ARUP

Roscommon County Council

Lough Funshinagh Interim Flood Relief Scheme

Construction Environmental Management Plan

Reference:

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1. Introduction

1.1 Overview

This Construction Environmental Management Plan (CEMP) has been prepared by Arup on behalf of Roscommon County Council (RCC) for the planned interim flood relief scheme for Lough Funshinagh, County Roscommon, herein referred to as "the proposed scheme". All works associated with the construction of the proposed scheme will be undertaken by RCC and their appointed contractor(s).

The purpose of the CEMP is to demonstrate how the proposed construction works can be delivered in a logical, sensible and safe sequence with the incorporation of specific environmental control measures relevant to construction works of this nature. The CEMP sets out the mechanism by which environmental protection is to be achieved during the construction phase of the proposed scheme. Implementation of the CEMP will ensure disruption and nuisance are kept to a minimum.

Due to the short-term duration of the proposed scheme (24 months), it is considered appropriate that this CEMP will also cover the decommissioning phase of the scheme.

The CEMP has been prepared in accordance with industry best practice guidance including:

- TII's Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan; and
- CIRIA (4th Edition, 2015); Environmental Good Practice on Site Guide.

The CEMP has been prepared in conjunction with the Environmental Impact Assessment (EIA) Screening Report and the Screening for Appropriate Assessment (AA) & Natura Impact Statement Report prepared for the proposed scheme and is structured as follows:

- Section 1 introduces the proposed scheme and outlines the purpose of the CEMP
- Section 2 describes in detail the proposed scheme
- Section 3 sets out the construction strategy for the proposed scheme
- Section 4 sets out the decommissioning strategy for the proposed scheme
- Section 5 outlines the procedures to be employed during construction to manage environmental aspects
- Section 6 outlines the management of construction traffic
- Section 7 sets out the framework and mechanisms through which environmental requirements will be managed
- Section 8 describe the general requirements and environmental commitments to be implemented to minimise likely significant negative effects, as far as practicable, during the construction of the proposed scheme.

2. Project Description

2.1 Overview

Lough Funshinagh is defined as a turlough or 'disappearing lake' located approximately 13km to the northeast of Athlone town in Co. Roscommon. In recent years, and in particular since 2016, water levels in the lough have risen, resulting in flooding of nearby property and increasing the flood risk to Curraghboy village which is 1.7 km to the southwest of the lough. Roscommon County Council is in the process of designing a more permanent scheme to manage flood risk in the vicinity of the lough. The proposed scheme is an interim scheme for up to two years only. Prior to the implementation of the permanent scheme, more immediate measures are needed to manage flood risk, particularly for local property and for the village of Curraghboy. To that end, an interim scheme has been designed, with the aim to extract enough water from Lough Funshinagh to prevent flooding in the surrounding areas. This will involve pumping water for up to 24 months when the lough level exceeds 67.50 metres above Ordnance Datum (mOD). Pumping rates will be adjust based on the receiving river (Cross River) flow conditions and will not exceed 300 litres per second. A remote monitoring system will control the pumping process, allowing for changes in flow rate or shutdowns as needed. Monitoring river flow in the Cross River will also help to ensure effective management of the overall system.

The proposed scheme comprises two pumps working in parallel, pumping water from the lough, into an overland pipe which will run from Lough Funshinagh to the Cross River, approximately 2.5km southwest of the lough. The overland pipe will discharge the pumped volume of water to the Cross River. The proposed scheme has been designed with due cognisance for the sensitivity of the lough, the River Cross and the pipe route.

The system will be remotely monitored and controlled.

The main elements of the proposed scheme consist of:

- Pump intake system
- Intake compound
- Pipeline Route
- Pipeline Outfall at the Cross River.

2.2 Project Location

The proposed scheme is located southwest of Lough Funshinagh. The route runs from the intake pump within the lough for approximately 2.2 km to the outfall location on the Cross River, as shown in Figure 1.

The land use surrounding the proposed route is agricultural lands and sporadic residential dwellings. The intake pump will be placed within the lough and connected to two diesel-powered hydraulic pump units (HPUs) located on purpose-built compound in an agricultural field near the edge of the lough. The overground pipeline will run through agricultural fields and transverse underneath three roads (R362, L2013 and a private access road adjacent to the R362 road) to the outfall point at the Cross River.

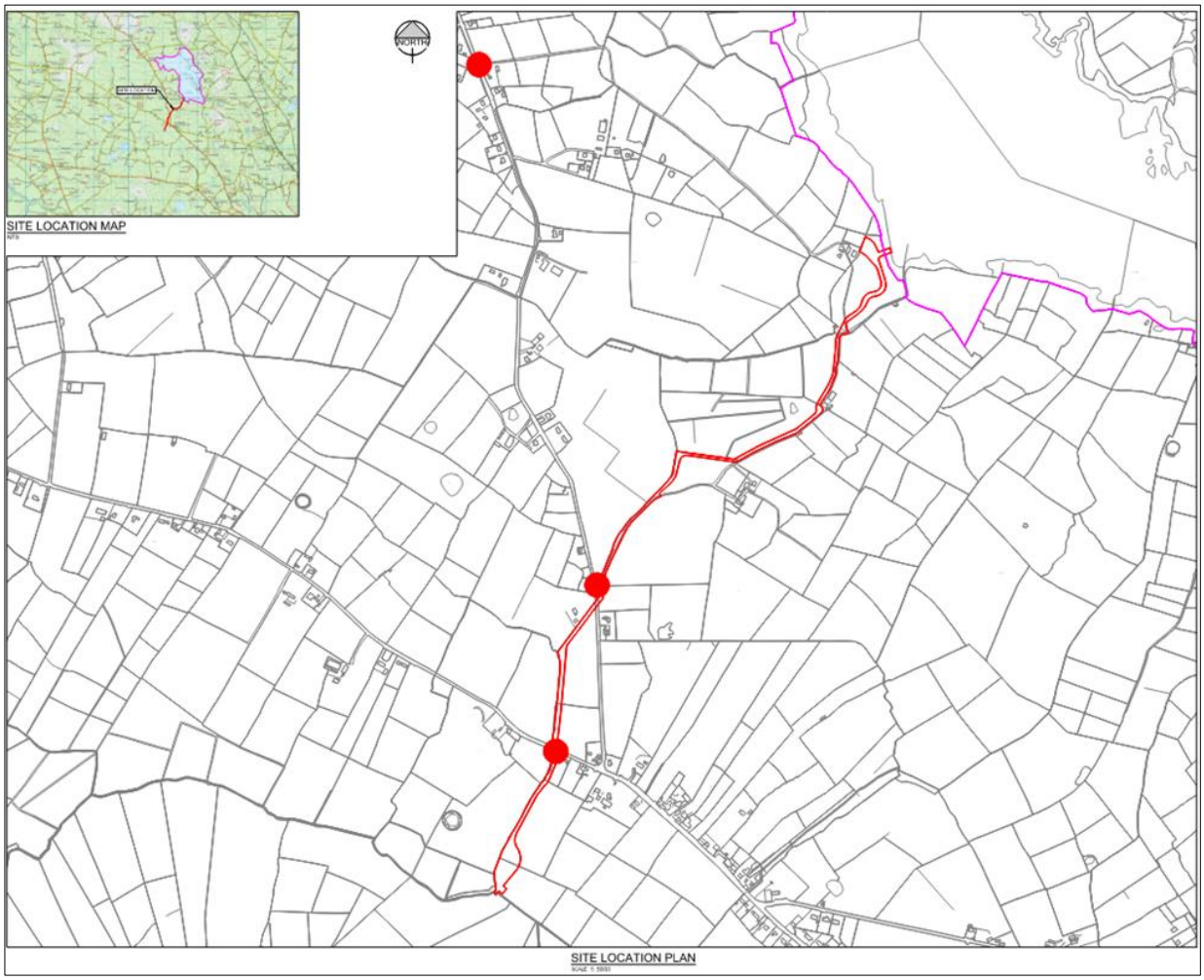

Figure 1 Location of the proposed scheme. Source Dwg. 24821-MWP-00-00-DR-C-0001 (MWP) | not to scale

2.3 Project Participants

Roscommon County Council will appoint a contractor for the construction of the proposed scheme who will ensure all requirements of the CEMP are met.

Table 1 lists the main project participants for the proposed scheme.

Table 1 List of Main Project Participants

Role	Company Name
Client	RCC
Project Manager	RCC
Contractor (construction and decommissioning phases)	To be appointed by RCC
Planning Consultant	Malachy Walsh & Partners (MWP)
Environmental Consultant	Arup
Project Environmental, Health and Safety Manager	To be appointed by RCC or the Contractor
Project Supervisor Construction Stage (PSCS)	To be appointed by RCC

3. Construction Strategy

This section describes the works required to construct, install and commission the proposed scheme.

3.1 Phasing of works

Some works may be carried out concurrently where possible however the overall phasing of the works will likely be as follows:

- Construction of the intake compound
- Installation of the pump intake system i.e. HPUs, pump pontoon and floating access pontoon
- Laying of pipeline along the pipeline route including road crossings and fencing
- Installation of outfall and
- Equipment installation and setup.

It is anticipated that the construction works will take approximately one month to complete. It is expected that the civil works will be completed in 3-4 weeks and that the installation and setting up of equipment will take one week.

3.2 Intake Compound

The compound will be constructed without excavating the existing ground. A combination of geogrid and geotextile will be placed over the vegetation on the existing surface within the footprint of the compound. A minimum thickness of 450mm of imported stone (Class 6F or similar) will be placed on top of the geogrid and geotextile. The total footprint of the hardstand area at the will be c. 1,150 m^2.

A site inspection by the design engineering team and landowner knowledge of the land have determined the ground conditions to be suitable for the size and nature of compound designed for the proposed scheme.

3.2.1 Intake Compound

The construction of the intake compound will involve the following sequence:

- The appointed contractor will mark out the line of the proposed compound using a GPS / total station
- A layer of geogrid / geotextile will be rolled out by hand along the line of the proposed compound
- The stone aggregate used to construct the compound will be imported from a local quarry using trucks. The trucks will reverse tip the stone onto the geogrid / geotextile and an excavator will be used to spread the stone before compaction. Compaction of the stone material will be completed using the Transport Infrastructure Ireland (TII) Specification for Roadworks. This is typically completed in layers with the use of a vibratory roller or similar
- The compound will be constructed with a minimum crossfall of 3% to ensure that water can flow off the surfaces and to reduce the risk of rutting / potholes occurring
- Surface water runoff from the compound will be discharged directly over the edge of the stone embankment and a continuous silt fence will be constructed on the downslope side to capture any sediment that may run off the surfaces
- The timber posts in the stockproof fence will be driven into the existing soil without any excavation.

