



OIFIG na nOIBREACHA POIBLÍ
OFFICE OF PUBLIC WORKS

River Deel (Crossmolina) Drainage Scheme



Environmental Method Statement

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ENVIRONMENTAL METHOD STATEMENT

The methods by which the works will be undertaken are described in general below. The details of the measures that will be used to minimise impacts on the identified Key Ecological Receptors are provided in this section. These measures have been discussed with the project engineers, hydrologists and the client and the provisions of the method statements and the mitigation measures set out in them have been agreed as possible and achievable. They follow tried and tested procedures, which are known to be effective. The works have been described in terms of the following operations:

- Site Preparation and Clearance of Vegetation
- Construction of Diversion Channel
- Construction of Road Bridges, Roads and Energy Dissipation Structure
- Construction of Intake Structure
- Construction of Flow Control Structure
- Construction Compound
- Monitoring

In addition to the above, general construction and site management measures to prevent any pollution and/or adverse effects on areas outside the site are also described in this section.

1. CONSTRUCTION METHODS

1.1 SITE PREPARATION & CLEARANCE OF VEGETATION

Overall, the proposed development will require the removal of approximately 1,471m of tree line and hedgerow along with a small area (0.46 ha) of recently established woodland and scrub where the intake structure is to be located and Mixed Broadleaved Woodland at the location of the Flow Control Structure.

Clearance will be undertaken on a sectional basis as work proceeds in the various areas. All clearance will have due regard to seasonal restrictions. It is anticipated that works will start with the construction of the diverted Lake Road and with a section of the diversion channel from which materials to construct the road will be excavated. Following this, the bridges and the energy dissipation structure will be constructed in tandem with the diversion channel itself. The intake structure will be constructed when the channel is completed and stabilised. The final piece of the project to be completed will be the flow control structure (though preparation for this may be undertaken in advance of its construction if weather conditions are favourable and the river dries out or is reduced to very low flow). The removal of this vegetation will be undertaken outside the bird nesting season as defined in Section 40 of the Wildlife Act 1979 as amended which runs from March 1st to August 31st.

Three small stands of Japanese Knotweed were identified within the works area. These are the subject of a management plan that is included as section five of this document. These identified strands will be fenced off and avoided during the site preparation and vegetation clearance operations.

Prior to removal of vegetation in close proximity to the River Deel and within the SAC, a silt fence will be erected by hand on the river bank to form a solid barrier between the works area and the river. There will be no requirement to remove instream trees. The requirement for these works in close proximity to the River Deel has been minimised to a length of approximately 150m at the location of the intake structure and at the location of the flow control structure with these being the only interfaces with the SAC.

Prior to construction, a dedicated otter survey will be undertaken by a suitably qualified ecologist to determine whether there is any occupied and active holt in the vicinity of the works. The status of any holt encountered will be assessed (breeding holt/occasional use etc.) and a derogation licence for potential disturbance will be sought if works are proposed within 30m of an active holt. If the holt is in active use as a breeding holt at the time of the proposed works – these works will be suspended until breeding activity has concluded. All works will be undertaken in accordance with the '*Guidelines for Treatment of Otters prior to the Construction of National Road Schemes*' (NRA 2008) following the procedure set out in EP 20 of the OPW '*Drainage Maintenance and Construction Environmental Guidance*' (OPW 2019)

Prior to the undertaking of the site clearance works a pre-construction Badger survey will be undertaken of all areas to be cleared.

Should any setts be encountered during the dedicated pre-construction badger survey (if badgers have migrated into the area since the recent dedicated surveys that have been undertaken), they will be avoided where possible by a distance of greater than 30m.

Should new setts be identified within the development footprint during the pre-construction surveys (i.e. if the abandoned sett that is within the footprint of the diversion channel is re-occupied or if additional new setts are identified), a licence will be sought to exclude the Badgers in advance of the undertaking of any construction or clearance works or to work within 30m of any such sett.

All works will be carried out in accordance with the '*Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes*' (NRA 2008) and OPW EP 23 – Badger Procedure (OPW 2019)

Vegetation will be cut and chipped or removed from the site. Where roots require removal and excavation is undertaken, any unconsolidated ground will be sown with grass seed following completion to prevent erosion.

1.2 CONSTRUCTION OF THE DIVERSION CHANNEL

Following the site clearance described above and the appropriate treatment of protected fauna on the site, works areas will be fenced off to prevent additional land take and the potential for additional effects. The fenced area will include all the areas required to facilitate the works such as site compounds and areas necessary for temporary works. The intake structure and flow control structure will not be

included within the worksite associated with the channel and works within these areas are described separately in this document.

Construction of the channel will begin at the downstream end and will involve the removal of the overburden to create the channel. This will be undertaken in small successive sections with each being reinstated prior to commencement on the next. Reinstatement will involve replacing topsoil, levelling and sowing with grass and wild-flower seed mix on the sides and base. A seed mix that is specifically designed for use in calcareous soils will be used. An example of a potentially suitable wild flower seed mix is the Esker Ridge/Burren Wildflower Seed Mixture EC08 available from Design by Nature (<http://www.wildflowers.ie>)

All materials to be removed from the site will be taken to an authorised waste or recovery facility via the public road network and in sealed vehicles.

