

TRIM MILLENNIUM PEDESTRIAN BRIDGE SCHEME

Construction and Environmental Management Plan

Prepared for:
Meath County Council



comhairle chontae na mí
meath county council

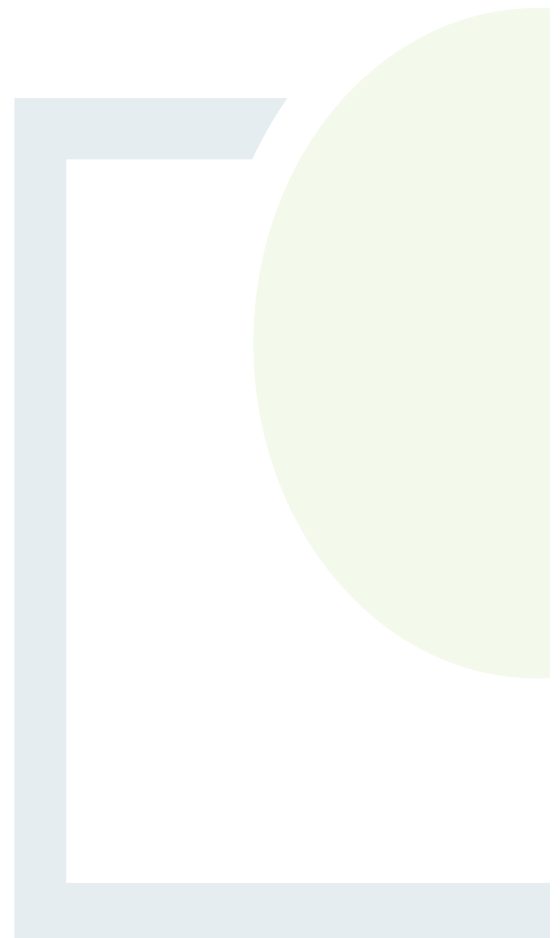
Date: May 2024

Document No:
P22256-FT-ZZ-XX-RP-EN-0003

Core House, Pouladuff Road, Cork, T12 D773, Ireland
T: +353 59 972 3800 | E: info@ftco.ie

CORK | DUBLIN | CARLOW

www.fehilytimoney.ie



CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

REVISION CONTROL TABLE, CLIENT, KEYWORDS AND ABSTRACT

User is responsible for Checking the Revision Status of This Document

Rev. No.	Description of Changes	Prepared by:	Checked by:	Approved by:	Date:
P01	For Approval	PF/CW	BB	BDH	11/03/2024
P02	Final	PF/CW/KB	BB	BDH	31/05/2024

Client: Meath County Council

Keywords: Trim, Pedestrian Bridge, Replacement, CEMP

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

TABLE OF CONTENTS

1. INTRODUCTION	1
1.1 General Introduction and Purpose.....	1
1.2 The Applicant.....	1
1.3 The Site	2
1.4 The Project.....	3
2. EXISTING SITE ENVIRONMENTAL CONDITIONS	4
2.1 Existing Site Description	4
2.2 Habitats Within and Immediately Adjacent to the Proposed Development	5
2.3 Invasive species	5
2.4 Mammals (excluding bats)	5
2.5 Bats	5
2.6 Avifauna.....	5
2.7 Aquatic Surveys	6
3. OVERVIEW OF CONSTRUCTION WORKS.....	7
3.1 Temporary Site Compound	7
3.2 Preparatory Works	8
3.3 Bridge Deck Installation.....	9
3.4 Approach Ramps and Finishes.....	9
3.5 Emergency Procedures.....	9
3.6 Construction Programme	10
3.7 Construction Working Hours	10
4. ENVIRONMENTAL MANAGEMENT PLAN.....	11
4.1 Introduction.....	11
4.2 Project Obligations	11
4.2.1 AA screening/NIS Obligations	11
4.2.2 Planning Permission Obligations.....	11
4.2.3 Other Obligations	12
4.3 Environmental Management Programme.....	12
4.3.1 Air Quality.....	12
4.3.2 Noise and Vibration Minimisation Plan.....	13
4.3.3 Ecological Management Plan	13
4.3.4 Soil Management Plan	16

4.3.5	Waste Management Plan	18
4.3.6	Traffic Management Plan	21
4.3.7	Dust Management Plan	25
4.3.8	Archaeology, Architectural and Cultural Heritage	27
4.4	Environmental Management Team - Structure and Responsibility	27
4.5	Training, Awareness and Competence	28
4.6	Environmental Policy	28
4.7	Register of Environmental Aspects.....	28
4.8	Register of Legislation	28
4.9	Objectives and Targets	28
4.10	Non-Conformance, Corrective and Preventative Action.....	29
4.11	EMS Documentation.....	29
4.12	Control of Documents	30

5. SAFETY AND HEALTH MANAGEMENT PLAN 31

5.1	Introduction.....	31
5.2	Project Obligations	31
5.2.1	Environmental Management Plan Obligations	31
5.2.2	Planning Permission Obligations	31
5.2.3	Statutory Obligations	31
5.2.4	The Management of Health and Safety during the Design Process.....	34
5.2.5	The Preliminary Safety and Health Plan	35
5.2.6	The Management of Health and Safety during the Construction Phase	37
5.2.7	The Construction Stage Safety and Health Plan.....	37

6. EMERGENCY RESPONSE PLAN 40

6.1	Emergency Response Plan.....	40
6.1.1	Emergency Response Liaison	40
6.1.2	Reporting Emergencies – Immediate threat to Health and Safety of Public or Personnel.....	41
6.1.3	Reporting Emergencies – Immediate threat to the Environment	41
6.1.4	Designated Responder	41
6.1.5	Emergency Alarm	42
6.1.6	Emergency Reporting	42
6.1.7	Medical Protocol	42
6.1.8	Emergency Response	42
6.1.9	Escape and Evacuation Procedure	43

6.1.10 Prevention of Illness/Injury Due to Weather/Elements.....	43
6.1.11 Environmental Emergency Procedure	44

LIST OF APPENDICES

Appendix 1 – Trim Millennium Pedestrian Bridge Drawings

Appendix 2 – Aquatic Baseline Report

LIST OF FIGURES

	<u>Page</u>
Figure 1-1: Plan Location of Bridge.....	2
Figure 2-1: Location of Trim Millennium Pedestrian bridge in context of the River Boyne and River Blackwate SAC and SPA (Site codes 002299 and 004232)	4
Figure 3-1: Proposed Site Layout.....	8
Figure 4-1: Project Management Team Organogram	27

LIST OF TABLES

Table 1-1: Coordinates of Bridge.....	2
Table 4-1: Construction Noise Mitigation Measures	13
Table 4-2: Site Specific Ground Hazards - Soil Management	17
Table 4-3: Nearby Waste Management Facilities	20



1. INTRODUCTION

1.1 General Introduction and Purpose

This document is the Construction and Environmental Management Plan (CEMP) for the proposed Replacement of the Trim Millennium Pedestrian Bridge, Co. Meath and has been prepared by Fehily Timoney and Company (FT) on behalf of Meath 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 Trim Millennium Pedestrian Bridge 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 Trim Millennium Pedestrian Bridge Works.

1.2 The Applicant

The applicant for the proposed project is Meath County Council.



1.3 The Site

The location of the proposed bridge is to be at the same location as that of the Trim Millennium Pedestrian Bridge which was demolished in August 2022. The bridge is centrally located in Trim, positioned just to the east of Trim Town centre and the location is shown in the Figure below. The bridge spans the River Boyne and connects Trim Castle to the Porch Fields. The previous wooden Millennium Pedestrian Bridge was deconstructed in 2022 and temporarily replaced with a bailey bridge installed by the Irish Army. There are two Natura 2000 sites within 15 km of the proposed development. The Millennium Bridge spans the River Boyne and River Blackwater SAC and River Boyne and River Blackwater SPA. Given the nature and scale of the proposed development, any potential impacts are likely to be limited to the immediate vicinity, within a distance of no more than 100m.



Figure 1-1: Plan Location of Bridge

Table 1-1: Coordinates of Bridge

Reference System	Crossing Point Coordinates
Latitude, Longitude (deg.)	53.555, -6.7893
ITM (m)	680218, 756858
Irish Grid (m)	80273, 56836



1.4 The Project

The proposed pedestrian bridge is a replacement for the Millennium Pedestrian footbridge which was demolished in August 2022. The superstructure of the demolished bridge was constructed from Ekki timber in 2001 but was observed as having undergone significant failure during a structural inspection undertaken in July 2022. The abutments and foundation of the bridge are still in place, and it is proposed to reuse the mass concrete foundations for the new bridge structure. The new bridge will therefore be at the same location and have the same span as that of the original Millennium Pedestrian Bridge. The new bridge superstructure will take the form of a warren truss and will be constructed from structural steel. The truss will be prefabricated off site and will be craned into position onto newly constructed reinforced concrete abutments seated on the existing mass concrete foundations.



2. EXISTING SITE ENVIRONMENTAL CONDITIONS

2.1 Existing Site Description

The surrounding area of the proposed bridge is characterised by Trim Castle located to the South, Trim Town Centre to the west and the porch fields to the north. At the south abutment, three paths lead towards the bridge. Two of these feed from the adjacent car park which is at a higher level and the paths descend towards the bridge location. Extending east from the south abutment, a path runs along the banks of the River Boyne, between the river and Trim Castle.

At the north abutment, an informal path connects from the Yellow Steeple and this path runs down a steep embankment. The formal path extends in an easterly direction from the bridge along the bank of the river. To the west of the bridge is located Talbot Castle and there is no access along the river in this direction.

The bedrock of the project area is Limestone. The soil types at and in the vicinity of the bridge are Alluvium and Made Ground / Topsoil. The site is located within the River Boyne and River Blackwater SPA and SAC.

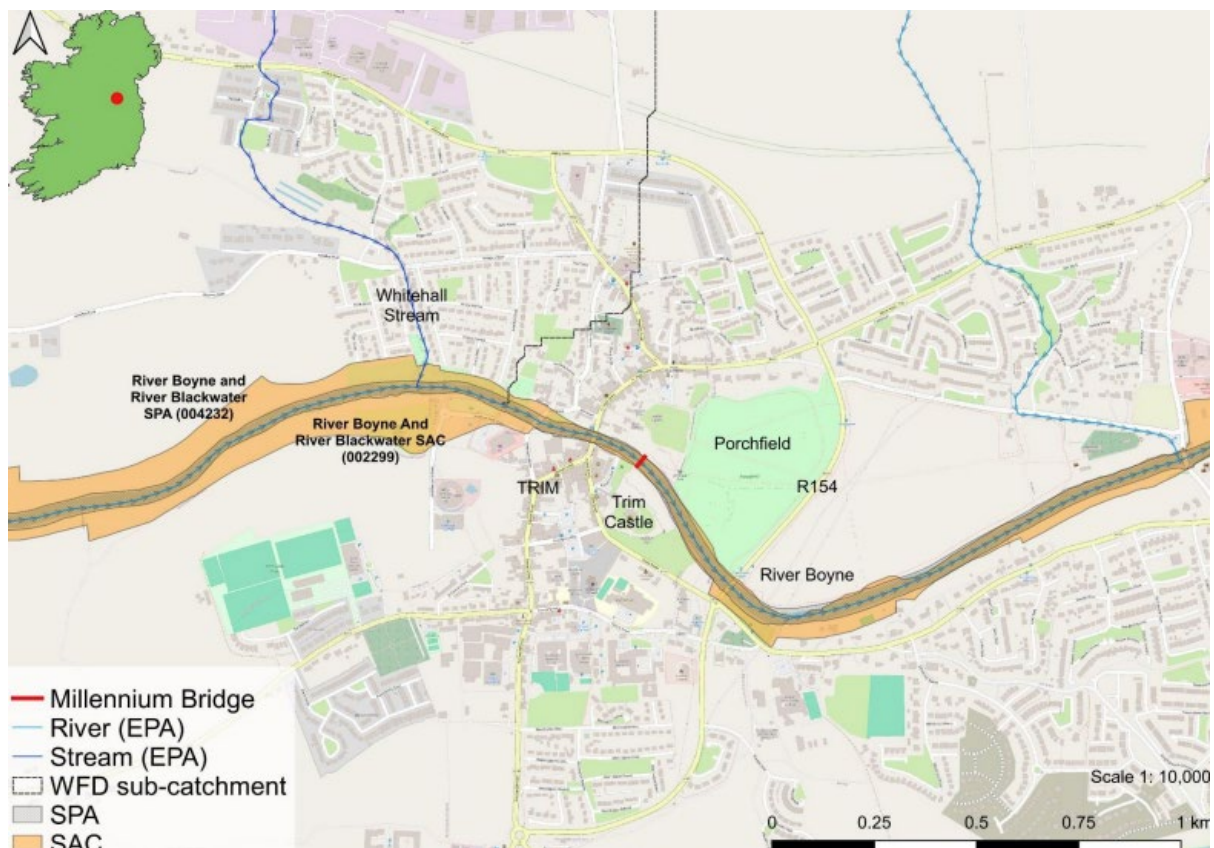


Figure 2-1: Location of Trim Millennium Pedestrian bridge in context of the River Boyne and River Blackwater SAC and SPA (Site codes 002299 and 004232)



2.2 Habitats Within and Immediately Adjacent to the Proposed Development

The site of the proposed new Trim Millennium Bridge is immediately adjacent to Trim town and crosses the River Boyne. Existing land use in the area is predominantly amenity and recreation. The land use classifications for the surrounding area as defined by the 2018 CORINE landcover dataset are discontinuous urban fabric (112) and pastures (231).

