CLONASLEE FLOOD RELIEF SCHEME

Preliminary Construction Environmental Management Plan

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ACRONYMS

Term	Meaning
ACA	Architectural Conservation Area
ACO	Architectural Conservation Officer
AEP	Annual Exceedance Probability
BMEP	Biodiversity Management and Enhancement Plan
BPM	Best Practice Mitigation
CSCS	Construction Skills Certification Scheme
CEMP	Construction Environmental Management Plan
CER	Client Environmental Representative
CH	Cultural Heritage
CIEEM	Chartered Institute of Ecology and Environmental Management
CTMP	Construction Traffic Management Plan
dB	Decibels
DMP	Dust Management Plan
DTTAS	Department of Transport, Tourism and Sport
ECoW	Ecological Clerk of Works
ECM	Environmental Control Map
EIAR	Environmental Impact Assessment Report
EnvCoW	Environmental Clerk of Works
EPA	Environmental Protection Agency
FRS	Flood Relief Scheme
GGBS	Ground Granulated Blast-Furnace Slag
GPR	Ground Penetrating Radar
ECM	Environmental Control Map
HV	Heavy Vehicles
HVO	Hydrotreated Vegetable Oil
IAPS	Invasive Alien Plant Species
IASMP	Invasive Alien Species Management Plan
ICW	Integrated Constructed Wetlands
IFI	Inland Fisheries Ireland
LCC	Laois County Council
NIS	Natura Impact Statement
NMS	National Monuments Service
NPWS	National Parks and Wildlife Services
NRA	National Roads Authority
NSL	Noise Sensitive Location
OHL	Overhead Line
OPW	Office of Public Works
pCEMP	Preliminary Construction Environmental Management Plan
PCMP	Project Carbon Management Plan
PPE	Personal Protective Equipment
PRF	Potential Roost Feature
PSCS	Project Supervisor Construction Stage
PSDP	Project Supervisor Design Process
RPA	Root Protection Area

TII	Transport Infrastructure Ireland
TSM	Transport's Traffic Signs Manual
TSS	Total Suspended Solids
TTM	Temporary Traffic Management
WAC	Waste Acceptance Criteria
WMP	Waste Management Plan

1 INTRODUCTION

This preliminary Construction and Environmental Management Plan (pCEMP) has been developed by RPS on behalf of Laois County Council to accompany an application for planning permission to An Bord Pleanála relating to the construction of a Flood Relief Scheme (FRS), hereafter referred to as the 'Proposed Scheme', in the townlands of Brittas, Bunastick, Clonaslee, Ballynakill and Brockagh, in Clonaslee Village in Co. Laois.

The pCEMP has been prepared in support of an Environmental Impact Assessment Report (EIAR) and the Natura Impact Statement (NIS) which accompany this planning application for the Proposed Scheme.

The pCEMP outlines the procedures for the delivery of environmental mitigation and monitoring measures and for addressing general day-to-day environmental issues that can arise during the construction phase of the Proposed Scheme, assisting the contractor in preventing, managing and/or minimising potential significant environmental effects during the construction phase.

The pCEMP will form the basis of the CEMP. The pCEMP will become superseded if planning permission is granted and it will not be used during construction. The OPW will prepare their own CEMP for the project which incorporates all measures detailed within the pCEMP and all relevant conditions of approval.

The CEMP will form part of the Works Contract (hereafter, 'the Contract') to ensure that all mitigation and monitoring measures, which are considered necessary to protect the environment, are implemented. The methods and principles contained herein, as well as within legislative instruments and published guidance documents (including the *OPW Environmental Guidance: Drainage Maintenance and Construction (2019) for the development of the CEMP*[1], will be adhered to by the Contractor. The Contractor will submit all relevant information as detailed in this document to LCC for acceptance in accordance with the contract provisions. No construction works will commence prior to the LCC's acceptance.

The CEMP is a live document which will be updated by the appointed Contractor on an as-needed basis throughout the construction of the Proposed Scheme. The appointed Contractor will be responsible for ensuring that all sub-contractors adhere to and implement the procedures and measures included in the CEMP.

1.1 Purpose of the CEMP

The principal objective of the CEMP is to detail appropriate environmental management, mitigation and monitoring measures required for the avoidance, minimisation and control of any potential adverse environmental impacts associated with the construction phase of the Proposed Scheme.

1.1.1 Targets and Objectives

The following key targets and objectives will ensure the protection of the environment from all construction-related environmental issues, which can significantly impact the local environment if not reduced. These targets and objectives will ensure that the potential environmental impacts associated with the Proposed Scheme are managed in an environmentally friendly way, and that the construction activities comply with environmental regulations, local authority guidelines and conditions that may be attached to a planning approval.

- Adopt a sustainable approach to construction and, ensure sustainable sources for materials supply where possible;
- Keeping all watercourses free from obstruction and debris;
- Avoidance of any pollution incident or near miss as a result of working within and/ or close to existing watercourses and having emergency measures in place;
- Correct fuel storage and refuelling procedures to be followed;
- Air and noise pollution prevention to be implemented;

[1] OPW (2019) *OPW Environmental Guidance: Drainage Maintenance and Construction (2019)" for the development of the CEMP*. Available at: environmental_guidance_-_drainage_maintenance_and_construction_2019_web_part-1.pdf

- Construction methods and designs will be altered where it is found there is an adverse effect on the environment;
- Good waste management and house-keeping to be implemented;
- Monitoring of the works and any adverse effects that it may have on the environment; and,
- Provide adequate environmental training and awareness for all project personnel.

The key construction site objectives are as follows:

- Keep impact of construction to a minimum on the local environment, watercourses, wildlife and heritage;
- Comply with all relevant water quality legislation and the Habitats Directive;
- Ensure construction works and activities are completed in accordance with mitigation and best practice approach presented in the Environmental Impact Assessment Report (EIAR), Natura Impact Statement (NIS) and associated planning documentation;
- Ensure construction works and activities are completed in accordance with any planning conditions for the Proposed Scheme;
- Ensure construction works and activities have minimal impact/disturbance to local landowners and the local community.

1.2 Contractor's Environmental Policy Statement

Once appointed, the Contractor shall append their Environmental Policy Statement to this section.

2 ROLES AND RESPONSIBILITIES

This section sets out the roles and responsibilities of the principal parties involved in the construction of the Proposed Scheme. The roles and responsibilities outlined below are indicative, and these will be updated upon appointment of the Contractor. The Contractor will allocate responsibility for compliance with the terms of the CEMP during the construction phase of the Proposed Scheme.

2.1 The Contractor

The Contractor is responsible for all activities necessary to complete the works in accordance with the scope/ requirements stated or implied within the Contract, unless explicitly stated as being the responsibility of the employer or others. This includes construction, testing and all associated management and supervision. It also includes implementation of mitigation measures and monitoring required. The Contractor shall resource, plan, progress and deliver the Proposed Scheme in such a manner that all management systems are fully transparent and auditable. The Contractor's management systems shall be inspected by the Local Authority as appropriate throughout the Contract. The Contractor shall be assigned the following responsibilities as a contractual requirement. It should be noted that this is an indicative list and does not limit the requirements of the Contract:

- Monitoring and Mitigation
- Inspections
- Reporting and Documentation
- Auditing
- Communication and Training.

2.2 Environmental Manager

The Contractor shall appoint Environmental Manager who will have overall responsibility for the organisation and execution of all related environmental activities as appropriate, in accordance with regulatory and project environmental requirements. The duties and responsibilities of the environmental manager shall include:

- Ensure that all works are completed safely and with minimal environmental risk.
- Approve and implement the CEMP and supporting environmental documentation and ensure that all environmental standards are achieved during the construction phase of the project.
- Take advice from the Ecological Clerks of Works (ECoW) on legislation, codes of practice, guidance notes and good environmental working practice relevant to their work.
- Ensure compliance through reporting, audits and management site visits.
- Ensure timely notification of environmental incidents.
- Ensure that all construction activities are planned and performed such that minimal risk to the environment occurs.

2.3 Client Environmental Representative

LCC shall appoint the Client Environmental Representative (CER) before the commencement of works. The CER shall act as the 'Laois County Council's' representative' and liaise directly with the Contactor's environmental staff, the ECoW, review reporting deliverables, and supervise site activities as required.

2.4 Ecological Clerk of Works

A suitably qualified and experienced ecologist shall be appointed to the role of Ecological Clerk of Works (hereafter, ECoW) for the Proposed Scheme. The ECoW will be appointed prior to the commencement of any construction or enabling works. The ECoW must be appointed and employed by the Client or CER, and not by the Contractor, to maintain a degree of independence. The ECoW shall report directly to the CER.

The CER or LCC will ensure that the ECoW is delegated sufficient powers under the construction contract, so that they will be able to instruct the Contractor to stop works and to direct the carrying out of emergency mitigation/clean-up operations. The ECoW will also be LCC's liaison for the purposes of consulting environmental bodies including Inland Fisheries Ireland and the NPWS.

In advance of works commencing on site, all personnel will receive on-site induction by the ECoW and Contractor relating to the ecological constraints and mitigation measures associated with the site. It will be the responsibility of the Contractor to ensure that any new personnel who are employed during the construction work also receive the on-site induction. The ECoW will provide toolbox talks, where required, to all site personnel.

Prior to the commencement of construction works, the scope, programme and phasing of update habitat and species surveys will be defined by the ECoW in consultation with LCC or the CER, and main Contractor. Given the duration of the construction works, the update habitat and species surveys will need to be appropriately phased, mindful of the planned work and seasonal constraints. This is to ensure that an up-to-date baseline is maintained to inform decision making including with respect to the need for derogation licensing. It will be the role of the ECoW to undertake any required pre-construction surveys, and to undertake ecological monitoring before and during the construction phase as required.

The ECoW will oversee the implementation of the eradication of IAPS on site, however, the "sign off" of the works required to remove/eradicate IAPS will be completed by a specialist Contractor specialising in such eradication.

The ECoW shall be in attendance on site during the following construction activities:

- All site clearance;
- Excavations, including topsoil stripping and earthworks activities;
- Excavations, foundations and flood wall construction works;
- Embankment creation; and
- Instream works.

The ECoW shall oversee the demarcation and erection of protective fencing around working areas in advance of works commencing.

Note: When mitigation measures extend beyond the construction phase, and thereafter require 'monitoring' during the operational phase, LCC will be responsible for the commission of a suitably qualified person(s) to undertake this work.

2.5 Contracting Archaeologist

The contraction archaeologist will be appointed by the client and will be responsible for the implementation of the following:

- A full archaeological mitigation strategy to be agreed in consultation with the NMS and relevant Local Authority planning archaeologist/Heritage Officer and Architectural Conservation Officer (ACO) post-consent and in advance of any on-site works taking place. Sufficient time will be allowed in programme to undertake early advance works agreed through consultation with NMS, and the results of any advance works will further inform archaeological mitigation required for the proposed development.
- All archaeological monitoring will be carried out under licence by the National Monuments Service, Department of Housing, Local Government and Heritage.
- All/any greenfield portions of the Proposed Scheme where previously unidentified sites or potential archaeological sites have been noted will be subject to advance works archaeological testing will be tested by a suitably qualified archaeologist in consultation with the Laois Co. Council officer responsible for planning and cultural heritage and under licence from the NMS in compliance with the relevant legislation, policy and guidelines. The results of this work will inform further archaeological mitigation where/if required, the scope of which will be agreed in advance with the Local Authority and in consultation with the NMS.
- Townland boundaries within the proposed development area to be subject to townland boundary surveys, including archaeological testing of same, under licence by a suitably qualified archaeologist, in

consultation with the relevant Co. Council planning archaeologist/Heritage Officer and NMS. The results of this work will inform the requirement for further archaeological mitigation where necessary.

- Architectural heritage surveys of all extant vernacular buildings/structures to be directly or potential directly impacted by the proposed development to be subject to Built Heritage Surveys in accordance with relevant guidance, and in consultation with the relevant Laois Co. Council officers.
- That archaeological monitoring confined to areas where advance archaeological works are not feasible will be undertaken by a suitably qualified archaeologist during construction.
- That the results of all archaeological works associated with the proposed development be disseminated both locally (through local lectures) and to the wider public through publications.

2.6 Other Roles

The Contractor shall be responsible for engaging suitably qualified and experienced professionals to fulfil the environmental obligations of the CEMP, if and where required. Roles that may be required are:

- Arboriculture Specialist
- Road Surveyor
- Noise and Vibration Specialist
- Dust Monitoring Consultant.

3 GENERAL PROJECT DETAILS

3.1 Location of the Proposed Scheme

Clonaslee is situated in the upstream Brosna catchment. Two rivers pass through the Clonaslee (the Clodiagh River to the west and Gorragh River to the east). The Clodiagh River flows northwards through the village of Clonaslee, from its source from the Knockachorra Mountain in the Slieve Bloom Mountain range. The Gorragh River passes to the east of Clonaslee before its confluence with the Clodiagh River approximately 1.5 km north of Clonaslee. The Clodiagh River is the main flood risk source within Clonaslee.

The Proposed Scheme comprises flood relief measures on three separate sections of the Clodiagh River. The Proposed Scheme will deliver protection to the identified properties affected by the predicted 1% Annual Exceedance Probability (AEP) flooding. The extent of predicted 1% AEP flooding, and resultant properties as risk is shown in **Figure 3-1.** The operational phase benefitting lands is illustrated on **Figure 3-2.**

3.2 Description of Proposed Scheme

Table 3-1 contains a summary of all proposed flood defence elements to be delivered under the Proposed Scheme. The Three works areas are illustrated on **Figure 3-3.**

Table 3-1: Proposed Works

Area	Location	Emerging Preferred Option Description	Dimensions	Material
Area 1	Brittas Loop Walk path	New embankment	135m x 3m x 0.60m (L x W x H) 1:3 slope	Impermeable Clay
		Debris Trap	7.0m x 3.5m x 1.2m (L x W x D)	Concrete
		Culvert	10m x 0.60m (L x Ø)	Concrete
Area 2	Along Chapel Street/ landowner boundary	Bolstering existing stone wall	235m x 0.50m x 1.5m (L x W x H)	Reinforce Concrete Stone finish
Area 3	Tullamore Road, left bank field upstream of ICW access bridge	New embankment	140m x 2m x 0.77m (L x W x H) 1:3 slope	Impermeable Clay
	Irish Water ICW, right bank upstream of entrance to ICW	New retaining wall	70m x 0.25m x 0.95m (L x W x H)	Reinforce Concrete

3.2.1 Construction Programme and Phasing

The construction activities are planned to take place over a 24-month construction campaign (See **Figure 3-4** for an indicative construction programme). The specific schedule for activities within each area of the Proposed Scheme will be finalised on appointment of a Contractor. Preference will be given to working during the summertime to avoid water high river and groundwater levels. There will be restrictions on the instream works discussed as a result of fish spawning season.

- All vegetation removal will be completed outside the breeding bird season (1 March to the 31 August, inclusive) with the following exception:
  - where breeding birds are confirmed absent by the ECoW immediately prior to the vegetation being removed. Areas found not to contain nests will be cleared within three days of the nest survey, otherwise repeat surveys will be required.
- Instream works will be required for the construction of the debris trap on the River Clodiagh and the new culvert inlet on the Brittas Stream. Instream works must avoid the spawning period of fish in the River Clodiagh. The fisheries open season is from 1st July to 30th of September, and instream works shall be restricted to this period;

- Instream and bankside works shall only be undertaken as per the triggers agreed between the ECoW and Contractor. A workable stream and river water level will be agreed with the ECoW and Contractor before works commence. As best practice works should be undertaken during dry weather, when there is no risk of flooding and when the soil is dry enough for works to commence (no overland flow or soil saturation).

3.2.2 Construction Hours

It is proposed that standard construction working hours will apply as follows: Monday to Friday: 08:00 to 19:00; Saturdays: 08:00 to 14:00; and no work on Sundays and Bank Holidays. Deviation from these times will only be allowed where prior written approval has been received from the local authority.