Whilst no significant watercourses were identified along the route of the channel, there are a number of drainage channels within the fields (many of which are dry and none that regularly carry a significant flow). The ecological clerk of works will identify any areas where there is any potential for run off of pollutants to the washlands and any potential pathways will be blocked with silt fencing and/or check dams. As shown on Plate 1.1 below.

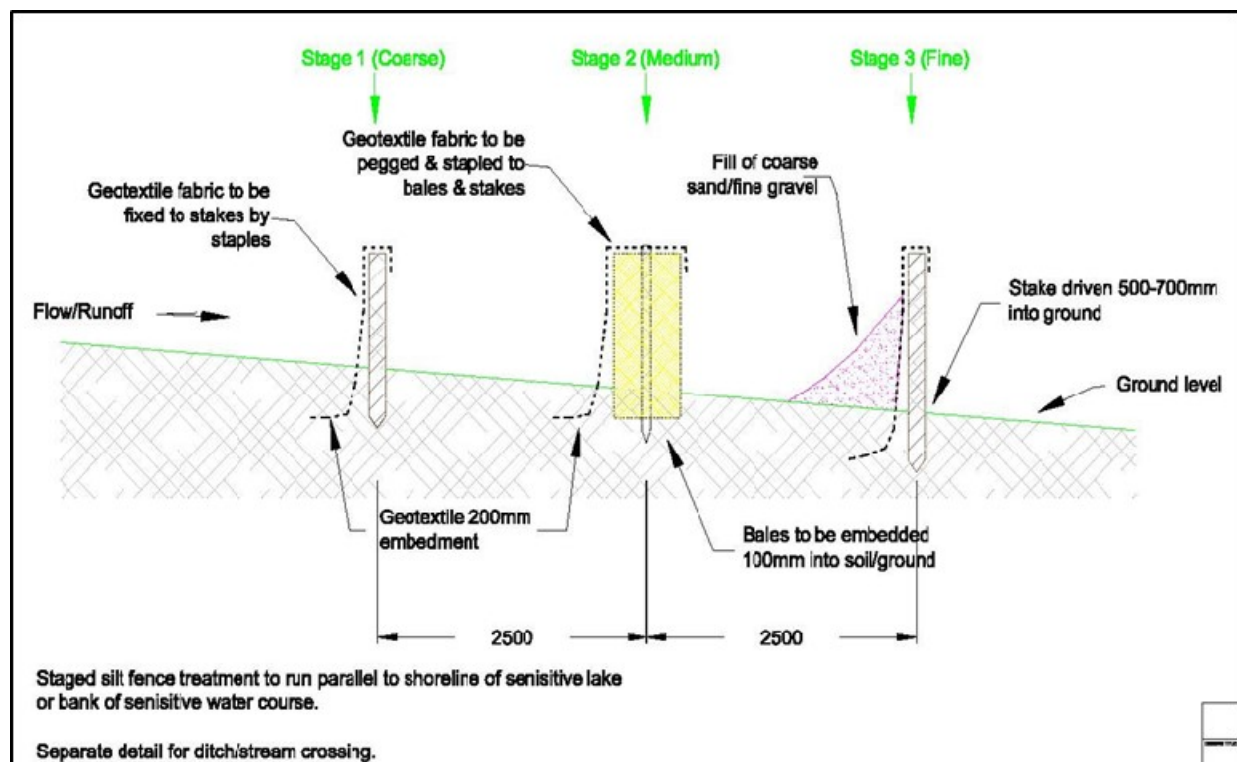


Plate 1.1. Silt Fence Detail

No significant accumulation of water within the excavations is anticipated following detailed site investigations. In addition, the OPW will manage the site to ensure that ingress of waters to the works area is minimised and that any clean waters are prevented from entering where possible and discharged to ground as described below. However, if there is the requirement to dewater any excavations, waters will

be pumped to lands that are over 30 metres from any watercourse and discharged via a silt bag and into a discharge point. The discharge point will consist of a circle of triple silt fences (diameter approx. 20m). In the centre of this will be a circle of straw bales wrapped in Terram. All waters will be discharged to this location through a silt sock (Silt bag). Waters will filter through the silt sock, straw bales and silt fences before diffusely discharging to ground. As shown on Plate 5.16.

This discharge points will be constructed prior to the commencement of construction works. The discharge points will move as required with the progression of the works. The discharge point will be monitored and checked on a daily basis (when in use) to ensure that it is in good working order and is effective in preventing the release of any potentially polluting material to any sensitive habitat or to result in any erosion on the site.

It will be necessary to store topsoil on the site in order to reinstate the channel. All storage will be undertaken within the identified works area including the site compounds. The amount stored at any one time will be minimised by completing the channel on a sectional basis with each section being completed before proceeding to the next. Topsoil storage areas will be defined and fenced off with silt fencing to prevent run off. It is likely that storage areas will move as the channel progresses towards the River Deel.

A sonde will be placed in the Mullenmore springs and stream and turbidity will be continually monitored to ensure that there is no effect of the proposed works on this watercourse.