There are no habitats identified on site that conform to those listed under Annex I of the EU Habitats Directive.

The habitats on site are Depositing/Lowland River (FW2), which was bordered by Riparian woodland (WN5) and improved Amenity Grassland (GA2).

For further details related to the ecological context of the site see the associated Ecological Impact Assessment.

2.3 Invasive species

The only invasive species observed within the River Boyne near the bridge and adjacent to the river near the bridge were sycamore and an invasive pondweed species (*Elodea sp.*). Sycamore is not listed on the Third Schedule, thus there is no requirement for an invasive species management plan. All *Elodea* species are listed on the Third Schedule. However, as there are no in-stream works proposed, there are no sources for impacts related to potential spread of this species which is present in the river.

2.4 Mammals (excluding bats)

Two regular otter spraint sites were recorded on a retaining wall ledge and stormwater inflow pipe upstream of the existing footbridge.

2.5 Bats

The River Boyne and riparian woodland present near the proposed project site offer potential foraging and commuting areas for bats.

2.6 Avifauna

Designated kingfisher surveys were carried out on the 6th of July, 24th of July and 8th of August 2023. During these surveys no kingfisher was noted, and no suitable nesting habitat was found. Suitable kingfisher perches and foraging habitat was however noted, and temporary disturbance to foraging kingfisher may occur outside of the breeding season.

A total of 39 bird species were recorded near the bridge location along the river across three kingfisher surveys in July and August 2023. Of these two species were red-listed: grey wagtail and swift and 12 species were amber-listed. None of the species noted during dedicated surveys are listed as Annex I species.



2.7 Aquatic Surveys

A full aquatic baseline report for the proposed Trim Millennium Pedestrian Bridge Scheme has been prepared by Triturus Environmental Ltd. and is available in Appendix 2.



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 southern abutment which will include welfare facilities. The location of the temporary site compound is proposed to be set back c. 50m southwest of the southern abutment of the bridge, as shown in the Figure below. The temporary compound shall be constructed in the grassed area adjacent to the existing car park. Temporary facilities will be removed, and the lands reinstated upon completion of the construction phase. A storage area will also be provided adjacent to the north abutment to allow for storage of materials and plant required for construction of the north abutment and embankments.

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

1. Welfare facility consisting of container with portaloo
2. Employee parking
3. Contractor lock-up facility
4. Bottled water for potable supply
5. Water tanker to supply water used for other purposes
6. Bunded fuel storage
7. Diesel generator
8. Storage areas
9. Waste management areas

The site compound is proposed to be located adjacent to the Car Park, southwest of the bridge (see Figure below).

All washout will be carried out in a dedicated area of the temporary compound as shown in 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 at both the south and north abutments 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 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 grassed land within the River Boyne and River Blackwater SAC and SPA and particular attention needs to be given to ensure the area is contained and no run off occurs to River Boyne (see Figure 3 1).



Figure 3-1: Proposed Site Layout

3.2 Preparatory Works

1. Existing reinforced concrete bankseats shall be removed and shall be reused as fill for the approach ramps.
2. New reinforced concrete abutments shall be constructed on top of the mass concrete foundation including wingwalls. The closest face of the abutment shall be approximately 1.2m from the edge of the river, depending on water levels, and each abutment shall contain 16.5m³ of in situ concrete which will be delivered to site by ready-mix delivery trucks. Reinforcement for the abutments will be fixed and formwork erected prior to concreting.
3. Two coats of epoxy paint to be applied to the areas of the reinforced concrete abutment which are to be buried



4. Bridge bearings to be installed onto the newly constructed abutment bankseats. Anchors for the bearings shall be cast into the concrete when constructing the abutment. The underside of bearing plates are to be grouted (0.1m³ grout).
5. Temporary Bailey Bridge located directly west of the proposed bridge to be removed by Army through reverse launching of the deck. Abutment blockwork etc to be removed after removal of bridge deck

3.3 Bridge Deck Installation

1. The bridge structure will be constructed using structural steel and shall be prefabricated offsite.
2. The prefabricated bridge deck will be transported to site by lorry.
3. It is anticipated that a single crane will be used to install the bridge deck onto the bearings. The crane will be positioned on the southern bank of the River Boyne.
4. After craning into position, the bridge superstructure shall be fixed to the bridge bearings on top of the bridge abutments.

3.4 Approach Ramps and Finishes

1. The topsoil and existing surfacing shall be removed from the area below the approach ramps to a depth of approximately 0.3m. The approach ramp and footpath on the North Abutment has a plan area of approximately 140m² while the approach ramps on the southern side have a plan area of approximately 400m². The approach ramp commences approximately 4m from the watercourse.
2. 20m³ of 6N/6P Fill shall be imported for the backfill at the abutments and 115m³ of Engineered Fill used to raise the approach embankments to the required bridge level approximately 1.2m above the existing ground level. The fill be compacted by vibratory roller as it is placed.
3. The approach paths to the bridge will receive a bound finish to tie in with the adjacent approach paths. A total area of approximately 400m² shall require finishing with a bound macadam surfacing.
4. The side slopes of the ramps will be top soiled and seeded with grass to match the surrounding areas.
5. Timber post and rail fencing shall be provided at each abutment to prevent falls. Posts shall be driven into the ground to the required depth.
6. A bridge deck joint will be installed at each abutment at the interface between the bridge deck and the approach ramps. This will be fixed to the structure through the use of an appropriate adhesive.
7. A permanent precast bollard will be constructed at each end of the bridge to prevent vehicular access to the bridge. The post shall have an in-situ concrete footing with an approximate volume of 0.2m³.

3.5 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 52.2m AOD Malin works at the abutments will cease, and the procedures detailed below will be followed:

In the event of heavy rainfall or threat of flooding which compromises works being undertaken at the abutments, 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.

3.6 Construction Programme

The total construction phase of the project is anticipated to last for a period of 6 months, including for the fabrication of the steel bridge off site. The estimated length of time for works on site is approximately 10-12 weeks.

3.7 Construction Working Hours

All construction work will typically be conducted Monday to Friday 08:00 to 18:00. At the peak of the construction phase for the proposed development approximately 5-10 people would be working within the site. 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 Trim Millennium Pedestrian 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 NIS.

4.2 Project Obligations

In the construction works proposed at Trim Millennium Pedestrian 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, business owners, 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 will be dust arising from earthworks, the temporary storage of excavated materials, the movement of construction vehicles, loading and unloading of aggregates/materials, demolition of existing reinforced concrete bankseats and the movement of material around the site.

Construction vehicles and plant emissions have the potential to increase concentrations of compounds such as NO₂, Benzene and PM₁₀ 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 Minimisation Plan

Construction Stage Mitigation Measures

The hours of construction activity will be limited to avoid unsociable hours. Construction operations shall be restricted to between 08:00 to 18:00 Monday to Friday and 08:00 to 14:00 Saturday, unless specifically agreed otherwise. A site representative responsible for matters relating to noise should be appointed.

The construction works will be carried out in accordance with the guidance set out in BS 5228:2009+A1:2014 which sets out the following general mitigation measures which will be implemented to reduce impacts related to construction noise and vibration. Table 4-1 contains a list of the mitigation measures for noise minimisation during construction.

Table 4-1: Construction Noise Mitigation Measures

Mitigation No.	Description of Mitigation Measure
1	Avoid unnecessary revving of engines and switch off equipment when not required.
2	Keep internal haul routes well maintained and avoid steep gradients.
3	Select equipment conforming to international standards on noise and vibration.
4	Select equipment with quiet and low vibration emissions, and ensure equipment is regularly maintained ensuring it operates in an efficient manner. If possible, all mechanical plant will be fitted with effective exhaust silencers.
5	Compressors will be of the “sound reduced” models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers.
6	Locate equipment as far away as noise sensitive receivers as possible within constraints of the site.

4.3.3 Ecological 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 which are identified as key ecological receptors. 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 Ecological Impact Assessment (EclA) and Natura Impact Statement(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 (birds).

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 Appendix 2, the EclA 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.

4.3.3.4 Mitigation by Avoidance and design

With regards to the proposed pedestrian bridge scheme, the following design and best practice measures are incorporated into the proposed project:

- The bridge and footprint of ancillary structures such as footpaths and ramps will follow the footprint of the existing approach paths and the former pedestrian bridge;
- The bridge will utilise existing foundation for the abutments;
- No in-stream works will take place for the installation of the bridge and ancillary infrastructure;
- The bridge is pre-fabricated and will be lifted into place in one piece by a crane, which will be located on the southern bank of the River Boyne;
- No new roads will be established to build the proposed bridge development;
- A geotextile will be placed under the aggregate hard standing of the site compound and access roads to minimise soil disturbance and ensure the seed bank is retained to aid in natural recolonisation after the hardstanding is removed.
- For decommissioning the self-supporting bridge structure can be lifted off the abutments via crane in one piece.

4.3.3.5 Mitigation measures to be implemented prior to the construction phase of the project

- The Contractor's Construction Manager will ensure the effective operation and maintenance of mitigation measures during the construction process.
- Toolbox talks will be undertaken with construction staff on the implementation and maintenance of mitigation measures.



4.3.3.6 Mitigation measures during the construction phase of the project

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 by reducing risk of sediment and pollutants from entering the River Boyne.

- A regular review of weather forecasts of heavy rainfall is required. Weather forecasts will be reviewed daily. Earthworks and concrete works will not take place during periods of heavy rainfall (>10mm/hour) or in the 24-hour period following heavy rainfall.
- Any earthen (sod) banks to be excavated within the grassy areas will be carefully opened with the surface sods being stored separately and maintained for use during reinstatement.
- Any temporary spoil heaps and stockpiles will be more than 20m away from the watercourse and be kept to less than 2m in height. The heaps will be surrounded by silt fences and preferably placed in a well vegetated area. Compact the surface of any stored soil or spoil heaps and keep their height to less than 2m. In heavy rainfall spoil heaps and stockpiles must be covered with geotextile to prevent erosion when not in use. Any surplus material will be transported off site and disposed of at a fully authorised soil recovery facility.
- Where suitable and where it is safe to do so; re-use of broken concrete components from demolished abutments, excavated stone, soil etc. as suitable fill or landscaping material elsewhere on site (see section 2 for details of materials proposed to be re-used);
- Where waste disposal (including excess excavated material) is unavoidable, waste will only be recovered or disposed of at an authorised site with a current Waste License or permit in accordance with the waste management acts, 1996 to 2008.
- This will not apply to the reuse of excavated uncontaminated soil and other naturally occurring material within the site boundary.
- Temporary silt fences will be installed along the river bank to isolate works from the watercourse and around soil stockpiles. A twin layer of silt fencing will be installed at all locations. Additional silt fencing will be kept on site in case of an emergency break out of silt laden run-off and for repairs.
- Concrete management will take place as to best practice measures to ensure no concrete emissions will enter the River Boyne.
- Any hazardous materials to be 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. No hazardous materials will be stored within 20m of any watercourses or other surface water feature.
- Refuelling of machinery will be carried out within the site compound and designated storage areas only.
- 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.
- Portaloo's and/or containerised toilets and welfare units will be used to provide toilet facilities for site personnel. Sanitary waste will be removed from site by a licensed waste disposal contractor.

Additional mitigation measures related to the timing of works for birds.



- Any trimming of vegetation (other than groundcover vegetation) should be carried out outside of the bird breeding season (March 1st – August 31st). If vegetation clearance must occur within the breeding season, then an ecologist will need to be appointed to check any area of riparian woodland/shrub for nests and breeding birds. The ecologist will examine the area(s) of construction/clearance no more than 48 hours in advance of works. These surveys will determine the presence/absence of nesting birds, and if active nests are present - no cutting will take place. They will have the authority to include a buffer zone if needed until young birds have fledged or it has been confirmed that breeding has failed.

4.3.3.7 *Mitigation measures during the operational phase of the project*

- Areas of the side-slopes of the new approach ramps which cannot be covered with existing sods, will be seeded with a diverse native grassland and meadow flower mix as soon as practicable. Mixes shall be a selected combination of appropriate grasses and wildflowers and appropriate to the particular site and soil conditions. Appropriate species to be included are laid out in the Ecological Impact Assessment.
- Shrubby vegetation will be planted to shield concrete abutments from sight. The shrubs planted will be of native species which are tolerant of the wet soil near the river. These can be selected from several willow species and hawthorn.
- Maintenance of shrubby vegetation that shield concrete abutments from sight, will only take place outside of the bird breeding season (March 1st - August 31st).