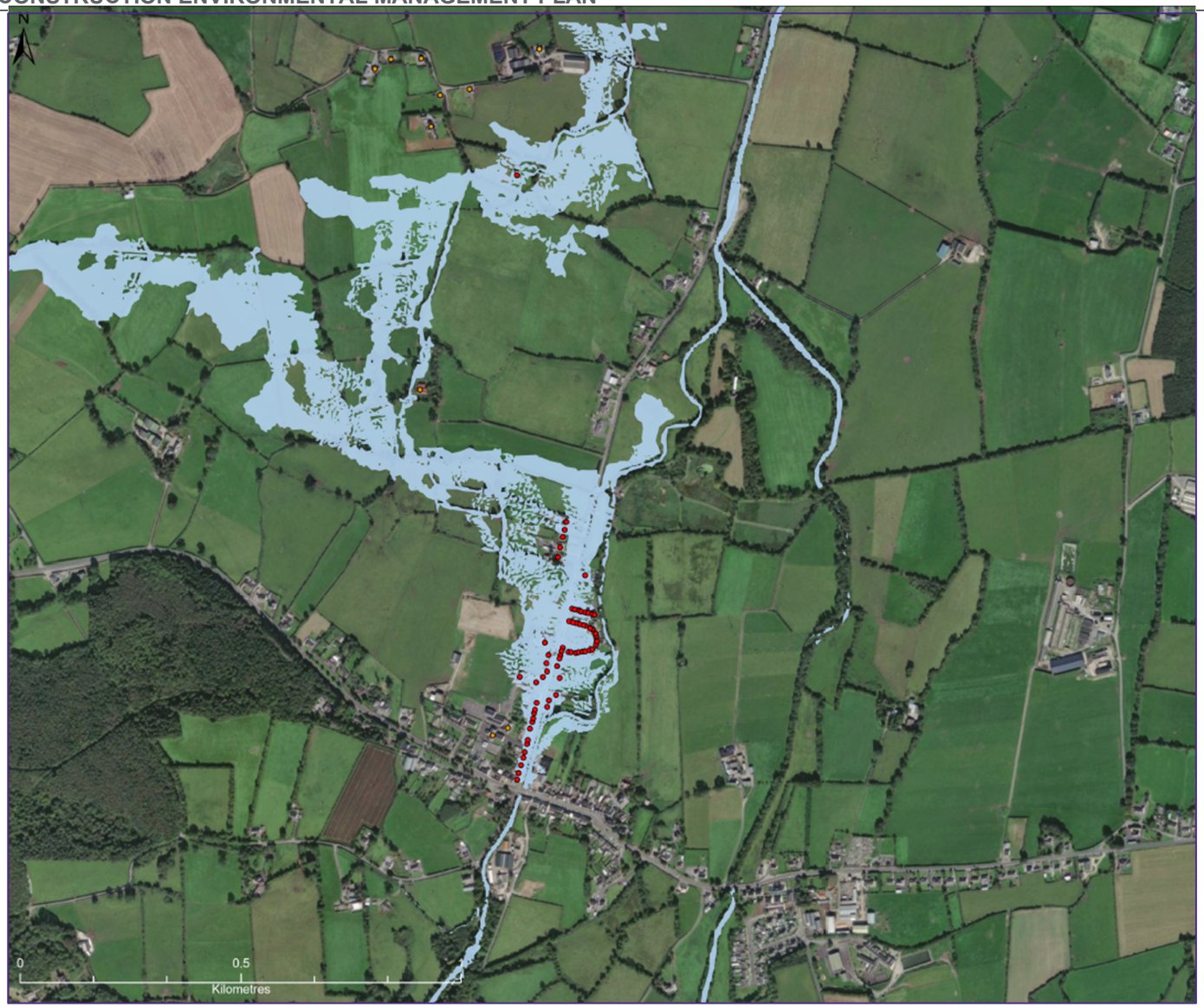

Figure 3-1:Clonaslee 1% AEP Event in the Undefended Scenario (incl. properties at risk)

Figure 3-2: Post-scheme 1% AEP Model Predicted Flooding

Figure 3-3: Proposed Scheme

1. 24 months total works programme
3. Estimated construction commencement in Nov 2027

Works Area	Works Description	Year 1												Year 2												Year 3											
		January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
All	Utility diversions (enabling works)																																				
Area 1																																					
	Req. Vegetation Clearance																																				
	Embankment																																				
	Culvert Headwall Installation																																				
	Debris Trap																																				
Area 2																																					
	Req. Vegetation Clearance																																				
	Excavation and cut-off																																				
	Conc Wall Construction																																				
Area 3																																					
	Req. Vegetation Clearance																																				
	Embankment																																				
	Wall																																				

Enabling Works

Embankment Construction Crew

Instream Works

Wall Construction Crew

Figure 3-4: Indicative Construction Phase Programme

3.2.3 Construction Compounds

The appointed Contractor will set up the temporary construction compounds. Compounds will include site offices, welfare facilities, bunded fuel storage areas, designated storage area and construction staff parking. Wastewater will connect to foul sewer networks where available. Where not available, the contractor will provide welfare facilities in accordance with best practice.

The locations of potential temporary compounds are shown in **Figure 3-5**Error! Reference source not found.**,** and listed below:

- **Compound Site A Brittas Wood –** This area is intended to store embankment material, and dealing with large delivery vehicles that will not be able to access the Brittas Wood works area. It will contain welfare facilities and a small office; and
- **Compound Site B Chapel Street -** This location will house the main compound for welfare/offices etc. Wall reinforcement steel and formwork will be stored here.

Figure 3-5: Location of construction compounds to be used for the Proposed Scheme

4 TRAFFIC MANAGEMENT

From a traffic and transport perspective, the key components of the Proposed Scheme are:

- The traffic generated by the staff and plant machinery associated with the construction works.
- The temporary diversions in place during construction works.

A Construction Traffic Management Plan (CTMP) has been produced for the Proposed Scheme. Refer to Section 4-2 below for details.

4.1 Construction Phase Traffic

Construction traffic will include Heavy Vehicles (HV) and construction staff cars / vans (Light Vehicles (LV)). Construction traffic will travel on roads that are located adjacent to residential and retail development and which also serve pedestrian movement.

Detailed information on anticipated traffic movements is not available. Indicative daily movements for one construction team operating on site are provided below:

- Six vehicles (cars/vans) will arrive on site in the morning (07:00 – 08:00) and depart in the evening (18:00 – 19:00)
- An average of 16 HV will arrive and depart the site throughout the typical working day (07:00 – 19:00) with a maximum of 32 HV movements per day

Total traffic movements will depend on construction methodology and actual number of crews during construction stage.

4.1.1 Haul Routes

Haul routes have been identified for the two construction compounds. Delivery of materials and other infrastructure associated with the Proposed Scheme will be carried out using HVs. Deliveries to the site will adhere to the hierarchy of roads where possible utilising the National Primary and Secondary Roads, Regional Roads then Local Roads.

It is assumed that that majority of aggregate, concrete and steel will be delivered to site from Tullamore town, the nearest, large town on a direct route from the Proposed Scheme, with several operating licenced quarries nearby.

The potential haul routes for the Proposed Scheme will vary depending on the Contractor's specific procedures and programme. All routes are subject to the agreement of LCC and TII where appropriate and alternative routes may be considered. However, for the purpose of the CTMP (Section 4-2), potential routes are shown in **Figure 4-1** below.

The road network surrounding Clonaslee provides multiple potential haul routes for material to be transported to and from the site. The preferred haul route to/from Tullamore town is via the N80 which connects to the site via the L2002/ L2006 Local Roads.

4.1.2 Temporary Lane Closure

The proposed temporary traffic management to facilitate works at Chapel Street will involve a southbound lane closure along a section of Chapel Street with stop/go or temporary traffic signal operation for the duration of the works. Access to local properties and amenities is to be maintained along Chapel Street.

Given the vicinity of the R422 Regional Road to the works in this area and the merging of traffic from Chapel Street on the R422, there are a number of scenarios from Chapter 8 of the TSM to allow for this movement.

1. When the distance from the junction to the Stop and Go / Traffic Signal on Chapel Street is less than 60m, full Stop and Go control must be provided on all arms of the junction.
2. When the distance from the junction to the Stop and Go / Traffic Signal on Chapel Road is greater than 60m but less than 90m, Stop and Go control can be provided on the minor road (Chapel Steet) only but 2 no. advanced warning signs on the major road approaches to the junction must be provided.

3. When the distance from the junction to the first advanced warning sign on the minor road (Chapel Street) is greater than 50m, advanced signage on the major road is not required and Temporary Traffic Management (TTM) can be local to the minor road.

Therefore, as the works progress along Chapel Street away from the crossroad junction, requirements for TTM on the R422 road itself can be reduced.

Details pertaining to temporary lane closures can be found in **Appendix 6-2 CTMP**.

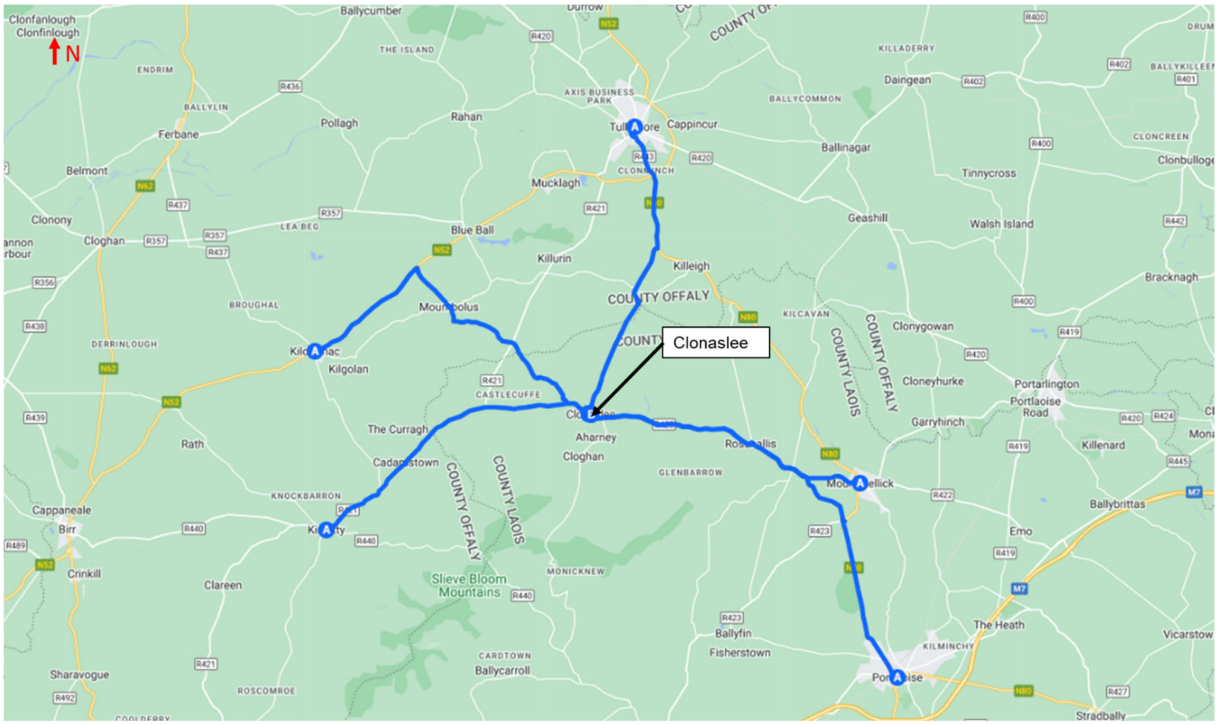

Figure 4-1: Proposed haul routes to the Proposed Scheme *(Source: Google Maps)*

4.2 Construction Traffic Management Plan (CTMP)

A Construction Traffic Management Plan (CTMP) has been prepared for the Proposed Scheme. See **Appendix 6-2** of this EIAR for details. The CTMP considers the potential impacts of construction related traffic generated as part of the Proposed Scheme and sets out the measures considered necessary to ensure that such traffic will be managed and monitored safely and efficiently throughout the construction phase.

It will be the responsibility of the appointed Contractor to further update this CTMP prior to the commencement of the construction phase. The Contractor will be required to agree the contents of the CTMP with both Laois County Council (LCC) and An Garda Síochána before the commencement of works on site. The Contractor will fully implement and maintain the CTMP throughout the construction phase.

The objectives of the CTMP are to:

- Outline minimum traffic management measures to be implemented for the works.
- Demonstrate to the Contractor and suppliers the need to adhere to the relevant guidance documentation for such works.
- Provide the basis for the preparation of a final CTMP by the appointed Contractor to carry out the works.

If approval is granted for the Proposed Scheme, the CTMP will address the requirements of any relevant conditions, including any additional mitigation measures which are conditioned. The Contractor will be responsible for ensuring the traffic related construction activities are undertaken accordance with the CTMP.

All site personnel will be responsible for following good practice and will be encouraged to provide feedback and suggestions for improvements. Site personnel will also be required to comply with the requirements of the Proposed Scheme's CTMP.

To reduce impacts on local communities and residents adjacent to the Proposed Scheme, the Contractor will be required to:

- Liaise with both LCC to co-ordinate access and egress to the site.
- Schedule deliveries to and from the construction compounds such that traffic volumes on the surrounding road network are kept to a minimum.
- Develop a construction phase programme for the duration of the works.
- Incorporate any specific construction moratoria (for example, certain busy periods) as indicated by LCC into the construction programme.
- Interact with members of the local community to ensure that deliveries will not conflict with sensitive events such as funerals.
- Abide by restrictions associated with the angling season.
- The Contractor will undertake consultation with LCC during the planning of all Temporary Traffic Management (TTM) measures for the Proposed Scheme.
- The Contractor will provide advanced warning signs in accordance with Chapter 8 of the *Department of Transport's Traffic Signs Manual*[2] (TSM) and its accompanying Design and Operation Guidance documents. The Contractor will also further develop this CTMP and issue it to LCC for agreement prior to the commencement of works on site. This CTMP will be developed by a qualified TTM designer in accordance with Chapter 8 of the TSM.
- The Contractor will provide, erect, and maintain dedicated signage along all public roads affected by the works to ensure the smooth and safe control of traffic entering and exiting the works area and diversion routes. All temporary traffic signs will conform to TSM Chapter 8. All signs will be reflectorised and adequately illuminated by night in a manner approved by the Employer and the Contractor will keep these signs clean and legible at all times.
- No parking, unloading or blockages will occur on the access route adjacent to construction compounds. Such vehicles will be immediately requested to move to avoid impeding traffic flow.

[2] Department of Transport (2019) *Current Traffic Signs Manual: Chapter 8Temporary Traffic Measures and Signs for Roadworks.* Available at: https://www.trafficsigns.ie/tsm-cur

5 LANDOWNER LIAISON

Minimising impact to the land and disruption to the farming activities, residential and commercial properties thereon is a key focus when the construction phase commences. This will be achieved as follows:

- **Landowner Engagement:** Prior to works commencing each landowner will be met by a member of the project team and Local Authority to inform them of the expected start date on their lands, duration of works and to agree on specific issues of access, presence of livestock etc. pertaining to the Proposed Scheme. Liaison with landowners will be on-going during the works and construction crews will work with landowners to address any issues arising.
- **Adherence to the Construction Methodology:** The construction methodology sets out how structures and work areas will be accessed, the means by which works will be undertaken and reinstatement of land on completion of the works.
- **Landowner Negotiation:** Any issues arising on the part of landowners in respect to the works will be referred to the Laois County Council (LCC) for further engagement.

6 TRAINING AND AWARENESS

The Contractor will ensure that all employees, sub-contractors, suppliers, and other visitors to the site are made aware of the environmental management measures in the CEMP, as applicable. Accordingly, environmental specific induction training will be prepared and presented to all categories of personnel working and visiting the site. As a minimum, the following information will be provided to all inductees:

- Environmental sensitivities related to the site, including the project specific Environmental Control Maps (ECMs) which will be developed by the Environmental Clerk of Works prior to the commencement of works.
- Identification of specific environmental risks associated with the work to be undertaken onsite by the inductee.
- Environmental Incident and Emergency Response Plan.
- Contact details for the ECoW.

The Contractor will provide an Environmental Risk Map illustrating environmentally sensitive areas, heritage constraints and potential sources of pollution (e.g., refuelling areas, location of spill kits, fuel tanks etc.). The Environmental Risk Map will be used during the induction and prominently displayed in the compound areas. In consultation with the EnvCoW and ECoW, the Contractor will update the map as required. Any update will trigger a toolbox talk to clearly communicate the change and offer opportunity for any necessary clarifications.