1.3 CONSTRUCTION OF THE ROAD BRIDGES, ROADS AND THE ENERGY DISSIPATION STRUCTURE

The proposed flood relief scheme will involve the construction of two road bridges, a section of realigned local access road at the eastern end of the scheme and an energy dissipation structure. All these works are located within the identified works area and are not proposed in close proximity to the River Deel, Mullenmore Springs, Lough Conn or any other sensitive ecological receptor. These works will be fenced off from the wider area and subject to the same silt and pollution control measures as discussed in relation to the construction of the channel. The Ecological Clerk of Works will be responsible for monitoring the site set up and pollution control measures. No works are proposed in close proximity to significant watercourses and no pathway for effects on the River Deel is identified. The Invasive species management plan (As described below) will be implemented in advance of commencement of works associated with these elements of the scheme. The works will involve use of concrete and other potentially polluting materials. The general construction measures as described below, will be implemented in full during these works.

1.4 CONSTRUCTION OF THE INTAKE STRUCTURE

This will involve the construction of a new reinforced concrete intake structure and spillway on the banks of the River Deel at the upstream end of the abovementioned grass lined channel.

The entire boundary between the working area and the River Deel will be fenced off with a triple silt fence as shown in Plate 5.16. In addition to this, a solid wall of double walled one tonne sand bags, filled with soil will be constructed inside the silt fences to create a solid barrier between the works area and the river (and SAC). The bags will be filled away from the river and transported to the site.

All works will be undertaken entirely within the confines of the works area as described above.

Topsoil will be stripped as necessary to prepare the foundations. It will be either stockpiled for re-use within the confines of the works area or removed from the site and stored for re-use within the dedicated site compound at a location that is over 30metres from any watercourse and is adequately protected with silt fences. Where soil is to be stored over a calendar month, it will be sown with grass seed to prevent any windblow or water erosion and subsequent run-off. Where it is not required for re-use, it will be removed to an authorised waste facility.

Following detailed site investigations, the requirement for rock breaking to be undertaken is not anticipated.

The invasive species, Japanese knotweed has been identified from three locations within the works area (as shown below) and has been the subject of ongoing treatment for the last two years. These stands of knotweed will be managed as per the invasive species management plan below to avoid its spread.

Following soil removal, formworks and steel for the structure will be constructed ensuring that all works are located within the defined works area that is protected from run off by the solid barrier described above. Formwork will be of solid construction and will be sealed to prevent any leakage of concrete during pouring operations.

Whilst no significant excavations are proposed, should any ingress of water (ground or rain) require pumping out prior to the pouring of concrete, this will be pumped from the site of the intake structure and discharged to a discharge point within the diversion channel as described in the preceding sections.

The weather forecast will be checked prior to the pouring of the concrete and no such works will be undertaken when bad weather is forecast. Works will be planned/programmed to avoid water levels that may cause inundation of the works area and any works at any time when water levels that may cause inundation of the works area will be avoided. Concrete will not be poured at times when heavy rain is predicted as this may lead to run off and over spillage of the form work.

Form work will be constructed with an adequate capacity and additional freeboard to prevent any spillage.

Alarmed Sondes will be placed in the river and will measure turbidity upstream and downstream of the works area. If there is a 20% difference in levels of turbidity between the upstream and downstream sondes, all works will cease until the source is identified and the problem rectified (if it is found to be associated with the proposed works).

Concrete trucks and other construction vehicles will work entirely from hard standing areas to avoid the generation of mud within the works area. Temporary hard standing will be made of clean stone behind the proposed wall location (landward side) and all machinery will work from this area.

Concrete trucks will not be washed out at the site of the proposed works. If chutes require wash out, this will be undertaken at a designated wash out tank located in the site compound. This will recycle waters within the tank.

Stone gabions will be placed at the upstream and downstream ends of the intake structure and the soil will be placed on the top of these. Taller native vegetation such as Hazel and Hawthorn will be planted in these drier areas.

All bankside works will be undertaken at times of low water and good weather, when there is no potential for the works area to become inundated with flood water.

There will be no storage of materials, machinery or soil in areas that are susceptible to flooding.

1.5 CONSTRUCTION OF THE FLOW CONTROL STRUCTURE

The terrestrial works area will be set up in advance of any instream works. The minimum area necessary to complete the works will be fenced off and all interfaces with the River Deel and SAC will be fenced off with triple layered silt fencing whilst the terrestrial working areas are excavated as necessary and surfaced with clean stone.

All terrestrial works will be undertaken at times of low water and good weather, when there is no potential for the works area to become inundated with flood water or for significant amounts of surface water to accumulate on the site or to run off.

Following site preparation on the banks, the instream works will be undertaken outside the sensitive period for spawning fish in the River Deel (October to June inclusive) or preferably in a period when there is no flow in the river.

Whilst it is intended to set up the instream works areas during periods when there is no flow in the river, should this not be possible, they will be set up when there is low flow in the river.

Prior to commencement, the section of the river-bed within the works area will be the subject of surveys for the following protected species:

White clawed crayfish – which, if present, will be translocated to areas upstream under licence from the NPWS.

Freshwater pearl mussel – which are not currently present in this section of the channel – but could potentially be washed in between completion of this EIAR and commencement of construction.