4.3.3.8 *Mitigation measures during the decommissioning phase of the project*

All mitigation measures regarding site supervision, earthworks, works near watercourses, vegetation, plant and machinery and spoil and waste management outlined for the Construction Phase, will also be employed during the Decommissioning Phase.

4.3.4 Soil Management Plan

This Soil Management Plan has been prepared for the development of the works at Trim Millennium Pedestrian 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 4-2. 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 4-2: Site Specific Ground Hazards - Soil Management

Site Specific Hazards	
Trim Millennium Pedestrian Bridge	<ul style="list-style-type: none"> • Materials storage • Demolition of existing reinforced concrete bankseat abutments • Construction on new reinforced concrete abutments • Laying of temporary hardstanding materials • Construction of Approach Ramps

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 River Boyne. Mitigation measures identified below 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 Trim Millennium Pedestrian Bridge works that could impact on land, soils and geology are:

- Drainage
- Vehicular movement
- Construction of temporary site compound
- Construction of reinforced concrete abutments
- Earthworks for approach ramps and footpaths

Construction Stage Mitigation Measures

Measures for spills

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

- 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 Trim Millennium Pedestrian Bridge 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 Construction 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 4-3.

Table 4-3: Nearby Waste Management Facilities

Facility	Type of wasted accepted
Navan Recycling Centre	Heavy, mixed waste
Kells Recycling Centre	Heavy, mixed waste
Trim Recycling Centre	Heavy, mixed waste
Dunboyne Recycling Facility - Thorntons Recycling	Most waste including hazardous waste
Beauparc Recycling Centre - Panda Waste	Mixed 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 Trim Millennium Pedestrian Bridge, Co. Meath. 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 Meath 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 Síochána.

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 Trim Millennium Pedestrian Bridge, 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.

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;
- Mobile Cranes;
- Concrete Trucks;
- General construction delivery vehicles;
- 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 18:00 hours Monday to Friday and between 08:00 and 13:00 on 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 **Error! Reference source not found..**

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.

Meath 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 bridge 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 Contractor's Construction 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. They 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. They will supervise construction personnel ensuring their competence.

They 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 Meath 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 Meath 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 Trim Millennium Pedestrian Bridge 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.
- Demolition of existing reinforced concrete bankseats
- Drilling/cutting of concrete

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.
- Dust suppression tanks to be used when drilling/ cutting.

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.



4.3.8 Archaeology, Architectural and Cultural Heritage

The contractor is required to implement the following measures in relation to archaeology, architectural and cultural heritage during construction:

- All ground excavations associated with the proposed development will be monitored by a suitably qualified archaeologist. This will enable the identification of any previously unrecorded features/deposits of archaeological significance. Full provision will be made to ensure the preservation by record of any such features, should that be deemed the most appropriate manner in which to proceed, following consultation with the DCHG;
- All archaeological works will be carried out under the supervision of a project archaeologist, appointed on behalf of Meath County Council, to ensure all mitigation measures are implemented;

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 Construction Manager will be responsible for the delivery of all elements of the Environmental Management Plan.

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

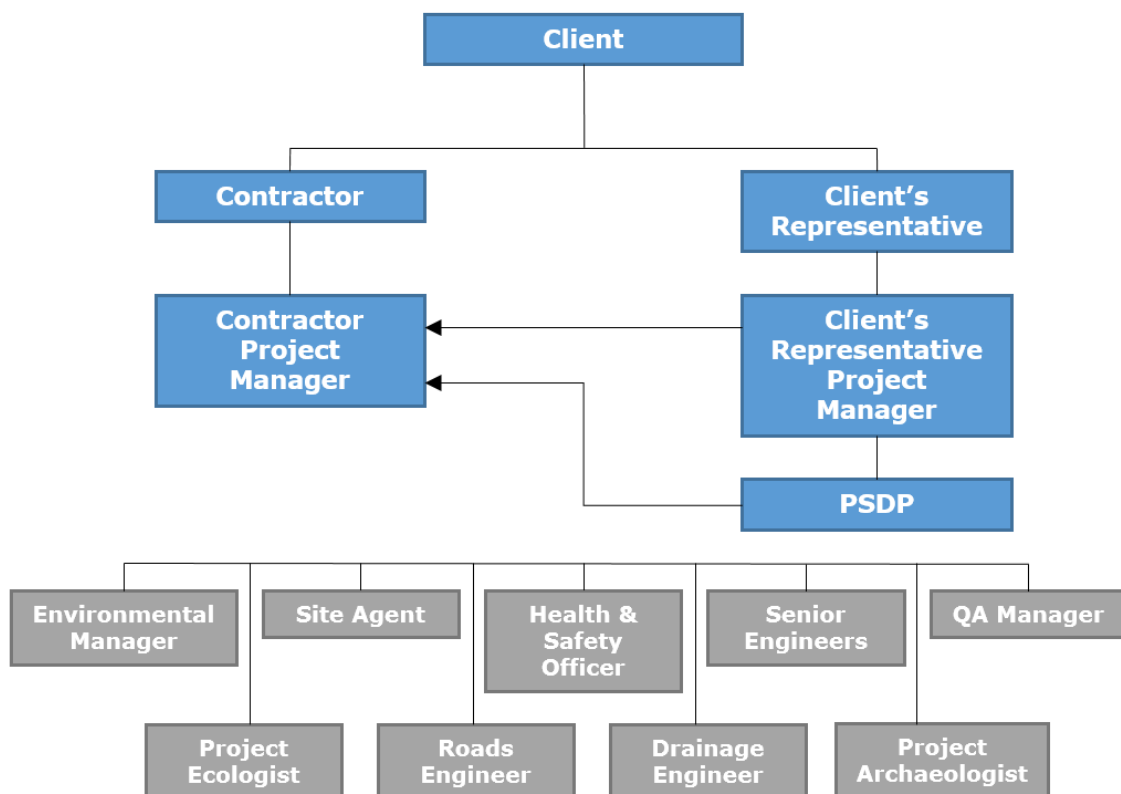


Figure 4-1: Project Management Team Organogram



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 to improve environmental performance. Environmental targets are set performance measurements (key performance indicators or KPI's) that must be met 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 Trim Millennium Pedestrian Bridge



- 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 works to Trim Millennium Pedestrian 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 Trim Millennium Pedestrian 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 Project 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 safe 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 construction works proposed at Trim Millennium Pedestrian 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 health 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:	
Emergency Department (ED)	Our Lady's Hospital Navan	(046) 9078630
Ambulance Service	Dial 112 or 999	
Fire Services	Dial 112 or 999	
Service:	Contact Details:	
Garda Station	Trim Garda Station	(046) 9481540

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		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 safely enter the area, look around the emergency scene for anything that can be dangerous or hazardous to you, the casualty, or anyone else at the scene. Bystanders can help with making the area safe. First aid kits will be available on site. Operators that have been first aid/CPR/AED trained will be listed on site and easily identifiable by a hard hat sticker.
- 2. Take charge of the situation** – if you are the first-aid provider on the scene act fast. If someone is already in charge, briefly introduce yourself and see if that person needs any help. If there is any chance the casualty could have a head or spinal injury, tell them not to move.
- 3. Get Consent** – always identify yourself as a first-aid provider and offer to help. Always ask for consent before touching a conscious adult casualty and always ask for consent from a parent or guardian before touching an unconscious or conscious child or infant. With an unconscious adult casualty consent is implied as it is generally accepted that most people want to live. Remember to protect yourself first by wearing gloves and eye protection.
- 4. Assess Responsiveness** – is the casualty conscious or unconscious? Note their response while you are asking them for their consent. If they respond, continue with the primary survey, and if they don't respond, be aware that an unconscious casualty is or has the potential of being a breathing emergency.



5. Call out for help – this will attract bystanders. Help is always useful in an emergency situation. Someone can be called over 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

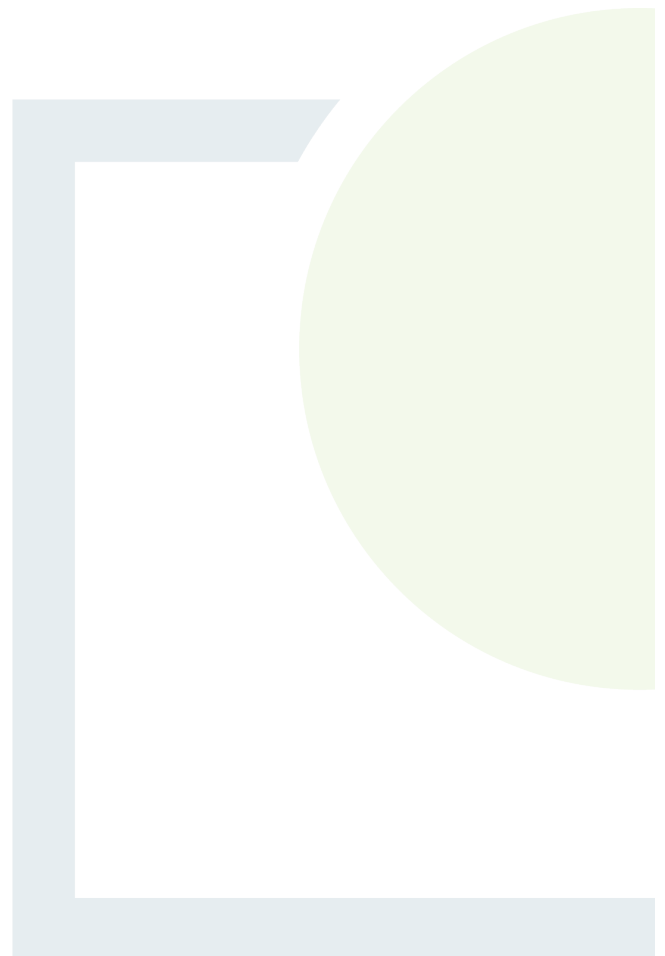
An emergency preparedness and response procedure is required to prevent environmental pollution incidents. Emergency Silt Control and Spillage Response Procedures are included in Section 4.3.3 of this CEMP. Suitable spill kits and absorbent material for dealing with oil spills will be maintained on site. In the event of pollution or potential risk of pollution the Local Authority should be informed immediately.

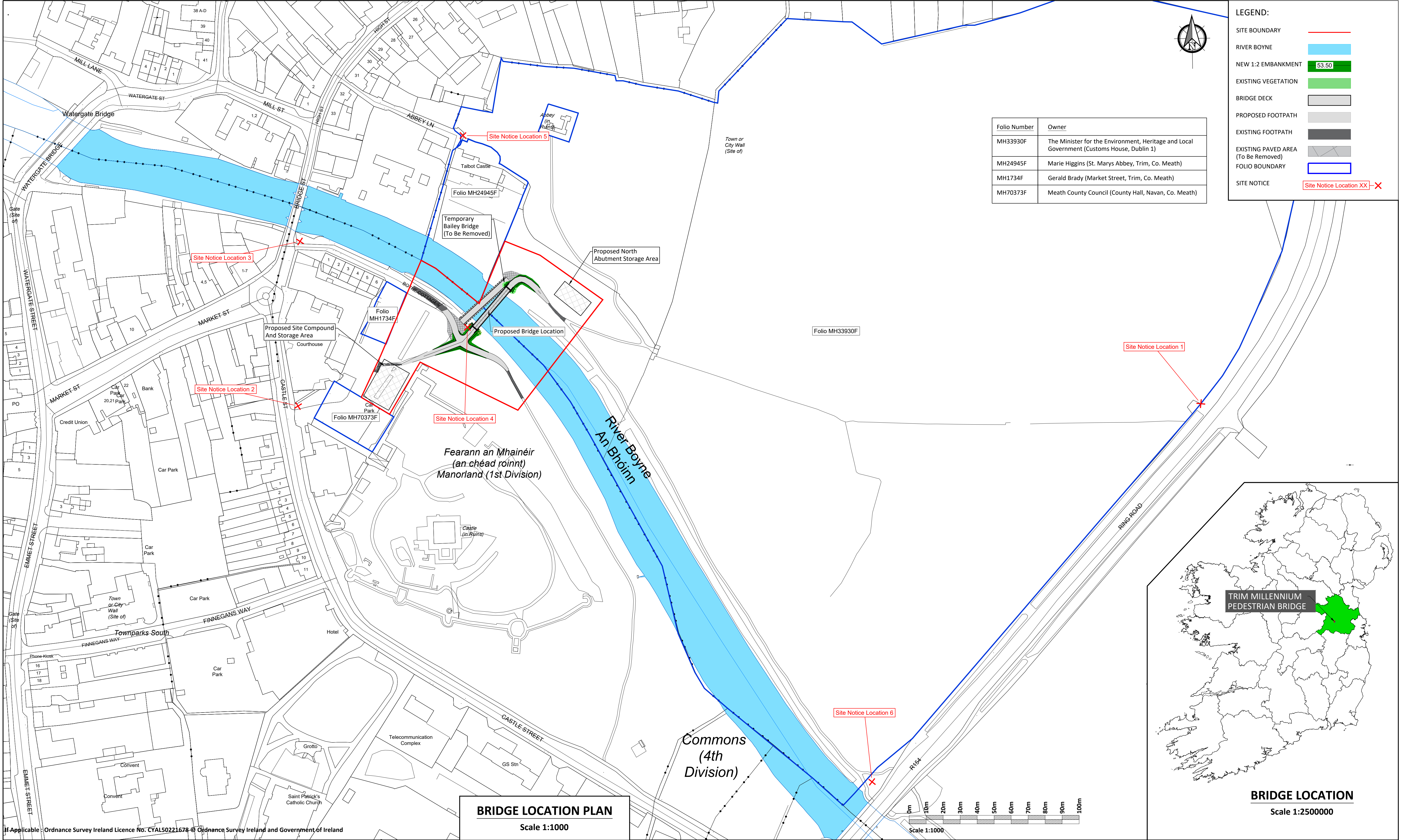


CONSULTANTS IN ENGINEERING,
ENVIRONMENTAL SCIENCE
& PLANNING

APPENDIX 1

Trim Millennium Pedestrian
Bridge Drawings





LEGEND:

