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CORK COUNTY BRIDGE REHABILITATION SERVICES

ARDCAHAN BRIDGE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

Prepared for:

Cork County Council

Comhairle Contae Chorcaí
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ARDCAHAN BRIDGE REHABILITATION
CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

REVISION CONTROL TABLE, CLIENT, KEYWORDS AND ABSTRACT

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Client: Cork County Council

Keywords: Bridge Rehabilitation Construction Environmental Management Plan

Abstract: This report outlines the proposed works methodology for the rehabilitation of Ardcahan bridge along with the environmental management measures required for the works.

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1. INTRODUCTION

1.1 General Introduction and Purpose

This document is the Construction and Environmental Management Plan (CEMP) for the proposed Rehabilitation works to Ardcahan Bridge, Co. Cork and has been prepared by Fehily Timoney and Company (FT) on behalf of Cork County Council.

The CEMP will be updated prior to construction to take account of any relevant conditions attached to the planning permission and will be implemented for the duration of the construction phase of the project. The CEMP will be a live document and will be subject to ongoing review through regular environmental auditing and site inspections and updated as required. For the avoidance of doubt, all measures stipulated in this CEMP will be implemented in full.

The CEMP sets out the key construction and environmental management issues associated with the proposed project and will be developed further at the post-planning and construction stages by the client and on the appointment of the main contractor to the project.

This CEMP sets out the key environmental management issues associated with the construction, operation and decommissioning of the proposed project, to ensure that during these phases of the development, the environment is protected and impacts on the environment are minimised.

The document is divided into six sections:

Section 1: *Introduction* provides an overview of the existing site and the proposed project.

Section 2: *Existing Site Environmental Conditions* provides details of the main existing geotechnical, hydrological, ecological and archaeological conditions onsite. These conditions are to be considered by the contractor in the construction, operation and decommissioning of this proposed project.

Section 3: *Overview of Construction Works*, this section provides an overview of the construction works proposed, including drainage and sediment controls to be installed.

Section 4: *Environmental Management Plan (EMP)*, this section outlines the main requirements of the EMP and outlines operational controls for the protection of the environment including soil management, habitat and species, site drainage control, archaeology, construction traffic, site reinstatement and decommissioning, waste management.

Section 5: *Safety & Health Management Plan,* this section defines the work practices, procedures and management responsibilities relating to the management of safety and health during the design, construction and operation of the Ardcahan Rehabilitation Works.

Section 6: *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 Ardcahan Rehabilitation Works.

1.2 The Applicant

The applicant for the proposed project is Cork County Council.

1.3 The Site

The proposed site is on the R587 located 4km north of Dunmanway, County Cork, refer to Table 1.1 below showing bridge location coordinates.

Ardcahan bridge carries the R587 over the river Bandon and connects Dunmanway to Toonbridge. The R587 has a history of flooding in this area and frequently becomes impassable to road traffic. Due to the road speed, traffic volumes and visibility issues in the hours of darkness the flooding presents and significant risk to the safety of road users.

Table 1-1: Bridge Location Coordinates

Reference System	Coordinates	
Latitude, Longitude	51.7940	-9.0457
ITM	527867.5	560710.4
Irish Grid	127901.9	60645.6

1.4 The Project

Based on recent inspections at the bridge a programme of rehabilitation works is required. The rehabilitation works are required to address one issue:

Corrosion: The steel beams supporting the deck were observed to have significant corrosion issues. The strength of the bridge is at risk and urgent intervention is required to arrest and repair the corroded areas to restore the structure to full strength.

In addition to the key issue above additional resurfacing, deck waterproofing are also required at the structure. A detailed description of the proposed construction works is provided in section 3.

2. EXISITING SITE ENVIROMENTAL CONDITIONS

2.1 Existing Site Description

The landscape of the study area is rural in nature; the bridge is at an elevation of 73 m OD. The land use classification for the surrounding area as defined by the 2018 CORINE landcover dataset are: 231 Pastures, 243 Land principally occupied by agriculture with significant areas of natural vegetation and 113 C.

The bedrock of the project area is Green-grey sandstone & purple siltstone. The soil types at and in the vicinity of the bridge are Alluvium and Sandstone till (Devonian).

The bridge spans the River Bandon (EPA Code 20B02), flowing north-south. The proposed development is located in the Bandon_SC_010 sub-catchment, which is part of the Bandon-Ilen catchment.

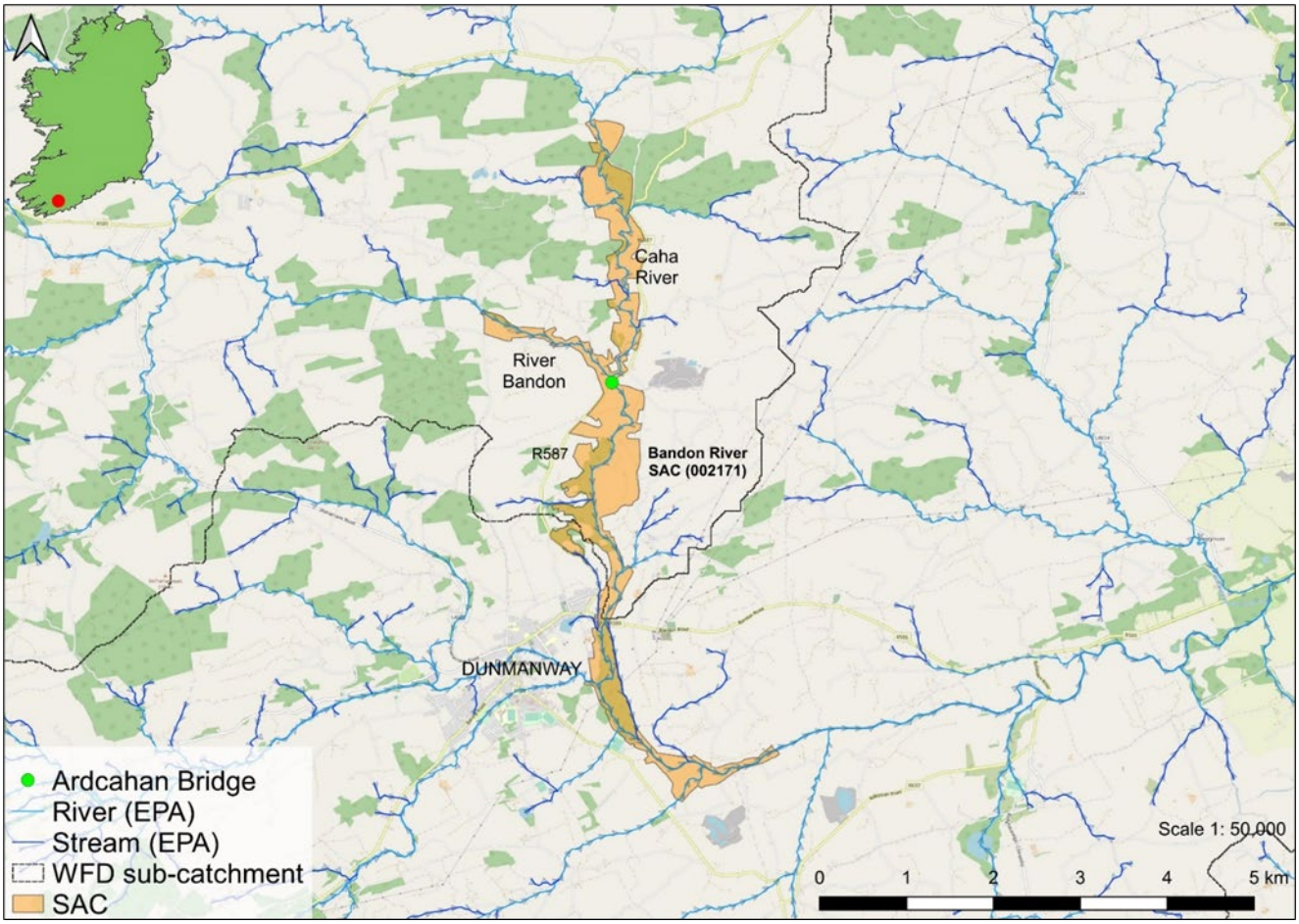

Figure 2-1: Location of Ardcahan bridge in context of the River Bandon SAC (Site Code 002171)

2.2 Habitats Within and Immediately Adjacent to the Proposed Development

There are ten habitat types at and around the bridge:

- Depositing/lowland rivers (FW2)
- Buildings and artificial surfaces (BL3)
- Dense Bracken (HD1)
- Wet grassland/Dry calcareous and neutral grassland Mosaic (GS4/GS1)
- Improved agricultural grassland (GA1)
- Hedgerows (WL1)
- Treelines (WL2)
- Dry meadows and grassy verges (GS2)
- Scrub (WS1)
- Riparian woodland (WN5)

Buildings and artificial surfaces (BL3) is represented by the bridge structure itself, while depositing/lowland rivers (FW2) is represented by the Bandon River. Dry meadows and grassy verges (GS2) is present along road verges leading up to the bridge.

Narrow strips of riparian woodland (WN5) dominated by grey willow (*Salix cinerea*) are present up and down-stream of the bridge along the riverbanks. This habitat has potential for links with the Annex I habitat 'Alluvial forests with Alnus glutinosa and Fraxinus excelsior' [91E0].

A mosaic of wet grassland / dry calcareous and neutral grassland (GS4/GS2) habitat is present in the field south-west of the bridge where the proposed site compound is located. Species indicative of wet conditions include Yorkshire fog (*Holcus lanatus*), ragged robin *(Silene flos-cuculi)* and rushes (*Juncus Spp.*), while the presence of selfheal (*Prunella vulgaris*), cat's ear (*Hypochaeris radicata*) and crested dog's tail (*Cynosurus cristatus*) are indicative of calcareous/neutral conditions. This is likely to be due to the presence of alluvial soils closer to the river which would differ in their makeup from the more acidic soils which would be characteristic of the surrounding upland areas. This habitat does not have links with any Annex 1 habitat type.

The other habitats are present in riparian areas up and down-stream, and in the surrounding landscape.

Exuberant instream water crowfoot (*Ranunculus penicillatus*) was present. This floating river vegetation shares strong links with EU Habitats Directive Annex I habitat type 'Watercourses of plain to montaine levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation (3260)'.

2.3 Invasive species

The following invasive plant species were found near the proposed development during the field survey (Figure 2):

1. Low impact winter heliotrope *Petasites fragrans*.

A small patch of this species is present in the road verge at north-western corner of the bridge. This species is not within the footprint or zone of influence of the proposed repair works.

The following were identified in the desktop review of the 2 km grid square (W25M) where the bridge is located: Canadian waterweed *Elodea canadensis* (High Impact invasive species; recorded in 2006).

2.4 Mammals (excluding bats)

Several otter signs (spraints and prints) were recorded under or in the vicinity of the bridge. The channel is suitable for foraging/commuting otter. No holts or slides were recorded.

No signs of other mammal species were recorded. The following were identified in the desktop review of the 2 km grid square (W25M) where the bridge is located: badger *Meles meles* (Wildlife Acts; recorded 2013), red squirrel *Sciurus vulgaris* (Wildlife Acts; recorded 2012), otter *Lutra lutra* (Wildlife Acts and Annex II; recorded 2016), pine marten *Martes martes* (Wildlife Acts; recorded 2012) and hedgehog *Erinaceus europaeus* (Wildlife Acts; recorded 2016).

2.5 Bats

Brown long-eared bat (*Plecotus auritus;* Wildlife Acts; Annex IV; recorded 2012) were identified in the desktop review of the 2 km grid square (W25M) where the bridge is located.

The underside of the bridge has moderate potential for bats, with a few features that could act as roosting habitat. Deep holes c. 3 cm diameter are present in the faces of all the concrete piers, from around waist height to chest height. These appear to have previously contained metal poles, with rusted remains left in some holes (see Figure 2 1). On the basis of the daytime visual inspection results, this bridge was given a score of 2 (crevices ideal for bats but no evidence of usage).

Treelines near to the bridge are suitable for commuting bats. The River Bandon is suitable for foraging Daubenton's bat, as well as more generalist species.

There was no evidence of bats roosting in the bridge as no bats were observed emerging from the bridge during both emergence survey rounds. The following species were recorded hunting and/or commuting in the vicinity of the bridge: soprano pipistrelle (most frequently recorded species), common pipistrelle, Daubenton's bat, Leisler's bat, whiskered bat, Natterer's bat and brown long-eared bat. In addition, a number of pipistrelle and *Myotis* records were identified to genus level only.

2.6 Avifauna

No evidence of nesting dipper was observed, although birds were observed feeding and diving under the bridge. No evidence of kingfisher was observed. Banks were evaluated as unsuitable for nesting kingfisher; the river is of high suitability for foraging kingfisher. No other riparian birds were recorded using the local area.

No birds of conservation concern were identified in the desktop review of the 2 km grid square (W25M) where the bridge is located.

2.7 Aquatic Surveys

Some excellent salmonid spawning habitat was present in the close vicinity of the bridge (both upstream and downstream) in well sorted coarse and medium gravel beds adjoining pool tailings. Both adult and juvenile brown trout were observed and a high abundance of Atlantic salmon parr was also noted, particularly downstream of the bridge. Good salmonid nursery habitat was located in the fast-flowing water flowing over the cobbled bed of bridge abutments. Ardcahan Bridge featured good fish passage with no evident obstructions.

Lamprey spawning habitat was situated at same locations, with notably good nursery habitat immediately downstream of bridge in deep pool below the bridge apron (right hand bank) and upstream at the mouth of Caha River.

No white-clawed crayfish records are known from the Bandon catchment, being a sandstone geology river, and none were recorded during the survey.

Good European eel habitat was present locally in association with deeper pool areas and large macrophyte stands, especially upstream of the bridge structure in deeper glide habitat.