Following these surveys, an instream works area will be created by lifting 1 tonne bags of sand into the river to create a horseshoe shaped cofferdam that encloses no more than half the river at any one time – allowing passage of fish etc to continue (if the river is not dry). The sand bags will be double bagged, with the inner bag being sealed.

Whilst it is proposed to carry out these works in a period when the river is dry, if it is undertaken at low water, the cofferdammed area will be electro-fished under licence from the IFI prior to dewatering.

If dewatering is required, a submersible pump will be used to pump waters to land at a distance of over 30m from the River Deel. At this point, it will be discharged to ground via a silt bag and to a constructed discharge point as described above (and shown on Plate 5.16).

The gravels, cobbles and boulders from the riverbed will be removed from the instream works area as required and stored within the terrestrial works area.

The base for the culverts will be constructed with all the same best practice requirements for the use of concrete as described above and adhered to.

The centre culverts will be installed at a level below the existing bed of the river and the gravels and cobbles replaced and reinstated.

The culverts installed in the initial phase of the works will be set at a lower invert than the subsequent phase (second half of the river). This will allow any flows that may be in the river at the time of the works to be directed through the recently constructed culvert, whilst the second half of the river is cofferdammed and the culverts installed in that section.

Wing walls will be constructed on the banks at either side of the culverts. These will either be constructed of reinforced concrete or sheet piles.

The terrestrial works area will then be reinstated by re-seeding with native grass seed and the planting of native tree species including grey willow and alder on the banksides and hazel on the areas that are higher up the bank.

In order to take advantage of periods when the river runs dry in advance of completion of the diversion channel, it may be beneficial to complete the base for the flow control structure. If this is the case, the procedure as outlined above will be followed, the in-channel excavations undertaken and the gravels and cobbles replaced. This will minimise the works that will be required during a later construction and has the potential to take full advantage of periods when the river runs dry.

During all works, the same pollution prevention measures and monitoring of turbidity within the river with sondes as described above in relation to the intake structure, will be undertaken.

1.6 CONSTRUCTION COMPOUND

The proposed works will require a number of site compounds throughout the construction phases. Any compounds will be located within the identified works area but may move to accommodate different elements of the works. All compound locations will meet the following requirements:

The compound will be surfaced with a hard standing to prevent the un-necessary generation of mud.

A silt fence will be erected on all sides to prevent any run off from the perimeter.

The compound will be adequately buffered from the River Deel (and River Moy SAC) to prevent any run off of surface waters to any sensitive environment.

All materials stored within the compound will be appropriately covered and stored to avoid run-off or pollution. There will be no storage of materials outside the confines of the defined storage compound.

The site compound will be located in an area that is not susceptible to flooding.

Monitoring

The construction works will be monitored at several levels of seniority as described below to ensure that the environmental best practice prescribed in this document is fully adhered to and is effective. The following system will be put in place to ensure compliance.

The contractor will assign a member of the site staff as the environmental officer with the responsibility for ensuring the environmental measures prescribed in this document are adhered to.

All operatives working on the site will be made fully aware of the environmental responsibilities, conditions and requirements along with a full description of the methods to be employed. This information will be imparted at a dedicated site induction prior to commencing work on the site.

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 and that the project team will take corrective action if necessary.

The construction management team will be regularly monitoring the works and will be fully briefed and aware of the environmental constraints and protection measures to be employed.

Whilst the works to construct the channel will be ongoing over a long period and will involve only works a relatively small area at any one time, the site will be visited by a suitably qualified ecologist (ECoW) on a weekly basis. An audit of the works will be undertaken during these weekly visits and it will be ensured that the prescribed methods are employed. Any potential impacts additional to those predicted will be highlighted and if necessary, additional measures put in place to prevent them. Any deviance from the agreed methodology will be highlighted and if necessary rectified.

Sondes will be put in place in the River Deel upstream and downstream of the works area and also in the Mullenmore Stream. These will continuously measure turbidity from the time that the scheme is confirmed and will gather baseline data from the river prior to any works commencing. They will continuously measure turbidity throughout the construction period. If there is a 20% or greater difference between upstream and downstream turbidity, an alarm will sound and a message will be sent to the site foreman and the ECoW. Works will be ceased until the cause of the difference is identified and (if it is associated with the works) rectified

The works associated with the construction of the flow control structure and site set up for the intake structure will require full time, on-site supervision from the ECoW. The other elements of the works will be overseen by the ECoW but will involve regular inspections and audits throughout the construction phase.

The ECoW will be responsible for:

- Ensuring that the works are carried out in accordance with the approved method statements.
- Highlighting and discussing any deviance from the agreed plan. Deviances will be agreed with the relevant authorities and the project team in advance of adoption.
- Taking water samples and turbidity readings as appropriate. Discussing works and preparations with the site staff to ensure that works can be completed as per agreed method statements.
- Stop works if there are any significant effects on the River Deel as a result of pollution or changes to the flow or danger of inundation of the works area.

