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KILLYCARD CLOSED LANDFILL REMEDIATION PROJECT

CONSTRUCTION AND ENVIRONMENTAL MANAGEMENT PLAN (CEMP) FOR THE PROPOSED REMEDIATION OF KILLYCARD CLOSED LANDFILL

Prepared for:

Monaghan County Council

Date: **April 2024**

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CONSTRUCTION AND ENVIRONMENTAL MANAGEMENT PLAN (CEMP) FOR THE PROPOSED REMEDIATION OF THE KILLYCARD CLOSED LANDFILL

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Abstract: This document comprises the Construction and Environmental Management Plan (CEMP) for the Remediation of the Closed Landfill at Killycard, Co. Monaghan, the purpose of which is to set out the key construction and environmental management issues associated with the proposed works. This plan will be developed further at the construction stage and on the appointment of the Contractor to the project.

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1. INTRODUCTION

This document is the Construction and Environmental Management Plan (CEMP) for the proposed Killycard Closed Landfill Remediation Works and has been prepared by Fehily Timoney and Company (FT) on behalf of Monaghan County Council (MCC) to accompany an application to An Bord Pleanála under Section 177AE of the Planning and Development Act, 2000 (as amended).

This document comprehensively sets out the construction and environmental management concerns associated with the proposed works, to ensure that during construction, the environment is protected and impacts on the environment are minimised. This CEMP will be adopted by the Contractor who will be responsible for the appropriate execution of the proposed works as set out in this document.

The Environmental Protection Agency (EPA) issued a Certificate of Authorisation (CoA) for the site (Licence number: H0364-01, See Appendix 1 of EIA Screening Assessment Report which accompanies this planning application). The proposed project is to implement the requirements of CoA to remediate the closed landfill site.

1.1 General Introduction and Purpose

This CEMP sets out the key environmental management issues associated with the proposed remediation works, to ensure that during the construction and operation of the development, the impacts on the environment are minimised.

Condition 3 of the CoA requires MCC to implement remediation works to this closed landfill in order to ensure

> *"..discharges and emissions from the closed landfill do not cause environmental pollution or deterioration in the status of the receiving surface water body or groundwater body.".*

The CoA is issued under Regulation 7 (6) of the Waste Management (Certificate of Historic Unlicensed Waste Disposal and Recovery Activity) Regulations 2008.

The purpose of the proposed remediation works is to implement Condition 3 of the CoA.

1.2 The Client

FT was commissioned by MCC to provide consultancy services in respect of the proposed Killycard Closed Landfill Remediation Works.

1.3 The Site

Killycard Closed Landfill is located in the townland of Killycard, approximately 1.7km to the northwest of Castleblayney town on the R183 Castleblayney to Ballybay Regional Road. It was previously reported by MCC that the landfill accepted waste from approximately 1980 to 1987. Since its closure the site has been covered with a soil cap, no other remediation works have been carried out. Waste deposited at the site is understood to comprise of municipal solid waste (MSW) to a maximum depth of 2.4m below ground level (BGL). The maximum waste footprint is calculated to be approximately 1.15 hectares (ha). An interred volume of waste deposited at the site is estimated at approximately 29,700m³.

The closed landfill is located in a low-lying valley within a predominantly rural setting. The site is generally flat with a hill rising from the northern boundary of the site. The site is at an elevation of between 93m and 95m above Ordnance Datum (OD).

The site is bordered by Corrinshigo Lough to the west and by drains to the south and the north. The northern drain runs along the border of the Killycard townland and drains into the Drumillard Lough which is to the north-east of the site and at an in-stream distance of ca. 1.5km. Commercial developments have been constructed on site including mushroom grow houses (now derelict) and an operational industrial building in the eastern portion of the site. The land use in the area is primarily agricultural with the covered landfill area currently used for silage production. There are dwelling houses within 50m of the site boundary.

The site is located within the Newry, Fane, Glyde and Dee catchments and the sub-catchment of River Fane. The site is bounded to the southwest by the source stream for Corrinshigo Lough, to the west by Corrinshigo Lough itself and to the north by the lake outlet stream. Carrickaslane Lough stream and Devlin stream lie northeast of the site and are tributaries of the river Fane. The in-stream distance between the Killycard Closed Landfill and Dundalk Bay SAC is ca. 44.5km and to the Dundalk Bay SPA is ca. 44km.

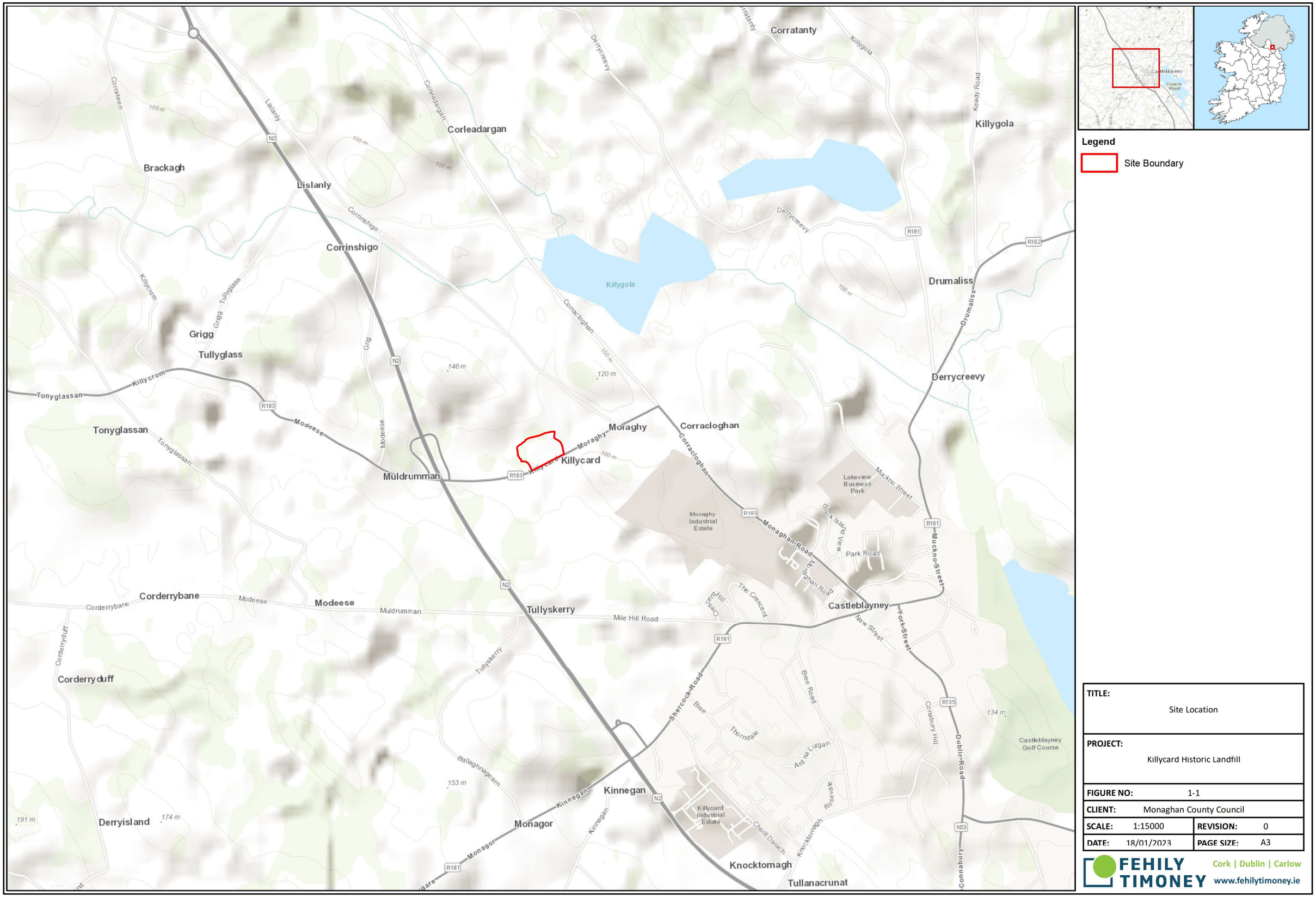
There are several small lakes located in the vicinity of the site. Drumillard Lough is located approximately 0.6km to the northeast of the site while an unnamed surface water area located approximately 0.5km to the east of the site. Killygola Lough and Lough Smiley are located approximately 1km northeast of the site.

Japanese knotweed (*Fallopia japonica)* is present along the western boundary of the closed landfill/Corrinshigo Lough shore. An Invasive Species Management and Treatment Plan to address the required works for invasive species in the site (Appendix 1).

A Site Location Map drawing showing the site and its immediate environs is enclosed with this planning application (Drawing Reference: P21-071-0100-0001).

Site Location is shown in Figure 1-1.

Path: R:\Map Production\2022\P22-071\Workspaces\P22-071_GIS_Fig1-1_Site_Location_A3.mxd



Legend

Site Boundary

TITLE:	Site Location
PROJECT:	Killycard Historic Landfill
FIGURE NO:	1-1
CLIENT:	Monaghan County Council
SCALE:	1:15000
REVISION:	0
DATE:	18/01/2023
PAGE SIZE:	A3

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1.4 Overview Description of the Project

Monaghan County Council proposes to seek the approval of An Bord Pleanála for the completion of Closed Landfill Remediation Works at a Closed Landfill site in Killycard, County Monaghan.

The application site, as defined by the red line boundary in the accompanying drawings, is 2.25ha in size. The proposed capping area within the application site is 1.34ha in size.

The proposed development will include:

- The development of a site access.
- The development of a temporary site compound and office area for the duration of the works.
- Invasive species management.
- Site clearance, including the removal of an existing gate, existing timber post and wire fencing and clearance of existing vegetation.
- Grading/profiling of the existing site area.
- Installation of an engineered landfill capping system covering an area of 1.34 ha.
- Installation of surface and subsurface surface water drainage infrastructures.
- Installation of passive landfill gas management infrastructure.
- The installation of stock proof fencing, and a new access gate on-site.
- Landscaping of the final formation of the capping area using a high value multi species grass cover.

Post completion of the remediation works ongoing environmental monitoring and maintenance of the engineered cap and onsite drainage system will be required.

The works will take place in accordance with a Construction Environmental Management Plan (CEMP).

The construction period for the proposed development is estimated to be in the region of 5-7 months.

2. EXISTING ENVIRONMENT

The closed landfill site is in the townland of Killycard, approximately 1.7km to the northwest of Castleblayney town on the R183 Castleblayney to Ballybay Regional Road. It was previously reported by MCC that the landfill accepted waste from approximately 1980 to 1987. Since its closure the site has been covered with a soil cap, no other remediation works have been carried out.

Commercial developments have been constructed on site including mushroom houses (now derelict) and an operational industrial building in the eastern portion of the site. The western portion of the site shares a boundary with Corrinshigo lake. A steeply sloped agricultural field is located to the north of the site. The land use in the area is primarily agricultural with this site currently used for general agricultural purposes, principally animal grazing.

The quaternary Map provided by GSI Online identifies most quaternary sediments at the site as 'cut-over raised peat'. The subsoils are typically of cutover/cutaway peat. Beyond the northern and southern site boundaries the superficial geology is made up of glacial tills derived from 'Lower Palaeozoic sandstones and shales'. During the installation of boreholes during the site investigation, the presence of peat was recorded to a depth ranging from of 4.0m to 4.8m below ground level (BGL).

The GSI online 1:100,000 scale bedrock geology map, the site and surrounding area is underlain by the Silurian Oghill formation (OL) which is generally made up of 'grey to grey-green massive sandstone (greywacke), microconglomerate and amalgamated beds with subordinate thin to thick-bedded greywacke and locally, at least partly, infaulted dark grey or black pyritic, occasionally graptolitic shale-mudstone'.

GSI online mapping classifies the Silurian Oghill formation as a Poor Aquifer (Pl) – bedrock which is generally unproductive except for local zones. The site lies within the Louth Groundwater Body (GWB No. IEGBNI_NB_G_019) which is defined as being at Good Status under the Water Framework Directive. There are no karst landforms within the site boundary.

According to the EPA map viewer, the site is located within the Newry, Fane, Glyde and Dee catchments and the sub-catchment of River Fane. The site is bounded to the southwest by the source stream for Corrinshigo Lough, to the west by Corrinshigo Lough itself and to the north by the lake outlet stream. Carrickaslane Lough stream and Devlin stream lie northeast of the site and are tributaries of the river Fane. The river Fane flows into Dundalk Bay SAC and Dundalk Bay SPA. The in-stream distance between Killycard Closed Landfill and Dundalk Bay SAC is c. 44.5 km and to Dundalk Bay SPA is c. 44 km.

There are several small lakes located in the vicinity of the site. Drumillard Lough is located approximately 0.6km to the northeast of the site while an unnamed surface water area located approximately 0.5km to the east of the site. Killygola Lough and Lough Smiley are located approximately 1km northeast of the site.

3. OVERVIEW OF THE CONSTRUCTION WORKS

3.1 Construction Period

The construction period for the proposed development has been estimated to be in the region of 5-7 months.

3.2 Construction Staffing and Machinery

It is estimated that approximately 8-10 construction staff will be tasked with implementing the works over the course of the construction phase, this will be downgraded to one during the operational phase to allow for the periodic maintenance and inspection of the site.

A 360-degree excavator (s), articulated dumper (s), roller compactor (s) will be utilized for the reprofiling of the closed landfill while HGV tippers will be required for the importations of subsoils on site.

