# BALLINA FLOOD RELIEF SCHEME

## Chapter 22: Schedule of Environmental Commitments

MGW0290-RPS-EI-XX-R-EN-2200
Ch 22 Schedule of Environmental Commitments
S4.P03
April 2025

## Document status

| Version | Purpose of document | Authored by | Reviewed by | Approved by | Review date |
|---|---|---|---|---|---|
| S5 | Final for Submission | RPS | KM | PJG | April 2025 |

## Approval for issue

| | |
|---|---|
| PJG | 4 April 2025 |



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## Tables

# ACRONYMS

| Terms | Meaning |
|---|---|
| BPM | Best Practicable Means |
| CEMP | Construction Environmental Management Plan |
| CMS | Construction Method Statements |
| CTMP | Construction Traffic Management Plan |
| EC | European Commission |
| ECoW | Ecological Clerk of Works |
| EIAR | Environmental Impact Assessment Report |
| ERP | Emergency Response Plan |
| GGBS | Ground Granulated Blast-furnace Slag |
| GPR | Ground Penetrating Radar |
| GWDTE | Groundwater Dependant Terrestrial Ecosystem |
| HSA | Health and Safety Authority |
| HV | Heavy Vehicle |
| IAA | Irish Architectural Archive |
| IAPS | Invasive Alien Plant Species |
| IASMP | Invasive Alien Species Management Plan |
| IFI | Inland Fisheries Ireland |
| LHS | Left Hand Side |
| MCC | Mayo County Council |
| NPWS | National Parks and Wildlife Services |
| NSL | Noise Sensitive Locations |
| OPW | Office of Public Works |
| PRF | Potential Roost Features |
| RHS | Right Hand Side |
| SS | Suspended Solids |
| WMP | Waste Management Plan |

# GLOSSARY

| Term | Meaning |
|---|---|
| Annual Exceedance Probability (AEP) | The percentage Annual Exceedance Probability, or 'AEP' represents the probability of an event of this, or greater, severity occurring in any given year. For example, a 1% AEP flood event has a 1%, or 1 in a 100, chance of occurring or being exceeded in any given year. |
| Annual Environmental Report (AER) | As part of the EPA's Waste Licence an Annual Environmental Report (AER) is formulated that collates and reports all monitoring data each year. A comparative assessment is made with the data from previous years. This report is also to be submitted to the EPA. |
| Best Available Techniques (BAT) | This is the most effective technique available to a particular industry sector to achieve a high general level of protection of the environment. |

# 22 SCHEDULE OF ENVIRONMENTAL COMMITMENTS

This chapter of the Environmental Impact Assessment Report (EIAR) summarises potential impacts of the Proposed Scheme and displays a summary of mitigation and monitoring commitments (environmental commitments) provided within **Chapters 6-19**. Full details of the various commitments should be obtained by reference to the EIAR individual chapters.

## 22.1 Traffic and Transportation

The environmental impacts and associated commitments provided in **Chapter 6: Traffic & Transportation**, are summarised in **Table 22-1**.

### 22.1.1 Construction Stage

**Table 22-1: Traffic and Transport Environmental Commitments Construction Stage**

| Location / Receptor | Description of Mitigation |
|---|---|
| **Traffic Diversions** | |
| Bachelors Walk works | • Lane closure along the River Moy for the duration of the works. Bachelors Walk will temporarily be a one-way street with a temporary traffic diversion via Nally Street and Arbuckle Row. |
| Barrett Street works | • Barrett Street will be closed temporarily to facilitate the works with a temporary traffic diversion via Tolan Street, O 'Rahilly Street and Bury Street (four weeks). An alternative parking along Barrett Street will be temporarily removed to facilitate the works.<br>• An alternative temporary parking area will be provided for the duration of the works as street parking will be removed for the duration of the works.<br>• The road closure will commence at the junction of Tolan Street and Barrett Street and ends at the junction of Water Lane and Barrett Street. Local vehicular traffic will be permitted to access the alternative temporary parking and the Ballina Manor Hotel resident carpark.<br>• Warning signage will be provided at Abbey Street (R294) and Cathedral Road, advising all Heavy Vehicles (HVs) to route via Emmet Street to avoid an excess of extra traffic using Tolan Street and subsequently Bury Street. |
| Ridgepool Road works | • The proposed temporary traffic management to facilitate works at Ridgepool Road will be a road closure of the one-way section of the road with a temporary traffic diversion via Wests Road, Plunkett Road and the R294 Regional Road.<br>• The two-way section of Ridgepool Road will have a lane closure along the River Moy with stop/go or temporary traffic signals for the duration of the works.<br>• Parking will be removed from along the riverside to accommodate the works. |
| Clare Street / Howley Terrace (N59 Sligo Road), Bunree Road and R294 | • Lane closure along the River Moy for the duration of the works. Clare Street / Howley Terrace will temporarily be a one-way street northbound with a temporary traffic diversion for southbound traffic via Bunree Road and R294 Regional Road.<br>• Junction priority at the intersection of Bunree road and R294 to be changed or controlled via Stop / go, traffic signals or vehicle controller as determined by the contractors TTM designer.<br>• To alleviate capacity issues, the lane closures on Cathedral Road and Clare Street should occur simultaneously, where possible. |
| Quignamanger Stream works (Creggs Road between Quay Road and Rathmeel Lawns) | • For the section of Creggs Road between Quay Road and Rathmeel Lawns, a section of Creggs Road will be closed with a temporary traffic diversion via Quay Road, Riverslade, Quignalecka, N59 National Road and Creggs Road.<br>• For the section of Creggs Road between Rathmeel Lawns and the Culvert Inlet, a section of Creggs Road will be closed with a temporary traffic diversion via Quay Road, Riverslade, Quignalecka, N59 National Road and Creggs Road.<br>• Access to local properties is to be maintained along Creggs Road. |
| Bunree/Behy Road Stream | • The proposed temporary traffic management to facilitate works at Behy Road comprise a lane closure along a section of Behy Road with stop / go or temporary traffic signal operation for the duration of the works. |

| Location / Receptor | Description of Mitigation |
|---|---|
| | • An advisory traffic diversion for through traffic will be northbound via L-10112 Local Road and Creggs Cross and southbound via L-51322 Local Road.<br>• Access to local properties is to be maintained along Behy Road. |
| Brusna (Glenree) River works | • The proposed temporary traffic management to facilitate works along Brusna (Glenree) River will be in two distinct sections.<br>• For the section of the Proposed Scheme along Brusna River at Shanaghy heights, the narrow access road will be closed for the duration of the works with a temporary access road / haul route required to maintain access to the local properties.<br>• For the section of the Proposed Scheme along the R294 Regional Road a lane closure along the Brusna River with stop/go or temporary traffic signals will be in place for the duration of the works.<br>• A potential traffic diversion for through traffic will be at Bonniconlon, northbound traffic via the L6612 Local Road and R297 Regional Road and southbound via The L1125 Local Road and N26 National Road. |
| **Temporary Traffic Management Measures** | |
| Cathedral Road | • The proposed temporary traffic management to facilitate works at Cathedral Road will be a lane closure along the Moy River for the duration of these works.<br>• Parking will be removed from along the riverside to accommodate these works. |
| Emmett Street | • Lane closure along the River Moy for the duration of the works.<br>• Parking will be removed from along the riverside to accommodate the works.<br>• Works on Emmett Street should not occur at the same time as of those on Barrett Street. |

### 22.1.2 Operational Stage

A new operation and maintenance programme will be agreed with the Office of Public Works (OPW) post construction works and implemented by MCC/agents on behalf of MCC for the completed Proposed Scheme. Traffic will arise during the operational and maintenance phase of the Proposed Scheme. The primary type of trips will be car and ad hoc Heavy Vehicles (HV) trips, which will not have significant impact on road width/capacity.

## 22.2 Human Health

The environmental impacts and associated commitments provided in **Chapter 7: Population** and **Chapter 8: Human Health**, are summarised in **Table 22-2** and

**Table** 22-3.

### 22.2.1 Construction Stage

**Table 22-2: Human Health Environmental Commitments During the Construction Phase**

| Location / Receptor | Description of Mitigation |
|---|---|
| All Locations | Fencing, signage, adherence to road safety guidelines, and other best practice measures |

**Table 22-3: Human Health Environmental Commitments During the Operational Phase**

| Location /Receptor | Description of Mitigation |
|---|---|
| All Locations | Best practise measures and legislation pertaining to health and safety will be adhered to by all maintenance staff. |

## 22.3 Aquatic Biodiversity

The environmental impacts and associated commitments provided in **Chapter 9: Aquatic Biodiversity**, are summarised in **Table 22-4**, **Table 22-5** and **Table 22-6.**

### 22.3.1 Construction Phase

**Table 22-4 Instream Timing Restrictions**

| Watercourse | Watercourse Reach and Type of Works | Timing restriction (Work Allowed) |
|---|---|---|
| Freshwater River Moy | Instream works (Ridgepool and Salmon Weir) | **Angling restriction**: No instream works allowed in Ridgepool before August 1st in Year 1, but as agreed with IFI, Ridgepool instream works can continue through Year 2 (subject to sea lamprey spawning habitat protection timing restrictions set out in **Table 22-5**).<br>**Sea lamprey spawning habitat protection restriction**: see details of bespoke timing restrictions set out in **Table 22-5** regarding instream works in the vicinity of Ridgepool Points RP2A and RP8 to RP8A<br>(see **Appendix 9.6** for locations). |
| Freshwater River Moy | Bankside works (no instream intrusion) | No timing restriction |
| Estuarine River Moy | Instream works downstream of N59 Lower Bridge, both banks. | No timing restriction: work occurs in Transitional Water and does not affect spawning / nursery waters |
| Estuarine River Moy | Works over or near water (not encroaching instream) adjacent to Cathedral Pool and downstream of N59 Lower Bridge | No timing restriction |
| Quignamanger | All instream works (culvert replacements). | May 1st to September 30th |
| Quignamanger | All works over or near water (flood wall construction along existing open section) | No timing restriction for works above water. |
| Bunree | All instream works for culvert replacement and installation | May 1st to September 30th |
| Brusna (Glenree) | All instream works (Rathkip/Shanaghy Bridge upgrade) | July 1st to September 30th |
| Brusna (Glenree) | Works over or near water (set back flood wall and embankment construction) | May 1st to September 30th |
| Tullyegan | All instream works (flood wall construction) | May 1st to September 30th |