3.2.2 Concrete Bund

- A concrete bund measuring 11m x 8m will be constructed inside the compound to support the HPU's and fuel tanks and to contain any fuel in the event of a spillage. The slab will be cast directly onto the imported stone used to construct the compound. The slab will include reinforcement to prevent leakage. The upstand walls will be cast in-situ using conventional formwork
- The acoustic barrier, 4m in height, will be fixed directly to the HPU bund upstand walls or slab
- The paladin fence posts will be secured to concrete blocks (Kelley Blocks or equivalent) so as to avoid disturbance of the underlying ground. Refer to the drawing in Figure 2 for details of fences.

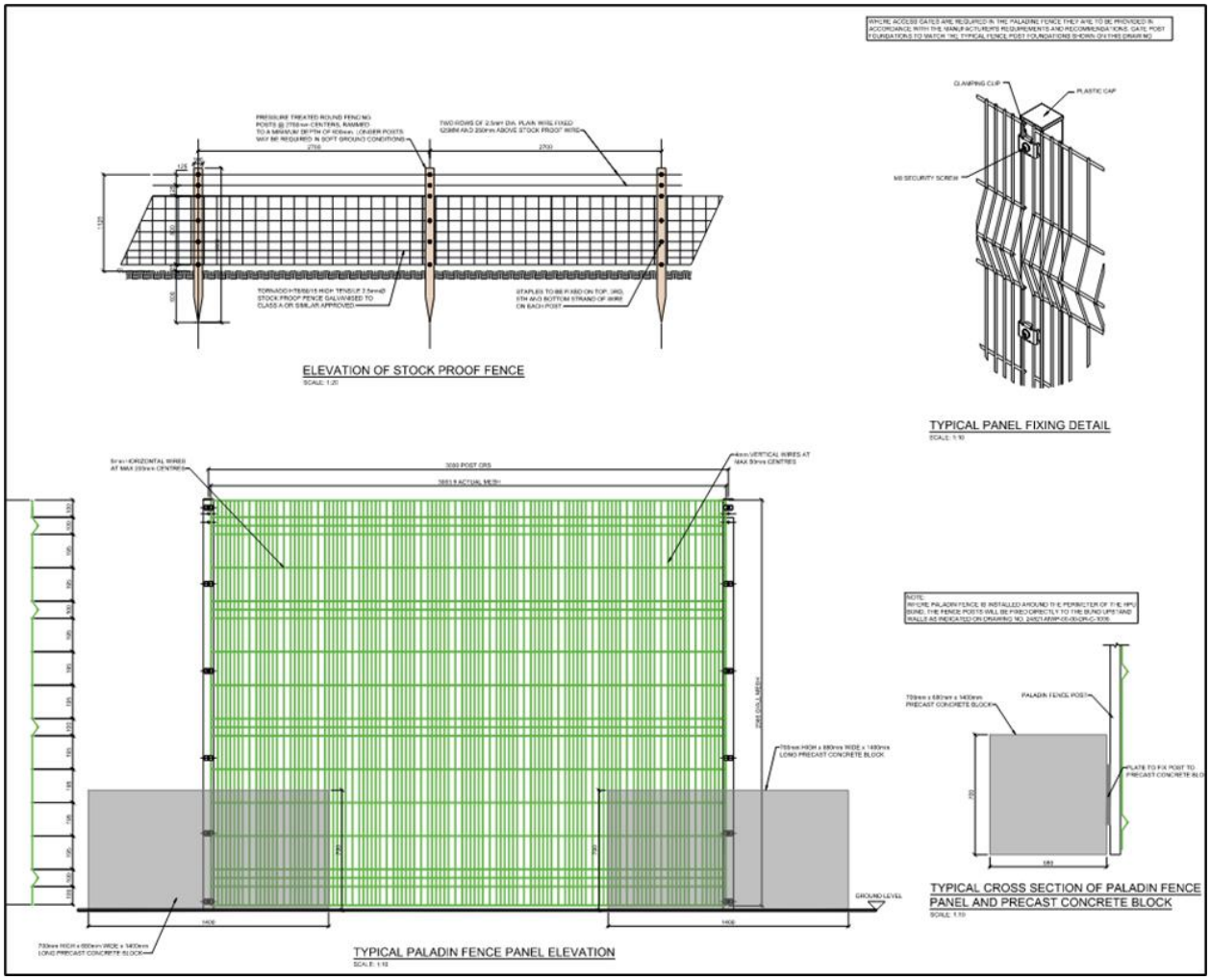

Figure 2 Design detail of paladin fence installation. Source Dwg. 24821-MWP-00-00-DR-C-0403 (MWP) | not to scale

3.3 Pump Intake System

The construction of the pump intake system will involve the following sequence:

- The pump pontoon and access pontoons will be manufactured in the Netherlands and will be transported to site on an articulated truck. The HPU's and fuel tanks will also be transported from the Netherlands on an articulated truck. The trucks will deliver all these components to the intake compound
- A 60-tonne mobile crane will be used to lift the pump pontoon (with the pumps already installed within it) from the truck in the compound to the lough. The pump pontoon will be floated into its final position and held in place horizontally using 4 no. spud legs (100 mm diameter) fixed with end plates, which will rest on the ground beneath the water. A small boat will be in the water to assist with positioning
- The same crane will lift the HPU's and fuel tanks into position within the HPU bund

- The floating access pontoons will be transported to the site in 5 no. 6.4m lengths. Each section will be lifted into position in the lough using the crane and bolted together
- The hydraulic hoses and 2 no. c.300 mm diameter pipes will be mounted on the sides of the floating pontoons using brackets
- The fuel tanks will be filled with diesel using a fuel truck
- The pump system will be tested and, after installing the remainder of the pipeline, it will be commissioned.

3.4 Pipeline Route to the Cross River

3.4.1 Laying of Pipeline

Vegetation clearance will be required where the pipes must cross ditches however only space for the two pipes will be required and these locations will be replanted on removal of the temporary pipeline. Similarly, it may be necessary to cut through concrete walls or dismantle stone walls to allow the pipeline through such boundaries. All such boundaries will be reinstated once the pipeline is removed.

The construction of the pipeline will involve the following sequence:

- The flexible layflat hose and PE ribbed pipe system will be supplied from the Netherlands and will be transported to site on articulated lorries
- The layflat hose will be supplied in 50 m to 200 m lengths (typically 200 m) and will be housed in a container for transport. The container will be lifted off the trucks and onto a flatbed trailer which will be attached to a tractor or excavator. The tractor or excavator will drive along the route of the pipeline and deploy the hose directly onto the ground surface. The final positioning of the hose will be done by hand
- The pipeline will need to pass through a number of field boundary fences/hedgerows, as shown on the engineering report drawings (24821-MWP-00-00-DR-C-0100-S21-P01, 24821-MWP-00-00-DR-C-0101, 24821-MWP-00-00-DR-C-0102, 24821-MWP-00-00-DR-C-0103.At each location, the existing boundary fence/hedgerows will be removed over a width of 5 m which is required to allow both the pipeline and a tractor/excavator to pass through
- Cross drains consisting of HDPE drainage pipes will be laid beneath the ‘layflat’ flexible pipes at appropriate intervals to maintain the existing drainage regime on the site. This approach eliminates the need to excavate new drainage channels or alter the existing flow regime
- The PE ribbed pipeline will be supplied in lengths varying between 5 m and 12 m and will be connected using rigid joints. The pipe sections will be loaded from the articulated lorry to a flatbed trailer attached to a tractor or excavator. The tractor or excavator will drive along the route of the PE ribbed pipe and will be followed by an excavator which will be used to lift the pipes from the trailer to the required position on the ground
- Due to the existing surface condition, which has a number of localised humps and depressions, the line of the 500mm diameter PE ribbed pipe will be smoothened out. This will be achieved using an excavator to compact and level out any localised humps/depressions. The maximum depth change will be 150mm which is less that the depth of influence in conventional agricultural tilling
- The layflat flexible pipes will be connected to the PE ribbed pipe using a bespoke fabricated manifold section
- A provision will be made for badgers to cross the PE ribbed pipe by installing ‘Badger Gates’ in the fencing. This consists of sections 300mm diameter pipe placed through and perpendicular to the wire fencing to allow badgers to travel through.

3.4.2 Fencing Installation

A stock proof fence will be provided both sides of the pipeline along the full length of the route and will incorporate timber posts which will be driven into the existing soil without any excavation. The stock-proof fence will consist of wooden post and wire fencing. Refer to Figure 2.

3.4.3 Road Crossings

There will be two public road crossings along the route (the R362 and L2013) and one crossing of a private road. A shallow trench will be excavated across each road and a concrete pipe installed through which the flexible pipes will subsequently be pulled. It is anticipated that the trenching works will take up to two days for each installation and one lane of traffic will be kept open to maintain traffic flow. It is known that an existing Uisce Éireann watermain and a fibre optic cable are present in the roads.

The construction of road crossings will involve the following sequence:

- On the public roads, in order to allow traffic to continue to use the roads, the pipe will be installed in two segments such that at least one traffic lane remains open at all times
- Prior to undertaking any works, a CAT scan will be undertaken to identify any services in the road
- An 1800 mm wide trench will be excavated across the road to accommodate 2 no. 600 mm diameter HDPE carrier pipes. The overall trench depth will be approximately 2,000 mm to provide sufficient cover to the pipe and to ensure that the existing services can be avoided
- The HDPE carrier pipe will be positioned onto a 100 mm thick layer of pipe bedding material placed at the bottom of the trench. Once the carrier pipe is in position the trench will be backfilled and the road will be reinstated
- The existing hedgerow will be removed on both sides of the road over a width of approximately 3 m. These will be reinstated following installation of the carrier pipes
- At each side of the road, the trench will extend past the pipe into the field and will be sloped upwards to meeting the existing field level as shown Figure 3 and Figure 4. A handrail will be erected around the trench in the field
- The flexible pipes will be placed through the carrier pipe.