3.3 Construction Phase

The remediation works will include:

- The development of a site access.
- The development of a temporary site compound and office area for the duration of the works.
- Invasive species management.
- Site clearance, including the removal of an existing gate, existing timber post and wire fencing and clearance of existing vegetation.
- Grading/profiling of the existing site area.
- Installation of an engineered landfill capping system covering an area of 1.34 ha.
- Installation of surface and subsurface surface water drainage infrastructures.
- Installation of passive landfill gas management infrastructure.
- The installation of stock proof fencing, and a new access gate on-site.
- Landscaping of the final formation of the capping area using a high value multi species grass cover.

The following operational activities will undertake post the proposed development works:

- Ongoing environmental monitoring.
- Ongoing maintenance of engineered cap and drainage systems on-site.
- Ongoing management of landfill gas.

The construction period for the proposed development is estimated to be in the region of 5-7 months.

The hours of construction activity will be between to 07:00 to 19:00 Monday to Saturday inclusive. Work on Sundays or public holidays will only be conducted in exceptional circumstances.

3.3.1 Development of a Site Access

Access to the to the closed landfill site shall be via the R183. The Contractor will be required to implement a traffic management plan to manage safe access and egress of construction vehicles from the site.

The Proposed Traffic Management Plan is shown in a drawing enclosed with this planning application. See Drawing Reference: P22-071-0100-0007.

3.3.2 Development of Temporary Site Compound and Office Area

The temporary site compound shall comprise a materials storage area, site offices and a parking area. Material storage compound, parking area and site offices in the form of portacabins and site canteen/welfare facilities (Contractor and Employers Representatives) will be provided to the south-east of the site, outside the footprint of the capping area. The temporary site compound shall be mobilised within the existing concrete yard area.

Access to the compound shall be via the existing access to the site off the R183.

Waste from the welfare facilities (i.e., Portaloo(s)) will be stored temporarily prior to disposal at a licensed wastewater treatment plant.

Mobile on-demand fuelling will be utilised for refuelling plant. Mobile refuelling vehicles will be equipped with spill pads and spill kits.

Generators will be used on-site for power supply during the temporary works. Water will be provided via water tankers.

Periodic road sweeping will be required where necessary.

3.3.3 Invasive Species Management

Invasive species have been identified at the site and management will form part of the works. The full extent of invasive species rhizomal growth including potential vector material will be removed and encapsulated in a dedicated geocomposite lined invasive species management cell. Upon completion of the excavation works the lined cell will be buried with a minimum 2.0m cover within a dedicated “fill” location within the waste body prior to placing the engineered cap.

Respective areas where invasive species are present will be isolated and have appropriate signage following the completion of the proposed works.

The Proposed Location for the Japanese Knotweed Burial is shown in a drawing enclosed with this planning application. See Drawing Reference: P22-071-0100-0008.

3.3.4 Site Clearance

Following completion of the invasive species management, vegetation on site will be cut back, mulched and re-spread on-site. Any vegetation left will be dispatched to an authorized waste facility for disposal.

A Site Clearance Plan enclosed with this application shows the areas of grass that will be cleared from the site. See Drawing Reference: P22-071-0100-0004.

3.3.5 Grading/Profiling of Existing Profile

The existing waste body was covered following cessation of waste filling with an intermediate soil cap.

The existing finished surface will require re-profiling to facilitate:

- Surface and sub surface drainage.

- Safe execution of the site remediation works.
- Safe access for maintenance of the cap.

Re-profiling will principally involve the (shallow) cutting of material at local high spots. These "cut" materials will be used as "fill" in local depressions. All cut and fill works will be carried out within the site boundary.

Thereafter imported granular "dust" material 50mm to 100mm thick will be used to provide formation for the engineered cap. The re-profiled surface will provide the foundation for the engineered landfill cap. See Drawing Reference: P22-071-0300-0001.

3.3.6 Installation of Engineered Landfill Capping System

The engineered landfill cap "barrier" system will:

- Cover an area of approximately 13,400m².
- Isolate the waste body from rainfall inputs which might otherwise produce leachate. This will protect underlying groundwater and adjacent surface waters.
- Minimise the potential for uncontrolled landfill gas migration to the atmosphere or adjacent lands.
- Provide a physical barrier between the finished surface and buried wastes.
- Facilitate controlled discharge of surface water runoff and sub surface drainage flows into the receiving surface waters.

The cap shall comprise of the following:

- Vertical wells.
- A passive below liner landfill gas venting system.
- A LLDPE barrier to isolate the waste body from rainfall inputs and prevent uncontrolled fugitive gas emissions from the waste body.
- Over liner gas management system.
- A subsurface drainage system.
- A surface drainage system.
- A subsoil layer average thickness 800-850 mm.
- A topsoil layer average thickness 150-200 mm barrier.

The Proposed Landfill Capping Area is shown in a drawing enclosed with this planning application. See Drawing Reference: P22-071-0300-0002.

Below Liner Landfill Gas System

Currently landfill gas as may be present vents gas to atmosphere via diffuse surface emissions. Once the LLDPE barrier is installed this preferential pathway to atmosphere will be isolated.

Below the LLDPE barrier a gas collection geocomposite and pipework system will be constructed to collect and direct landfill gas as may be present to the proposed passive ventilation system.

The below liner gas collection geocomposite is a cuspated synthetic product that is rolled out above the granular "dust" material overlying the re-profiled intermediate cap which overlies the waste. The gas collection geocomposite forms a "cavity" to intercept gas emissions from the underlying body.

Gas collection pipework will be slotted and laid in gravel surround below the gas collection geocomposite and it will facilitate collection of landfill gas; and soakage, if required, of condensate or other as may collect in pipework.

The Proposed Under Liner Gas Collection System has been enclosed with this planning application (Drawing Reference: P22-071-0700-0001.

LLDPE Barrier

The LLDPE barrier will be a 1.0 mm thick "plastic" sheet that is impermeable to both water and gas. It prevents gas escaping into the overlying soils and stops water from rainfall entering the underlying waste body.

The LLDPE sheets will be welded at joints and will terminate in a vertical cut-off trench about the perimeter of the site.

Subsurface Drainage

The over liner sub surface drainage collection geocomposite is a cuspated synthetic product that is rolled out above the LLDPE barrier. It forms a "cavity" to intercept rainfall inputs into the cap. Subsurface drainage flows from the drainage geocomposite are transferred via a supporting pipework system to a surface drainage outfall manhole and outlet at Corrinshigo Lough.

Drawings showing the proposed surface and subsurface drainage system is enclosed with this planning application. See Drawing Reference: P22-071-0500-0001, P22-071-0500-0002 and P22-071-0500-0003.

Surface Drainage

French drains around the capping perimeter will collect and direct surface water flows to the subsurface drainage network ultimately outfalling at the same location. French drains will be provided with HDPE SDR 17 slotted pipes.

A drawing showing the proposed surface and subsurface drainage system is enclosed with this planning application. See Drawing Reference: P22-071-0500-0001.

Subsoil Layer

Suitably sourced subsoils will then be imported to the site and placed atop of the sub surface drainage geocomposite and /or geogrid on side slopes. The subsoil layer will generally be 800-850mm deep.

The purpose of the subsoil layer will be to protect the synthetic geocomposite materials and to support landscaping.

Topsoil Layer

Suitable sourced topsoil will be placed atop the subsoil. The topsoil will have no stones greater than 50mm diameter. Stones greater than 50mm will be removed by a proprietary stone picker or similar prior to seeding.

The topsoil layer will be 150-200 mm deep.

Recovered stones will be reused on site as fill to sub surface drains.

3.3.7 Temporary Works

Leachate Management

Storage tanks will be provided for the safe storage of any leachate arisings during the construction works. Leachate arising during construction works will be disposed at a licensed wastewater treatment plant.

Daily Cover of Exposed Waste

In the unlikely event that waste is exposed it will be covered with soil or similar approved at the close of each working day.

Suspended Solid Management

Suspended solids will be prevented from entering watercourses by installing silt fences around the site perimeter and around stockpiles.

Odour Management

Odour management is not expected to be an issue due to the age of the interred waste is older than 25 years. The proposed works have been designed to reduce the risk of exposing waste.

In the event that it is exposed, waste will be covered up at the end of each working day.

Traffic Management

The Contractor will be required to implement a traffic management plan to manage safe access and egress of construction vehicles from the site. The Proposed Draft Traffic Management Plan is shown in a drawing enclosed with this planning application. See Drawing Reference: P22-071-0100-0007.

Stock Proof Fencing

Clearance of shrub on the perimeter will result in damage to exiting stock proof fencing. Following placement of the cap a replacement perimeter stock proof fence 1.3m high will be installed around the landfill footprint.

The existing access gate to the site will be replaced. Redundant fences and gates will be transported and disposed of offsite in a licenced facility.

3.3.8 Permanent Works: Management and Monitoring Infrastructure

Installation of Passive Landfill Gas Management Infrastructure

The development will include the installation of a landfill gas ventilation trench along the entire eastern boundary of the site. The ventilation trench will mitigate the risk of landfill gas migration to the neighbouring commercial properties. The ventilation trench will be constructed by excavating a trench to the depth of the waste body and backfilling with rounded drainage stone. Vertical standpipes will be installed at 20m centres along the trench to provide a pathway for landfill gas to vent to the atmosphere. The standpipes shall be fitted with rotating stainless-steel cowls and a carbon filter pack. The rotation of the cowls (by wind power) will induce

a negative pressure or suction within the pipe network aiding ventilation. The carbon filter pack will neutralise any potential odours prior to exhaust to atmosphere.

See Drawing Reference: P22-071-0700-0001 for proposed location and details.

Installation of Additional Environmental Monitoring Infrastructure

The following additional monitoring infrastructure will be installed as part of the development:

- Perimeter Landfill Gas Migration Monitoring Boreholes.
- Continuous Emissions Monitoring Infrastructure.
- Additional Groundwater Monitoring Locations.
- Additional Leachate Monitoring Locations.

Seven new perimeter landfill gas monitoring boreholes (LFGM1 – LFGM7) shall be installed at maximum 50m centres maximum along the eastern edge of the capping boundary and southern site boundary. The monitoring points shall be installed to detect the presence of otherwise of migrating landfill gas.

Continuous gas monitoring infrastructure shall be installed within the two commercial buildings to the east of the capping boundary. The monitoring infrastructure will consist of a small wall mounted control panel and a number of isolated continuous gas monitoring sensors.

Three additional groundwater monitoring (GW04 – GW06) will be installed to monitor groundwater. Three existing wells (GW01 – GW03) as are present within the waste footprint will be retained and incorporated into the cap to support future environmental monitoring as may be required by the EPA.

Arisings from all borehole installations will be managed on site below the LLDPE barrier and gas collection geocomposite.

Monitoring wells will have a chamber and a cover atop the wells at the same elevation as the surrounding ground. The wells will have monitoring ports to support monitoring of landfill gas quality and or groundwater quality as may be required.

A drawing showing all existing and proposed monitoring wells locations is enclosed with this planning application, see Drawing Reference: P22-071-0100-0005.

Grass Cover/Landscaping for Pasture

Post capping and placement of the subsoils and topsoil layers it is proposed to landscape the site using a high value multi species grass cover. Grass is used to prevent erosion of the soils and to provide an attractive final visual appearance for the site.

3.4 Operational/Post Construction Phase

The Operational/Post Construction works will include:

- Ongoing environmental monitoring.
- Ongoing maintenance of engineered cap and drainage systems on-site.
- Ongoing management of landfill gas.

3.4.1 Environmental Monitoring

Monitoring staff will be required to access installed infrastructure (wells and surface water monitoring locations) to take samples and/or monitor gas quality during the aftercare period post construction.

3.4.2 Maintenance of Cap, Passive Landfill Gas Management Infrastructure and Surface Drainage

The grass cover will require maintenance. This may be provided either by light animal grazing and/or by mowing. Fertiliser supplements may also be required periodically during the aftercare period subject to stocking density.

Landfill gas ventilation pipes may require periodic inspection and replacement of carbon filter media for the control of odours.

Sub surface drainage pipes may require periodic inspection and jetting of pipes if they become compromised with roots or silt.

3.4.3 Management of Landfill Gas

Post completion of the works and installation of the proposed landfill gas management infrastructure, there will be an on-going requirement to:

- Monitor landfill gas within and external to the facility at dedicated periodic and continuous monitoring locations.

4. ENVIRONMENTAL MANAGEMENT PLAN

4.1 Introduction

This Environmental Management Plan (EMP) defines the project obligations, Environmental Management System (EMS) and environment mitigation measures relating primarily to the construction phase of the proposed works.

This EMP describes how the Contractor for the construction works will implement a site Environmental Management System (EMS) on this project to meet the specified contractual, regulatory and statutory requirements and mitigation measures. This plan will be further developed and expanded following the grant of planning permission and appointment of the Contractor for the construction works. Please note that some items in this plan can only be finalised with appropriate input from the Contractor who will carry out the construction works and once the planning conditions attached to any grant of planning are known. It will be the Contractor's contractual responsibility to implement an effective environmental management system to ensure that the Boards **environmental** requirements for the construction of this project are achieved.

All site personnel will be required to be familiar with the environmental management plan's requirements as related to their role on site. The plan describes the project, sets out the environmental procedures that will be adopted on site and outlines the key performance indicators for the site.