6.1 Risk Assessment and Method Statements

The Contractor will undertake risk assessments and method statements for all works and tasks prior to works being undertaken. Such assessments are to consider and address all the environmental aspects of the planned works and will include proposed mitigation measures. These are to be approved by the EnvCoW and ECoW prior to the commencement of works.

6.2 Training and Toolbox Talks

The Contractor will provide, as a minimum, the following environmental training to competent staff/sub-contractors as applicable to their work:

- Training on the use of spill kits (on ground and in surface waters), to be provided on a regular basis (to account for staff/sub-contractor changes, etc); and
- Training on silt mitigation, e.g., installation of silt fencing, etc., silt mitigation measures to relevant construction / site staff.

Toolbox talks will be used to provide on-going reinforcement and awareness training. Toolbox talks will also be used to address any other environmental issues which arise onsite, such as unforeseen risks, repeated observation of bad practices, perceived lack of awareness, pollution event, etc.

Other toolbox talk topics will include but are not necessarily limited to the following:

- Material handling, including excavation, segregation, storage, and reuse/disposal of excavated materials;
- Waste management, including waste storage, waste segregation and littering.
- Control of fuel and refuelling, and fuel handling procedures.
- Surface water runoff, drainage control and silt mitigation.
- Ecologically and archaeologically sensitive areas.

The Contractor will maintain records of all toolbox talks and training and make these records available if requested.

6.3 Notice Boards/Labelling and Signage

The Contractor will provide and maintain project environmental notice board(s) which will be positioned at strategic positions to enhance ongoing environmental awareness. As a minimum, this is to include one notice board at the site compounds. The environmental notice boards are maintained by the Contractor and will be reviewed, and updated as required, to address pertinent environmental topics. As a minimum, the notice boards will contain:

- A description of the key environmental risks and intended risk mitigation measures,
- Environmental Risk Map illustrating the location of the key risks and required exclusion zones / buffer zones and location of emergency response equipment, and
- Key contact numbers and responsible personnel identified within the Environmental Incident and Emergency Response Plan (see **Section 7**).

Environmental labelling and signage will be used onsite to inform project personnel of key environmental requirements or restrictions, including information to assist good environmental practice across the site.

7 ENVIRONMENTAL INCIDENT & EMERGENCY RESPONSE; BIOSECURITY

An Environmental Incident and Emergency Response Plan will be established by the Contractor to deal with environmental incidents or accidents. The plan will contain details of emergency scenarios and relevant procedures and actions that will apply. The Contractor will communicate the plan as part of the site induction to all staff and visitors.

7.1 Incident and Emergency Response Plan

The Incident and Emergency Response Plan will consider the impacts of pollution/spill incidents during construction and will note the actions to be taken in the event of a pollution incident, including the following:

- Containment measures
- Emergency discharge routes
- List of appropriate equipment and clean-up materials
- Maintenance schedule for equipment
- Details of trained staff, location, and provision for 24-hour cover;
- Details of staff responsibilities;
- Internal notification procedures;
- Notification procedures to inform the relevant environmental protection authority;
- Audit and review schedule;
- Telephone numbers of statutory water undertakers and local water company; and
- List of specialist pollution clean-up companies and their telephone numbers.

In the event of spillage of any polluting substance and/or pollution of a watercourse, the relevant local authority, Inland Fisheries Ireland, and the NPWS are to be notified by the Contractor. A specialised Emergency Contractor is to be appointed prior to construction, with contact detail provided in the Environmental Incident and Emergency Response Plan.

The Contractor will ensure that the Environmental Incident and Emergency Response Plan contains contact details of relevant staff / external authorities such as:

- Environmental Protection Agency and EPA 24-hour emergency incident line (1890 33 55 99);
- Specialist clean-up contractor;
- Emergency Services;
- Inland Fisheries Ireland;
- Local Authority Environmental Officers;
- An Garda Síochána; and
- National Parks and Wildlife Services.

7.2 Emergency Access

The Contractor will be required to maintain access routes for the emergency services in all work areas for the duration of the construction phase and to identify the emergency site access points to each work area.

These will be developed in consultation with the emergency services and documented by the Contractor in the updated CEMP prior to construction commencing, as well as being identified in the updated Environmental Incident and Emergency Response Plan.

7.3 Extreme Weather Events and Flood Risk

The Contractor will consider the impacts of extreme weather events, flood risk and related conditions during construction. The Contractor will be required to use the short to medium range weather forecasting service from Met Éireann, or other approved meteorological data and weather forecast provider, to inform short to medium term scheduling of the works, environmental controls, and mitigation measures.

The updated CEMP will include appropriate contingency measures to manage extreme weather events (red weather warnings from Met Éireann), including the suspension of work, where required. The measures will include training of personnel and prevention and monitoring arrangements for weather events. Where relevant risks have been identified, the detailed construction method statements will consider extreme weather events.

7.4 Incident Investigation and Reporting

The Contractor will include an Incident and Investigation Procedures in the updated CEMP. As a minimum the procedure will provide for:

- Description of the magnitude of the incident;
- Documentation of immediate actions taken;
- Identification of the cause;
- Further actions, if required; and
- Recommendations to changes to work methods/procedures required to prevent repeats.

7.5 Biosecurity

Add ref that it will be added to contract

8 CORRESPONDENCE AND GENERAL COMMUNICATION

The Contractor will provide a complete record of all relevant communication and reports associated with aspects of environmental management related to the Proposed Scheme. The following records will be maintained:

- Minutes and attendance records of project progress/planning meetings clearing indicating environmental management as an agenda item.
- Records of environmental induction and training.
- Environmental Inspection Records and Audit Reports.
- Licences and Consents - copies of all permissions, consents, licenses, and permits, including related correspondence.
- Incident Investigation Reports.
- Waste Manifest Documents and Safe Disposal Records.
- General Correspondence - all other relevant internal and external communication records relating to environmental management issues and implementation of the updated CEMP.

8.1 Construction Phase Communication Plan

Communications will locals residential receptors and commercial businesses will be maintained during the construction phase. Notification of lane closures and any potential for temporary noisy generating construction works will be made in the form of letter drops in advance of the works.

Additionally, information regarding construction phasing, the opening and decommissioning of construction sites, construction programme and progress will be made available on the local authority website which will be updated regularly. Contact details will also be made available on the local authority website which the public can avail of to raise queries or make comments.

9 ENVIRONMENTAL MITIGATION AND MONITORING COMMITMENTS

9.1 Mitigation Measures

Table 9-1 below details all the mitigation measures recommended for the pre-construction and construction phase of the Proposed Scheme.

Table 9-1: Mitigation Commitments for the pre-construction and construction phase of the Proposed Scheme

MM No	Reference Heading	Location Reference	Mitigation Measure	Audit Results	Action Required
EIAR Chapter 6 Traffic and Transport					
Construction Phase					
MM1	Traffic Management-General	Chapter 6 Traffic & Transport Section 6.5.1	• A Construction Traffic Management Plan (CTMP) has been prepared and outlines measures in detail to be implemented by the appointed contractor during the Construction phase to reduce impacts on local communities and residents adjacent to the Proposed Scheme and wider road network. The information below provides a summary of the mitigation measures stated in the CTMP. Refer to Appendix 6-2: CTMP for details. • The sightline assessment demonstrates that the required junction visibility splay of 45 m is achievable from the 2.4m setback in the northbound direction. It is not achievable however in the southwest direction from 2.4m setback or the 2.0m relaxation setback. A vehicle controller / flagman may be required during the works to facilitate movements in and out of the compound A during the construction phase. Refer to Appendix 6-2: CTMP for details • A vehicle controller / flagman may be required during the works to facilitate movements in and out of the Area 3 ICW/Tullamore Road. Refer to Appendix 6-2: CTMP for details. • Prior to the commencement of construction, an updated detailed Construction Traffic Management Plan (CTMP) will be prepared by the Contractor to ensure construction traffic is appropriately managed with agreement of Laois County Council. • The Contractor shall provide general condition and structural surveys of all transport infrastructure) on all routes, including haulage routes, that may be impacted as a result of the proposed Scheme before works commence on site and after completion. • Traffic management measures will be designed in accordance with TS4 – Guidelines, Certification Scheme and the Specification for the Construction of Traffic Signs (DTTAS, 2012) and Chapter 8 of the Department of the Transport Traffic Signs Manual, available at www.trafficsigns.ie, or any amendments thereof for the time being in force. • The Contractor shall provide construction details of any lay-bys or hardstand if required to facilitate construction traffic during the construction phase of the Proposed Scheme • The Contractor shall be obliged to identify locations of any bridges that have weight/ height restrictions along proposed haul routes and comply with these restrictions	•	•

			• Site entrance locations off the public road may require a durable bound surface and a secure joint must be formed between the access road and the public road. • Cleaning regime for plant will be implemented in order to minimise mud/dust on public roads.		
MM2	Traffic Management-Chapel St.	Chapter 6 Traffic & Transport Section 6.5.1	• The updated detailed CTMP (in agreement with LCC) will provide detail traffic management measures to be in place at Chapel St for the duration of the Area 2 works. • The appointed Contractor will develop a complete schedule for the Chapel St lane closure, which will be published in advance of the works commencing to facilitate residents and those attending the School, GAA grounds and Church in making alternative arrangements where necessary. • The proposed temporary traffic management to facilitate works at Chapel Street will have a southbound lane closure with stop/go or temporary traffic signals for the duration of the works • The reinstatement of Chapel St road and temporary site entrances will be carried out in consultation with the Local Authority and will also follow all relevant publications by the Department of Transport and Transport Infrastructure Ireland (TII).	•	•
Ref MM No.	**Reference Heading**	**Location Reference**	**Mitigation Measure**		
EIAR Chapter 7 Population					
Construction Phase					
MM3	Health and Safety	Chapter 7 Population Section 7.5.1	• Access to construction zones located on private property will be restricted for health and safety.	•	•
MM4	Third party temporary Land use		• Where necessary, suitable boundary fencing will be erected for the duration of the works. Any necessary permanent restoration of fences, walls, or hedges will be completed without unreasonable delay after works have concluded in the area.	•	•
MM5	Third party permanent Land use		• All lands temporarily acquired, will be re-instated to pre-construction conditions unless otherwise agreed with the landowner.	•	•
Ref MM No.	**Reference Heading**	**Location Reference**	**Mitigation Measure**		
EIAR Chapter 8 Human Health					
Construction Phase					
MM6	Health and Safety	Chapter 8 Human Health Section 8.5.1	Fencing, signage, adherence to road safety guidelines, and best practice measures set out in this pCEMP and the updated CEMP.	•	•

Ref MM No.	Reference Heading	Location Reference	Mitigation Measure		
EIAR Chapter 9 Biodiversity					
Pre-Construction Phase					
MM7	Biodiversity- General	Chapter 9 Biodiversity Section 9.6.1	Prior to commencement of any works related to the Proposed Scheme, the following key environmental personnel shall be appointed: **Independent Ecological Clerk of Works (ECoW):** to undertake all pre-construction ecological surveying, ensure that activities on site are conducted in accordance with the planning permission as they pertain to ecological matters, to ensure that the mitigation measures outlined in the updated CEMP (including any updates following consent) are implemented in full, and to supervise works with respect to sensitive habitats and/or species (including the control/eradication of invasive species). **Client Environmental Representative (CER):** Laois County Council (LCC) shall appoint the CER before the commencement of works. The CER shall act as the 'LCC representative' and liaise directly with the Contactor's environmental staff, the independent ECoW, review reporting deliverables, and supervise site activities as required. Inductions: In advance of works commencing on site, all personnel will receive on-site induction by the ECoW and Contractor relating to the ecological constraints and mitigation measures associated with the site. It will be the responsibility of the Contractor to ensure that any new personnel who are employed during the construction work also receive the on-site induction. The ECoW will provide toolbox talks, where required, to all site personnel.	•	•
MM8	Biodiversity- General	Chapter 9 Biodiversity Section 9.6.7.1.4	Prior to works commencing, the ECoW, together with the Employers Representative and Contractor will establish a works exclusion zone adjacent to the instream works area, to protect riparian vegetation. The exclusion zone will demarcate the areas where construction plant, equipment and personnel may not enter, and will ensure the working area is restricted to the minimum possible size;	•	•
MM9	Stakeholder Engagement	Chapter 9 Biodiversity Section 9.6.7.1.2	• Before works commence, IFI and the NPWS shall be notified of the proposed works. • A detailed method statement for works within and adjacent to the Brittas Stream and River Clodiagh will be prepared. The method statement shall include a map showing the locations of surface water features, works exclusion zones, site compounds, storage areas for hazardous liquids (e.g., fuel, oil), stockpiles, settlement tanks and silt fencing. The method statement and maps will be submitted to the ECoW, CER, IFI and the NPWS for approval and any further requirements deemed necessary shall be agreed with the ECoW, CER, IFI and the NPWS no less than 6 weeks in advance of works commencing.	•	•
MM10	Invasive Species	Chapter 9 Biodiversity	• The presence of Japanese Knotweed and a hybrid species have been identified in the vicinity of the Proposed Scheme. An Invasives Species survey will be undertaken within the entire	•	•

		Section 9.6.1.1.1, Section 9.6.3, Section 9.6.5.1.4	Proposed Scheme area prior to the construction phase. All stands of Third Schedule species will be taped off to prevent accidental spread. • **An Invasive Alien Species Avoidance and Management Plan** will also be prepared by an ecologist/invasive species specialist and shall build on the baseline data presented in this chapter and include the findings of the pre-construction survey. The Plan will include any measures to manage, control or eradicate any IAPS identified prior to and during the construction phase of the Proposed Scheme. The Plan will also identify any licensing or approvals necessary from NPWS, EPA or other party to enable the implementation of the plan. • Prior to works commencing, the ECoW, together with the Employers Representative and Contractor will establish a works exclusion zone adjacent to the instream works area, to protect riparian vegetation. The exclusion zone will demarcate the areas where construction plant, equipment and personnel may not enter, and will ensure the working area is restricted to the minimum possible size • The **Local Authority** shall appoint a suitably qualified contractor to deal with any Third Schedule Invasive Alien Plant Species within the proposed works areas prior to any works commencing. This specialist will prepare an Invasive Alien Species Management Plan (IASMP) that will be followed during the treatment of the IAS identified within the Proposed Scheme area. It is assumed that it will be necessary to eradicate IAPS concurrently with the construction phase. This would need to be carefully planned, implemented and managed as part of the Proposed Scheme. At the time of writing, the works will be completed with reference to the following guidance: • Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (NRA, 2010); ○ Guidelines for the Management of Waste from National Road Construction Proposed development (NRA, 2014); ○ The management of Invasive Alien Plant Species on National Roads – Standard (TII, 2020a); ○ The management of Invasive Alien Plant Species on National Roads – Technical Guidance (TII, 2020b); ○ Invasive Species Ireland guidance (http://invasivespeciesireland.com). • The locations of known stands of IAPS will be avoided as much as possible during the proposed works. Exclusion fencing and signage will be installed to prevent interaction of construction vehicles with the area where possible. Strict biosecurity measures are proposed for the duration of the works. The IASMP shall include the following as a minimum: ○ General measures to avoid spreading invasive species during construction or soil movement; ○ Treatment plan to include in-situ chemical treatment, root barrier membranes and/or excavation and disposal at a suitably licensed facility as appropriate; ○ Guidance regarding off-site disposal and licencing - if material contaminated with Third Schedule IAPS, is removed off site it will require a licence from the NPWS in advance of any removal, in accordance with the European		