Results from the initial surveys showed that algal growth was also visible on both live and dead freshwater pearl mussel shells upstream (and downstream) of the bridge, typically in pool areas adjoining glide and riffle where stable cobble was present amongst gravels. Pearl mussels (both live and dead) were also present upstream of the bridge with small numbers present in gravels at mouth of the adjoining Caha River. Limited pearl mussel habitat was present under the bridge structure.

Results from the stage I and II freshwater pearl mussel surveys showed that pearl mussels were well distributed throughout the Ardcahan survey sections with the highest densities recorded in the immediate downstream vicinity (≤5 m) of the bridge structure. At this location, unbedded cobble and gravel substrata provided stable footing opportunities for mussels in deep glide areas downstream of the bridge. However, filamentous algal cover (indicating enrichment) and siltation were evidently causing stress to some mussels (approx. 20% of individuals) in this area at the time of survey.

Other areas such as survey section B (50-≤125 m downstream of bridge), which comprised stable cobble in deeper glide, also supported moderate quality pearl mussel habitat (87 live mussels recorded), albeit siltation pressures were still evident. Indeed, siltation and eutrophication pressures have already been identified as significant in the Bandon catchment and are seriously impacting pearl mussel habitat. Recent significant native woodland removal and instream works approx. 6.5 km upstream at Keenrath (Ross Macklin, pers. obs.) during 2018 and 2019 has resulted in further destruction of pearl mussel habitat and evident deterioration of water quality. Continued pressure from land use activities is continuing the long-term trend of habitat deterioration in the catchment and has to be reversed in order to restore habitat quality for pearl mussel if the river population is to be prevented from extinction.

3. OVERVIEW OF CONSTRUCTION WORKS

3.1 Temporary Site Compound

During the construction phase, it will be necessary to provide temporary facilities for construction personnel. This project will have 1 no. temporary compound located near the entrance to the site which will include welfare facilities. The location of the temporary site compound is proposed to be set back c. 30m from the south west corner of the bridge, as shown in Figure 3-1. The temporary compound shall be constructed with crushed rock aggregate hard standings with low dust content. A geotextile will be placed under the hard standing to minimise soil disturbance when aggregate is removed after completion of the project. Temporary facilities will be removed, and the lands reinstated upon completion of the construction phase (bare areas will be allowed to recolonise naturally).

Facilities to be provided in the temporary site compounds will include the following:

- Welfare facility;
- Employee parking;
- Contractor lock-up facility;
- Bottled water for potable supply;
- Water tanker to supply water used for other purposes;
- Bunded fuel storage;
- Diesel generator;
- Storage areas;
- Waste management areas.

All washout will be carried out in a dedicated area of the temporary compound as shown in Figure 3-1.

Small mortar mixers will be required to be cleaned in a designated concrete wash-out area (Figure 3-1). A purpose-built concrete wash-out facility will be installed to separate solids and liquids. Solids shall be removed to an appropriate waste management facility; wastewater will be collected in a secondary holding tank for recycling in the washing process. Wash-out facilities will be positioned away from drainage features and fuel storage areas. Upon completion of the project, the wash-out area will be removed from the site and the area reinstated with the material arising during excavation. The area will be re-vegetated following the completion of works. Silt fencing will be left around any bare ground areas until they have re-vegetated.

Wheel wash facilities will be located at the site entrance to reduce construction traffic fouling public roads. Each wheel wash will come with a water tank which will be filled regularly. These units will be self-contained and will filter the waste for ease of disposal. Waste will be removed from each unit and from the site to an appropriate waste management facility by the proposed contractor.

Note that paint will be stored in a watertight bunded container. Statutory check to be carried out on machinery weekly (GA2 Form).

Sand stored in the compound will be covered in a secure area and surrounded by silt barriers.

Cement and any other mortar constituents required will be stored in secure watertight containers, preventing washout.

Oils/hydrocarbons will be stored in a designated secure bunded area in watertight containers, preventing washout or disturbance of containers.

Any generators stored in the compound will be bunded to 110% capacity.

Distributed overland minimum drainage will be required to the site compound as the washout facility will be used. A double row of silt fencing will be erected on the downstream side of the site compound location.

Note that the site compound and wash-out facilities are both located in agricultural land within the Bandon River SAC, particular attention needs to be given to ensure the area is contained and no run off occurs to River Bandon (see Figure 3-1).

Figure 3-1: Site compound location and Wash-out area

3.2 Corrosion Repairs & Parapet minor repairs

1. To facilitate the installation of the suspended scaffold, vegetation within a 2-meter width on either side of the bridge face will be cut back. Trimming will be limited to tree branches; no main stems will be cut.
2. Suspended Scaffold from the bridge deck shall be designed by a temporary works design specialist. Suspended scaffold to be installed in order to provide access to the bridge deck soffit this will fully encase the bridge and will be supported by the bridge itself. Note that the scaffold will be fully installed from the bridge without the need for any access to the riverbed. A road closure licence will be required during the whole duration of the works.

3. Field tent and bund to be erected on the scaffolding to contain and prevent any dirt and debris falling into the river. The field tent and bund will be impermeable and daily checks will be carried out by the appointed contractor to ensure the system remains in good condition and is capable of fulfilling it's function, i.e. containing waste and contaminants within the work area. The bund will cover the surface of the working scaffold deck and tie in with the sides of the field tent to ensure no leakage of fluids/solids will occur. The field tent will cover the entire scaffold and will prevent rain ingress and associated washout of contaminants including sand, paint, concrete or debris.
4. Steel beams to be sandblasted to SA2.5 as per detail provided in Drawings P1959-ARDH-0004. Clean sand only to be used. Note that one operator will carry out the sandblasting using appropriate sandblasting equipment accessing to the beams surface from the suspended scaffold provided. Sandblasting equipment typically consists of a chamber in which sand and air are mixed. The mixture travels through a hand-held nozzle to direct the particles toward the surface of work. Field tent to be sealed to ensure the sand and debris won't leak out to the river.
5. Welding of additional steel plate at the bottom flange of existing steel beams as shown in Drawings P1959-ARDH-0004. Note that one operator will carry out the welding using portable electric welding equipment accessing the beams surface from the suspended scaffold provided. Note that any petrol generator needed to operate equipment will be positioned on the bridge deck and bunded to 110% capacity, daily inspection of bund to be carried out by the appointed contractor to ensure no oil/petrol spillage will occur. Any generator used on the bridge deck will be removed after works cease and stored in a secure bunded area in the compound overnight.
6. A protective paint system to be applied to all exposed steel work, Hempel Hempadur Mastic 45880/1 or similar approved to be applied by brush in 2 coats of minimum 190 micron DFT (dry film thickness). Note that one operator will paint the steel beams accessing to them from the suspended scaffold provided.
7. Stainless Steel Drip Strips will be positioned along the bottom edge of the bridge parapet on both sides of the bridge, the holes will be drilled along the bridge as per the spacing shown in drawing P1959-ARDH-0004 and bolted through with post-fixed mechanical anchors as shown in drawings P1959-ARDH-0004. The position of these elements is shown on drawings P1959-ARDH-0004.
8. Cracking at Deck Pier interface to be injected with Epoxy Resin. Prior the injection, the crack and surrounding surface will be cleaned to allow the paste-over to bond to sound concrete. The epoxy resin will be pressure pumped locally (directly into the cracks) to close the cracks at the Deck Pier interface. The deck/pier interface is above the waterline.
9. Vegetation on the internal side of the existing parapet and drainage outlets to be cleared from structure.
10. Minor repairs to missing sections of render shall be carried out along the parapet as shown in P1959-ARDH-0003. Repairs to be carried out by hand by an operator accessing the parapet surface from the deck/scaffolding level.
11. New Black Pvc drain pipe to be positioned in the existing drainage outlets location and fixed in place with mortar from the deck level.
12. Scaffold tent and bund to be cleaned and material to be sent to an appropriate licensed off-site waste management facility. Waste/debris will be collected and placed in secure containers and brought up to the bridge deck for transfer to the site compound and then off-site disposal at a suitably licensed facility. The frequency of waste/debris removal from the scaffold will occur at minimum at the end of each work day, or following completion of a specific task, whichever occurs first. If large volumes of waste/debris are created due to the nature of the task, removal will occur more frequently, in order to prevent large buildups which would pose a higher environmental risk and also pose health and safety risks in the confined environment of the enclosed scaffold. Collected waste will be removed from the compound for off-site licensed storage/disposal at the end of each day.

13. The scaffold tent and bund will be inspected prior to and during works, and following each task, to ensure any breaches in the material potentially caused by works are detected. In the event of a breach occurring, works will cease. If possible, the breach will be repaired and sealed with suitable materials. If the breach cannot be repaired, all debris will be removed, and works will be paused until a new tent/bund is installed.
14. Scaffold to be safely removed. The procedure used will be the reverse of the installation described above.

3.3 Deck Works

1. Upon completion of corrosion repairs works it is proposed to repair the road surfacing on this bridge and Parapet. A road closure and diversion will be required to facilitate these works. Works shall not be carried out in periods of heavy rain. Heavy rain is defined by Met Éireann as a precipitation rate that exceeds 2 mm per hour averaged over 3 or 6 hours.
2. The deck drainage outlets shall be blocked with a water proof membrane to prevent run off or debris entering the water course.
3. The existing road surface shall be scarified, and the existing surface shall be removed, and the concrete surface of the bridge deck exposed.
4. Any defects encountered when deck is exposed to be repaired using an appropriate concrete repair mortar. This will only include small, localized repairs with concrete repair mortar, only the top side of the deck will be involved with no risk of leakage to the river.
5. A trial hole and rebar scan shall be completed to confirm the deck reinforcement and strength. Note that the trial hole will be superficial and won't penetrate through the whole thickness of the deck. If this investigation is unsatisfactory, Cork County Council may introduce a weight limit to the bridge.
6. A spray applied bridge deck waterproofing system shall be installed. Spraying will only be carried out during calm, dry weather periods (little to no breeze) to prevent drift of airborne substances or runoff towards the river.
7. Kerb drain (feeding to new Black PVC drainage outlet) and concrete rubbing strip to be installed by an operator accessing the area from the deck level.
8. The pavement surface shall be laid, sand asphalt followed by HRA, high friction colour contract surfacing shall be applied.
9. Deck drainage outlets shall be reinstated.

3.4 Emergency Procedures

Water levels will be monitored continuously. In the event of heavy rainfall (precipitation rate exceeding 2 mm per hour averaged over 3 or 6 hours) and/or water levels rising above 0.5m (70.78m AOD Malin) works will cease, and the procedures detailed below will be followed:

In the event of heavy rainfall or threat of flooding which compromises the efficacy of the tent and bund during sandblasting, painting or rendering, activities will cease, debris and waste will be collected in a secure container and all debris/waste, equipment and personnel will be removed from the scaffold.

In the event of heavy rainfall or threat of flooding, any generator in use in the works area will be shut down and removed to the compound.

In the event there is a threat of flooding to the compound, or threat from heavy rainfall to the secure storage of sand, cement, paint, hydrocarbons or waste/debris stored at the compound, these materials will be removed to a secure location off site.

3.5 Construction Programme

In order to avoid periods of high-water level it is proposed that the construction will take place over 6-10 weeks during July to September inclusive, to coincide with low river water level and the instream works season.

3.6 Construction Working Hours

The hours of construction activity will avoid unsociable hours and will be agreed in advance of site start. It is anticipated that this will restrict working hours at the site during the construction phase to 08:00 to 19:00 Monday to Saturday inclusive. Additional emergency works may be required outside of normal working hours. Work on Sundays or public holidays will only be conducted in exceptional circumstances and subject to prior notification insofar as possible with the local community.

4. ENVIRONMENTAL MANAGEMENT PLAN

4.1 Introduction

This Environmental Management Plan (EMP) defines the work practices, environmental management procedures and management responsibilities relating to the proposed works at Ardcahan Bridge.

This EMP describes how the Contractor for the main construction works will implement a site Environmental Management System (EMS) on this project to meet the specified contractual, regulatory and statutory requirements and identified mitigation measures. This plan will be further developed and expanded following the grant of planning permission and appointment of the Contractor for the main 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 main construction works and once the planning conditions attached to any grant of planning are known. It is the Contractor's responsibility to implement an effective environmental management system to ensure that environmental requirements for the construction of this project are met.

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 organisation, 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 on 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 EMP and its contents.

This section includes the mitigation measures to be employed by the contractor and client during the construction, operation and decommissioning of the proposed project as per the EIAR and NIS.

4.2 Project Obligations

In the construction works proposed at Ardcahan Bridge there are a number of environmental management obligations on the developer and the contractor. As well as statutory obligations, there are several specific obligations set out in the AA and NIS. These obligations are set out below. The final CEMP which will be produced by the main contractor following appointment will incorporate these obligations. The contractor and all of its sub-contractors will be fully aware of and in compliance with these environmental obligations.

4.2.1 AA screening/NIS Obligations

The AA screening and NIS identified mitigation measures that will be put in place to mitigate the potential environmental impacts arising from construction of the project.

4.2.2 Planning Permission Obligations

All planning conditions associated with the project's planning permission shall be adhered to. All pre-commencement planning conditions shall be discharged fully by the project owner prior to site start.

4.2.3 Other Obligations

The contractor for the main construction works will liaise directly with the 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;
3. Temporary Road Closures (if required);
4. Road Opening Licence (if required).

The contractor and local authority shall liaise closely with the local residents, especially homeowners and landowners along the local access routes in relation to works and all reasonable steps will be taken to minimise the impact of the development on such persons.

4.3 Environmental Management Programme

4.3.1 Air Quality

Construction Stage Impacts

The principal source of potential air emissions during the works of renovation of the bridge will be dust arising from earthworks, limb cutting activities, removal of debris from river bed, the temporary storage of excavated materials, the movement of construction vehicles, loading and unloading of aggregates/materials and the movement of material around the site.

