1 Contacts

The EIRP will detail the initial contact that should be made in case of an emergency incident as well as those responsible for following up once an emergency event is declared. To cover the full length of the Proposed Development, more than one contact may be needed. The EIRP will indicate which contacts apply to which sections of the Proposed Development.

Contact details will include the organisation, position title, name, mobile phone number and email address of the relevant personnel. Numbers will be obtained for contacts, including the following:

- Radio / mobile contacts for management staff and trained personnel;
- Out-of-hours contacts;
- Environmental regulators (hotline or local contact);
- Local authorities;
- Fire Services;
- Irish Water (IW);
- NPWS;
- EPA;
- DECC;
- DHLGH; and
- Spill response and clean-up contractors.

#### 5.6.2.1.1 Training and Testing

Personnel will be trained on the implementation of the EIRP and how to use the necessary equipment such as spill kits. Emergency arrangements will need to be reviewed and tested periodically (and always after an incident) to ensure that measures are effective, and that the workforce is aware of what to do in the event of an incident. Emergency drills will be recorded, and improvements noted and actioned accordingly.

## 5.6.3 Environmental Emergency Response Procedures

### 5.6.3.1 Fuel and Chemical Spillages

For pollution prevention measures, refer to the SWMP in Section 5.4. Emergency procedures will be further developed; either Proposed Development specific, works area specific or activity specific, and all personnel will be required to know these procedures.

An effective pollution EIRP relies on the following elements, with regards to fuel, and chemical spillages:

- Identification of receptors / pathways (e.g. surface water drains and/or watercourses);
- Identification and clear marking of surface water drain locations within the Construction Compounds;
- Identification of all possible emergency scenarios;
- Effective planning (e.g. availability of booms, spills kits at appropriate locations along the Proposed Development);
- Identification and dissemination of contact numbers;
- Definition of personnel responsibilities;
- Assurance that all appropriate personnel are aware of the emergency procedure(s) (e.g. spillage, leakage, fire, explosion, and flooding), that drain covers and spill kits are available, and personnel know how to use them;
- Knowledge of incident scenarios, such as spill drills; and
- Implementation of lessons learnt from previous incidents.

In terms of pollution spill response procedures, these will vary depending on the sensitive receptor and nature of construction activities. However, the following information will be included as a minimum and displayed at appropriate locations along the Proposed Development, at river crossings, near outfalls, refuelling locations, fuel storage areas, etc.:

- Instructions on how to stop work and switch off sources of ignition;
- Instructions on how to contain the spill;
- Location of spill clean-up material;
- Name and contact details of responsible personnel (these personnel should assess the scale of the incident to determine whether the environmental regulator needs to be called); and
- Measures particular to that location or activity (for example, close to a settlement pond).

More detailed plans may be location-specific, or specific to a particular activity depending on the nature of the work. They will identify the potential sources of pollution and pathways to receptors so that containment measures can be put in place at these locations. Suitable equipment, such as spill kits, oil booms and absorbent material, will be held at appropriate locations along the Proposed Development and personnel will be trained in the use of the equipment.

Emergency equipment will be obtained from a reputable supplier, and personnel will be trained in its correct use. Material Safety Data Sheets (MSDS) and best practice assessments will be used for advice on appropriate spill measures. The type of equipment required will depend on the activity taking place. The Control of Water Pollution from Linear Construction Projects (C648), Technical Guidance document (hereafter referred to as the CIRIA Technical Guidance Document) (CIRIA 2006a), provides details on the types and applications of emergency equipment. Refer to Table 15.2 of the CIRIA Technical Guidance Document for further information.