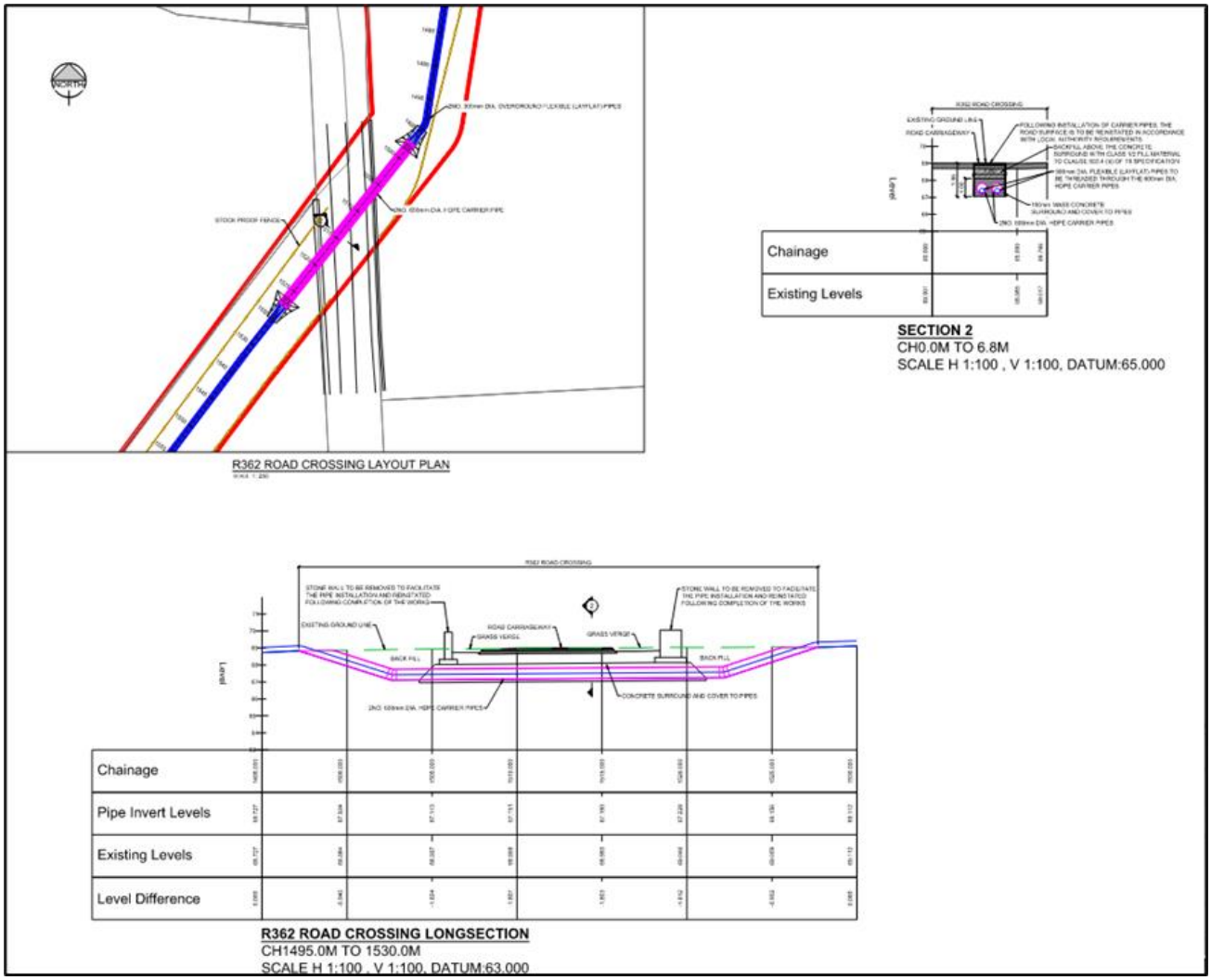

Figure 3 Proposed R362 road crossing detail. Source Dwg. 24821-MWP-00-00-DR-C-0401 (MWP) | not to scale

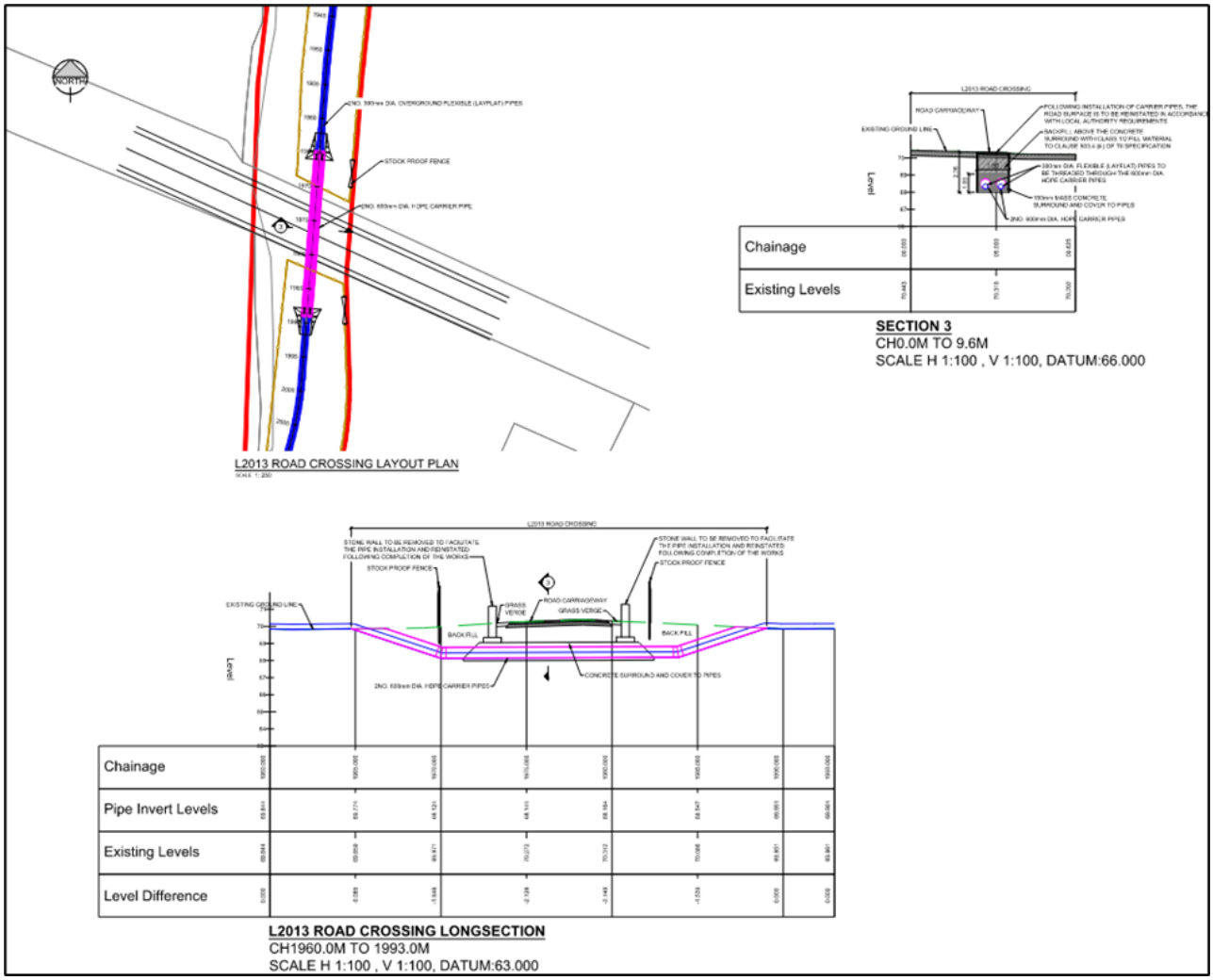

Figure 4 Proposed L2013 road crossing detail. Source Dwg. 24821-MWP-00-00-DR-C-0402 (MWP) | not to scale

3.5 Outfall

No excavation works or vegetation removal will be required at the outfall location.

The construction of the outfall will involve the following sequence:

- The geotextile will be supplied in a roll and transported to the outfall location by an excavator
- The rock armour and natural flag stones will be transported to the outfall location using a tipper truck or tracked dumper
- As noted on drawing 24821-MWP-00-00-DR-C-1003:
  - All rock shall be quarried with a minimum saturated surface dry density of 2600 kg/m³
  - Stone should be crushed and angular from strong inert rock, which shall exclude shales and weak sandstones
  - All individual stones shall be dense, sound, durable rock, free from all cracks, joints and bedding planes, which could result in breakdown of the rock in a fluvial or marine environment. It shall be capable of being handled and placed without fracture or damage
  - Individual pieces shall be blocky and take the basic shape of a cuboid. Armour units shall be hand selected and individually placed to the approval of the Employers Representative so each rock is securely held by its neighbours. Rocks shall not be placed so that they obtain their stability on a plane by frictional resistance alone

  - Armour stone is to be placed in a systematic way such that the finished construction consists of close packed layers of rock of the specified thickness for the appropriate zone. The surface of the rock shall present a close packed uneven face
  - The contractor shall provide details of the source of supply for approval prior to delivery to site.

- The geotextile will be rolled out across the full width of the channel from top of bank to top of bank.
- An excavator will be used to systematically position rock armour and natural flag stones onto the geotextile, starting at the bottom and working upwards to ensure stability is maintained. The finished construction consists of close packed layers of rock of the specified thickness for the appropriate zone. A 1.60 metre width of the riverbed will be covered with natural flag stones. The leading edge and tail edge of the flag stone at the upstream and downstream interfaces with the existing riverbed will be level.
- The PE ribbed pipe will be laid as far as the top of the channel bank using the method outlined in the previous sub-section. The pipe will be mitre cut and jointed to another pipe section by fusion welding a coupler so that the jointed section will be oriented downwards following the riverbank gradient.
- The diffuser tee will have been pre-fabricated and will be fixed to the end of the pipe with a rigid joint.
- Additional rock armour will be placed around the ends of the diffuser tee to ensure that water discharging from the ends must flow around and through the rock armour before entering the river.

3.6 Service Diversions

Services will potentially be encountered during the road crossing works. As noted above in Section 3.4.3, the overall trench depth will be approximately 2,000 mm to provide sufficient cover to the pipe and to ensure that the existing services can be avoided.

3.7 Traffic Management

As noted in Section 3.4.3, traffic management measures will be required during the installation of the pipeline under the public roads. One lane of traffic on the public roads will be maintained at all times.

3.8 Landowner and Community Liaison

Roscommon County Council (RCC) will coordinate communications and liaise with affected landowners and the local community during all phases of the proposed scheme. RCC will liaise with residents and the general community during the construction phase to ensure that any disturbance is kept to a minimum and to ensure that all anticipated nuisances are minimised and that the construction activity will have the lowest possible impacts on the residents and other properties.

3.9 Construction Management

RCC will have a construction management team on site for the duration of the construction phase. This team will supervise the construction of the scheme including monitoring the contractors' performance to ensure that the proposed construction phase mitigation measures are implemented and that construction impacts and nuisance are minimised.

3.10 Construction Safety

All contractors and subcontractors must progress their works with reasonable skill, care and diligence and, at all times, proactively manage the works in a manner most likely to ensure the safety, health and welfare of those carrying out construction works, pedestrians, road users and other interacting stakeholders. Measures related to construction health and safety are detailed in the CEMP.

A Project Supervisor Design Process (PSDP) has been appointed by RCC.

RCC will appoint the Project Supervisor Construction Stage (PSCS) for the construction stage of the project to manage and co-ordinate health and safety matters during the construction stage. The PSCS will be appointed before the construction work begins and remains in that position until all construction work on the project is completed.