			Communities (Birds and Natural Habitats) Regulations 2011 (SI 477) as amended; ○ Biosecurity measures to ensure invasive species are not spread between sites; and ○ Good machinery hygiene including steam cleaning machinery and disinfection of water pumps etc. The ECoW must be present on site to supervise the works and ensure the IASMP is fully implemented.		
MM11	Otter Surveys	Chapter 9 Biodiversity Section 9.6.3	Pre-construction surveys by an experienced ecologist will be carried out for otter. • This includes a survey of all areas within 150 m of the Proposed Scheme. • Otter surveys will be carried out in accordance with NRA guidance (NRA, 2008a). The findings of the pre-construction survey will be reviewed with respect to the Proposed Scheme in relation to whether the updated findings trigger a requirement for a species derogation licence from NPWS; based on current baseline a derogation licence will not be required.	•	•
MM12	Badger Surveys	Chapter 9 Biodiversity Section 9.6.3	Pre-construction surveys by an experienced ecologist will be carried out for badger. • This includes a survey of all areas within 150 m of the Proposed Scheme. • These will be undertaken in a representative season to ensure accuracy. • Badger surveys will be carried out in accordance with NRA guidance (NRA, 2008b). The findings of the pre-construction survey will be reviewed with respect to the Proposed Scheme in relation to whether the updated findings trigger a requirement for a species derogation licence from NPWS; based on current baseline a derogation licence will not be required.	•	•
MM13	Bat Surveys	Chapter 9 Biodiversity Section 9.6.3 Section 9.6.6.1.2	Pre-construction surveys by an experienced bat ecologist will be performed where tree removal or removal of tree limbs is required. • The survey shall determine whether there are likely to have been material changes to any of the trees assessed in terms of their potential to support roosting bats since the ground level tree assessment surveys were carried out in summer 2024, prior to any felling or disturbance works occurring. • The ground level tree assessment shall be updated for all trees where material changes are considered to have occurred, in whole or part; particularly if bat roost potential has increased or evidence of bats roosting is found. The survey shall determine the status of the trees with respect to roosting bats. Bat surveys shall be carried out with reference to Bat Mitigation Guidelines for Ireland (v.2) (Marnell, et al., 2022) and Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th Ed.) (Collins, 2023). The findings of the pre-construction survey will be reviewed with respect to the Proposed Scheme in relation to whether the updated findings trigger a requirement for a species derogation licence from NPWS; based on current baseline a derogation licence will not be required for bats. The findings of the pre-construction survey will be reviewed in relation to whether the updated findings trigger a requirement for additional survey work (e.g. tree-climbing or emergence surveys), additional mitigation, or a species derogation licence from NPWS. Based on the current baseline,	•	•

			no such derogation licensing is necessary. Additional survey work of any trees with an overall suitability of PRF-I is not required.		
MM14	Kingfisher Surveys	Chapter 9 Biodiversity Section 9.6.3	Pre-construction surveys by an experienced ecologist will be carried out for kingfisher. • This includes a survey of the banks of the Clodiagh river within 100 m of the red line boundary. The findings of the pre-construction survey will be reviewed with respect to the Proposed Scheme in relation to whether the updated findings trigger a requirement for additional mitigation measures, such as the requirement for exclusion areas within the vicinity of nests should they be recorded.	•	•
MM15	Breeding Bird Surveys	Chapter 9 Biodiversity Section 9.6.3	Pre-construction surveys for breeding birds in particular grey wagtail and dipper will be undertaken. If none are found works will commence as scheduled. If evidence of breeding is encountered, derogation licence will be sought from NPWS.	•	•
MM16	Pre-construction surveys- General	Chapter 9 Biodiversity Section 9.6.3	Based on the findings of the pre-construction surveys, mitigation for each of these species set out in the EIAR will be reviewed and, if necessary, augmented accordingly by the ECoW; particularly with respect to whether any derogation licensing or other approvals are triggered by the findings of the pre-construction surveys. Any adjustment to the mitigation measures will be agreed with the CER in advance of them being implemented. The pre-construction surveys will be supplemented by further inspection by the ECoW (as deemed necessary by them) immediately prior to site clearance.	•	•
MM17	Release of Hydrocarbons into watercourse	Chapter 9 Biodiversity Section 9.6.4	The Contractor shall prepare an **Environmental Emergency Response Plan/ Contingency Plan**. The plan will detail the procedures to be undertaken in the event of the release of any sediment into a watercourse, a serious spillage of chemical, fuel or hazardous wastes (e.g. concrete), or other such risks that could lead to a pollution incident, including flood risks. The plan will be updated regularly and shall include a Spill Response Plan with the following as a minimum: • Containment measures; • Emergency discharge routes; • List of appropriate equipment and clean-up materials; • Maintenance schedule for equipment; • Details of trained staff, location and provision for 24-hour cover; • Details of staff responsibilities; • Notification procedures to inform the EPA or Environmental Department of Laois County Council; • Audit and review schedule; • Telephone numbers of statutory water consultees; and • List of specialist pollution clean-up companies and their telephone numbers An emergency-operating plan will be established to deal with incidents or accidents during construction that may give rise to pollution within any watercourses. This will include:	•	•

			• Means of containment in the event of accidental spillage of hydrocarbons or other pollutants. The emergency response plan should include a register of the significant potential pollutants and their locations on Site; • An inventory of suitable pollution prevention and remediation equipment. This will include any equipment and materials held by the regulatory agencies and equipment and materials that may be sourced from commercial suppliers. Typical examples include filter media designed to prevent sediment run off over land in the form of sediment curtains; filter media designed to inhibit sediment discharges from pipes or to be installed in river beds to trap sediment; temporary storage tanks which are readily transported and erected on site; oil pollution booms, skimmers etc. • Procedures for addressing fires on Site, including water sources and discharge of fire-fighting run-off; • An appropriate number of 'siltbusters' which will be on standby for use in emergency situation; • A Monitoring Plan for emergency situations.		
MM18	Tree Protection	Chapter 9 Biodiversity Section 9.6.5.1.2	With the exception of the trees highlighted as "tree retention to be assessed on site during construction" on the arborist drawings, trees along the Proposed Scheme area that are to be retained, both within and adjacent to the Proposed Scheme area (where the root protection area of the tree extends into the Proposed Scheme area), will be fenced off prior to works commencing and for the duration of construction to avoid damage to the tree canopy and root systems of the trees. Temporary fencing will be erected at a sufficient distance from the tree so as to enclose the Root Protection Area (RPA) of the tree. The RPA will be defined based upon the recommendation of a qualified arborist.	•	•
Ref MM No.	**Reference Heading**	**Location Reference**	**Mitigation Measure**		
EIAR Chapter 9 Biodiversity					
Construction Phase					
MM19	Tree Protection	Chapter 9 Biodiversity Section 9.6.5.1.2	The trees highlighted as "tree retention to be assessed on site during construction" on the arborist drawings will be monitored by an arborist throughout the construction phase. Appropriate measures, such as the use of ground protection mats, will be used to protect the roots of trees towards the southern end of Area 1, as directed by an arborist; The area within the RPA of all trees will not be used for vehicle parking or the storage of materials (including soils, oils and chemicals). The storage of hazardous materials (e.g., hydrocarbons) or concrete washout areas will not be undertaken within 10 m of any retained trees, hedgerows and treelines;	•	•
MM20	Vegetation and habitat protection	Chapter 9 Biodiversity Section 9.6.5.1.2	• To avoid unintended incursion by personnel, equipment and materials, the construction site boundary will be fenced off and site access/egress points constructed. • Only site access/egress points will be used by personnel and equipment. Signage will be placed at intervals along the fencing stating, "no access or storage of materials beyond this point" (or similar). The signage to face inwards into the construction site.	•	•

			• As part of the on-site ECoW induction for construction personnel, it will be stated that there will be no access to personnel or equipment and no storage of construction materials beyond the fenced construction boundary. • Fencing of the Proposed Scheme boundary will be undertaken as part of the enabling works. • The ECoW will advise on any other vegetation within the Proposed Scheme boundary which can be retained during the construction works, and this will be fenced-off with suitable protective fencing as specified by the ECoW. The fencing will form a clear barrier between retained habitats within and adjacent to the Proposed Scheme boundary		
MM21	Earthworks	Chapter 9 Biodiversity Section 9.6.5.1.2	• The sequencing of earthworks and excavations must be carefully planned by the Contractor and approved by the ECoW to ensure that large areas of exposed soil are not left as such for extended periods of time; • Any excavations greater in depth than 30 cm which are left open overnight will either be temporarily covered over or a temporary ramp (e.g. scaffold board at suitable angle) will be inserted.	•	•
MM22	Topsoil Stripping	Chapter 9 Biodiversity Section 9.6.5.1.2	Topsoil-stripping of each phase of works must be delayed until shortly before construction begins, rather than stripping the whole site many months before construction.		
MM23	Habitat Remediation/ Reinstatement	Chapter 9 Biodiversity Section 9.6.5.1.2	• Remediation/reinstatement of habitat will start preferably during the construction phase or as soon as construction works have ceased; • Remediation/reinstatement will involve the implementation of the **Biodiversity Management and Enhancement Plan** (BMEP), which has been prepared and can be found in **Appendix 9.6.** Regarding habitats, this plan provides for: • Replacement tree planting; • Topsoil and subsoil management and reinstatement during the construction phase; • Grass and wildflower regeneration; • Management of grassland areas within the Proposed Scheme area; • Adaptive management of these measures if required.	•	•
MM24	Otter Protection	Chapter 9 Biodiversity Section 9.6.5.1.3	• A watching brief during vegetation clearance as detailed above will help to protect against accidental mortality of otter; • In the event that holts are confirmed during pre-construction surveys and are to be closed, this will be carried out under the supervision of an appropriately qualified ecologist under licence from the NPWS, in accordance with the necessary derogation licence and with reference to the Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (NRA, 2008). The need for derogation licence will be determined by the ECoW; • Any otter holts identified within 150 m of the Proposed Scheme infrastructure during the pre-construction surveys, will be clearly identified to all personnel working in the vicinity of the holt during the construction phase. Temporary boundary tape fencing (or similar) can used at	•	•

			the discretion of the ECoW to identify such holts subject to such measures themselves not impacting on the use of the holt; • In event that derogation licence(s) will be required, these could require the loss of holt(s) to be compensated through the construction of artificial holt(s). The locations of such holts will be determined by the ECoW in liaison with the Contractor and the requirement of any derogation licence.		
MM25	Invasive Alien Plant Species	Chapter 9 Biodiversity Section 9.6.5.1.4	• The locations of known stands of IAPS will be avoided as much as possible during the construction phase. Exclusion fencing and signage will be installed to prevent interaction of construction vehicles with the area where possible. Strict biosecurity measures are proposed for the duration of the works. • The ECoW must be present on site to supervise the works and ensure the IASMP is fully implemented	•	•
MM26	Breeding Birds	Chapter 9 Biodiversity Section 9.6.5.1.5	• All vegetation removal will be completed outside the breeding bird season (1 March to the 31 August, inclusive) with the following exception: • Where breeding birds are confirmed absent by the ECoW immediately prior to the vegetation being removed. Areas found not to contain nests will be cleared within three days of the nest survey, otherwise repeat surveys will be required.	•	•
MM27	Construction Lighting	Chapter 9 Biodiversity Section 9.6.5.1.6	• Construction operations during the hours of darkness will be kept to a minimum. • If construction lighting is required, lighting shall be directed away from all habitats where bats are potentially foraging and commuting (i.e., woodland, treelines, hedgerows, watercourses. This can be achieved by using directional lighting (i.e. lighting which only shines on the proposed works and not nearby countryside) to prevent overspill. • This shall be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvres and shields to direct the light to the intended area only.	•	•
MM28	Bat Roost Protection	Chapter 9 Biodiversity Section 9.6.5.1.7	The killing or injury of individuals will be avoided by implementing a 'soft felling' technique for all trees with an overall assessment of PRF-I, as follows: • Where it is safe and appropriate to do so for both bats and humans, each tree should be pushed lightly using heavy plant/machinery two to three times, with a pause of approximately 30 seconds between each nudge to allow bats to become active. This shall ensure the optimum warning for any roosting bats that may still be present; • The tree should then be pushed to the ground slowly and should remain in place until it is inspected by the Contractor's Bat Specialist; • Felled trees should be left grounded for 24 hours prior to removal/disposal to allow any bats (or other wildlife) beneath foliage to escape overnight; • Tree should be sectioned or felled entire, without increased force (e.g. without being pulled or pushed to the ground by machinery); and • Trees will only be felled "in section" where the sections can be rigged to avoid sudden movements or jarring of the sections.	•	•

			• The tree with a (Potential Roost Feature Medium) PRF-M will not be felled as a result of the Proposed Scheme. However, it is located within the works area, and could be used by bats in the future. As a precaution, the root system of this tree will be protected through the use of appropriate matting as advised by an arborist. No branches of the tree shall be removed. Construction phase lighting will not be directed at this tree.		
MM29	Site Clearance	Chapter 9 Biodiversity Section 9.6.6.1.1, Section 9.6.7.1.5	• All vegetation removal shall be monitored by the ECoW to ensure there is no disturbance of any protected species e.g., otter, badger, birds, bats, stoat, hedgehog etc. If disturbance occurs, the ECoW will treat each species appropriately, e.g., contact NPWS for otter and bats, relocate hedgehogs etc. • Where dense vegetation or inaccessibility prevents adequate determination of the presence or absence of otter holts or badger setts as part of the pre-construction surveys, these areas will require monitoring during vegetation clearance to ensure that any holts or setts present will be found and treated appropriately. • Vegetation clearance is proposed to be undertaken outside the breeding bird season in the month of February, prior to works within each area commencing. As vegetation clearance will be undertaken prior to instream works commencing (see MM38 & MM39), it is vital that the clearance activities do not result in bank destabilisation or losses of silt to the River Clodiagh in the period following vegetation clearance. This shall be achieved as follows: ○ Vegetation will be cut down to 0.5 m above ground; ○ Tree stumps shall be retained; ○ The soil/root system on the bank will not be disturbed; ○ Screens shall be utilised where required to ensure branches and sawdust does not fall into river channel and to minimise dust deposition; and ○ An ECoW shall monitor vegetation clearance. • It is proposed to replant by hand all trees that will be removed for these works within Area 1 to accommodate the Proposed Scheme. The manner and location of this replanting will be undertaken in agreement with Coillte.	•	•
MM30	EcoW	Chapter 9 Biodiversity Section 9.6.7.1.1	Together with the ECoW, environmental triggers for safe undertaking of the high-risk work items will be agreed between the Contractor, LCC, the CER along with any other experts or technical specialists needed for high risk aspects of the Proposed Scheme and understood and transferred to a spreadsheet by the ECoW. An experienced ECoW may assist with determining these values, but the responsibility rests with LCC. The triggers must be very clearly defined for each work item. The work items will include but will not be limited to the following: • Site set-up and materials/equipment delivery • Earthworks and excavation • Instream and bankside works on the Brittas Stream and River Clodiagh • Concrete pouring	•	•

			• Removal of temporary shuttering Commencement and abandonment triggers for the above items will be agreed for the following parameters: • Rainfall • Water levels • Onsite weather conditions • Turbidity levels or total suspended solids (TSS) • pH • Soil wetness • Integrity of mitigation measures • The ECoW will have the authority to instruct the cessation of works when agreed abandonment triggers are met.		
MM31	Surface Water Protection	Chapter 9 Biodiversity Section 9.6.7.1.3.1	• Surface water runoff or groundwater encountered during the excavation of the proposed underground structures and foundations shall be pumped clear from the excavations. Water shall be directed toward a sump within the excavations. Using submersible pumps can generate more sediment through water turbulence. To avoid this, a corner of the excavation shall be used as a sump and care taken to avoid disturbing that corner. The pipe intake shall be fitted with a device to minimise disturbance of sediment within the sump, such as a perforated oil drum, a short length of wide bore perforated pipe or concrete manhole rings containing granular fill; • Dewatering pumps will have appropriate capacity to pump out the residual seepage from excavations to maintain the works area excavation dry. • The pumps shall be integrated sumps or shall sit within a fully bunded impermeable surface which is monitored and emptied regularly; • It will not be possible to allow pumped water to percolate to the ground, due to the presence deep water extraction boreholes in the vicinity. Therefore, water from excavations shall be pumped to appropriately sized mobile 'Siltbuster' or similar equivalent specialist water treatment system to treat sediment polluted waters from any works process should that occur. • Siltbusters are mobile silt traps that can remove fine particles from water and are specifically designed for use on construction-sites. ○ The use of proprietary equipment such as 'Siltbuster' type tanks to assist with the reduction of suspended solids is noted in 'Good Practice during Wind Farm Construction' (a joint publication by Scottish Renewables, Scottish Natural Heritage, Scottish Environmental Protection Agency, Forestry Commission Scotland, Historic Environment Scotland, Marine Scotland Science and AEECoW), which was published in 2019 . • Sufficient numbers of 'Siltbusters' will be stored on site to be rapidly employed when needed. Inland Fisheries Ireland should be consulted if the use of chemical coagulants as part of the treatment process is required (e.g., where clay or very fine silt must be filtered) for subsequent discharge to the River Clodiagh.	•	•