Every effort will be made to prevent an environmental incident during the Construction Phase of the Proposed Development. The objective of the measures in the EIRP and the SWMP (see Section 5.4) is to prevent an incident arising in the first place. Oil / fuel spillages are one of the main environmental risks that will exist during the Construction Phase of the Proposed Development which will require an emergency

response procedure. An example of the steps that could be followed in the event of a spillage to ensure that the environmental risk is reduced to as low as is reasonably practical is provided in this Section. This procedure can be tailored to be location / activity specific as required:

- Stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers;
- Notify the EM immediately giving information on the location, type, and extent of the spill so that they can take appropriate action;
- If necessary, the EM will inform the appropriate regulatory authority, including the Fire Services, depending on the size and nature of the spill. The appropriate regulatory authority will vary depending on the nature of the incident;
- If applicable, eliminate any sources of ignition in the immediate vicinity of the incident;
- Contain the spill using the spill control materials, track mats or other material as required. Do not use detergent or hoses to disperse spilled fuel;
- If possible, cover or bund off any vulnerable areas where appropriate such as drains, watercourses or sensitive habitats;
- Clean up as much as possible using the spill control materials;
- Contain any used spill control material and dispose of used materials appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited;
- The details of the incident will be recorded on an Environmental Incident Form (such as that provided in Section 5.6.3.3 or equivalent identified by the appointed contractor), which will provide information such as the cause, extent, actions, and remedial measures used following the incident. The form will also include any recommendations made to avoid reoccurrence of the incident. This form will be appended to the EIRP;
- A record of all environmental incidents will be kept on file by the EM and the appointed contractor. These records will be made available to the relevant authorities if required; and The EM will be responsible for any corrective actions required as a result of the incident (e.g. an investigative report, formulation of alternative construction methods or environmental sampling), and will advise the appointed contractor as appropriate.

By carrying out the above steps, a proper system will be in place to investigate, record and report any potential fuel or chemical spillages.

#### 5.6.3.2 Other Environmental Incidents

Environmental incidents are not limited to just fuel spillages. For example, other environmental incidents could include:

- Accidental stripping of a protected habitat;
- Accidental excavation of protected archaeological structure (without archaeologist present);
- Accidental release from settlement pond / tank, etc.; and
- Unplanned utility strikes, resulting in foul water releases, temporary loss of services, etc.

Therefore, any environmental incident will be investigated in accordance with the following steps:

- Immediately notify the EM, giving information on the location, type, and extent of the incident so that they can take appropriate action;
- In the very unlikely event of an incident occurring which may impact on a sensitive receptor, the EM will inform the appropriate persons / regulatory authority. The appropriate persons / regulatory authority will vary depending on the nature of the incident;
- The details of the incident will be recorded on an Environmental Incident Form (such as that provided in Section 5.6.3.3 or equivalent identified by the appointed contractor) which will provide information

such as the cause, extent, actions, and remedial measures used following the incident. The form will also include any recommendations made to avoid reoccurrence of the incident. This form will be appended to the EIRP;

- A record of all environmental incidents will be kept on file by the EM and the appointed contractor. These records will be made available to the relevant authorities if required; and
- The EM will be responsible for any corrective actions required as a result of the incident (e.g. an investigative report, formulation of alternative construction methods or environmental sampling), and will advise the appointed contractor as appropriate.

By carrying out the above steps, a proper system will be in place to investigate, record and report any potential accidents or incidents.

### 5.6.3.3 Environmental Incident Form

An example of an Environmental Incident Form is provided in Table 5-21 An Environmental Incident Form will record details of any environmental incidents. This form will be appended to the EIRP.

**Table 5-21 Environmental Incident Form Example**

Incident Details				
Date:				
Time:				
Location:				
Extent:				
Direct activity being undertaken:				
Cause:				
Dangerous substance(s) involved (identify and quantify):				
Remedial measures undertaken:				
Parties Involved in the Incident				
Name	Role	Phone Number	Email	Address
Description of the Incident				
Recommendations following the Incident				

#### 5.6.3.4 Fire Control

Every effort will be made to prevent the outbreak of a fire during the Construction Phase of the Proposed Development. Fire extinguishers and first aid supplies will be available in the work area. In the event of such an incident, the health and safety of all personnel will be a priority. All relevant legislation and guidance on health and safety of people and in particular fire safety will be complied with.