- SITE BOUNDARY
- RIVER BOYNE
- NEW 1:2 EMBANKMENT 53.50
- EXISTING VEGETATION
- BRIDGE DECK
- PROPOSED FOOTPATH
- EXISTING FOOTPATH
- EXISTING PAVED AREA (To Be Removed)
- FOLIO BOUNDARY
- SITE NOTICE Site Notice Location XX-X


Folio Number	Owner
MH33930F	The Minister for the Environment, Heritage and Local Government (Customs House, Dublin 1)
MH24945F	Marie Higgins (St. Marys Abbey, Trim, Co. Meath)
MH1734F	Gerald Brady (Market Street, Trim, Co. Meath)
MH70373F	Meath County Council (County Hall, Navan, Co. Meath)

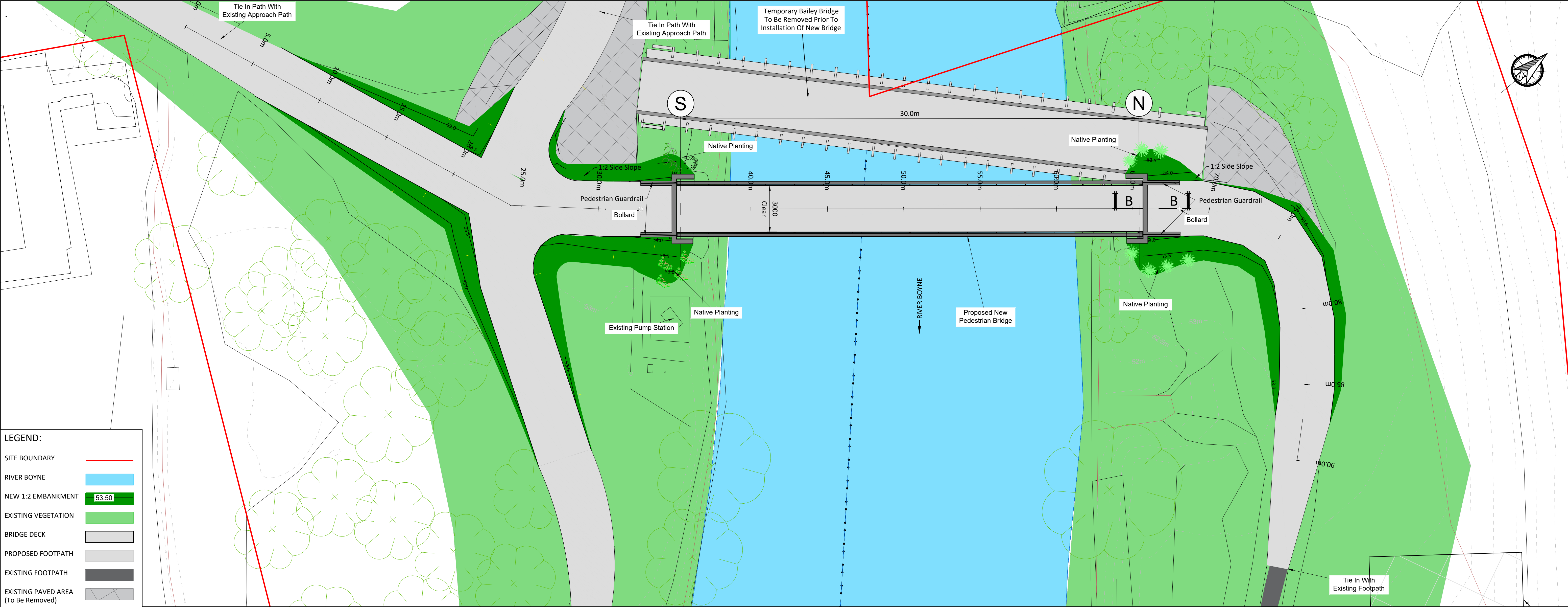
BRIDGE LOCATION PLAN
Scale 1:1000

Map of Ireland showing the location of the Trim Millennium Pedestrian Bridge in the east of the country.

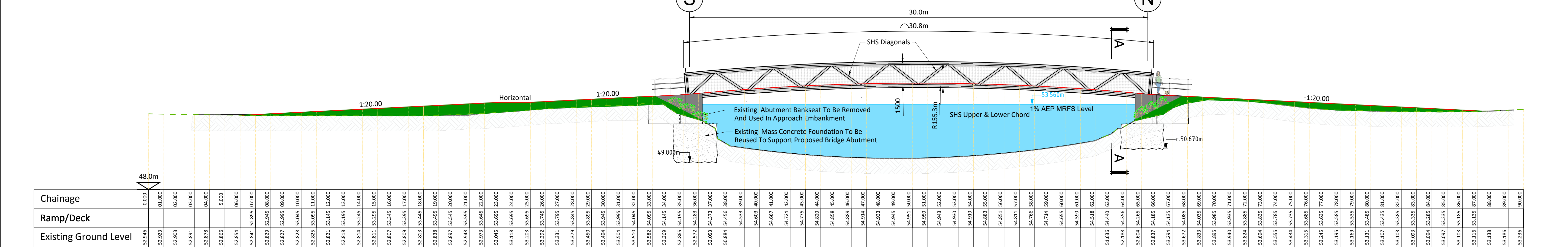
BRIDGE LOCATION
Scale 1:2500000

Rev.	Description	App By	Date
P01	ISSUE FOR APPROVAL	BB	19.02.24
P02	ISSUE FOR APPROVAL	BB	08.03.24
P03	FOR PLANNING	BB	31.05.24

PROJECT		CLIENT		
TRIM MILLENNIUM PEDESTRIAN BRIDGE		 comhairle chontae na mí meath county council		
SHEET		Date 19.02.24	Project number P22-256	Scale (@ A1-) 1:1000
BRIDGE LOCATION PLANS		Drawn by SK	Drawing Number P22256-FT-XX-ZZ-DR-S-0001	Rev P03
		Checked by AB		



BRIDGE PLAN
Scale 1:125



BRIDGE ELEVATION (Viewed From South East)
Scale 1:125

Rev.

Description

App By

Date

P01

ISSUE FOR APPROVAL

BB

19.02.24

P02

FOR PLANNING

BB

31.05.24

PROJECT

TRIM MILLENNIUM PEDESTRIAN BRIDGE

SHEET

PLAN & ELEVATION

CLIENT

comhairle chontae na mí
meath county council

Date

19.02.24

Project number

P22-256

Scale (@ A1-)

1:125

Drawn by

SK

Drawing Number

P22256-FT-XX-ZZ-DR-S-0002

Rev

P02

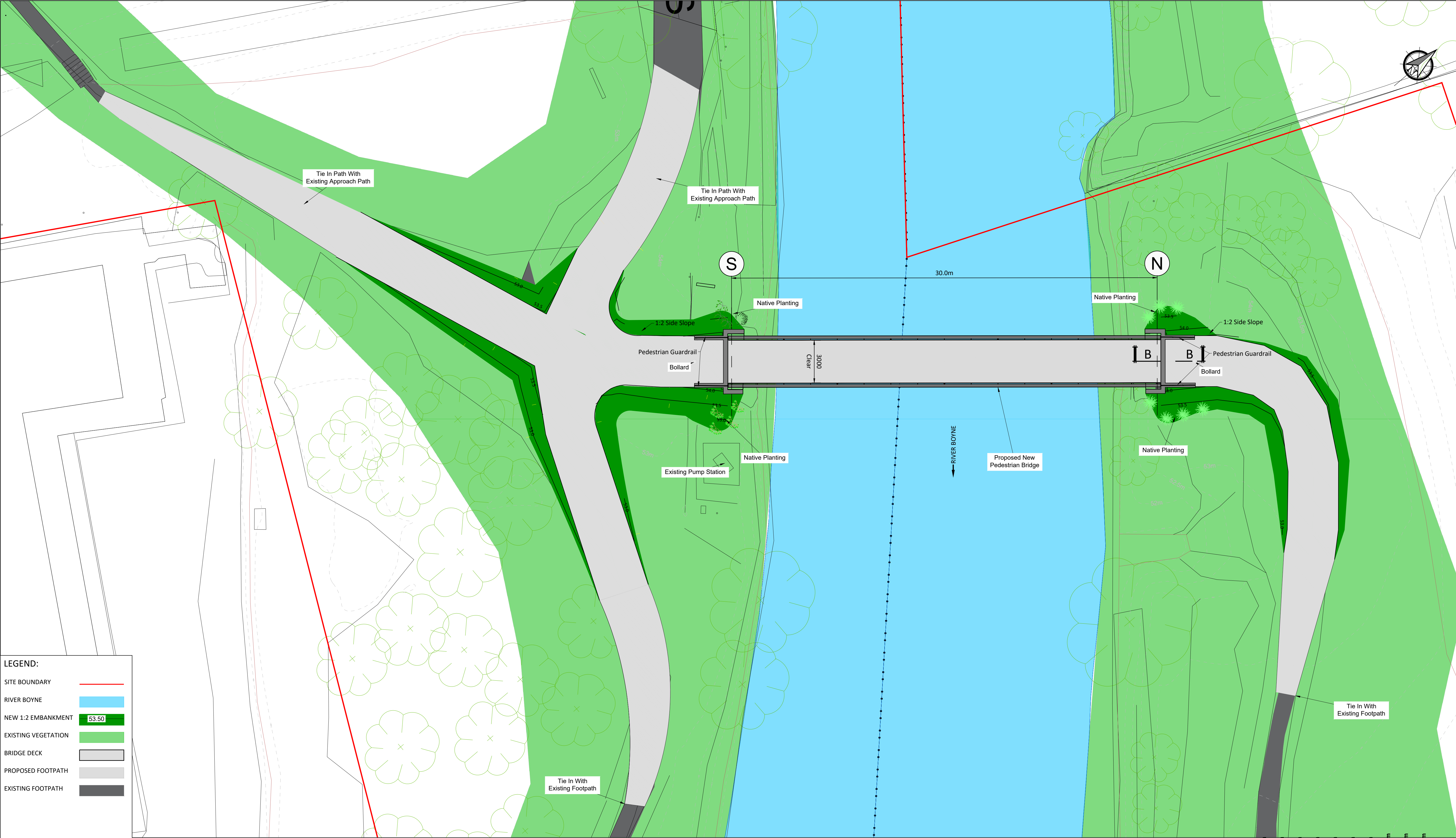
FEHILY
TIMONEY

Cork | Dublin | Carlow
www.fehilytimoney.ie

No part of this document may be reproduced or transmitted in any form or stored in any retrieval system of any nature without the written permission of Fehily Timoney & Company as copyright holder except as agreed for use on the project for which the document was originally issued. Do not scale. Use figured dimensions only. If in doubt - Ask!

O:\ACAD\2022\P22-256\FT-XX-ZZ-DR-S-0002

29 May 2024



LEGEND:

SITE BOUNDARY

RIVER BOYNE

NEW 1:2 EMBANKMENT

EXISTING VEGETATION

BRIDGE DECK

PROPOSED FOOTPATH

EXISTING FOOTPATH

Note:
Levels given are with reference to Malin Head Benchmark

If Applicable : Ordnance Survey Ireland Licence No. CYAL50221678 © Ordnance Survey Ireland and Government of Ireland



Cork | Dublin | Carlow

www.fehilytimoney.ie

No part of this document may be reproduced or transmitted in any form or stored in any retrieval system of any nature without the written permission of Fehily Timoney & Company as copyright holder except as agreed for use on the project for which the document was originally issued. Do not scale. Use figured dimensions only. If in doubt - Ask!