Construction vehicles and plant emissions have the potential to increase concentrations of compounds such as NO_2, Benzene and PM_{10} in the receiving environment. Plant and machinery such as generators, excavators etc. will be required at various stages of the construction works. These will be relatively small units which will be operated on an intermittent basis. Although there will be an emission from these units, given their scale and the length of operation time, the impacts of emissions from these units will be negligible.

Construction Stage Mitigation Measures

Construction stage mitigation measures to minimise dust and emissions are as follows:

- A water bowser will be available to spray work areas and haul roads, especially during periods of excavations works coinciding with dry periods of weather, in order to suppress dust migration from the site;
- All loads which could cause a dust nuisance will be covered to minimise the potential for fugitive emissions during transport;
- Gravel will be used at the site exit point to remove any dirt from tyres and tracks before travelling along public roads;
- The access and egress of construction vehicles will be controlled to designated locations, along defined routes, with all vehicles required to comply with onsite speed limits;
- Construction vehicles and machinery will be serviced and in good working order;

- The developer in association with the contractor will be required to implement a dust control plan as part of the CEMP.
- Receptors which receive dusting and soiling from local routes entering the site; and dwellings directly adjacent to the site that experience dust soiling, where appropriate, and with the agreement of the landowner, will have the facades of their dwelling cleaned if required should soiling have taken place;
- Ensure all vehicles switch off engines when stationary – no idling vehicles; and
- Exhaust emissions from vehicles operating within the site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor by ensuring that emissions from vehicles are minimised through regular servicing of machinery.

4.3.2 Noise and Vibration

Construction Stage Impacts

The construction noise model assessed several tasks with the potential to generate noise. These tasks included: deliveries and/or removal of material to and from site, preparation of access roads, excavation of material from riverbed and reinstate natural material, preparation of hardstands and drainage and repair works on existing steelwork.

In relation to site traffic, the noise impact from construction personnel movements to and from the site is expected to be low.

The noise associated with the excavation of material from riverbed and reinstate natural material is expected to have a slight impact and be temporary in duration. The preparation of access roads, hardstands and drainage are expected to have a slight impact and be temporary in duration. The construction works associated with repair works on existing steelwork are expected to have a slight impact and be temporary in duration. The predicted noise levels at the nearest noise sensitive location for each of these construction activities is below the daytime noise limit of 65 dB $L_{Aeq,1hr.}$

The potential for vibration at neighbouring sensitive locations was scoped out due to the low levels of vibration generated and the distant between construction activities and sensitive locations.

Construction Stage Mitigation Measures

The predicted noise levels from on-site activity from the proposed project is below the noise limits in BS 5228-1:2009+A1:2014. Nonetheless, several mitigation measures will be employed to minimise any potential impacts from the proposed project.

The noise impact for construction works traffic will be mitigated by generally restricting movements along access routes to the standard working hours and exclude Sundays, unless specifically agreed otherwise.

The construction works on site will be carried out in accordance with the guidance set out in BS 5228:2009+A1:2014. Proper maintenance of plant will be employed to minimise the noise produced by any site operations.

All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the project. Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use.

The hours of construction activity will be limited to avoid unsociable hours where possible. Construction operations shall generally be restricted to between 07:00 - 19:00 hours Monday to Friday and 07:00 - 13:00 hours on Saturdays. However, to ensure that optimal use is made of fair-weather windows, or at critical periods within the programme, it could occasionally be necessary to work outside these hours. Any such out of hours working would be agreed in advance with the local authority.

The on-site construction and decommissioning noise levels will be below the relevant noise limit of 65 dB $L_{Aeq,1hr}$ for operations exceeding one month, and therefore construction noise impacts are not considered to be significant.

4.3.3 Biodiversity / Flora and Fauna Management Plan

This Ecological Management Plan outlines the measures that will be put in place to protect species and natural and semi-natural habitats at the proposed site. The management plan shall be finalised in accordance with this plan following the appointment of the contractor for the main construction works. This plan should be read in conjunction with the AA Screening Report and NIS.

4.3.3.1 Objectives

The primary objectives of the management plan over the construction, operation and reinstatement phases of the project are as follows:

- Promote the conservation of habitats on site through the establishment of management and/or mitigation;
- Provide management and mitigation for aquatic fauna, habitats and water quality;
- Provide management and mitigation for avifauna;
- Provide management and mitigation for bats and terrestrial mammals.

4.3.3.2 Current Site Status and Management

Existing ecological conditions are outlined in Section 2. Further detail on aquatic baseline conditions is also included in the AA Screening Report and NIS.

4.3.3.3 Habitat and Species Mitigation and Management Requirements

Detailed mitigation measures for aquatic ecology at the site are listed in Section 4.3 of the NIS. These are also listed below, in addition to mitigation measures to limit negative effects on birds, limit habitat disturbance and limit negative effects on terrestrial mammals and bats.

4.3.3.4 Mitigation by Avoidance and design

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

- All site clearance works to minimise land take of habitats and flora and restricted to the establishment of the site compound area in agricultural grassland. No instream works.

- Aggregate with low content of fines will be used for construction of the temporary compound hard standing in order to minimise sediment washout.
- A geotextile layer shall be installed under the site compound hard standing to minimise soil disturbance when the hard standing material is removed.
- All washout will be carried out in a dedicated area of the temporary compound as shown in Figure 3 1. Small mortar mixers will be required to be cleaned in a designated concrete wash-out area (Figure 3 1). A purpose-built concrete wash-out facility will be installed to separate solids and liquids. Solids shall be removed to an appropriate waste management facility; wastewater will be collected in a secondary holding tank for recycling in the washing process. Wash-out facilities will be positioned away from drainage features and fuel storage areas. The area will be re-vegetated following the completion of works. Silt fencing will be left around any bare ground areas until they have re-vegetated.
- A suspended scaffold supported by the bridge deck shall be designed by a temporary works design specialist. Suspended scaffold to be installed in order to provide access to the bridge arch, this will fully encase the bridge and will be supported by the bridge itself. Note that the scaffold will be fully installed from the bridge without the need for any access to the riverbed. This will prevent any instream works and prevent impacts to pearl mussel situated under the footprint of the bridge.
- The scaffold construction will require tree limb cutting but this will be limited to overhanging limbs within 2m of the bridge structure. No main stems will be cut and an ECoW will supervise the cutting to ensure only the minimum amount of limbs are removed to prevent excessive light penetration of the riverbed. The localised and minimal removal of tree limbs will prevent adverse effects to gallery woodland habitat that has links with the Annex I Habitat, 'Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)'.

4.3.3.5 Mitigation measures during the construction phase of the project

4.3.3.6 Introduction

Construction of this project has the potential to cause adverse effects on local ecological receptors, including those outlined in the NIS. The mitigation measures described below will reduce these impacts significantly.

4.3.3.7 Project Ecologist

A Project Ecologist/Ecological Clerk of Works (ECoW) with appropriate experience and expertise (aquatic specialist) will be employed for the duration of the construction phase to ensure that all the mitigation measures outlined in relation to the environment are implemented. The Project Ecologist/ECoW will be awarded the authority to stop construction activity if there is potential for significant adverse ecological effects to occur.

4.3.3.8 Habitats and Flora

The area of the proposed works will be kept to the minimum necessary, to minimise disturbance to habitats and flora.

No disturbance to habitats or flora outside the proposed works area will occur. Machinery and equipment will be stored within the site compound. Designated access points will be established, and all access will be restricted to these locations. Access to the site will be via the R587.

The following will be implemented:

- A geotextile will be placed under the aggregate hard standing of the site compound to minimise soil disturbance and ensure the seed bank is retained to aid in natural recolonisation after the hardstanding is removed.
- Prevent ingress of dust, sediment or pollutants during steel beam and deck repairs. This will be achieved through the use of impermeable membranes on work platforms and blocking of drainage eyelets in the bridge parapets during deck works.
- Trimming of trees will be limited to tree branches; no main stems will be cut. An ECoW will supervise tree trimming to minimise the area affected.
- Prior to works an invasive species survey will be undertaken in the area to reconfirm the findings of the Ecological Appraisal.
- If any invasive species have become established in areas potentially affected by works, management measures will be prepared and agreed with NPWS and the contractor prior to construction.
- Demarcation fencing and signage will be installed to implement an exclusion area around invasive species in which no works or access will be permitted.
- All workers on site will be informed of the location of the exclusion zone in advance of the works.
- Good work hygiene practises will be adhered to throughout.

4.3.3.9 Management of the Spread of Non-native Invasive Species

Generic measures for invasive species management are included here.

Halting the spread of non-native invasive species can be achieved via prevention, containment, treatment and eradication.

Prevention

A pre-construction survey will be carried out to reconfirm the extent of winter heliotrope to ensure that it has not spread to any areas in or near the proposed works locations. A survey for aquatic invasive species will also be completed. Mapping using GPS equipment will be carried out to document any records.

Containment, Treatment, Eradication

- Cordoning off the area – this shall include a buffer of 5m surrounding the area of infestation to ensure that seeds are not transported to other sections of the site via vehicular traffic, equipment or PPE.
- No machinery or personnel shall be allowed within this restricted area. Similarly, there shall be no storage of materials within or adjacent to this restricted area.
- There shall be no vegetation clearance or trimming within the cordoned area (except where undertaken in accordance with the invasive species management plan) as this can lead to the species recolonising other areas via the wind, water if displaced into drains, or soil and vegetation attached to machinery, vehicles or personnel.
- No soil or vegetation shall be removed from this area unless it is securely contained and is transported under licence to a suitably licenced facility for treatment.
- Informing all site staff through toolbox talk as part of site inductions.

- Any new sightings of invasive species shall by relayed to construction staff and the developer via the project ecologist/ECoW. These areas shall follow the same protocol as described above.
- Reporting sighting(s) to the NPWS and NBDC and liaising with NPWS.

4.3.3.10 Mammals (excluding bats)

An ecologist will supervise vegetation removal prior to and during construction as appropriate (e.g., an ecologist may be required during some clearance works for areas where vegetation is too dense to check beforehand). This will ensure that any site-specific issues in relation to wildlife not currently present (e.g. otter holts) on site will be reconfirmed prior to commencement of works to allow appropriate mitigation measures to be put in place.

In the event that an issue arises, the NPWS will be updated, consulted with and the relevant guidelines will be implemented as appropriate (e.g. '*NRA guidelines for the treatment of otters prior to the construction of national road schemes*'; NRA, 2005). A derogation licence will be sought.

Construction operations will take place during the hours of daylight. This will minimise disturbances to faunal species at night.

Vegetation clearance

There is the potential for holts to be discovered during vegetation clearance works. Care will need to be taken during this early stage of the development and a competent ecologist will be required on-site for these works. If a holt is discovered, all works within 150m of the holt shall cease including vegetation clearance. NPWS shall be contacted, and a derogation licence shall be sought. An activity survey shall be carried out to assess the potential for the holt to be used by otters.

4.3.3.11 Bats

There is moderate bat roosting potential within the bridge structure. Two rounds of emergence surveys did not detect any bats emerging from the bridge. A total of seven bat species were confirmed to be active along the river corridor and surrounding area.

Mitigation

Carry out preconstruction endoscope and emergence surveys (2 separate emergence survey rounds) to re-confirm baseline conditions.

If bats are found to be present, the ECoW will supervise works (accompanied by a bat specialist if required) to ensure they are carried out in a manner which minimises disturbance and ensures no bats are harmed.

Derogation

If bats are found to be present, the derogation process will be completed (a derogation licence will be sought from NPWS to allow works to proceed in a manner which minimises disturbance and ensures no bats are harmed).

An Annex IV assessment and report shall be completed in the event that bats are present in the bridge.

A bat specialist will carry out any exclusion procedures required under the conditions set out in the derogation licence prior to any works.

Enhancement

Bat boxes will be installed under the bridge to enhance roosting potential and increase roosting options and capacity. It is noted that the bridge is located in an area which presents opportunities for foraging bats, but roosting opportunities in the bridge may be limited in terms of variety/conditions.

Supervision of vegetation clearance

In the event that vegetation clearance (tree trimming) could potentially affect any potential roosting features, an ecologist/ECoW will supervise removal (prior to and during construction as appropriate -e.g., ecologist may be required during some clearance works of areas where vegetation is too dense to check beforehand). This will ensure that any site-specific issues in relation to wildlife not revealed by preconstruction surveys (e.g., potential bat roosting features) will be discovered prior to commencement of works to allow appropriate mitigation measures to be put in place. In the event that an issue arises, the NPWS will be informed, and the relevant guidelines and procedures will be implemented as appropriate (e.g. NRA guidelines, derogation application).

Lighting

Construction operations will take place during daylight. As such there is no requirement for artificial lighting and therefore no potential for impacts in this category.

4.3.3.12 Avifauna

Where feasible, trimming of trees will be undertaken outside of the bird breeding season (March 1st to August 31st inclusive). This will help protect nesting birds. Where vegetation removal is required outside this period, vegetation will be inspected for nesting birds by a suitably qualified Ecologist. In the event of birds nesting within affected areas, suitable mitigation will be put in place and trimming will only proceed upon agreement with NPWS and receipt of a wildlife licence.

Construction operations will take place during the hours of daylight to minimise disturbances to roosting birds, or active nocturnal bird species. This is in line with best practice recommendations for mitigation measures in regard to birds and wind farms as recommended by statutory bodies such as English Nature and the Royal Society for the Protection of Birds (Drewitt and Langston, 2006).

Toolbox talks will be undertaken with construction staff on disturbance to key species during construction. This will help minimise disturbance.

Dipper: If any dipper are found nesting on or near the bridge prior to works, works shall be halted until the young are confirmed to have fledged.

Kingfisher and dipper: Implement mitigation measures outlined in section 4.3.3.13 below, to minimise and prevent the identified indirect impacts to water quality.