**Table 22-5: Aquatic Biodiversity Mitigation Measures for the Construction Stage**

| Location / Receptor | Description of Mitigation |
|---|---|
| Invasive Species | • Personnel working instream will be aware of potential for presence of aquatic invasive species (including but not restricted to zebra mussel, crayfish plague) and strict biosecurity measures applied to any equipment used in the water.<br>• Check/Clean/Dry policy shall be applied. All equipment used for instream works shall be checked before leaving site and any plant or animal material/debris removed. Equipment shall then be cleaned.<br>• Biosecurity facilities shall be installed on-site prior to site works commencing within the site compound. Any personal protective equipment (PPE) machinery and equipment used during instream works for the construction shall be washed down and disinfected in this facility. It shall include facilities for wheel brushing, brushing down of vehicles, cleaning of footwear and other equipment prior to arrival on site and on leaving site. It shall also include an area where bushing can be directed into a dedicated and contained area. Washdown water shall not be allowed to enter surface water bodies. Vehicles leaving the site shall be inspected for any plant/animal material and cleaned down in the biosecurity containment area following the biosecurity procedures within the guidance documents below. Water shall not be abstracted from the River Moy for cleaning. A sign-off sheet shall be maintained by the Contractor to confirm cleaning.<br>• The disinfection protocol is set out in IFI Biosecurity Protocol for Field Survey Work (Caffrey, 2010) |
| **River Moy (Ridgepool)** | |
| 1. Timing Restrictions | • **Angling restriction:** No instream works allowed in Ridgepool before August 1st in Year 1, but as agreed with IFI, Ridgepool instream works can continue through Year 2 (subject to sea lamprey spawning habitat protection timing restrictions set out in this table).<br>• **Sea lamprey spawning habitat protection restriction:** see details of bespoke timing restrictions set out in table regarding instream works in the vicinity of Ridgepool Points RP2A and RP8 to RP8A (see **Appendix 9.6** for locations). |
| 2. Access ramp construction LHS in front of IFI Building | • The entire temporary access ramp must be comprised of materials that do not cause a constant leaching of suspended solids to the River Moy arising from scour and sediment wash-out owing to variable and at times elevated and swift, erosive flows. To achieve this the base of the access ramp will be constructed using a product such as Ridgeway (Kyowa) Rockbags: Rockbags in Europe and UK - Rockbags or a similar product (e.g., rock filled reno-mattresses) which delivers the same function and effectiveness. Rockbags are a type of flexible rock gabion that can be placed on top of each other to form a base, which could then have a surface of, for example, temporary steel access ramps placed atop to form the access ramp, precluding any requirement for hardcore material with fines that would otherwise be subject to sediment wash-out. Because the access ramp needs to be in place for 20-22months, a robust, non-erodible solution such as this is required as the construction is within the SAC and adjacent to an iconic angling pool.<br>• Use of rock bags (or product of similar function and effectiveness in terms of being non-erodible) will also protect the composition of underlying benthic substrates, such that when the access ramp is removed the overlying bags can be lifted, leaving substates largely unaltered in terms of sediment size class to recolonise with algae and aquatic mosses similar to baseline conditions. |
| 3. Potential Sea lamprey spawning habitat protection at Sites RP2A and RP8-RP8A (see Appendix 9.6) | • Although there are no potential lamprey spawning habitats directly affected by the temporary works areas in the Ridgepool (see **Appendix 9.6**: Ridgepool Instream Survey), on a precautionary basis there are two discrete areas (Sites RP2A and RP8-RP8A, see locations in Appendix 9.6) in proximity to the outer margins of the proposed temporary instream works areas on both banks that are subject to precautionary restrictions / mitigations set out here. This is because sea lampreys are mobile and opportunistic and will construct redds in suitable substrates, subject to the actual low flow wetted channel characteristics during spawning season of any year. |

| Location / Receptor | Description of Mitigation |
|---|---|
| | • It is crucial to take advantage of low flows in the Ridgepool during the construction programme to carry out instream works for wall repairs on the RHS (Ridgepool Road) quay walls which are badly eroded and collapsing at the base. Doing these works during low flows will greatly decrease the risk of pollutant washout from works areas and avoid delays to the overall work programme.<br>• **In Year 1 (Y1):** cofferdams will not be placed between points RP8 and RP8A (RHS) and the access ramp will not be laid adjacent to point RP2A (LHS) before end of Week 2 of August Y1 – this only applies to these specific reaches as an extreme precaution to allow for any late spawned sea lamprey eggs to hatch. Other instream works downstream of these points can commence in Ridgepool on August 1st in Y1.<br>• **In Year 2 (Y2):** The access ramp (LHS) remains in-situ through Y2 with no additional lateral incursion into the Ridgepool. Works will continue on the LHS using the access ramp and the cofferdam containment area. On Ridgepool Road (RHS), instream works downstream of Point RP8A can continue or commence at any time in Y2. However, as a precaution, if works were not completed between RP8 and RP8A between mid-August of Year 1 and the 1st of May in Year 2, then there are two options for placement of cofferdams along the reach that covers RP8 and RP8A on Ridgepool Road (RHS):<br>• **OPTION A (RHS, Y2):** Cofferdams that include the reach RP8 to RP8A must be placed during mid-April, as this is before water temperature reaches 15oC in the Ridgepool and no sea lamprey spawning will have been initiated (see Appendix 9.6). Water temperature must be taken by the ECoW to ensure it is below 15$^{o}$C. Once the cofferdam id laid in April, any lamprey that then select to nest adjacent to the cofferdam will do so in May / June /July once temperatures reach 15$^{o}$C, and they will not be subject to direct disturbance during spawning. Prior to removal of cofferdams – if this occurs before mid-August - a qualified, experienced aquatic ecologist or fisheries scientist will be employed to SCUBA or snorkel survey the outer edge of the 5m temporary works cofferdam footprint. This will occur during mid-to-high tide when snorkelling over the area is possible because depth will be more suitable without undue disturbance to any lamprey that are present. If there are no redds or lamprey nest building activity observed by the surveyor, then the temporary cofferdam can be removed immediately and without delay. If there is lamprey nesting building activity or redds observed then cofferdam removal along the reach will be delayed until the end of Week 2 of August Y2, to avoid disturbing nests prior to egg hatching and larval emergence.<br>• **OPTION B (RHS, Y2):** If cofferdams cannot be placed in April of Y2, then there can be no laying of cofferdams later than the last week of April (subject to water temperature being below 15oC) unless a qualified, experienced aquatic ecologist or fisheries scientist is employed to SCUBA or snorkel survey the outer edge of the 5m temporary works footprint in the days before proposed cofferdam placement, i.e., in May June or July. Instream survey will occur during mid-to-high tide when snorkelling over the area is possible because depth will be suitable without undue disturbance to any lamprey that do happen to be present. If sea lamprey nest building / spawning activity is recorded on the outer edge of the proposed 5m temporary work area, then the cofferdam placement will be delayed in that defined reach (encompassing RP8-RP8A) for one month to allow for hatching and emergence of larval lampreys. After that month has passed, another SCUBA survey must be carried out and once again: (1) in the absence of lamprey redd(s) and/or nest building activity the cofferdam can immediately be installed, or (2) if lamprey redd(s) and/or nest building activity is occurring, works must be delayed in that defined reach for a further month. If works have not been achieved because of these restrictions, then the final SCUBA / snorkel survey shall occur in the third week of July in Year 2, at which time, if sea lamprey spawning activity is absent then the cofferdam can be installed immediately with no further timing restriction. If sea lamprey nesting activity was still recorded in the third week of July, the cofferdam installation must be delayed until the end of the 2nd week of August of Y2 between RP8 and RP8A to allow for any late emergence of larval lampreys.<br>• Whilst the above timing restrictions appear laborious, they protect sea lamprey, whilst allowing for the possibility of completing critical instream repairs to the Quay Walls on the Ridgepool Road (RHS) during the low flow period in the River Moy. This will greatly reduce the potential for adverse effects that could arise from |

| Location / Receptor | Description of Mitigation |
|---|---|
| | unexpected inundation of cofferdams by floods, since flooding has a lower probability of occurring May-July inclusive.<br>• Records of the exact location and number of sea lamprey and/or redds observed in the above surveys shall be kept and submitted to NPWS and IFI. |
| 4. Wildlife rescue and relocation on groyne area - Ridgepool LHS | • 1-tonne sandbag cofferdams (if required) must be placed in the channel on low tide.<br>• Once in place the cofferdam shall be sealed on a low tide as this will reduce water volume and decreases probability of fish entrapment.<br>• Once sealed, electrofishing will be conducted within the cofferdam under approval and supervision of IFI staff (subject to licence and agreement with IFI Ballina). Any rescued fish shall be temporarily held in containers of clean, well-oxygenated river water or immediately transferred to the outside of the cofferdam. |
| 5. Protection of lamprey nursery habitat - Ridgepool LHS at Site RP5 | • The stand of emergent reeds (*Sparganium erectum*) in front of Ballina Manor Hotel at Site RP5 (see **Appendix 9.6**) will be cordoned off marking the area as an exclusion zone.<br>• A double line of silt fencing will be installed on the landward side of the emergent reed stand, extending all the way along the existing grassed bankside verge to prevent sediment loss from the access ramp and bankside works zone.<br>• The ECoW will conduct a toolbox talk explaining the presence of larval lampreys and the importance of protecting the RP5 area from disturbance. |
| 6. Wildlife rescue and relocation – larval lampreys Ridgepool RHS at Site RP11 | • If possible, repairs to the river walls will be carried out without the use of instream cofferdams (i.e., using scaffold or platform from the footpath above) in which case the marginal sediment deposit on Ridgepool RHS between RP11 and the Upper Bridge: (see **Appendix 9.6**) will be treated as an exclusion zone (no disturbance).<br>• If instream works are required in the vicinity of Site RP11, the sandbag cofferdam will be installed and sealed at low tide to help prevent fish entrapment.<br>• Electrofishing will then be conducted by either IFI Ballina staff or by a qualified aquatic ecologist (Level 9 or higher) with electrofishing experience, licenced and under supervision by IFI staff. The aquatic ecologist will remain onsite during the initial pump-out and water draw down inside the cofferdam to observe any sign of lamprey ammocoetes that may emerge from silt accumulations in the RP11 to Upper Bridge reach.<br>• Larval lamprey shall be captured by hand or pond net and temporarily be kept in a bucket of clean river water then transferred immediately outside of the cofferdam where they will move downstream and settle in suitable silt deposits which are widely available downstream of the Lower Bridge.<br>• The ECoW will be present for the dewatering and records of type / number of trapped and released fish shall be kept by the ECoW.<br>• The first pass of any earthmoving activity within the Ridgepool RHS RP11 to Upper Bridge cofferdam shall involve the digger removing the top layer of marginal silt to a depth of about 30-50 cm and spreading it out on a patch of the dewatered work zone so that lamprey ammocoetes can be collected and released. Juvenile lamprey will quickly re-burrow into suitable substrates once relocated (King, et al., 2008) |
| 7. River margin reinstatement prior to cofferdam removal – Ridgepool RHS (Ridgepool Road) and LHS on “groyne” area adjacent to Otters Lodge Apartments | • If there are excavations to be carried out within the cofferdams, the top 30 cm of naturally occurring substrates will be scraped off and stockpiled for reinstatement before cofferdam removal. These substrates shall also be used to gauge the size of replacement substrate material for reinstatement works prior to cofferdam removal. Thus, reinstated substrates will be of the same size classes as the pre-existing condition and will facilitate sediment deposition patterns equal to baseline for regrowth of aquatic plants at the river margin.<br>• Prior to removal of cofferdams on the RHS of the Ridgepool the river margin areas must be reinstated inside the cofferdam using a combination of the retained substrates (as above) and locally sourced, clean, calcareous substrates of cobble that is approved by IFI and that broadly mimic the naturally occurring substrates. IFI carry out other river improvement works in the catchment using locally sourced cobble / gravel materials and as such they are 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. |