Rev.	Description	App By	Date
P01	FOR PLANNING	BB	31.05.24


PROJECT

TRIM MILLENNIUM PEDESTRIAN BRIDGE

SHEET

PROPOSED FINAL LAYOUT OF BRIDGE AND APPROACH RAMPS

CLIENT



comhairle chontae na mí meath county council

Date 31.05.24

Project number P22-256

Scale (@ A1-) 1:125

Drawn by SK

Checked by AB

Drawing Number P22256-FT-XX-ZZ-DR-S-0004

Rev P01

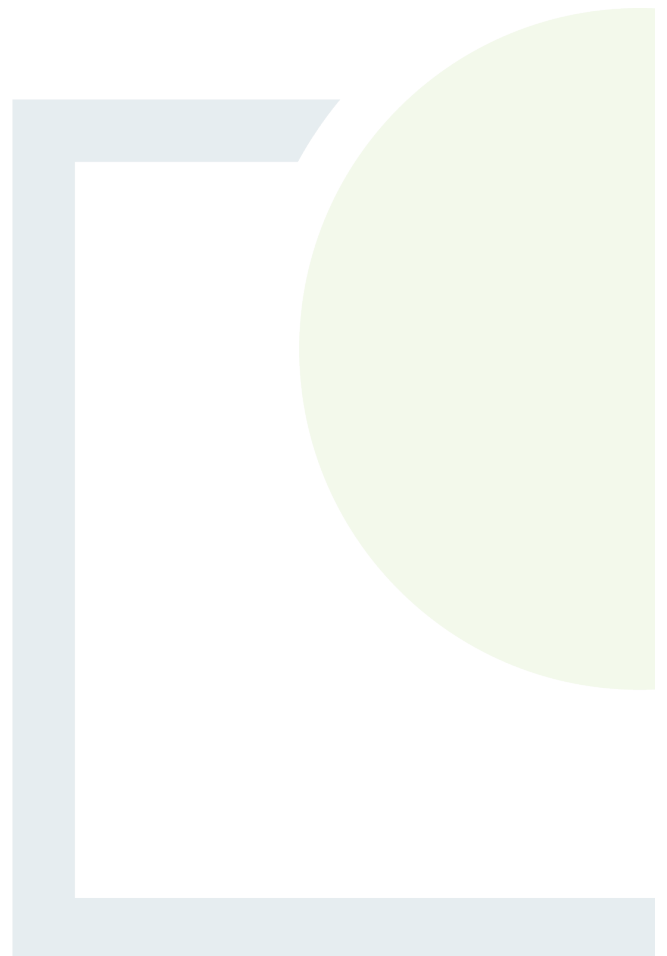
O:\ACAD\2022\P22-256\P22256-FT-XX-ZZ-DR-S-0004



CONSULTANTS IN ENGINEERING,
ENVIRONMENTAL SCIENCE
& PLANNING

APPENDIX 2

Aquatic Baseline Report



Aquatic baseline report for the proposed Trim Millennium Pedestrian Bridge Scheme, Trim, Co. Meath



Prepared by Triturus Environmental Ltd. for Fehily Timoney

December 2023

Please cite as:

Triturus (2023). Aquatic baseline report for the proposed Trim Millennium Pedestrian Bridge Scheme, Trim, Co. Meath. Report prepared by Triturus Environmental Ltd. for Fehily Timoney. December 2023.

Table of contents

1. Introduction	3
1.1 Background	3
1.2 Scheme description	3
2. Methodology	4
2.1 Aquatic site surveys	4
2.2 Fisheries habitat appraisal	7
2.3 White-clawed crayfish survey	7
2.4 eDNA analysis	7
2.5 Biological water quality (Q-sampling)	8
2.6 Macrophytes and aquatic bryophytes	8
2.7 Otter signs	8
2.8 Biosecurity	8
3. Desktop review	10
3.1 Fisheries asset of the survey area	10
3.2 Protected aquatic species	10
4. Results of aquatic surveys	11
4.1 Aquatic survey	11
4.2 White-clawed crayfish	14
4.3 eDNA analysis	15
4.4 Biological water quality (macro-invertebrates)	16
5. Discussion	19
6. References	21
7. Appendix A – eDNA analysis lab report	24

1. Introduction

1.1 Background

Triturus Environmental Ltd. were commissioned by Fehily Timoney to conduct baseline aquatic surveys to inform NIS preparation for the proposed Trim Millennium Pedestrian Bridge scheme, located on the River Boyne, Trim, Co. Meath (**Figure 2.1**). This report provides a baseline assessment of the aquatic ecology including fisheries and biological water quality, as well as protected species and habitats in the vicinity of the proposed scheme (bridge replacement). Aquatic surveys were undertaken on the 10th October 2023.

1.2 Scheme description

A full description of the proposed scheme will be provided in the accompanying NIS report used to support consenting applications.

2. Methodology

2.1 Aquatic site surveys

Aquatic surveys of the River Boyne (EPA code: 07B04) within the vicinity of Millennium Bridge were conducted on the 10th October 2023. Survey effort focused on both instream and riparian habitats at the site and included a fisheries habitat appraisal¹, white-clawed crayfish (*Austropotamobius pallipes*) survey, otter (*Lutra lutra*) survey (within 150m radius), environmental DNA sampling, macrophyte and aquatic bryophyte survey and biological water quality sampling (Q-sampling at 2 no. locations, upstream and downstream) (**Figure 2.1**). This holistic approach informed the overall aquatic ecological evaluation of the site in context of the proposed scheme and ensured that any habitats and species of high conservation value would be detected to best inform mitigation.

In addition to the ecological characteristics of the site, a broad aquatic and riparian habitat assessment was conducted utilising elements of the methodology given in the Environment Agency's 'River Habitat Survey in Britain and Ireland Field Survey Guidance Manual 2003' (EA, 2003) and the Irish Heritage Council's 'A Guide to Habitats in Ireland' (Fossitt, 2000). This broad characterisation helped define the watercourses' conformity or departure from naturalness. The site was assessed in terms of:

- Physical watercourse/waterbody characteristics (i.e. width, depth, channel form) including associated evidence of historical drainage
- Substrate type and relative condition, listing substrate fractions in order of dominance (i.e. bedrock, boulder, cobble, gravel, sand, silt etc.)
- Flow type by proportion of riffle, glide and pool in the sampling area
- An appraisal of the macrophyte and aquatic bryophyte community at each site
- Riparian vegetation composition and bordering land use practices

Table 2.1 Location of the aquatic survey site in the vicinity of the proposed Trim Millennium Pedestrian Bridge scheme

Watercourse	EPA code	Location	X (ITM)	Y (ITM)
River Boyne	07B04	Millennium Bridge	680219	756860

¹ Site unsuitable for electro-fishing due to prohibitive depths

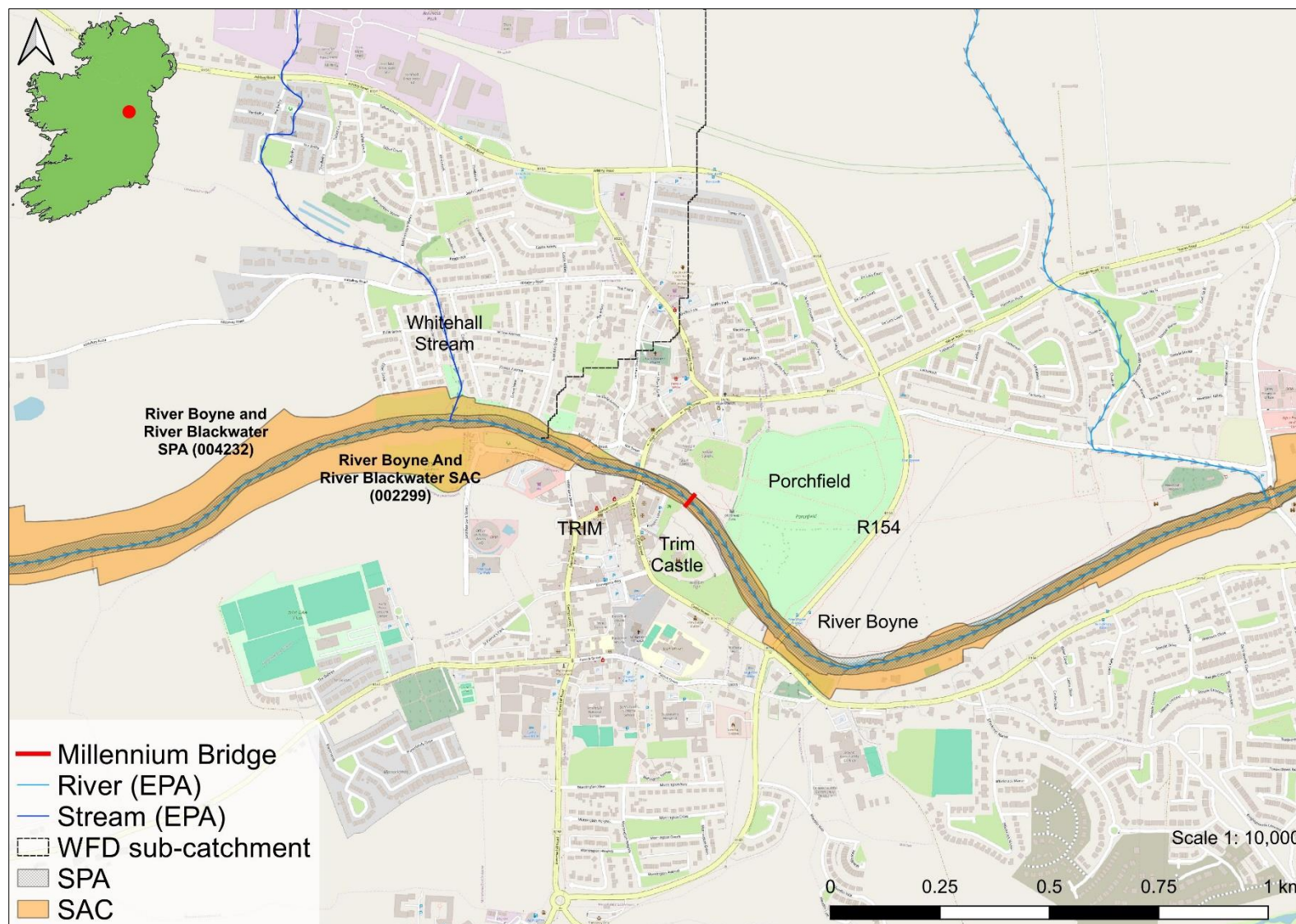


Figure 2.1 Overview of the aquatic survey sites in the vicinity of the proposed Trim Millennium Pedestrian Bridge scheme

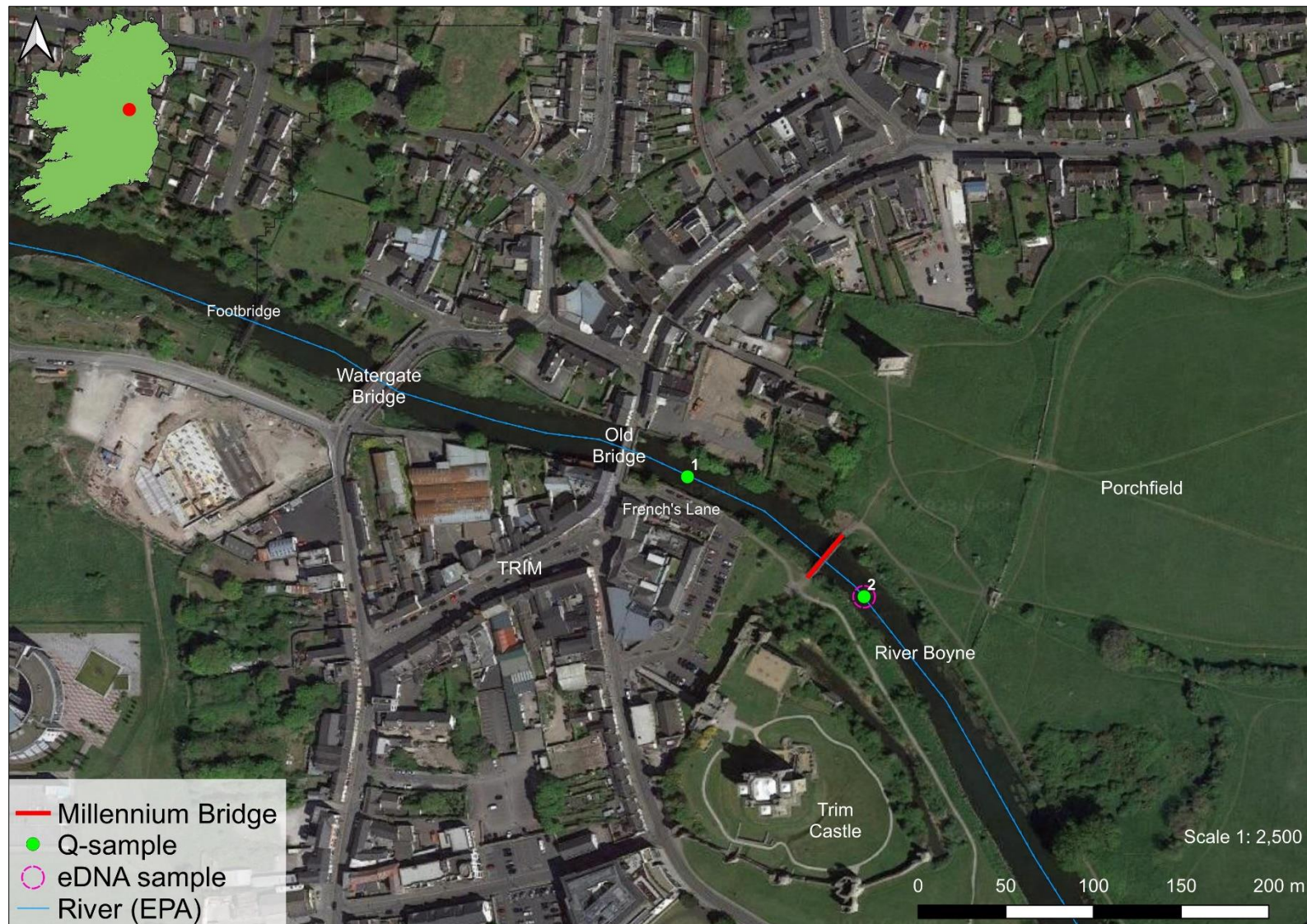


Figure 2.2 Location of the aquatic survey sites in the vicinity of the proposed Trim Millennium Pedestrian Bridge scheme

