

Construction Environmental and Waste Management Plan

(Working Document)



Public Park, Remediation and Restoration Works

On behalf of
Sligo County Council



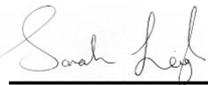


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**Construction Environmental and Waste Management Plan
Public Park, Remediation and Restoration Works
Sligo County Council
Finisklin Closed Landfill**

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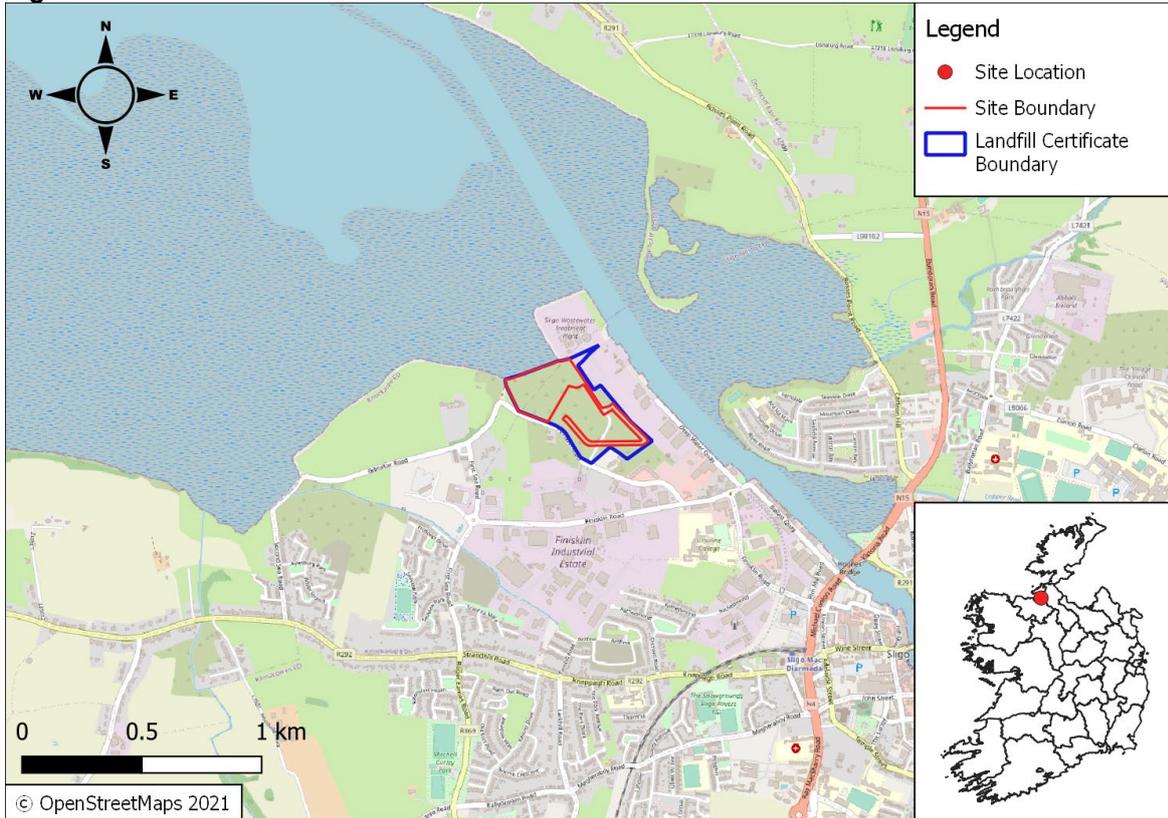
APPENDICES

Appendix A: Surface Water Monitoring Locations

1 INTRODUCTION

Malone O' Regan Environmental Services (MOR) were commissioned by Sligo County Council (SCC) ('the Applicant') to prepare a Construction Environmental and Waste Management Plan (CE&WMP) to accompany a planning application for a proposed public park, remediation and restoration works at the closed landfill at Finisklin, Sligo, Co. Sligo. (OS Reference G 67732 37069). The location of the Proposed Development ('the Site') is shown in Figure 1-1.

Figure 1-1: Site Location



1.1 Scope and Objective

The key objective of this CE&WMP is to ensure that all potential construction phase environmental impacts will be addressed in accordance with current legislative requirements and best practice guidelines. It will assist in the control of environmental risks that may arise during construction to ensure that these works do not result in an environmental incident, environmental damage or undue nuisance to the local environment.

This CE&WMP aims to fulfil the requirements of the Certificate of Authorisation (CoA) (EPA Ref: H0006-01) issued by the Environmental Protection Agency (EPA), which states the following:

“A Construction Environmental Management Programme (CEMP) incorporating method statements will be implemented for the site works taking cognisance of key guidance including ‘Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors’ (CIRIA, 2001).”

In line with the requirements of the CoA (EPA Ref: H0006-01) this CE&WMP will specifically consider measures to *“avoid the potential for water pollution and will ensure that there will be no significant impact on Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC [000627], Cummeen Strand SPA [004035], Ballysadare Bay SAC [000622], Ballysadare Bay SPA [004129], Drumcliff Bay SPA [004013], Aughris Head SPA [004133], Ballintemple and Ballygilgan SPA [004234] and Ardboline Island and Horse Island SPA [004135].”*

In doing so SCC will satisfy their commitment to Condition 3.2 of the CoA (EPA Ref: H0006-01) which states the following:

“The local authority shall manage the closed landfill to ensure that discharges and emissions from the closed landfill or resulting from construction works do not cause environmental pollution or deterioration in the status of the receiving surface water body or groundwater body.”

This document contains an assessment of the likely risks on-site, it outlines procedures for monitoring the effectiveness of the environmental protection measures and for the dissemination of information to all relevant personnel during the construction programme. In assessing the risks to the environment on and adjacent to the Site, full cognisance has been taken of:

- Landfill Manuals – Landfill Restoration and Aftercare (EPA, 1999),
- CIRIA C741 Environmental Good Practice on Site (4th edition) (CIRIA, 2015).
- C532 – Control of Water Pollution from Construction, Guidance for Consultants and Contractors (CIRIA, 2001);
- Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (NRA, 2010); and,
- BS 5228-1 + A1:2014: Code of Practice for noise and vibration control on construction and open sites- Part 1: Noise (BSI, 2009) and Part 2 Vibration (BSI, 2009).
- C774 - Coastal and Marine Environmental Site Guide (Second Edition) (CIRIA, 2015b)
- Guidance for Invasive non-native species (National Road Authority, 2010)

Further guidance mentioned in the Natura Impact Statement (NIS) regarding the protection of particular species may also be applicable to the construction period. For further detail please see the NIS that has been submitted as part of this application.