| Location / Receptor | Description of Mitigation |
|---|---|
| | • Prior to removal of cofferdams on the LHS of the Ridgepool, the 'groyne' area must also be reinstated inside the cofferdam (and within the proposed realigned 'groyne' outline) using approved, locally sourced, clean, calcareous cobble and pebble that is approved by IFI and that broadly mimics the naturally occurring substrates. 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.<br>• Reinstatement within the cofferdam shall match the profile of the bed level on the outside of the cofferdam, and at the upstream and downstream ends, such that there is no significant step-change in lateral or longitudinal riverbed profile.<br>• Cofferdams shall be removed beginning downstream and working in an upstream direction beginning at low tide and working through to the high tide to slowly submerge the newly reinstated river margin areas. This is to avoid wash-out of newly reinstated substrates owing to strong river flows from the upstream end at low tide. The ECoW will be responsible for ensuring implementation of the above reinstatement measures for the River Moy channel margins within the Ridgepool in conjunction with IFI Ballina. |
| 8. Management of ingress water (Cofferdams on the River Moy) | • Cofferdams will be carefully managed On-site pumps must be present to dewater, as required, at cofferdam containment areas to maintain a dry working area. These areas will inevitably be subject to water ingress.<br>• Pumped-out ingress water must not be directly discharged to either the River Moy or any adjoined drainage channels, unless treated before discharge.<br>• In the absence of appropriate treatment, pump-out water must also not be directly discharged to the general environment at any other location.<br>• On-site storage facilities for pump-out water (e.g., proprietary sedimentation tanks) must be of sufficient volume to hold the volumes of pump-out water encountered, and tank volume should be overcompensated by 10% so as to ensure adequate containment capacity, thus avoiding spills and overflows to the river.<br>• 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.<br>• "Appropriate treatment" means attenuation and treatment that ensures discharge water does not exceed 25 mg/l suspended solids and must be within the pH bracket of ≥ 6 ≤ 9 (related to concrete usage. |
| Effects of bulk liquid concrete usage on aquatic receptors (if leakage or spillage occurs) | • At the new fishing access area on Ridgepool Road at Weir Building, where possible, pre-cast units will be used, e.g., steps, and pre-cast slabs. Any cast in-situ concrete usage will be carefully managed using Best Practice. Concrete materials cast in place will remain inside sealed formed structures until set.<br>• It will be ensured that no concrete, cement, mortars, and other Portland cement, concrete debris and dust, wash or contact water enters any surface water.<br>• Concrete delivery trucks will be washed-down at designated containment areas in the site compound and never to the river. Concrete wash-down water will be removed for disposal at a licenced facility. |
| **River Moy (Downstream of Lower Bridge - N59 crossing)** | |
| Timing Restrictions | • No timing restrictions on instream works as habitats are within the transitional water. |
| Wildlife rescue and relocation – larval lampreys LHS River Moy downstream of Lower Bridge (N59 crossing) | • If possible, repairs to the river walls will be carried out without the use of instream cofferdams, i.e., using the space available on the berms inside the existing river walls.<br>• In the 120m LHS reach downstream of the Lower Bridge adjacent Bachelors Walk cofferdams are likely to be required as the berm is narrow and the Knockanelo culvert meets the Moy.<br>• 1-tonne sandbag cofferdams (where required) must be placed in the channel on low tide.<br>• Once in place the cofferdam shall be sealed on a low tide as this will reduce water volume and decreases probability of fish entrapment.<br>• Electrofishing will then be conducted by either IFI Ballina staff or by a qualified aquatic ecologist (Level 9 or higher) with electrofishing experience, licenced and under supervision by IFI staff. |

| Location / Receptor | Description of Mitigation |
|---|---|
| | • The aquatic ecologist will remain onsite during the initial pump-out and water draw down inside the cofferdam to observe any sign of lamprey ammocoetes that may emerge from silt during the dewatering. Any rescued fish shall be temporarily held in containers of clean, well-oxygenated river water and immediately transferred to the outside of the cofferdam. Species are likely to be encountered include, at a minimum, eel and lamprey ammocoetes, but could include estuarine species such as grey mullet, flounder and possibly coarse species such as roach.<br>• The ECoW will be present for the dewatering and records of type / number of trapped and released fish shall be kept by the ECoW.<br>• The first pass of the earthmoving activity within the cofferdam shall involve the digger removing the top layer of marginal silt to a depth of about 30-50 cm and spreading it out on the nearby bank so that lamprey ammocoetes can be gathered by the ecologist into buckets of clean water and transferred to alternative habitat downstream. Juvenile lamprey will quickly re-burrow into suitable substrates once translocated (King, et al., 2008).<br>• Larval lamprey shall be captured by hand or pond net and temporarily be kept in a bucket of clean river water then transferred immediately outside of the cofferdam where they will move downstream and settle in suitable silt deposits which are widely available downstream of the Lower Bridge.<br>• The existing boulder riprap shall be removed and stockpiled on the bank for use in reinstatement following the works. |
| Water quality degradation affecting instream biota during flood wall construction on vegetated berms (Downstream Lower Bridge LHS and RHS) | • Where cofferdams and instream works are not required (owing to sufficient berm space), a double line of silt fencing will be installed along the riverbank between the wall construction zone and the river. The ECoW will be responsible for regular checks and will request the contractor to carry out maintenance to silt fencing if and when required to ensure its efficacy. |
| River margin reinstatement prior to cofferdam removal – Bachelors Walk LHS | • The existing boulder riprap material shall be reused in the bank/berm reinstatement following the temporary instream works.<br>• Prior to cofferdam removal, the line of boulder riprap will be installed, and the river margin will be backfilled with clean earth and tamped down so as to recreate the riverside berm of the same width as the pre-existing condition. The berm shall be reinstated as described in **Chapter 10: Terrestrial Biodiversity**, to ensure that FS2 tall reed swamp habitat is replaced.<br>• Stockpiled boulders shall be used and if additional rocks are required, these shall be locally sourced, clean, calcareous boulder and large cobble that are approved by IFI and that broadly mimics the pre-existing substrates. As set out above, the 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.<br>• The ECoW will be responsible for implementing the above reinstatement measures for the River Moy channel margins along Bachelors Walk in conjunction with IFI Ballina and NPWS.<br>• Replacement of boulder riprap along to river margin will encourage deposition of finer material and eventual sedimentation and regrowth of marginal plant species. This will in time also allow for re-establishment of juvenile lamprey populations at low levels as is the baseline condition.<br>• All reinstatement within the cofferdam shall be carried out to match the profile of the bed level on the outside of the cofferdam, and at the upstream and downstream ends, such that there is no significant step-change in lateral or longitudinal riverbed profile.<br>• The cofferdam shall be removed beginning downstream and working in an upstream direction to slowly submerge the newly reinstated river margin areas. This is to avoid wash-out of substrates owing to river flows from the upstream end. |
| **Quignamanger** | |
| Timing Restrictions | • Instream works period stipulated by IFI is May 1st to September 30th of any year. |
| Water quality protection during culvert removal / installation (Creggs Road) | • The contractor will be required to notify IFI in advance of instream works and provide an updated detailed construction work plan for approval including any planning conditions and consequent environmental commitments before works commence. |

| Location / Receptor | Description of Mitigation |
|---|---|
| | • Each section of culvert replacement must be installed in a 'dry' works area using an appropriate method of water management, e.g., dam and pump-over, temporary piping.<br>• Works shall proceed in an upstream direction.<br>• A schedule of works will be drawn up by the contractor to break the culvert replacement works into manageable sections (e.g., 30-50 m at a time) such that water management can be adequately controlled, thus preventing entrainment of sediment and other potentially polluting substances.<br>• Where possible, the new culvert should be installed off-line with flow diverted from the old culvert following completion. |
| Water quality protection during culvert removal / installation (Quay Road) | • The Quay Road culvert must be installed in a 'dry' works area using an appropriate method of water management, e.g., dam and pump-over, temporary piping.<br>• The contractor and ECoW will be required to notify IFI in advance of instream works and provide an updated detailed construction work plan for approval including any planning conditions and consequent environmental commitments before works commence.<br>• There can be no discharge of any polluting substances (sediment, concrete, hydrocarbons) directly to the watercourse during the construction. |
| Management of ingress water ('dry' instream working areas of Quignamanger during culvert replacements) | • On-site pumps must be present to dewater and maintain 'dry' working containment areas to complete instream works.<br>• Dewatering pumps to be placed in sumps surrounded by drainage stone.<br>• There will be no dewatering discharge directly back to the Quignamanger or any adjoining drainage channel.<br>• Ingress waters will be pumped out and discharged via a silt bag 30m away from the watercourse. The discharge point will be a vegetated area of land and will be surrounded by a triple line of staked silt fencing surrounding a circle of staked down strawbales wrapped in terram. Any outflow from the protected discharge point will be visually monitored to ensure there is no escapement of highly turbid water. If highly turbid water is observed works will be stopped by the ECoW and additional silt control measures will be implemented, e.g., use of settlement tank in series with silt bag. These mitigations will be overseen by the ECoW. |
| Protection of Tufa deposit *7220 Habitat | • Prior to instream works commencing for the Quay Road culvert (above) the stream must be surveyed by a qualified, experienced ecologist (Level 9 or higher) identifying the tufa cascades (these were located approximately 15 m upstream of the Quay Road culvert in 2023). This area must be cordoned off using hazard tape, upstream and downstream to delineate it as an exclusion zone. The ECoW will be responsible for ensuring that there is no tracking or walking through the stream, nor any other direct physical impact upon the tufa habitat within the exclusion zone.<br>• The works area upstream of the existing Quay Road culvert shall be carefully planned by the contractor to only impact on a short section of the open channel leading into the proposed new culvert. This will be no more than 5 -7 m of channel upstream of the existing Quay Road culvert. The ECoW is responsible for ensuring this spatial restriction is adhered to. |
| Design Measures to be incorporated during construction | • Refer to **Table 22-6** below, for design measures to be implemented in the Construction Phase relating to the regrading of the Quignamanger upstream of Quay Road culvert, i.e., baffles or step-pool design to facilitate fish passage and tufa deposition in the operational phase. |
| **Bunree** | |
| Timing Restrictions | • Instream works period stipulated by IFI is May 1st to September 30th of any year. |
| Water quality protection during culvert removal / installation | • Each section of culvert replacement must be installed in a 'dry' works area using an appropriate method of water management, e.g., dam and pump-over, temporary piping.<br>• Works shall proceed in an upstream direction.<br>• A schedule of works must be drawn up to break the culvert replacement works into manageable sections (e.g., 30-50 m at a time) such that water management |