2.2 Fisheries habitat appraisal

A fisheries habitat appraisal of the River Boyne in vicinity of the existing Millennium Bridge was undertaken to establish the importance of the supporting habitats as nursery, spawning and or holding habitats for salmonids and lamprey species, but also considered European eel and other fish species. The appraisals of salmonids and lamprey were cognisant of species-specific habitat requirements and preferences as outlined in O’Grady (2006), Hendry et al. (2003), Armstrong et al. (2003), Harvey & Cowx (2003), Maitland (2003) and Hendry & Cragg-Hine (1997). River habitat surveys and fisheries assessments were also carried out utilising elements of the approaches in the River Habitat Survey Methodology (EA, 2003) and Fishery Assessment Methodology (O’Grady, 2006) to broadly characterise the riverine site (i.e., channel profile, substrata etc.).

2.3 White-clawed crayfish survey

A white-clawed crayfish (*Austropotamobius pallipes*) survey was undertaken in October 2023 under a National Parks and Wildlife (NPWS) open national licence (no. C24/2023), as prescribed by Sections 9, 23 and 34 of the Wildlife Act (1976-2023), to capture and release crayfish to their site of capture. As per Inland Fisheries Ireland aquatic biosecurity recommendations, the crayfish sampling started at the uppermost site(s) of the catchment/sub-catchments in the survey area to minimise the risk of transfer invasive propagules (including crayfish plague) in an upstream direction.

Hand-searching of instream refugia and sweep netting was undertaken according to Reynolds et al. (2010). An appraisal of white-clawed crayfish habitat in the vicinity of Millennium Bridge was conducted based on physical habitat attributes, water chemistry and incidental records in mustelid spraint. Additionally, a desktop review of crayfish records within the wider survey area was completed.

2.4 eDNA analysis

To validate site surveys, fill data lacunae and detect potentially cryptically-low populations within the study area, a composite water sample was collected from the River Boyne downstream of Millennium Bridge in October 2023 (**Figure 2.2**) and analysed for Atlantic salmon (*Salmo salar*), lamprey (*Lampetra* spp.), white-clawed crayfish and crayfish plague (*Aphanomyces astaci*) environmental DNA (eDNA).

In accordance with laboratory guidance, a composite (500ml) water sample was collected from the sampling point, maximising the geographic spread at the site (20 x 25ml samples at each site), thus increasing the chance of detecting the target species’ DNA. The composite sample was filtered and fixed on site using a sterile proprietary eDNA sampling kit. The sample was stored at room temperature and sent to the laboratory for analysis with 48 hours of collection. A total of $n=12$ qPCR replicates were analysed for the site. Given the high sensitivity of eDNA analysis, a single positive qPCR replicate is considered as proof of the species’ presence (termed qPCR No Threshold, or qPCR NT). Whilst an eDNA approach is not currently quantitative, the detection of the target species’ DNA indicates the presence of the species at and or upstream of the sampling point. Please refer to **Appendix A** for full eDNA laboratory analysis methodology.

2.5 Biological water quality (Q-sampling)

The River Boyne at Millennium Bridge was assessed for biological water quality through Q-sampling in October 2023, with a sample collected upstream and downstream of the existing bridge. The 2 no. samples were taken with a standard kick sampling hand net (250mm width, 500µm mesh size) from areas of riffle/glide utilising a 2-minute kick sample, as per Environmental Protection Authority (EPA) methodology (Feeley et al., 2020). Large cobble was also washed at each site for 1-minute (where present) to collect attached macro-invertebrates (as per Feeley et al., 2020). Samples were elutriated and fixed in 70% ethanol for subsequent laboratory identification to species level. Samples were converted to Q-ratings as per Toner et al. (2005) and assigned to WFD status classes (**Table 2.2**). Any rare invertebrate species were identified from the NPWS Red List publications for beetles (Foster et al., 2009), mayflies (Kelly-Quinn & Regan, 2012), stoneflies (Feeley et al., 2020) and other relevant taxa (i.e. Byrne et al., 2009; Nelson et al., 2011).

Table 2.2 Reference categories for EPA Q-ratings (Q1 to Q5) (Toner et al., 2005)

Q value	WFD status	Pollution status	Condition
Q5 or Q4-5	High status	Unpolluted	Satisfactory
Q4	Good status	Unpolluted	Satisfactory
Q3-4	Moderate status	Slightly polluted	Unsatisfactory
Q3 or Q2-3	Poor status	Moderately polluted	Unsatisfactory
Q2, Q1-2 or Q1	Bad status	Seriously polluted	Unsatisfactory

2.6 Macrophytes and aquatic bryophytes

Surveys of the macrophyte and aquatic bryophyte community were conducted by instream wading, with specimens collected (by hand or via grapnel) for on-site identification. An assessment of the aquatic vegetation community helped to identify any rare macrophyte species listed under the Flora (Protection) Order, 2022 and or Irish Red list for vascular plants (Wyse-Jackson et al., 2016) or habitats corresponding to the Annex I habitats, e.g., ‘Water courses of plain to montane levels, with submerged or floating vegetation of the *Ranunculus fluitantis* and *Callitriche-Batrachion* (low water level during summer) or aquatic mosses [3260]’ (more commonly referred to as ‘floating river vegetation’).

2.7 Otter signs

The presence of otter (*Lutra lutra*) was determined through the recording of otter signs within 150m radius of each survey site. Notes on the age and location of signs (ITM coordinates) were made, in addition to the quantity and visible constituents of spraint (i.e. remains of fish, crustaceans, molluscs etc.).

2.8 Biosecurity

A strict biosecurity protocol following IFI (2010) and the Check-Clean-Dry approach was adhered to during surveys for all equipment and PPE used. Disinfection of all equipment and PPE before and after

use with Virkon™ was conducted to prevent the transfer of pathogens or invasive propagules between survey sites. Surveys were undertaken at sites in a downstream order to minimise the risk of upstream propagule mobilisation. Care was given towards preventing the spread or introduction of highly virulent crayfish plague, known throughout the Boyne catchment with checking, cleaning, disinfecting and drying of equipment undertaken after the survey to prevent spread of crayfish plague. All Triturus staff are certified in 'Good fieldwork practice: slowing the spread of invasive non-native species' by the University of Leeds.

3. Desktop review

3.1 Fisheries asset of the survey area

The River Boyne rises in Co. Kildare and flows for over 110km in a north easterly direction through counties Offaly, Meath and Louth before entering the Irish Sea at Drogheda. The Boyne was subject to extensive arterial drainage from 1969 until 1985 and this has significantly impacted fisheries habitat (Massa-Gallucci & Mariani, 2011).

The River Boyne is a designated salmonid watercourse under the European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 293/1988) and is ranked 5th nationally in terms of the amount of fluvial habitat accessible to Atlantic salmon (*Salmo salar*) (5.93% of national; McGinnity et al., 2003). The Boyne is a renowned wild brown trout (*Salmo trutta*), Atlantic salmon and (in its lower reaches) sea trout fishery (O'Reilly, 2009). In addition to salmonids, the river also supports three-spined stickleback (*Gasterosteus aculeatus*), minnow (*Phoxinus phoxinus*), stone loach (*Barbatula barbatula*), pike (*Esox lucius*), roach (*Rutilus rutilus*) and European eel (*Anguilla anguilla*) (Gordon et al., 2023; Kelly et al., 2011a, 2011b). Whilst *Lampetra* sp. ammocoetes (likely brook lamprey *Lampetra planeri*) are widespread throughout both the Boyne, densities have been recorded as low (O'Connor, 2006) and the species is known to suffer from the impacts of continued arterial drainage throughout the catchment (IFI, 2013).

3.2 Protected aquatic species

A comprehensive desktop review of available data from the National Biodiversity Data Centre (NBDC), Inland Fisheries Ireland (IFI), Botanical Society of Britain and Ireland (BSBI), National Crayfish Plague Surveillance Programme (NCPSP), Environmental Protection Agency (EPA) and Triturus databases for the River Boyne in the vicinity of Trim identified a low number of records for rare and or protected aquatic species.

White-clawed crayfish (*Austropotamobius pallipes*) are known from the River Boyne in the vicinity of Trim although the most recent record is from 2006 (0.3km upstream of survey area). Crayfish plague has been known from the Boyne catchment since the 1980s (Matthews & Reynolds, 1992) and has also been detected in recent years (Triturus data).

Otter (*Lutra lutra*) records were widespread on the River Boyne in the Trim area, including within the town (Old Bridge) (NBDC data).

4. Results of aquatic surveys

4.1 Aquatic survey

The River Boyne in the vicinity of Millennium Bridge was a high energy lowland river (FW2: Fossitt, 2000) that was 18-20m wide and ranged from 1.2-1.8m deep. The river had been historically modified and deepened with steeply sloping banks (particularly on the eastern bank). Upstream of the existing Millennium footbridge the river flowed between retaining walls (both banks) in the vicinity of Old Bridge. The profile comprised fast-flowing glide with occasional pool. Riffle and shallower glide was present locally in the vicinity of the existing footbridge (including at a historic weir). Deeper glide predominated downstream. The substrata were dominated by partially bedded cobble and boulder with frequent but scattered mixed gravels. Despite high flow rates at this location, siltation was moderate. Areas of sand were present but localised. Soft sediment accumulations were frequent along channel margins and in association with instream macrophyte beds.

The modified section of channel upstream of the existing footbridge supported sparse macrophyte growth due to the compacted bed and absence of riparian fringes although the moss *Fontinalis antipyretica* and *Leptodictyum riparium* were present on larger boulder, with scattered common clubrush (*Schoenoplectus lacustris*). Downstream of the footbridge, the macrophyte community was dominated by abundant common clubrush which forms extensive stands throughout the channel for much of the years (pers. obs.). Scattered stands of branched bur-reed (*Sparganium erectum*) were also present with occasional water mint (*Mentha aquatica*) and blue water-speedwell (*Myosotis scorpioides*). Deeper glide and flow refugia supported highly localised curled pondweed (*Potamogeton crispus*), perfoliate pondweed (*Potamogeton perfoliatus*) and water starwort (*Callitriche* sp.). Invasive *Elodea* sp. was also present in deeper glide but rare overall. The aquatic vegetation community was not representative of any Annex I habitats (e.g. floating river vegetation [3260]). Filamentous algal cover was low (2%) but its presence indicated eutrophication. The littoral zones and sloping banks were dominated by reed-canary grass (*Phalaris arundinacea*) with mature scrubby treelines of grey willow (*Salix cinerea*), osier (*Salix viminalis*), crack willow (*Salix fragilis*), sycamore (*Acer pseudoplatanus*), ash (*Fraxinus excelsior*) and hawthorn (*Crataegus monogyna*) with localised dense bramble (*Rubus fruticosus* agg.) along the eastern bank.

The River Boyne in vicinity of the existing Millennium Bridge was considered a good quality salmonid spawning and nursery habitat given the dominance of glide habitat, hard substrata and flow refugia. Undercut banks (mostly along the western bank downstream but also along retaining walls) provided valuable holding areas for adult salmonids although the deeper glide downstream of the survey site provided higher quality holding habitat. This area was dominated by clubrush beds and of high value as both a coarse fish nursery and European eel habitat. Whilst localised and limited in extent, soft sediment accumulations along channel margins provided some suitability for lamprey ammocoetes although such areas were typically sub-optimal due to compaction and high sand content. Despite good physical suitability (abundant instream refugia), no white clawed crayfish were recorded by sweep netting or hand searching. However, white-clawed crayfish were detected via eDNA sampling, in addition to Atlantic salmon and lamprey (*Lampetra* sp.) (Table 4.1). Two regular otter spraint sites were recorded on a retaining wall ledge and stormwater inflow pipe upstream of the existing footbridge (ITM 680125, 756899 & ITM 680135, 756921).