#### 5.6.3.5 Flood Risk Control

Where temporary stockpiles of invasive species infected material cannot, for practical limitations, be situated away from a potential flood risk area, the appointed contractor will be required to include a flood response plan within the EIRP, to ensure that any inundation of the Construction Compounds does not result in a pollution event to nearby water bodies.

#### 5.6.4 Corrective Action

When an incident happens, it is important to learn from it and ensure that such an incident does not occur again. This may involve changing the method of work for a particular activity, providing containment or treatment materials, or simply training personnel so they are aware of the correct method of work. Similarly, if an audit of planned arrangements indicates that measures are not in place, or those in place need to be improved, action will be taken immediately.

A record of corrective actions and lessons learned will be kept and communicated to all relevant persons, teams, sub-contractors, etc. across the Proposed Development.

### 5.7 Cultural Heritage Mitigation Plan (CHMP)

#### 5.7.1 Introduction

The Cultural Heritage Mitigation Plan (CHMP) details specific measures proposed to mitigate adverse effects and/or enhance opportunities concerning the Cultural Heritage resource and is summarised herein where relevant for purposes of the CEMP.

The project significance of effects are those predicted in the Cultural Heritage technical Chapter 15 of the Environmental Impact Assessment Report (EIAR), which should be read in conjunction with this plan.

This CHMP has been prepared in line with TII standards and guidance document PE-ARC-02009 (February 2024) *Guidelines for Cultural Heritage Impact Assessment of TII National Road and Greenway Projects*.

#### 5.7.2 Roles and Responsibility

The project will have an assigned TII Project Archaeologist, in line with Code of Practice for Archaeology (2017) agreed between TII and Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs (currently administered by Department of Housing, Local Government and Heritage). The Project Manager will work closely with the TII Project Archaeologist at all Phase 5 Enabling & Procurement, Phase 6 Construction & Implementation and Phase 7 Close Out & Review.

The TII Project Archaeologist will manage and supervise, as necessary, the Cultural Heritage services required during the Main Construction Contract. In the event of archaeological sites/features being uncovered during the Main Construction Contract, the Project Archaeologist will determine, in conjunction with the Project Manager and in consultation with statutory consultees, the preferred means of preservation (in situ or by record).



An appointed Archaeological Consultant will oversee the archaeological and built heritage requirements of the Project and undertake the Cultural Heritage aspects of the enabling works (Phase 5) and Main Construction Contract (Phase 6) including any required post-works statutory reporting and public dissemination deliverables. Inputs to the final CEMP will also be undertaken by the Archaeological Consultant to ensure Main Contractor management of mitigation measures during construction and post-construction phases. All Cultural Heritage reporting, deposition of archaeological objects, archives and digital datasets will be closed out by the Archaeological Consultant at Phase 7.

### 5.7.3 Statutory requirements

#### 5.7.3.1 Licensable works

Archaeological monitoring will be required during the initial stages of the Main Construction Contract at all greenfield areas (including the temporary construction compound and area along Merlin Park **CH014**) and for all works within the Zone of Notification of the recorded milestone monument **CH002**.

In the event of an archaeological feature being identified, if preservation in situ is not feasible, preservation by record through a programme of archaeological excavation and recording will be completed prior to construction, subject to statutory approval.

The archaeological works (monitoring, and if required, excavation) will be carried out under licence from the National Monuments Service (NMS) in the Department of Housing, Local Government and Heritage and/or any other statutory consents required.

#### 5.7.3.2 Archaeological monitoring requirements

Archaeological monitoring will involve the stripping of topsoil/removal of overburden in a controlled manner down to the uppermost archaeological horizon, natural subsoil or formation level, whichever is encountered first. The topsoil/overburden will be removed using a mechanical excavator fitted with a toothless bucket under the constant supervision of a suitably qualified archaeologist.

#### 5.7.3.3 Archaeological excavation and post-excavation requirements

A systematic programme of manual archaeological excavation of all revealed features of archaeological potential will be carried out in accordance with a method statement submitted to the NMS as part of the licence application process. This will include the manual excavation of all identified archaeological features, the compilation of written, drawn and photographic records, the retrieval of archaeological objects and a programme of environmental sampling, as required.