1.7 AUDITING

Environmental audits will be carried out during the construction phase of the project. In contrast to monitoring and inspection activities, audits are designed to shed light on the underlying causes of non-compliance, and not merely detect the non-compliance itself. In addition, audits are the main means by which system and performance improvement opportunities may be identified. Environmental audits will be carried out by the OPW. It is important that an impartial and objective approach is adopted. Environmental audits will be conducted at planned intervals to determine whether the OCEMP is being properly implemented and maintained. The results of environmental audits will be provided to project management personnel.

1.8 ENVIRONMENTAL COMPLIANCE.

The following definitions shall apply in relation to the classification of Environmental Occurrences during construction:

- **Environmental Near Miss:** An occurrence which if not controlled or due to its nature could lead to an Environmental Incident.
- **Environmental Incident:** Any occurrence which has potential, due to its scale and nature, to migrate from source and have an environmental impact beyond the site boundary.
- **Environmental Exceedance Event:** An environmental exceedance event occurs when monitoring results indicate that limits for a particular environmental parameter (as indicated in the Environmental Monitoring Programme) has been exceeded. An exceedance will immediately trigger an investigation into the reason for the exceedance occurring and the application of suitable mitigation where necessary. Exceedance events can be closed out on achieving a monitoring result below the assigned limit for a particular environmental parameter.
- **Environmental Non-Compliance:** Non-fulfilment of a requirement and includes any deviations from established procedures, programs and other arrangements related to the EMP.

1.9 CORRECTIVE ACTION PROCEDURE

A corrective action is implemented to rectify an environmental problem on-site. Corrective actions will be implemented by the Construction Manager, as advised by the Site ECoW. Corrective actions may be required as a result of the following:

- Environmental Audits;
- Environmental Inspections and Reviews;
- Environmental Monitoring;
- Environmental Incidents; and,
- Environmental Complaints.

A Corrective Action Notice will be used to communicate the details of the action required to the main contractor. A Corrective Action Notice is a form that describes the cause and effect of an environmental problem on site and the recommended corrective action that is required. The Corrective Action Notice, when completed, will include details of close out and follow up actions.

If an environmental problem occurs on site that requires immediate attention direct communications between the Construction Manager and the ECoW will be conducted. This in turn will be passed down to the site staff involved. A Corrective Action Notice will be completed at a later date.

1.10 CONSTRUCTION PHASE PLAN REVIEW

The Outline CEMP will be updated and reviewed prior to commencement of construction, and also every six months thereafter during the construction phase of the project.

2. EMERGENCY RESPONSE PLAN

An Emergency Response Plan (ERP) is presented in this section. It provides details of procedures to be adopted in the event of an emergency in terms of environmental protection.

2.1 EMERGENCY RESPONSE

The Emergency Response Plan (ERP) provides details of procedures to be adopted in the event of an environmental emergency. The site ERP includes details on the response required and the responsibilities of all personnel in the event of an emergency. The ERP will require a weekly review and may require updating and submissions from the contractor/PSCS and suppliers as the project progresses. If sub-contractors that are contracted on site are governed by their own emergency response procedure a bridging arrangement will be adopted to allow for inclusion of the sub-contractor's ERP within this document.

2.2 ROLES AND RESPONSIBILITIES

The chain of command during an emergency response sets out who is responsible for coordinating the response. The Site Manager will lead the emergency response which makes them responsible for activating and coordinating the emergency response procedure. The other site personnel who can be identified at this time who will be delegated responsibilities during the emergency response are presented in Plate 5.17. In a situation where the Site Manager is unavailable, the responsibility will be transferred to the next person in the chain of command outlined in Plate 2.1. This will be updated throughout the various stages of the project.

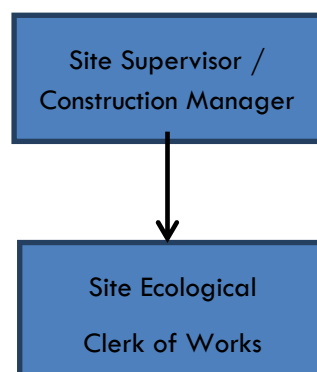


Plate 2.1 Emergency Response Procedure Chain of Command

2.3 SPILL CONTROL MEASURES

Every effort will be made to prevent an environmental incident during the construction and operational phase of the proposed project. Oil/Fuel spillages are one of the main environmental risks that will exist at the site which will require an emergency response procedure. The importance of a swift and effective response in the event of such an incident occurring cannot be over emphasised. The following steps provide the procedure to be followed in the event of such an incident.