Biological water quality, based on Q-sampling, was calculated as **Q3-4 (moderate status)** both upstream (site 1) and downstream (site 2) of Millennium Bridge (**Appendix A**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.



Plate 3.1 Millennium Bridge, October 2023 (facing upstream)



Plate 3.2 The modified River Boyne at Old Bridge, located upstream of Millennium Bridge



Plate 3.3 Facing downstream to Millennium Bridge from French's Lane, October 2023



Plate 3.4 Facing upstream from Millennium Bridge towards Old Bridge



Plate 3.5 Facing downstream from Millennium Bridge, October 2023



Plate 3.6 Facing downstream to Boyne Bridge

4.2 White-clawed crayfish

No white-clawed crayfish were recorded via hand-searching or sweep netting of instream refugia during the October 2023 survey. However, environmental DNA sampling detected the presence of crayfish from the River Boyne (see section 4.3 below).

4.3 eDNA analysis

Atlantic salmon, lamprey (*Lampetra* sp.) and white-clawed crayfish eDNA was detected in composite water samples taken from the River Boyne downstream of Millennium Bridge (12, 12 & 2 positive qPCR replicates out of 12, respectively) (**Table 4.1; Appendix B**).

The invasive pathogen crayfish plague was also detected in the sample (11 positive qPCR replicates out of 12) (**Table 4.1; Appendix B**).

Table 4.1 eDNA results collected downstream of Trim Millenium Pedestrian Bridge (positive qPCR replicates out of 12 in parentheses)

Watercourse	White-clawed crayfish	Crayfish plague	Atlantic salmon	<i>Lampetra</i> sp. ²
River Boyne, Millennium Bridge	Positive (2/12)	Positive (11/12)	Positive (12/12)	Positive (12/12)

² eDNA techniques are unable to reliably distinguish between brook lamprey (*Lampetra planeri*) and river lamprey (*Lampetra fluviatilis*)

4.4 Biological water quality (macro-invertebrates)

No rare or protected macro-invertebrate species (according to national red lists) were recorded in the biological water quality samples taken from a 2 no. riverine sites in October 2023 (**Appendix A**).

Sites 1 and 2 on the River Boyne (**Figure 4.1**) achieved **Q3-4 (moderate status)** water quality based on the dominance of EPA group C (moderate water quality indicator taxa with lower numbers of EPA group A and B (clean water indicator species). EPA group A taxa included small number of the mayfly species *Ecdyonurus dispar*, *Heptagenia sulphurea* and *Ephemera danica* (**Appendix A**). The most abundant EPA group C taxa included the mayflies *Baetis rhodani* and *Serratella ignita* (**Table 4.2**).

Table 4.2 Macro-invertebrate Q-sampling results, October 2023

Group	Family	Species	Site 1	Site 2	EPA class
Ephemeroptera	Heptageniidae	<i>Ecdyonurus dispar</i>	2		A
Ephemeroptera	Heptageniidae	<i>Heptagenia sulphurea</i>	1		A
Ephemeroptera	Ephemeridae	<i>Ephemera danica</i>		2	A
Trichoptera	Glossosomatidae	sp. indet.	12	5	B
Trichoptera	Hydroptilidae	<i>Hydroptila</i> sp.	3		B
Trichoptera	Limnephilidae	<i>Unidentified species</i>	1	2	B
Trichoptera	Limnephilidae	<i>Potamophylax cingulatus</i>		1	B
Trichoptera	Sericostomatidae	<i>Sericostoma personatum</i>	2	7	B
Odonata	Calopterygidae	<i>Calopteryx splendens</i>		1	B
Ephemeroptera	Baetidae	<i>Baetis rhodani</i>	55	36	C
Ephemeroptera	Ephemerellidae	<i>Serratella ignita</i>	18	10	C
Plecoptera	Leuctridae	<i>Leuctra fusca</i>	2		C
Trichoptera	Hydropsychidae	<i>Hydropsyche siltalai</i>	4	4	C
Trichoptera	Rhyacophilidae	<i>Rhyacophila dorsalis</i>		1	C
Coleoptera	Elmidae	<i>Elmis aenea</i>	13	5	C
Coleoptera	Elmidae	<i>Limnius volckmari</i>	4	5	C
Coleoptera	Elmidae	<i>Esolus parallelepipedus</i>	2		C
Crustacea	Gammaridae	<i>Gammarus duebeni</i>	4	24	C
Diptera	Chironomidae	Non- <i>Chironomus</i> spp.	2	6	C
Diptera	Simuliidae	sp. indet.	21	68	C
Diptera	Ceratopogonidae	sp. indet.	1	3	C
Gastropoda	Bithyniidae	<i>Bithynia tentaculata</i>	16	25	C
Gastropoda	Lymnaeidae	<i>Ampullaceana balthica</i>	3	11	C
Gastropoda	Planorbidae	<i>Ancylus fluviatilis</i>	4	2	C
Crustacea	Asellidae	<i>Asellus aquaticus</i>		2	D
Hirudinidae	Glossiphoniidae	<i>Glossiphonia complanata</i>	1	1	D
Diptera	Chironomidae	Non- <i>Chironomus</i> spp.		1	E
Oligochaeta		sp. indet.		3	n/a
Abundance			171	225	
Q-rating			Q3-4	Q3-4	
WFD status			Moderate	Moderate	

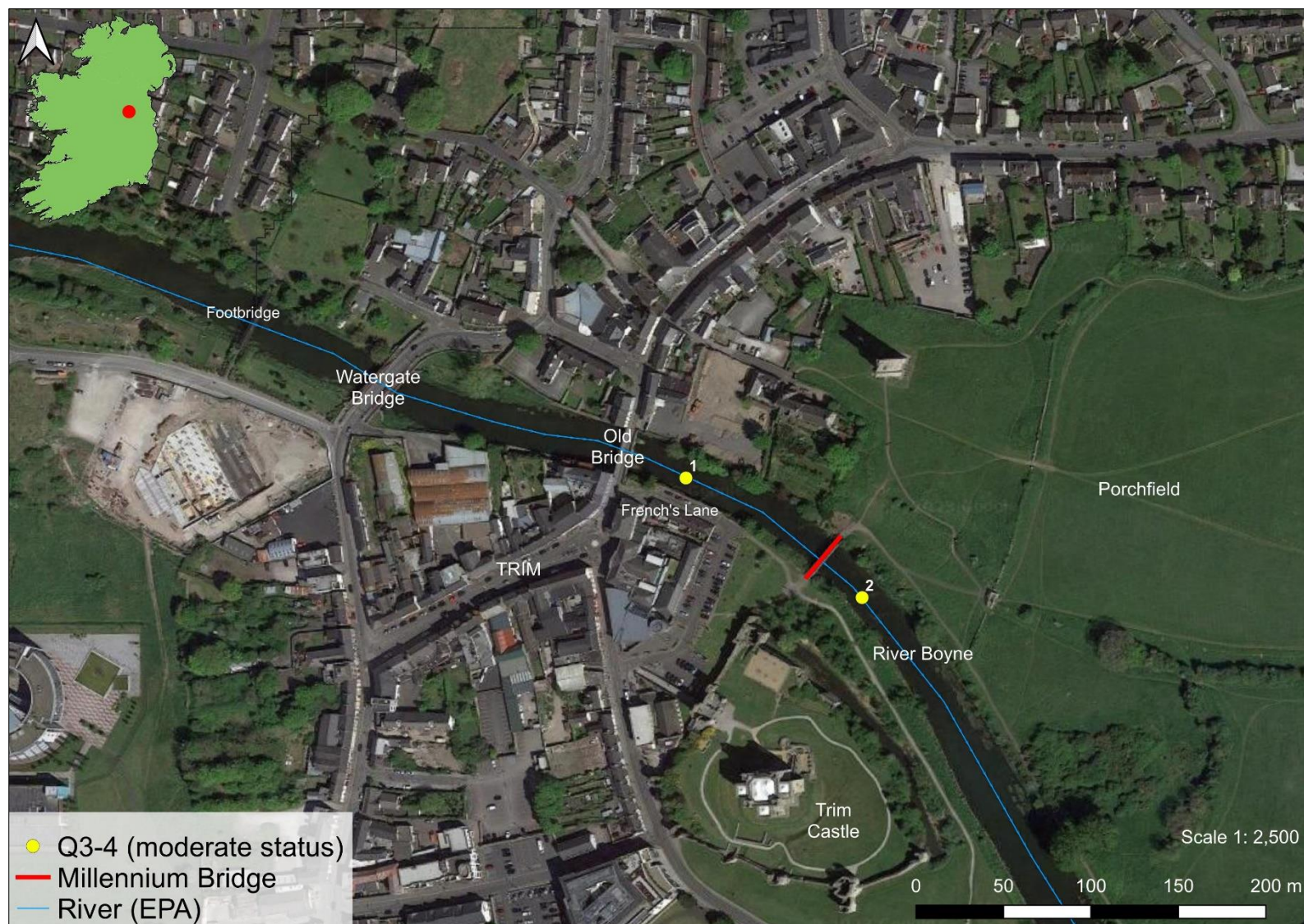


Figure 4.1 Overview of the biological water quality status in the vicinity of Millennium Bridge, October 2023

Table 4.3 Summary of aquatic species and habitats of higher conservation value recorded in the vicinity of Millennium Bridge, October 2023

Watercourse	White-clawed crayfish	Otter signs ⁴	Annex I aquatic habitats	Rare or protected macrophytes/aquatic bryophytes	Rare or protected macro-invertebrates (excl. crayfish)	Other species/habitats of high conservation value
River Boyne, Millennium Bridge	None recorded but detected via eDNA	2 no. spraint sites	Not present	None recorded	None recorded	Atlantic salmon, <i>Lampetra</i> sp. recorded (eDNA); Red-listed European eel likely present

Conservation value: Atlantic salmon (*Salmo salar*), brook lamprey (*Lampetra planeri*) and river lamprey (*Lampetra fluviatilis*), white-clawed crayfish (*Austropotamobius pallipes*) and Eurasian otter (*Lutra lutra*) are listed under Annex II of the Directive on the Conservation of Natural Habitats of Wild Fauna and Flora (92/43/EEC) ('EU Habitats Directive') and all are protected under the Irish Wildlife Acts 1976-2023. White-clawed crayfish (Füreder et al., 2010) are also listed as 'Endangered' according to the IUCN Red List. European eel are 'critically endangered' according to most recent ICUN red list (Pike et al., 2020) and listed as 'critically engendered' in Ireland (King et al., 2011).

⁴ Otter signs within 150m of the survey site

5. Discussion

The River Boyne in the vicinity of the proposed Trim Millennium Pedestrian Bridge scheme (bridge replacement) is of international importance in terms of aquatic ecology given its location with the River Boyne And River Blackwater SAC (002299), a site designated for several aquatic species, namely Atlantic salmon, river lamprey and otter (NPWS, 2021).

Despite historical modifications from both arterial drainage and urbanisation (i.e. retaining walls, modified banks), the river at this location remains of considerable value for a range of aquatic species of high conservation value. Both Atlantic salmon and lamprey (*Lampetra* sp.) were detected via eDNA sampling and indeed spawning and nursery habitats for both species were present in vicinity of the existing footbridge. Good quality salmonid spawning and nursery habitat was located upstream of Millennium Bridge, with valuable holding areas for migratory adults present downstream (in deeper glide habitat). Spawning areas for *Lampetra* sp. were also present here although nursery areas were limited in extent and typically sub-optimal where present due to the shallow nature of sediments and or high sand content. Nevertheless, areas of marginal soft sediment downstream of Millennium Bridge likely support low densities of *Lampetra* sp. ammocetes, as routinely observed throughout the River Boyne (Gordon et al., 2023; Gallagher et al., 2022; O'Connor, 2006; Triturus data). The survey area (especially deep glide downstream) was of high suitability for Red-listed (King et al., 2011) and critically endangered (Pike et al., 2020) European eel, as well as a range of coarse fish species.

Although some good habitat suitability was present in terms of instream refugia (inclusive of old retaining walls), no white-clawed crayfish were recorded during the survey via hand searching or sweep netting. However, the species was detected by eDNA sampling (**Table 4.1**), confirming their presence at and or upstream of the sampling point. Records for crayfish are available throughout the River Boyne, including in the vicinity of Trim, although many are historical only. This is most likely due to the prevalence of crayfish plague, first known in the Boyne catchment in 1987 and detected again in recent years (Triturus 2021-2022 data). The presence of crayfish plague (confirmed via eDNA sampling) will continue to jeopardise the persistence of remaining Boyne crayfish populations. Crayfish plague is listed at one of the world's 100 worst invasive species (GISD, 2022; Lowe et al., 2000) and is becoming highly prevalent across Ireland.