4.3.3.13 Aquatic Ecology - Water Quality Measures during the Construction Phase

Mitigation By Design

- All site clearance works to minimise land take of habitats and flora and restricted to the establishment of the site compound area in agricultural grassland. No instream works.
- Aggregate with low content of fines will be used for construction of the temporary compound hard standing in order to minimise sediment washout.

- A geotextile layer shall be installed under the site compound hard standing to minimise soil disturbance when the hard standing material is removed.
- All washout will be carried out in a dedicated area of the temporary compound as shown in CEMP Figure 3 1. Small mortar mixers will be required to be cleaned in a designated concrete wash-out area (Figure 3 1). A purpose-built concrete wash-out facility will be installed to separate solids and liquids. Solids shall be removed to an appropriate waste management facility, wastewater will be collected in a secondary holding tank for recycling in the washing process. Wash-out facilities will be positioned away from drainage features and fuel storage areas. The area will be re-vegetated following the completion of works. Silt fencing will be left around any bare ground areas until they have re-vegetated.
- A suspended scaffold supported by the bridge deck shall be designed by a temporary works design specialist. Suspended scaffold to be installed in order to provide access to the bridge arch, this will fully encase the bridge and will be supported by the bridge itself. Note that the scaffold will be fully installed from the bridge without the need for any access to the riverbed. This will prevent any instream works and prevent impacts to pearl mussel situated under the footprint of the bridge.
- The scaffold construction will require tree limb cutting but this will be limited to overhanging limbs within 2m of the bridge structure. No main stems will be cut and an ECoW will supervise the cutting to ensure only the minimum amount of limbs are removed to prevent excessive light penetration of the riverbed. The localised and minimal removal of tree limbs will prevent riverbank disturbance and adverse effects to gallery woodland habitat that has links with the Annex I Habitat, 'Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)'.

Guidance and Consultation

The following best-practice mitigation measures, which will incorporate the recommendations arising from consultation with Inland Fisheries Ireland (Macroom) and National Parks and Wildlife Service (NPWS), will be implemented in order to reduce or avoid potential impacts to aquatic qualifying interest species and habitats within the Bandon River SAC (002171).

Mitigation measures for the Ardcahan Bridge remediation works were drafted in consideration of the following consultation, legislation and guidance:

- Consultation Response from Cork Co. Council Ecologist, 4th October 2023.
- Onsite consultation with NPWS, 8th June 2023.
- Video Conference with NPWS, 15th December 2020.
- IFI Consultation Response dated 4th April 2023.
- Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora;
- Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds;
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a Framework for Community Action in the Field of Water Policy;
- IFI (2016). Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites;
- IFI (2016). Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes;

- The Planning System and Flood Risk Management - Guidelines for Planning Authorities - Department of Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW);
- CIRIA Environmental Good Practice on Site;
- Best Practice Guide BPGCS005, Oil Storage Guidelines;
- CIRIA Control of Water Pollution from Linear Construction Sites. Technical Guidance (C648);
- CIRIA Control of Water Pollution from Construction Sites. Guidance for Consultants and contractors (C532);
- CIRIA Sustainable Construction Procurement. A Guide to Delivering Environmentally Responsible Projects (C571);
- UK Pollution Prevention Guidelines (PPG):
- PPG1: Understanding your environmental responsibilities – good environmental practice;
- PPG2: Above Ground Oil Storage Tanks;
- PPG3: Pollution Prevention Guidelines;
- PPG4: The Disposal of Sewage where no Mains Drainage is Available;
- PPG5: Works in, near or liable to affect Watercourses;
- PPG6: Working at Construction and Demolition Sites;
- PPG7: The Safe Operation of Refuelling Facilities;
- PPG8: Safe Storage and Disposal of Used Oil;
- PPG21: Pollution Incident Response Planning;
- PPG22: Dealing with Spills; and
- PPG26: Drums and intermediate bulk containers.
- South Western River Basin District River Basin Management Plan (2009-2015);
- Biological River Water Quality Data (EPA)

Water Quality

- The ecological mitigation including that from the NIS will be reviewed by an appointed Ecological Clerk of Works (ECoW). The mitigation considers all potentially polluting activities from the construction stage and includes mitigation measures for critical elements such as storage and handling of potentially polluting materials.
- All efforts to minimise pollution and siltation escapement to the river will be made in light of proposed bridge remediation works and an Ecological Clerk of Works (EcoW) will be present to supervise works and as informed by their knowledge of the site's ecological sensitivities (i.e. pearl mussel and other downstream qualifying interest habitats/species).
- A double row of silt fencing will be erected on the downslope side of the site compound location.
- Daily inspections of surface waters in the vicinity of the site will be undertaken, with any escape of contaminants notified immediately to IFI.
- Wheel wash facilities will be located at the site entrance to reduce construction traffic fouling public roads. Each wheel wash will come with a water tank which will be filled regularly. These units will be self-contained and will filter the waste for ease of disposal. Waste will be removed from each unit and from the site to an appropriate waste management facility by the proposed contractor.

- Operations to cease during and after periods of heavy rainfall, due to the potential for loss of nutrients and/or mobilisation of sediment, fine organic matter and debris into receiving waters. Heavy rain is defined by Met Éireann as a precipitation rate that exceeds 2 mm per hour averaged over 3 or 6 hours. Consult the Met Éireann website www.met.ie and review the forecast details for the meteorological station nearest to the site. While no instream works are required this will ensure that risks to the flooding of the suspended scaffold and material contained on the structure can be cleaned and removed before potential river spates.
- All temporary works shall be designed to accommodate water levels up to 0.75m (71.03m AOD malin). Where water level exceeds 0.5m (70.78m AOD Malin) rising temporary works shall be demobilised.
- Water levels will be monitored at all times by site management to anticipate flood events. Works will cease during spate events and the works area will be prepared to ensure that flood risk will not result in material escapement or spills which may indirectly impact qualifying interest habitats or species downstream.
- Chemical testing will be undertaken as per the NPWS request from the site meeting on the 8th June 2023.Turbidity and pH will be measured daily with a site log kept. Sampling of suspended solids will be taken upstream and downstream weekly, prior to commencement and during works. Should results show a 10% increase in suspended solids or turbidity downstream of the site this will be brought to the attention of the contractor by the ECoW and any suitable contingency measures will be instigated. Silt levels in the downstream river gravels should not be artificially elevated as defined in the thresholds of the Freshwater Pearl Mussel Regulations S.I. No. 296 of 2009 and those conditions outlined under best guidance for freshwater pearl mussel (CEN, 2017).
- Machinery will only be refuelled in the site compound, located a safe distance from the Bandon River or potential surface water pathways (i.e., ≥25m). Any diesel or fuel oils stored on site will be bunded to 110% of the capacity of the storage tank. Design and installation of fuel tanks will be in accordance with best practice guidelines BPGCS005 (Oil Storage Guidelines). Mobile bowsers, tanks and drums will be stored in a secure, impermeable storage area, away from drains and open water. Ancillary equipment such as generators, fuel storage tanks will be contained within a bunded area. Only designated trained operators will be authorised to refuel plant on site and emergency spill kits will be present at equipment for all refuelling events. An emergency spill kit with absorbers etc. is to be kept on site in the event of an accidental spill.
- Any generators stored in the compound will be bunded to 110% capacity.
- Paint will be stored in a watertight bunded container.
- Statutory check to be carried out on machinery weekly (GA2 Form).
- Field tent and bund to be erected on the scaffolding to contain and prevent any dirt and debris falling into the river. The field tent and bund will be impermeable and daily checks will be carried out by the appointed contractor to ensure the system remains in good condition and is capable of fulfilling it's function, i.e. containing waste and contaminants within the work area. The bund will cover the surface of the working scaffold deck and tie in with the sides of the field tent to ensure no leakage of fluids/solids will occur. The field tent will cover the entire scaffold and will prevent rain ingress and associated washout of contaminants including sand, paint, concrete or debris.
- Any petrol generator needed to operate equipment will be positioned on the bridge deck and bunded to 110% capacity, daily inspection of bund to be carried out by the appointed contractor to ensure no oil/petrol spillage will occur. Any generator used on the bridge deck will be removed after works cease and stored in a secure bunded area in the compound overnight.
- Clean sand only to be used during sandblasting.
- Sand stored in the compound will be covered in a secure area and surrounded by silt barriers.

- Cement and any other mortar constituents required will be stored in secure watertight containers, preventing washout.
- Scaffold tent and bund to be cleaned and material to be sent to an appropriate licensed off -site waste management facility. Waste/debris will be collected and placed in secure containers and brought up to the bridge deck for transfer to the site compound and then off-site disposal at a suitably licensed facility. The frequency of waste/debris removal from the scaffold will occur at minimum at the end of each work day, or following completion of a specific task, whichever occurs first. If large volumes of waste/debris are created due to the nature of the task, removal will occur more frequently in order to prevent large buildups which would pose a higher environmental risk. Collected waste will be removed from the compound for off-site licensed storage/disposal at the end of each day.
- The scaffold tent and bund will be inspected prior to and during works, and following each task, to ensure any breaches in the material potentially caused by works are detected. In the event of a breach occurring, works will cease. If possible the breach will be repaired and sealed with suitable materials. If the breach cannot be repaired, all debris will be removed, and works will be paused until a new tent/bund is installed.
- In the event of heavy rainfall or threat of flooding, any generator in use in the works area will be shut down and removed to the compound.
- In the event of heavy rainfall or threat of flooding which compromises the efficacy of the tent and bund during sandblasting, painting or rendering, activities will cease, debris and waste will be collected in a secure container and all debris/waste, equipment and personnel will be removed from the scaffold.
- In the event there is a threat of flooding to the compound, or threat from heavy rainfall to the secure storage of sand, cement, paint, hydrocarbons or waste/debris stored at the compound, these materials will be removed to a secure location off site.
- Prior to deck works, the deck drainage outlets shall be blocked with a waterproof membrane to prevent run off or debris entering the water course. Deck drainage outlets shall be reinstated following completion of deck works.
- Spraying of deck waterproofing will only be carried out during calm, dry weather periods (little to no breeze) to prevent drift of airborne substances or runoff towards the river.

Tree Branch/Limb Cutting

- Tree branch/limb cutting will only be undertaken within 2m of the Ardcahan Bridge structure. The branches/limbs will only be cut by hand and all work will be supervised by an ECoW.
- There will be no interference with the main stems or root systems of riparian trees within 2m of the bridge structure.
- Any large tree limbs removed will be cut into 1m sections and placed on the lower river bank downstream of the bridge to provide deadwood supply to the river. This will be supervised by the ECoW.

Invasive Species (Biosecurity)

- All contractors must implement routine cleaning and drying of their equipment once they leave a site and before using it again on a new watercourse. Best practice according to the Check-Clean-Dry approach will be followed to minimise the risk of introducing invasive species to the proposed works area, which may impact on qualifying interest habitats and species. There were no invasive species recorded in the vicinity of Ardcahan Bridge apart from a small stand of winter heliotrope. This species will not be encroached upon as it does not occur in the footprint of the works and thus there will be no risk of further spread.
- During the duration of the proposed bridge remediation works, all plant/equipment used onsite shall be cleaned, dried and disinfected prior to and after demobilisation from the works area.
- To prevent spread of hazardous invasive species (and pathogens), high-pressure steam cleaning of all items of plant and equipment to be used in and adjacent to waters will be undertaken prior to and after use. The wash-down area will be located in the site compound area. All PPE including waders, boots etc. will be treated using Virkon Aquatic disinfectant prior to use in and adjacent to waters. The treated materials will be allowed to dry before use, and this treatment will be carried each time new equipment arrives on-site.
- Importation of materials to the site shall comply with Regulation 49 of the EC (Birds and Natural Habitats) Regulations 2011-2021.

4.3.3.14 Mitigation Measures during the operational phase of the project

No requirements for operational phase mitigation have been identified.

4.3.3.15 Mitigation Measures during the Decommissioning of the project

Decommissioning of Ardcahan bridge is not proposed, and therefore decommissioning phase mitigation is not required.

4.3.3.16 Vulnerability to Major Accidents or Disasters

The main possible accidents or disasters for biodiversity the main possible impact is the release of sediment and pollutants into watercourses, which could negatively impact upon aquatic habitats and species.

Machinery will only be refuelled in the site compound, located a safe distance from the Bandon River or potential surface water pathways (i.e., ≥25m). Any diesel or fuel oils stored on site will be bunded to 110% of the capacity of the storage tank. Design and installation of fuel tanks will be in accordance with best practice guidelines BPGCS005 (Oil Storage Guidelines). Mobile bowsers, tanks and drums will be stored in a secure, impermeable storage area, away from drains and open water. Ancillary equipment such as generators, fuel storage tanks will be contained within a bunded area. Only designated trained operators will be authorised to refuel plant on site and emergency spill kits will be present at equipment for all refuelling events. An emergency spill kit with absorbers etc. is to be kept on site in the event of an accidental spill.

The other potential major disaster/accident that could occur and has the potential to negatively impact biodiversity (e.g. through the loss of habitats and destruction of species) is fire.

As part of the Safety and Health Management Plan (section 5. in CEMP), all hazards (including fire) must be minimised throughout the design, construction, operation and decommissioning process.

While specific measures undertaken to reduce the risk of fire are not explicitly outlined in the CEMP, the Environmental Management Programme will incidentally reduce the risk of fire through other measures. For example, as part of the Noise and Vibration programme, exhaust emissions will be minimised via the regular maintenance of machinery. This will also reduce the risk of faults developing and thus, the start of fires.

All site personnel will receive environmental awareness information as part of their initial site briefing. The detail of the information should be tailored to the scope of their work on site.

An Emergency Response Plan for any fires is contained with CEMP (section 6.1).