To achieve this objective the CE&WMP will:

- Provide a method of documenting compliance with the Environmental Commitments / Environmental Management Requirements / Best Practice Guidelines;
- Ensure compliance with current legislation;
- Effectively minimise any potential adverse environmental effects during construction including how site-specific method statements will be developed to avoid, minimise and mitigate construction effects on the environment; and,
- Communicate key environmental obligations that apply to all Contractor organisations, their Sub-Contractors and employees while carrying out any form of construction activity.

This CE&WMP will be used by the appointed Contractor to prepare an updated and comprehensive CE&WMP prior to the commencement of any on-site works. If required by the conditions of the grant of approval, the updated plan will be approved by the Planning Authority in advance of any works commencing on-site. The approved plan will be implemented for the duration of the construction works to protect the receiving environment from potential impacts arising during the construction works.

1.2 Report Structure

The CE&WMP should be considered by the appointed Contractor as a 'living' document with reviews being undertaken at predetermined intervals and data added as appropriate. The measures identified in the CE&WMP should be:

- Viewed as mandatory and common practice on-site; and,
- Embedded within the construction company's policies and site procedures, e.g., within an existing environmental management system framework.

2 DESCRIPTION OF THE PROPOSED DEVELOPMENT

The Proposed Development will consist of the remediation works and development of a new park located on the closed Finisklin Landfill site. The total area of the Site will be 6.27ha, which the majority namely 4.8ha, will comprise of a new public park. The proposed works will include the following:

- Remediation works including the installation of six (6No) biowindows, one (1No) bioactive trench and increasing the thickness of the landfill capping layer within a localised portion of the Site, these remediation works have been agreed with the EPA in accordance with requirements of CoA *H0006-01*;
- Provision of a ca. 4.8 ha public park including 1,000m of a 3.5m wide walking track;
- Construction of an 18m² viewing platform;
- Construction of a ca. 750 m² car park, including 27No. of car parking spaces and 10No. of bicycle parking spaces;
- Demolition of a 4m² single story concrete block hut;
- Modifications to the existing site entrance and provision of new gates;
- Provision of a new pedestrian entrance; and,
- Associated ancillary works including land grading, drainage works, landscaping, fencing and seating areas.

Figure 2-1 shows an extract of the layout of the Proposed Development. Refer to drawing P804 and P805 submitted with this application for full details.

Figure 2-1: Proposed Development plan (refer to drawing P804 and P805 for further detail)



3 CONSTRUCTION WORKS

The proposed remediation works as required under CoA H0006-01 and agreed with the EPA will include the installation of landfill gas remediation measures and the regrading of a portion of the landfill capping material. These works are described in further detail in this section.

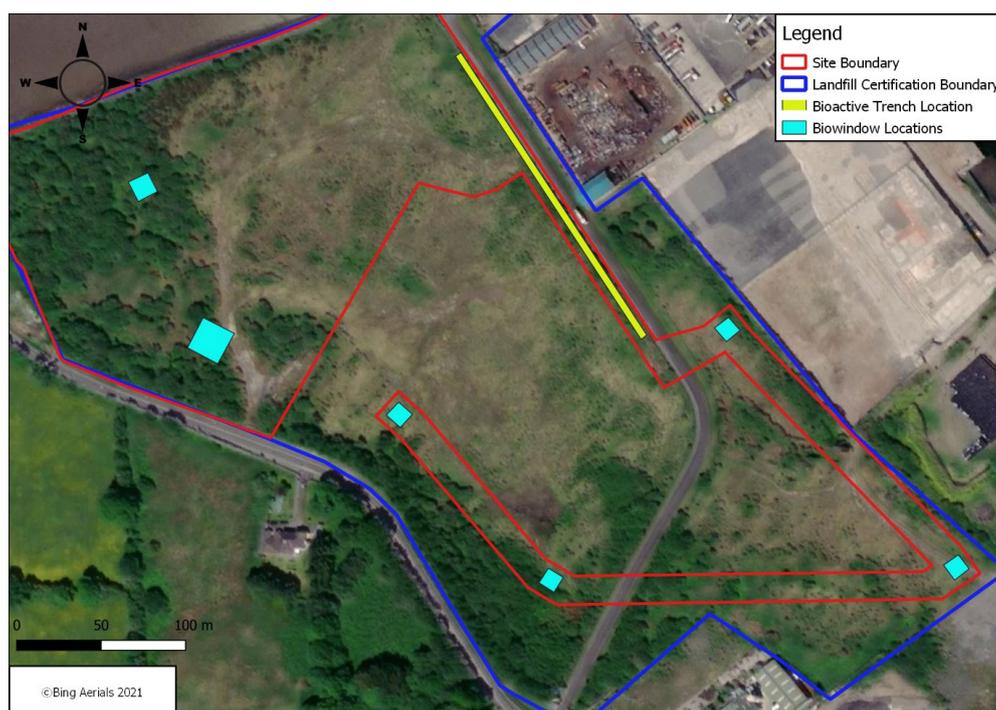
3.1 Biowindows and Bioactive Trench

Works to install the biowindows and bioactive trench will include the following:

- The Final Cell - One (1No.) biowindow sized 12m x 12m to be installed;
- The Northern Cell - One (1No.) biowindow sized 20m X 20m
- The Middle Cell - Three (3No.) biowindows 10m x 10m at the surface to be installed;
- The Southern Cell - One (1No.) biowindow 10m x 10m to be installed; and
- The Northern/Middle Cell – One (1No.) bioactive trench sized 200m x 4m x 4m to be installed.

No other trenches or excavations other than the biowindows and trench will breach the capping layer on top of the waste body.

Figure 3-1: Proposed (approximate) locations for Biowindows and the Bioactive trench



The sides of the Methane Oxidising Layer (MOL) in the top 1 m will be hopper shaped to reduce the propensity for short circuiting of gas flow at the edges of the biowindows or the bioactive trench.

The base of the MOL, capillary break layer, and the top of the gas distribution layer (GDL) will be inclined at an angle of between 2-5° to the horizontal. The GDL will be laid in direct contact with the waste. A herringbone drainage system will be installed at the base of the MOL to help increase the length of unrestricted gas migration.

During construction, the MOL may be lightly compacted to reduce the need for additional material to be added to the biowindows following settlement. Light compaction will not affect the oxidising performance of the MOL. Figure 3-2, and Figure 3-4 show the sectional layouts for the biowindow and the bioactive trench.