			• Dewatering outfall pipes will be placed well downstream of the works, and protection such as large stones or geotextile matting provided to avoid scouring of the bed and/or banks at the outfall; • The outfall pipes will be fitted with a silt sock.		
MM32	Water Management	Chapter 9 Biodiversity Section 9.6.7.1.3.1	Pumped-out water from all excavations must be treated to a standard that will not affect water quality. • Pump-out water can be treated on-site (e.g., sediment settlement and pH monitored) or can be removed off-site for discharge at a licenced treatment facility. Attenuation and treatment on site must ensure discharge water does not exceed 25 mg/l TSS and must be within the pH bracket of ≥ 6 ≤ 9; Discharge water from the 'Siltbuster' or similar equivalent specialist water treatment system will be inspected on a daily basis by the ECoW with a handheld turbidity/conductivity/pH probe. • If any of the parameters exceed environmental triggers set out in advance, the flow will be stopped immediately, and appropriate remedial works will be carried out. This may involve pH correction and the deployment of additional emergency 'silt busters' or similar; Discharge hoses shall be routed out of the way of vehicle movements. • Wherever hoses pass over a solid edge (the top of an excavation or a concrete sump, for example), care shall be taken to ensure no damage can occur. • Regular daily checks shall be carried out on the pump, hoses and couplings for leaks and kinks by site personnel, with any problems being fixed immediately. Electric pumps shall be used wherever possible to reduce the use of fuels on site. • Should water pumped from excavations become contaminated (e.g., from a hydrocarbon spill or leak), pumped water must be tankered off site and treated at an appropriately licensed facility. • Sediment collected within the settlement ponds shall not be disposed of on site. Sediment accumulating within settlement ponds shall be carefully removed and disposed of off-site to an appropriate waste facility. • Should overland flow or surface water run-off into excavations affect the integrity of the various mitigation measures in place, temporary interceptor drains will be installed within the site, as per a detailed method statement, with the locations agreed with the CER and ECoW. The drains will be used to divert runoff around the works area to a location within the Site that is low risk (e.g., where silt fencing has already been installed) where it can be redistributed over the ground surface as sheet flow. • A mobile 'Siltbuster' or similar equivalent specialist water treatment system will be available on-site for emergencies in order to treat sediment polluted waters from any works process should that occur.	•	•

			• There shall be no direct discharge of untreated water from excavations, surface runoff, dewatering activities, washdown or any other construction works directly to any surface water body or surface water drainage network at any time • The number of 'Siltbusters' or similar equivalent specialist water treatment system required shall be determined by the Contractor, using the information as obtained from site investigations to ensure that the treatment provided suits the actual ground conditions encountered during the construction works; The water treatment system must be sized to allow for: ○ Expected rainfall intensity; ○ Expected rainfall duration; ○ Water ingress during instream works; and ○ Size of the drained area.		
MM33	Earthworks	Chapter 9 Biodiversity Section 9.6.7.1.3.2	• The sequencing of excavations must be carefully planned by the contractor to ensure that large areas of exposed soil are not left as such for extended periods of time. • Topsoil-stripping of each phase of works must be delayed until shortly before construction begins, rather than stripping the whole site many months before construction. • Excavation and topsoil stripping will commence as per the environmental triggers agreed. • As much existing vegetation within and around the site perimeter, stockpiles and haul roads as possible will be retained and protected during construction with fencing, signs etc. • A works exclusion zone adjacent to the entire river channel adjacent to the works area will be established in consultation with the ECoW and clearly demarcated	•	•
MM34	Silt Fencing	Chapter 9 Biodiversity Section 9.6.7.1.3.2	• Silt Fencing will be used to isolate the Site from receiving surface water bodies. The siting of silt fencing shall be agreed with the Contractor, ECoW and CER. It may not be necessary or possible to install silt fencing in some works area, such as where works are proposed on the land side of an existing wall to be retained (e.g., Chapel Street). However, in other areas silt fencing will be required (e.g., Area 1 and Area 3). The following criteria, as per CIRIA C648 must be adhered to for the installation/operation of silt fencing: ○ Where space permits, and where considered necessary by the ECoW, a double silt fence shall be installed ○ The double silt fence shall be installed as follows: ○ The inner silt fence fabric is buried at least 100 mm into the ground; ○ The outer silt fence fabric is folded at ground level and not buried; ○ Where a single layer of silt fencing is installed, the fence fabric must be buried at least 100 mm into the ground ○ Silt fencing must be installed along a level contour so water does not pond more than 400 mm at any point; ○ An undisturbed area behind the fence must be retained for runoff to pond and sediment to settle;	•	•

			○ No more than 0.5 ha of concentrated flow shall drain to any point along the silt fence; ○ The fabric will be fixed to strong supporting posts at regular intervals; ○ The silt fences will be positioned at central and right angles to flow, with the ends curving up slope to ensure water ponds behind the fence and does not flow around it; ○ The fence will be supported by a wire mesh if the fabric selected does not have sufficient strength; ○ Accumulated silt will be cleared regularly; commercially produced silt fences have a printed indicator line over which silt should not accumulate; ○ The silt fence must be capable of preventing 180µ (micron) and above sediment from passing through; ○ Silt fences must not be decommissioned until all land is vegetated; ○ The buried inner silt fence is removed first; ○ The outer folded silt fence is removed last when the inner silt fence ground has revegetated. ○ Where space allows, silt fencing must be positioned at a minimum of 10 metres from surface water bodies. The 2 layers of silt fencing shall be spaced in 1 metre intervals. ○ Every precaution will be taken to ensure that the installation of the silt fencing itself does not result in emissions of silt to the River Clodiagh. To this end, sequential excavation and reinstatement of turves as the silt fence is trenched will be implemented. Silt fencing will be placed as close as possible to the construction works while allowing for sufficient space for maintenance and clearance of silt and debris. ○ The ECOW shall regularly inspect the silt fences as per the monitoring programme (Table 9-27 of Chapter 9 Biodiversity); ○ In no circumstances will works be undertaken on the river side of silt fences.		
MM35	Silt Run Off	Chapter 9 Biodiversity Section 9.6.7.1.3.2	• Exposed soil adjacent to the River Clodiagh and Brittas Stream will be protected from erosion with biodegradable geotextile matting made from natural fibres that will remain in-situ. The weave must be coarse enough to stabilize the soil while permitting plants to grow through it. It will not be necessary to remove this matting at the project's completion. • Any drains within the site or affected by construction activities will be isolated with check-dams and/or silt curtains in series. • Drainage inlets on Chapel Street downgradient of the works area will be either blocked or protected as per the following criteria: ○ Drain inlets will be protected with a drain guard designed to filter oil and silt from stormwater run-off (e.g., https://ssienvironmental.ie/product/drain-guard/); • In addition to the above, sandbags will be placed around the inlet to provide additional protection from sediment.	•	•
MM36	Fuels and Chemicals	Chapter 9 Biodiversity	• Concrete works during the Construction Phase, will avoid any contamination of ground and water through the use of appropriate design and methods implemented by the Contractor and	•	•

		Section 9.6.7.1.3.3, Section 9.6.7.1.4	in accordance with industry standards (e.g., Guidance for Consultants and Contractors, CIRIA - C532', CIRIA, 2001); • Concrete pouring will be undertaken in accordance with the agreed commencement and abandonment triggers. • Shuttering will be designed to accommodate increases in the volume of material contained within the shuttered area due to rainfall; • Discharge water generated during placement of concrete will be stored and removed off site for treatment and disposal; • Wherever possible, concrete should be carefully placed by the use of a hydraulic pump to minimise the risk of concrete spillages, especially for operations over a watercourse. Ends of pump hoses should be secured by means of a rope during concreting over and adjacent to watercourses to prevent the discharge hose accidentally depositing concrete away from the pour site. If concrete is to be placed by means of skips, the opening gate of the delivery chute should be securely fastened by a lock chain to prevent accidental opening of the skip over water, especially if that would cause spillage during concrete placement manoeuvres; • At the delivery point either for pump-placed or skip-placed concrete, measures for preventing concrete spillage from truck mixers contaminating the ground and leaching out into the groundwater must be in place for all concreting operations. Washing out of truck mixers, concrete pumps, skips and other items of plant and equipment needing to be cleaned of concrete after use must only take place at a designated area, away from the watercourse. Compressors or generators used for connecting operations should be fitted with drip trays to collect fuel and oil spills that might otherwise contaminate the groundwater and lead to pollution of the watercourses; • It is proposed to pour the concrete base of the debris trap in two parts to facilitate diverting the river to one side of the river bed for each stage of works. The works area will be dammed on three sides using large sand bags. Pumping will be required from within the works area to deal with water seeping through the temporary dams or through the ground;		
MM37	Instream Works Timing Restrictions	Chapter 9 Biodiversity Section	• Instream works will be required for the construction of the debris trap on the River Clodiagh and the new culvert inlet on the Brittas Stream. **Instream works must avoid the spawning period of fish in the River Clodiagh. The fisheries open season is from 1st July to 30th of September, and instream works shall be restricted to this period.** • Instream and bankside works shall only be undertaken as per the triggers agreed between the ECoW and Contractor. A workable stream and river water level will be agreed with the ECoW and Contractor before works commence. As best practice works should be undertaken during dry weather, when there is no risk of flooding and when the soil is dry enough for works to commence (no overland flow or soil saturation).	•	•
MM38	Instream Works	Chapter 9 Biodiversity Section 9.6.7.1.4	Access routes for material delivery, plant and construction personnel must be from the left bank only within Brittas Wood. It will be necessary to create a dry working area to facilitate the installation of the debris trap:	•	•

			• The concrete base of the debris trap will be poured in a minimum of two parts, by diverting the river to one of the river-bank sides for each stage of works. • Under no circumstances will soil or clay be used to create a dry working area. • The dry working area will be constructed of small or large geotextile bags filled with sand. Sandbags can be wrapped in impermeable geotextile if necessary to prevent excessive water ingress. • Sand within the sandbags must be clean and free of silt; • The concrete base will be poured within trench boxes to prevent unnecessary over-excavation of the riverbed and a binding layer of concrete will be placed at the bottom of the excavation to seal the bottom of the excavation; • Dewatering will continue within the trench during all concrete placement, via a submersible pump placed in a sump, to ensure positive flow into the excavation rather than escaping outwards. Pumped water containing cementitious fines will require additional treatment prior to discharge to the river; • The Contractor will have a flood warning action plan in place prior to commencing works. • Upon a flood warning being issued by Met Éireann all plant and equipment will be removed from the channel and any excavations backfilled and compacted to replicate the conditions prior to the works. • The height of the sandbags must be higher than the water level that could be reasonably expected during the duration of the works. The scheme designer should be consulted in determining this level, as outputs from the hydraulic model may be required; • Monitoring of water levels within the River Clodiagh must be undertaken upstream and downstream of the instream works area, to assess whether dewatering within the instream works area is causing low water levels within the adjacent channel. This shall be undertaken daily when dewatering is being undertaken. • The ECoW will have the authority to instruct works to cease if dewatering is causing water levels in the adjacent river channel to fall to levels that would result in potential mortality of fish, until the problem is resolved. • Before any excavation within the channel, the top 50 cm of bed material must be scraped off and stockpiled (separate to other materials) for use in reinstatement. • Excavated material will be spread out on sheeting adjacent to the river channel and immediately searched by the aquatic ecologist so that lamprey ammocoetes can be collected and released. • Lighting during the construction phase will avoid direct illumination of the Clodiagh River Stream. For works during winter months certain limited activities may require lighting which will be cowled to minimise light spill onto watercourses. • Prior to removal of sandbags at the instream works area, damaged riverbanks and margins must be reinstated inside the instream and bankside works area. Materials and methods used to reinstate the banks will be dependent on scour and erosion protect		

			requirements, which will be determined following detailed design. The following outlines criteria that must be adhered to as part of the detailed design and construction methods for river bank reinstatement and scour/erosion protection. • The use of hard engineering solutions for scour/erosion protection shall be limited to areas where it is deemed to be absolutely necessary. It is assumed riprap will have to be installed on the left bank at the proposed slipway; • Riprap placed on the channel margins shall comprise of locally sourced, clean boulders that have been approved by IFI and that broadly mimic the naturally occurring substrate. IFI is the appropriate body to be contacted by the ECoW to establish current (at the time) approved supplier(s) of such materials prior to the reinstatement period; • Riprap protection must be carefully designed and placed to ensure flow paths under and around the bank side of the boulders do not develop; • Alternative solutions for scour/erosion protection shall be considered at detailed design stage and shall include soft engineering approaches such as willow spiling. A rationale for the design choice, including reasons for rejection of a soft engineering approach should this occur, must be provided to the client; and; • Should soft engineering approaches such as willow spiling be included within the design, a plan for the long-term management of such structures must be prepared. • Reinstatement of the stockpiled river substrate within the instream works area shall match the profile of the bed level on the outside of the instream works area, and at the upstream and downstream ends, such that there is no significant step-change in lateral or longitudinal riverbed profile. • The dry area must be rewetted gradually and carefully, in accordance with a method statement approved by IFI and triggers set by the ECoW, to avoid wash-out of substrates owing to river flows from the upstream end of the contained area; • River margin and channel reinstatement shall be supervised by the ECoW.		
MM39	Reinstatement of River Post Instream Works	Chapter 9 Biodiversity Section 9.6.7.1.4	• Reinstatement of the stockpiled river substrate within the instream works area shall match the profile of the bed level on the outside of the instream works area, and at the upstream and downstream ends, such that there is no significant step-change in lateral or longitudinal riverbed profile. • The dry area must be rewetted gradually and carefully, in accordance with a method statement approved by IFI and triggers set by the ECoW, to avoid wash-out of substrates owing to river flows from the upstream end of the contained area; • River margin and channel reinstatement shall be supervised by the ECoW.	•	•
MM40	Fish Protection during Instream Works	Chapter 9 Biodiversity Section 9.6.7.1.4	• Any fish (e.g., eels, lamprey ammocoetes and salmonids) that emerge during the water draw down must be collected in clean buckets of water and returned to the channel, a short distance upstream of works. In the unlikely event that crayfish are found, they must not be transferred to another watercourse, but returned to the channel a short distance upstream of works;	•	•

			• Given the size of the area to be dewatered on the River Clodiagh, a fish rescue must be undertaken in advance of water draw down. • Once the area has been sealed, electrofishing will be conducted within the area to be dewatered under approval and supervision of IFI staff (subject to licence and agreement with IFI). • Any rescued fish shall be temporarily held in containers of clean, well-oxygenated river water or immediately transferred to the area upstream of the contained area. • Species that are likely to be encountered include eel, salmonids, lamprey, minnow, stickle-back and stoneloach. In the unlikely event that crayfish are found, they must not be transferred to another watercourse, but returned to the channel a short distance upstream of works; • An aquatic ecologist will remain onsite during the initial pump-out and water draw down inside the contained area to observe any sign of fish such as lamprey ammocoetes that may have remained in the channel following electrofishing. • Any fish that emerge during the water draw down must be collected in clean buckets of oxygenated water and returned to the channel, a short distance upstream of works. • In the unlikely event that crayfish are found, they must not be transferred to another watercourse, but returned to the channel a short distance upstream of works.		
MM41	Debris Trap and Slipway Design	Chapter 9 Biodiversity Section 9.6.7.1.6	During detailed design, the risk of excessive scour around the debris trap poles will be assessed. A site-specific scour analysis will be carried out at detailed design stage to assess the need to extend the debris trap foundation to form bed scour protection. The design will be discussed with IFI before finalising.		
MM42	Tree Replanting	Chapter 9 Biodiversity Section 9.6.7.1.6	• Locally sourced stone compatible with local geology will be used to construct the slipway. Although not identified as a significant effect, as best practice, as much tree and shrub cover as possible will be retained during the construction of the slipway. Native trees of Irish provenance suited to the locality (e.g., willow or alder) will be planted in scattered aggregations in areas where tree loss is unavoidable, in consultation with Coillte. IFI must be consulted regarding the design of the slipway; • Drainage of the slipway must be carefully designed to ensure overland flow from the embankment and slipway does not result in silt-laden water flowing into the River Clodiagh. The slipway must also be carefully designed to ensure materials used to surface it (e.g., gravel, hardcore) do not get washed or pushed into the river during rainfall or maintenance activities. This could be achieved though the incorporation of drainage channels within the embankment that divert water to into vegetation on the landside of the embankment where it can percolate to ground, and the inclusion of a raised lip or similar at the slipway margin. The drainage design of the slipway and embankment shall be approved by IFI.	•	•
MM43		Chapter 9 Biodiversity Section 9.6.7.1.6	• The foundation of the debris trap shall be designed to include roughness elements, as opposed to having a smooth surface. The inclusion of roughness elements shall support the stabilisation of instream river material reinstated on top of the foundation.	•	•