Briefly, the steps (relevant to containing the fire and thus, preventing damage to biodiversity) to be taken in response to fire include:

- Designate an Emergency Response Liaison;
- Provide a map depicting tower locations with emergency meeting points to the local County Council Fire Department and HSE ambulance co-ordinators;
- Raise an emergency alarm on site as soon as fire is detected;
- Contact the nearest supervisor with radio equipment/mobile phone;
- In case of major emergency, the local fire department (999) will be contacted.

An emergency response plan is contained in the CEMP in Section 6. and outlines how any major accident or disaster in relation to watercourses will be addressed.

4.3.4 Soil Management Plan

This Soil Management Plan has been prepared for the development of the works at Ardcahan Bridge Rehabilitation. The Soil Management Plan shall be finalised in accordance with this plan following the appointment of the contractor for the main construction works.

Site Risk Assessment

The preliminary site-specific hazards have been identified for this site in Table 4-5. The hazards should be re-assessed prior to the commencement of construction on the site and these hazards should be communicated to all personnel entering the site. No site personnel should enter lands outside the scope of the project. The construction areas must be secured from public access at all times.

Table 4-1: Site Specific Ground Hazards - Soil Management

Site Specific Hazards	
Ardcahan Bridge	• Materials storage

Daily Preparation during the Implementation of the Soil Management Plan

The Resident Engineer appointed by the contractor should conduct regular meetings with the Construction Management Team to discuss the phasing of soil management as the work progresses.

Particular regard will be taken of daily weather conditions and long-range forecasts. The Resident Engineer should have the authority to suspend the works if weather conditions are deemed too extreme for the effective protection of the Bandon river. Mitigation measures identified in Section 4.3.5 to protect receiving watercourses will be put in place as directed by the Resident Engineer in advance of extreme forecasts.

Personnel Qualifications and Key Contacts

All those carrying out work on site must have a Solas/FÁS Safe Pass Card. All works must be supervised by a competent supervisor. Workers must be adequately trained in the tasks they are required to carry out. The key contact names and contact details should be supplied to all personnel entering the site. All site staff should be informed of the emergency procedures for the site. The Resident Engineer should be contacted if there are any issues with soil/rock stability or other materials management issues.

Construction Stage Impacts

The main characteristics of the proposed Ardcahan Bridge Rehabilitation works that could impact on land, soils and geology are:

- Drainage
- Vehicular movement
- Construction of temporary site compound

Construction Stage Mitigation Measures

Tree Trimming

The use of plant and machinery during tree trimming works will require the storage and use of fuels and oils. Details of oil spill protection measures adjacent to sensitive receptors and emergency spill response procedures are outlined in Section 4.3.5.

Storage tanks, used to store fuel for the various items of machinery, will be self-contained and double-walled.

Refuelling of equipment/machinery will be carried out from these tanks or from delivery vehicles at designated refuelling area at site compound location. Any diesel, fuel or hydraulic oils stored on site will be stored in bunded storage tanks – the bund area will have a volume of at least 110 % of the volume of such materials stored.

Measures for spills

Details of oil spill protection measures adjacent to sensitive receptors and emergency spill response procedures are outlined in Section 4.3.5.

- Storage tanks, used to store fuel for the various items of machinery, will be self-contained and double-walled. Refuelling of construction vehicles will be carried out from these tanks or from delivery vehicles at designated refuelling areas. Specific mitigation measures relating to the management of hydrocarbons are as follows:
- 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; and

- 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.

4.3.5 Waste Management Plan

It will be the objective of the Developer in conjunction with appointed contractor to prevent, reduce, reuse and recover as much of the waste generated on site as practicable 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.

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

This Construction Waste Management Plan has been prepared for the proposed Ardcahan Bridge repair works in line with the ”Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects” (2006) as published by the Department of the Environment, Community and Local Government and supported by the Eastern-Midlands Region Waste Management Plan 2015-2021.

The Waste Management Plan shall be finalised in accordance with this plan following the appointment of the contractor for the main construction works.

Assignment of Responsible Personnel

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 overall responsibility to instruct all site personnel including sub-contractors to comply with on-site requirements. They will ensure that at an operational level that each crew foreman is assigned direct responsibility.

Waste Generated

It is envisaged that the following categories of waste will be generated during the construction of the project:

- municipal solid waste (MSW) from the office and canteen
- construction and demolition waste
- waste oil/hydrocarbons
- paper/cardboard
- timber
- steel.

A fully authorised waste management contractor will be appointed prior to construction works commencing. This contractor will provide appropriate receptacles for the collection of the various waste streams and will ensure the regular emptying/and or collection of these receptacles.

Waste Minimisation/Reduction

All efforts will be made by site management to minimise the creation of waste throughout the project.

This will be done by:

- material ordering will be optimised to ensure only the necessary quantities of materials are delivered to site;
- material storage areas will be of a suitable design and construction to adequately protect all sorted materials to ensure no unnecessary spoilage of materials occurs which would generate additional waste;
- all plant will be serviced before arriving on site. This will reduce the risk of breakdown and the possible generation of waste oil/hydrocarbons 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;
- where materials such as concrete are being ordered, great care will be practiced in the calculation of quantities to reduce wastage.

Waste Reuse

When possible, materials shall be re used onsite for other suitable purposes e.g.

- re-use of shuttering etc. where it is safe to do so
- re-use of rebar cut-offs where suitable
- re-use of excavate materials for screening, berms etc.
- re-use of excavated material etc. – where possible will be used as suitable fill elsewhere on site for the new site tracks, the hardstanding areas and embankments where possible.

Waste Recycling & Recovery

In accordance with national waste policy, source separation of recyclable material will take place. This will include the provision of receptacles for the separation and collection of dry recyclables (paper, cardboard, plastics etc.), biological waste (canteen waste) and residual waste.

Receptacles will be clearly labelled, signposted and stored in dedicated areas.

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

- Timber;
- ferrous metals;
- aluminium;
- dry mixed recyclables;
- packaging waste;
- food waste.

The materials will be transported off-site by a licensed contractor to a proposed recovery centre and these materials will be processed through various recovery operations. A list of nearby licensed waste management facilities is shown in Table 4-7.

Table 4-2: Nearby Waste Management Facilities

Facility	Type of wasted accepted
Dunmanway Recycling Centre	Plastic, metals, oil, paper, cardboard, glass, electrical goods, green waste, domestic waste as generated at the site compound
Bandon Civic Amenity Site	Plastic, metals, oil, paper, cardboard, glass, electrical goods, green waste, domestic waste as generated at the site compound
Clonakilty Civic Amenity Site	Plastic, metals, oil, paper, cardboard, glass, electrical goods, green waste, domestic waste as generated at the site compound
Private construction and demolition waste management contractor	Construction and demolition waste from the works e.g. concrete, timber, steel
Private waste management contractor	Hazardous Waste

Waste Disposal

Residual waste generated on-site may require disposal. This waste will be deposited in dedicated receptacles and collected by the licensed waste management contractor and transported to an appropriate facility. All waste movements will be recorded, of which records will be held by the waste manager on-site.

Contaminated Material

Any contaminated soils will be handled, removed and disposed of in accordance with statutory requirements for the handling, transportation and disposal of waste. In particular, the following measures will be implemented:

- Contaminated material will be left in-situ and covered, where possible until such time as WAC (Waste Acceptance Criteria) testing is undertaken in accordance with recommended standards and in-line with the acceptance criteria at a suitably licenced landfill or treatment facility. This will determine firstly the nature of the contamination and secondly the materials classification i.e. inert, non-hazardous or hazardous,
- If the material is deemed to be contaminated, consultation will take place with the respective local authority and/or EPA on the most appropriate measures. Such materials will be excavated, transported by a contractor with a valid waste collection permit and recovered/disposed of at an appropriate facility.

Training

Copies of the project 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 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.

4.3.6 Traffic Management Plan

This document is the Construction Traffic Management Plan (TMP) for the proposed Ardcahan Bridge Rehabilitation, Co. Cork. The Construction Traffic Management Plan shall be finalized in accordance with this plan following the appointment of the contractor for the main construction works.

Please note that some items in this plan can only be finalised with appropriate input from the contractor who will actually carry out and schedule the works. Furthermore, it is appropriate that the Project Supervisor Construction Stage (PSCS), when appointed, should have an active role in the preparation/review of the Traffic Management Plan.

The contractor is required to prepare the necessary Site-Specific Traffic Management Plans prior to the construction works commencing in accordance with Chapter 8 of the Traffic Signs Manual and subject to load permits.

The contractor will be responsible for the implementation of all agreements between the developer and the County Council with the objective that the transportation needs for the proposed project will have a minimal impact on the road network and local communities.

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.

The aim of this TMP is to put in place procedures to manage traffic effectively on site and in the immediate vicinity of the proposed project, to ensure the continued movement of traffic on the public roads and to minimize disturbance during transportation of materials. The correct implementation of this TMP will ensure that appropriate procedures are in place to minimize any effects on the safety and movement of the general public.

Prior to the commencement of construction, the TMP will be reviewed by the main contractor (and any subcontractors) and will be updated as necessary.

General Traffic Management Measures

General measures that shall be addressed in the TMP shall include:

- **Traffic Management Coordinator** - A dedicated competent Traffic Management Coordinator will be appointed for the duration of the project and this person will be the main point of contact for all matters relating to traffic management on the project.
- **Road to be used and not used** - The final TMP will clearly identify those roads that will be used to access this project and those roads that are not to be used. In some cases, the An Garda Síochána and the roads authority may direct/agree that certain roads cannot be used for laden HGV's but can be used for LGV's or unladen HGV's.
- **Road Reinstatement** – As agreed with Cork County Council, all roads will, upon completion of the construction works, be expeditiously reinstated to their pre-works condition or better and to the satisfaction of the relevant roads authority. If, during the course of the construction works, some of the roads used in connection with the works are damaged then these roads will be made good to the satisfaction of the roads authority without delay.
- **Site Inductions** - All workers will receive a comprehensive site induction which will include, as appropriate, a section on traffic management and clear guidance on the routes to be used/not used.

- **24 Hour Emergency Phone Number** - A 24-hour emergency phone number will be maintained for the duration of the construction works and the number will be noted on temporary signage at each works area.
- **Orderly Traffic Management** - All necessary temporary traffic management will be planned and executed in accordance with best practice, including Chapter 8 of the Traffic Signs Manual as published by the NRA/Department of Transport.
- **Letter Drops** - Subject to agreement with the planning authority, a letter drop will be carried out to notify members of the public living near the proposed site/route/roadworks where necessary, to advise them of any particularly significant upcoming traffic related matters e.g. temporary lane/road closure (if required).
- **Clear signage** - A system of clear signage relating to the project, both temporary and permanent will be agreed with the planning authority. These signs will also identify those roads to be used (and not to be used) for accessing the site in line with the objectives of the TMP.
- **Wheel washing facilities** - temporary wheel washing facilities will be located at the site entrance, subject to agreement with the planning authority, to prevent soil/dirt from being transported onto the public road network.
- **Road sweepers** will be utilised where required to maintain the public roads in a clear condition, and this will apply especially during the earthworks stages of the project.
- **Site Entrances** will be secured and locked when not in use. Where required, the entrance will be controlled by flagmen to assist traffic movements.
- **Abnormal Load Deliveries:** Abnormal loads will require an abnormal load permit prior to delivery and will be delivered at times and frequencies directed by An Garda Siochána.

Mitigation Measures – Operational Phase

It is considered that no further mitigation measures are necessary for the operational stage of the project.

Traffic Management Measures for Potential Cumulative Impacts

No known existing and proposed developments have been identified at present. Should any activities associated with proposed and existing developments identified in the future coincide with the construction of Ardcahan Bridge Rehabilitation, the Contractor should advise the local authority of these developments as part of the finalisation of the construction stage TMP so that they can be considered.

Construction Staging

The construction programming and staging shall be carried out as described in Section 3.2.

Construction Plant and Vehicles

The typical construction plant and vehicles used as part of the works are as follows (non-exhaustive):

- Hydraulic Excavators;
- Dump Trucks;
- General construction delivery vehicles;
- Bridge inspector platform;
- Site Jeeps (off-road 4x4 all purpose vehicles);
- Private vehicles of those employed on site for the construction phase.

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 will ensure that a spill kit is nearby.

The hours of construction activity will be limited to avoid unsociable hours as per Section 8.5 (d) of the code of practice for BS 5228: Part 1: 1997. Construction operations shall generally be restricted to between 08:00 hours and 19:00 hours Monday to Saturday. Work on Sundays or public holidays will only be conducted in exceptional circumstances or in an emergency.

Construction commencement dates are yet to be confirmed at this stage; these will be made known to the Planning Authority by way of a formal Commencement Notice.

Construction Compound

The locations of the construction compounds are shown on Figure 3-1.

Consultation and Notification

An Garda Síochána

Following the appointment of the successful contractor for this project, this Transport Management Plan shall be finalised following the appointment of the contractor for the main construction works.

The contractor will liaise directly with An Garda Síochána in relation to the plan and any concerns/requirements they have will be incorporated into the plan. This may include details in relation to the escorting of oversized loads.

The necessary permits will be applied for and obtained from An Garda Síochána.

Cork County Council

The contractor will liaise directly with the County Council in relation to the plan and any concerns/requirements they have will be incorporated into the plan. The contractor will also liaise with other local authorities, as necessary, along the final turbine delivery route.

The necessary permits (including standard permits) will be applied for and obtained from the relevant local authorities.

Local Residents

The following measures will be used to communicate the necessary information to the households along the local road to be used as a haul road:

(a) Information signs will be erected in advance of the construction/transportation works.

(b) A flyer drop will be carried out to advise households along the local road leading to the site in relation to the programme of construction works.

Complaints will be entered into the site complaints log and the relevant site environmental officer will arrange to meet with those affected. The situation will be acted upon immediately and reviewed by the Project Manager.