Figure 3-2: Design of Biowindow (12m x 12m version)

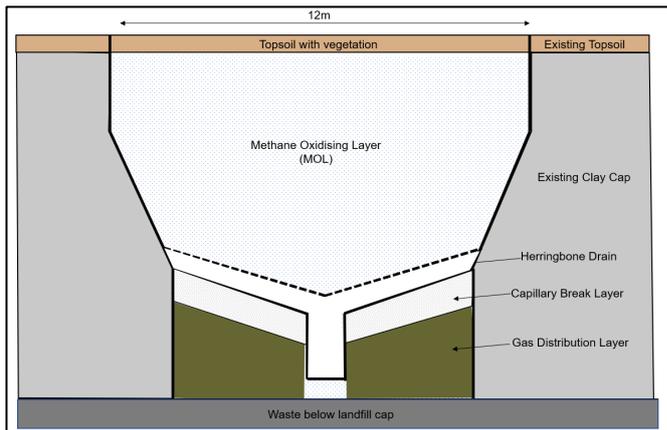


Figure 3-3: Design of Bioactive Trench

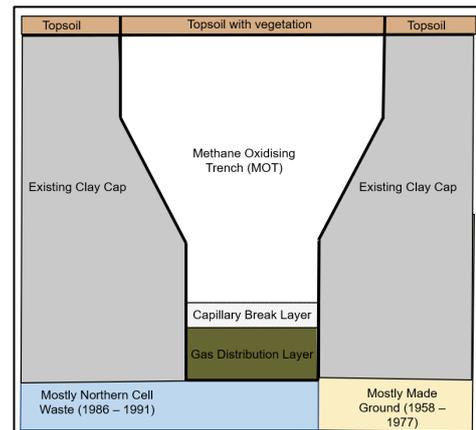
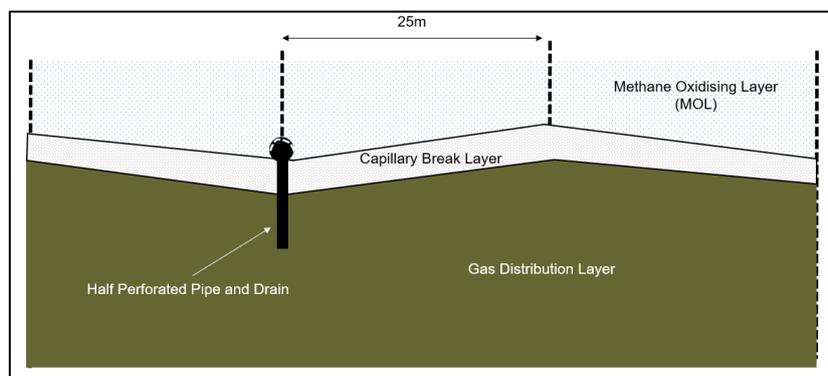


Figure 3-4: Design of Bioactive Trench – View on Long Section of Trench Showing Zig-Zag Capillary Break Layer



3.2 Capping Material Regrading

The EPA, in the final CoA determination (H0006-01), require under condition 3.1(c) that SCC “Install a permeable landfill cap, minimum 500mm”. Some areas of the capping layer are between 200mm and 400mm thick. It is estimated that ca.1,900 tonnes of soil will be required in order to bring the capping layer up to the mandatory depth. Excavation work on the walking track and car park will provide ca. 1,550 tonnes, the remaining ca. 350 tonnes will be sourced by regrading parts of the Site during landscaping works in areas that have surplus capping material. This approach will avoid the importation of further external materials and the export of soils from the Site.

The area which will require additional capping material is largely covered in willow dominated scrub. This scrub will be required to be cleared in advance of the capping works. An updated ecological site survey will be undertaken by the Ecological Clerk of Works (ECoW) in advance of the works commencing. In addition, an updated Japanese Knotweed Survey and a

Management Plan specific for the Proposed Development will be prepared in advance of the works commencing. All vegetation clearance works will be supervised by appropriately qualified ecologists. Further measures are outlined in table 5-3.

For further information, refer to the EIAR Screening and Engineering Planning Report submitted with this application.

3.3 Construction Programme

The proposed works will take approximately 10-12 weeks onsite to complete. Table 3-1 below indicates the approximate timeframe of each stage of the construction programme.

Table 3-1: Proposed Approximate Construction Programme

Stage	Week	Min 4 weeks in advance	1	2	3	4	5	6	7	8	9	10	11	12
Ecological site survey		✓												
Preparation of contractor CE&WMP		✓												
Site Clearance (Inc. Demolition Works)			✓	✓										
Vegetation Clearance				✓	✓		✓							
Installation of Biowindows & Bioactive Trench				✓	✓									
Trenching & installation of ducting, drainage & electrical connection points					✓	✓	✓							
Landfill Capping and land grading							✓	✓	✓					
Car Park Surfacing									✓	✓	✓			
Walking Track and Viewing Platform Construction										✓	✓	✓		
Landscaping												✓	✓	✓

3.4 Construction Management Plan

During the construction phase, the methods of working will comply with all relevant legislation and best practice in reducing the environmental impacts of the works. Although construction phase impacts are generally of a short-term duration and are localised in nature, the impacts will be reduced as far as practicable through compliance with current construction industry guidelines.

Construction Phase times will be as follows:

- 7:00am to 7:00pm Monday to Friday; and,
- 9:00am to 3:00pm on Saturdays.

In general, work will not be permitted at night-time, on Sundays or on public holidays. However, construction works outside the above-mentioned hours will be limited to works necessary for health and safety reasons, to protect the environment or with prior agreement with SCC.

3.5 Construction Compound

To ensure the efficient management of the construction works, a temporary construction compound will be set up for the duration of the construction works. The compound will be located in and around the area of the proposed car park. Sewage will be chemically treated and removed off-site by a licensed Contractor to a licensed disposal facility.

For the duration of the construction works, construction vehicles (i.e., Heavy Goods Vehicles (HGVs)) are proposed to access the Site via the existing entrance on the local Far Finisklin Road which diverges from the main Finisklin Road ca. 200m west of the Ballast Quay and Finisklin Road roundabout. The Finisklin Road is connected to the N4 national road.

4 ENVIRONMENTAL MANAGEMENT FRAMEWORK

4.1 Environmental Policy

The project will be carried out in accordance with the policies / objectives of the appointed Contractor's Environmental Policy and procedures. This should have particular regard to the following:

- Prevention of run-off containing contaminants and sediment to the adjoining surface body, the Garavogue Estuary;
- Measures to prevent spread of invasive species identified at the Site including Japanese knotweed;
- Measures to protect any notable ecological receptors identified during pre-construction ecological surveys will be incorporated into the construction stage CE&WMP;
- Measures to prevent impacts on nesting birds including minimising vegetation clearance works, however the works will take place outside of the nesting season (i.e. 1st March to 31st August).