MM44	Biosecurity	Chapter 9 Biodiversity Section 9.6.7.1.7	• The ECoW will provide a toolbox talk to all personnel on site regarding crayfish plague and the importance of implementing biosecurity protocols in advance of works commencing; • All PPE, plant and equipment used on site will be fully disinfected (as per the below protocol) prior to arrival on site. All staff must have access to clean PPE and equipment; • On completion of any field operation or when moving from one location or waterway to another, staff must clean and disinfect all PPE and equipment using the following protocol: • Visually inspect for evidence of attached invasive species material or adherent mud or debris. Remove any such material before disinfecting. During inspection and cleaning, pay particular attention to places where the seeds or fragments of invasive species could be accidentally trapped, such as the treads of boots, tracks of vehicles etc. Remove anything found and leave it at the site; • For heavily soiled equipment, boots and PPE, use a hard-bristle brush to remove mud and debris, and then spray with disinfectant solution such as Virkon Aquatic, Virasure or alternative disinfectant or use a boot bath, for example. Remove anything found and leave it at the site; • Wipe down or spray PPE and equipment that has come into contact with river water using an absorbent cloth soaked in disinfectant such as Virkon Aquatic, Virasure or another appropriate disinfectant. Cleaning must be undertaken thoroughly and as soon as possible, paying particular attention to waders, boots and areas that are damp and hard to inspect. If possible, use hot water (at least 45°C) or a high-pressure spray; • Where plant and machinery has come into contact with river water it must be sprayed with disinfectant such as Virkon Aquatic, Virasure or alternative disinfectant, using a knapsack with a high-volume nozzle, before leaving the site. Cleaning must be undertaken thoroughly and as soon as possible, paying particular attention to areas that are damp and hard to inspect. If possible, use hot water (at least 45°C) or a high-pressure spray; and • Ideally, all PPE and equipment must be allowed to dry fully for at least 48 hours. Where complete drying is not possible, cleaned items must be disinfected. Extreme care should be taken when using disinfectants and the manufacturer's guidelines should always be followed.	•	•
MM45	Culvert Design	Chapter 9 Biodiversity Section 9.6.8.2	• The new headwall will be designed to ensure passage of aquatic fauna at the inlet is not hindered. This is to ensure any future remediation works on this culvert to enhance fish passage through it are not affected by proposed works at the inlet. The design will be discussed with IFI before finalising.	•	•
Ref MM No.	**Reference Heading**	**Location Reference**	**Mitigation Measure**		
EIAR Chapter 10 Land, Soils, Geology and Hydrogeology (LSGH)					
Construction Phase					
MM46	Importation of Construction Materials	Chapter 10 LSGH Section 10.5.1.1	• The importation of surplus clean and inert excavated material from quarries or as a by-product from other sites will be undertaken. By-product will be subject to an Article 27 notification to the EPA in accordance with relevant waste legislation and taking account of the findings of	•	•

			OPW '*Article 27 Management of Soil and Stone By-Products on Flood Relief Scheme Technical Note June 2023*'.		
MM547	Embankment Settlement	Chapter 10 LSGH Section 10.5.1.2	• Soft soils will be removed during the construction of the foundation to create a stable base and a geotextile membrane placed over the formation to strengthen the foundation. To prevent a surface water and shallow groundwater flow paths destabilising the embankment a cut off ditch will be extended below the level of the embankment. Embankments will be constructed of suitable compacted materials, tamped down and the surface reinstated to ensure stability and to minimise the potential for erosion of sediments into the adjacent River Clodiagh.	•	•
MM48	Infiltration of Surface Runoff	Chapter 10 LSGH Section 10.5.1.3	• Where stockpiling of topsoil is required, stockpiles shall be limited to heights not exceeding two metres, shall be battered back to a stable slope, and shall not be unnecessarily trafficked (TII, 2009). • There will be no stockpiles within 20 m of the main channel of the River Clodiagh or any drains that connect to the river. • Care will be taken in reworking this material to minimise the effects of weathering, dust generation, groundwater infiltration and generation of runoff. • Construction compounds are located north of Brittas Wood works area and north of the Chapel St works area where there will be designated stockpiling areas. These locations will allow material to be delivered to central locations and is not bound by the works programmes at each works area. • To prevent suspended sediment runoff to ground and to the boreholes within Area 1, a barrier method such as a sediment barrier or silt fence will be placed on the river side of the embankment. • Installation of temporary protective fencing around the boreholes, in line with the Specification and Related Documents for Ground Investigation (Engineers Ireland, 2016) may also be considered for the duration of the construction works. • The development of a surface water management plan will mitigate any risks associated with surface water runoff and also prevent or reduce impacts to groundwater quality. • Where compaction occurs due to vehicle and truck movements remediation works will be undertaken to reinstate the ground to a condition to at least equal to that of the original surface. Vehicles will minimise tracking over natural or unfinished surfaces and will not track over reinstated soils.	•	•
MM49	Loss of Soil Reserves	Chapter 10 LSGH Section 10.5.1.4	• Where possible the removal of topsoil will be avoided. Where needed (embankment footprints, debris trap access slipway and stockpiles) the topsoil will be stripped and assessed for reuse within the Proposed Scheme, ensuring appropriate handling, processing and segregation of material. • Excavations will be supported by use of trench boxes or other specifically designed temporary works measures.	•	•

			• A sediment control plan will form part of the updated CEMP and will be developed further by the contractor prior to the commencement of work. • This plan will identify actions on site to minimise the loss of topsoils and soils and its potential for erosion such as stabilising side surfaces to prevent erosion through appropriate slope angles. • Soils removed during excavations will be reinstated as soon as possible and backfilled and compacted to replicate the conditions prior to the works. Excess soil will be disposed of at a licenced waste disposal facility. • The Waste Management Plan will address the analysis of waste arisings, methods proposed for the prevention, reuse and recycling of wastes and material handling procedures.		
MM50	Impact to Aquifers	Chapter 10 LSGH Section 10.5.1.5	• Refer to **MM53 and MM54** • Protection measures including fencing will be undertaken to reduce and prevent any runoff infiltrating to the Public Water Supply abstraction boreholes located within Area 1.	•	•
MM51	Use of hydrocarbons	Chapter 10 LSGH Section 10.5.1.6	Construction activities will be undertaken in strict compliance with measures set out in the OPW *(2019): Environmental Guidance: Drainage Maintenance and Construction* to minimise the risk of transmission of hazardous substances to adjacent soils, groundwater and watercourses. These measures will ensure soil and groundwater and adjacent watercourses remain free from pollution: • Ensuring that all areas where liquids (including fuel) are stored, or cleaning is carried out, are located in designated impermeable areas that are isolated from the surrounding area and within a secondary containment system, e.g., by a roll-over bund, raised kerb, ramps or stepped access. • The location of any fuel storage facilities shall be considered in the design of the construction compounds. These are to be designed in accordance with relevant guidelines and codes of best practice and will be fully bunded. • Careful management of concrete placement and truck wash-out etc. will be enforced; • Use of dry low strength concrete, that will set to form an impermeable barrier in order to prevent washout of cementitious material into shallow groundwater during the construction of the cut-off trench in Area 2. • Good housekeeping at the site (daily site clean-ups, use of disposal bins, etc.) during the entire construction phase. • Spill kit to be provided and to be kept close to the storage area. Staff to be trained on how to use spill kits correctly. • Production and Implementation of an emergency plan to deal with accidental spillages.	•	•
MM52	Contamination	Chapter 10 LSGH Section 10.5.1.7	• The appointed contractor will be responsible for regular testing of excavated soils to monitor the suitability of the soil for reuse. • If contamination is encountered suitable measures will be put in place to avoid mobilising the contamination based on best practice for contaminated land management. • Samples of ground suspected of contamination will be tested for contamination by the appointed contractor during the ground investigation.	•	•

			• The management of surplus excavated material or temporarily stored material at the site compounds will be determined by the classification of the material and will be stored in such a manner as to prevent disturbance of any existing contamination that may be present in the material itself or at the site compound. • After temporary storage contaminated material will be disposed of to a suitably licensed or permitted sites in accordance with the current Irish waste management legislation. • Any dewatering required in areas of contaminated ground shall be designed by the appointed contractor to minimise the mobilisation of contaminants into the surrounding environment.		
MM53	Instream Works	Chapter 10 LSGH Section 10.5.1.8	• In stream works will be undertaken during the normal recommended IFI window from July to September. • In line with the IFI's Guidelines of Protection of Fisheries During Construction Works in and Adjacent to Waters, the flow management measures shall be designed to "accommodate such flood event as might reasonably be expected over the period in question". • Water will be managed by completing the excavation and construction in two halves. For the first half, water will be dammed and directed to one side of the channel using large sandbags or another suitable damming system. The excavation will be completed using trench boxes. A sump will be created within the excavation to enable pumping of any river or ground water that seeps in. This water will be passed through a suited sedimentation system before returning to the river. • The extent and area of dewatering required will be small (366m²) and local in nature over a short timeframe and is therefore not expected to result in any significant impact on groundwater levels. In order to mimic the naturally occurring substrates, river-bed reinstatement measures prior to trench box removal and re-diverting of flows over the area will be agreed with the IFI. • There will be no direct discharge of surface water from any element of the works without suitable attenuation and treatment of sediments.	•	•
Ref MM No.	**Reference Heading**	**Location Reference**	**Mitigation Measure**		
EIAR Chapter 11 Water					
Pre-Construction					
MM54	ECoW	Chapter 11 Water Section 11.5.1	A suitably qualified and experienced EcoW will be employed for the duration of the scheme, including advance works and accommodation works, to oversee and ensure implementation of the updated CEMP.	•	•
Ref MM No.	**Reference Heading**	**Location Reference**	**Mitigation Measure**		
EIAR Chapter 11 Water					
Construction Phase					
MM55	Suspended Solids	Chapter 11 Water Section 11.5.1	Limit suspended solids from entering watercourses by placing controls at all sources and pathways including, at a minimum, the following measures:	•	•

			• Placing silt fencing between works areas and pathways to watercourses; Passing sediment-laden runoff and dewatering effluent through settling tanks and silt bags before allowing discharge to watercourses; • Ensuring dewatering pumps are placed in sumps surrounded by drainage stone; • Prioritising infiltration of silt-laden water to ground through soak pits and infiltration trenches where feasible; • Stockpiling only allowed in designated areas; • Constructing ditches and installing silt fencing around stockpile areas (restricted to the compounds); • Placing sandbags and/or straw bales as check dams in drainage ditches to attenuate runoff and reduce erosion; • Regular road washing to prevent build-up of mud from construction vehicles, which may runoff into watercourses. Wheel wash facilities to be provided at exit points of all compound sites; • Delineating buffer zones of at least 1m along greenfield riparian works areas within which tracking of machinery and storage of construction materials will be prohibited; • Reviewing earthworks programming when prolonged rainfall is forecast • Limit construction debris entering watercourses due to wall construction by: • Edge protection along the riverfront or a floating boom cordoning off an area of the river below the works to be implemented to prevent debris entering the river. • Checking weather forecasts to ensure suitable programming of earthworks activities		
MM56	Hydrocarbon Usage	Chapter 11 Water Section 11.5.1	Limit cementitious particles from entering watercourses by placing controls at all sources and pathways including, at a minimum, the following measures: • Having dedicated, suitably prepared concrete washout areas for concrete chute and bowser washout, and cleaning of concrete contaminated plant and materials. Signs will be erected at works sites to inform concrete delivery drivers that washout is not permitted outside these areas; • Ensuring disposal of raw or uncured waste concrete is controlled using approved waste disposal and/or concrete wash-out pits to ensure that seepage to drains from the site is avoided; • Water collected in wash pits will be tankered off-site for treatment at an appropriate licensed facility, ensuring none is allowed to overflow or infiltrate to ground; • Employing best practice in bulk-liquid concrete management addressing pouring and handling, secure shuttering / formwork, ensuring adequate curing times. Where shuttering is used, measures will be put in place to prevent against shutter failure and control storage, handling and disposal of shutter oils; • Treating cement-laden runoff and dewatering effluent in settling tanks before allowing discharge to watercourses;	•	•

			• Dust suppression using water sprayers during demolition of quay walls or other activities resulting in the creation of cement dust. Limit hydrocarbons from entering watercourses by placing controls at all sources and pathways including, at a minimum, the following measures: • Training operatives in the use of spill kits and keeping spill kits at each work site; • Ensuring all fuels and oils are stored in bunded trays at least 20 m from any watercourses or surface water feature. Trays will be bunded to 110% of the capacity of the fuel volume; • Runoff from construction plant washdown to be collected and passed through an oil-water separator before release into the environment; • Refuelling activities to be restricted to designated, bunded areas, at least 20 m from any watercourse or surface water feature; • All construction plant to be regularly maintained and checked for oil and fuel leaks before use. Drip trays to be available on site; • Consideration to be given to the use of biodegradable fuels and oils, where possible.		
MM57	Flood Preparedness	Chapter 11 Water Section 11.5.1	Flood preparedness: • Checking water levels at Bracknagh Bridge gauge on a daily basis or twice daily during times of high flow when works are occurring in the vicinity of the River Clodiagh; • Developing an emergency response and evacuation procedure for all works areas including removal of potential contaminants and construction plant.	•	•
MM58	Instream Works	Chapter 11 Water Section 11.5.1	• Following consultation with IFI, instream works are restricted to appropriate seasonal windows (1st July to 30th September); • Instream works areas to be left clean of all residual construction waste and potential pollutants before re-flooding; • Backup pumps and generators to be in place where over-pumping is taking place to mitigate flood risk	•	•
MM59	Foul Sewer treatment	Chapter 11 Water Section 11.5.1	• Foul water is to be stored and tankered away for treatment as needed.	•	•
MM60	Watermain Outage	Chapter 11 Water Section 11.5.1	• Customers to be notified in advance of watermain outages to allow time to prepare.	•	•
MM61	Water Quality Monitoring	Chapter 11 Water Section 11.5.1	The following water quality monitoring activities should be undertaken the construction phase: • Daily water quality checks (twice daily during wet weather conditions) at watercourses downstream of active works sites including: • A visual check of turbidity levels and measurements using a calibrated hand-held probe. • Measuring pH using a calibrated hand-held probe. • A visual check for evidence of oil slicks. • Note to be made of any foul odours. • Monitoring of dewatering effluent to ensure adequate treatment before release to environment.	•	•

			• Daily inspections of all silt fencing and other silt control measures for integrity and efficacy. • Monitoring the condition of roads around the compound and works sites and order washing where build-up of mud becomes visible.		
Ref MM No.	**Reference Heading**	**Location Reference**	**Mitigation Measure**		
EIAR Chapter 12 Air Quality					
Pre- Construction Phase					
MM62	Dust Management	Chapter 12 Air Quality Section 12.5.1	• Dust Management Plan (DMP) shall be prepared by the appointed main contractor and submitted for approval to the relevant planning authority. The plan must include all appropriate dust and emissions mitigation measures, applicable to the circumstances of the relevant site, based on the mitigation in this EIAR and local authority requirements and industry best practices. • The plan will be developed by the main contractor and for each worksite shall include: • An inventory and timetable of activities which may give rise to emissions or dust; • Alert levels; • Alert system to be used (including notification process); • Details of control measures; • Details of dust monitoring arrangements, including the location of sensitive receptors, monitoring locations, and monitoring equipment to be used. • Details of the air quality reporting requirements. • In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust will be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations	•	•
Ref MM No.	**Reference Heading**	**Location Reference**	**Mitigation Measure**		
EIAR Chapter 13 Climate					
Pre-Construction Phase					
MM63	Project Carbon Management Plan	Chapter 13 Climate Section 13.5.1	• A Project Carbon Management Plan (PCMP) will be prepared in accordance with PAS 2080 (Carbon Management in Infrastructure). This Plan will be devised by Laois County Council at detailed design stage and then transferred for ownership to the Contractor for construction and handover. The Plan will be used to monitor and report on the above committed carbon management measures and all other measures adopted during the design, procurement, and construction phases.	•	•
Ref MM No.	**Reference Heading**	**Location Reference**	**Mitigation Measure**		
EIAR Chapter 13 Climate					
Construction Phase					