Key Personnel and Responsibility

Once prepared and agreed with the local County Council and An Garda Síochána the contractor will implement the project specific Traffic Management Plan (TMP).

Please note that some items in this plan can only be finalised with appropriate input from the contractor who will carry out and schedule the works. Furthermore, it is appropriate that the Project Supervisor Construction Stage (PSCS), when appointed, should have an active role in the preparation/review of the Traffic Management Plan.

Typically, the following members of the contractors' staff will have responsibility for adherence to the TMP as follows:

Traffic Management Coordinator	The Traffic Management Coordinator will be responsible for maintaining regular contact with An Garda Síochána, The local County Council, the statutory bodies and the client concerning traffic control, interference with services and co-ordination of crossings at roads, rivers and railways. The Transport Officer will contact the relevant bodies in relation to method statements prior to the work taking place. The Transport Officer will be responsible for instructing the Construction Manager, Foreman and all other personnel on the information in the agreed method statement prior to the work commencing and ensuring that the method statement is adhered to. The Transport Officer will be responsible for ensuring that the Traffic Management Plan will be implemented in full.
Safety Officer	The Safety Officer will be responsible for implementing all safety requirements detailed in the Project Safety Plan. Ensure that all operatives receive site safety induction prior to commencing work on site. He will ensure that all plant, particularly lifting equipment, on site has the relevant certification and are checked regularly by a competent person. The Safety Officer will carry out safety audits and checks on a regular basis and amend procedures where necessary.
Construction Manager	The Construction Manager will be responsible for overall supervision of the operations to ensure they are constructed in a safe and efficient manner. He will ensure that sufficient resources are available to meet the programme and that the necessary information is provided to the appropriate staff.
Foreman	The Foreman is responsible for ensuring that the crew carry out the work in accordance with the method statement and contract specifications and drawings using good working practices in a safe manner. He will supervise construction personnel ensuring their competence. He will check all plant and equipment on a regular basis ensuring it is maintained and in good working order.

Restricted Public Road Use by Construction Traffic

The local authority may impose restrictions on the use of some local roads. These will be agreed in liaison with Cork County Council prior to construction and will be outlined in this section, as well as specific signage requirements for construction works.

Using local roads is unavoidable, however, introducing a one-way system where necessary and restricting construction traffic access to a small number of roads will minimise disruption to the local community.

Road Closures, Diversions and Safety Measures for Road Crossings

The consent of Cork County Council will be required and the necessary road diversions together with the appropriate signage will be put in place.

It is proposed to maintain local access at all times during this element of the works. It is proposed that all access points (domestic, business, farm) are considered when finalising the temporary road closures and diversions. Diversion signage will also be included.

Road Cleaning

Public roads shall be kept free of mud, dust, spillages and debris from the construction site, construction plant or haulage vehicles.

4.3.7 Dust Management Plan

4.3.7.1 Introduction

This Dust Management Plan (DMP) for the construction works at Ardcahan Bridge Rehabilitation outlines the sources of dust during the works, identifies measures to minimise dust during the works and the complaints procedure for dust.

4.3.7.2 Dust generation and control

4.3.7.3 Dust generation

The amount of dust generated and emitted from a working site and the potential impact on the 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.

Dust and particulate matter arising from construction works can affect nearby residents, land uses, soils and flora.

Dust emission is when dust and particulate matter become airborne mostly via windblow. Once dust becomes airborne, the air currents disperse it.

The prevailing wind in Ireland is from the south-west and so dust will most frequently disperse towards the north-east.

The proposed works associated with the proposed project that have the potential to cause dust include:

- Site clearance activities
- Soil excavations
- Movement of dump trucks containing soils/subsoils within the site.

4.3.7.4 Dust control

The following dust control measures will be put in place during the works:

- A water bowser will be available to spray work areas, especially during periods of excavations works coinciding with dry periods of weather, in order to suppress dust migration from the site;
- All loads which could cause a dust nuisance will be covered to minimise the potential for fugitive emissions during transport;
- Wheel washing facilities will be provided at the entrance/exit point of the proposed project site.

4.3.7.5 Complaints Procedure

At the main site entrance, the contact details for the site will be available so that local residents are encouraged to contact the site in the event of an off-site dust impact.

The contractor on site will need to be immediately informed of the incident so that fugitive dust complaints can be substantiated.

In all instances, a complaint will be logged by the environmental manager and each complaint should be assigned a discrete complaint number in the Environmental Log.

The environmental manager will maintain the complaints register and any complaints received will be investigated and the dust suppression methods employed will be reviewed. Suitable remedial action will be undertaken as necessary.

4.4 Environmental Management Team - Structure and Responsibility

A preliminary organisation chart is included in Figure 4-1. Revisions to the project organisation chart shall be controlled independently of this plan following the appointment of the Contractor for the main construction works.

The Contractor's Project Manager will be responsible for the delivery of all elements of the Environmental Management Plan.

The Contractor's Project Manager will retain all responsibility for issuing, changing and monitoring the Environmental Management Plan throughout.

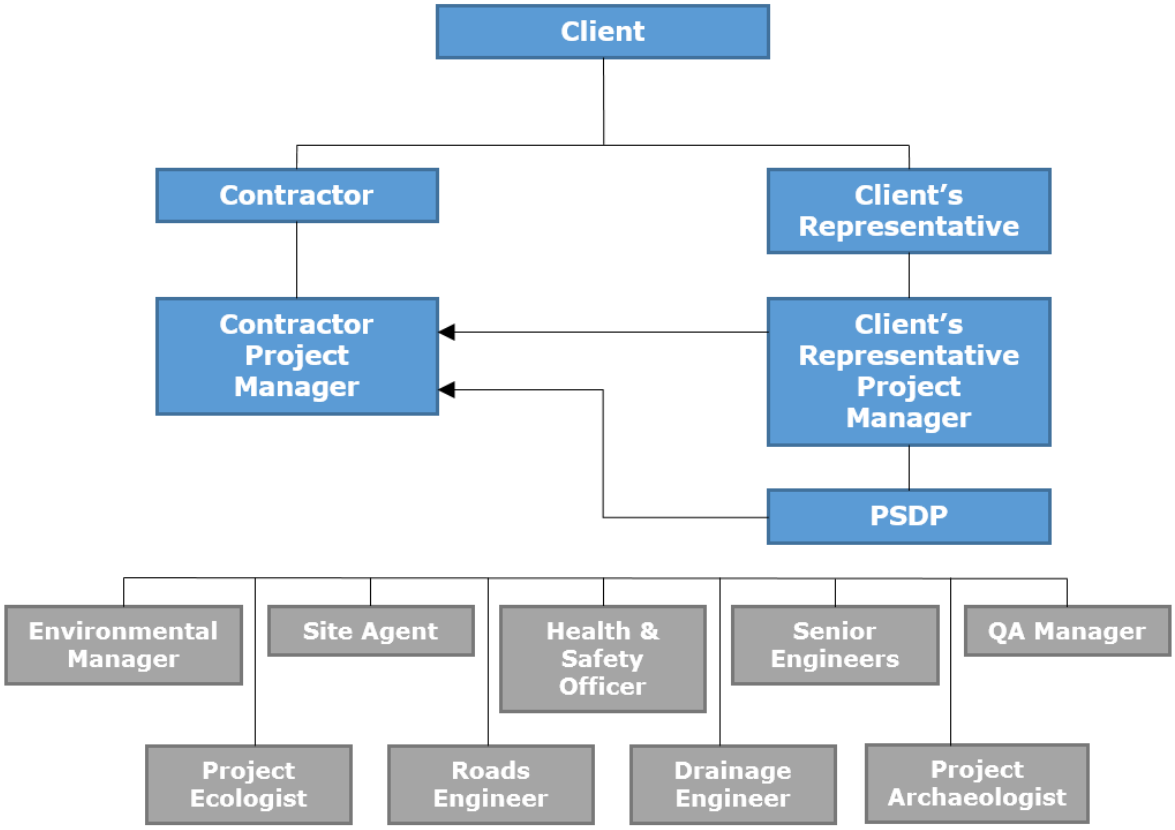

Figure 4-1: Project Management Team Organogram

4.5 Training, Awareness and Competence

All site personnel will receive environmental awareness information as part of their initial site briefing. The detail of the information should be tailored to the scope of their work on site.

The contractor for the main 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 posted on the main site notice board during the project. The environmental performance at the site is 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.

4.6 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.

4.7 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.

4.8 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.

4.9 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 and AA Screening, 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 will include the following:

- To ensure that the rivers and 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 or vibration 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.

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

4.10 Non-Conformance, Corrective and Preventative Action

Non-Conformance Notices will be issued where there is a situation where limits associated with activities on the project are exceeded, or there is an internal/external complaint associated with environmental performance.

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.

The EMS and all its components must conform to the EMP, objectives and targets and the requirements of the ISO 14001 management standard.

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

- 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.

4.11 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 Ardcahan Bridge Rehabilitation

- Register of Environmental Impacts
- Register of Planning Conditions
- Monitoring Records
- Minutes of Meetings
- Training Records
- Audit and Review Records.

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

4.12 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.

5. SAFETY AND HEALTH MANAGEMENT PLAN

5.1 Introduction

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 rehabilitation works to Ardcahan Bridge 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 finalized in accordance with this plan following the appointment of the contractor for the main construction works.

This SHMP describes how the contractor for the main construction works will implement a site safety management system (SMS) on this project to meet the specified contractual, regulatory and statutory requirements, environmental impact statement mitigation measures and planning conditions. It is the contractor's responsibility to implement an effective safety management system to ensure that the developer's safety requirements for the construction of this project are met.

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.

5.2 Project Obligations

The construction works at Ardcahan Bridge will impose numerous safety management obligations on the Client, designer and contractor. As well as statutory obligations, there are several specific obligations set out in the Environmental Management Plan in addition to any planning conditions attached to the proposed works. These obligations are set out below. The contractor for the main construction works and all its sub-contractors are to ensure that they are fully aware of and in compliance with these safety obligations.

5.2.1 Environmental Management Plan Obligations

EMP obligations are described in Section 4.

5.2.2 Planning Permission Obligations

Planning permission obligations will be fully outlined in the Contractor's CEMP.

5.2.3 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 the Developer as the "Client", the Designer, the Project Supervisors and the Contractor.

The Client must:

- Appoint a competent and adequately resourced Project Supervisor for the Design Phase (PSDP);
- Appoint a competent and adequately resourced Supervisor for the Construction Stage (PSCS);
- Be satisfied that each designer and 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;
- Notify the Authority of the appointment of the PSDP.

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 sage 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 works. This plan will be developed further at the construction stage, on the appointment of the Contractor for the main construction works.

5.2.4 The Management of Health and Safety during the Design Process

Fehily Timoney & Company (FT) has been appointed Project Supervisor for the Design Process and is competent to fulfil this role in accordance with the Safety, Health and Welfare at Work (Construction) Regulations, 2013. Health and safety are a major priority for FT and FT adopts health and safety practices that are an inherent part of a safe and sustainable business. FT's objective is to provide a safe and healthy work environment for all and to meet our duties to clients, contractors and members of the public.

It is FT's policy to comply fully with all health and safety legislation, in particular the Safety, Health and Welfare at Work Act, 2005, Safety, Health and Welfare at Work (General Application) Regulations 2007, and the Safety, Health and Welfare at Work (Construction) Regulations 2013.

FT has developed in-house procedures to ensure, so far as is reasonably practicable, that all projects:

- are designed to be capable of being constructed to be safe/ without risk to health;
- can be operated and maintained safely and without risk to health during use; and
- comply in all respects, as appropriate, with the relevant statutory enactments and instruments.

These procedures include effective risk management procedures involving the identification and evaluation of risks and the development of mitigation measures to eliminate (where possible) or reduce those risks during the life cycle of the project. The FT team is committed to health and safety and shares responsibility for managing risk at all stages of a project.

All work by FT is undertaken in a competent and efficient manner taking account of the general principles of prevention to safeguard the safety, health and welfare of construction & maintenance workers and other third parties.

The FT procedures for the management of safety during the design process are outlined in the in-house procedure PP09 "Health and Safety Requirements in Design Projects" and is adhered to on all design projects.

The purpose of this procedure is to define the requirements for the management of health & safety during design projects, to ensure compliance with The Safety, Health and Welfare at Work (Construction) Regulations 2013.

The procedure includes standard forms which are used to communicate health and safety considerations within the design team and also guidelines which develop the company's health and safety procedure and outline the company's responsibilities for health and safety during the design process.

The procedure addresses health and safety issues at all stages of a project, from the preliminary design through to commissioning and operation. By establishing a chain of responsibility each party is clear on their role and obligations from a health and safety perspective.

Risk assessments are carried out, at preliminary and detailed design stages by every discipline involved in the design. Each risk assessment is prepared by the designers and reviewed by the Health and Safety Facilitator for the project.

Risk assessments are used to identify hazards and assess risk at all stages during the life of the project including the construction & maintenance stages.

A Health and Safety Facilitator for the Design Process (HSF) is appointed on all projects where FT are the Project Supervisor for the Design Process (PSDP).

Health & Safety Facilitators are selected from the senior ranks of FT design staff to ensure they have the required knowledge, experience and training to carry out the role.

Meetings will be held between the HSF and relevant design personnel to collate all the risk assessments and other pertinent information and to discuss any issues relating to health and safety and ensure the constructability of the designs. The minutes of these meetings are circulated to the entire design team complete with actions allocated to the designers as appropriate. At such a meeting a "Construction Risk Analysis" form is completed which forms the basis for the Preliminary Safety & Health Plan. This document outlines the particular, significant and residual risks and in addition specific construction methods or sequences assumed during the design. Special requirements for maintenance envisaged at the design stage is also included.

A Designers Safety File shall be kept and maintained during the design. All design criteria adopted, and safety & health information required for the Safety File shall be kept in this file which is maintained by the HSF and is the pre-cursor to the Safety File. The information required from the Contractor/ PSCS for inclusion in the Safety File is specified at tender stage in the Preliminary Safety and Health Plan.