The archaeological excavations where possible shall be undertaken in advance of the Main Construction Contract works at the relevant areas, in order to allocate adequate time to appropriately excavate and record the archaeological deposits/features, should they be identified.

Following the completion of excavations, a post-excavation phase of works, involving analysis, reporting and dissemination to the relevant authorities will be undertaken off site. The level of the post-excavation analysis and reporting will be commensurate with the level of archaeology excavated on site.

### 5.7.4 Project Communications

Statutory agreements/licences must be secured in advance of construction stage to allow for appropriate programming for same (a minimum processing time of approx. six weeks from date of application is likely).

There are two modern memorials dedicated to deceased persons (**CH005** and **CH008**) located along the scheme footprint. The relevant family members of the deceased will require consultation by project management with respect to the need to temporarily remove, store and reinstall these memorials, in accordance with their wishes and relevant project safety requirements at operational stage.

Consultation meetings/correspondence will be required in advance of pre-works stage and at construction stage both immediately prior to and after reinstallation. Details of agreements are to be documented and the CEMP updated accordingly.

Works at the former entrance area to Rinmore House (RPS) (**CH013**) and former building façade (**CH003**) at the Brothers of Charity complex, where feasible, should be prioritised in the overall project programme in order to reduce any potential temporary disruption.

#### 5.7.5 Temporary Storage Facilities

For any identified temporary mitigation measures (avoidance/reduction) required during construction stages, an adequate and designated dry, safe storage area within the temporary site compound(s) will be required for any Cultural Heritage material requiring re-use (e.g. salvaged stone) and/or re-installation (e.g. iron gates, modern memorials).

#### 5.7.6 Site Specific Measures

Refer to Cultural Heritage Management Plan (CHMP) in Appendix A15.5 in Volume 4 of this EIAR and CHMP Mapping in Volume 3 of this EIAR for full mitigation measures required as part of advance works, during the main Construction Phase.

## 5.8 References

Animal and Plant Health Agency et al. (2018). Good Practice Management, New Zealand pygmyweed (*Crassula helmsii*) Version 1, August 2018.

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

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

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

CIRIA (2001). Control of Water Pollution from Construction Sites. Guidance for Consultants and Contractors (C532).

CIRIA (2005). PUB C650 Environmental Good Practice on Site, 2nd Edition.

CIRIA (2006a). Control of Water Pollution from Linear Construction Projects. Technical Guide (C648).

CIRIA (2006b). Control of Water Pollution from Linear Construction Projects. Site Guide (C649).

CIRIA (2015). Environmental Good Practice on Site Guide, 4th Edition.

DCCAE (2020). A Waste Action Plan for a Circular Economy Ireland's National Waste Policy 2020-2025.

DCHG (2017). Ireland's Third National Biodiversity Action Plan 2017 to 2021.

DECC (2021a). Whole of Government Circular Economy Strategy 2021 to 2022, Pre-Consultation Draft.

DECC (2021b). Whole of Government Circular Economy Strategy 2022 to 2023, Living More, Using Less.

Department of Agriculture and Rural Development (Northern Ireland) (2016). Countryside Management Publications, Giant hogweed.

DHLGH (2021). A Framework for Major Emergency Management.

DTTAS (2019). Chapter 8, Temporary Traffic Measures and Signs for Roadworks, Traffic Signs Manual.

Eastern Midlands Waste Region (2015). The Eastern Midlands Region Waste Management Plan 2015-2021.

Enterprise Ireland (2003). Best Practice Guidelines BPGCS005 – Oil Storage Guidelines.

EA (2010). Managing Invasive Non-Native Plants in or near Freshwater.

EA (2013). Managing Japanese knotweed on Development Sites: The Knotweed Code of Practice. (Version 3, amended in 2013, withdrawn from online publication in 2016).