4. Decommissioning Strategy

The proposed scheme is planned to be in operation on an interim basis, for up to two years. At the end of the scheme all equipment and structures will be removed, and the land will be restored to its previous state. To ensure no adverse effects are caused by the decommissioning phase, information on the decommissioning strategy and specific mitigation measures have been included in the CEMP.

4.1 Pump Intake System

Decommissioning of the pump intake system will involve the following:

- The pumps will be shut down and disconnected from the pipeline and hydraulic hoses
- A 60-tonne mobile crane will be used to lift the pump pontoon (with the pumps inside) from the lough to an articulated truck parked in the intake compound. A small boat will be in the water to assist
- The floating access pontoons will be dismantled (unbolted) and lifted from the edge of the lough to a truck parked in compound using the 60-tonne crane
- The same crane will lift the HPU's and fuel tanks onto the truck.

4.2 Intake Compound

Decommissioning of the intake compound will involve the following sequence:

- The stock proof fence and paladin fence will be taken up and loaded onto a flatbed truck for reuse
- The concrete HPU bund will be demolished using an excavator with a rock breaker and removed to a licensed facility
- The Class 6F stone (compound) as well as the geogrid / geotextile used to construct the compound will be taken up and brought to a licensed facility. A reuse for the stone aggregate will be sought where possible following confirmation of acceptability
- The ground beneath the footprint of the compound will be rotovated and tilled to reinstate the area to agricultural usage, similar to the surrounding lands.

4.3 Pipeline Route

Decommissioning of the pipeline will involve complete removal of all PE ribbed pipe and flexible 'layflat' pipe.

4.3.1 Road Crossing

Decommissioning of the road crossings will involve the following sequence:

- The HDPE carrier pipes will remain in place after the pipeline has been removed
- Each end of the pipe will be blocked by filling in the trench at the ends. The redundant pipe beneath the road will not be of concern

- The existing hedgerow which was removed will be replanted using native hedge species and/ or walls/ fences will be restored.

4.4 Outfall

Decommissioning of the outfall will involve the following sequence:

- The PE ribbed pipe and diffuser tee will have been removed in conjunction with the remainder of the pipeline
- The rock armour and natural flag stones will be carefully removed from the surface of the geotextile using an excavator and placed into a tipper truck or tracked dumper
- The geotextile will be pulled across the river and removed by hand without entering the water.

4.5 Waste Arising

All waste arising will be managed in accordance with the waste hierarchy, in compliance with the provisions of the Waste Management Act, 1996, as amended, and to contribute to achieving the objectives set out in the Waste Action Plan for a Circular Economy (DECC, 2020).

Opportunities for reuse of materials, by-products and wastes will be sought throughout the decommissioning phase. Where possible, metal, timber, glass and other recyclable material will be segregated and removed off site to a permitted / licensed facility for recycling.

The contractor appointed for the decommissioning of the scheme will record the quantity in tonnes and types of waste and materials leaving the site. The name, address and authorisation details of all facilities and locations to which waste and materials are delivered will be recorded along with the quantity of waste in tonnes delivered to each facility. Records will show the type of material, specifying those that are recovered, recycled, and disposed of. The relevant appropriate waste authorisation will be in place for all facilities that wastes are delivered to (i.e., EPA Licence, Waste Facility Permit or Certificate of Registration).

The following are the expected wastes to be generated during the decommissioning phase:

- Concrete from HPU bund and Paladin post bases to be removed to a licensed facility
- Geotextiles/ geogrid to be taken to licensed facility and reused following confirmation of acceptability
- Stone aggregate to be taken to licensed facility and reused following confirmation of acceptability
- Natural flag stones to be taken to licensed facility and reused following confirmation of acceptability
- Fencing (posts, wire and paladin) to be gather for re-use
- Rock amour to be taken to licensed facility
- Pipeline to be gather and re-used where possible.

Mitigation measures for the management of waste are set out below in Section 8.4.9.

5. Site Management

The following site management measures will be implemented for both the construction and decommissioning phases. The contractor will be required to implement these measures for the duration of the contract.

RCC and their contractor(s) will also be obliged to address any issues as and when they arise and coordinate with the contractor throughout the works of the proposed scheme to avoid and minimise any adverse effects during construction and decommissioning.

5.1 Working Hours

Construction operations on site are proposed to be between the hours of 07:00 and 19:00, Monday to Friday, and 07:00 to 16:00 on Saturdays. Similarly, deliveries of materials to site will generally be between the hours of 07:00 and 19:00, Monday to Friday, and 08:00 to 16:00 on Saturdays and will be scheduled to avoid peak times.

This will ensure construction traffic will have limited impact on the peak periods of 07:30-08:30 in the morning and 16:15-17:15 in the evening.

Due to the urgent nature of construction activities, or if required to mitigate disruption to the local environment, there may be a requirement for working outside these hours. Should this be required, it will be by agreement with Roscommon County Council.

5.2 Good Housekeeping

A “good housekeeping” policy will be employed at all times. This will include, but not necessarily be limited to, the following requirements:

- General maintenance of working areas and cleanliness of welfare facilities and storage areas
- Provision of site layout map showing key areas such as first aid posts, material storage, spill kits, material and waste storage, welfare facilities etc
- Maintain all plant, material and equipment required to complete the construction work in good order, clean, and tidy
- Keep construction compounds, access routes and designated parking areas free and clear of excess dirt, rubbish piles, scrap wood, etc. at all times
- Details of site managers, contact numbers and warning signs will be provided at the boundaries of the working areas
- Provision of adequate welfare facilities for site personnel
- Installation of appropriate lighting and fencing each working area as required
- Effective prevention of oil, grease or other objectionable matter being discharged from any working area
- Provision of appropriate waste management at each working area and regular collections as per the existing arrangements on site
- Excavated material generated during construction will be reused on site as far as practicable and surplus materials/soil, should it be deemed a by-product, will be recovered or if considered to be waste material, disposed of to a suitably authorised waste facility site
- Open fires will be prohibited at all times
- The use of less intrusive noise alarms which meet the safety requirements, such as broadband reversing warnings, or proximity sensors to reduce the requirement for traditional reversing alarms; and

- Material handling and/or stockpiling of materials, where permitted, will be appropriately located to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.

5.3 Health and Safety

The primary aim of planning for safety on this site is ensuring the safety of people involved in and affected by the development. This includes pedestrians, road users, neighbours, site staff and visitors to site.

The following are examples of some site-specific issues that will have to be addressed during the construction of the works:

1. Protecting existing roadways against damage.
2. Managing vehicular traffic on the surrounding roadways for the duration of the construction works.
3. Maintaining existing public and private access roads.

All contractors and subcontractors must progress their works with reasonable skill, care and diligence and, at all times, proactively manage the works in a manner most likely to ensure the safety, health and welfare of those carrying out construction works, pedestrians, road users and other interacting stakeholders.

Contractors and subcontractors are further required to ensure that, as a minimum, all aspects of their works and project facilities comply with legislation, good industry practice and all necessary consents.

Health and safety requirements will be further expanded and developed within the contractor's Construction Management Plan and Construction Stage Health and Safety Plan required to be prepared by the Project Supervisor Construction Stage, prior to the commencement of construction works on site.

5.4 Public Relations

The site is located near to a number of residences. The contractor will be required to ensure that all agents, subcontractors, and suppliers act in a manner to minimise disruption to the surrounding locality. Keeping people informed of site operations will help create and maintain good relationships, fostering a co-operative atmosphere.

RCC will act as the main point of contact between the community, landowners and the contractor.

5.5 Site Security

The contractor will be responsible for the security of the site for the duration of the works. All reasonable precautions will be taken to prevent unauthorised access to the site, the works and adjoining property. Adequate safeguards will be put in place to protect the site, the works, products / materials, plant, and any existing buildings affected by the construction works from damage, theft and trespass.

As part of their site security responsibilities, the contractor will be required to:

1. Install and maintain adequate site fencing to the site boundary with adequate controlled access and egress points until the proposed fencing for the proposed scheme is fully installed.
2. Ensure restricted access is maintained to the works.
3. Monitor and record all deliveries to site and materials / waste taken off site.

All staff will be made fully aware of their individual responsibilities regarding safety and security and will undertake their work in accordance with such guidelines. All staff and operatives will be fully inducted into the security, health and safety and logistic requirements on site.

5.6 Road Maintenance

The following measures will be taken to ensure that the site and surrounding roads are kept clear, tidy and well maintained:

- A regular programme of site tidying will be established to ensure a safe and orderly site
- In the event of any fugitive solid waste escaping the site, it will be collected immediately and removed to storage on site, and subsequently disposed of in the appropriate manner
- The proposed scheme will require crossing of two public roads (R362 and L2013). If necessary an approved mechanical road sweeper will be used to remove any soil or debris generated by the trenching works and hedgerow or wall removal works
- The private access road used for the intake compound will continue to be used by the landowner and the contractor will be responsible for maintaining access for the landowner, regular inspection and ensuring construction materials or rubbish is removed as soon as possible.

6. Traffic Management

The following traffic management will be implemented for the construction and decommissioning phases.

6.1 Site Access

The construction traffic for the intake system and intake compound will enter the site from the private access road off the R362 as shown in Figure 5. Agricultural access gates will be provided at the compound to facilitate access for the landowner.

Access to the outfall site will be through a private access road located on the L2013.

Traffic management measures will be required during the installation of the pipeline under the public roads. One lane of traffic will be maintained open at all times.