This information from the PSCS & Contractor(s) and the Designers Safety File is used to compile the Safety File in the latter stages of a contract and formally issued to the Client on completion of the contract.

FT promotes a collaborative approach to health and safety on site where the Client, PSDP, Designers, Contractors and PSCS co-operate with each other and share information. Joint site safety audits and/or walk-downs are carried out as part of this collaboration and safety is monitored and addressed on site on an ongoing basis. The regular safety meetings are held to document this ongoing co-operation, get an over-view of works currently in hand onsite and about to commence and share information.

5.2.5 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 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;
- 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;
- the location of electricity water and sewage connections so as to facilitate early establishment of welfare facilities.

In accordance with the PSDP's procedures the Preliminary Safety & Health Plan for the proposed works should include the following sections and subsections to ensure 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.

5.2.6 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.

5.2.7 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;
    - main 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;

- dealing with existing unstable structures;
- accommodating adjacent land use;
- other significant safety risks;

- Health risks:
  - removal of asbestos;
  - 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 tool box talks etc. as required.

6. EMERGENCY RESPONSE PLAN

This chapter of the CEMP presents an Emergency Response Plan for the proposed project. The Emergency Response Plan shall be finalized in accordance with this plan following the appointment of the contractor for the main 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. This outlines the immediate response to an emergency or disaster situation and will be developed by the main 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 rehabilitation works proposed at Ardcahan Bridge, examples of Emergency Response Plan emergency events are:

- medical emergency
- fire/explosion;
- serious vehicle collisions or overturning;
- falls from height;
- structural failure of the bridge;
- extreme weather event, storm/flooding;
- chemical and fuel spill;
- pollution of the water course.

6.1 Emergency Response Plan

6.1.1 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.

The local 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.

6.1.2 Reporting Emergencies – Immediate threat to Health and Safety of Public or Personnel

In the event of a medical or heath related emergency, immediately contact:

ALL ON SITE EMERGENCIES DIAL 999

As soon as it is safe to do so the event should be reported to the Employers Representative. Nominated representatives and contact details shall be provided to the Contractor and outlined in the site final Emergency Response Procedure.

6.1.3 Reporting Emergencies – Immediate threat to the Environment

As soon as it is safe to do so environmental emergencies should be reported to the Employers Representative, Inland Fisheries Ireland Representative, and National Park and Wildlife. Nominated representatives and contact details shall be provided to the Contractor and outlined in the site final Emergency Response Procedure,

6.1.4 Designated Responder

A map depicting the emergency meeting point will be furnished to the local 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)	Cork University Hospital	(021) 4920200
Urgent Care Unit	Bantry Hospital	(027) 50133
Ambulance Service	Dial 112 or 999	
Fire Services	Dial 112 or 999	
Service:	**Contact Details:**	
Garda Station	Dunmanway Garda Station	(023) 8845202

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.

6.1.5 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	x	**Radio**		**Voice**		**Hand Signals**		**Siren**

6.1.6 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.

6.1.7 Medical Protocol

In the event of a major medical emergency, the emergency centre (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).

6.1.8 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 safety 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 to 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 communicated by management during the 999 call. The emergency personnel escort will use the hazard lights on their vehicle, so they are easily identified.

6.1.9 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.

6.1.10 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. High wind warnings and 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.

6.1.11 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 4.3.3 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.

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APPENDIX 1

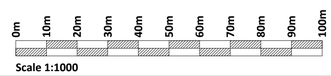
Ardcahan Bridge drawings

KEYPLAN

Scale - N.T.S.

PLAN

Scale 1:1000



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Rev.	Description	App By	Date
A	ISSUE FOR DISCUSSION	BDH	03.05.23
B	ISSUE FOR PLANNING	BDH	17.08.23

PROJECT

CORK COUNTY BRIDGE REHABILITATION SOUTH & WEST REGION 2019

CLIENT

Cork County Council
Comhairle Contae Chorcaí

SHEET

ARDCAHAN BRIDGE SITE LOCATION

Date 03.05.23	Project number P1959	Scale (@ A1-) 1:1000	
Drawn by POR	Drawing Number P1959-ARDH-0001		Rev B
Checked by TL			

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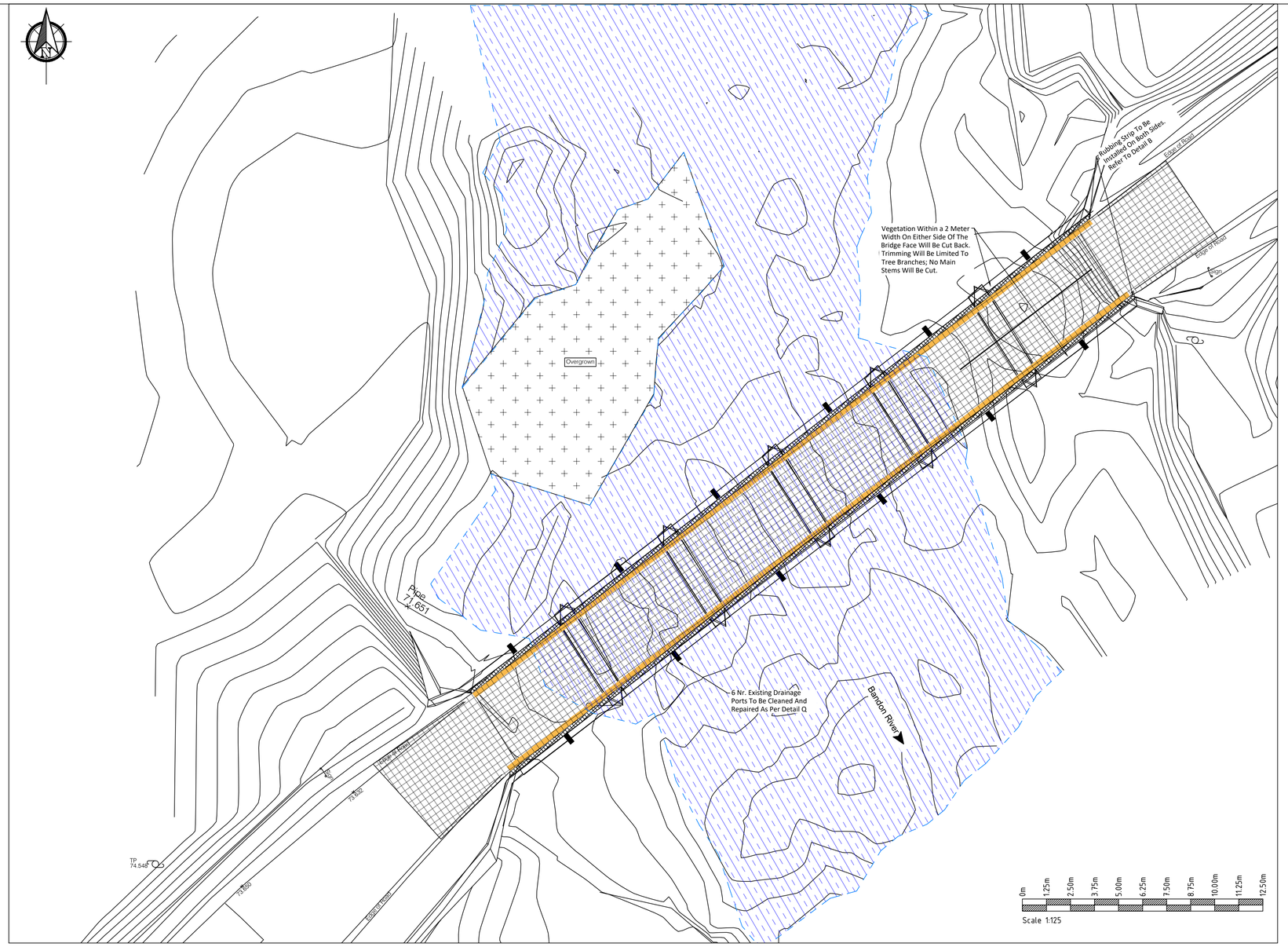
23 August 2023



LEGEND:

River Bandon

New Rubbing Strip

Proposed Resurfaced Area

ARDCAHAN PLAN VIEW

Scale 1:125

6.19. A trial hole and rebar scan shall be completed to confirm the deck reinforcement and strength. Note that the trial hole will be superficial and won't penetrate through the whole thickness of the deck. If this investigation is unsatisfactory, Cork County Council may introduce a weight limit to the bridge.

6.20. A spray applied bridge deck waterproofing system shall be installed. Spraying will only be carried out during calm, dry weather periods (little to no breeze) to prevent drift of airborne substances or runoff towards the river.

6.21. Kerb drain (feeding to new Black PVC drainage outlet) and concrete rubbing strip to be installed by an operator accessing the area from the deck level.

6.22. The pavement surface shall be laid, sand asphalt followed by HRA, high friction colour contract surfacing shall be applied.

6.23. Deck drainage outlets shall be reinstated.

Notes

1. Dimensions in meters unless otherwise noted.

2. Levels shown relative to ordinance datum (Malin Head).

3. Known existing service location shown in preliminary safety and health plan. Locations to be confirmed on site by contractor.

4. Drawing to be read in conjunction with the works specification.

5. Refer to drawing series P1959-ARDH-0004 for repair details.

6. Corrosion Repairs and Parapet minor repairs

6.1. To facilitate the installation of the suspended scaffold, vegetation within a 2-meter width on either side of the bridge face will be cut back. Trimming will be limited to tree branches; no main stems will be cut.

6.2. Suspended Scaffold from the bridge deck shall be designed by a temporary works design specialist. Suspended scaffold to be installed in order to provide access to the bridge deck soffit this will fully encase the bridge and will be supported by the bridge itself. Note that the scaffold will be fully installed from the bridge without the need for any access to the riverbed. A road closure licence will be required during the whole duration of the works.

6.3. Field tent and bund to be erected on the scaffolding to contain and prevent any dirt and debris falling into the river. The field tent and bund will be impermeable and daily checks will be carried out by the appointed contractor to ensure the system remains in good condition and is capable of fulfilling it's function, i.e. containing waste and contaminants within the work area. The bund will cover the surface of the working scaffold deck and tie in with the sides of the field tent to ensure no leakage of fluids/solids will occur. The field tent will cover the entire scaffold and will prevent rain ingress and associated washout of contaminants including sand, paint, concrete or debris.

6.4. Steel beams to be sandblasted to SA2.5 as per detail provided in Drawings P1959-ARDH-0004. Clean sand only to be used. Note that one operator will carry out the sandblasting using appropriate sandblasting equipment accessing to the beams surface from the suspended scaffold provided. Sandblasting equipment typically consists of a chamber in which sand and air are mixed. The mixture travels through a hand-held nozzle to direct the particles toward the surface of work. Field tent to be sealed to ensure the sand and debris won't leak out to the river.

6.5. Welding of additional steel plate at the bottom flange of existing steel beams as shown in Drawings P1959-ARDH-0004. Note that one operator will carry out the welding using portable electric welding equipment accessing the beams surface from the suspended scaffold provided. Note that any petrol generator needed to operate equipment will be positioned on the bridge deck and bunded to 110% capacity, daily inspection of bund to be carried out by the appointed contractor to ensure no oil/petrol spillage will occur. Any generator used on the bridge deck will be removed after works cease and stored in a secure bunded area in the compound overnight.

6.6. A protective paint system to be applied to all exposed steel work, Hempel Hempadur Mastic 45880/1 or similar approved to be applied by brush in 2 coats of minimum 190 micron DFT (dry film thickness). Note that one operator will paint the steel beams accessing to them from the suspended scaffold provided.

6.7. Stainless Steel Drip Strips will be positioned along the bottom edge of the bridge parapet on both sides of the bridge, the holes will be drilled along the bridge as per the spacing shown in drawing P1959-ARDH-0004 and bolted through with post-fixed mechanical anchors as shown in drawings P1959-ARDH-0004. The position of these elements is shown on drawings P1959-ARDH-0004.

6.8. Cracking at Deck Pier interface to be injected with Epoxy Resin. Prior the injection, the crack and surrounding surface will be cleaned to allow the paste-over to bond to sound concrete. The epoxy resin will be pressure pumped locally (directly into the cracks) to close the cracks at the Deck Pier interface. The deck/pier interface is above the waterline.

6.9. Vegetation on the internal side of the existing parapet and drainage outlets to be cleared from structure.

6.10. Minor repairs to missing sections of render shall be carried out along the parapet as shown in P1959-ARDH-0003. Repairs to be carried out by hand by an operator accessing the parapet surface from the deck/scaffolding level.

6.11. New Black Pvc drain pipe to be positioned in the existing drainage outlets location and fixed in place with mortar from the deck level.

6.12. Scaffold tent and bund to be cleaned and material to be sent to an appropriate licensed off-site waste management facility. Waste/debris will be collected and placed in secure containers and brought up to the bridge deck for transfer to the site compound and then off-site disposal at a suitably licensed facility. The frequency of waste/debris removal from the scaffold will occur at minimum at the end of each work day, or following completion of a specific task, whichever occurs first. If large volumes of waste/debris are created due to the nature of the task, removal will occur more frequently, in order to prevent large buildups which would pose a higher environmental risk and also pose health and safety risks in the confined environment of the enclosed scaffold. Collected waste will be removed from the compound for off-site licensed storage/disposal at the end of each day.

6.13. The scaffold tent and bund will be inspected prior to and during works, and following each task, to ensure any breaches in the material potentially caused by works are detected. In the event of a breach occurring, works will cease. If possible the breach will be repaired and sealed with suitable materials. If the breach cannot be repaired, all debris will be removed and works will be paused until a new tent/bund is installed.