EA (2014). Aquatic and Riparian Plant Management: Controls for Vegetation in Watercourses, Technical Guide.

EPA (2020). Guidance to Planners, Planning Authorities and An Bord Pleanála on the Management of Excess Soil and Stone from Developments.

EPA (2021a). Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects – Draft for Public Consultation.

EPA (2021b). Circular Economy Programme 2021-2027.

EPA (2023a) Construction & Demolition Waste Statistics for Ireland [Online] Available from <https://www.epa.ie/our-services/monitoring--assessment/waste/national-waste-statistics/construction--demolition/>

EPA (2023b). Waste Licence Search [Online] Available from:  
<https://epawebapp.epa.ie/terminalfour/waste/index.jsp?disclaimer=yes&Submit=C>

EPA (2023c). EPA By-Product Register. [Online] Available from: <https://circulareconomy.epa.ie/#/>

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

European Commission (2020). Circular Economy Action Plan, For a Cleaner and More Competitive Europe.

IFI (2010). Biosecurity Protocol for Field Survey Work.

IFI (2016). Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.

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.

ISI (2008a). Best Practice Management Guidelines for Japanese knotweed.

ISI (2008b). Best Practice Management Guidelines for Himalayan balsam.

ISI (2008c). Best Practice Management Guidelines for Giant hogweed.

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

NBDC (2022). Online Dataset.

NRA (2005a). A Guide to Landscape Treatments for National Road Schemes in Ireland.

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

NRA (2006). Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes.

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

NNSS (2011). Allium triquetrum (Three-cornered garlic) Great Britain Non-Native Organism Risk Assessment.

Northern Ireland Environment Agency (2021). Management Measures for Widely Spread Species (WSS) in Northern Ireland Nuttall's waterweed (Elodea nuttallii).

Regional Waste Management Offices (2020). Construction & Demolition Waste Soil and Stone Recovery / Disposal Capacity, Update Report 2020.

Regional Waste Management Office (Offaly County Council) 2021. Waste Permit Facility Register.

TII (2007). Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan.

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

TII (2023a). Specification for Road Works Series 800 – Road Pavements – Unbound and Hydraulic Bound Mixtures. Standard CC-SPW-00800.

TII (2023b). Specification for Road Works Series 900 – Road Pavements – Bituminous Materials. Standard CC-SPW-00800.

TII (2015a). Design Manual for Roads and Bridges Part 3 DN-DNG-03022 (NRA HD 33/15) (Including Amendment No. 1).

TII (2015b). Road Drainage and the Water Environment DN-DNG-03065.

TII (2017). The Management of Waste from National Road Construction Projects.

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.

WRAP (2014). Builders: Estimating Waste.

S.I. No. 374/2024 - European Union (Invasive Alien Species) Regulations 2024

#### Directives and Legislation

Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives.

Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste.

National Monuments (Amendment) Act, 2004.

No. 6 of 1987 - Air Pollution Act, 1987.

No. 10 of 1996 - Waste Management Act, 1996 (as amended).

No. 38 of 1936 - Noxious Weeds Act, 1936.

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

Regulation (EU) No. 1143 of 2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species.

S.I. No. 103 of 1937 - Noxious Weeds (Thistle, Ragwort, and Dock) Order, 1937.

S.I. No. 194 of 2013 - Waste Management (Landfill Levy) (Amendment) Regulations 2013.

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

S.I. No. 291 of 2013 - Safety, Health and Welfare at Work (Construction) Regulations 2013.

S.I. No. 323 of 2020 - European Union (Waste Directive) Regulations 2020.

S.I. No. 324 of 2011 - European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011.

S.I. No. 355 of 2015 - European Communities (Birds and Natural Habitats) (Amendment) Regulations 2015.

S.I. No. 419 of 2007 - Waste Management (Shipments of Waste) Regulations 2007.

S.I. No. 477 of 2011 - European Communities (Birds and Natural Habitats) Regulations 2011.

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

S.I. No. 821 of 2007 - Waste Management (Facility Permit and Registration) Regulations 2007.