4.2 Objectives and Targets

Environmental objectives for the construction phase will be developed and should refer to legal compliance and environmental good practice, these may include:

- Zero pollution incidents;
- Minimise disruption to residents;
- Reduce / avoid impacts on biodiversity; and,
- Minimise waste sent to landfill.

4.3 Structure and Responsibilities

A management structure that includes an organisational chart encompassing all staff responsible for environmental work will be included within the CE&WMP. This will set out the respective roles and responsibilities with regard to the environment and identify the nominated Construction Environmental Manager. Illustrative key roles and responsibilities are set out in Table 4-1 below.

Table 4-1: Roles and Responsibilities

Role	Responsibility
Project Manager/ Construction Environmental Manager (Appointed Contractor)	Responsible for management of the construction phase of the project. Has overall responsibility for the environmental performance of the project. Responsible for implementing the CE&WMP during the construction phase to ensure that waste is disposed of legally, economically and safely. Ensure compliance with environmental legislation, consents, objectives, targets and other environmental commitments, including those arising from the CoA, NIS and other reports submitted with this application. Responsible for reporting incidents and where required, communicating the incident details to the client and relevant regulatory authorities. Monitoring of the construction processes against the project objectives. Liaison with all staff and local stakeholders dealing with any complaints or queries from the public. Provision of appropriate training to relevant site staff.
Site Staff (Assigned by Appointed Contractor)	To receive general environmental awareness training and undertake work in accordance with Method Statement Briefings and toolbox talks. Trained personnel to manage particular tasks such as, refuelling plant and equipment, managing the stores, and supervising the segregation and collection of waste.
Environmental / Ecological Clerk of Works (ECoW) (Assigned by SCC) (MOR)	All remediation works will be supervised onsite by appropriately qualified and competent persons in relation to landfill works on behalf of SCC. They will be responsible for providing relevant construction information that may assist the Contractor in managing environmental aspects of the scheme and to ensure that the Contractor complies with all the relevant legal requirements, commitments and targets agreed for the scheme. They will also be responsible for water quality monitoring.

4.4 Communication

The CE&WMP will be distributed to the project team, including Sub-Contractors, to ensure that the environmental requirements are communicated effectively. Relevant staff and Contractors will also be briefed on key activities and environmentally sensitive operations. Project, client and company environmental policies, where available, should be displayed on-site.

The Contractor will define procedures for internal and external communication. The client may require that any communication with external parties such as environmental regulators or the public will be undertaken through a nominated client representative.

During the construction phase, internal communication will include regular progress meetings, which should cover:

- Training undertaken;
- Progress reports;
- Inspections, audits and non-conformance;
- Complaints received;
- Visits by external bodies and the outcome or feedback from such visits;
- Objective / target achievement, including reporting on environmental performance; and,
- External communication, including letter drops or meetings, and liaison with statutory authorities will be overseen by the Site Manager.

5 ENVIRONMENTAL RISK ASSESSMENT

5.1 Risk Classification

The assessment of risks arising from known sources and an assessment of risk for unplanned events/incidents on site were assessed. These were rated as per the EPA 'Guidance on assessing and costing environmental liabilities,' (EPA, 2014). The methodology for the rating of likelihood and consequence are shown in Table 5-1 and Table 5-2.

Table 5-1: Rating of Likelihood of Risk Occurring

Rating	Likelihood	
	Category	Description
1	Trivial	Very low chance of hazard occurring
2	Low	Low chance of hazard occurring.
3	Medium	Medium chance of hazard occurring.
4	High	High chance of hazard occurring
5	Very High	Very high chance of hazard occurring.

Table 5-2: Rating of Consequence of Risk Occurring

Rating	Consequence	
	Category	Description
1	Trivial	No impact or negligible change to the environment.
2	Minor	Minor impact / localised or nuisance.
3	Moderate	Moderate impact to environment.
4	Major	Severe impact to the environment
5	Massive	Massive impact to a large area, irreversible in medium term.

5.2 Risk Identification

In developing this CE&WMP, the following site-specific aspects were considered relevant to the construction phase:

- The location of the Site in the context of the surrounding area;
- The local road network;
- Local residences and businesses;
- The location of the Site in context of the closest water bodies;
- The potential to encounter landfill gas (LFG) and leachate;
- An increase in air and noise emissions during the construction stage; and,
- The biodiversity value of the Site and its surrounding habitats.

Mitigation measures to prevent and manage likely environmental risks are outlined within Table 5-3.

Additionally, the following detailed site-specific plans will be completed by the appointed Principal Contractor, adhered to and incorporated into the site works:

- Construction Stage Method Statement(s);
- Final Construction Environmental and Waste Management Plan (CE&WMP);
- Construction Health and Safety Management Plan.

Table 5-3: Site Specific Environmental Risk Assessment and Management

Aspect of Construction	Potential Hazard	Consequence	Likelihood	Risk Management Procedures – Mitigation Measures
1. Site Operations and Design	a. Potential nuisance towards public (out of hour's activities).	Minor	Low	<ul style="list-style-type: none"> Normal construction hours will be restricted to 7:00am to 7:00pm Monday to Friday; 9:00am to 3:00pm on Saturdays; and, in general, work will not be permitted at night-time, on Sundays or on public holidays.
	b. Traffic.	Moderate	Low	<ul style="list-style-type: none"> Best practice measures and the Construction Traffic Management Plan will be agreed with SCC in advance of commencement of the works and implemented. Access to the Site for HGVs will be via the existing entrance on the local Far Finisklin Road which diverges from the main Finisklin Road ca. 200m west of the Ballast Quay and Finisklin Road roundabout. The Finisklin Road is connected to the N4 national road. Hydrocarbon spill kits shall be in place on all Site vehicles / plant. Adequate signage shall be provided on the public network identifying the Site, access, speed limits etc.
	c. Potential nuisance towards public (anti-social behaviour).	Moderate	Medium	<ul style="list-style-type: none"> The site will be locked at night. CCTV and temporary security lighting will be provided within the site compound and adjacent to the site entrance.
2.A Water Quality – Suspended solids	a. Suspended sediment due to run-off from construction areas entering the Garavogue Estuary causing potential detriment to water quality.	Minor	Medium	<ul style="list-style-type: none"> The northern boundary of the site will be visually inspected daily during works at low tide. Sampling and testing at SW1, SW2, SW8 and SW9 (see Appendix A) will be carried out the month before works begin and the month after works are completed in accordance with the CoA. During sampling, tidal factors will be taken into consideration. Standard measures to control run-off will be incorporated into the Method Statements, to include Construction Industry Research and Information Association (CIRIA) 2001 C532 – Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors and CIRIA 2015 C741 Environmental Good Practice on Site. Other than the limited capping works required to comply with the CoA issued by the EPA, a set-back distance of 5m minimum from the Garavogue Estuary will be in place throughout the construction phase. No tracking of vehicles will occur within this 5m buffer zone. Excavations will be left open for minimal periods to avoid acting as a conduit for surface water flows. During the construction period appropriate containment measures, sandbags, silt fences or similar, shall be installed on site where