6.14. Scaffold to be safely removed. The procedure used will be the reverse of the installation described above.

Deck Works:

6.15. Upon completion of corrosion repairs works it is proposed to repair the road surfacing on this bridge and Parapet. A road closure and diversion will be required to facilitate these works. Works shall not be carried out in periods of heavy rain. Heavy rain is defined by Met Éireann as a precipitation rate that exceeds 2 mm per hour averaged over 3 or 6 hours.

6.16. The deck drainage outlets shall be blocked with a water proof membrane to prevent run off or debris entering the water course.

6.17. The existing road surface shall be scarified, and the existing surface shall be removed, and the concrete surface of the bridge deck exposed.

6.18. Any defects encountered when deck is exposed to be repaired using an appropriate concrete repair mortar. This will only include small, localized repairs with concrete repair mortar, only the top side of the deck will be involved with no risk of leakage to the river.

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PROJECT
CORK COUNTY BRIDGE REHABILITATION SOUTH & WEST REGION 2019

CLIENT
Cork County Council
Comhairle Contae Chorcaí

SHEET
ARDCAHAN BRIDGE PLAN

Date 03.05.23	Project number P1959	Scale (@ A1-) As Shown
Drawn by SM	Drawing Number P1959-ARDH-0002	Rev C
Checked by TL		

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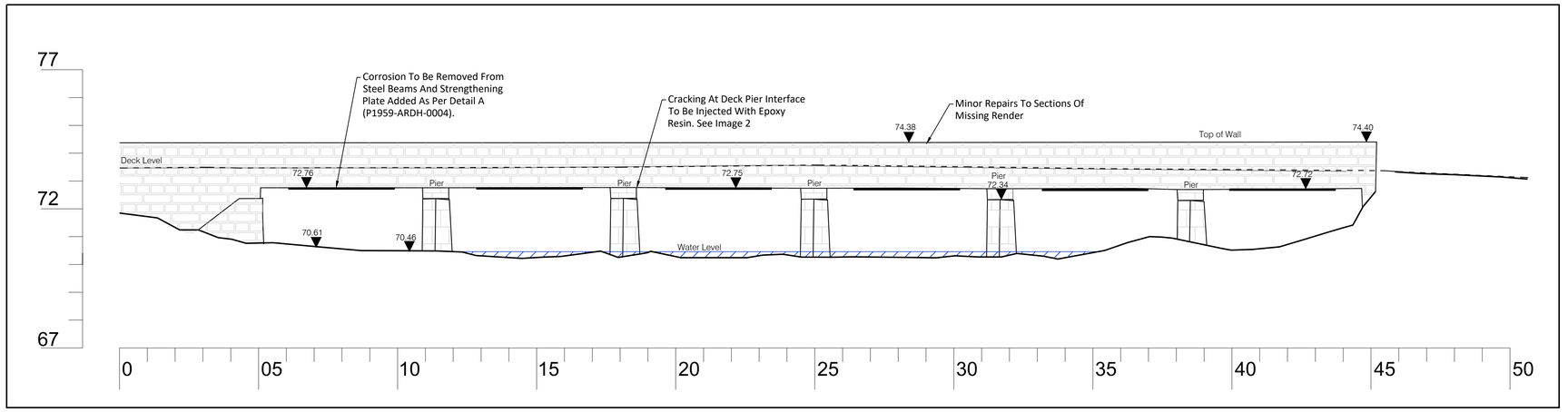
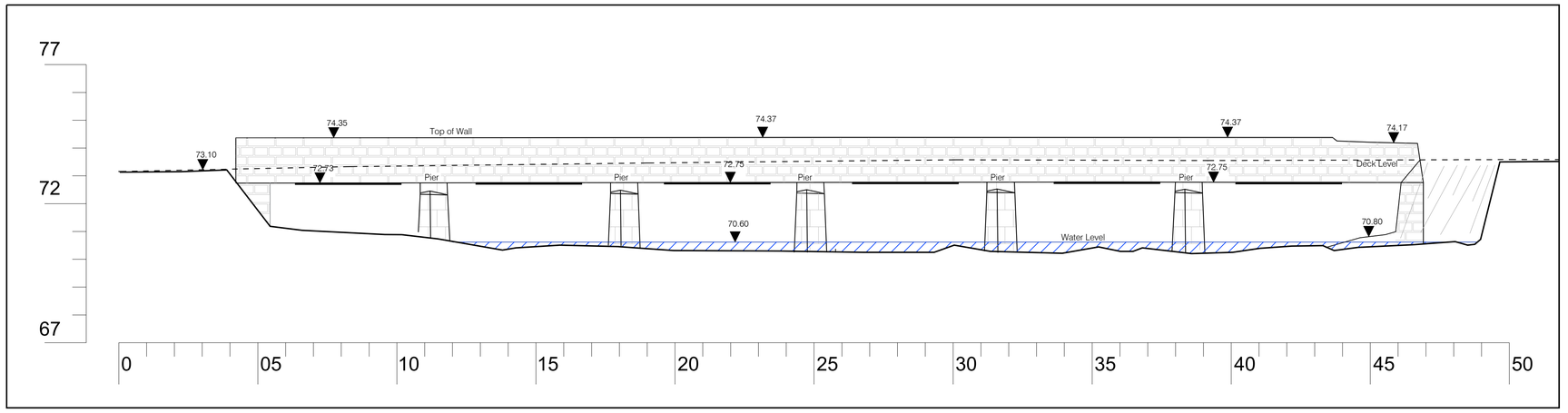
23 November 2023



EAST ELEVATION

Scale 1:100

IMAGE 1 - BRIDGE SOFFIT - @ MID SPAN



WEST ELEVATION

Scale 1:100

IMAGE 2 - BRIDGE SOFFIT - @ SUPPORT

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PROJECT

CORK COUNTY BRIDGE REHABILITATION SOUTH & WEST REGION 2019

CLIENT

Cork County Council
Comhairle Contae Chorcaí

SHEET

ARDCAHAN BRIDGE ELEVATIONS

Date: 03.05.23
Project number: P1959
Scale (@ A1-): As Shown
Drawn by: SOC
Drawing Number: **P1959-ARDH-0003**
Rev: **B**
Checked by: TL

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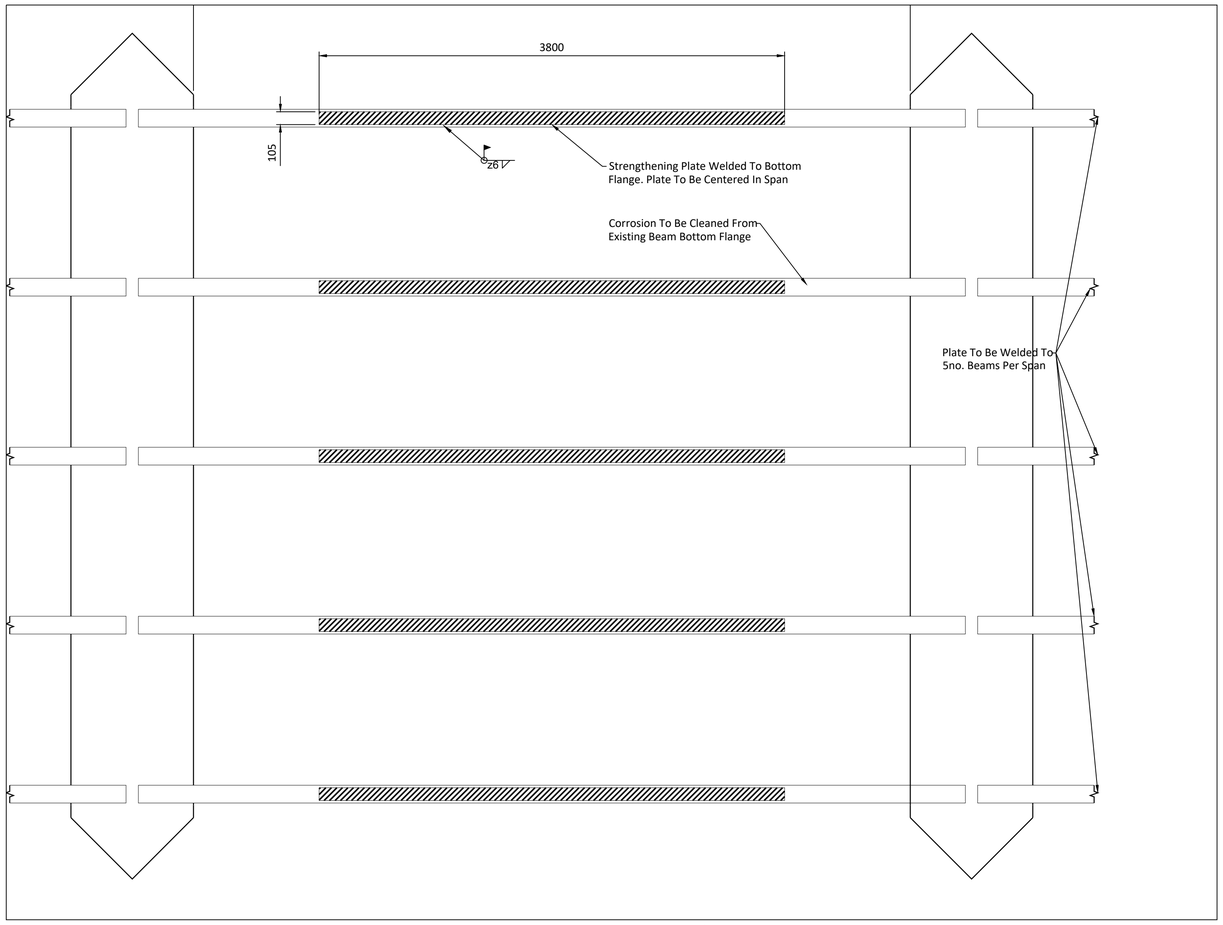
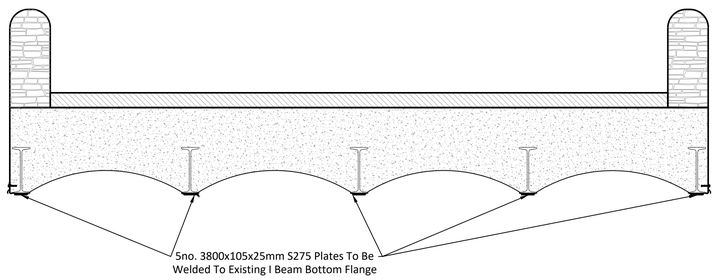
Thursday 24 August 2023



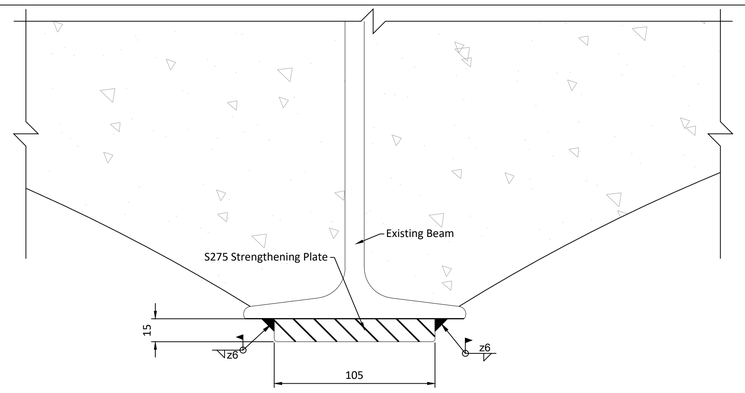
PLAN VIEW - Remedial works at Steel Beams

Scale 1:25



TRANSVERSE SECTION THROUGH BRIDGE

Scale 1:25

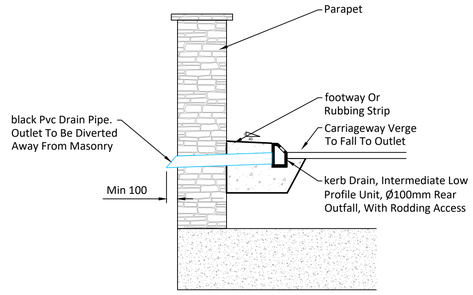


DETAIL A - Strengthening Plate

Scale 1:2

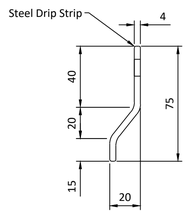
Notes

1. Dimension in millimeters unless otherwise notes.
2. Levels shown relative to ordinance datum (Malin Head).
3. Known existing service location shown in prelim safety and health plan. Locations to be confirmed on site by contractor.
4. Drawing to be read in conjunction with the works specification.
5. Cast in situ rubbing strip kerb to conform to CC-SCD-01102



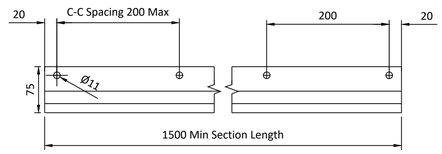
DETAIL B - KERB DRAIN

Scale 1:25



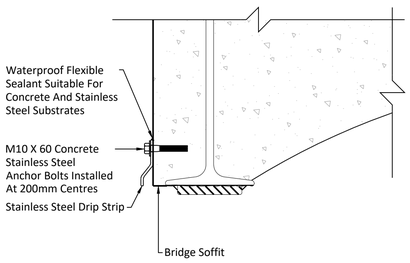
Drip Strip Cross-Section

Scale 1:2



Drip Strip Elevation

Scale 1:5



Drip Strip Installation

Scale 1:5

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PROJECT

CORK COUNTY BRIDGE REHABILITATION SOUTH & WEST REGION 2019

CLIENT

Cork County Council
Comhairle Contae Chorcaí

SHEET

ARDCAHAN CONSTRUCTION DETAILS

Date 03.05.23	Project number P1959	Scale (@ A1-) As Shown	
Drawn by SOC	Drawing Number P1959-ARDH-0004		Rev B
Checked by TL			

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Wednesday 23 August 2023

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