- The EMP is a controlled document and will be reviewed and revised as necessary.
- A copy of the EMP will be located at the proposed temporary Contractor's compound.
- All employees, suppliers and Contractors whose work activities cause/could cause impacts on the environment will be made aware of the EMP and its contents.

4.2 Project Obligations

During the remediation phase of the proposed development several environmental management obligations must be implemented and achieved by Monaghan County Council and the Contractor. In addition to statutory obligations, there are several specific obligations set out in the accompanying Natura Impact Statement (NIS). When development consent is granted, there is also likely to be planning conditions, with which Monaghan County Council must comply. At the outset however, this CEMP has been prepared for the purpose of ensuring no adverse environmental impacts occur as a consequence of the proposed development. The Contractor and all of its sub-Contractors will be made fully aware of and be contractually required to adhere to all environmental obligations.

4.2.1 NIS Obligations

The accompanying NIS, which is provided under a separate cover, identifies measures that will be put in place to mitigate the potential environmental impacts arising from the construction phase of the proposed project.

4.2.2 Planning Permission Obligations

Should the remediation works be consented by An Bord Pleanála, the planning conditions will be complied with and should be read in conjunction with the project CEMP and other related reports prepared by and on behalf of Monaghan County Council.

4.2.3 Other Obligations

The Contractor will liaise directly with Monaghan County Council and An Garda Síochána in relation to securing any necessary permits to allow the works to take place including for example (non-exhaustive list):

1. Commencement notice;
2. Special Permits in relation to oversized vehicles on public roads, if required.

Monaghan County Council will continue to liaise closely with the local residents, especially near neighbours and landowners in relation to works and all reasonable steps will be taken to minimise the impact of the development.

4.3 Environmental Management System

The Environmental Management System (EMS) is outlined in the sections below.

4.3.1 Environmental Policy

The Contractor is responsible for preparing and maintaining an Environmental Policy for the site. The policy should be appropriate to the project, commit to continuous improvement and compliance with legal requirements and provide a framework for objectives and targets. This will be communicated to all site personnel and will be available on-site notice boards.

4.3.2 Training, Awareness and Competency

All site personnel will receive environmental awareness information as part of their initial site induction and briefing. The detail of the information should be tailored to the scope of their work on site. The Contractor for the construction works may decide to conduct the environmental awareness training at the same time as health and safety training (often referred to as Site Inductions).

This will ensure that personnel are familiar with 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.

The CEMP will be retained in the site management office during the project. The environmental performance at the site will be on the agenda of the monthly project management meetings for the project.

Elements of the CEMP will be discussed at these meetings including objectives and targets, the effectiveness of environmental procedures, etc. Two-way communication will be encouraged by inviting all personnel to offer their comments on environmental performance at the site.

4.3.3 Register of Environmental Aspects

The Contractor is responsible for preparing and maintaining a *Register of Environmental Aspects* pertaining to the site. This register will identify the environmental aspects associated with activities onsite and determine

which aspects have or can have a significant impact on the environment. Risks and Opportunities associated with environmental aspects will be identified. Life-cycle impacts (i.e. upstream and downstream impacts) will be identified if present.

4.3.4 Register of Legislation

The Contractor is responsible for preparing and maintaining a register of key environmental legislation pertaining to the site. This register will reference all current environmental legislation and will be inspected, reviewed and updated regularly to ensure compliance.

4.3.5 Objectives and Targets

Objectives and targets are required to be set to ensure that the project can be constructed and operated in full accordance with the NIS, planning conditions and legislative requirements, with minimal impact on the environment.

Environmental objectives are the broad goals that the Contractor must set in order to improve environmental performance. Environmental targets are set performance measurements (key performance indicators or KPI's) that must be met in order to realise a given objective.

The Contractor will set objectives based on each significant environmental impact. Key objectives are likely to include the following:

- To ensure that nearby watercourse (lakes, rivers & streams) are not negatively impacted by construction works.
- To ensure that humans are not negatively impacted by dust generated by construction works.
- To ensure that humans are not negatively impacted by noise generated by construction works.
- To ensure that impacts to habitats and wildlife are minimised during works.
- To ensure that a waste management plan for this site will be fully implemented.
- To ensure that the visual impact during the construction work is minimised.
- To ensure that the proposed development is constructed in compliance with the EIA Screening Report.
- To prevent adverse environmental impacts due to noise, vibration or dust.

Performance in relation to each of these objectives will be reviewed on a regular basis by means of inspections, audits, monitoring programmes, etc.

4.3.6 Non-Conformance, Corrective and Preventative Actions

Non-conformance notices will be issued in the following cases:

- Where site activities do not conform with the requirements of the EMS.
- Where environmental monitoring shows that there is a breach of an emission limit value or Environmental Quality Standard on-site.
- Where there is a breach of an EPA condition imposed under the EPA's CoA for the site.
- Where there is a complaint relating to site activities.

Non-conformance is the situation where essential components of the EMS are absent or dysfunctional, or where there is insufficient control of the activities and processes to the extent that the functionality of the EMS in terms of the policy, objectives and management programmes, is compromised. A non-conformance register should be controlled by the Contractor.

In the event of non-conformance with any of the above, the following must be undertaken:

- Investigate cause of the non-compliance.
- Develop a plan for correction of the non-compliance.
- Determine preventive measures and ensure they are effective.
- Verify the effectiveness of the correction of the non-compliance.
- Ensure that any procedures affected by the corrective action taken are revised accordingly.

Responsibility must be designated for the investigation, correction, mitigation and prevention of non-conformance.

Internal Audits

Periodic internal audits will be carried out under the EMS to ensure that all site activities conform to the requirements of the EMS. Non-conformances identified during Internal Audits will be addressed by way of the Non-conformance management process detailed above. Opportunities for improvement identified during internal audits will be communicated to the relevant responsible personnel.

4.3.7 EMS Documentation

The Contractor is required to keep the following documentation in relation to the environmental management of the project (as a minimum):

- Construction Environmental Management Plan for the proposed development
- Register of Environmental Aspects/Impacts
- Register of Planning Conditions
- Monitoring Records
- Minutes of Meetings
- Training Records
- Audit and Review Records

All of these documents and records are to be available for inspection in the site office. The documentation shall be up to date and shall be reviewed on a regular basis with revisions controlled in accordance with the site quality plan.

It will be a requirement to develop and maintain a Management and Monitoring programme in accordance with Condition 3 of the CoA for the site.

4.3.8 Control of Documents

The Contractor will establish, implement and maintain a procedure to control CEMP documents and records so they are clearly identifiable, organised, current, easily located and revised when necessary.

4.4 Ecological Management Plan

FT was commissioned on behalf of Monaghan County Council to undertake an Appropriate Assessment Screening and Natura Impact Statement which accompany the application for the proposed landfill remediation.

The ecology appraisal involved a field assessment and a desktop review of relevant data available for the study site and locality.

4.4.1 Designated Sites

Potential impacts on European sites are considered in the Natura Impact Statement accompanying the Planning Application.

4.4.2 Habitats

The habitat types (according to the Fossitt, 2000 classification system) identified during the ecological surveys conducted at the site on the 14th May 2022 are outlined below.

The western portion of the site, which is to be capped, consists of Improved agricultural grassland (GA1). This is dominated by rye grass and is heavily fertilised. The verge or bank of the mound is predominantly dry meadow grassy verge habitat (GS2). The remainder of the land to be capped was classified as buildings and artificial surfaces (BL3) with no plant species present.

4.4.3 Invasive Species

Japanese Knotweed was identified as an invasive species within the footprint of the original study area. The extent of the closed landfill was confirmed during the CoA process. As a result, the original study area was reduced to ensure remediation works were only carried out where the closed landfill is present. During the ecological surveys conducted at the site on the 14th May 2022, no invasive species were present within the remediation works area.

4.4.4 Construction/Operational Stage Mitigation Measures

Mitigation by Avoidance and Design

The following measures are incorporated into the proposed remediation plan to reduce impacts on designated sites, flora and fauna through avoidance and design:

- Preparation of an Invasive Species Management Plan (See Appendix 2)
- Stock proof fencing will be installed which will prevent spread of invasive species
- Installation of a surface drainage system to prevent leachate entry to watercourses
- Capping the landfill to isolate the waste from rainfall, preventing leachate entry to watercourses

Further mitigation measures prescribed to avoid or reduce potential for the proposed project and remediated site to have an adverse effect on the integrity/conservation objectives of Dundalk Bay SAC and Dundalk Bay SPA are outlined in Section 4.4.5. These mitigation measures also mitigate against cumulative impacts.

4.4.5 General Mitigation Measures

The following general mitigation measures will be adopted and implemented on-site to minimize potential impact on ecological receptors.

A suitably qualified person will be appointed to ensure the effective operation and maintenance of mitigation measures during the construction process.

- Compact surface of stored/stockpiled soils during the reprofiling and capping works.
- In the event of exposure of uncovered waste, waste will be relocated to a low-lying location on site and soil will be compacted on top of the waste before the end of the working day.
- Weather forecasts will be reviewed daily, and earthworks will not be undertaken during periods of heavy rainfall.
- Mobile storage tanks will be provided to store leachate arising during construction works. This leachate will be disposed of to a licensed wastewater treatment plant.

- Temporary silt fences will be installed along the site perimeter and around soil stockpiles.
- The access track will be resurfaced with Clause 804 with minimal fines.
- Refuelling of plant during construction will only be carried out at a designated refuelling area.
- Appropriate spill control equipment, such as oil soakage pads, will be kept within the construction area and in each item of plant to deal with any accidental spillage.
- Portaloos and/or containerised toilets and welfare units will be used to provide toilet facilities for site personnel. Sanitary waste will be removed from site by a licensed waste disposal contractor.
- The Contractor carrying out the works will be required to provide temporary works to prevent soil being carried out onto the R183. In addition, the Contractor will be required to provide backup provision by way of a road sweeper to clean up fines as may be present.
- Existing invasive species management undertaken in line with the invasive species management plan shall continue during remediation works as required.
- Supervision of control measures and treatment works by an appropriately qualified ecologist or invasive species specialist is required for the duration of the works.
- Raising awareness to site workers via toolbox talks given by a suitably qualified person as part of site introduction; informing workers what to look out for and what procedure to follow if they observe an invasive species.
- Where invasive species have been physically removed and soil disturbed, this soil will be seeded or replanted with native plant species. This will prevent erosion and the easy colonisation of bare soil by invasive species in the area.
- Signs will warn people working within the site that there is invasive species contamination.
- Ensure appropriate biosecurity measures are in place, these will include the Check Clean Dry method, along with those outlined below:
  - Remove the build-up of soil on equipment.
  - Keep equipment clean.
  - Do not move fouled equipment from one site to another.
  - Footwear and clothing of operatives working near invasive species should be checked for seeds, fruits, knotweed rhizomes or other viable material before exiting the site.
  - All vehicles exiting the site will be examined to prevent the transport of rhizomes, seeds and other plant material.
  - Soil, rhizomes and other material cleaned down in the excavation area will be buried in the burial cell.
- No contaminated soil (contamination from non-native species) or vegetation shall be removed from site unless suitable biosecurity is observed and removal by an appropriately licensed waste contractor to a suitably licenced facility.
- New sightings of the invasive plant species identified within the site shall be relayed to the contractor for invasive species control. These areas shall follow the same protocol as the current infected areas.
- It is possible, particularly in the first year of control, that new plants will sprout following the initial removal/treatment, either because shade suppression will be reduced or due to soil disturbance. As such, several additional visits will likely be required. Three visits, May/June, July/August and September/October should be sufficient to catch all regrowth, although, a cautionary approach is advisable.
- Plants that germinate after September/October are very unlikely to have sufficient time to complete their life cycle and produce seeds.

- The capped surface will be vegetated post-construction to prevent the generation of silted runoff.
- Post construction the LLDPE barrier will provide an engineered barrier that will isolate the waste body from rainfall inputs and prevent leachate production that might otherwise contaminate groundwater.
- The constructed surface drainage system will filter surface water before it enters the receiving watercourses.

4.5 Noise, Vibration, Dust and Air Quality Management Plan

4.5.1 Potential Impacts During the Construction Phase

Noise from the construction phase would arise from deliveries and/or removal of material to and from site, top-soil excavation, preparation of access roads & drainage and concrete pouring of foundations/footings where necessary.

Dust emissions arise when particulate matter becomes airborne making it available to be carried downwind from the source. Dust emissions can lead to elevated PM_{10} and $PM_{2.5}$ concentrations and may also cause dust soiling.

The amount of dust generated and emitted from a working site and the potential impact on surrounding areas varies according to:

- The type and quantity of material and working methods.
- Distance between site activities and sensitive receptors.
- Climate/local meteorology and topography.

The principal sources of potential air emissions during the construction of the proposed development include:

- Dust arising from earthworks.
- Dust arising from the movement of construction vehicles over land as well as the transporting of materials to the site of the proposed development.
- Dust arising from the temporary storage of any excavated materials and wind blowing over unprotected, unconsolidated soils.
- Dust arising from uncovered truckloads, the movement of material around the site and the loading and unloading of aggregates and of materials within the site.
- Pollutants arising from temporary diesel generators.