Two otter spraint sites were recorded on the east and west bank of the River Boyne between Old Bridge and Millennium Bridge in October 2023. The survey area was considered to provide good foraging and commuting habitat although the generally high levels of human disturbance (urban centres, public footpaths etc.) and modified banks were unsuitable for breeding or resting areas – neither of which were identified within a 150m radius of the existing footbridge.

No rare or protected macro-invertebrate species (according to national red lists) were recorded in the samples taken from the River Boyne upstream and downstream of Millennium Bridge (**Table 4.2**). In terms of biological water quality, both sites achieved **Q3-4** (moderate status) due to the low abundances of pollution sensitive (EPA group A) taxa. Thus, the Boyne at this location failed to meet the target good status ($\geq Q4$) requirements of the European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2019 and the Water Framework Directive (2000/60/EC), in keeping with the most recent EPA monitoring data (2020). Significant hydromorphological modifications and

water quality pressures (including urban run-off, eutrophication & siltation) were noted during the surveys and are known to be the primary threats to water quality in the survey area (EPA data).

No examples of Annex I aquatic habitats associated with large lowland rivers including the Boyne were recorded in the study area. This included an absence of, 'Water courses of plain to montane levels with the *Ranunculus fluitans* and *Callitriche-Batrachium* vegetation' [3260] or 'Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels' [6430].

6. References

- Armstrong, J. D., Kemp, P. S., Kennedy, G. J. A., Ladle, M., & Milner, N. J. (2003). Habitat requirements of Atlantic salmon and brown trout in rivers and streams. *Fisheries research*, 62(2), 143-170.
- Byrne, A. W., Moorkens, E. A., Anderson, R., Killeen, I. J., & Regan, E. (2009). Ireland Red List no. 2: Non-marine molluscs. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government.
- EA (2003). River Habitat Survey in Britain and Ireland Field Survey Guidance Manual 2003. Environment Agency, UK.
- Feeley, H. B., Baars, J. R., Kelly-Quinn, M., & Nelson, B. (2020). Ireland Red List No. 13: Stoneflies (Plecoptera). National Parks and Wildlife Service.
- Fossitt, J. (2000) A Guide to Habitats in Ireland. The Heritage Council, Ireland.
- Foster, G. N., Nelson, B. H. & O Connor, Á. (2009). Ireland Red List No. 1 – Water beetles. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.
- Füreder, L., Gherardi, F., Holdich, D., Reynolds, J., Sibley, P. & Souty-Grosset, C. (2010). *Austropotamobius pallipes*. The IUCN Red List of Threatened Species 2010: e.T2430A9438817. <https://dx.doi.org/10.2305/IUCN.UK.2010-3.RLTS.T2430A9438817.en>.
- Gallagher, T., O’Gorman, N.M., Rooney, S.M., Brett, A., and O’Leary, C. (2022) National Programme: Habitats Directive and Red Data Book Species Summary Report 2021. Inland Fisheries Ireland, 3044 Lake Drive, Citywest, Dublin 24, Ireland.
- Gardiner, R. (2003). Identifying lamprey. A field key for sea, river and brook lamprey. *Conserving Natura 2000 Rivers*, Conservation techniques No. 4. Peterborough. English Nature.
- GISD (2022). Global Invasive Species Database downloaded from http://www.iucngisd.org/gisd/100_worst.php on 06-10-2022.
- Gordon, P., Matson, R., Corcoran, W., Heagney, B. and Kelly, F.L. (2023). Sampling Fish in Rivers 2022 – Boyne Catchment, Factsheet No. 2022/04. National Research Survey Programme. Inland Fisheries Ireland.
- Harvey, J. & Cowx, I. (2003). Monitoring the River, Sea and Brook Lamprey, *Lampetra fluviatilis*, *L. planeri* and *Petromyzon marinus*. *Conserving Natura 2000 Rivers Monitoring Series No. 5*, English Nature, Peterborough.
- Hendry, K., & Cragg-Hine, D. (1997). Restoration of Riverine Salmon Habitats: A Guidance Manual. Environment Agency.
- Hendry, K., Cragg-Hine, D., O’Grady, M., Sambrook, H., & Stephen, A. (2003). Management of habitat for rehabilitation and enhancement of salmonid stocks. *Fisheries Research*, 62(2), 171-192.
- IFI (2010). Biosecurity Protocol for Field Survey Work. Available at <http://www.fisheriesireland.ie/Invasive-Species/biosecurity-protocol-for-field-survey-work.html>
- IFI (2013). Environmental River Enhancement Programme review report 2008 – 2012. Inland Fisheries Ireland. May 2013.
- Kelly, F.L., Harrison, A., Matson, R., Connor, L., Feeney, R., Morrissey, E., O’Callaghan, R., Wogerbauer, C., Hanna, G., Rocks, K. & Gallagher, K. (2011a). Sampling fish for the Water Framework Directive Rivers 2010: Eastern River Basin District. Inland Fisheries Ireland, Swords Business Campus, Swords, Co. Dublin, Ireland.

- Kelly, F.L., Harrison, A., Connor, L., Wightman, G., Matson, R., Hanna, G., Feeney, R., Morrissey, E., O'Callaghan, R., Wogerbauer, C., Rocks, K., Hayden, B., & Stafford, T. (2011b). Sampling fish for the Water Framework Directive Rivers 2009: Eastern River Basin District. Inland Fisheries Ireland, Swords Business Campus, Swords, Co. Dublin, Ireland.
- Kelly-Quinn, M. & Regan, E.C. (2012). Ireland Red List No. 7: Mayflies (Ephemeroptera). National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- King, J.L., Marnell, F., Kingston, N., Rosell, R., Boylan, P., Caffrey, J.M., FitzPatrick, Ú., Gargan, P.G., Kelly, F.L., O'Grady, M.F., Poole, R., Roche, W.K. & Cassidy, D. (2011). Ireland Red List No. 5: Amphibians, Reptiles & Freshwater Fish. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- Lowe, S., Browne, M., Boudjelas, S., & De Poorter, M. (2000). 100 of the world's worst invasive alien species: a selection from the global invasive species database (Vol. 12). Auckland: Invasive Species Specialist Group.
- Maitland, P.S. (2003). Ecology of the River, Brook and Sea Lamprey. Conserving Natura 2000 Rivers Ecology Series No. 5. English Nature, Peterborough.
- Massa-Gallucci A. & Mariani S. (2011). A genetic study of the mixed trout populations of the Boyne and Suir River catchments. Technical Report. Inland Fisheries Ireland.
- Matthews, M., & Reynolds, J. D. (1992). Ecological impact of crayfish plague in Ireland. *Hydrobiologia*, 234, 1-6.
- McGinnity, P., Gargan, P., Roche, W., Mills, P. & McGarrigle, M. (2003). Quantification of the Freshwater Salmon Habitat Asset in Ireland using data interpreted in a GIS platform. Irish Freshwater Fisheries, Ecology and Management Series: Number 3, Central Fisheries Board, Dublin, Ireland.
- Nelson, B., Ronayne, C. & Thompson, R. (2011). Ireland Red List No.6: Damselflies & Dragonflies (Odonata). National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.
- NPWS (2021). Conservation Objectives: River Boyne and River Blackwater SAC 002299. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.
- O'Connor W. (2006). A survey of juvenile lamprey populations in the Boyne Catchment. Irish Wildlife Manuals, No. 24 National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.
- O'Grady, M.F. (2006). Channels and challenges: enhancing Salmonid rivers. Irish Fresh- water Fisheries Ecology and Management Series: Number 4. Central Fisheries Board, Dublin.
- O'Reilly, P. (2009). Rivers of Ireland, a Flyfisher's Guide (7th Edition). Merlin Unwin Books, Shropshire, UK.
- Pike, C., Crook, V. & Gollock, M. (2020). *Anguilla anguilla*. The IUCN Red List of Threatened Species 2020: e.T60344A152845178. <https://dx.doi.org/10.2305/IUCN.UK.2020-2.RLTS.T60344A152845178.en>.
- Reynolds, J.D., Lynn, D., O' Keeffe, C. (2010). Methodology for Monitoring Irish Lake Populations of White-clawed Crayfish *Austropotamobius pallipes* (Lereboullet). *Freshwater Crayfish* 17:195–200.
- Toner, P., Bowman, J., Clabby, K., Lucey, J., McGarrigle, M., Concannon, C., ... & MacGarthaigh, M. (2005). Water quality in Ireland. Environmental Protection Agency, Co. Wexford, Ireland.

Wyse Jackson, M., FitzPatrick, Ú., Cole, E., Jebb, M., McFerran, D., Sheehy Skeffington, M., & Wright, M. (2016). Ireland red list no. 10: Vascular plants. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin, Ireland.

7. Appendix A – eDNA analysis lab report

Folio No: 141-2023
Purchase Order: eDNA_OCT23
Contact: Triturus Environmental Ltd
Issue Date: 31.10.2023

eDNA Report

Technical Report



Folio No: 141-2023
Purchase Order: eDNA_OCT23
Contact: Triturus Environmental Ltd
Issue Date: 31.10.2023



eDNA Analysis

Summary

When aquatic organisms inhabit a waterbody such as a pond, lake or river they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm the presence or absence of the target species within the waterbody.

Results

Lab ID	Site Name	OS Reference	Target Species	Sample Integrity Check	Result	Positive Replicates
11696	River Boyne, Millenium Bridge, Trim		Atlantic salmon	Pass	Positive	12
			Brook lamprey	Pass	Positive	12
			Crayfish plague	Pass	Positive	11
			White-clawed crayfish	Pass	Positive	2

Matters affecting result: none

Reported by: Lauryn Jewkes

Approved by: Chelsea Warner



Folio No: J41-2023
Purchase Order: eDNA_OCT23
Contact: Triturus Environmental Ltd
Issue Date: 31.10.2023



Methodology

Samples have been analyzed for the presence of target species eDNA following readily available and scientifically published eDNA assays and protocols.

The analysis is conducted in two phases. The sample first goes through an extraction process where the filter is incubated in order to obtain any DNA within the sample. The extracted sample is then tested via real-time PCR (also called q-PCR) for each of the selected target species. This process uses species-specific molecular markers (known as primers) to amplify a select part of the DNA, allowing it to be detected and measured in 'real time' as the analytical process develops. qPCR combines amplification and detection of target DNA into a single step. With qPCR, fluorescent dyes specific to the target sequence are used to label targeted PCR products during thermal cycling. The accumulation of fluorescent signals during this reaction is measured for fast and objective data analysis. The primers used in this process are specific to a part of mitochondrial DNA only found in each individual species. Separate primers are used for each of the species, ensuring no DNA from any other species present in the water is amplified. If target species DNA is present, the DNA is amplified up to a detectable level, resulting in positive species detection. If target DNA is not present then amplification does not occur, and a negative result is recorded.

Analysis of eDNA requires scrupulous attention to detail to prevent the risk of false positive and false negative results. True positive controls, negative controls, and spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared. Stages of the analysis are also conducted in different buildings at our premises for added security. SureScreen Scientifics Ltd is ISO9001 accredited and participates in Natural England's proficiency testing scheme for GCN eDNA testing.

Interpretation of Results

Sample Integrity Check: Laboratory Arrival:

When samples are received in the laboratory, they are inspected for any tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to inconclusive results. Any samples which fail this test are rejected and eliminated before analysis.

Degradation and Inhibition check:

Analysis of the spiked DNA marker to see if there has been degradation or inhibition of the kit or sample, between the date it was made to the date of analysis. Degradation of the spiked DNA marker may indicate a risk of false negative results. If inhibition is detected, samples are purified and re-analyzed. Inhibitors cannot always be removed, if the inhibition check fails, the sample should be re-collected.

Result:

Presence of eDNA (Positive/Negative/Inconclusive)

Positive: DNA was identified within the sample, indicative of species presence within the sampling location at the time the sample was taken or within the recent past.

Positive Replicates: Number of positive qPCR replicates out of a series of 12. If one or more of these are found to be positive the pond is declared positive for species presence. It may be assumed that small fractions of positive analyses suggest low level presence, but this cannot currently be used for population studies. Even a score as low as 1/12 is declared positive. 0/12 indicates negative species presence.

Negative: eDNA was not detected or is below the threshold detection level and the test result should be considered as evidence of species absence, however, does not exclude the potential for species presence below the limit of detection.

Inconclusive: Controls indicate inhibition or degradation of the sample, resulting in the inability to provide conclusive evidence for species presence or absence.





Triturus Environmental Ltd.

42 Norwood Court,

Rochestown,

Co. Cork,

T12 ECF3.



**CONSULTANTS IN ENGINEERING,
ENVIRONMENTAL SCIENCE
& PLANNING**

www.fehilytimoney.ie

 **Cork**

 **Dublin**

 **Carlow**