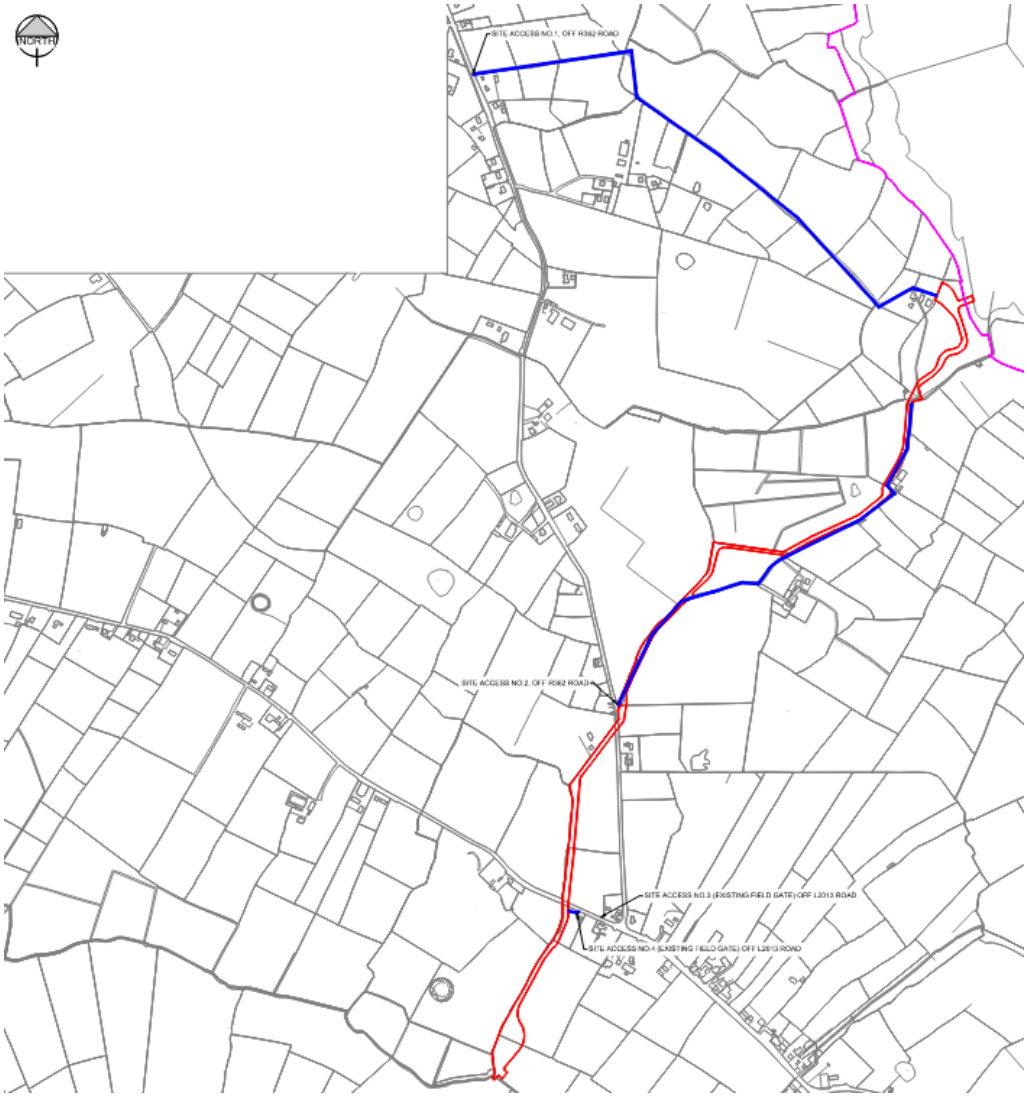

Figure 5 Roads context and potential site entrances for construction of the proposed scheme. Source Dwg. 24821-MWP-00-00-DR-C-0002 (MWP) | not to scale

6.2 Traffic Mitigation

6.2.1 Potential Impact

It is envisaged that no significant adverse effects on traffic will occur during the construction phase. The contractor will consider traffic management for the proposed scheme in agreement with RCC.

Traffic management and road signage for site access will be in accordance with the Department of Transport, Tourism and Sport (2019) Traffic Signs Manual, *Chapter 8: Temporary Traffic Measures and Signs for Roadworks*[1] and in agreement with Roscommon County Council.

It has been estimated that there will be approximately 20 construction staff on site on a typical day during the one-month construction period.

Working hours are outlined in Section 5.1. These hours will ensure construction traffic will have limited impact on the peak periods of 07:30-08:30 in the morning and 16:15-17:15 in the evening.

[1] Department of Transport, Tourism and Sport (2019) Traffic Signs Manual, Chapter 8: Temporary Traffic Measures and Signs for Road Works https://assets.gov.ie/34731/20abae155ee5458993122838cb317ca9.pdf

6.2.2 Traffic Management

The Contractor will agree traffic management measures with Roscommon County Council prior to commencement of the works. This will include information on the management of deliveries, control of site access and required signage.

During peak hours, ancillary, maintenance, and other site vehicular movements will be discouraged.

HGV routes to and from the works areas will be developed in agreement with Roscommon County Council and with the objective of minimising the impact in the local area for residents and businesses.

7. Environmental Management Framework

The following environmental management framework will be implemented for both the construction and decommissioning phases.

7.1 Overview

As part of the environmental management framework, RCC and their contractor(s) will be required to comply with all relevant environmental legislation and take account of published standards, accepted industry practice, national guidelines, and codes of practice appropriate to the nature of the proposed scheme works. Due regard should be given to the guidance and advice given by ISO14001 standard[2] and Construction Industry Research and Information Association (CIRIA) guidance[3,4,].

The contractor will be required to develop and implement an Environmental Management System (EMS) that follows the principles of ISO14001.

Further, the contractor's EMS should include an environmental policy, operational, monitoring and auditing procedures to ensure compliance with all environmental requirements and to monitor compliance with environmental legislation and the environmental management provisions outlined in the relevant documentation.

7.2 Responsibilities

Outlined below is a summary of the key roles for the works phase of the proposed scheme and their associated responsibilities in relation to the CEMP.

7.2.1 Employer

RCC will be the employer responsible for ensuring that competent parties are appointed to undertake construction/ decommissioning of the proposed scheme and that sufficient resources are made available to facilitate the appropriate management of risks to the environment.

7.2.2 Employer's Representative

RCC will act as the Employers Representative (ER) and will be responsible for monitoring compliance with the CEMP.

It is envisaged that the ER will coordinate with the contractor and facilitate any specialists appointed to implement on site procedures and monitor construction on behalf of the employer.

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[2] ISO (2015) ISO 14001:2015 Environmental management systems -- Requirements with guidance for use

[3] CIRIA (2015) Environmental Good Practice on Site (fourth edition) (C762)

[4] CIRIA (2001) Control of water pollution from construction sites. Guidance for consultants and contractors (C532)

7.2.3 The Contractor

The Contractor appointed by RCC will be responsible for the organisation, direction, and execution of environmental related activities during the detailed design and construction of the proposed scheme. The contractor is required to undertake all activities in accordance with the relevant environmental requirements including the consent documentation and other regulatory and contractual requirements.

7.2.4 Site Manager

A Site Manager will be appointed to oversee the day-to-day management of working areas within the site and ensure that effective, safe, planned construction activities are delivered on an ongoing basis to the highest standards.

The Site Manager will be a suitably qualified, competent, and experienced professional that will oversee site logistics, communicate regularly with construction staff, accommodate project-specific inductions for staff on site and ensure that all work is compliant with the relevant design standards and health and safety legislation.

7.2.5 Project Supervisor for the Construction Stage

The Project Supervisor for the Construction Stage (PSCS) will be appointed by RCC appointed and responsible for the organisation, direction, and execution of environmental related activities during the detailed design and construction of the proposed scheme. The PSCS is required to undertake all activities in accordance with the relevant environmental requirements including the consent documentation and other regulatory and contractual requirements.

7.2.6 Environmental Manager

An Environmental Manager will be appointed to ensure that the CEMP is effectively implemented. The Environmental Manager will be a suitably qualified, competent and experienced professional that would perform the necessary tasks, review environmental procedures and consult with the members of the construction team and stakeholders as required.

7.2.7 Environmental Specialists

To fulfil its obligations under the CEMP and to support the Environmental Manager, suitably qualified and experienced professionals will be appointed as required. Refer to Section 8.4 (Construction and Decommissioning Phase Mitigation and Monitoring Measures) below for those specialists required:

- Ecological Clerk of Works (ECoW), refer to Section 8.4.1.

7.2.8 Emergency Contacts

An emergency contact list will be established and made available to all construction staff employed. The contact list shall be displayed prominently on site as well as at suitable locations where construction activity is being carried out around working areas. The contact list will include key environmental representatives that may need to be contacted in the event of an incident.

7.2.9 Enquiries and Complaints

The Contractor will establish a process for handling all enquiries including complaints. All enquiries will be recorded, and a log will be maintained to include details of the response and action taken. This will be available upon request for inspection to RCC. All enquiries, whether a query or a complaint, will be dealt with in a timely manner.

The Environmental Manager will be immediately informed of any environmental-related issues that have been raised. Where appropriate, the environmental manager would be responsible for informing Roscommon County Council, relevant stakeholders, and statutory bodies.

8. Environmental Management Procedures

The following environmental management procedures will be implemented for both the construction and decommissioning phases.

8.1 Training, Awareness and Competence

The contractor (and their subcontractors, if any) will be selected with due consideration of relevant qualifications and experience. The contractor will be required to employ construction staff with appropriate skills, qualifications, and experience appropriate to the needs of the works to be carried out during construction.

A site induction will be provided to all construction staff before they commence work on site.

The contractor will ensure that all personnel receive adequate training prior to the commencement of construction activities. A baseline level of environmental awareness will be established through the site induction programme. Key environmental considerations and objectives will be incorporated into this induction. Specifically, site inductions will cover the following as a minimum:

- Introduction to the Environmental Manager
- Description of the CEMP and consequences of non-compliance
- The requirements of due diligence and duty of care
- Overview of conditions of consents, permits, and licences
- Identification of environmental constraints and notable features within the site; and
- Procedures associated with incident notification and reporting.

Nobody will work on site without first receiving environmental induction. Signed records of environmental training will be established, maintained, and made available to the Employers Representative.

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

8.2 Monitoring and Inspections

Given the health and safety aspects of the proposed works, all site visits related to monitoring and inspections will be arranged and agreed in advance between the contractor, RCC and its Employer's Representative and the Site Manager.

Records of all inspections carried out will be recorded on standard forms and all actions should be closed out in a reasonable time. The updated CEMP will include further details of inspection procedures.

8.2.1 Monitoring

Mitigation and monitoring will be carried out in accordance with the requirements of the CEMP and associated environmental/ecological reports so that construction activities are undertaken in a manner that does not give rise to significant negative effects. Suitable monitoring programmes will need to be developed, implemented, documented, and assessed.

The results of all environmental monitoring activities will be reviewed by the Environmental Manager on an ongoing basis to enable trends or exceedance of criteria to be identified and corrective actions to be implemented as necessary. The contractor will be required to inform the Employer's Representative of any exceedances of criteria, whether continuous or not.

8.2.2 Inspections

Routine inspections of construction activities will be carried out by the Environmetal Manager daily to ensure all necessary environmental measures relevant to the construction activities are being effectively implemented by construction staff, ensuring legal and contractual conformity.

8.3 Incident Response

8.3.1 Corrective Actions

Corrective actions are measures to be implemented to rectify any non-conformances identified during monitoring and inspections.

In the first instance, an investigation will be undertaken by the Environmental Manager to identify the cause of any non-conformances. Appropriate remedial measures will be identified and implemented as soon as practicable to prevent further exceedances. If necessary, the appropriate statutory authority and stakeholders will be notified.

Where new or amended measures are proposed, the relevant CEMP will be updated accordingly by the Environmental Manager and the Employer's Representative will be informed at the earliest opportunity.