4.5.2 Construction Stage Mitigation Measures

During the construction phase there is potential for increased ambient noise levels and potential temporary impacts on residential dwellings in the surrounding area of the site during the proposed earthworks and installation of site infrastructure using plant and machinery. If noise emissions from these activities are an issue, the scheduling of construction activity will be addressed such that durations of construction activity likely to exceed the 65 dB $L_{Aeq,1hr}$ noise limit do not occur simultaneously with other construction activity.

Generally, construction works will be carried out in accordance with best practice and in line with recommendations contained within BS 5228-1:2009+A1:2014.

To mitigate against the impacts of noise on the local community during construction, the following specific measures are proposed:

- A pre-construction commitment to managing noise levels will be agreed through notification and consultation with affected parties, if deemed necessary.
- Working hours at the site during the installation phase will be limited to 07:00 to 19:00 Monday to Saturday inclusive. Work on Sundays or public holidays will only be conducted in exceptional circumstances.
- Construction contractors will be required to comply with the requirements of the European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations, 1988 as amended in 1990 and 1996 (S.I. No. 320 of 1988, S.I. No. 297 of 1990 and S.I. No. 359 of 1996), and the Safety, Health and Welfare at Work (Control of Noise at Work) Regulations, 2006 (S.I. No. 371 of 2006).

The main control measures will involve control of noise at source measures using the following methods in line with Clause 8 'Control of noise' of BS 5228-1:2009+A1:2014:

- Operators of all mobile equipment will be instructed to avoid unnecessary revving of machinery (Clause 8.2.1 General).
- Use of appropriate plant and equipment where possible with low noise level generation where possible (Clause 8.2.2 Specification and substitution).
- All construction plant to be used on site should have effective well-maintained silencers (Clause 8.2.3 Modification of existing plant and equipment).
- Noise generating equipment will be located as far as possible away from local noise sensitive areas identified (Clause 8.2.5 Use and siting of equipment); and
- Regular and effective maintenance of site machinery including a full maintenance schedule to ensure that all pieces of equipment are in good working order. With efficient use of well-maintained mobile equipment, considerably lower noise levels than those predicted can be attained (clause 8.2.6 Maintenance).

In addition, the following best practice measures are proposed:

- Training of site staff in the proper use and maintenance of tools and equipment.
- Avoidance of unnecessary noise when carrying out manual operations and when operating plant and equipment.
- Machines that could be in intermittent use will be shut down between work periods or will be throttled down to a minimum.
- Plant start-up will be sequential rather than all together.
- Internal access tracks to be well maintained.
- Plant known to emit noise strongly in one direction will, when possible, be orientated so that the noise is directed away from noise-sensitive locations.

Mitigation measures to reduce dust nuisance and to minimise impact on air quality will be employed during the construction phase of the project. These mitigation measures will include the following:

- The Contractor or equivalent must monitor the Contractors' performance to ensure that the proposed mitigation measures are implemented, and that dust impacts and nuisance are minimised.
- The drop height of materials will be minimised to a practicable level, to limit fugitive dust generation.
- Gravel will be used at site exit points to remove possible caked on dirt from tyres and tracks before travelling along public roads. Periodic road sweeping, as necessary, shall be put in place at the site entry/exit points.
- The site supervisor will undertake daily visual inspections to examine dust generation.
- The working area will be kept as small as possible so as to minimise potential dust generation.
- To suppress the migration of dust from site, a water bowser will be available to spray work areas and access roads, especially during periods where excavation works coincide with dry periods of weather or existing activities.
- All loads with potential to cause dust nuisance will be covered using strong, waterproof sheets such as tarpaulin sheets and will not be overloaded. This will minimise the potential for fugitive emissions during transport.
- All other stockpiles will be kept damp and covered to prevent windblown dust emissions.
- Construction vehicles and plant will be routinely serviced to minimise the exhaust emissions during construction. Vehicles will not be left running unnecessarily and low emission fuels will be used where possible.

4.6 Surface Water Management Plan

4.6.1 Adjacent Watercourses

According to the EPA map viewer, the site is located within the Newry, Fane, Glyde and Dee catchments and the sub-catchment of River Fane. The site is bounded to the southwest by the source stream for Corrinshigo Lough, to the west by Corrinshigo Lough itself and to the north by the lake outlet stream. Carrickaslane Lough stream and Devlin stream lie northeast of the site and are tributaries of the river Fane. The river Fane flows into Dundalk Bay SAC and Dundalk Bay SPA. The in-stream distance between Killycard Closed landfill and the Dundalk Bay SAC is c. 44.5 km and to Dundalk Bay SPA is c. 44 km.

4.6.2 Proposed Drainage

French drains around the capping perimeter will collect and direct surface water runoff to the receiving watercourses. Proposed French drains will be provided with 300 mm diameter HDPE SDR 17 slotted pipes.

A drawing showing the proposed surface and subsurface drainage system is enclosed with this planning application (Drawing Reference: P22-071-0500-0001).

4.6.3 Construction Stage Impact and Mitigation

The impact of the remediation works during the construction phase is not significant for hydrology and water quality. However, the following mitigation measures to reduce potential impacts during the construction stage are outlined below:

- Weather forecasts will be reviewed on a daily basis and earthworks will not be undertaken during periods of heavy rainfall.
- The Contractor will be responsible to ensure the effective operation and maintenance of drainage and other mitigation measures during the construction process. The operations management of the subject development will include regular monitoring of the drainage system and maintenance as required.
- Silt fencing shall be located adjacent to all water courses and shall be installed prior to any works.
- Dewatering flows from excavations will be managed to prevent elevated suspended solids entering the watercourse by use of silt fencing.
- Temporary storage tanks in the form of IBC's will be provided for the safe storage of any leachate arisings during the construction works. Leachate arising during construction works will be disposed at a licensed wastewater treatment plant.
- Emergency drip trays and spill kits will be kept available on site, to ensure that any spills from vehicles are contained and removed off site.
- Portaloos and/or containerised toilets and welfare units will be used to provide toilet facilities for site personnel. Sanitary waste will be removed from site via a licenced waste disposal contractor.
- Access track construction methodology to reduce suspended solids generation.

4.7 Soil Management Plan

It is intended to maintain an earthworks balance on site, with all excavated material re-used within the site where possible, thereby minimising the need for removal of any materials for off-site disposal. This will in turn lead to the reduction of noise and dust associated with construction traffic.

Excavation and backfilling will take place over short lengths. There will be no permanent spoil heaps at the site of the proposed development.

Excavation/capping works will be monitored by suitably qualified and experienced personnel.

The programming of the works will be such that earthworks are not scheduled to be carried out during severe weather conditions. Where such weather is forecast, suitable measures will be taken to secure the works. Due to the possibility of soil-borne diseases, all topsoil/peat recovered from the site will remain on the site. Topsoil will be used for landscaping berms alongside existing and new access tracks where suitable and will also be used for reinstatement and landscaping purposes.

No off-site disposal of soil will be required from the site and no spoil stockpiles will be left on site after construction is completed.

In addition to the above, lubricants and hydraulic fluids for equipment will be stored within an appropriately bunded storage unit in the proposed temporary Contractor's compound. Refuelling will be carried out directly from delivery vehicles at designated refuelling areas. Specific mitigation measures relating to the management of hydrocarbons spills are outlined below:

- Fuels, lubricants and hydraulic fluids for equipment used on the construction site will be carefully handled to avoid spillage.
- Any spillage of fuels, lubricants or hydraulic oils will be immediately contained and the contaminated soil removed from the site and properly disposed of.

- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling.
- Appropriate spill control equipment, such as oil soakage pads, will be kept within the proposed temporary Contractors compound and in each item of plant to deal with any accidental spillage.
- Drip trays and spill kits will be kept available on site, to ensure that any spills from vehicles are contained and removed off site.

4.8 Waste Management Plan

It will be the objective of Monaghan County Council in conjunction with the appointed Contractor to prevent, reduce, reuse and recover as much of the waste generated on site as practicable (in accordance with Waste Hierarchy Principles) and to ensure the appropriate transport and disposal of residual waste off site. This is in line with the relevant National Waste Management Guidelines and the European Waste Management Hierarchy, as enshrined in the Waste Management Act 1996, as amended.

4.8.1 Assignment of Responsible Personnel

It will be the responsibility of the Contractor for the construction works (when appointed) to nominate a suitable site representative such as a Project Manager, Site Manager or Site Engineer as Waste Manager who will have overall responsibility for the management of waste. The Waste Manager will have responsibility to instruct all site personnel including sub-contractors to comply with on-site requirements.

4.8.2 Waste Generated

It is envisaged that all excavated materials on-site will be reutilized on-site during reprofiling of the site.

Any waste materials generated on-site during the construction of the proposed development will be handled and managed in accordance with the requirements of the Waste Management Act 1996, as amended, and associated Regulations. All waste will be stored in segregated waste containers at the temporary construction compound and collected separately by appropriately licensed waste contractors. All waste materials transferred off-site for disposal or recovery will be taken only to suitably permitted/licensed waste facilities.

4.8.3 Waste Management During the Construction Phase

Any waste generated during the development construction phase will be collected, source separated and stored in dedicated receptacles at the temporary compounds during construction.

Typical categories of waste generated during the construction of this type of project:

- Municipal solid waste from the office and canteen.
- Construction and demolition waste.
- Waste oil/hydrocarbons.
- Paper/cardboard/plastic wrapping.
- Timber.
- Steel.

It will be the responsibility of the Contractor for the main construction works (when appointed) to nominate a suitable site representative such as a Project Manager, Site Manager or Site Engineer as Waste Manager who will have overall responsibility for the management of waste. The Waste Manager will have responsibility to instruct all site personnel including sub-contractors to comply with on-site requirements.

Where waste is generated, every effort will be made to separate and segregate the different waste streams.

Table 4-1: Principal Wastes Generated during the Construction Phase

Waste	Source
Timber	Temporary supports and packaging waste
Miscellaneous materials	Surplus materials from installation works
Lubricating oils, diesel	Unused quantities at end of installation period
Plastics	Packaging waste
Paper/cardboard	Packaging waste
Non-hazardous Office and Canteen Waste	Temporary welfare facilities unit
Food waste	Temporary welfare facilities unit
Sanitary waste	Temporary welfare facilities unit

4.8.4 Installation Stage Waste Reduction

The appointed Contractor will make all reasonable effort to minimise the creation of waste throughout the installation stage. This will be achieved through the following measures:

- The ordering of material will be optimised to ensure that only the necessary levels are delivered to site.
- All plant will be serviced before arriving on site. This will reduce the risk of breakdown and the possible generation of water oil on site.
- All operators will be instructed in measures to cut back on the amount of wastage for trimming of materials etc.
- Prefabrication of design elements will be used where suitable to eliminate waste generation on site, and;
- Where materials such as concrete are being ordered, care will be taken when calculating required quantities to reduce wastage.

4.8.5 Construction Material Re-use

Where possible, materials will be re-used onsite for other suitable purposes.

4.8.6 Construction Waste Recycling

Where waste is generated, every effort will be made to recycle it. To optimally recycle, waste source segregation of recyclable materials will be undertaken.

Suitable containers will be provided for the storage and collection of source segregated materials. These containers will be clearly labelled and signposted.

The following sourced segregated materials containers will be made available on site at a suitable location:

- Timber;
- Ferrous metals;
- Aluminium;
- Dry mixed recyclables; and
- Packaging waste.

4.8.7 Construction Waste Disposal

Where waste disposal is unavoidable, waste will be disposed of in a manner not likely to cause environmental damage:

- All waste materials will be stored in suitable locations and enclosed containers where suitable to avoid pollution and generation of wind-blown debris.
- All waste will be collected by a suitably competent and permitted waste collection contractor.
- All waste will be dispatched to an appropriate authorized waste facility.
- Dispatch to a waste recovery/recycling facility will be preferred over dispatch to a waste facility involved in waste disposal or energy recovery.
- No material will be burned on site under any circumstances.

4.8.8 Training

Copies of the Waste Management Plan will be made available to all relevant personnel on site. All site personnel and sub-contractors will be instructed about the objectives of the Project Waste Management Plan and informed of the responsibilities that fall upon them as a consequence of its provisions.

It will be the responsibility of the Contractors' appointed Waste Manager to ensure that all personnel are made aware of their responsibilities under the plan via a toolbox talk or otherwise.

4.9 Traffic Management

As with any construction development project, the transport of materials onto the site will give rise to increased traffic and associated impacts. However, due to the very nature of construction these impacts will be temporary.

Materials arising on-site will be reused on-site where possible to minimize traffic movements off-site.

Public perception of the construction phase will be influenced primarily from the impact of traffic movements. The degree of traffic disturbance caused by the construction phase depends on the volume of material imported/exported, the associated civil engineering requirements and the length of the construction period.

Construction traffic will require regular access to the site at varying times throughout the construction phase.

Traffic management procedures to manage traffic effectively on site and in the immediate vicinity of the development, to ensure the continued movement of traffic on the public roads and to minimise disturbance during the transportation of materials.

The site is accessed from the south via the R183. The surrounding routes are acceptable for the level of traffic generated during construction with some mitigation proposed. Similar traffic is currently using these roads to service the industrial, farmland and agriculture practices in the area. There should be ample capacity to carry the deliveries associated with the temporary short-term construction activities of the landfill.

The construction phase for the proposed works will result in additional traffic on the roads in the vicinity of the development, in particular the N2 which is approximately 500m west of the site. The R183 connects the N2 to the site.

This additional traffic will include:

- Construction worker vehicles.
- Delivery vehicles carrying conventional construction materials e.g. aggregate.
- Delivery vehicles carrying machinery and equipment.