Aspect of Construction	Potential Hazard	Consequence	Likelihood	Risk Management Procedures – Mitigation Measures
				<p>material is required to be stored temporarily, thus ensuring adequate protection in silt-laden run-off draining off-site.</p> <ul style="list-style-type: none"> • All construction works associated with the new drainage infrastructure onsite will be completed, checked and cleaned where required, in advance of discharging to the public storm drain. • Weather conditions will be considered when planning construction activities to minimise risk of run-off from site. • No dewatering will be permitted, should groundwater/leachate of any nature be encountered, works should cease with immediate effect and an appropriately qualified professional should be consulted. • Entry by plant equipment, machinery, vehicles and construction personnel into watercourses, wet drainage ditches or ponds will be prohibited. • All routes used for construction traffic shall be protected against migration of soil or wastewater into watercourses. • An environmental clerk of works (ECoW) will be in full-time supervision during site clearance through to the completion of excavations and landfill capping. The ECoW will periodically inspect all elements of the works there after. • Emergency response procedures will be put in place.
<p>2.B Water Quality – Oil & other construction related chemicals</p>	<p>a. Oil Spill/Oil leaking from bulk container to ground / surface water. Oil pollution is known to cause significant damage to the aquatic environment.</p>	<p>Moderate</p>	<p>Medium</p>	<ul style="list-style-type: none"> • All materials shall be stored at the main Contractor compound and transported to the work zone immediately prior to construction. • Appropriate containment facilities will be provided to ensure that any spills from vehicles are contained and removed off-site. • Adequate stocks of absorbent materials, such as commercially available spill kits shall be accessible. • The Contractor shall ensure that all personnel working on-site are trained in pollution incident control response. • A regular review of weather forecasts of heavy rainfall is required. • Any diesel or fuel oils stored on site will be bunded to 110% of the capacity of the storage tank. • Design and installation of fuel tanks to be in accordance with best practice guidelines. • Drip trays and spill kits will be kept available on site. • Cabins, containers, workshops, plant, materials storage and storage tanks shall be located within the temporary construction compound approximately 200m from the Garavogue Estuary.

Aspect of Construction	Potential Hazard	Consequence	Likelihood	Risk Management Procedures – Mitigation Measures
				<ul style="list-style-type: none"> • Prior to any works commencing, all construction equipment will be checked to ensure that they are mechanically sound, to avoid leaks of oil, fuel, hydraulic fluids and grease. • All construction works associated with the new drainage infrastructure onsite will be completed, checked and cleaned where required, in advance of discharging to the public storm drain. • Any oils, fuels and potential pollution substances shall be stored on hardstanding or within a suitably bunded area.
	b. Oil spill during refuelling operations.	Moderate (low volume)	Low	<ul style="list-style-type: none"> • Refuelling of plant and machinery will be completed in a controlled manner using drip trays (bunded container trays). • Fuel containers will be stored within a secondary containment system, e.g., bunds for static tanks or a drip tray for mobile containers. Bunds for the storage of hydrocarbons and chemicals will have a holding capacity of 110% of the volume to be stored. • Only emergency breakdown maintenance will be carried out on-site. • Emergency procedures and spillage kits will be available and construction staff will be familiar with emergency procedures. • Fuel and oil stores including tanks and drums will be regularly inspected for leaks and signs of damage. • Drip trays will be used for fixed or mobile plant such as pumps and generators to retain oil leaks and spills. • Only designated trained operators will be authorised to refuel plant on-site. • Procedures and contingency plans will be set up to deal with emergency accidents or spills. • An emergency spill kit with oil booms, absorbers etc. will be kept on-site for use in the event of an accidental spill. • All construction works associated with the new drainage infrastructure onsite will be completed, checked and cleaned where required, in advance of discharging to the public storm drain.
2.C Water Quality - Cement	a. Cement and Concrete entering waters resulting in water pollution and contamination to the environment.	Minor	Low	<p>The amount of concrete required will be minimal, mainly in the car park area (e.g. curbing) and for post footings (e.g. fence posts and viewing platform), however, the following mitigation measures will be required;</p> <ul style="list-style-type: none"> • All concrete pours will be carefully planned to avoid any impacts; • Water supply points, if required, will be agreed with the appointed Contractor in advance of the works.

Aspect of Construction	Potential Hazard	Consequence	Likelihood	Risk Management Procedures – Mitigation Measures
				<ul style="list-style-type: none"> • Shutters will be designed to prevent failure. Grout loss will be prevented from shuttered pours by ensuring that all joints between panels achieve a close fit or that they are sealed. • Chemicals used will be biodegradable where possible. • Any spillages will be cleaned up immediately and disposed of correctly. • Where concrete is to be placed by means of a skip, the opening gate of the delivery chute will be securely fastened to prevent accidental opening. • Where possible, concrete skips, pumps and machine buckets will be prevented from slewing over water when placing concrete. • Concrete washout of trucks and larger plant should not occur on site; • Concrete washing from smaller equipment will be collected and disposed of off-site, not to the on-site drainage system; • Surplus concrete will be returned to the batch plant or an off-site concrete wash facility after completion of a pour.
2.D Water Quality – Leachate	a. Risk to water through mobilisation of leachate.	Moderate	Medium	<ul style="list-style-type: none"> • Excavations will only extend as far as the top of the waste body. • Regular inspections should be carried out to ensure the waste body has not been penetrated. • Weather conditions will be considered when planning excavation activities to minimise risk of run-off from site or mobilisation of leachate.
3. Earthworks	a. Encountering contaminated materials during excavation works.	Moderate	Very High	<p>It is anticipated that there will likely be contaminated material encountered during the proposed works, however, excavations will not go beyond the capping layer and all waste will be left in situ. None the less, the following mitigation measures should be in place:</p> <ul style="list-style-type: none"> • Excavations will only extend as far as the top of the waste body. Regular inspections should be carried out to ensure the waste body has not been penetrated. • Any soil excavated should only be used on site in order to bring the capping layer up to the mandatory depth as stated in the CoA. • Regrading parts of the Site during landscaping works should only be carried out along the walking track, in the car park and areas with surplus capping material. • If contaminated material is found in the capping soil layer, works should cease in that area with immediate effect and an appropriately qualified professional should be consulted.