- Immediately notify the ECoW immediately giving information on the location, type and extent of the spill so that they can take appropriate action.
- Simultaneously, stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers.
- If applicable, eliminate any sources of ignition in the immediate vicinity of the incident
- Contain the spill using the spill control materials, track mats or other material as required. Do not spread or flush away the spill.
- If possible, cover or bund off any vulnerable areas where appropriate such as drains, watercourses or sensitive habitats.
- If possible, clean up as much as possible using the spill control materials.
- Contain any used spill control material and dispose of used materials appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited.
- The ECoW will inspect the site and ensure the necessary measures are in place to contain and clean up the spill and prevent further spillage from occurring.
- The ECoW will notify the appropriate regulatory body such as OPW, Mayo County Council.
- Environmental incidents are not limited to just fuel spillages. Therefore, any environmental incident must be investigated in accordance with the following steps.
- The ECoW must be immediately notified.
- If necessary, the ECoW will inform the appropriate regulatory authority. The appropriate regulatory authority will depend on the nature of the incident.
- The details of the incident will be recorded on an Environmental Incident Form which will provide information such as the cause, extent, actions and remedial measures used following the incident. The form will also include any recommendations made to avoid reoccurrence of the incident.
- If the incident has impacted on an ecologically sensitive receptor, such as a sensitive habitat, protected species or designated conservation site (SPA or SAC), the ECoW will liaise with the Project Ecologist.
- A record of all environmental incidents will be kept on file by the ECoW and the Main Contractor. These records will be made available to the relevant authorities such as the OPW or Mayo County Council.
- The ECoW will be responsible for any corrective actions required as a result of the incident e.g. an investigative report, formulation of alternative construction methods or environmental sampling, and will advise the Main Contractor as appropriate.

2.4 FLOOD RESPONSE MEASURES

- The ECoW and site staff will monitor the weather forecasts on a daily basis.
- The works will be undertaken at a time of year when flooding is least likely to occur – based on available data.
- If a heavy rainfall event is forecasted by Met Eireann within the River Deel catchment area, that may result in a flow of higher than the Q50 at the site of the proposed development, the works shall be ceased.
- All machinery and materials will be removed from the site in advance of any flood event.
- No potentially polluting works will be undertaken in areas that are liable to flooding during periods of high rainfall or high water levels. The sand bag dam will also be removed from the river in advance of any potential flood and replaced following any flood event.

3. GENERAL CONSTRUCTION SITE ENVIRONMENTAL MANAGEMENT

The following measures will be employed during the construction process to prevent the occurrence of negative impacts on the environment occurring as a result of the proposed works

3.1 GENERAL SITE MAINTENANCE

- All construction activity and storage associated with the main phases of development will take place within the defined site areas and construction compound as described above.
- There will be no storage of materials or construction activity outside the confines of the defined storage compound.
- All substances and materials used in construction will be stored in a suitable storage compound within the construction site. Where necessary materials will be covered and banded.
- The construction site will be kept free from litter and debris. It will be cleared daily with any detritus removed to skips that separate all recyclable and waste materials.
- All trucks leaving the site will be checked to ensure that they have clean wheels and if the site becomes dirty with trucks fouling the access road, a wheel wash will be installed to prevent this.
- Dust prevention measures will be put in place as necessary throughout the site. These will include the use of dampening sprays, covering of dusty areas with stone and covering of stored loose material.
- No works will be undertaken between 6pm and 8am to minimise the potential for disturbance to fauna.

No artificial lighting will be required in the works areas close to the River Deel or any other areas of ecological sensitivity. It may be required within the construction compound but will not be focused onto any areas of ecological sensitivity.

3.2 HYDROCARBON USAGE

The use of plant and machinery on the construction site creates the potential for hydrocarbon pollutants to issue from the site and contaminate the wider environment. The following measures will be put in place to avoid the occurrence of any adverse impacts resulting from the use of hydrocarbons on the site.

- All plant and machinery will be kept in good condition and checked regularly for oil/fuel leaks.
- It is unlikely that large volumes of fuel will be stored on the site but any storage bowers will be adequately banded or double skinned and kept in secure areas within the site.
- Refuelling will take place in a defined refuelling location and a drip tray will be used on all occasions.
- Vehicles will never be left unattended during refuelling operations.
- All hoses, nozzles, valves will be locked into the off position when not in use
- A hydrocarbon spill kit will be on site at all times for use in the case of emergency. This will include absorbent pads, oil containment booms and other items for the clean-up and containment of spills.
- A plan will be in place for dealing with spillage events.

3.3 WASTE DISPOSAL

The works on the site will result in the production of construction waste material. This could lead to pollution of the environment if removed to a location that could impact on ecologically sensitive habitats.

- Any waste material arising will be removed to a permitted waste facility.

4. OPERATION AND MAINTENANCE

4.1 INTAKE AND FLOW CONTROL STRUCTURE

Operational requirements of the intake structure and flow control structure include an inspection regime to ensure that there is no deterioration in their structural integrity or operational function, which may occur over time and that the adjustable element is functioning correctly. It is expected that the structures will be relatively maintenance free otherwise. In the unlikely event that repair works are required, any such works will be the subject of individual ecological impact assessment and Screening for Appropriate Assessment (possibly full AA depending on the nature of required works).

There will be the requirement to remove deposited material from the river channel between the intake structure and the flow control structure on a periodic basis. This will be undertaken using an excavator to remove any accumulated gravels. All works will be undertaken during periods when there is no flow in the River Deel. Any gravel deposits will be topped so as not to result in any effect on low or normal flows within the river. A low flow channel will always be retained. Any gravels that require removal, will be made available to the IFI for fisheries enhancement works elsewhere within the River Deel and will be stored on the site for this purpose. Any works carried out by the IFI using these gravels will be the subject of their own separate ecological and environmental assessments. No works within the wetted channel of the River Deel will be necessary.