It should be noted however that final selection of construction plant and vehicles may vary depending on suitability, availability, Contractor's choice, etc. Plant operators will be responsible for the upkeep and maintenance of construction plant and vehicles, ensuring good working order prior to use. Should emergency maintenance need to be carried out on site, this will be carried out at a designated area away from sensitive receptors and it will be ensured that a spill kit is nearby.

Parking for all site staff vehicles during the Construction phase will be provided adjacent to the construction compound. Parking of construction related vehicles (or queuing) will not be permitted outside the facility gate. This will be achieved using a combination of signage, suitable bollards (if required) and enforcement by site management.

HGVs entering the site shall do so via the proposed access, which will be developed to allow adequate visibility sightlines in accordance with TII Standard DN-GEO-03031: Road Link Design, 2012, and in accordance with Monaghan County Development Plan.

Public roads shall be kept free of mud, dust, spillages and debris from the construction site, construction plant or haulage vehicles. Periodic road sweeping, as necessary, shall be put in place at the site entry/exit points.

The roadway on site from the public road entrance, shall be kept free of dust, spillages and debris. Regular watering of the access road will take place and Monaghan County Council will liaise with adjacent residences to avoid undue or unnecessary truck movements during unsocial hours.

4.9.1 Consultation and Notification

Traffic Management Co-ordinator

The Contractor will appoint a dedicated competent Traffic Management Coordinator for the duration of this project and this person will be the main point of contact for all matters relating to traffic management on the project.

Induction

Prior to the works commencing, the Traffic Management Coordinator will carry out an induction for the materials haulage contractor staff to inform them of the traffic requirements in relation to vehicle movements. Traffic consideration shall form part of the induction process for all site staff also.

An Garda Síochána

Following the appointment of the successful Contractor for the main construction works for this project, the CTMP shall be finalised. The Traffic Management Coordinator will liaise directly with An Garda Síochána in relation to the plan and any concerns/requirements they have will be incorporated into the plan. The necessary permits (including approved route permits) will be applied for and obtained from An Garda Síochána, if required.

Monaghan County Council

The Contractor will liaise directly with Monaghan County Council Roads Department in relation to the plan and any necessary permits (including standard permits) will be applied for and obtained from the Roads Department.

5. SAFETY & HEALTH MANAGEMENT PLAN

5.1 Induction

This Safety and Health Management Plan (SHMP) defines the work practices, procedures and management responsibilities relating to the management of health and safety during the design, construction and operation of the proposed development and shall be read in conjunction with the Preliminary Safety & Health Plan prepared for the project by the Project Supervisor for the Design Process. The Safety and Health Management Plan shall be finalised in accordance with this plan following the appointment of the Contractor for the construction works.

The SHMP describes how the Contractor for the construction works will implement a site safety management system (SMS) on this project to meet the specified contractual, regulatory and statutory requirements, environmental control and mitigation measures, and planning conditions. It is the Contractor's responsibility to implement an effective safety management system to ensure that MCC's safety requirements for the construction of this project are met. Any SMS will incorporate and develop upon any preliminary plans prepared for the project by the Project Supervisor for the Design Process.

All site personnel will be required to be familiar with the requirements of the safety management plan as related to their role on site. The plan describes the project organisation and sets out the health and safety procedures that will be adopted on site:

- The Safety and Health Plan is a controlled document and will be reviewed and revised as necessary.
- A copy of the Safety and Health Plan will be located on/near the site H&S notice board.
- All employees, suppliers and contractors whose work activities cause/could cause impacts on the environment will be made aware of the SHMP and its contents.

The selection criteria for the Contractor for the works will be based on the ability to construct the works in a manner that will not endanger the safety, health and welfare of any parties and competence to fulfil the role of PSCS.

All site personnel will be required to be familiar with the requirements of the Safety and Health Management Plan for the construction phase of the project as related to their role on site. The plan will describe the project organisation and sets out the health and safety procedures that will be adopted on site.

Solas Safe Pass registration cards are required for all construction, delivery and security staff. Construction operatives will hold a valid Construction Skills Certificate Scheme card where required. Public safety will be addressed by restricting site access during construction. Appropriate warning signs will be posted, directing all visitors to the site office.

All personnel on site will wear adequate personal protective equipment (PPE), appropriate for their activity while on site.

In relation to working near overhead electric lines, the contractor will comply with ESB Networks Code of Practice for Avoiding Danger from Overhead Electricity Lines, 2008. Prior to site start, hazard exclusion zones will be established by the main contractor and overhead goalposts will be set up at designated crossing points where plant must pass directly under overhead electricity lines in accordance with ESBN requirements. A minimum 3m exclusion zone for 10kV, 20kV and 38kV overhead lines will be maintained at all times.

5.2 Project Obligations with Respect to Health and Safety

The construction of the proposed development will impose numerous safety management obligations on MCC, designer and Contractor. These obligations are set out below. The Contractor for the construction works and all of its sub-contractors are to ensure that they are fully aware of and in compliance with these safety obligations.

5.2.1 Statutory Obligations

The Safety, Health and Welfare at Work Act 2005 and the Safety, Health and Welfare at Work (Construction) Regulations 2013 place a responsibility on Monaghan County Council as the "Client", the Designer, the Project Supervisors and the Contractor.

The Council must:

- Appoint a competent and adequately resourced Project Supervisor for the Construction Stage (PSCS).
- Be satisfied that the Contractor appointed has adequate training, knowledge, experience and resources for the work to be performed.
- Co-operate with the project supervisor and supply necessary information.
- Keep and make available the safety file for the completed structure.
- Provide a copy of the safety and health plan prepared by the PSDP to every person tendering for the project.

The Designers must:

- Identify any hazards that their design may present during construction and subsequent maintenance.
- Eliminate the hazards or reduce the risk.
- Communicate necessary control measures, design assumptions or remaining risks to the PSDP so they can be dealt with in the safety and health plan.
- Co-operate with other designers and the PSDP or PSCP.
- Take account of any existing safety and health plan or safety file.
- Comply with directions issued by the PSDP or PSCS.

The PSDP must:

- Identify hazards arising from the design or from the technical, organisational, planning or time related aspects of the project.
- Where possible, eliminate the hazards or reduce the risks.
- Communicate necessary control measure, design assumptions or remaining risks to the PSCS so they can be dealt with in the safety and health plan.
- Ensure that the work of designers is coordinated to ensure safety.
- Organise co-operation between designers.
- Prepare a written safety and health plan for any project and deliver it to the client prior to tender.
- Prepare a safety file for the completed structure and give it to the client.

The PSCS must:

- Co-ordinate the identification of hazards, the elimination of the hazards or the reduction of risks during construction.
- Develop the Safety and Health Plan initially prepared by the PSDP before construction commences.
- Co-ordinate the implementation of the construction regulations by contractors.
- Organise cooperation between contractors and the provision of information.
- Co-ordinate the reporting of accidents to the Authority.
- Notify the Authority before construction commences.
- Provide information to the site safety representative.
- Co-ordinate the checking of stage working procedures.
- Co-ordinate measures to restrict entry on to the site.
- Co-ordinate the provision and maintenance of welfare facilities.
- Co-ordinate arrangements to ensure that craft, general construction workers and security workers have a Safety Awareness card, e.g. Safe Pass and a Construction Skills card where required.
- Co-ordinate the appointment of a site safety representative where there are more than 20 persons on site.
- Appoint a safety adviser where there are more than 100 on site.
- Provide all necessary safety file information to the PSDP.
- Monitor the compliance of contractors and others and take corrective action where necessary.
- Notify the Authority and the client of non-compliance with any written directions issued.

The Contractor must:

- Co-operate with the PSCS.
- Promptly provide the PSCS with information required for the safety file.
- Comply with directions of the project supervisors.
- Report accidents to the Authority and to the PSCS where an employee cannot perform their normal work for more than 3 days.
- Comply with site rules and the safety and health plan and ensure that your employees comply.
- Identify hazards, eliminate the hazards or reduce risks during construction.
- Facilitate the site safety representative.
- Ensure that relevant workers have a safety awareness card and a construction skills card where required.
- Provide workers with site specific induction.
- Appoint a safety officer where there are more than 20 on site or 30 employed.
- Consult workers with site specific induction.
- Monitor compliance and take corrective action.

Consequently, at all stages of the project there are statutory requirements for the management of safety, health and welfare of all involved in or affected by the development. As previously outlined, this CEMP and specifically the Safety and Health Management Plan addresses key construction management issues associated with the proposed development. This plan will be developed further at the construction stage, on the appointment of the Contractor for the main construction works.

5.2.2 The Preliminary Safety and Health Plan

In accordance with the requirements of the Safety, Health & Welfare at Work (Construction) Regulations 2013, a Preliminary Safety & Health Plan will be required as part of the design process. This plan will be further developed by the PSCS on appointment and maintained as a live document during construction and commissioning of the proposed development.

The safety and health plan is required to include the following information:

- A general description of the project;
- Details of other work activities taking place on site;
- Works involving particular risks;
- The timescale for the project and the basis on which the time frame was established; and
- Conclusions drawn by designers and the PSDP having taken into account the General Principles of Prevention and any relevant Safety and Health Plan or Safety File.

In accordance with the PSDP's procedures, the Preliminary Safety & Health Plan for the proposed development should include the following sections and subsections to ensure that the PSCS is aware of the health and safety issues at tender stage and enable them to price accordingly:

Preamble:

1 General Project Information:

- 1.1 Title
- 1.2 Description of Project
- 1.3 Employer
- 1.4 Designers/Other Consultants
- 1.5 Project Supervisor Design Process
- 1.6 Drawings, Specifications and Other Documents
- 1.7 Intended Contract Commencement Date
- 1.8 Intended Contract Completion Date
- 1.9 Basis for Contract Duration
- 1.10 Restrictions on Working Hours
- 1.11 Notification of Project
- 1.12 Termination of the PSCS Appointment

2 The Existing Environment:

- 2.1 Site Location
- 2.2 Relevant Adjoining Land Uses
- 2.3 Site Restrictions
- 2.4 Restrictions on Access
- 2.5 Hazardous Area Classification
- 2.6 Existing Services
- 2.7 Ground Conditions
- 2.8 Existing Hazards
- 2.9 Liaison with Statutory Bodies

3 Other Work Activities:

- 3.1 Other Contracts Which May Affect Work
- 3.2 Occupation of Site
- 3.3 Building Activities
- 3.4 Other Work Activities
- 3.5 Emergency Procedures in Place on Site

4 Particular and Residual Risks:

- 4.1 Works Which Puts Persons at Work at Risk
- 4.2 Work Which Puts Persons at Risk from Chemical or Biological Substances
- 4.3 Work with Ionising Radiation
- 4.4 Work near High Voltage Power Lines

4.5 Work Exposing Persons at Work to the Risk of Drowning
4.6 Work on Wells, Underground Earthworks and Tunnels
4.7 Work Carried Out by Divers at Work Having a System of Air Supply
4.8 Work Carried Out in a Caisson with a Compressed Air Atmosphere
4.9 Work Involving the Use of Explosives
4.10 Work Involving the Assembly or Dismantling of Heavy Prefabricated Components
4.11 Work Involving Hazardous Material
4.12 Residual Risks

5 Additional Information:

5.1 Existing Documents
5.2 Site Possession
5.3 Site Rules
5.4 Site Specific Safety Objectives
5.5 Phasing of Works
5.6 Permits/Authorisation Required
5.7 Maintenance
5.8 Continuing Liaison
5.9 Specific Recommendations

6 Information Required for Safety File:

6.1 Information Required for Safety File from PSCS

5.2.3 The Management of Health and Safety during the Construction Phase

The selection criteria for the Contractor for the works will be based on the ability to construct the works in a manner that will not endanger the safety, health and welfare of any parties and competence to fulfil the role of PSCS.

The contract will be awarded on the basis of assessment of the candidates against relevant health and safety criteria including experience of similar projects, knowledge of the construction processes involved and training of their management and staff who will be involved in carrying out the works.

5.2.4 The Construction Stage Safety and Health Plan

In accordance with the requirements of the Safety, Health & Welfare at Work (Construction) Regulations 2013, the preliminary Safety & Health Plan prepared by the PSDP will be further developed by the PSCS before the commencement of the construction work and updated on a regular basis during the construction phase of the project.

The document will include the following sections and subsections to ensure the management of health and safety during the construction phase of the project:

1. Description of Project:

- project description and programme details
- details of client, PSDP and PSCS, designers
- contractor and other consultants
- extent and location of existing records and plans
- arrangements for communicating with Contractors, PSDP and others as appropriate.

2. Communication and Management of the Work:

- management structure and responsibilities
- safety and health goals for the project and arrangements for monitoring and review of safety and health performance
- arrangements for:
    - regular liaison between parties on site
    - consultation with the workforce
    - the exchange of design information between the Client, Designers, Project Supervisor for the Design Process, Project Supervisor Construction Stage and Contractors on site
    - handling design changes during the project
    - the selection and control of contractors
    - the exchange of safety and health information between contractors
    - security, site induction, and on-site training
    - welfare facilities and first aid
    - the production and approval of risk assessments and method statements
    - the reporting and investigation of accidents and other incidents (including near misses)
- site rules
- fire and emergency procedures

3. Arrangements for Controlling Significant Site Risks:

- Safety risks
    - services, including temporary electrical installations
    - preventing falls
    - work with or near fragile materials
    - control of lifting operations
    - dealing with services (water, electricity and gas)
    - the maintenance of plant and equipment
    - poor ground conditions
    - traffic routes and segregation of vehicles and pedestrians
    - storage of hazardous materials

- accommodating adjacent land use
- other significant safety risks

- Health risks:
  - dealing with contaminated land
  - manual handling
  - use of hazardous substances
  - reducing noise and vibration
  - other significant health risks

The construction stage safety and health plan will be maintained on site by the PSCS and will be communicated to all relevant parties on an ongoing basis through inductions, site safety meetings and toolbox talks etc. as required.