Aspect of Construction	Potential Hazard	Consequence	Likelihood	Risk Management Procedures – Mitigation Measures
4. Waste Management	a. Incorrect management of general Municipal Wastes / welfare facilities resulting in litter on-site and / or attraction of rodents.	Moderate	Medium	<ul style="list-style-type: none"> Excavations will only extend as far as the top of the waste body. Regular inspections should be carried out to ensure the waste body has not been penetrated. Measures will be implemented to minimise waste and ensure correct handling storage and disposal of waste. During the construction phase, covered skips should be available across the Site to allow for appropriate segregation of wastes in accordance with existing legislation. As per condition 1.2 of the CoA “No waste shall be accepted at the closed landfill unless authorised by this certificate of authorisation”. As per condition 1.3 of the CoA “No waste shall be burned at the closed landfill”.
5. Nuisance – Dust / Dirt	a. Generation of dust leading to dust soiling at receptors.	Minor	Low	<ul style="list-style-type: none"> All potential environmental impacts from construction dust will be addressed through the implementation of the Construction Environmental & Waste Management Plan (CE&WMP) in accordance with current best practice guidelines. These measures will include but not be limited to: <ul style="list-style-type: none"> Damping down of stockpiles haul roads and bare ground during dry, windy weather; Limiting traffic speeds on site; Cleaning of sealed surfaces (e.g., public road) as necessary; Use of appropriate dust suppression equipment during dusty processes. This plan will be agreed with the planning authority and relevant statutory bodies for the proposed works.
6. Nuisance - Noise	a. Generation of noise resulting in loss of amenity to the local area and cause disruption to the local species;	Minor	Medium	<ul style="list-style-type: none"> While increased levels of background noise are unavoidable during any construction works, all construction activities will be confined within the Site Boundary. A noise complaint procedure shall be implemented; Onsite vehicles/equipment shall be throttled down/switched off when not in use; Selection of low noise rated machinery and equipment; Use of acoustic enclosures/screens where applicable; Isolation of vibrational sources such as pumps/compressors where required; Cut off trenches to isolate vibration transmission paths to be installed, where required.

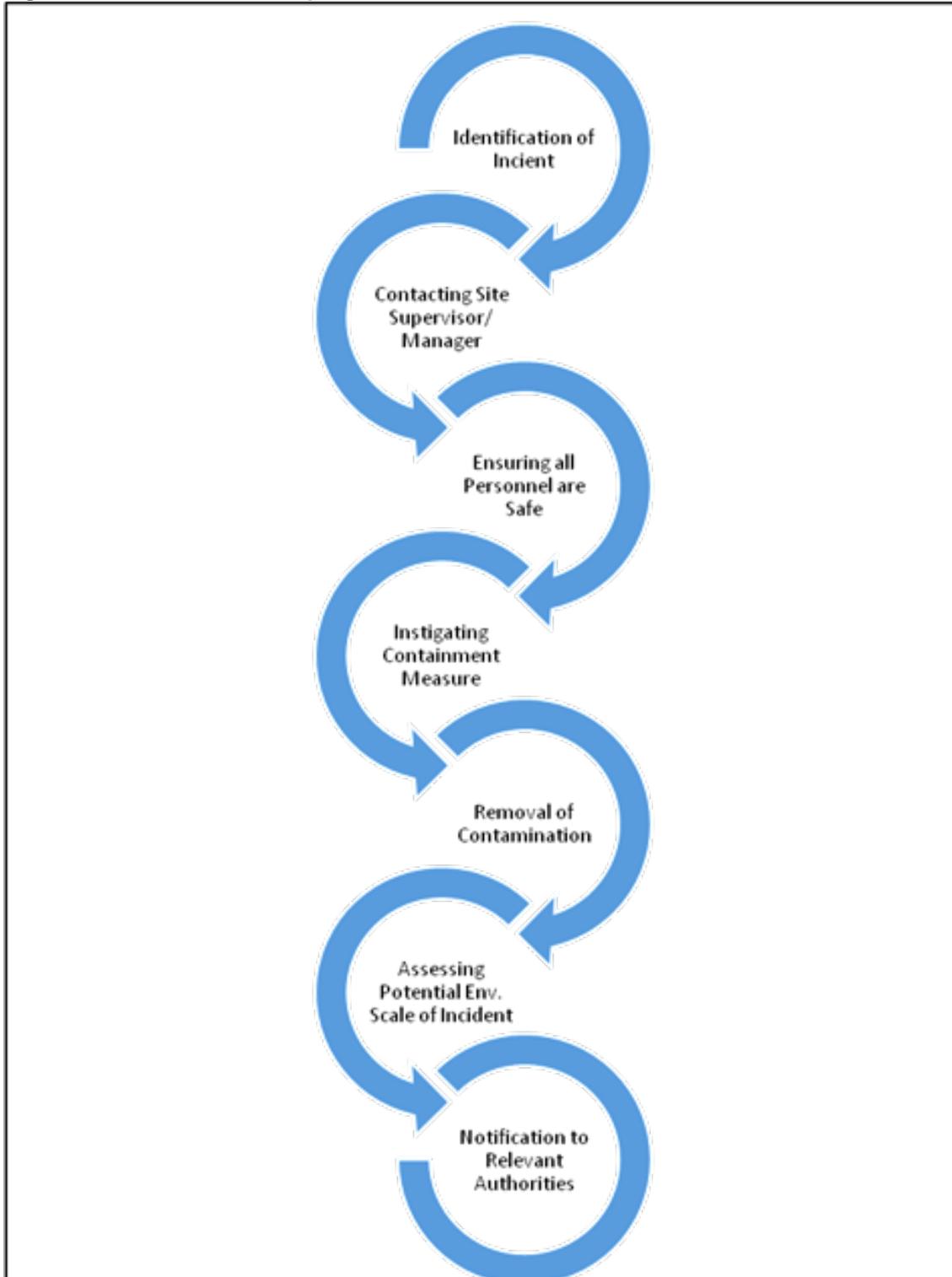
Aspect of Construction	Potential Hazard	Consequence	Likelihood	Risk Management Procedures – Mitigation Measures
				<ul style="list-style-type: none"> The Site will be secured for the duration of the works to prevent noise at night and anti-social behaviour.
10. Biodiversity Protection	a. Impacts on specific flora and fauna.	Minor / moderate	Medium	<p>In order to avoid any disturbance to species the following precautionary mitigation measures will be employed:</p> <ul style="list-style-type: none"> An inspection for any target species will be undertaken in advance of site works commencing; Protection for Birds Section 40 of the Wildlife Act 1976, as amended by Section 46 of the Wildlife (Amendment) Act 2000, restricts the cutting, grubbing, burning or destruction by other means of vegetation growing on uncultivated land or in hedges or ditches during the nesting and breeding season for birds and wildlife, from 1st March to 31st August. The management of vegetation (including trees and scrub) will be restricted to outside the bird breeding season. If seals are found, in accordance with best practice, the noisy works will be gradually ramped up to encourage any seals away, therefore, any short-term localised disturbance will not result in any significant or long-term impacts on any nearby seals. Other than the limited capping works required to comply with the CoA issued by the EPA, a set-back distance of 5m minimum from the Garavogue Estuary will be in place throughout the construction phase. No tracking of vehicles will occur within this 5m buffer zone. Refer to NIS for further details.
	b. Impacts on water quality and therefore aquatic ecology.	Moderate	Medium	<p>In order to avoid any disturbance to aquatic species the following precautionary mitigation measures will be employed:</p> <ul style="list-style-type: none"> An inspection for any target species will be undertaken in advance of site works commencing; If seals are found, in accordance with best practice, the noisy works will be gradually ramped up to encourage any seals away, therefore, any short-term localised disturbance will not result in any significant or long-term impacts on any nearby seals. Other than the limited capping works required to comply with the CoA issued by the EPA, a set-back distance of 5m minimum from the Garavogue Estuary will be in place throughout the construction phase. No tracking of vehicles will occur within this 5m buffer zone. Excavations will only extend as far as the top of the waste body. Regular inspections should be carried out to ensure the waste body has not been penetrated to avoid the mobilisation of leachate.