MM64	Embodied Carbon	Chapter 13 Climate Section 13.5.1	• As a replacement for traditional precast concrete materials made with Portland cement mixes, the Proposed Scheme will use 50% ground granulated blast-furnace slag (GGBS) cement for all structural and non-structural precast structures; • Similarly, all concrete poured in-situ for the Proposed Scheme will consist of 50% GGBS cement; and • All reinforcing steel employed on site will be 85% minimum recycled steel; and • The use of these low embodied carbon materials in construction will reduce the construction phase emissions and comply with the requirements of CAP24. • In addition to the above mitigation regarding material choices, there are a series of additional construction mitigation measures that will also be adopted as follows: • Sustainable timber post fencing will be specified over steel in boundary treatments where possible • All aggregates shall be secondary aggregates. Virgin aggregates shall only be employed where it is demonstrated that secondary aggregates are unsuitable for structural reasons and/or they are unavailable	•	•
MM65	Energy Usage	Chapter 13 Climate Section 13.5.1	• For electricity generation at the construction compounds, hydrogen generators or electrified plant shall be utilised over traditional diesel generators. This shall also apply to lower powered mobile plant, as appropriate. • Hydrotreated Vegetable Oil (HVO) is currently being used for plant and equipment on OPW sites and this practise will be implemented at this project site also.	•	•
MM66	Vehicle and Plant Usage /Maintenance	Chapter 13 Climate Section 13.5.1	• Wherever available, the contractor shall secure construction materials from local/regional sources or sources within the State to minimise material transport emissions and reduce life cycle carbon emissions associated with the construction materials. • Engines will be turned off when machinery is not in use. • The use of private vehicles by construction staff to access the site will be minimised through the encouragement of use of public transport, encouragement of car sharing, and maximising use of local labour to reduce transport emissions. • A regular maintenance schedule for all construction plant machinery shall be undertaken to maintain optimum machinery efficiency	•	•
Ref MM No.	**Reference Heading**	**Location Reference**	**Mitigation Measure**		
EIAR Chapter 14 Noise & Vibration					
Construction Phase					
MM67	Best Practise Mitigation	Chapter 14 Noise & Vibration Section 14.5.1	Noise predictions assumed Best Practice Mitigation (BPM) will be implemented at all works locations. Implementation of BPM is required to ensure that construction noise levels are properly controlled. In addition to BPM, a range of measures will be implemented during construction works to mitigate the noise impacts where possible	•	•

MM68	Noise & Vibration- General	Chapter 14 Noise & Vibration Section 14.5.1.1	• Works shall, as a minimum, include the measures set out in this assessment and these measures will be documented in the updated CEMP. • Where works need to be completed outside normal working hours or where proposed works indicate that the noise or vibration levels set out in Section 14.2.5.1 or Section 14.2.5.2 may be exceeded, permission for these works must be sought from the Local Authority in advance of any works taking place. The application for such works will require a detailed noise control plan and follow up report to be prepared. This plan will include (i) a justification for the works being carried out in the manner proposed, (ii) an assessment indicating what alternatives have been considered, (iii) a statement of the noise control measures from BS 5228 to be adopted and how Best Practicable Means will be used to control noise, (iv) an activity specific noise monitoring programme including contact details for persons with the authority to cease working if required by the Local Authority. Each follow up report will include details of any complaints received and the action taken to address such complaints. • A formal stakeholder engagement process shall be put in place for the duration of the construction phase, including the provision of information to local residents about noise and vibration monitoring results, works likely to cause significant noise or vibration and/or works planned to take place outside of core working hours.	•	•
MM69	Noise & Vibration- Area 1 Brittas Wood	Chapter 14 Noise & Vibration Section 14.5.1.2	Installation of 2.4 m high site hoarding or temporary noise barriers along the eastern boundary of Compound 'A' adjacent to the nearest NSL to block line of sight and subsequently reduce noise levels experienced by receptors.		
MM70	Noise & Vibration- Area 2 Chapel Street	Chapter 14 Noise & Vibration Section 14.5.1.3	Installation of 2.4 m high site hoarding or temporary noise barriers along the boundaries of Compound B adjacent to the nearest NSLs. Installation of 2.4 m high heras fencing along the boundary of the works taking place along the street. High-grade lightweight noise absorption panels, or similar, will be added to the fencing. Site hoarding or temporary noise barriers will be used to block line of site from rock breaking, timber sawing or consaw activities where NSLs are located within 25 m of these activities. In respect of pumps and generators, the following is recommended: Plant such as pumps and generators used near noise sensitive locations will be contained within an acoustic enclosure. Adopt quiet working methods and use plant with lower noise emission levels. Locate plant as far away from noise and vibration sensitive receptors as practicable. Noise levels at the nearest NSL are not to exceed the 45 dB LAeq construction noise threshold during night-time periods. No adverse structural impacts to properties along Chapel Street are anticipated due to vibration from works at Area 2. However, given the close proximity of some of the properties to Area 2, the following is recommended: A pre-construction condition survey will be carried out before any construction works commence at Area 2. A condition survey will also be carried out when all construction works are completed.	•	•

			Vibration monitoring will be undertaken at the nearest sensitive location(s) during key activities at Area 2 to ensure that vibration levels are below the thresholds outlined in Table 14-4 of Chapter 14 Noise & Vibration.		
Ref MM No.	**Reference Heading**	**Location Reference**	**Mitigation Measure**		
EIAR Chapter 15 Material Assets- Waste & Utilities					
Pre-Construction Phase					
MM71	Utility Surveys	Chapter 15 Waste & Utilities Section 15.8.1.1	At detailed design stage, a second round of confirmatory surveys (e.g. GPR) and engagement with operators will be undertaken to re-confirm the location of utilities	•	•
MM72	Waste Management Plan	Chapter 15 Waste & Utilities Section 15.6.1.2	• Prior to the commencement of the construction phase, an updated Waste Management Plan (WMP) will be produced by the appointed Contractor and in accordance with the Best Practice Guidelines for the Preparation of Resources & Waste Management Plans for Construction and Demolition Projects (EPA, 2021). • The detailed WMP will be implemented by the Contractor. • The Contractor will ensure that all hired waste contractors have the necessary permits/licenses and authorisations, and that the waste management hierarchy is adhered. The person nominated must have sufficient authority so that they can ensure everyone working on the Proposed Scheme adheres to the WMP. • The detailed WMP will, as a minimum address the following aspects of the Proposed Scheme: • Analysis of the waste arising/material surpluses • Methods proposed for the prevention, reuse, and recycling of wastes • Material handling procedures • Proposals for disposal of waste at appropriately licensed facilities only Proposals for education and a workforce and plan dissemination programme.	•	•
EIAR Chapter 15 Material Assets- Waste & Utilities					
Construction Phase					
MM73	Utilities- General	Chapter 15 Waste & Utilities Section 15.6.1.1	• All existing services will be confirmed prior to construction using service records and slit trenching to ensure that their position is accurately identified before excavation works commence across all sections of the Proposed Scheme. • Enabling works shall be programmed to maintain connections, or at least minimise downtimes, to public and private customers where conflicts arise. • Where works are required in and around known utility infrastructure, precautions will be implemented by the appointed contractor to protect the infrastructure from damage and avoid unplanned interruptions. • Any damage to services during the construction phase shall be repaired / replaced by the Contractor	•	•
MM74	Utilities- Electricity Services	Chapter 15 Waste & Utilities Section 15.6.1.1	• Works affecting electricity services must also be carried out strictly in accordance with the Code of Practice for Avoiding Danger from Overhead Electricity Lines (ESB, 2019). Where construction equipment passes under lines, goalpost barriers will be established within a lateral distance of 6 m either side of the line, ensuring that tall vehicles will not come into	•	•

			contact with OHLs during construction. A no-tip zone will also be established within 10 m of power lines. All proposed poles will be placed at a sufficient distance from proposed earthworks		
MM75	Health & Safety	Chapter 15 Waste & Utilities Section 15.6.1.1	• Safety procedures will be put in place to minimise the risk to utility provider personnel and the general public during works on services. Protection measures during construction will include warning signs and markings indicating the location of utility infrastructure, safe digging techniques in the vicinity of known utilities, and in certain circumstances where possible, isolation of the section of infrastructure during works in the immediate vicinity. • Site specific method statements and risk assessments detailing safe means of works for working in close proximity to existing underground and overground existing services shall be prepared at detailed design stage. Works effecting underground services shall be carried out strictly in accordance with the Health and Safety Authority Code of Practice for Avoiding Danger from Underground Services (HSA, 2016).	•	•
MM76	Utilities Diversions	Chapter 15 Waste & Utilities Section 15.6.1.1	• Where diversions, or modifications are required to utility infrastructure: • The appointed contractor will ensure adequate notice (not less than 14 days) will be given to all impacted properties. • Notification shall include information on when interruptions and works are scheduled to occur and the duration of such interruption. Any required works will be carefully planned by the appointed contractor to ensure that the duration of interruptions is minimised in so far as is practicable. • Early consultation shall be undertaken with service providers to enable providers to reroute their service during non-peak periods to maintain connections to customers. • For unknown utilities encountered during construction works, further liaison with utility providers will be undertaken to establish the preferred solution. • Alternative connections shall be provided before any connections are severed. Supply to existing services will be maintained as far as possible during construction. • All proposed relocation / diversion works shall be delivered through the appropriate service provider processes e.g. Uisce Eireann Developer Services – Diversion process.	•	•
MM77	Waste-Source Segregation	Chapter 15 Waste & Utilities Section 15.6.1.2	• Source Segregation: Source separating wastes into dry mixed recyclables, biodegradable, and residual wastes. Clear labelling of waste bins, containers, skip containers and storage areas, including waste stream colour coding and photographs as appropriate.	•	•
MM78	Waste-Waste Auditing	Chapter 15 Waste & Utilities Section 15.6.1.2	• Waste Auditing: Good record keeping being conducted by the contractor including quantities (tonnes) and type of waste and materials leaving the site. The name, address and authorisation details of all facilities and locations to which waste and materials are delivered will be recorded along with the quantity of waste in tonnes delivered to each facility. Records will show material, which is recovered, and which is disposed.	•	•
MM79	Waste-Appropriate Storage	Chapter 15 Waste & Utilities Section 15.6.1.2	• Appropriate Storage: Ensuring that all areas where liquids (including fuel) are stored, or cleaning is carried out, are in designated impermeable areas that are isolated from the surrounding area and within a secondary containment system, e.g., by a roll-over bund, raised kerb, ramps or stepped access. The location of any fuel storage facilities shall be considered in the design of the construction compounds. These are to be designed in accordance with relevant guidelines and codes of best practice and will be fully bunded. Good housekeeping at the site (daily site clean-ups, provision of recycling and compost, etc.) is to be conducted during the construction phase.	•	•

MM80	Waste-Efficient Removal	Chapter 15 Waste & Utilities Section 15.6.1.2	• Efficient Removal: Where possible the removal of topsoil will be avoided, and all topsoil shall be assessed for reuse within the Proposed Scheme ensuring appropriate handling, processing and segregation of material. Minimal excavations will be maintained using shoring or trench boxes. The updated CEMP will identify actions on site to minimise the loss of topsoil and soils. Soils removed during excavations will be reinstated as soon as possible and suitable inert material will be used as infill to protect the quality of the surrounding subsoil. The WMP will address the analysis of waste arisings, methods proposed for the prevention, reuse and recycling of wastes and material handling procedures. • If unforeseen waste or hazardous material is encountered during the course of the Proposed Scheme, the appropriate authorities will be notified, and the material will be deposited at an appropriate waste facility. There is a possibility that unforeseen or hazardous material is encountered during excavation works.	•	•
MM81	Concrete Waste	Chapter 15 Waste & Utilities Section 15.6.1.2	• Concrete waste will be dealt with using an Article-28 notification. These notifications will allow the concrete waste to be fully recovered. By-product notifications (under Article 27 of the EC Waste Directive Regulations 2011) provide an opportunity for reuse of surplus clean soil & stone material arising from construction activity. At the time of construction, options for Article 27 by-product status will be reviewed, subject to waste management and planning requirements being fully met. Such opportunities offer potential to further reduce indirect effects of waste management resulting from the transport of materials from site, notably traffic, noise and air emissions from transport-related haulage.	•	•
Ref MM No.	**Reference Heading**	**Location Reference**	**Mitigation Measure**		
EIAR Chapter 16 Cultural Heritage					
Pre-Construction Phase					
MM82	Archaeological Mitigation Strategy	Chapter 16 Cultural Heritage Section 16.5.	• A full archaeological mitigation strategy to be agreed in consultation with the NMS and relevant Local Authority planning archaeologist/Heritage Officer and Architectural Conservation Officer (ACO) post-consent and in advance of any on-site works taking place. Sufficient time will be allowed in programme to undertake early advance works agreed through consultation with NMS, and the results of any advance works will further inform archaeological mitigation required for the proposed development.	•	•
MM83	Advanced Archaeological Testing	Chapter 16 Cultural Heritage Section 16.5.	• All/any greenfield portions of the Proposed Scheme where previously unidentified sites or potential archaeological sites have been noted will be subject to advance works archaeological testing will be tested by a suitably qualified archaeologist in consultation with the Laois Co. Council officer responsible for planning and cultural heritage and under licence from the NMS in compliance with the relevant legislation, policy and guidelines. The results of this work will inform further archaeological mitigation where/if required, the scope of which will be agreed in advance with the Local Authority and in consultation with the NMS.	•	•

MM84	Advanced Archaeological Testing/Survey	Chapter 16 Cultural Heritage Section 16.5.1	• Townland boundaries within the proposed development area to be subject to townland boundary surveys, including archaeological testing of same, under licence by a suitably qualified archaeologist, in consultation with the relevant Co. Council planning archaeologist/Heritage Officer and NMS. The results of this work will inform the requirement for further archaeological mitigation where necessary.	•	•
MM85	Cultural Heritage Receptors CH-020, CH-022	Chapter 16 Cultural Heritage Section 16.5.1	• For Cultural Heritage receptors CH-020, CH-022: Protective barriers: Advance works townland boundary survey and archaeological testing to ascertain the nature and potential age of the boundary feature within the planning application boundary extents. Further archaeological works such as resolution and/or monitoring may also be required.	•	•
MM86	Advanced Archaeological Testing/ Survey	Chapter 16 Cultural Heritage Section 16.5.1	• Architectural heritage surveys of all extant vernacular buildings/structures to be directly or potential directly impacted by the proposed development to be subject to Built Heritage Surveys in accordance with relevant guidance, and in consultation with the relevant Laois Co. Council officers.	•	•
Ref MM No.	**Reference Heading**	**Location Reference**	**Mitigation Measure**		
EIAR Chapter 16 Cultural Heritage					
Construction Phase					
MM87	Cultural Heritage Receptors CH-020, CH-022	Chapter 16 Cultural Heritage Section 16.5.1	For Cultural Heritage receptors CH-020, CH-022: Protective barriers: Advance works townland boundary survey and archaeological testing to ascertain the nature and potential age of the boundary feature within the planning application boundary extents. Further archaeological works such as resolution and/or monitoring may also be required.	•	•
MM88	Cultural Heritage Receptors CH-024, CH024.1, CH024.2, CH-024.3, CH024	Chapter 16 Cultural Heritage Section 16.5.1	For Cultural Heritage receptors CH-024, CH024.1, CH024.2, CH-024.3, CH024.4: Built heritage survey of stone wall and associated features prior to works; use of appropriate materials and re-building like-for-like.	•	•
MM89	Cultural Heritage Receptors CH-035	Chapter 16 Cultural Heritage Section 16.5.1	For Cultural Heritage receptors CH-035: Protective barriers; Advance works townland boundary survey and archaeological testing to ascertain the nature and potential age of the boundary feature within the planning application boundary extents. Further archaeological works such as resolution and/or monitoring may also be required.	•	•
MM90	Cultural Heritage Receptors CH-038	Chapter 16 Cultural Heritage Section 16.5.1	For Cultural Heritage receptors CH-038: Advance works townland boundary survey and archaeological testing to ascertain the nature and potential age of the boundary feature within the planning application boundary extents. Further archaeological works such as resolution and/or monitoring may also be required.	•	•
MM91	Cultural Heritage Receptors	Chapter 16 Cultural Heritage Section 16.5.1	For Cultural Heritage receptors CH-041, CH-041.1 to CH-041.15, CH-043 – CH-043.08: Advance works testing strategy to be devised by consultant archaeologist and to be agreed in advance with relevant Local Authority officers and NMS. Sufficient time to be allowed in programme to apply for	•	•