The bankside vegetation adjacent to the intake weir will be maintained at a low level. This will be undertaken using a strimmer on a periodic basis. No in-stream works will be required.

4.2 BYPASS CHANNEL

In general, the management of the bypass channel will involve the mowing of the grass within it using a tractor and mower to prevent scrub encroachment. The scheme requires that this will be undertaken on an annual basis so that scrub does not start to develop within the channel. The native hedges that surround the channel will also be trimmed. The hedge trimming will be undertaken outside the bird nesting season and will involve the use of a tractor and flail.

The diversion channel will be sown with a wild flower/pollinator friendly seed mix in all areas except the very base of the channel where, the erosive forces may require a tough, resistant sward. The grass will be cut in September of each year, and if necessary, in March. All cut material will be removed from the site (as hay). No fertiliser will be applied to the grasslands within the diversion channel. An example of a

potentially suitable wild flower seed mix is the Esker Ridge/Burren Wildflower Seed Mixture EC08 available from Design by Nature (<http://www.wildflowers.ie>)

The following specific measures will be employed:

- Cutting will not take place before characteristic annual, biennial or short-lived perennial plant species which depend on seed production have set seed (for example yellow rattle (*Rhinanthus minor*). Sustained early hay cutting is known to reduce species richness in meadows (Smith 1994). For this reason, cutting will be undertaken in August of each year. This will also maintain their nature conservation value while also maintaining reasonable crop yields.
- Ensure an occasional late hay cut (late August/September) (e.g. 1 year in 5), where practical. This will promote late-flowering species such as devil's bit scabious (*Succisa pratensis*) (Crofts, and Jefferson, (eds), 2009).
- Late cutting of grassland will also benefit ground nesting bird species such as meadow pipit or skylark.
- Discourage machinery access to grassland when ground conditions are wet, otherwise rutting will occur which will damage the sward and create areas which could be invaded by undesirable species.
- Ensure hay bales are removed from the field within three-four weeks to avoid sward damage. Smaller bales coupled with lighter machinery are also preferable to avoid soil compaction (Crofts, and Jefferson, (eds), 2009). The removal of vegetation off the grassland will also help to impoverish the soil/ reduce nutrients and thereby suppress competitive grass species and enhance floral diversity.
- Grass cut each year will always be removed and not left to decay on site. Where vegetation is left on site, changes in the botanical composition of the grassland may ensue. Excess vegetation left on site may also suppress low growing species and reduce species-richness.
- There will be no use of herbicides or artificial fertilisers during the management of the meadow.

4.3 MAINTENANCE OF RIVER DEEL

The River Deel is currently included within the River Moy Drainage Maintenance Scheme from Lough Conn to the Jack Garrett Bridge in Crossmolina. It is currently managed by the OPW over this reach. Following the construction of the proposed scheme, the reach of the River Deel from between the Jack Garrett Bridge and just upstream of the proposed intake structure will be included within the River Moy Maintenance region. The OPW will manage the vegetation along this section of the river, following the construction of the proposed scheme to ensure that the current condition of the channel is retained.

Maintenance will involve periodic trimming of woody vegetation at the edges of the channel upstream of the bridge. This is designed to prevent riparian trees causing a narrowing of the channel, further deposition of silt and the danger of trees becoming dislodged and swept downstream and causing obstructions (particularly of the Jack Garrett Bridge) which could cause flooding. Management of riparian

trees is a standard procedure, undertaken by the OPW at numerous ecologically sensitive locations throughout the country. This section of the channel is currently maintained on an Ad Hoc basis (not by the OPW). However, following confirmation of the scheme, this will be carried out in line with OPW environmental protocols and will be the subject of AA Screening in advance of any such works.

The methods by which this work will be completed are described below:

- During the vegetation clearance works associated with the scheme (as described above). The riparian trees within the channel will be assessed and any trees that are likely to fail under flood conditions will be removed to ground level (coppiced).

In addition, any low branches that are shown to be gathering trash or compromising river flow during high water will be removed to reduce obstruction to conveyance of water and to prevent the further deposition of silt within the river channel. Following preliminary inspections undertaken, it is anticipated that the majority of the trees will be retained and the overall vegetation structure will remain similar to the existing situation.

- There will be no significant changes to the level of shading along the channel with continued dappled shading of the channel.
- Works will be carried out on foot using chainsaws or from the roadside using tree shears. There will be no requirement for machinery to track in the riparian area. No in-stream works as part of this maintenance works (all works will be carried out at low water).
- Ongoing maintenance of the riparian vegetation will include rotational coppicing of (mainly) Grey Willow to prevent any trees becoming sufficiently large to become unstable in a flood situation and to prevent low branches from trapping silt or slowing the conveyance of water to a large extent. This will be undertaken without the tracking of machinery in the riparian area and without the requirement for in-stream works. All cut material will be removed from the site.
- Continuous cover of riparian vegetation will be retained through rotational management and root systems will be retained to prevent soil from becoming destabilised and allow for vigorous and fast re-growth.