Aspect of Construction	Potential Hazard	Consequence	Likelihood	Risk Management Procedures – Mitigation Measures
				<ul style="list-style-type: none"> Weather conditions will be considered when planning excavation activities to minimise risk of run-off from site. An ecological clerk of works will be onsite at key stages of the remediation works to ensure that all preventative measures are correctly implemented and amended as required. Refer to NIS for further details.
11. Invasive Species	a. Spread of Invasive Alien Species.	Minor	Very High	<ul style="list-style-type: none"> All vehicles, machinery and any other equipment used for the works will be washed prior to its use at the Site to prevent the import of plant material or seeds; Before machinery or equipment is unloaded at the Site, equipment will be visually inspected to ensure that all adherent material and debris has been removed; Any vehicles and machinery that are not clean will not be permitted entry to the Site; All materials to be imported to the Site including additional planting will be sourced from a reputable supplier and records of all material and supplies will be maintained; and, Measures outlined in Section 3.1 of the guidance for Invasive non-native species (National Road Authority, 2010) will be considered.
12. Expected Contact with waste body	a. Odour.	Minor	Medium	<ul style="list-style-type: none"> Odours associated with landfill gas (primarily ammonia and hydrogen sulfide) may present a temporary nuisance during the installation of the biowindows/bioactive trenches. However, this will be short term in nature, as odour will likely only be present when the capping has been breached. Once the biowindows/bioactive trench are installed, the odour will dissipate.
	b. Fire/explosion.	Minor	Low	<ul style="list-style-type: none"> Continuous landfill gas (LFG) monitoring will take place during excavation works. Should the LFG explosion threshold be reached, works should cease with immediate effect and an appropriately qualified professional should be consulted. The southern, older parts of the Site are lower risk grading to the northern, more recently filled areas are deemed to be at a moderate to high risk.

6 EMERGENCY MANAGEMENT PLAN

Although, the Site will be managed, there remains a low risk from unexpected occurrences, such as accidental spillages on-site, which may result in environmental pollution. Incidents on-site will follow a similar emergency response template. This template is outlined in the schematic presented in Figure 6-1 below:

Figure 6-1: Site Incident Response



6.1 Incident Response

Where an environmental incident is identified, it will be reported to the on-duty Project Manager and thereafter the Health and Safety Officer. Each incident will have the following information gathered and reported:

- Location of the incident;
- Time and date;
- Scale of the incident;
- Nature of the incident, including any specific environmental dangers;
- Remediation actions taken;
- Name of personnel noting the incident, and who they work for; and,
- Any other relevant details.

Works in the vicinity of the incident must be stopped until the incident is resolved and an all-clear is issued by the Site Manager or Environmental Manager. All personnel in the immediate area of the release/spill shall be alerted to the circumstances and any dangers to them (Health and Safety) and to the environment.

The Project Manager will ensure, where required, that the incident details are communicated to the relevant regulatory authorities.

7 WASTE MANAGEMENT

7.1 Minimisation, Reuse and Recycling of C&D Waste

Construction and Demolition (C&D) waste will be minimal arising mainly from the removal of a small building inside the site access gate. It is expected that while there will be unavoidable construction waste, material surpluses, and damaged materials that will need to be disposed of, the Site Manager shall ensure that materials are ordered so that the quantity delivered; and the storage is not conducive to the creation of unnecessary waste.

The construction phase may generate plastic wrapping, strips, containers, polystyrene and wooden pallets etc. associated with the components of the biowindow/bioactive trench, self-binding gravel (for the walking track) and features of the car park. These wastes will be collected and segregated onsite before being removed off-site and recycled or disposed of at a suitably licensed waste facility.

7.2 Earthworks and Excavated Material

As outlined in Section 3.2 the proposed development has been specifically designed to avoid the importation of soils to the Site and the export of soils from the site.

These works will require the clearing of willow dominant scrub within the footprint of the proposed capping works. The majority of this will be segregated and removed off-site to a suitable waste disposal facility, however, a portion of the cleared scrub will be reused as part of the biodiversity management plan.

7.3 Assignment of responsibilities

The Site Foreman appointed by the Contractor will be the designated C&D Waste Manager and have overall responsibility for the implementation of the Project C&D Waste Management Plan. The C&D Waste Manager will be assigned the authority to instruct all site personnel to comply with the specific provisions of the Plan. At the operational level, the Site Foreman from each Sub-Contractor on the Site shall be assigned the direct responsibility to ensure that the discrete operations stated in the Project C&D Waste Management Plan are performed on an on-going basis.