| Location / Receptor | Description of Mitigation |
|---|---|
| | can be adequately controlled, thus preventing entrainment of sediment and other potentially polluting substances.<br>• Where possible, the new culvert should be installed off-line with flow diverted from the old culvert following completion. |
| Management of ingress water ('Dry' instream working areas of Bunree during culvert replacements) | • On-site pumps must be present to dewater and maintain 'dry' working containment areas to complete instream works.<br>• Dewatering pumps to be placed in sumps surrounded by drainage stone.<br>• There will be no dewatering discharge directly back to the Bunree or any adjoining drainage channel.<br>• Ingress waters will be pumped out and discharged via a silt bag 30m away from the watercourse. The discharge point will be a vegetated area of land and will be surrounded by a triple line of staked silt fencing surrounding a circle of staked down strawbales wrapped in terram. Any outflow from the protected discharge point will be visually monitored to ensure there is no escapement of highly turbid water. If highly turbid water is observed works will be stopped by the ECoW and additional silt control measures will be implemented, e.g., use of settlement tank in series with silt bag. These mitigations will be overseen by the ECoW. |
| **Brusna (Glenree)** | |
| Timing Restrictions | • Instream works period is stipulated by IFI as July 1st to 30th September 30th of any year.<br>• Works near or over water within the SAC is stipulated May 1st to September 30th of any year. |
| Sediment loss controls during embankment construction - Brusna (Glenree) | • There must be a line of well-secured silt fencing between the proposed embankment construction and the river channel during all earthmoving works adjacent to the channel. This must be put in place in advance of any work commencing on-site.<br>• The temporary access track and all works on formation of the embankment will be carried out on the outside of the proposed embankment, ensuring as little disturbance as possible to vegetated ground between the proposed embankment and the river.<br>• Embankments will be formed, then firmly tamped down and reseeded immediately upon completion. The use of hydroseeding on the newly formed earth embankment is recommended to rapidly establish vegetative cover.<br>• All drains and preferential flow pathways that connect to the River Brusna/Glenree from temporary works areas, site compounds and construction material storage areas must be subject, as appropriate to silt control measures in the form of e.g., bunds, geotextile sheeting, silt fencing to avoid entrainment and prevent sediment run-off into drains and the river.<br>• Material storage areas and stock-piled spoil / earth shall be located outside the SAC boundary and not within 20 m of the River Brusna or any drain to same. In addition to silt fencing around loose material stockpiles (e.g., earth, gravel with high fine content) these shall be covered with geotextile during extended storage periods to avoid mobilisation of suspended solids. |
| Works near and over water – flood walls, bridge parapet | • There must be no discharge of deleterious substances, e.g., sediment, concrete rubble / dust or new liquid concrete, from the works areas to the river. All concrete waste will be immediately removed and disposed of at a licenced waste facility. The bridge parapet will be prefabricated and not involve use of bulk liquid concrete in proximity to the river. |
| Instream works Rathkip/Shanaghy Bridge | • A 'dry' working area must be formed at the Rathkip/Shanaghy Bridge, encompassing the reach subject to instream bed and bank protection replacement works. A suitable method to create the dry working area will be set out in the contractors detailed construction method statement and agreed with IFI prior to instream works commencing (noting that IFI have agreed in principle to the works subject to timing restrictions, plus methods to protect water quality and fish passage).<br>• It is proposed that partial cofferdams covering alternate halves of the river shall be used to create the instream dry working area. At any one time the river will be flowing on the opposite half of the normal wetted width. This is to protect fish passage and hydrological conditions. An alternative method such as a large pipe |

| Location / Receptor | Description of Mitigation |
|---|---|
| | or flume capable of passing a 10% AEP flood event that achieves the same goals would be acceptable, i.e., it must create a dry working area.<br>• Cofferdams can be constructed of small or large geotextile bags filled with clean sand, but there can be no use of soil or clay to bund the structure because the risk to water and habitat quality is too high in this SAC channel with high value salmonid habitat. Sandbags can be wrapped in impermeable geotextile if necessary to prevent excessive water ingress.<br>• The height of the cofferdams must be higher than the 10% AEP flood flow plus freeboard (minimum top height of 14.32mOD + freeboard) to prevent consequences of, e.g., concrete, and other pollutant escapement, if unexpected flooding was to occur, noting that the instream works timing restriction means that works will occur in summer when flooding is least likely.<br>• Access routes for material delivery to and from the cofferdam areas must be from each bank alternately, i.e., no passing of construction materials over water.<br>• **Pre-construction Bathymetry Survey:** The river reach through Rathkip/Shanaghy Bridge will require pre-construction channel bathymetry survey in the reach covering a minimum of 50 m upstream and downstream of the bridge faces. Bathymetry survey will take place during the months of May to September inclusive to record the baseline condition, using both cross section and long section measurements. This will occur in the season before or early in the season of construction works commencing. This will record the existing bed levels so that they can be replaced like-for-like making sure that there is a suitable low flow channel and that the upstream and downstream ends of the new bed protection are drowned out at all times during the operation phase. The existing scour pool at the downstream side of the Rathkip/Shanaghy bridge will be retained with the same morphology and dimensions (depth, width, length) as pre-existing. The pool is an important feature in terms of fish lay-over during flood events given the elevated water velocities that occur (under baseline and post-scheme scenarios) in this reach of the river. |
| Management of ingress water ('Dry' instream working areas at Shanaghy Bridge) | • On-site pumps must be present to dewater and maintain 'dry' working containment areas to complete instream works.<br>• Dewatering pumps to be placed in sumps surrounded by drainage stone.<br>• There will be no dewatering discharge directly back to the Brusna (Glenree) or any adjoining drainage channel.<br>• Ingress waters will be pumped out and discharged via a silt bag 30m away from the watercourse. The discharge point will be a vegetated area of land and will be surrounded by a triple line of staked silt fencing surrounding a circle of staked down strawbales wrapped in terram. Alternatively, a plan may be put in place to clean the water using a series of settlement tanks or system with similar effect (water filtration system). This allows treatment of water in an instance where vegetated land, if saturated, may not have capacity to adsorb water being removed even with strawbales and silt fencing. Any outflow from the protected discharge point will be visually monitored to ensure there is no escapement of highly turbid water. If highly turbid water is observed works will be stopped by the ECoW and additional silt control measures will be implemented, e.g., use of settlement tank in series with silt bag. A sample of the final discharge effluent will be taken by the ECoW to ensure suspended solids (SS) concentration does not exceed 25mg/l. These mitigations will be overseen by the ECoW. |
| Design Measures to be incorporated during construction | • Refer to **Table 22-6**, below, for design measures to be implemented during the construction phase relating to the Rathkip/Shanaghy bridge scour protection (bed-protection), i.e., incorporation of low flow channel / depression and roughness elements (concrete conglomerate or inset rock/cobble) to prevent shallow laminar flows in the Operational Phase. |
| Direct impact on white-clawed crayfish during instream works | • Although crayfish are very unlikely to be present, for the avoidance of doubt, during initial water drawdown within the areas of water management (dam and pump-over on the Tullyegan) a qualified experienced ecologist will be present and shall have the appropriate licence from National Parks and Wildlife Service to capture any emerging crayfish, keep them in a bucket of clean river water and return them to the channel upstream of the works area. This is a once off operation (a few hours at most in each location). Once the working area is dried |