8.3.2 Emergency Incidents

8.3.2.1 Overview

Emergency incidents are those occurrences that give rise to significant negative environmental effects including but not limited to the following:

- Any malfunction of any response measure and/or environmental protection system
- Any emission that does not comply with the requirements of the contract and relevant licences
- Any circumstance with the potential for environmental pollution; and
- Any emergency that may give rise to environmental effects e.g., release or spill of hazardous substance such as fuel, oil, concrete or fire outbreak.

The focus of including all the stringent measures in this CEMP is on prevention of an incident arising in the first place. However, an Emergency Response Plan (ERP) will be prepared to ensure that in the unlikely event of an emergency, response efforts are prompt, efficient, and suitable for particular circumstances. This plan will be a live document and will be updated by the Contractor following appointment and prior to commencing works on site.

8.3.2.2 Emergency Response Plan

A set of standardised emergency response procedures will govern the management of emergency incidents.

The Contractor will be required to detail emergency incident response procedures and to develop an Emergency Response Plan (ERP). The ERP to be prepared by the Contractor will be based on the following elements:

- Identification of all possible emergency scenarios
- Effective planning, e.g., availability of booms, spills kits at appropriate locations
- Identification of receptors/pathways (e.g., waterbodies)
- Identification and dissemination of contact numbers
- Definition of site-based staff responsibilities
- Appropriate site-based staff training
- Availability of suitable spill kits (and appropriately trained staff) at appropriate locations on the site

- Implement lessons learnt from previous incidents; and
- Ensure that all appropriate site staff are aware of the site emergency procedure(s) (e.g., spillage, leakage, fire, explosion, and flooding), that drain covers and spill kits are available, and they know how to use them.

8.3.2.3 Spill Control Measures

Every effort will be made to prevent pollution incidents associated with spills during the construction and decommissioning of the proposed scheme. The risk of oil/fuel spillages will exist on the site and any such incidents will require an emergency response procedure.

The following steps provide the procedure to be followed in the event of an oil/fuel spill occurring on site:

- Identify and stop the source of the spill and alert people working in the vicinity
- Notify the Environmental Manager immediately giving information on the location, type, and extent of the spill so that they can take appropriate action
- If applicable, eliminate any sources of ignition in the immediate vicinity of the incident
- Contain the spill using the spill control materials, track mats or other material as required. Do not spread or flush away the spill
- If possible, cover or bund off any vulnerable areas where appropriate such as drains, watercourses and/or sensitive habitats
- If possible, clean up as much as possible using the spill control materials
- Contain any used spill control material and dispose of used materials appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited
- The Environmental Manager will inspect the site as soon as practicable and ensure the necessary measures are in place to contain and clean up the spill and prevent further spillage from occurring; and
- The Environmental Manager will notify the Employer's Representative who will notify the Employer and appropriate stakeholders such as National Parks and Wildlife Service (NPWS), and/or the Environmental Protection Agency (EPA), if required.

Further spill prevention and control measures are set out in Section 8.3.2.3 below.

8.3.2.4 Fire Control

Every effort will be made to prevent the outbreak of a fire during the construction phase of the proposed scheme. Fire extinguishers and first aid supplies will be available in the works areas. In the event of such an incident, the health and safety of all personnel will be a priority. All relevant legislation and guidance on health and safety of people and in particular fire safety will be complied with.

8.3.3 Extreme Weather Events

The Contractor will consider the effects of extreme weather events and related conditions during construction. The Contractor will use a short to medium range weather forecasting service from Met Eireann or other approved meteorological data and weather forecast provider to inform short to medium term programme management, environmental control measures.

All measures deemed necessary and appropriate to manage extreme weather events will be considered and will specifically cover training of personnel and prevention and monitoring arrangements for staff. As appropriate, method statements will also consider extreme weather events where risks have been identified.

8.3.4 Unexpected Discoveries

Appropriate procedures will be put in place in the event of encountering unexpected archaeological or cultural heritage assets or subsurface contamination during intrusive ground works.

Appropriate procedures will be developed as part of the CEMP and the Environmental Manager will ensure that specialists are facilitated to ensure management in accordance with industry best practice and effective compliance with the relevant legislation. All unexpected discoveries will be reported to the appropriate authorities and documented in an appropriate manner and reported to the Employer's Representative who will inform the appropriate authorities.

8.4 Construction and Decommissioning Phase Mitigation and Monitoring Measures

Set out below are the key environmental mitigation and monitoring measures to be implemented during the construction and decommissioning phases.

8.4.1 Biodiversity

The following measures will apply to the construction and decommissioning phase.

These mitigation measures have been taken from the following reports:

- Arup (2024) Lough Funshinagh Interim Flood Relief Scheme – Screening for Appropriate Assessment & Natura Impact Statement
- Arup (2024) Lough Funshinagh Interim Flood Relief Scheme – Ecological Impact Assessment Report.

8.4.1.1 Ecological Clerk of Works

An Ecological Clerk of Works (ECoW) will be appointed for the duration construction and decommissioning of the project. In general, the ECoW duties will include daily supervision of on-site works during construction and decommissioning to review and confirm that mitigation measures are being implemented correctly and adhered to, and to identify any unforeseen effects which could not have been reasonably predicted in the drafting of this report. Further details on duties relating to specific risks are identified through this mitigation section of the AA and Natura Impact Statement.

The ECoW will be a qualified ecologist and member of a relevant professional body such as the Chartered Institute of Ecology and Environmental Management and will be employed by, and report directly to, Roscommon County Council. The ECoW shall have a broad range of onsite ecological and environmental supervision including freshwater ecology and fisheries specialism and experience of overseeing construction activities in or near water.

The ECoW will provide an introductory toolbox talk for any people working on site to highlight all sensitive receptors including the lough itself and any potential mobile species such as birds and otter which may be present.

The ECoW will carry out a pre-construction walkover of the site to confirm that there have been no further evidence of protected species or significant change in conditions on site.

8.4.1.2 Silt Measures

Silt fencing will be installed to eliminate any silt load entering the lough and any other waterbody. The silt fencing specification will be reviewed by a qualified surface water specialist on behalf of RCC. The installation of silt fencing will be supervised by the ECoW and will be inspected at least three times per day during the construction and decommissioning works to ensure it is performing as required and for example has not become clogged with any sediment. If any failures in sediment fencing are identified these shall be rectified immediately on identification.

No direct untreated point discharge of construction runoff to watercourses or groundwater bodies will be permitted.

The regular monitoring of downstream receptor water quality for sediments and hydrocarbons and the inspection of the pollution control facilities will be carried out during construction works.

Where a pollution incident is detected, construction works will be stopped until the source of the construction pollution has been identified and remedied.

All pollution control measures will be monitored daily to ensure their continued integrity and desired function.

Continuous monitoring of sediment concentrations in the receiving water, during construction activities near watercourses, will be carried out to ensure compliance and respond immediately to pollution events.

These measures are based on the following best practice guidelines to ensure that water bodies are adequately protected during construction work:

- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (Inland Fisheries Ireland, 2016)
- Central Fisheries Board Channels and Challenges – The Enhancement of Salmonid Rivers
- CIRIA – Guideline Document C648 Control of Water Pollution from Linear Construction Projects, technical guidance
- CIRIA – Guideline Document C793 The SuDS Manual
- CIRIA – Guideline Document C624 Development and flood risk – guidance for the construction industry
- CIRIA (C649) Control of water pollution from linear construction projects, site guide (2006)
- CIRIA (C532) Control of water pollution from construction sites, guidance for consultants and contractors (2001)
- Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (NRA, 2005).

8.4.1.3 Fuelling Activities

Fuelling of machines during construction or decommissioning will be carried out in accordance with OPW Protocols. During the construction and decommissioning phases, the refuelling of vehicles, equipment and machines will take place at a designated area that is no less than 50 m away from all watercourses. A spill kit will be present at this designated area.

Fuel trucks will be certified in accordance with regulations.

8.4.1.4 Chemical Storage

Reference should also be made to mitigation measures for chemical storage described in Section 8.4.2 (Water) and 8.4.3 (Land, Soils, Geology and Hydrogeology).

During construction, the storage tanks for oils, fuels or chemicals will be sited on an impermeable base, surrounded by an impermeable bund, and inspected regularly for leaks. Any valve, filter, sight gauge, vent pipe or other ancillary equipment must be kept within the bund when not in use. The drainage system of bunded areas shall be sealed with no outlet to any watercourse, pond or underground strata.

Bunded areas will be located on stable and on level ground and located away from all waterbodies.

All bulk fuels storage for the construction stage must be contained within a double skinned bowser/container or have a bund. Double skinned tanks or bowsers must also be bunded unless the outer skin would provide secondary containment. The bund must have sufficient volume to contain 110% of the contents of the largest fuel/pipe container or 25% of the total storage capacity of all the containers, whichever is the greater.

- All fuel containers, including those containing waste fuels, must be stored on a drip tray/bunded area away from vehicle traffic within a designated storage area, where possible, to avoid damage

- Plant will be regularly inspected, serviced and maintained to minimise the risk of leaks/spills. At the end of each working day, driveable plant will be moved away from watercourses.

8.4.1.5 Spill Control Measures

An effective spillage procedure should be put in place. Any waste oils or hydraulic fluids should be collected, stored in appropriate containers and disposed of offsite in an appropriate manner. Site operatives should provide spill kits and they should be stored on-site during construction and used in the event of a fuel or chemical spillage. Such kits should contain absorbent materials (such as absorbent granules, booms or mats). Appropriate operatives responsible for handling chemicals or oils or for plant refuelling should be trained in the use of this kit.

Spill kits are to be available near all points of work and personnel trained in their use. Physical barriers will be installed wherever necessary to stop any material overspill.

No fuels, oils or other chemicals will be stored in high-risk locations such as:

- Within 50 metres of a spring, well or borehole
- Within 10 metres of a watercourse
- Places where spills could enter open drains or soak into groundwater or
- On a floodplain.

8.4.1.6 Vehicle and Plant Movements

Public and access roads will be regularly inspected and maintained to minimise sediment laden run-off.

All vehicles, plant and equipment will be regularly inspected and maintained in accordance with manufacturers' recommendations. Records of inspections will be maintained on site.

Areas of hard standing will be provided at site access and egress points, where practicable. The areas will be regularly inspected and cleaned.

8.4.1.7 Biosecurity

Biosecurity measures shall be implemented for the construction stage of the scheme. Measures will be required to specify no transfer of organic materials from outside the construction site without appropriate safeguards to avoid the introduction and/or spread of invasive non-native species to the site.

All loose stone material used for the compound and access road will be washed prior to import to site.

All machinery should be dry and free of mud or debris from all previous sites. If necessary, machinery and equipment will be washed down to remove any soil and organic material and then disinfected before entering site. No machinery and equipment will be allowed within 10m of the lough edge and any other waterbodies including the Cross River unless necessary for the construction and decommissioning of the infrastructure.