7.4 Training

Copies of the project C&D Waste Management Plan will be made available to all relevant personnel on site and included as part of the Site induction information. All site personnel and sub-contractors will be instructed about the objectives of the project C&D Waste Management Plan and informed of the responsibilities which fall upon them as a consequence of its provisions. Where source segregation and material reuse techniques apply, each member of staff will be given instructions on how to comply with the project C&D Waste Management Plan.

7.5 Waste Documentation

The main contractor will manage the development and the implementation of the Construction, Environmental and Waste Management Plan and monitoring/mitigation measures. The C&D Waste Manager shall arrange for full details of all movements and treatment of construction and demolition waste discards to be recorded during the construction stage of the Project. Each consignment of C&D waste taken from the Site will be subject to documentation, which will conform to the requirements of Table 7-1 and ensure full traceability of the material to its final destination.

Table 7-1: C & D Waste Details to be Included in Transportation Dockets

Details	Particulars
Name of project of origin	Insert Address
Material being transported	Identify the material being transport e.g., soil and stone, timber
Quantity of material	Record the quantity in tonnes (use three place decimals)
Date of material movement	Record the date
Name of permitted carrier	Record the driver's name, vehicle registration and permit number
Material Destination	Record site address and permit number if applicable
Proposed Use	Record the proposed use, recovery or disposal.

Final details of the quantities and types of C&D Waste arising from the Project will be forwarded to Council's Environmental Department and/or their appointed representative(s).

8 MONITORING AND IMPLEMENTATION OF THE CE&WMP

8.1 Complaints, Comments and Enquiries

Due to the proximity of the Site to a number of industrial facilities and occupied residential properties it is of paramount importance to have a detailed complaints procedure in place. Any complaint related to the Site will be dealt with by the Site Manager. The source of the complaint will be investigated immediately. If possible, the source of the complaint will be stopped, moved or modified immediately. All complaints must be recorded including details of the complaint and any required corrective actions.

8.2 Site Visits and Evaluation of Compliance

An Environmental clerk of works (ECoW) will undertake Site inspections as required during the works. The aim of these visits will be to ensure compliance with procedures and mitigation measures set out in the CE&WMP.

This will be done by means of a site inspection and the auditing of different aspects of the works including documentation. Checklists for compliance will be drawn up, corrective actions will be required for any non-compliances identified and follow-up surveys will be scheduled to ensure compliance.

All monitoring results and reports detailing the compliance or otherwise of the works will be maintained at the site office. In the event of an incident, an incident report will be completed and that will document both the cause of the incident and the corrective action taken to address the incident. These incident forms will be available for inspection at the site office.

8.3 Control of Records

Environmental records, including waste management records, will be maintained in accordance with the respective company procedure and legal requirements. The records are to be maintained, in either hard copy or electronic format as required by the individual procedure that the records relate to, in such a way that they are readily identifiable, retrievable and protected against damage, deterioration or loss. The procedure that the records relate to also specifies the retention time for the records and who has the authority to dispose of them.

9 IMPLEMENTATION, REVIEW AND TRAINING

The Appointed Project Manager will be responsible for developing an updated site-specific CE&WMP(s) prior to the commencement of Site works. The Project Manager will be responsible for ensuring compliance with the CE&WMP. Each Sub-Contractor will be responsible for appointing a point of contact for matters related to environmental protection.

Copies of the CE&WMP(s) will be made available to all personnel on-site. All Site personnel and Sub-Contractors will be instructed about the objectives of the CE&WMP and informed of the responsibilities which fall upon them as a consequence of its provisions.

All staff will receive environmental awareness training as part of their Site induction to ensure they are aware of their responsibilities under the CE&WMP. This will include:

- Site induction, including relevant environmental issues;
- Method statement and risk assessment briefings;
- Toolbox talks, including instruction on incident response procedures; and,
- Key task-specific environmental issue briefings.

The CE&WMP(s) will be reviewed on an as needed basis if the scope of works changes significantly or if the need is identified following a site audit.

9.1 Training Awareness and Competence

Site personnel shall be trained appropriately to ensure they are competent to perform tasks that have the potential to cause a significant environmental impact as part of the Proposed Development. Competence is defined in terms of appropriate education, training and experience. All managers and supervisors will be briefed on the CE&WMP.

Method Statements will be prepared for specific activities prior to the works commencing and will include environmental management / best practice measures and emergency preparedness appropriate to the activity. The Site Manager or nominated deputy will review key Method Statements prior to their issue. Method Statement briefings will be given before personnel carry out key activities for the first time.

10 CONCLUSIONS

This CE&WMP document outlines the management procedures to enable the Appointed Site Manager to respond to potential environmental risks from construction activities on-site. The final CE&WMP will cover all aspects of the construction development.

In assessing risks on-site, full cognisance has been taken of best practice guidance including:

- Landfill Manuals – Landfill Restoration and Aftercare (EPA, 1999);
- CIRIA C741 Environmental Good Practice on Site (4th edition) (CIRIA, 2015);
- C532 – Control of Water Pollution from Construction, Guidance for Consultants and Contractors (CIRIA, 2001);
- Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (NRA, 2010); and,
- BS 5228-1 + A1:2014: Code of Practice for noise and vibration control on construction and open sites- Part 1: Noise (BSI, 2009) and Part 2 Vibration (BSI, 2009);
- C774 - Coastal and Marine Environmental Site Guide (Second Edition) (CIRIA, 2015b);
- Guidance for Invasive non-native species (National Road Authority, 2010).

The appointed Contractor will be required to develop an updated CE&WMP prior to the commencement of any construction works and, if required, this will be submitted to the Planning Authority for approval.

The implementation of all the environmental management measures outlined in this CE&WMP will ensure that the construction programme will be completed without significant adverse effects on the surrounding environment.

11 REFERENCES

- BSI. (2009). *BS 5228-2:2009 2009 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration*. London: British Standard.
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- CIRIA. (2001). *CIRIA C532 Control of Water Pollution from Construction, Guidance for Consultants and Contractors*. CIRIA.
- CIRIA. (2015). *C:741 Environmental Good Practice on site (fourth edition)*. London: Construction Industry Research and Information Association.
- CIRIA. (2015b). *C774 - Coastal and Marine Environmental Site Guide (Second Edition)*. Construction Industry Research and Information Association.
- EPA. (1999). *Landfill Manuals: Landfill Restoration and Aftercare*. Environmental Protection Agency.
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- EPA Ref: H0006-01. (2018). *Closed Landfill Certificate of Authorisation*. Wexford: Environmental Protection Agency.
- National Road Authority. (2010). *Guidance on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads*.
- NRA. (2010). *Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads*. Dublin: National Roads Authority.

APPENDICES

APPENDIX A