| Location / Receptor | Description of Mitigation |
|---|---|
| | out, there will be no further requirement for the crayfish licence holder to be present. |
| Channel reinstatement | • The Brusna channel will be reinstated prior to rewatering using clean washed gravels and cobbles of local origin (calcareous) and of an appropriate size, in agreement with IFI. This will allow recolonisation by macroinvertebrates and fish during operation. |
| **Tullyegan** | |
| Timing Restrictions | • Instream works period stipulated by IFI is May 1st to September 30th of any year. |
| Water quality protection during out-of-channel flood wall / embankment construction | • All drains and preferential flow pathways that connect to the Tullyegan Stream from the temporary work area must be subject, as appropriate, to silt control measures in the form of e.g., bunds, geotextile sheeting, silt fencing to avoid entrainment and prevent sediment run-off into drains and the river.<br>• There must be no discharge of deleterious substances, e.g., sediment, concrete rubble / dust or new liquid concrete, from the works areas to the stream. All concrete waste will be immediately removed and disposed of at a licenced waste facility. |
| Water quality protection during instream flood wall / embankment construction | • A 'dry' instream works area must be created using an appropriate method of water management, e.g., dam and pump-over, temporary piping.<br>• Prior to dewatering the dammed area, the stream will be de-stocked of fish. Fish removal shall be carried out by authorised personnel under electro-fishing licence and in agreement with, or under supervision of IFI Ballina. Fish must be kept in clean oxygenated water and returned to the channel upstream of the works area.<br>• Before any excavation within the channel, the top 30 cm of bed material must be scraped off and stockpiled for use in reinstatement. |
| 'Dry' working area ingress water – during instream works | • On-site pumps must be present to dewater and maintain 'dry' working containment areas to complete instream works.<br>• Dewatering pumps to be placed in sumps surrounded by drainage stone.<br>• There will be no dewatering discharge directly back to the Tullyegan or any adjoining drainage channel.<br>• Ingress waters will be pumped out and discharged via a silt bag 30m away from the watercourse. The discharge point will be a vegetated area of land and will be surrounded by a triple line of staked silt fencing surrounding a circle of staked down strawbales wrapped in terram. Alternatively, a plan may be put in place to clean the water using a series of settlement tanks or system with similar effect (water filtration system). This allows treatment of water in an instance where vegetated land, if saturated, may not have capacity to adsorb water being removed even with strawbales and silt fencing. Any outflow from the protected discharge point will be visually monitored to ensure there is no escapement of highly turbid water. If highly turbid water is observed works will be stopped by the ECoW and additional silt control measures will be implemented, e.g., use of settlement tank in series with silt bag. These mitigations will be overseen by the ECoW. |
| Direct impact on white-clawed crayfish during instream works | • Although crayfish are very unlikely to be present, for the avoidance of doubt, during initial water drawdown within the areas of water management (dam and pump-over on the Tullyegan) a qualified experienced ecologist will be present and shall have the appropriate licence from National Parks and Wildlife Service to capture any emerging crayfish, keep them in a bucket of clean river water and return them to the channel upstream of the works area. This is a once off operation (a few hours at most in each location). Once the working area is dried out, there will be no further requirement for the crayfish licence holder to be present. |
| Channel reinstatement | • The Tullyegan channel will be reinstated prior to rewatering using clean washed gravels and cobbles of local origin (calcareous) and of an appropriate size, in agreement with IFI. This will allow recolonisation by macroinvertebrates and fish during operation. |

## 22.3.2 Operational Phase

**Table 22-6: Aquatic Biodiversity Mitigation Measures for the Operational Stage**

| Potentially Significant Impact Category Identified | Mitigation |
|---|---|
| **Brusna (Glenree)** | |
| Riparian tree loss LHS between river and R294 road | • Retain as much tree and shrub cover as possible on the LHS floodplain between the river and the proposed flood wall along the R294 road.<br>• Retain all marginal and bankside growth along the river in the reach where bankside tree loss is unavoidable. This includes any fringing emergent reeds and tall bankside herbs and grasses which offer cover to fish and thermal regulation to the river.<br>• Any replanting shall be in using appropriate native tree / shrub species in scattered aggregations in areas where tree loss is unavoidable.<br>• Strip planting shall be avoided as this causes tunnelling and loss of instream productivity when it is too dense.<br>• Retain as much tree cover on the RHS bank as possible to ameliorate losses of tree cover on the LHS bank. |
| Fish passage – design and construction of scour protection at Shanaghy Bridge | • Bed scour protection will be designed with a low flow channel or mid-channel depression so that water depth will always be sufficient for fish passage.<br>• The entire bed scour protection will include 'roughness' elements (mortared riprap, embedded stones, blocks) to break up laminar flow and create turbulence that mimics natural conditions, providing cover for migrating and resident fish. Under no circumstances will the bed protection comprise laminar flow over a smooth, flat concrete bed.<br>• The replacement bank scour protection shall be similar to existing with boulder riprap used upstream and downstream of the bridge abutments, as these provide a degree of flow diversity and bankside habitat for plants and macroinvertebrates. |
| **Quignamanger** | |
| **Hydromorphology:** Tufa habitat disturbance / recovery upstream of Quay Road culvert | • When the lower reach of the Quignamanger channel upstream of the existing Quay Road culvert is graded down into the new enlarged Quay Road culvert, rather than leaving a uniformly sloping channel, the design shall include a series of fixed rock or concrete baffles or step-pools (ensuring a low- flow notch) using natural rock and cobble to create turbulent flow as shown in the Project Description, **Figure 5-24**. This will encourage tufa deposition and is likely to assist in extending the area of *7220 habitat because turbulence encourages precipitation of calcite, similar to the tufa cascades and *7220 habitat located upstream.<br>• The regraded channel with the baffles or low rock step-pool design shall be agreed with IFI in advance of construction such that fish passage will be maintained. The baffled design is required as the residual slope of the regraded channel is 5.8%. |
| **Hydromorphology:** Prevention of habitat fragmentation arising from new box culvert (Quay Road) | • The new box culvert must be set at least 500 mm below the existing bed level, and at the same gradient or near the same gradient as the existing bed and not >3% slope.<br>• Additional works to minimise erosion must be undertaken, e.g., rock armour, downstream pools, baffles to maintain channel structure. All such works must ensure fish passage is not obstructed.<br>• Original bed material should be stockpiled and reinstated or where imported will consist of local rock type, rounded washed gravels which will be either seeded upstream of the culvert or placed in the culvert before it becomes live.<br>• There shall be no screening of the culvert to prevent rubbish build up as this can cause obstruction to fish passage. The culvert faces at Quay Road are amenable to maintenance and debris clearance from the road. |

## 22.4 Terrestrial Biodiversity

The environmental impacts and associated commitments provided in **Chapter 10: Terrestrial Biodiversity**, are summarised in **Table 22-7, Table 22-8** and **Table 22-9.** .

### 22.4.1 Pre-Construction Phase

**Table 22-7 Terrestrial Biodiversity Environmental Commitments Pre-Construction Phase**

| Location / Receptor | Description of Mitigation |
|---|---|
| **General Pre-Construction Surveys** | |
| All Locations | • Pre-construction surveys by an experienced ecologist will be carried out for otter. This includes a survey of any otter breeding/resting sites identified in the current baseline within the ZoI of the Proposed Scheme (150 m for breeding sites, where access allows; noting that TII guidance recommends 20 m for non-breeding sites). These will be undertaken in a representative season to ensure accuracy. 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 be required and an application is currently underway.<br>• 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.<br>• Pre-construction surveys by an experienced ecologist will be carried out for Third Schedule IAPS within the ZoI of the Proposed Scheme. These will be undertaken in a representative season to ensure accuracy. Invasive species will be carried out having regard to guidance of Transport Infrastructure Ireland (TII, 2020a) (TII, 2020b).<br>• Pre-construction surveys by an experienced ecologist will be performed on sites where tree removal or removal of tree limbs is required. These surveys will be undertaken to determine the presence or absence of bat roosts or breeding birds, and these will be undertaken in a representative season to ensure accuracy. 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 but may be required for breeding birds should clearance be required during the bird breeding season.<br>• Pre-construction surveys by an experienced ecologist will be performed on structures to be impacted by the Proposed Scheme e.g. quay walls along the main channel of the River Moy. These surveys will be undertaken to determine the presence or absence of bat roosts and breeding birds, and these will be undertaken in a representative season to ensure accuracy. 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.<br>• Pre-construction surveys by an experienced ecologist will be performed on the boat yard shed where a roosting bat was observed exiting during dawn surveys. This survey will be undertaken to determine the presence or absence of roosting bats and it will be undertaken in a representative season to ensure accuracy. The surveyor will also use their professional judgement with respect to the need to survey any other buildings or structures within or adjacent to the Proposed Scheme boundary likely to provide roosting opportunities for 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 |

| Location / Receptor | Description of Mitigation |
|---|---|
| | requirement for a species derogation licence from NPWS; based on current baseline a derogation licence will not be required.<br>• Breeding bird surveys will be undertaken to identify nest sites which are to be marked and avoided by construction if found until such time that the site is vacated by fledglings. Where bird or bat species are detected to be nesting or roosting, an exclusion zone will be determined by the ECoW, using best practice guidelines specific to the species. The same approach will be taken to wintering bird species. Breeding bird surveys shall be conducted with reference to the methodology described by Bibby et al. (2000) and the Countryside Bird Survey Manual - Guidelines for Countryside Bird Survey participants (BirdWatch Ireland, 2012).<br>• A season of overwintering waterbird usage of the River Moy Estuary shall be carried out prior to construction to ascertain if minimal usage of this area is typical for these species.<br>• Based on the findings of the pre-construction surveys, the adequacy of the mitigation for each of these species set out in the EIAR will be reviewed and, if necessary, adjusted accordingly by the ECoW. The ECoW will also ensure that the CEMP will be updated accordingly.<br>• The pre-construction surveys will also inform the need or otherwise for derogation licensing (as detailed below). Any adjustment to the mitigation measures will be agreed with the local authority 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.<br>• All surveys will be undertaken by suitably qualified ecologists with demonstrable experience in the survey and assessment of the feature. |
| **Invasive Species** | |
| All Locations | • The Local Authority shall appoint a suitably qualified contractor to deal with any Third Schedule Invasive Alien Plant Species within the proposed works areas.<br>• This specialist will prepare an Invasive Alien Species Management Plan (IASMP) that will be followed during the eradication of the any IAS across the Proposed Scheme. Any invasive plant species identified that are likely to be disturbed by the Proposed Scheme works will be dealt with prior to construction works taking place in accordance with the management plan. Works to eradicate invasive species will be completed and signed off by suitably experienced personnel.<br>• All machinery or equipment that may have worked in environments where invasive species are present shall be suitably cleaned by pressure washer before being used on site to prevent the spread of invasive species. Machinery shall be washed down on permeable material such as terram which will collect any IAPS fragments. This permeable material shall then be disposed of at a facility licenced to accept IAPS contaminated material. Water used for this washing process shall always be intercepted and prevented from draining back into watercourses.<br>• Where ongoing treatment of IAPS is occurring on stands in the vicinity of the proposed works area, appropriate exclusion fencing will be erected to prevent disturbance and spread of these stands. |
| **Otters and Badgers (Derogation Licensing)** | |
| All Locations | • Mindful of the mobile nature of otters and badgers, the need for derogation licencing for any particular phase of works will need to be kept under review and informed by the findings of the pre-construction surveys.<br>• The level of surveying will need to be sufficient to inform any derogation licensing which may be required. The need for derogation licensing will be determined by the ECoW prior to any works commencing, including site preparation works. The need for derogation licences will be kept under review by the ECoW as the works progress based on the findings of the pre-construction surveys completed for Otter and Badgers. |
| **Fencing** | |
| All Locations | • As part of the enabling works, any vegetation within the Proposed Scheme boundary which is capable of being retained during the construction works will be fenced-off with suitable protective fencing and location to be specified by the ECoW. The fencing will form a clear barrier between retained habitats within and adjacent to the Proposed Scheme boundary which includes European Sites. This includes the retention of trees, hedgerow, woodland, grassland, aquatic features etc. The same measures as stipulated below with respect to avoiding unintended incursion will also be applied to these areas.<br>• As part of the enabling works, any other vegetation within the Proposed Scheme boundary which is capable of being retained during the construction works will be fenced-off with |

| Location / Receptor | Description of Mitigation |
|---|---|
| | suitable protective fencing and location to be specified by the ECoW. The fencing will form a clear barrier between retained habitats within and adjacent to the Proposed Scheme boundary which includes European Sites. This includes the retention of trees, hedgerow, woodland, grassland, aquatic features etc. The same measures as stipulated below with respect to avoiding unintended incursion will also be applied to these areas.<br>• 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 for personnel or equipment and no storage of construction materials beyond the fenced construction boundary. |
| **Floating River Vegetation** | |
| River Moy | • Prior to instream works along the main channel of the River Moy being undertaken, a full survey of floating river vegetation habitat shall be undertaken, including capturing the extent of this habitat to be disturbed and species composition. |