A visual inspection of plant machinery, equipment and material will be conducted by the ECoW when entering site to confirm absence of organic material. The most recent project working locations where all machinery and plant has been deployed shall be recorded and reviewed by RCC and the ECoW prior to entering the site. The contractor will confirm that machinery is not being brought onto site immediately from works on other waterbodies. If this is the case, then a record should be provided detailing disinfection methods as approved by IFI.

All boats, their trailers and any lines/ropes, equipment etc., that have the potential to be used within Lough Funshinagh for the purpose of the proposed scheme must adhere to the IFI biosecurity guidance[5] and the IFI Biosecurity Protocol for Field Survey Work[6] and the 'Check, Clean, Dry' protocol.

[5] IFI Biosecurity Theme. Accessed at https://www.fisheriesireland.ie/what-we-do/research/research-theme-biosecurity August 2024.
[6] IFI (2010) IFI Biosecurity Protocol for Field Survey Work. December 2010. Accessed at https://www.fisheriesireland.ie/sites/default/files/2021-06/research_biosecurity_biosecurity_for_fieldsurveys_2010.pdf

All boats, trailers and equipment must be thoroughly inspected prior to commissioning of works for attached plants, animals or mud. Any foreign material should be removed and disposed of responsibly. To ensure complete disinfection, boats, trailers, and equipment should be allowed to dry thoroughly for at least 48 hours before being used in another waterbody. Boat operators must be mindful of anchor lines, ensuring they do not drag along the bottom of the waterbody, which can disturb aquatic habitats.

All boats/equipment must clean and disinfect any live wells, baitwells or any other likely sources of contaminated water prior to entering Lough Funshinagh and this should be carried out at a controlled facility where waste can be safely disposed of. The bilge must be flushed with disinfectant before leaving the cleaning facility. Following works, all boats and equipment must be visually inspected for all surfaces and any attached plant and animal material, mud or associated debris must be removed in a controlled manner.

8.4.1.8 Disturbance to Otter

The potential for visual and noise disturbance to otter exists therefore mitigation measures are proposed.

The ECoW will be present on site every day during the construction and decommissioning stages. Prior to construction commencing each day the ECoW will carry out a walkover check of the lough edge in proximity to the works to identify if any otters are present. The ECoW will inform site personnel when works can commence without causing disturbance to otter.

The ECoW will carry out weekly checks of the pumping area and lough edge in proximity to identify any evidence of otter. During operations, these checks will be conducted by the Project Ecologist in addition to the weekly checks of remotely operated cameras for the presence of otter. If any evidence of otter is identified this will be reviewed and any necessary further measures to mitigate effects identified and implemented.

Working hours are set out in Section 5.1.

There is no lighting proposed during construction and operation however if required this will be directional and pointed away from waterbodies including Lough Funshinagh and its shoreline and the Cross River and its riparian corridor. Any lighting on site will be reviewed by the ECoW and if necessary, changes to lighting arrangements will be discussed and agreed to safeguard movement of otters.

8.4.1.9 Mitigation for Brook Lamprey

To protect brook lamprey during construction activities, it is advised to schedule in-stream work outside their critical life stages, particularly spawning and larval periods. Therefore, in-stream work should be avoided during the spawning period (March to May) to prevent disturbance of spawning adults and the disturbance of spawning beds where eggs are deposited. In addition, in-stream work should be avoided during larval development stages (June to August) as ammocoetes are vulnerable to sedimentation and habitat disruption. If it is not possible to adhere to these avoidance periods, it will be necessary to liaise with NPWS and IFI and other relevant stakeholders to agree timing of works and relevant mitigation if required.

The installation of the geotextile material and natural flag stones on the bed of the Cross River, should be carried out under the supervision of the ECoW. The ECoW will involve overseeing the installation process and fish translocation to move fish from impacted areas to avoid risk of fish mortality. Fish translocation would take place prior to the installation of this material to move fish from the impacted areas to suitable habitat upstream of the outfall location. Netting and/or electric fishing techniques would be used, under DECC licence.

Any areas of exposed sediment deemed at risk of erosion during heavy rainfall shall be protected using measures such as coir matting until vegetation is able to establish on these surfaces. The ECoW will identify locations likely to be at risk of erosion.

8.4.2 Water

The employment of good construction management practices will minimise the risk of impacts to surface water due to the construction and decommissioning of the proposed scheme.

The following measures will apply to the construction and decommissioning phase.

The Construction Industry Research and Information Association (CIRIA) in the UK has issued a guidance note on the control and management of water pollution from construction sites, 'Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors'[7] .

The guide is written for project promoters, design engineers and site and construction managers. It addresses the main causes of pollution of soil, groundwater and surface waters from construction sites and describes the protection measures required to prevent impacts to groundwater and surface waters and the emergency response procedures to be put in place so that any impacts, which occur, can be remedied. The guide addresses developments on green field and potentially impacted brownfield sites. The construction management of the site will take account of the recommendations of the CIRIA guidance to minimise as far as possible the risk of impacts to soil, groundwater, and surface water.

Site activities considered in the guidance note include concreting operations.

8.4.2.1 Chemical Storage

Reference should also be made to mitigation measures for chemical storage described in Section 8.4.1 (Biodiversity) and 8.4.3 (Land, Soils, Geology and Hydrogeology).

- A detailed spillage procedure will be put in place and all personnel will be trained with respect to the relevant procedures to be undertaken in the event of the release of any sediment, hydrocarbons into a watercourse
- Spill kits will be maintained on site and relevant staff will be trained in their effective usage. All site personnel will be trained and aware of the appropriate action in the event of an emergency. In the event of spillage of any polluting substance and/or pollution of a watercourse, the EPA, Inland Fisheries Ireland and the NPWS will be notified
- Hydrocarbons used will be appropriately handled, stored, and disposed of in accordance with recognised standards as laid out by the EPA
- Containers will be properly secured to prevent unauthorised access and misuse. Any waste oils or hydraulic fluids will be collected, stored in appropriate containers, and disposed of offsite in an appropriate manner
- Refuelling of vehicles and mobile plant will take place at designated locations on an impermeable surface and from any drains or watercourses. A spill kit, including an oil containment boom and absorbent pads, will be on site at all times
- Generators, diesel pumps and similar equipment will be placed in drip trays to collect minor spillages. These will be checked regularly, and accumulated oil removed
- No vehicles will be left unattended when refuelling
- Hoses and valves will be checked regularly for signs of wear and turned off when not in use
- All vehicles will be regularly maintained, washed, and checked for fuel and oil leaks.

8.4.2.2 Concrete Control Measures

Concrete, grout, and other cement-based products which would typically be used in the construction of structures are highly alkaline and corrosive and can have a devastating effect upon water quality. Cement-based products generate very fine, highly alkaline silt (11.5 pH) that can physically damage fish by burning their skin and blocking their gills.

The following measures will be implemented to prevent concrete entering watercourses:

- Hydrophilic grout and quick-setting mixes or rapid hardener additives to be used to promote the early set of concrete surfaces exposed to water

[7] CIRIA (2001) Control of water pollution from construction sites. Guidance for consultants and contractors (C532)

- Concreting works will be carried out in dry conditions where possible and concrete works will be strictly controlled and monitored
- No concrete washout will be allowed to discharge to watercourses. Wash out of concrete trucks will not be permitted on site
- Batch loads of concrete will be delivered on an as needed basis, to pre-prepared hardstand areas within the site
- All concrete mixing and batching activities will be located in areas away from watercourses and drains
- Small batch concrete loads will be delivered to specific construction locations by mini dumper or other enclosed contained system of transfer
- Trucks that deliver concrete to site will be washed out at the supplier's facilities and not on site
- A designated trained operator experienced in working with concrete will be employed during concrete pours
- Best practice in bulk-liquid concrete management addressing pouring and handling, secure shuttering / formwork, adequate curing times will be implemented; and
- Wash water from cleaning ready mix concrete lorries and mixers may be contaminated with cement and is therefore highly alkaline, therefore, washing will not be permitted on site.

8.4.2.3 Flood Risk Mitigation

During the construction and decommissioning phase, the following control measures will be adhered to:

- The construction compound will be located in area that is above the expected water level of the lough
- No construction materials or temporary stockpiles will be stored in areas which would impede flood flow paths; and
- In relation to effects of extreme weather events and related conditions the contractor will use a short to medium range weather forecasting service from Met Éireann or other approved meteorological data and weather forecast provider to inform short to medium term programme management, environmental control and mitigation measures.

8.4.2.4 Foul Waste

The foul drainage from the welfare facilities at the construction site will be associated with toilets. Wastewater will be disposed of by removal from site by a licensed waste contractor to an appropriately licensed treatment facility.

8.4.3 Lands, Soils, Geology, Hydrogeology

The proposed works will be constructed in accordance with the relevant design standards by means of good practice measures under appropriate engineering supervision. The following measures will apply to the construction and decommissioning phase.

8.4.3.1 Pollution of soil and groundwater

Measures to be implemented to minimise the risk of spills and contamination of soils and groundwater will include:

- Employing only competent and experienced workforce, and site-specific training of site managers, foreman and workforce, including all subcontractors, in pollution risk and preventative measures
- Ensure that all areas where liquids (including fuel) are stored, or cleaning is carried out, are in designated impermeable areas that are isolated from the surrounding area and within a secondary containment system, e.g. by roll-over bund, raised ramps or stepped access

- The location of any fuel storage facilities will be considered in the design of all construction compounds and will be fully bunded. These are to be designed in accordance with relevant current guidelines and codes of best practice at the time of construction
- Good housekeeping will be maintained at the site (daily site clean-ups, use of disposal bins, etc) during the entire construction and decommissioning phase
- All concrete mixing and batching activities will be located in designated areas away from watercourses and drains
- Potential pollutants will be adequately secured against vandalism in containers in a dedicated secured area
- Provision of proper containment of potential pollutants according to relevant and current codes of practice and legal requirements
- Thorough control during the entire construction and decommissioning stages to ensure that any spillage is identified at early stage and subsequently effectively contained and managed
- Spill kits to be provided and kept close to the temporary construction compounds. Staff to be trained on how to use spill kits correctly.

8.4.3.2 Protection of lands and soil

The contractor will reinstate all working areas and access routes as work proceeds during construction and decommissioning. All plant, equipment, materials, temporary infrastructure and vehicles will be removed at the earliest opportunity and the surface of the ground restored as near as practicable to its original condition.

Where trees and hedgerows are to be removed, tree protection fencing in accordance with BS5837:2012[8] will be installed to protect adjacent trees from construction traffic or activity to ensure their integrity and vitality.

Excavated topsoil and subsoil during trenching at road crossings will be stockpiled appropriately for later backfilling.