5.3 Control of Documents

The Contractor will establish, implement and maintain a procedure to control project documents and records so they are clearly identifiable, organised, current, easily located and revised when necessary.

6. EMERGENCY RESPONSE

6.1 Introduction

This chapter of the CEMP presents an Emergency Response Plan for the proposed development. The Emergency Response Plan shall be finalised in accordance with this outline plan following the appointment of the Contractor for the construction works and following detailed design development.

This Emergency Response Plan contains predetermined guidelines and procedures to ensure the safety, health and welfare of everybody involved in the project and to protect the environment during the construction phase of the proposed development. This plan outlines the immediate response to an emergency or disaster situation and will be developed by the construction works contractor and PSCS as part of their construction stage Safety and Health Plan.

An emergency is any disruptive or harmful event that endangers people, environment, property or assets. Emergencies can be small, as in a fire contained by employees using firefighting equipment or large, as in a disaster resulting from a storm.

In the context of the proposed development, examples of Emergency Response Plan emergency events are:

- Medical emergency
- Explosion
- Overheated equipment
- Chemical and fuel spill
- Fire
- Loss of power
- Vehicle incidents.

Example sources of emergency or disaster events are:

- Unstable/inappropriate stockpiles on site
- Faulty or incorrect use of equipment
- Falls from height
- Smoking
- Storm/adverse weather
- Power failure
- Fuel spill
- Road failure
- Serious vehicle collisions or overturning.

6.2 Emergency Response Plan

An emergency response plan deals with the immediate physical effects of a disaster and outlines the initial response.

6.2.1 Emergency Response Liaison

The Contractor/PSCS will designate an individual to serve as the Emergency Response Liaison for this project. The Emergency Response Liaison will coordinate the emergency response for the duration of any emergency at or nearby the project site.

Monaghan County Council, An Garda Síochána and the HSE Ambulance Co-ordinator will be provided with the construction programme and the onsite contact information from the Emergency Response Liaison prior to construction.

The Emergency Response Liaison will be immediately reachable at all times during project construction. The Liaison will coordinate with the above agencies to establish emergency procedures for access to and within the site in the event of an emergency.

6.2.2 Reporting Emergencies

In the event of fire, storm, flood, serious injury or other emergency, contact:

ALL ON SITE EMERGENCIES DIAL 112 or 999

6.2.3 Designated Responder

A map depicting the location with the emergency meeting point will be furnished to Monaghan County Council Fire Department and HSE ambulance co-ordinators.

Upon arrival on the scene, the senior EMS Officer will set up the incident command structure. The Emergency Response Liaison and all contractor's personnel will cooperate with directions of the incident commander and assist as directed.

The nearest emergency services, ambulance and Accident & Emergency (A&E) facilities are:

Service:	Contact Details:	
Accident & Emergency (A&E)	Monaghan General Hospital	(047) 81811
Ambulance Service	Dial 112 or 999	
Fire Services	Dial 112 or 999	
Garda Station	Monaghan Garda Station	(047) 77200

Each member of the Contractor's site team who are First-Aid and Cardiopulmonary Resuscitation (CPR) trained personnel will be identifiable with a hard hat sticker indicating their training.

6.2.4 Emergency Alarm

The emergency alarm will be raised on site as soon as an emergency situation is detected, the alarm will be identified (contractor to check those that apply):

Air Horn		**Radio**		**Voice**		**Hand Signals**		**Siren**	

6.2.5 Emergency Reporting

In the event of an emergency, the nearest supervisor with radio equipment/mobile phone will be notified. The degree of emergency will be reported to the Emergency Response Liaison who will contact the Emergency Services and request the appropriate emergency service.

6.2.6 Medical Protocol

In the event of a major medical emergency, the emergency centre (112 or 999) will be notified and an ambulance and emergency medical team will respond to the scene. All major medical cases require professional (ambulance) transportation. In the event of a minor medical case, the affected employee can be transported via company vehicle in the escort of a foreman or site engineer (with first aid training).

6.2.7 Emergency Response

Upon notification, the Emergency Response Liaison will respond to the emergency scene and manage emergency operations:

1. Assess hazards and make the area safe – If you cannot enter the area without risking your safety, don't do it, call the Emergency Services immediately and wait for them. If you think you can safely enter the area, look around the emergency scene for anything that can be dangerous or hazardous to you, the casualty, or anyone else at the scene. Bystanders can help with making the area safe. First aid kits will be available on site. Operators that have been first aid/CPR/AED trained will be listed on site and easily identifiable by a hard hat sticker.

2. Take charge of the situation – if you are the first-aid provider on the scene act fast. If someone is already in charge, briefly introduce yourself and see if that person needs any help. If there is any chance the casualty could have a head or spinal injury, tell them not to move.

3. Get Consent – always identify yourself as a first-aid provider and offer to help. Always ask for consent before touching a conscious adult casualty and always ask for consent from a parent or guardian before touching an unconscious or conscious child or infant. With an unconscious adult casualty consent is implied as it is generally accepted that most people want to live. Remember to protect yourself first by wearing gloves and eye protection.

4. Assess Responsiveness – is the casualty conscious or unconscious? Note their response while you are asking them for their consent. If they respond, continue with the primary survey, and if they don't respond, be aware that an unconscious casualty is or has the potential of being a breathing emergency.

5. Call out for help – this will attract bystanders. Help is always useful in an emergency situation. Someone can be called over the phone for medical help. Others can bring blankets if needed, get water, etc. A bystander can help with any of the following:

- Make the area safe.
- Find all the casualties.
- Find the first aid kit, or any useful medical supplies.
- Control the crowd.
- Call for medical help.
- Help give first aid, under your direction.
- Gather and protect the casualty's belongings.
- Take notes, gather information, be a witness.
- Reassure the casualty's relatives.
- Lead the ambulance attendants to the scene of the emergency.
- Notify Emergency Services as soon as you can. Either send a bystander or call yourself.

In the event of a major medical emergency, the Emergency Response Liaison, as the person-in-charge of the emergency scene, will dispatch someone to the site access point nearest the emergency scene to direct and lead arriving outside responders to the emergency scene. The designated meeting point will be agreed prior to the commencement of construction. Emergency personnel will be met at this meeting point which has been communicated by management during the 112/999 call. The emergency personnel escort will use the hazard lights on their vehicle so they are easily identified.

6.2.8 Escape and Evacuation Procedure

Dependent upon the degree of the emergency and if safe to do so, employees will evacuate to the designated assembly area where the designated wardens shall account for all employees and determine if anyone still remains within the emergency scene.

Should a wild land fire or peat slippage occur, and the designated assembly area is compromised, other locations will be designated as secondary assembly areas.

6.2.9 Prevention of Illness/Injury due to Weather/Elements

1. All employees will have access to shelter and heat in the event of inclement weather.
2. Employees will have access to at least a litre of water at all times.
3. Weather forecast will be discussed every morning with the crews. Weather conditions and forecast will be monitored regularly by management.
4. No Employee will work alone. A buddy system will be used so employees can contact a supervisor in case of an emergency.

6.2.10 Environmental Emergency Procedure

An emergency preparedness and response procedure is required to prevent environmental pollution incidents. Emergency Silt Control and Spillage Response Procedures are included in Section 4.4.5 of this CEMP.

Suitable spill kits and absorbent material for dealing with oil spills will be maintained on site. In the event of pollution or potential risk of pollution, the Local Authority should be informed immediately.

6.2.11 Emergency Response Plan – Haul Routes

Emergency Response Procedure relating to transportation of plant, equipment and materials to the site will be developed by the Contractor during the construction phase of the development.

FEHILY TIMONEY

CONSULTANTS IN ENGINEERING,
ENVIRONMENTAL SCIENCE
& PLANNING

APPENDIX 1

Invasive Species Management Plan

FEHILY TIMONEY

CONSULTANTS IN ENGINEERING, ENVIRONMENTAL SCIENCE & PLANNING

KILLYCARD CLOSED LANDFILL REMEDIATION PROJECT

INVASIVE SPECIES MANAGEMENT PLAN

Prepared for:

Monaghan County Council

Monaghan County Council

Date: **April 2024**

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INVASIVE SPECIES MANAGEMENT PLAN

REVISION CONTROL TABLE, CLIENT, KEYWORDS AND ABSTRACT

User is responsible for Checking the Revision Status of This Document

Rev. No.	Description of Changes	Prepared by:	Checked by:	Approved by:	Date:
A	Final	CW/NSC/KB	AT	BG	09/04/2024

Client: Monaghan County Council

Keywords: Invasive species, Killycard, Historic Landfill, Management

Abstract: Fehily Timoney and Company is pleased to submit this Invasive Species Management Plan to Monaghan County Council in order to provide guidance and strategies for the management of invasive plant species located on the site at Killycard.

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1. INTRODUCTION

Monaghan County Council has commissioned Fehily Timoney & Company (FT) to prepare an Invasive Species Management Plan (ISMP) for the Landfill remediation works at Killycard closed landfill, located approximately 1.7 km to the North-West of Castleblayney town on the R183 Castleblayney to Ballybay Regional Road in Co. Monaghan; to comply with Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 to 2021 (not to cause the spread of non-native invasive plant species listed in schedule III), and to ensure non-native invasive plant species not listed in schedule III are not spread to adjacent lands or Natura 2000 (European) sites. The report details a programme for the control, eradication and monitoring of invasive species within the site.

A previous site walkover carried out on the 12th of June 2018 identified stands of Japanese knotweed along the western bank of the landfill by the shore of the Corrinshigo Lough. The Japanese knotweed seemed to be under treatment with herbicides. No invasive species were found on site during the surveys conducted on the 14th of May 2022. This ISMP is being prepared as a prudent measure in case Japanese Knotweed is found on site at any point prior to the commencement of the works, throughout the duration of the works or during post works monitoring.

In keeping with the third schedule of S.I. No. 477/2011 European Communities (Birds and Natural Habitats) Regulations 2011 to 2021, the overall aim of this management plan is to put in place systems to contain the spread of any invasive species within the site, to control the invasive species from this area, and to ensure they are not spread off-site during the landfill remediation works.

This document provides background information on the non-native invasive species historically present, mapping of their historic location and their historic extent within the footprint of the remediation site. It provides sources of information including policy and guidelines to which cognisance has been paid, and the means of eradicating the species from site safely using prevention, containment, treatment, monitoring, follow up treatment, record keeping and appropriate disposal.

1.1 Legislative Context

In Ireland, the spread and propagation of species listed in the third schedule of S.I. No. 477/2011 European Communities (Birds and Natural Habitats) Regulations 2011 to 2021 is an offence. Under Regulation 49 (2) - Save in accordance with a licence granted under paragraph (7), any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow in any place specified in relation to such plant in the third column of Part 1 of the Third Schedule, any plant which is included in Part 1 of the Third Schedule, shall be guilty of an offence. Under Regulation 50 it is an offence to transport a vector material listed in Part 3 of the Third Schedule except under licence; in the case of this project, it would apply to soil or spoil taken from places infested with Japanese Knotweed (Fallopia japonica).

In October 2017, Ireland's 3rd National Biodiversity Action Plan, for the period 2017-2021 was launched with 7 objectives supported by 119 targeted actions. The Plan sets out actions through which a range of government, civil and private sectors will undertake to achieve Ireland's 'Vision for Biodiversity' and follows on from the work of the first and second National Biodiversity Action Plans.

Target 4.4 states that:

> *'Harmful invasive alien species are controlled and there is reduced risk of introduction and/or spread of new species.'*

This is supported by 7 actions, those relevant to this management plan are:

> *4.4.2. Develop national and whole island plans to implement the EU Invasive Alien Species (IAS) Regulation and relevant sections of Ireland's EU (Birds and Natural Habitats) Regulations 2011 including: development and adoption of biosecurity plans in relevant state bodies; a Rapid Response Protocol for the island of Ireland; coordination and collation of invasive species surveillance and monitoring data; and work with Northern Ireland and UK authorities on invasive species of mutual concern.*
>
> *4.4.3. Continue and enhance measures for eradication, where feasible, control and containment of invasive species*
>
> *4.4.4. Encourage horticultural nurseries to produce native species, varieties and landraces from appropriate native sources for public and private sector plantings. Public bodies will endeavour to plant native species in order to reduce importation of non-native species, varieties and landraces.*
>
> *4.4.6. Publish legislation to address required provisions under the EU Regulation on invasive alien species (No. 1143/2014) and on responsibilities and powers regarding invasive alien species, giving IFI responsibility for aquatic invasive species.*

1.2 Site Description

Killycard Closed Landfill is located in the townland of Killycard, approximately 1.7km to the northwest of Castleblayney town on the R183 Castleblayney to Ballybay Regional Road.