## 22.4.2 Construction Phase

**Table 22-8: Terrestrial Biodiversity Environmental Commitments Construction Phase**

| Location / Receptor | Description of Mitigation |
|---|---|
| **Damage to Flora and Fauna** | |
| All Locations | • In the event of damage occurring to protected flora/fauna or designated area, the cause of the incident will be identified.<br>• If on-site vehicles or personnel were the cause of the incident, all works will cease until the Health and Safety Officer will declare the site a safe working area.<br>• When the site is declared secure, an assessment of the incident will be carried out.<br>• In the event of the death of any faunal species, species details, photographs and any other available information will be recorded.<br>• The ECoW and a county council representative will be informed of the incident.<br>• The NPWS will be notified of the incident by the ECoW.<br>• The mitigation measures will be put in place to manage the incident. |
| **Watching Brief during Site Clearance** | |
| All Locations | • All vegetation removal and demolition of walls will be completed outside the breeding bird season (March to August, inclusive) unless no breeding birds are confirmed present by the ECoW immediately prior to the vegetation or structure being removed or unless required for the implementation of derogated measures with respect to otter or badger.<br>• 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. |
| **Invasive Alien Plant Species Management** | |
| All Locations | • At the time of writing, the works will be completed with reference to the following guidance:<br>– Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (NRA, 2010)<br>– Guidelines for the Management of Waste from National Road Construction Proposed development (NRA, 2014)<br>– The management of Invasive Alien Plant Species on National Roads – Standards (TII, 2020a)<br>– The management of Invasive Alien Plant Species on National Roads – Technical Guidance (TII, 2020b) |

| Location / Receptor | Description of Mitigation |
|---|---|
| | – Invasive Species Ireland guidance (http://invasivespeciesireland.com).<br>• All machinery or equipment that may have worked in environments where invasive species are present shall be suitably cleaned by pressure washer before being used on site to prevent the spread of invasive species. Water used for this washing process shall always be intercepted and prevented from draining back into watercourses.<br>• Where ongoing treatment of IAPS is occurring on stands in the vicinity of the proposed works area, appropriate exclusion fencing will be erected to prevent disturbance and spread of these stands. |
| **Floating River Vegetation** | |
| River Moy | • Ground protection mats e.g., bog matting, shall be used in each dry working area created via cofferdam placement to prevent against sediment compaction and disturbance.<br>• If recolonisation of the area has not occurred in the following growing season post disturbance, then propagules from nearby floating river vegetation habitat shall be used to reinstate the habitat. This may require the use of biodegradable matting on the riverbed to hold and contain propagules and to help prevent them from washing away. This is also dependant on sufficient sediment building up if extensive sediment disturbance had occurred.<br>• All works will be undertaken with the supervision of a suitably qualified ecologist or ECoW. |
| **Tall Herb Swamp** | |
| Quignamanger, River Moy (Clare Street, Bachelors Walk) | • Works along both banks of the River Moy downstream of the Lower Bridge are to take place from the roadside to avoid damage to this habitat.<br>• Fencing is to be erected at the boundary of the necessary works footprint within this habitat along all proposed works areas where this habitat occurs (Quignamanger, Clare Street, Bachelors Walk) to prevent unnecessary incursion of personnel and machinery.<br>– Silt fencing is also to be erected along this boundary to prevent any potential siltation of nearby watercourses.<br>– At any one time a maximum length of 50m working area along Bachelors Walk and Clare Street is to be implemented. Works on additional 50m lengths will not commence until works on previous length have been completed and tall herb swamp habitat reinstated (see next point).<br>• Where tall herb swamp habitat is to be disturbed by flood wall or culvert construction, turves are to be collected from the areas to be disturbed and stored on bog mats within adjacent working areas in a single layer i.e. no stacking of turves is to occur.<br>– The turves to be removed will be approximately 2m x 1m x 0.5m deep and will be collected with the use of a specially designed excavator bucket to lift and place the turves carefully on to bog mats so that they do not break up.<br>– The storing of turves on bog mats will facilitate their later removal and reinstatement without damaging the underlying habitat.<br>– Turves will be monitored during storage, and they will be watered when required to keep them moist. The depth of turves proposed is in line with practice elsewhere (Anderson, 2003), where in a wetland situation, the turf depth extracted for translocation was between 50 and 80 cm, depending on rooting depth.<br>– The deeper the turves, the greater likelihood of vegetation recovery.<br>– Turves will be stored for no more than 1 working week and measures will be implemented to ensure no erosion of tall herb swamp habitat or turves occurs while works are ongoing e.g. monitoring of weather forecasts to ensure works are avoided during periods of heavy rainfall, monitoring of tides to ensure habitat area does not flood while works are ongoing etc.<br>– The area where turves are to be taken and reinstated will not be traversed by machinery prior to or after works to ensure compaction does not occur to help facilitate recovery post reinstatement. Anderson (2003) recommends that all turf translocation should take place in the dormant season for terrestrial habitats, therefore, the best time for undertaking works where sections of tall herb swamp are to be disturbed is during the autumn or early winter.<br>– This timing ensures that soils will be at their field capacity with maximum cohesiveness without containing excess water which will facilitate habitat recovery after reinstatement. |

| Location / Receptor | Description of Mitigation |
|---|---|
| | • Ground protection mats shall be used, where subsoil and topsoil stripping is not necessary e.g., access routes for personnel.<br>• The ECoW will undertake regular monitoring of habitat restoration undertaken to inform any adaptive mitigation measures as required and report such monitoring to relevant parties.<br>– All re-instated or indirectly impacted vegetation will be inspected at the completion of construction at which time the ECoW will report to the local authority and other relevant parties on habitat condition.<br>– If the condition of the habitat is unsatisfactory the ECoW will determine whether collection of local seed is additionally required to achieve effective vegetation restoration and take appropriate steps to source and sow such seed.<br>– Only seeds of native Irish provenance shall be used should such a measure be necessary. |
| **Wet Grassland** | |
| Bunree/Behy Road and Brusna | • Works on the culvert along the Bunree/Behy Road are to take place from the roadside with no footprint in the adjacent wet grassland field. Fencing is to be erected to at the edge of this field prior to works commencing to prevent accidental incursion.<br>• Ground protection mats are to be used on the access route within the wet grassland field to prevent unnecessary damage to this habitat. Fencing is to be erected around the edge of the proposed works area in this field prior to works commencing to prevent accidental incursion and damage to the habitat. |
| **Riparian Woodland** | |
| Riparian Woodland (left-hand bank of the River Moy adjacent to the boatyard), | • Where possible, minimal disturbance of this habitat is to take place with structures to be set as far back from this habitat as practicable<br>• Planting of trees that will be undertaken for the Proposed Scheme will help minimise any effects of loss of riparian woodland. Planting will consist of the same species lost with trees sourced to be of Irish native provenance |
| **Mixed Broadleaved Woodland** | |
| Mixed Broadleaved Woodland (Tullyegan, the Quignamanger, the Brusna and the Bunree), | • Where possible, minimal disturbance of this habitat is to take place with structures to be set as far back from this habitat as practicable.<br>• Planting of trees that will be undertaken for the Proposed Scheme will help minimise any effects of loss of riparian woodland. Planting will consist of the same species lost with trees sourced to be of Irish native provenance. |
| **Hedgerows and Treelines** | |
| Hedgerows and Treelines (Tullyegan, the Moy main channel and the Brusna) | • Where possible, minimal disturbance of this habitat is to take place with structures to be set as far back from this habitat as practicable.<br>• Planting of trees that will be undertaken for the Proposed Scheme will help minimise any effects of loss of riparian woodland. Planting will consist of the same species lost with trees sourced to be of Irish native provenance. |
| **Otter Holts and Badger Setts** | |
| All Locations | • No construction personnel or machinery will be used within 150m of otter holts / badger setts unless subject to the provisions of a derogation licence.<br>– Temporary boundary tape fencing (or similar) can used at the discretion of the ECoW to identify such holts / setts subject to such measures themselves not impacting on the use of the holt / sett.<br>– Neither blasting nor pile-driving will be undertaken within 150m of active holt/sett during the breeding season, unless subject to provisions of a derogation licence.<br>• It is assumed that all active holts/ setts at the time of construction and within very close proximity to the Proposed Scheme boundary will need to be closed in accordance with a derogation licence. |