5. INVASIVE SPECIES MANAGEMENT PLAN

The invasive alien species, Japanese Knotweed (*Fallopia japonica*) was identified on the site of the proposed flood defence scheme. Three small strands were recorded within the footprint of the proposed works. Two are located close to the proposed bridge over the R315 (Grid Ref: E 114073, N 316814 and E 113984, N 316796). These measured approximately (13sqm. and 7sqm.). The third area is located in the vicinity of the intake structure (Grid Ref: E 114073, N 316814). All stands are shown on Figure 5.1. No



- Map Legend**
- Invasive species
 - Japanese Knotweed
 - Japanese Knotweed 7m Buffer
 - Indicative knotweed bund location
 - Washlands Extent
 - Temporary Construction Works Area
 - Permanent Works Area

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Invasive Species Map

Project Title: Crossmolina Flood Relief Scheme

Drawn by: JOS	Checked by: PR
Project No: 120211-a	Figure No: 6.1
Scale: 1:4000	Date: 25.06.2020

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other invasive species were recorded within the works area although a stand was recorded in the washlands at Grid Ref E 114338, N 316530, but will not be affected by the proposed works.

There follows a comprehensive plan for the treatment of this species within and surrounding the site of the proposed works in accordance with guidelines set out in the 'the Irish Water guidelines, (Irish Water Report, Information and Guidance Document on Japanese Knotweed Asset Strategy and Sustainability)'. These are hereafter referred to as 'the guidelines'

- A Pre-construction invasive species survey will be undertaken at the site of the proposed flood relief scheme.
- In advance of any works being carried out on the site of the proposed flood relief scheme, any invasive species that occur within the identified works area will be subject to treatment with a non-persistent glyphosate herbicide. This will be undertaken at the end of the growing season (late August – September) and the method of application and chemical formulation will be agreed with all relevant stakeholders prior to application and treatment. Some of the stands are currently being treated in advance of any works.
- Treatment will be undertaken from hand held sprayers and will avoid the potential for spray drift into other areas.
- It is intended that these advance works will weaken the plant in advance of the construction works that are proposed as part of the flood defences.
- The stand that is within the washlands is not within the footprint of the proposed development and will not be affected by the construction of the project. It will be subject to continued treatment on an annual basis until it is eradicated.
- In all areas where Japanese Knotweed has been identified within the footprint of the proposed works (including areas within 7 metres of recorded stems) will be fenced off and included within the Knotweed Management Plan.
- Knotweed and infested soil will be excavated from its current location and removed to a containment bund within the works area for ongoing treatment. The location of this bund is shown in Figure 5.1.
- The following procedure will be followed to safely and legally remove the Knotweed from its current locations to the bund:
 - The ECoW will supervise any operations within the fenced exclusion zones and will assess whether or not soil is contaminated.
 - Excavators will be used to load waiting trucks with Knotweed and infested soil. These will transport the infested material to the bund within the works area.
 - The loading of each truck will be undertaken on a surface that can be easily cleaned (such as a radon barrier) and will be inspected by the ECoW and if necessary brushed down before departure to ensure that there is no knotweed present on the outside of it.
 - The excavation will be overseen by a suitably qualified ecologist and will involve the excavation of the Knotweed and associated rhizomes. The ecologist will inspect the excavated area following removal and will determine whether all rhizomes have been removed. Once satisfied, the sites will be declared free from Knotweed.
 - All excavation machinery will be thoroughly cleaned and disinfected prior to leaving the section of the proposed works that is subject to the Knotweed Management Plan.

- Following completion of the construction and reinstatement, the site will be sown with grass seed mix and allowed to quickly re-vegetate.
- Follow up surveys will be undertaken for at least three years following the construction to ensure that these small stands are completely eradicated.
- The containment bund will be constructed using the following methodology:
- Following the pre-commencement invasive species surveys the potential volume of contaminated material to be moved, will be identified (this will include the location of the identified stands plus the 7metre radius surrounding them and a depth of 3m. It is unlikely that this amount of space will be required but a worst case scenario will be assumed at the outset.
- A containment bund will be constructed by scraping back the topsoil and creating earth berms to surround the bund. The bund will be no more than 1.5m deep. The location of the bund is shown on Figure 5.1.
- The bund will be covered with a layer of soft sand, then lined with root barrier membrane, which will extend over the sides of the bund.
- Contaminated material will be tipped into the bund and the containing vehicles washed or brushed out before leaving the containment area.
- Care will be taken not to damage the root barrier membrane when filling the bund with no driving on exposed membrane permitted.
- Once full, the bund will be fenced and appropriate signage placed on it to warn of its contaminated nature.
- Any regrowth will be treated with glyphosate herbicide for a period of at least three years following creation of the bund. This will be applied annually in late summer or early autumn for maximum effect.
- Following a period of three years, or when there is no regrowth, the bund will be rotovated. Any Knotweed that is exposed and starts to grow following this procedure, will be treated until none remains within the bund.
- Any machinery or personnel used to undertake this procedure will follow strict biosecurity procedures before leaving the site and will be thoroughly cleaned.

5.1 BIOSECURITY

All plant, machinery and equipment will be thoroughly cleaned and disinfected using Virkon 1% biocide prior to arrival and departure from the site to prevent the spread of invasive species such as Asian Clam, Zebra Mussel, Crayfish plague.