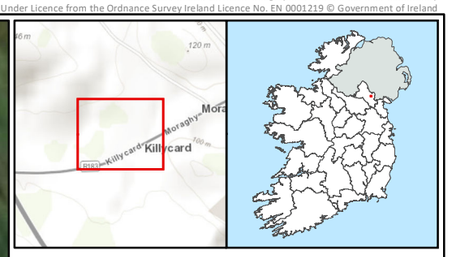
The landfill is a closed landfill having accepted waste from approximately 1980 to 1987. Waste deposited at the site is understood to comprise of municipal solid waste to a maximum depth of 4.4m. The application site, as defined by the red line boundary in the accompanying planning drawings, is 2.25 hectares (ha) in size.

Commercial developments have been constructed on site including mushroom houses (now derelict) and an operational industrial building in the eastern portion of the site. The site is bounded to the southwest by the source stream for Corrinshigo Lough, to the west by Corrinshigo Lough itself and to the north by the lake outlet stream.

Construction of an engineered cap is required to isolate the waste body from rainfall inputs which contribute to leachate generation which has the potential to contaminate surface and groundwaters. The capping area footprint is 1.34 ha.

The western portion of the site, which is to be capped, consists of Improved agricultural grassland (GA1). This is dominated by rye grass and is heavily fertilised. The verge or bank of the mound is predominantly dry meadow grassy verge habitat (GS2). The remainder of the land to be capped was classified as buildings and artificial surfaces (BL3) with no plant species present. The site is bordered by Corrinshigo Lough to the west and by drains to the south and the north. The northern drain runs along the border of the Killycard townland and drains into the Drumillard Lough which is to the north-east of the site and at an in-stream distance of ca. 1.5 km. Scrubby and wooded areas are also adjacent to the west of the site. Neighbouring land uses include agricultural grassland, industrial and commercial units as well as residential properties.

Path: R:\Map Production\2022\P22-071\Workspaces\P22-071_GIS_Fig2-1_Location_of_Killycard_Historic_Landfill_A3.mxd



Legend

- Site Boundary
- Area to be Capped

Habitats

Name, Description

- BL3, Buildings and Artificial Surfaces
- GA1, Improved Agricultural Grassland
- GS2, Grassy Verge
- WS1, Scrub
- Drainage Ditches

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TITLE: Location of Killycard Historic Landfill			
PROJECT: Killycard			
FIGURE NO:	2-1		
CLIENT:	Monaghan County Council		
SCALE:	1:1000	**REVISION:**	0
DATE:	18/10/2022	**PAGE SIZE:**	A3

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2. METHODOLOGY

2.1 Relevant Guidance

The methodology and guidance for this management plan has been devised in consideration of the following relevant guidance:

- NRA, (2010). Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads. Revision 1, December 2010. National Roads Authority.
- Property Care Association (2018). Practical Management of Invasive Non-Native Weeds in Britain and Ireland. Packard Publishing Ltd.
- Kelly, J., Maguire, C.M. and Cosgrove, P.J., Muir, R.A. (2015). Best Practice Management Guidelines Japanese Knotweed Fallopia japonica. Prepared for NIEA and NPWS as part of Invasive Species Ireland.
- Tu, M., (2009). Assessing and Managing Species within Protected Areas. Protected Area Quick Guide Series. Editor J., Ervin, Arlington, VA. The Nature Conservancy, 40 pp.
- Stokes et al., (2004). Invasive Species in Ireland. Unpublished report to Environment and Heritage Service and National Parks and Wildlife Service. Quercus, Queens University Belfast, Belfast.

2.2 Desktop Study

A desktop study was carried out to identify existing records of invasive flora species both within and adjacent to the closed landfill at Killycard, as well as habitat suitability of the footprint of the remediation works for the invasive species. This study allows the surveyor to narrow down the source of the species introduction and its likelihood of spreading. The following open sources of information were consulted:

- National Biodiversity Data Centre (NBDC) web mapping (National Biodiversity Data Centre, 2022)

2.3 Mapping

The habitats at the closed landfill at Killycard were identified and classified, according to ‘A Guide to Habitats in Ireland’ (Fossitt, 2000) during a walkover survey undertaken by Rory Dalton on the 14th of May 2022. During this survey, invasive species were identified and mapped.

3. EXISTING ENVIRONMENT

3.1 Desktop Records

Historical records of invasive species plants from the relevant national datasets were assessed through the National Biodiversity Data Centre (20/01/2023). The invasive species listed in Table 3-1 have been recorded within the 10km grid square H82 in which part of Castleblayney and the closed landfill at Killycard are located. A total of nine invasive plant species have been recorded in this 10km grid square, of which Japanese Knotweed, Canadian Waterweed, Himalayan Knotweed, *Rhododenron ponticum* and Salmonberry are listed in Schedule III under Regulations 49 and 50 of the EC (Birds and Natural Habitats) Regulations 2011, which makes it an offence to cause the spread of plant species listed on the Schedule. Only three invasive species were found in the 2km grid (H82A) square overlapping the closed landfill site, of which one is a Schedule III, High Impact species (Japanese knotweed). Cherry laurel and sycamore were the other invasive species within the 2km grid squares and are classified as 'High Risk' and 'Medium Risk' species respectively.

Table 3-1: Invasive Species within 10km and 2km grid squares overlapping the closed landfill

Species	2km	10km	Invasive Impact*	Legal Status
Black Currant (*Ribes nigrum*)		2 records	Medium Risk	None
Canadian Waterweed (*Elodea canadensis*)	2 records	9 records	High Risk	Schedule III
Cherry Laurel (*Prunus laurocerasus*)		1 record	High Risk	None
Himalayan Knotweed (*Persicaria wallichii*)		1 record	Medium Risk	Schedule III
Japanese Knotweed (*Fallopia japonica*)	1 record	3 records	High Risk	Schedule III
Rhododendron ponticum		2 records	High Risk	Schedule III
Salmonberry (*Rubus spectabilis*)		5 records	Medium Risk	Schedule III
Sycamore (*Acer pseudoplatanus*)	1 record	15 records	Medium Risk	None
Wall Cotoneaster (*Cotoneaster horizontalis*)		3 records	Medium Risk	None

*Impact classified according to Invasives.ie, 2022

3.2 Results of Field Survey

The following invasive species were recorded during a field survey undertaken by Fehily Timoney on the 12th of June 2018:

- Japanese knotweed (*Fallopia japonica*)[1].

[1] Updated scientific name is *Reynoutria japonica*

Plate 3-1: Japanese Knotweed stand by Corrinshigo Lough June 12th 2018

Japanese knotweed was detected in the site boundary along the bank of Corrinshigo Lough, see Figure 3-1 for distribution of this species within the closed landfill footprint and adjacent to the site.

The stands of Japanese knotweed appeared to be in treatment when identified on the 12th of June 2018. The ecological surveys carried out on the 14th of May 2022 did not identify Japanese knotweed or any other invasive botanical species onsite and treatment of Japanese knotweed appears to have been successful.

Path: R:\Map Production\2022\P22-071\Workspaces\P22-071_GIS_Fig3-1_Location_of_Invasive_Species_A3.mxd

Legend

- Site Boundary
- Area to be Capped
- Area of Historic Japanese Knotweed

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0 25 50 100 Meters

TITLE:	Location of Invasive Species		
PROJECT:	Killycard		
FIGURE NO:	3-1		
CLIENT:	Monaghan County Council		
SCALE:	1:1000	**REVISION:**	0
DATE:	25/01/2023	**PAGE SIZE:**	A3

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4. INVASIVE/NON-NATIVE SPECIES ACCOUNTS

4.1 Japanese Knotweed[2]

According to the Invasive Species Ireland Project who have carried out a risk assessment of Japanese Knotweed (Fallopia japonica), which is distributed throughout the island of Ireland, the species is "one of the highest risk (most unwanted) non-native invasive species in Ireland". The species poses a risk to open and riparian areas where it spreads rapidly to form dense stands, excluding native vegetation and prohibiting regeneration. This process has been known to reduce diversity and alter semi-natural and locally important habitats for wildlife. Once stands become established, they are extremely persistent and difficult to remove. Japanese Knotweed can grow through weaknesses in both tarmac and concrete. Population clusters must be completely removed, under appropriate licencing, before site works or specific projects within the site can commence (ISI, 2018).

4.1.1 Species Ecology

Although Japanese Knotweed plants flower, all flowers in Ireland and Britain are female, precluding the possibility of sexual reproduction. The means of spread is entirely through the movement of rhizomes or rhizome fragments in soil or cut stems. Japanese Knotweed has an extraordinary ability to spread vegetatively from crown, stem and rhizome (underground root) if disturbed. Even tiny amounts of cut stem, crown or rhizome can produce a new plant.

Controlling the spread of the species is therefore dependent on preventing the spread of the stem, crown or rhizome. Japanese Knotweed causes numerous impacts, both ecological and economic.

It is capable of outcompeting native plants and blocking commuting corridors of native mammals, and damaging buildings, tarmacadam and concrete. In waterways, it can block and reduce water flow, increasing the risk of flooding. In winter, when it dies back, it can leave riverbanks bare and open to erosion.

Red/purple shoots appear early in spring, which in some cases have an asparagus-like appearance but, as the canes grow, the leaves unfurl, and the plant takes its more characteristic appearance. The mature canes are like bamboo, being hollow, and have a characteristic pattern of purple speckles.

The leaves are shield-shaped with pointed tips and a flat base, arranged in a zig-zag formation. The plant can grow to over 3m in height. Flowering occurs in late summer/autumn (End July – typically August) and consists of small creamy white flowers. During the winter the leaves die back and reveal orange/brown woody erect stems. Rhizomes are bright orange inside and can extend to a depth of 3m and a width of 7m around the visible growth above ground.

[2] A species identification guide can be found at https://www.knotweed.ie/download/2114

Source: "Expansion of Japanese Knotweed" by U. S. Fish and Wildlife Service (accessed: August 2022)

Plate 4-1: Characteristics of Japanese Knotweed

4.1.2 Timeframe for treatment

Japanese Knotweed shoots typically appear between March and April. During this time energy stores from the root system are used to facilitate initial growth. The summer growth period commences in May and lasts until July, typical growth occurs during this time. Flowering begins in August and lasts until October. During this time the pale flowers can be seen.

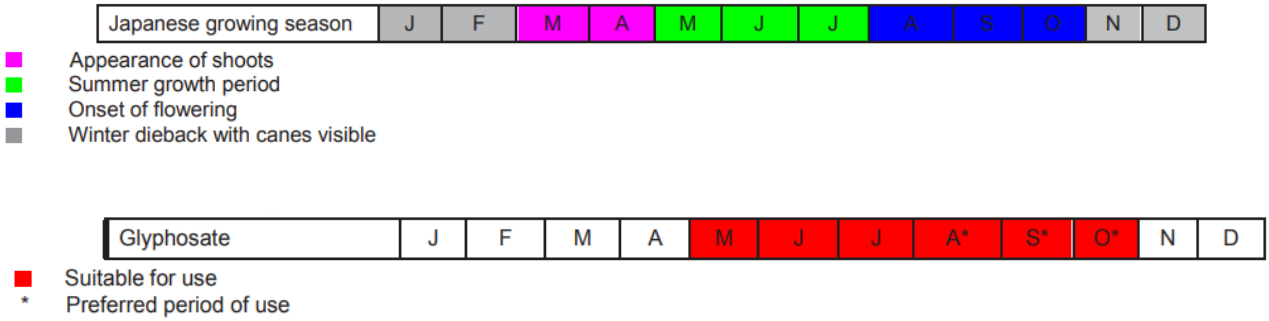

Figure 4-1: Japanese Knotweed Growth season summary (Kelly, et al., 2015).

Figure 4-1 indicates the suitable period which glyphosate herbicide is used to remove Japanese Knotweed. It is suitable to use glyphosate herbicide on Knotweed between the months of May and October, with August, September and October being the preferred months of use.

5. RECOMMENDED MEASURES

5.1 General Prevention of spread within the site and works footprint

Prevention of the spread of invasive species will be achieved by:

- A pre-construction survey (to reconfirm the findings of the ISMP) will be undertaken during the growing season to mark out the extent of invasive species within the proposed works at the closed landfill site, prior to any works commencing there. If any other schedule III invasive species is found on or adjacent to the works area, another ISMP is to be prepared.
- Raising awareness of site workers via toolbox talks given by a suitably qualified person as part of site introduction; informing workers what to look out for when identifying Japanese Knotweed having regard to the NBDC identification guide available at https://www.knotweed.ie/download/2114 and what procedure to follow if they observe an invasive species.
- Where invasive species are identified a full invasive species survey will be undertaken to ensure all incidents of the species are identified by a suitably qualified person.
- Following the identification and mapping of the species, the full implementation of the invasive species management plan (section 6) in conjunction with a competent and experienced Invasive Species Specialist Contractor.
- Supervision of control measures and treatment works by an appropriately qualified ecologist or invasive species specialist.
- Where invasive species have been physically removed and disturbed soil, this soil will be seeded or replanted (including 5cm deep mulch) with native plant species. This will prevent erosion and the easy colonisation of bare soil by invasive species in the area.
- Contaminated material originating from the site will be transported off site by an appropriately licensed waste contractor and disposed of properly at a suitably licenced facility.
- Signs should warn people working there that there is invasive species contamination.
- Ensure good personnel and equipment hygiene practices:
    - Remove the build-up of soil on equipment;
    - Keep equipment clean;
    - Do not move fouled equipment from one site to another.
- All vehicles exiting the site should be washed down with a pressure washer to prevent the transport of seeds, since this cannot be prevented comprehensively by any other measure.
- Wastewater from washing facilities will be stored securely and treated to prevent spread outside the site.
- Footwear and clothing of operatives working near invasive species should be checked for seeds, fruits, or other viable material before exiting the site.