| Location / Receptor | Description of Mitigation |
|---|---|
| | • If holt / setts are to be closed (wholly or partially), this will be completed 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, 2008a) and the Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes (NRA, 2006a).<br>• The need for further licencing is to be determined by the ECoW during pre-construction surveys and if any holts/ setts are encountered during vegetation clearance. The need for additional mitigation for derogation licensing purposes is to be reviewed and determined by the ECoW and relayed, as necessary to the local authority.<br>• Where required, evacuation and destruction of holts/setts will be carried out under the supervision of an appropriately qualified ecologist under licence from the NPWS. The locations of such setts/ holts will be determined by the ECoW in liaison with the Contractor and the requirement of any derogation licence. |
| **Otter and Badger Measures to Protect Against Mortality** | |
| All Locations | • Any excavations greater in depth than 30cm 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. |
| **Otter Specific** | |
| Tullyegan and Brusna | • Night-time (including dawn and dusk) works along the Brusna and Tullyegan areas will be avoided. |
| Moy main channel, Brusna and Tullyegan. | • Where feasible, a 10 m buffer should be applied to all watercourses where otters were recorded across the Proposed Scheme i.e. Moy main channel, Brusna and Tullyegan. |
| River Brusna | • Two artificial holts will be created to compensate for the loss of the holt along the River Brusna. These two holts are to be located along the left-hand bank of the River Brusna downstream of the Shanaghy Heights bridge. |
| Quignamanger and River Moy | • Should night-time works be required along the River Moy and Quignamanger, the entire stretch/width of the river shall not be lit up while works are being undertaken, i.e. a dark stretch of the river should remain to facilitate the movement of otter past the works.<br>– This can be achieved by using directional lighting (i.e. lighting which only shines on the proposed works and not nearby lands) 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. |
| **Badger Specific** | |
| All Locations | • Badger setts within 150 m of the Proposed Scheme boundary will be confirmed and made available following the pre-construction surveys.<br>• Currently, no setts have been identified within 150 m of the Proposed Scheme boundary, therefore, there is currently no need for a derogation licence with respect to badger. Should a derogation licence be required post pre-construction surveys, this licence could require this loss of sett(s) to be compensated through the construction of artificial sett(s) |
| Brusna and Tullyegan. | • As badger are most active at night, night-time works (including dawn and dusk) will be avoided in areas where badger are most likely to be active such as along the Brusna and Tullyegan. |
| **Bats – Commuting and Foraging (Lighting)** | |
| All Locations | • Construction operations during the hours of darkness will be kept to a minimum. If construction lighting is required during the bat activity period (April to September), lighting shall be directed away from all woodland and watercourse habitats. 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.<br>• Where the removal of bankside vegetation is likely to result in light spill on previously unlit sections of watercourses and other habitats likely to be used by commuting and foraging bats, an assessment of the adjacent lighting shall be carried out by a bat specialist prior to any vegetation removal. If they don't already, these light sources, e.g. street lamps should |

| Location / Receptor | Description of Mitigation |
|---|---|
| | consist of LED luminaires with a warm white light source (2700 Kelvin or lower) with a peak wavelength higher than 550 nm as per guidelines (BCT, 2023) Column heights should minimise light spill and glare visibility and only luminaires with a negligible or zero Upward Light Ratio and with good optical control should be considered. Furthermore, luminaires should always be mounted horizontally, with no light output above 90° and/or no upward tilt. Where these light sources do not meet relevant guidelines, changing to light sources that do meet guidelines shall be required. This may be relevant along the Main channel of the River Moy at the boat yard where a section of riparian woodland is to be removed and also along the Brusna where section of mixed broadleaved woodland is to be removed. Re-planting of lost vegetation to recreate a buffer can help minimise light spill onto these areas and should be undertaken. |
| **Roosting Bats General** | |
| All Locations | • Given the current baseline, the Proposed Scheme is not considered to effect roosting bats, however, as bat roosts can be ephemeral and circumstances can change between initial surveys and the commencement of construction, the mitigation measures listed below are provided here on a precautionary basis and are measures which will avoid, minimise and mitigate construction phase impacts on roosting bats.<br>• No demolition of structures or the removal of any trees with bat roost potential (potential to be determined by the ECoW) is to occur unless the ECoW has confirmed that the structures or trees do not support roosting bats (confirmed via survey) or unless the demolition/removal is completed under the provisions of a derogation licence.<br>• Following the pre-construction survey, bat roosts located within the proposed works boundary will be clearly identified to all personnel working in the vicinity of the roost.<br>• Temporary boundary tape fencing (or similar) can be used at the discretion of the ECoW to identify such roosts subject to such measures themselves not impacting on the use of the roost. |
| **Roosting Bats Tree Felling** | |
| All Locations | Where bats are recorded roosting in the trees scheduled for felling, the following mitigation will be required:<br>**Timing:** Tree-felling will occur in the period late September to late October, or early November, as per NRA Guidelines (NRA 2006a; NRA, 2006b). Tree felling will be completed by Mid-November.<br>• Trees with ivy-cover, once felled, will be left intact onsite for 24 hours prior to disposal to allow any bats beneath foliage to escape overnight.<br>• If roosting or stranded bats are encountered on the Proposed Scheme, works shall immediately cease in that area and the local NPWS Conservation Ranger shall be contacted. If present, bats shall only be removed under licence from the NPWS.<br>• Trees to be felled under the supervision of the ECoW (i.e. trees identified as having Potential Roost Features (PRFs) during the pre-construction survey) will be examined and where bats are found, they will be translocated to an area where bat boxes will already be installed on appropriate trees within the Proposed Scheme area. The proposed process for felling the trees with PRFs is outlined below:<br>– The ECoW will be present during the tree felling works;<br>– Tree(s) identified as having potential to support bats will be surveyed during the daytime for bats prior to felling, on the day the felling is due to take place. The bat specialist will inspect all potential bat roost features of the tree, including those above ground level. This will include visual inspection as well as use of an endoscope to inspect cavities/crevices.<br>– Any bats found in the trees will be removed by hand to a bat box and will then be relocated to the bat boxes installed in advance of works. Records of any such activities will be maintained.<br>– The tree and/or tree sections will be left on the ground for a minimum period of 24 hours to enable any unidentified bats residing in deeper crevices to make good their escape during night-time hours.<br>– These trees will also be 'soft' felled. Soft felling shall include the following measures:<br>Felling to be undertaken under the supervision of the ECoW.<br>Felling of entire tree from base, allowing the tree to fall (i.e. no introduced force). |

| Location / Receptor | Description of Mitigation |
|---|---|
| | The ECoW shall inspect the tree for further evidence of bat roosting. If evidence is found, all works on that tree shall be halted and the local NPWS Conservation Ranger shall be contacted. No works on that tree shall be permitted without agreement from the NPWS.<br>Tree to be left in place (uncut) for 24hrs, after which, sectioning, chipping, and removal can take place. |
| **Bat Roosting Lighting** | |
| All Locations | • Construction operations during the hours of darkness will be kept to a minimum.<br>• If construction lighting is required between April to September, lighting shall be directed away from all woodland and watercourse habitats using directional lighting.<br>– 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. |
| **Roosting Bats Bat Boxes** | |
| All Locations | • Nine no. bat boxes shall be erected along the Brusna, six no. bat boxes shall be erected along the northern section of the River Moy (i.e., downstream of the Lower Bridge), six no. bat boxes shall be erected along the Tullyegan, six no. bat boxes shall be erected along the newly opened channel along the Bunree and six no. bat boxes shall be erected adjacent to the open channel of the Quignamanger.<br>– Each box shall be placed in groups of three bat box per structure arranged at the same height facing north, south-east and south-west to ensure a range of temperatures for roosting bats. Suitable locations will be determined by the ECoW based on suitable locations available to erect them, proximity to artificial lighting and connectivity to foraging and commuting habitats.<br>– In the absence of suitable structures (e.g. retained trees, bridge structures, buildings) to erect the boxes, they will be pole-mounted in suitable locations or mounted in suitable locations on built structures.<br>– These boxes shall be away from any felling or trimming to ensure that they are not accidentally damaged or removed.<br>– The bat boxes will be Schwegler-type (woodcrete) type boxes (or similar) and a range of different type boxes (e.g., 2f, 1FF, 3FF, 1FW, 1FE and 1FTH) will be used. These will be provided in addition to any mitigation required with respect to any derogation requirements which may be identified as a result of pre-commencement surveys. |
| **Breeding Birds (Derogation License)** | |
| All Locations | • Where nests are present, a buffer zone of at least 20 m will be cordoned off and the nests will either be left in-situ until the end of the bird nesting season or dealt with in accordance with the terms of a derogation licence sought from relevant bodies.<br>• Buffer zones will vary dependant on species in question and the exact buffer zone for a particular species when encountered must be discussed with a professional ornithologist who must be contacted within 24 hours of the discovery of an occupied nest. |
| **Breeding Birds (Protect against Mortality)** | |
| All Locations | • Additionally, all vegetation removal or demolition of structures will be completed outside the breeding bird season (March to August, inclusive) unless no breeding birds are confirmed present by the ECoW immediately prior to the vegetation/structure being removed. |

| Location / Receptor | Description of Mitigation |
|---|---|
| **Breeding Birds (Bird Boxes)** | |
| Brusna, Tullyegan, River Moy, Bunree, Quignamanger | • Bird boxes will be erected at suitable locations across all sections of the Proposed Scheme. Ten no. bird boxes shall be erected along the Brusna, six no. bird boxes shall be erected along the River Moy, six no. bird boxes shall be erected along the Tullyegan, six no. bird boxes shall be erected along the Bunree, and six no. bird boxes shall be erected along the Quignamanger. Suitable locations will be determined by the ECoW based on locations available to erect boxes and connectivity to foraging and commuting habitats. In the absence of suitable structures (e.g. trees, bridge structures, buildings etc.) to erect the boxes, they will be pole mounted in suitable locations. The bird-boxes will be Schwegler-type (woodcrete) boxes (or similar) and a range of different type boxes (e.g. 1B, 2H, 2MR etc.) suitable for all species likely to be using the adjacent habitats |
| **IEF Specific** | |
| Works along the River Moy SAC | • Planting of trees and shrubby species that will be undertaken for the Proposed Scheme will help minimise any effects of loss of SAC area. Planting will consist of the same species lost with trees/shrubs sourced to be of Irish native provenance. |

### 22.4.3 Operational Phase

**Table 22-9: Terrestrial Biodiversity Environmental Commitments Operational Phase**

| Location / Receptor | Description of Mitigation |
|---|---|
| **Wet Grassland** | |
| Bunree / Behy Road and Brusna | The culvert adjacent to the wet grassland field along the Bunree/Behy Road shall be of a French drain style to allow drainage from the wet grassland habitat and prevent a build-up of water within this area. This will ensure that they hydrological regime of the habitat does not change thus impacting upon the habitat itself. |

## 22.5 Land, Soil, Geology and Hydrogeology

The environmental impacts and associated commitments provided in **Chapter 11: Land, Soil, Geology and Hydrogeology**, are summarised in **Table 22-10** and **Table 22-11**.