8.4.4 Noise

The contractor will be required to manage the noise and vibration aspects of the project in accordance with BS 5228 Part 1 (2009) and the European Communities (Noise Emission by Equipment for Use Outdoors) Regulations, 2001 '*Code of Practice for Noise and Vibration Control on Construction and Open Sites*'[9]. This document provides for practical measures that limit the hours in which noisy activities are permitted, provision of acoustic screening for noisy activities, use of silencers on equipment, siting of noisy mobile equipment away from sensitive receptors, and the provision of relevant training with respect to minimising noise disturbance.

BS 5228 includes guidance on several aspects of construction site practices, including, but not limited to:

- Selection of quiet plant
- Control of noise sources
- Screening.

Detailed information on these items is provided in the following paragraphs. Noise control measures that will be considered include the selection of quiet plant, enclosures, and screens around noise sources, limiting the hours of work and noise monitoring.

[8] British Standards Institution (BSI). (2012). BS5837:2012 Trees in Relation to Design, Demolition and Construction – Recommendations. BSI Standards Limited, London, UK.

[9] British Standards Institution (BSI). (2009). BS 5228-1:2009+A1:014 Code of Practice for noise and vibration control on construction and open sites. Part 1: Noise. BSI Standards Limited, London, UK.

8.4.4.1 Selection of quiet plant

This practice is recommended in relation to sites with static plant such as compressors and generators. It is recommended that these units be supplied with manufacturers' proprietary acoustic enclosures where possible. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site.

The least noisy item should be selected wherever possible. Should a particular item of plant already on the site be found to generate high noise levels, the first action should be to identify whether or not said item can be replaced with a quieter alternative.

8.4.4.2 General comments on noise control at source

If replacing a noisy item of plant is not a viable or practical option, consideration should be given to noise control 'at source'. This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.

BS 5228 states that "*as far as reasonably practicable sources of significant noise should be enclosed*". In applying this guidance, constraints such as mobility, ventilation, access, and safety must be taken into account. Items suitable for enclosure include pumps and generators. Demountable enclosures will also be used to screen operatives using hand tools and will be moved around site as necessary.

8.4.4.3 Screening

Typically, screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. The effectiveness of a noise screen will depend on the height and length of the screen and its position relative to both the source and receiver.

The length of the screen should be at least five times the height, however, if shorter sections are necessary then the ends of the screen should be wrapped around the source. The height of any screen should be such that there is no direct line of sight between the source and the receiver.

BS 5228 states that on level sites the screen should be placed as close as possible to either the source or the receiver. The construction of the barrier should be such that there are no gaps or openings at joints in the screen material. In most practical situations the effectiveness of the screen is limited by the sound transmission over the top of the barrier rather than the transmission through the barrier itself. In practice screens constructed of materials with a mass per unit of surface area greater than 7 kg/m^2 will give adequate sound insulation performance.

In addition, careful planning of the site layout should also be considered. The placement of site buildings such as offices and stores and in some instances materials such as topsoil or aggregate can provide a degree of noise screening if placed between a noise source and receptor.

8.4.5 Air Quality

Dust emissions may occur during construction and decommissioning, although the prevailing weather, the nature of the works and the distance from sensitive receptors will determine the extent of the effects. The focus of the control procedures will therefore be to reduce the generation of airborne material.

Standard measures will be implemented, as per guidance presented in the TII document *Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes* (TII, 2011). These will include the following:

- During dry periods when dust generation is likely or during windy periods, working areas and vehicles delivering material with dust forming potential will also be sprayed with water, as appropriate
- Control of vehicle speeds, speed restrictions and vehicle access; and
- Surrounding public roads used by trucks to access to and egress from the works areas will be cleaned regularly using an approved mechanical road sweeper as required.

In addition, the following measures will be implemented. These measures are based on best practice as outlined in the British Research Establishment (BRE) document *Controlling particles, vapour and noise pollution from construction sites* (BRE, 2003) and the Institute of Air Quality Management (IAQM) document *Guidance on the assessment of dust from demolition and construction* (IAQM, 2024).

- Exhaust emissions from vehicles operating within the working areas, including trucks, excavators, diesel generators or other plant equipment, will be controlled through regular servicing of machinery
- Areas where materials will be handled and temporarily stockpiled will be designed to minimise their exposure to wind – all stockpiles will be kept to the minimum practicable height with gentle slopes
- There will be no long-term stockpiling within the working areas and storage time will be minimised
- Material drop heights from plant to plant or from plant to stockpile will be minimised
- Truck loads will be covered when carrying material likely to generate dust
- Employee awareness is also an important way that dust may be controlled on any site. Staff training and the management of operations will ensure that all dust suppression methods are implemented and continuously inspected.

8.4.6 Climate

The following measures will apply to the construction and decommissioning phase:

- Minimise wastage of materials due to poor timing or over ordering on site thus helping to minimise the embodied carbon footprint of the proposed works
- Where practicable, opportunities for materials reuse should be identified and incorporated within the extent of the proposed works including maximising the use of site-won material; and
- Where practicable, materials should be sourced locally to reduce the embodied emissions associated with transport.

8.4.7 Archaeological Heritage

The following measures will apply to the construction and decommissioning phase:

8.4.7.1 Construction

Table 2 Archaeological heritage mitigation and monitoring measures for the construction phase

No.	Works	Potential impact	Mitigation
1	Installation of pump intake system within the underwater section of the field	Unknown archaeology within the submerged field disturbed	Pump intake system will be installed to be supported by the pontoon and sit on thin metal legs with plates at the bottom to avoid settlement. Settlement into field submerged in water not expected to exceed 150mm.
2	Establishment of intake compound next to lough	Unknown archaeology within field impacted by compound	A combination of geogrid and geotextile will be placed over the vegetation on the existing surface within the footprint of the proposed intake compound. The intake compound will be located next to access from landowners' yard; therefore, access track is not necessary and as such, the field will not be impacted by any machinery or vehicles.
3	Excavation under and to either side of roads	Impact to unknown archaeology potentially under and to either side of roads	Impact unlikely due to depth similar to depths excavated for the laying of services previously. Regardless, the methodology for these excavations should be reviewed by an archaeologist. The excavations either side of the road should be subject to archaeological monitoring. Road crossings will necessitate pipes being run through hedgerows and stone walls. This will be done in such a way to minimise impact and hedgerows will be replaced by native species and stone wall repairs will be carried out by suitably experienced stonemasons.

No.	Works	Potential impact	Mitigation
4	Laying of pipe	Impact to unknown archaeology potentially within fields	Pipes will be laid overground (transported by tractor/excavator and trailer and laid by hand) across the field systems. They will not be pinned in place. In the field where the pipes transition to a single PE ribbed pipe, the ground beneath the PE ribbed pipe will be smoothed to remove bumps and depressions within the soil surface from livestock hoofs. The maximum depth change will be 150mm which is less that the depth of influence in conventional agricultural tilling.
5	Protection of Cross River from scour and erosion including laying geotextile and natural flag stones onto the riverbed	Compaction of riverbed, affecting potential archaeology within riverbed	It is not considered that impacts are likely due to the shallow depth of this intervention and the relatively modern nature of the riverbed due to modifications over time. However, archaeological monitoring is required to monitor the laying of the geotextile and natural flag stones.

8.4.7.2 Decommissioning

- The site compound (concrete bund on compacted stone on geogrid and geotextile layers) along with the pump and pontoon will be carefully removed, the compound area rotavated to a maximum depth of 150mm and the field returned to its original use
- The flexible pipes and fences will be removed and rolled by hand
- The removed sections of hedgerows will be replaced by native species and the removed sections of stone walls will be replaced and repaired by experienced stone masons
- The geotextile layers, natural flag stones and rock armour will be carefully removed from the riverbanks
- The PE ribbed pipe will be removed by cutting it into transportable lengths (typically 5-12m lengths) using a consaw and lifted onto a flatbed trailer using an excavator. The ground beneath the PE ribbed pipe will be rotovated to a maximum depth of 150mm if the pipe has made an indentation in the soil
- No impacts are foreseen from the decommissioning phase.

8.4.8 Traffic & Transportation

The traffic management is detailed in Section 6.

8.4.9 Resources and Waste

A suite of mitigation measures are outlined below which RCC will implement with agreement with the contractor, in any event, to ensure that waste arisings will be managed in accordance with the waste hierarchy, in compliance with the provisions of the Waste Management Acts, 1996[10], as amended, and to contribute to achieving the objectives set out in the Waste Action Plan for a Circular Economy[11] .

The following mitigation measures will be implemented during construction and decommissioning phase, where practicable, by the appointed contractor, to minimise waste and maximise material reuse:

- Where waste generation cannot be avoided, waste disposal will be minimised
- Opportunities for reuse of materials, by-products and wastes will be sought throughout the construction and decommissioning phase of the proposed works
- The site will be maintained to prevent litter and regular litter picking will take place throughout the site
- 'Just-in-time' delivery will be used, where practicable, to minimise material wastage

[10] Government of Ireland (1996) Waste Management Act, 1996. Number 10 of 1996. Irish Statute Book

[11] Department of Communications, Climate Action and Environment (2020) A Waste Action Plan for a Circular Economy, Ireland's National Waste Policy 2020-2025.

- All staff on-site will be trained on how to minimise waste (i.e., training, induction, inspections and meetings)
- Materials on-site will be correctly and securely stored
- Where possible, metal, timber, glass and other recyclable material will be segregated and removed off site to a permitted / licensed facility for recycling
- Waste bins, containers, skip containers and storage areas will be clearly labelled with waste types which they should contain, including photographs as appropriate
- Segregated skips will be used within a designated waste segregation area to be located in the on-site construction compound (particularly for hazardous, gypsum, metal, timber, inert waste and general waste)
- The appointed contractor will record the quantity in tonnes and types of waste and materials leaving the site during the construction phase
- The name, address and authorisation details of all facilities and locations to which waste and materials are delivered will be recorded along with the quantity of waste in tonnes delivered to each facility. Records will show the type of material, which is recovered, which is recycled, and which is disposed of
- Waste generated on-site will be removed as soon as practicable following generation for delivery to an authorised waste facility
- The appointed contractor will ensure that any off-site interim storage facilities for excavation material have the appropriate waste licences or waste facility permits in place; and
- The relevant appropriate waste authorisation will be in place for all facilities that wastes are delivered to (i.e., EPA Licence, Waste Facility Permit or Certificate of Registration).

8.4.10 Material Assets - Existing Services

The contractor will be obliged to put measures in place to ensure that there are no interruptions to existing services and that all services and utilities are maintained unless this has been agreed in advance with the relevant service provider and local authority. Where connections are required, the contractor will apply to the relevant utility company for a connection permit and adhere to their requirements.

Prior to undertaking any works, a cable avoidance tool (CAT) scan will be undertaken to identify any services in the road.

8.4.11 Landscape and Visual

As the construction of the proposed scheme is short in duration, with no potential for significant landscape and visual effects, no mitigation or monitoring measures are proposed.

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