5.2 General Containment

Containment of invasive species will be achieved by:

- Japanese Knotweed and contaminated soil within the works area including the 7m buffer around the stand of Japanese Knotweed (where appropriate) will be excavated by a licensed specialist for the eradication of Japanese Knotweed. Cordoning off of the 7m buffer around Japanese Knotweed will occur if required. Japanese Knotweed's root structure rhizomes can extend up to 7m in a lateral direction (but usually only up to 5m), and 3m deep from the over ground parent plant.
- Cordoning off the area for other invasive species found shall include a buffer of up to 1m surrounding the area of infestation. This will prevent plants with underground rhizomes being transported to other sections of the site and it will also prevent contact with plants which could result in the transport of seed, fruit or vegetation to other areas. No site works will occur within exclusion zones prior to the eradication of invasive species.
- No machinery or personnel shall be allowed within exclusion zones. Similarly, there shall be no storage of materials within or adjacent to exclusion zones.
- No soil or vegetation shall be removed from this area unless proper hygiene is observed and is transported via an appropriately licensed waste contractor to a suitably licenced facility for treatment.
- Informing all site staff through toolbox talks as part of site inductions.
- Any new sightings of invasive plant species shall be relayed to any workers entering site and the contractor for invasive species eradication. These areas shall follow the same protocol as the current infected area.

5.3 Treatment and control options

5.3.1 Japanese Knotweed (*Fallopia japonica*)

Two options for the treatment of Japanese Knotweed at the site have been recommended. Since the infested areas will be replanted, all potentially infested soil will be required to be removed and disposed of appropriately. Either of these two options shall be used to eradicate Japanese Knotweed from the site and avoid the spread of the species. However, the following general recommendations will be adhered to as part of the plan:

- Japanese Knotweed root systems can extend up to 7m in a lateral direction (but usually only up to 5 m), and 2m deep from the over ground parent plant.
- Areas of infestation to be fenced off from other works areas including a buffering distance of up to 7m to create exclusion zones.
- Clearly identify and mark out infested areas. Erect signs to inform Contractors of the risk.
- Staff shall be made aware of this buffer zone when working within areas of infestation.
- Erection of adequate site hygiene signage in relation to the management of non-native invasive material as appropriate.
- Toolbox talks shall be undertaken with all personnel accessing the site to ensure that the details of the invasive species management plan are adhered to and to raise awareness of the potential treat of invasive species.
- Site works will only be allowed within exclusion zones following the eradication of Japanese Knotweed.
- No treatment measures to take place in these areas without supervision and agreement by appointed appropriately experienced ecologist or Japanese Knotweed eradication specialist.

- All machinery and vehicles operating within areas of infestation to be thoroughly checked and if necessary, cleaned prior to leaving the area to protect against further spreading of Japanese Knotweed.
- During vegetation clearance and the removal of rubbish and other waste materials from infested areas care must be taken to ensure that Japanese Knotweed is not carried with these materials out of the site. Japanese Knotweed plants (or other invasive species) should not be removed along with other vegetation during clearance works.
- No material shall be taken from areas of infestation (unless for disposal at a suitably licenced facility or appropriate burial on-site). All staff shall be made aware of nature of threat via toolbox talks as part of site inductions.
- Wheel washes shall be put in place at entry and exit points, if considered appropriate. Wastewater from these facilities will be stored and treated to avoid further outbreaks.
- If operating within an area of known infestation all machinery, vehicles, equipment, footwear and clothing will be cleaned thoroughly (if necessary, using steam cleaners) in a contained area to avoid further contamination. It is unlikely that one treatment will kill this plant. Treatment will be required for several years before eradication is achieved.

Option 1: Burial on site

This is an option that is used in situations where there is a pressing development need for the site and time constraints which would not allow for in-situ herbicide control over a longer period of time.

Pre-excavation treatment

The Japanese Knotweed infestation must be treated with herbicide before removing. When sufficient time has been allowed for the herbicide to take effect (preferably at least a fortnight) the canes should be cut and removed and contained for burial.

Herbicides can be applied using a range of suitable applicators such as a knapsack sprayer. Control is easier if dead winter stems are tidied over the winter months to assist with access before growth commences i.e. to prevent tripping on them or them interfering with your knapsack lance. It is advised to leave live canes in situ to reduce the risk of spread to other sites. Care must be taken to avoid spreading Knotweed crowns when tidying dead canes. Application in sensitive vegetation areas is best achieved by stem injection or weed wiper.

Stockpiling Japanese Knotweed infested soil prior to burial

If soil containing Japanese Knotweed is stockpiled, the material must be stored in a manner that will not harm health or the environment. The stockpile should be on an area of the site that will remain undisturbed. The area should be clearly signed and regularly treated with herbicide to avoid re-infestation.

As a precaution, the stockpiled material should be laid on a root barrier membrane to avoid contaminating the site further and covered fully with the same material to avoid dispersal via wind.

Burying the material

Soil containing Japanese Knotweed material may be buried on the site where it is present to ensure that it is completely eradicated.

It is advisable to apply a non-persistent herbicide at least once to reduce the growth of infective material. The period of time during which the herbicide is ‘active’ is described on the product label. Material cannot be buried during that period of activity.

Material must be buried on-site at least 5m deep. The Japanese Knotweed material must then be covered with a root barrier membrane layer before infilling it to 5m deep with inert fill or topsoil.

Root barrier membranes that may have been used to protect clean ground from vehicles involved in excavating Japanese Knotweed must also be buried.

This method relies on the depth of burial as the main Japanese Knotweed treatment, rather than the protection from the root barrier membrane.

Where on-site burial is used, the area of deposition must be accurately mapped and the location recorded to prevent potential disturbance and re-infestation, future owners must be advised of its position. Japanese Knotweed is likely to survive for many years, depending on how effective the treatment was before it was buried. It is essential that it is not buried in a location where landscaping, installing services, building foundation are proposed or erosion from a watercourse is likely.

Where the deep burial of the dead Japanese Knotweed material is the preferred method of disposal, it is recommended to use glyphosate formulations. Other persistent herbicides are not allowed for deep burial under various waste regulations and due to a potential risk of pollution of groundwater.

Material, including contaminated soils, rhizome and the crown at the base of the stem, must be buried:

- at least 5 metres deep, (immediately cover to 1-2 metres, final depth after 2-4 weeks);
- at least 10 metres from the margins of the site or any engineering features, for example drains or bunds, of the site;

It is only acceptable to bury Japanese Knotweed material if the soil is otherwise uncontaminated.

- Moving soil off site
- Transporting soil infested with Japanese Knotweed, it is essential to carry out strict hygiene measures.

Option 2: Moving Soil and Treated Japanese Knotweed Off-site

Prior to excavation, herbicide treatment will take place and will be undertaken by a licensed invasive species contractor. Material (soil, vegetation, etc.) contaminated with Japanese Knotweed can only be transported offsite under the conditions of a relevant licence from the National Parks and Wildlife Service (NPWS). The material can only be removed to a prearranged EPA licenced waste transfer facility by the licenced haulier. Excavation for off-site disposal, great care needs to be taken to avoid excess waste and ensure the excavated Japanese Knotweed does not contaminate surplus soil that is currently free from infestation during excavations. When transporting soil infested with Japanese Knotweed, it is essential to carry out strict hygiene measures. If proper standards are not followed, this may lead to Japanese Knotweed spreading. Japanese Knotweed is a particular problem along transport corridors, where it interferes with the line of vision and can cause accidents.

Trucks which transport the material should only be filled up to a maximum of 20cm from the top. The void must be sealed with a well-secured membrane.

There must be enough membrane to seal the soil into a temporary cell for transporting. It is very important that the soil is contained to prevent any material being lost when it is moved. To contain the soil in the short-term, you can use a lower specification of membrane.

The final fate of Knotweed material transported off-site would be deep burial or incineration at an appropriately licensed facility.

6. MANAGEMENT PLAN

The management of any invasive species is achieved by the assessment and mapping of the invasive species, containment once found, continual monitoring and record keeping as well as the safe disposal of invasive species material. It is recommended that surveys be carried out periodically at/near the closed landfill to monitor the extent of invasive flora and the success of the eradication measures. These can be carried out by FT, or a contractor specialised in invasive flora eradication. Monitoring should continue at least two years after target invasive flora can no longer be detected to make sure successful eradication has been achieved. Liaison with land holders of adjacent sites may be necessary to effectively eradicate invasive species and prevent re-colonization. All invasive species which occur within the area utilized by people and machinery during the proposed landfill remediation works must be eradicated within the works area before commencement of works.

6.1 Containment

For the efficient use of resources namely, financial, and physical effort, it is important to prevent the further spread of invasive species. Containment will be achieved via:

- A pre-construction survey (to reconfirm the findings of the ISMP) will be undertaken during the growing season to mark out the extent of invasive species within the proposed works at the closed landfill site, prior to any works commencing there. If any other schedule III invasive species is found on or adjacent to the works area, another ISMP is to be prepared.
- Cordoning off the area of infestation to prevent further spread of seed or rhizome by people or machinery;
- Mark the cordoned off area with an information/warning sign;
- Toolbox talks to be carried out for all construction workers on the identification of Japanese Knotweed and the processes to follow if it is identified or suspected;
- Landholder to be informed of the location of the invasive species and the management plan;
- To help with monitoring of the infestation, the area is to be outlined where practical with spray paint;
- Ensure anyone treating the infestation is a suitably qualified trained professional who follows the management plan.
- The area of the works will be re-surveyed prior to treatment / remedial works to confirm the findings of the original survey.
- Follow up surveys will be carried out post-treatment to determine effectiveness of treatment and trigger further treatment if required.

6.2 Schedule

Please note that the schedule and treatment method may require amendment following any given site visit:

Table 6-1: Schedule of Eradication of invasive species

Year	Details of measures
1	• A pre-construction survey (to reconfirm the findings of the ISMP) will be undertaken during the growing season to mark out the extent of invasive species within the proposed works at the closed landfill site, prior to any works commencing there. If any other schedule III invasive species is found on or adjacent to the works area, another ISMP is to be prepared. • Invasive species material that is to be retained onsite will be buried in advance of other works, and no further excavation or disturbance of these areas will take place. • Cordoning off the area of infestation (exclusion zone) – this shall include a buffer of up to 7m surrounding the areas of infestation for Japanese Knotweed to ensure that underground rhizomes shall not be transported to other areas. No site works, storage, or access allowable within these exclusion zones until Japanese Knotweed has been fully eradicated. • Other invasive species observed shall include a buffer of up to 1m surrounding the area of infestation. This will prevent plants with underground rhizomes being transported to other areas and it will also prevent contact with plants which could result in the transport of seed, fruit or vegetation. • Control of invasive species using one or more of the treatment options proposed in Section 5.3 • Disposal of plant matter and soil off-site, should be completed through an appropriately licenced haulier and waste facility. Removal of a schedule 3 listed species such as Japanese Knotweed from the site will require a licence from NPWS. • Only once treatment has been completed and invasive species have been removed from within the area of works/buried securely will works commence. • Toolbox talks shall be given to all personnel accessing the site, informing them of the locations of the invasive species and instructing them not to enter these areas (unless they are licensed invasive species contractors). • Site to be monitored for signs of regrowth of all invasive species after the works have concluded.
2	• Following treatment, site to be monitored in the growing season following the works for signs of regrowth of invasive species, particularly Japanese Knotweed. • Monitoring of material collected during equipment washing for signs of growth during following growing season. • If any re-growth of Japanese Knotweed is observed, a further Invasive Species Management Plan is to be prepared.

6.3 Mapping, Evaluating and Record Keeping

During each treatment the following will take place before control treatments:

1. Check that the area of infestation is still cordoned off and a warning/information sign is still in place;
2. Photographs of the area(s) of invasive species infestation;
3. Map the extent via recording GPS coordinates and measure the length and width of infestation and plot on map;
4. Evaluate the status/condition of the infestation;
5. If the infestation has spread, spray paint the extent of the new area (for comparison on next visit);
6. Make sure step 1-5 are recorded.

At the end of each site visit the recorded data should be compared with the findings of this report and where required the management plan should be updated. Preparation of a short report on the progress of treatment following treatment works, and any subsequent monitoring.

7. CONCLUSION

There is a legal obligation not to spread plants listed on the third schedule of Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 to 2021; the relevant species at Killycard closed landfill, Co. Monaghan, and therefore the species of principal concern, is Japanese Knotweed (*Fallopia japonica*), should this species again be found on site. During the last survey in May 2022, no invasive species were found on site at Killycard closed landfill. However as a prudent measure due to previous infestation with Japanese knotweed at the western bank of the site this ISMP was prepared to provide steps in case this species is again found within or near the works area. If any other schedule III invasive is found, another ISMP is to be prepared. Liaison with landholders of adjacent lands may be necessary to effectively control invasive species in the area and to prevent re-infestation.

The measures detailed in sections 5 and 6 will ensure the early detection of any invasives species on site which are currently not known; as well as facilitating the successful control of any potential spread of invasive species - particularly with regard to Japanese knotweed which has closed records at the site.

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