	CH-041, CH-041.1 to CH-041.15, CH-043 – CH-043.08		archaeological licence and for undertaking the works in advance of construction. Results of archaeological testing to inform further mitigation (if required).		
MM92	Cultural Heritage Receptors CH-024, CH024.1, CH024.2, CH-024.3, CH024.4	Chapter 16 Cultural Heritage Section 16.5.1	For Cultural Heritage receptors CH-024, CH024.1, CH024.2, CH-024.3, CH024.4: Built heritage survey of stone wall and associated features prior to works; use of appropriate materials and re-building like-for-like.	•	•
MM93	Cultural Heritage Receptors CH-007, CH-009	Chapter 16 Cultural Heritage Section 16.5.1	For Cultural Heritage receptors CH-007, CH-009: Use of appropriate protective measures such as the installation of barriers at entrance gates; Use of appropriate materials and appropriate wall height to fit with the character of the townscape/ACA.	•	•
MM94	Cultural Heritage Receptors CH-011	Chapter 16 Cultural Heritage Section 16.5.1	For Cultural Heritage receptor CH-011: Use of appropriate protective measures such as barriers in front of house to prevent accidental damage during construction.	•	•
MM95	Cultural Heritage Receptors CH-015.1	Chapter 16 Cultural Heritage Section 16.5.1	For Cultural Heritage receptor CH-015.1: Use of appropriate protective measures such as the installation of barriers. If a section of stone wall needs to be removed, it should be re-built using like-for-like fabric.	•	•
MM96	Cultural Heritage Receptors CH-025	Chapter 16 Cultural Heritage Section 16.5.1	For Cultural Heritage receptor CH-025: Use of appropriate protective measures such as the installation of barriers, where considered necessary.	•	•
Ref MM No.	Reference Heading	Location Reference	Mitigation Measure		
EIAR Chapter 17 Landscape & Visual Impact (L&V)					
Pre-Construction Phase					
MM97	Tree Protection	Chapter 17 L&V Section 17.5.1	An arboricultural survey, impact assessment and tree constraints plan has been prepared to inform the project. This will be made available in advance of construction in order that the necessary tree protection measures can be implemented. The tree survey will be fully updated at the end of the construction phase, with any recommendations for on-going monitoring of retained trees during the operational phase.	•	•
MM98	Landscaping	Chapter 17 L&V Section 17.5.1	Where the gardens of properties are subject to temporary acquisition to facilitate construction, an inventory of boundary details, accesses, planting, paving, and other features that may be disturbed or removed will be prepared prior to commencement of construction in order that these can be protected or replaced;	•	•
MM99	CEMP	Chapter 17 L&V Section 17.5.1	An updated CEMP (which will supersede this pCEMP), will be developed prior to the commencement of construction activities, in order to minimise the effects on the environment, including landscape and visual amenity, during construction.	•	•
Ref MM No.	**Reference Heading**	**Location Reference**	**Mitigation Measure**		

EIAR Chapter 17 Landscape & Visual Impact (L&V)					
Construction Phase					
MM100	Tree Protection	Chapter 17 L&V Section 17.5.1	All trees and vegetation to be retained within and adjoining the works area will be protected in accordance with the British Standard Institution (BSI) British Standard (BS) 5837:2012 'Trees in relation to design, demolition and construction – Recommendations' (BSI, 2012). Works required within the RPA of existing trees to be retained will follow a project specific method statement for such works, which will be prepared by a professional qualified arborist; Trees and vegetation identified for removal will be removed in accordance with 'BS 3998:2010 Tree Work – Recommendations' (BSI 2010) and best arboricultural practices as detailed and monitored by a professional qualified arborist; Trees and wooded vegetation, removed to facilitate construction, will be replanted where feasible	•	•
MM101	Topsoil Stripping	Chapter 17 L&V Section 17.5.1	Topsoil stripping will be carefully undertaken and stored in stockpiles of a height not exceeding 1.5m and located as close as possible to the locations where it was removed. Topsoil will be reinstated to the locations where it was removed on completion of the engineering works. These operations will apply to the proposed path / flood relief embankment at Brittas Wood and the flood relief embankment in the field on Tullamore Road.	•	•
MM102	Chapel St Wall	Chapter 17 L&V Section 17.5.1	The flood relief wall on Chapel Street and Tullamore Road will be finished in a manner that is sympathetic to the surrounding landscape of Clonaslee ACA. This will feature a stone finish similar to that existing in accordance with that specified by a conservation architect.	•	•
MM103	Chapel St Footpath	Chapter 17 L&V Section 17.5.1	A new footpath is to be provided along the full length of the works and this will be surfaced in concrete, similar to existing footpaths in the village which will weather favourably over time;	•	•
MM104	Brittas Wood	Chapter 17 L&V Section 17.5.1	In Brittas Wood, the short section of replacement footpath will be surfaced in a gravel material selected to match as closely as possible the existing path surfacing in use along the wider woodland trail network. Topsoil, previously stripped to facilitate construction, will be reinstated and allowed to regenerate naturally, thus developing a natural sward;	•	•
MM105	ICW/Tullamore Embankment	Chapter 17 L&V Section 17.5.1	The proposed flood relief earthworks embankment within the field adjacent to the Clodiagh River on Tullamore Road has been designed to minimise loss of mature trees and wooded vegetation. Topsoil, previously stripped to facilitate construction, will be reinstated and seeded, to develop a grass sward in order to be consistent with the existing field;	•	•
MM106	Temporary Compounds and Noise Barriers	Chapter 17 L&V Section 17.5.1	The layout of temporary construction compounds are designed to minimise visual effects, in particular, on surrounding residents of dwellings overlooking these locations; Temporary noise barriers completely blocking line of sight to the nearest residential receptors will be used. Refer to Chapter 14 Noise and Vibration for details.	•	•
MM107	Replacement Tree Planting	Chapter 17 L&V Section 17.5.1	Existing wooded vegetation will be retained as far as is feasible. Proposed planting will be introduced to mitigate adverse landscape and visual effects where feasible and having regard for engineering and safety requirements as follows:	•	•

			• Replacement mitigation planting will be introduced at the road junction near the access to the ICW facility on Tullamore Road; • Replacement planting within private property (dwellings) including boundary hedgerows and other woody garden species in agreement with landowners; • Replacement planting to compensate for wooded vegetation losses in Brittas Wood at the location of the proposed debris trap and slipway and at other locations to be agreed with Coillte. • The gardens of private properties will be restored with replacement planting and landscape detailing in agreement with each affected landowner; and • Areas of land, formerly in use as site compounds during construction, will be restored.		

9.2 Monitoring Commitments

Table 9-2 below details all the Monitoring Commitments (MC) recommended during construction phase of the Proposed Scheme.

Table 9-2: Monitoring Commitments for the Construction Phase of the Proposed Scheme.

MC No.	Reference	Location Reference	Monitoring Measure	Audit Result	Acton Required
EIAR Chapter 9 Biodiversity					
Construction Phase					
MC1	Terrestrial Ecology Monitoring	Chapter 9 Biodiversity Section 9.8.1	A checklist will be filled in on a weekly basis to show how the measures above have been complied with. Any environmental incidents or non-compliance issues will immediately be reported to the project team; The Contractor will be continuously monitoring the works and will be fully briefed and aware of the environmental constraints and protection measures to be employed. The works will be periodically monitored during the construction phase by the ECoW. Following completion of the works, the ECoW will complete a final audit report to show how the works complied with the environmental provisions described in Chapter 9 Biodiversity. **Refer to Table 9-26 for the Terrestrial Ecology Monitoring Schedule**	•	•
MC2	Aquatic Ecology Monitoring	Chapter 9 Biodiversity Section 9.8.3	In advance of the construction phase commencing, and throughout the construction phase, the ECoW will undertake turbidity monitoring to establish baseline turbidity levels. Turbidity will be monitored via handheld sondes upstream and downstream of the works area and at the discharge of settlement tanks. Alternatively, fixed turbidity monitors, installed at locations agreed with the ECoW, could be used to monitor turbidity levels within the River Clodiagh in real time. An increase in turbidity levels by 20% over the baseline should trigger an abandonment of works and implementation of immediate corrective actions. Onsite water attenuation and treatment systems must ensure discharges do not result in suspended solid concentrations within discharges do not exceed 25 mg/l and must be within the pH bracket of ≥ 6 ≤ 9. Suspended solids concentration provides an absolute measure of sediment concentration within a water sample and requires laboratory determination. A broad correlation will be made between the in-situ turbidity data and laboratory analysed suspended solids concentrations. This relationship will be used to establish a suspended solids/turbidity trigger level for works. Weekly grab sampling upstream and downstream of active works areas will be undertaken with samples analysed in an accredited laboratory for total suspended solids, pH and turbidity. Visual inspections of the River Clodiagh and Brittas Stream for hydrocarbon sheen, as well as on going monitoring of the weather forecast, onsite weather conditions, overland flow and soil wetness conditions on Site will also be undertaken by the ECoW. **Refer to Table 9-27 for the aquatic Ecology Monitoring Schedule**	•	•

Ref MC No.	Reference Heading	Location Reference	Monitoring Measure		
EIAR Chapter 10 Land, Soil, Geology and Hydrogeology (LSGH)					
Construction Phase				•	•
MC3	Embankment Monitoring	Chapter 10 LSGH Section 10.8.1.2	The appointed contractor shall monitor settlement every two to three days using settlement plates during and after embankment construction at Brittas Wood.	•	•
MC4	Groundwater Monitoring	Chapter 10 LSGH Section 10.8.1.4	Groundwater quality and level monitoring (background groundwater levels) of the existing Clonaslee PWS Plant and Forest boreholes will be monitored prior to, during and post construction in order to establish baseline conditions and demonstrate that the design of the Proposed Scheme has not impacted on groundwater quality and flow regime.	•	•
MC5	Excavations Monitoring	Chapter 10 LSGH Section 10.8.1.5	Records shall be kept of all truck movements relating to the removal of site clearance vegetation, topsoil and construction soil. The records shall include quantity, nature/ type and quality of the material, and the excavation and disposal locations. Excavations shall be monitored during earthworks to ensure the stability of side slope and that excavated soils meet the Waste Acceptance Criteria (WAC) testing classifications and descriptions.	•	•
Ref MC No.	**Reference Heading**	Location Reference	**Monitoring Measure**		
EIAR Chapter 11 Water					
Construction Phase					
MC6	Water Quality Monitoring	Chapter 11 Water Section 11.7.1	Water Quality Monitoring for River Clodiagh should be undertaken, both upstream and downstream of the scheme area, during the construction of the project The following water quality monitoring activities should be undertaken the construction phase: • Daily water quality checks (twice daily during wet weather conditions) at watercourses downstream of active works sites including: –A visual check of turbidity levels and measurements using a calibrated hand-held probe. –Measuring pH using a calibrated hand-held probe. –A visual check for evidence of oil slicks. –Note to be made of any foul odours. •Monitoring of dewatering effluent to ensure adequate treatment before release to environment. •Daily inspections of all silt fencing and other silt control measures for integrity and efficacy. •Monitoring the condition of roads around the compound and works sites and order washing where build-up of mud becomes visible. •Checking weather forecasts to ensure suitable programming of earthworks activities.	•	•

Ref MC No.	Reference Heading	Location Reference	Monitoring Measure		
EIAR Chapter 12 Air Quality					
Construction Phase					
MC7	Dust Monitoring	Chapter 12 Air Quality Section 12.5.1	Monitoring of construction dust deposition at nearby sensitive receptors that are identified based on potential risk of dust nuisance during the construction phase of the Proposed Scheme. This can be carried out using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2 m above ground level. The TA Luft limit value is 350 mg/m2/day (for non-hazardous dusts) during the monitoring period between 28 – 32 days. Monthly monitoring of dust deposition levels will be undertaken for the duration of construction for comparison with the guideline of 350 mg/m2/day (for non-hazardous dusts). This monitoring shall be carried out at a series of locations based on potential risk of dust nuisance during the construction phase of the Proposed Scheme. This monitoring should be carried out at a minimum of three locations at construction compounds with a medium to high risk of dust nuisance and further monitoring locations at sensitive receptors around the proposed works. Where dust levels are measured to be above the guideline of 350 mg/m2/day, the mitigation measures in the area must be reviewed and improved to ensure that dust deposition is reduced to below 350 mg/m2/day. Should high dust levels continue to occur following these improvements, the contractor will provide alternative mitigation measures and/or will modify the construction works taking place.	•	•
Ref MC No.	**Reference Heading**	Location Reference	**Monitoring Measure**		
EIAR Chapter 14 Noise & Vibration					
Construction Phase					
MC8	Noise Monitoring	Chapter 14 Noise & Vibration Section 14.7.1	Prior to the commencement of the construction, the contractor will set out and agree a schedule of noise monitoring with the Local Authority to include the number of locations at which noise monitoring will be carried out, the frequency and duration of the monitoring and the reporting of results. Similarly, vibration monitoring will be undertaken at the nearest sensitive location(s) during key activities at Area 2 to ensure that vibration levels are below the thresholds outlined in Table 14 4 of Chapter 14 Noise & Vibration.	•	•
Ref MC No.	**Reference Heading**	Location Reference	**Monitoring Measure**		
EIAR Chapter 15 Waste and Utilities					
Construction Phase					
MC9	Visual Checks-Utilities	Chapter 15 Waste & Utilities Section 15.8.1.1	Daily visual checks of the integrity of the overhead lines will be carried out at the start and end of each day during the construction phase.	•	•

MC10	Waste Management	Chapter 15 Waste & Utilities Section 15.8.1.2	Records shall be kept of all truck movements relating to the removal of site clearance vegetation, topsoil and construction soil. The records shall include quantity, nature/ type and quality of the material, and the excavation and disposal locations. Records shall be kept on the quantity, nature/ type and quality of all waste leaving the construction site including individual waste and typical construction site waste. Segregation of construction site waste shall be carefully monitored with waste audits taking place at regular intervals.	•	•
Ref MC No.	**Reference Heading**	Location Reference	**Monitoring Measure**	•	•
EIAR Chapter 16 Cultural Heritage					
Construction Phase					
MC11	Cultural Heritage Receptors CH-033	Chapter 16 Cultural Heritage Section 16.5.1	For Cultural Heritage receptor CH-033: Archaeological monitoring during construction. All elements of this receptor are to be treated as archaeological features and are appropriately recorded during construction. Preserve remains in situ, in consultation with an appropriate methodology to be agreed in advance with the relevant authorities.	•	•
MC12	Cultural Heritage Receptors CH-007, CH-009	Chapter 16 Cultural Heritage Section 16.5.1	For Cultural Heritage receptors CH-040: Archaeological monitoring of all groundworks in vicinity of receptor. Full recording of any elements of the footbridge that may be exposed.	•	•
MC13	Archaeological Monitoring	Chapter 16 Cultural Heritage Section 16.5.1	That archaeological monitoring confined to areas where advance archaeological works are not feasible will be undertaken by a suitably qualified archaeologist during construction	•	•
MC14	Cultural Heritage Receptors CH-012:	Chapter 16 Cultural Heritage Section 16.5.1	For Cultural Heritage receptor CH-012: Archaeological monitoring of all groundworks in the demesne. Under licence by a suitably qualified Archaeologist and in consultation with the NMS.	•	•
MC15	Cultural Heritage Receptors CH-018, CH-019	Chapter 16 Cultural Heritage Section 16.5.1	For Cultural Heritage receptors CH-018, CH-019: Archaeological monitoring of all groundworks in vicinity of the receptor. Under licence by a suitably qualified Archaeologist and in consultation with the NMS.	•	•