### 22.5.1 Construction Phase

**Table 22-10: Land, Soil, Geology and Hydrogeology Environmental Commitments Construction Phase**

| Location / Receptor | Description of Mitigation |
|---|---|
| **Importation of Construction Materials** | |
| All Locations | • 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 the current EPA public consultation document 'Regulatory position on soil & stone by-products' published in October 2018. |
| **Embankment Settlement** | |
| All Locations | • 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. If a high-water table is encountered during excavation an appropriate backfill such a Class 6A material will be incorporated. |

| Location / Receptor | Description of Mitigation |
|---|---|
| | • A barrier method such as a sediment barrier or silt fence will be placed on the river side of the embankment.<br>• Permanent cut-off ditches on the land side of the embankment will be used to prevent over land flow. |
| Brusna and Tullyegan | • Embankments will be constructed of suitable compacted materials, tamped down, and reseeded immediately to ensure stability and to minimise the potential for erosion of sediments into the adjacent Brusna River and Tullyegan Stream. |
| **Infiltration of Surface Runoff** | |
| All Locations | • 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, 2011).<br>• Care will be taken in reworking this material to minimise the effects of weathering, dust generation, groundwater infiltration and generation of runoff.<br>• 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. |
| River Moy Main Channel | • There will be no stockpiles within the SAC and or within 20 m of the main channel of the River Moy or any drains that connect to the river. |
| Barrett Street, Ridgepool Road, Behy Road and Bonniconlon Road | • Construction compounds have been selected at the Old Ballina Diaries site, Mayo County Council (MCC) lands on Barrett Street and sites located on private lands at Ridgepool Road, Behy Road and Bonniconlon Road 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 embankment/flood wall works area. |

| Location / Receptor | Description of Mitigation |
|---|---|
| **Loss of Soil and Bedrock Reserves** | |
| All Locations | • Where possible the removal of topsoil will be avoided (except where topsoil will need to be removed for the placement of fill under embankments), temporary access roads and stockpiles in which case the topsoil will be stripped and assessed for reuse within the Proposed Scheme ensuring appropriate handling, processing and segregation of material.<br>– The excavated material will be reused for side-slope protection of the new embankments at Rathkip and Shanaghy and Tullyegan Stream and regrading adjacent to the new flood walls. Excavations will be kept to a minimum using shoring or trench boxes.<br>• A Soil Management Plan will be developed by the contractor as part of the CEMP.<br>– This plan will identify actions on site to minimise the loss of topsoil and soils and its potential for erosion such as stabilising side surfaces to prevent erosion through appropriate slope angles.<br>– Dewatering will be carried out where required prior to backfilling to avoid impacts to the water table and backfill material will be of appropriate composition to achieve compaction to avoid seepage of groundwater.<br>– 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.<br>• The CEMP will provide appropriate measures for mitigating against ingress of groundwater and management of the groundwater table during excavation works for foundations, trenches and placement of submersible surface water pumps such as pumping out groundwater and/or rainfall with a sump pump.<br>• Where surplus soil cannot be reused it will be removed off site for treatment, recycling, or disposal at an authorised waste management facility off site.<br>– 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.<br>• In areas of soft soils and peat, excavate and replace options are proposed to achieve acceptable settlement limits. |
| **Use of Concrete, Fuel, Oils or Chemicals (Accidental Spillage)** | |
| All Locations | • Construction activities will be undertaken in strict compliance with measures set out in CIRIA's Control of water pollution from construction sites. Guidance for consultants and contractors (2001) to minimise the risk of transmission of hazardous substances to adjacent soils, groundwater, and watercourses.<br>– 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.<br>– 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.<br>– Good housekeeping at the site (daily site clean-ups, use of disposal bins, etc.) during the entire construction phase.<br>– 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. |
| **Encountering Contaminated Soils** | |
| All Locations | • The appointed contractor will be responsible for regular testing of excavated soils to monitor the suitability of the soil for reuse.<br>– If contamination is encountered suitable measures will be put in place to avoid mobilising the contamination based on best practice for contaminated land management.<br>– Samples of ground suspected of contamination will be tested for contamination by the appointed contractor during the ground investigation.<br>• 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.<br>– 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.<br>• 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. |

| Location / Receptor | Description of Mitigation |
|---|---|
| **Loss or Damage to Groundwater Dependent Terrestrial Ecosystems (GWDTE)** | |
| Quignamanger Stream | • Any instream works will be undertaken during low flow conditions and water will either be diverted or over pumped.<br>• Instream works are limited to the open section before the water flows under Quay Road.<br>• The lower section of the Quignamanger Stream before the bridge has been designed with an open channel and allowed to flood to support and even improve existing growth of Tufa cascade. |
| **In-Channel Works (Dewatering)** | |
| All Locations | • In channel works and the placement of submersible pumps will be undertaken during low level conditions and within the seasonal restrictions placed on the programme using an appropriate method of water management, e.g., dam and pump-over, temporary piping.<br>• To avoid the use of sheet piles, cofferdams for dewatering will be constructed using geotextile sandbags and silt netting to prevent the influx of water into the workings and also to prevent sediment from entering the river.<br>• There will be no direct discharge of surface water from any element of the works without suitable attenuation and treatment of sediments.<br>• New culverts and culvert upgrades are required to be constructed in accordance with the requirements of the OPW and IFI. |

### 22.5.2 Operational Phase

**Table 22-11: Land, Soil, Geology and Hydrogeology Environmental Commitments for the Operational Phase**

| Location / Receptor | Description of Mitigation |
|---|---|
| All Locations | • Mitigation measures, proposed for the construction phase will be implemented for maintenance operations, where relevant.<br>• OPW Guidance will be adhered to for periodic maintenance and/or repair of flood defences. |

## 22.6 Water

The environmental impacts and associated commitments provided in **Chapter 12: Water**, are summarised in **Table 22-12** and **Table 22-13**.

### 22.6.1 Construction Phase

**Table 22-12: Water Environmental Commitments for the Construction Stage**

| Location / Receptor | Description of Mitigation |
|---|---|
| **General Hydrological Measures** | |
| All Locations | • Following consultation with IFI, instream works are restricted to appropriate seasonal windows.<br>• Instream works areas to be left clean of all residual construction waste and potential pollutants before re-flooding.<br>• Backup pumps and generators to be in place where over pumping is taking place to mitigate flood risk.<br>• If no foul sewer connection is available at the compound and works sites, foul water is to be collected and tankered away for treatment as needed.<br>• Construction sequencing to proceed from downstream to upstream on all watercourses as far as is possible.<br>• The timing of the instream works will reduce the impact on aquatic wildlife and the dewatering requirements. |

| Location / Receptor | Description of Mitigation |
|---|---|
| | • The timing of the instream works will reduce the likelihood of a high flow event occurring while they are taking place, minimising the potential increase in flood risk by occupation of the floodplain.<br>• Best practices to be adhered to as outlined in publications by CIRIA (2001, 2006a, 2006b) and IFI (Guidelines on protection of fisheries during construction works in and adjacent to waters). |
| Brusna | • To minimise temporary reductions in floodplain storage on the Brusna, the instream works area cofferdam will have a top-level equivalent to the 50% AEP event. The sequencing will be such that the bridge parapet will be installed before the scour protection.<br>• The bridge parapet to be installed on the Brusna will be prefabricated to reduce the risk of cementitious pollution on site. |
| Ridgepool Road | • Instream working areas will be limited to 50 m lengths at any one time along the Ridgepool Road. |
| **Limit Suspended Solids** | |
| All Locations | • Placing silt fencing between works areas and pathways to watercourses<br>• Passing sediment-laden runoff and dewatering effluent through settling tanks and silt bags prior to discharging to watercourses.<br>• Ensuring dewatering pumps are placed in sumps surrounded by drainage stone.<br>• Prioritising infiltration of silt-laden water to ground through soak pits and infiltration trenches where feasible.<br>• Stockpiling only allowed in designated areas.<br>• Constructing ditches and installing silt fencing around stockpile areas (restricted to the compounds).<br>• Placing sandbags and/or straw bales as check dams in drainage ditches to attenuate runoff and reduce erosion.<br>• 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.<br>• 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.<br>• Reviewing earthworks programming when prolonged rainfall is forecast. |
| **Limit Cementous Particles** | |
| All Locations | • 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.<br>• 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.<br>• 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.<br>• 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.<br>• Treating cement-laden runoff and dewatering effluent in settling tanks before allowing discharge to watercourses.<br>• Dust suppression using water sprayers during demolition of quay walls or other activities resulting in the creation of cement dust. |
| **Limit Hydrocarbons** | |
| All Locations | • Training operatives in the use of spill kits and keeping spill kits at each work site.<br>• 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.<br>• Runoff from construction plant washdown to be collected and passed through an oil-water separator before release into the environment.<br>• Staff parking to be restricted to designated areas.<br>• Refuelling activities to be restricted to designated, bunded areas, at least 20 m from any watercourse or surface water feature.<br>• All construction plant to be regularly maintained and checked for oil and fuel leaks before use. Drip trays to be available on site. |

| Location / Receptor | Description of Mitigation |
|---|---|
| | • Consideration to be given to the use of biodegradable fuels and oils, where possible. |
| **Limit Construction Debris** | |
| All Locations | • Installing edge protection systems resembling cantilevered scaffolding over the River Moy at Emmet Street to prevent debris and sediment from wall reconstruction falling into the river. The decking shall include a toe board and be underlain by geotextile to trap sediments that wash through the floorboards. The supports for the scaffolding shall not rest within the watercourse.<br>• A floating boom will be deployed underneath the works areas to contain any floating debris or oil spills from spreading.<br>• The construction work and the storage of materials shall take place on the roadside and not on the scaffold overhanging the watercourse |
| **Flood Preparedness** | |
| All Locations | • Monitoring the tide forecast.<br>• Developing an emergency response and evacuation procedure for all works areas including removal of potential contaminants and construction plant and appropriate measures to manage any potential flooding. |
| River Moy Main Channel | • Checking water levels at Rahans gauge daily or twice daily during times of high flow when works are occurring in the vicinity of the River Moy. |

## 22.6.2 Operational Phase

**Table 22-13: Water Environmental Commitments for the Operational Stage**

| Location / Receptor | Description of Mitigation |
|---|---|
| **General Measures** | |
| Brusna, Bunree and River Moy | • The proposed walls on the Brusna have been set back as far as possible to mitigate disconnection to the floodplain.<br>• A petrol interceptor will be fitted to surface water pumping stations outfalling to the River Moy to mitigate against hydrocarbons entering the watercourse during pumping.<br>• Scour and erosion protection measures have been incorporated on the Brusna and Bunree watercourses. |
| **Flood Preparedness** | |
| All Locations | Operational protocols to be included in the O&M Manual. |
| **Monitoring** | |
| All Locations | • The OPW will continue to monitor flows in the River Moy at Rahans gauging station and any other stations within the catchment as required. Any unforeseen changes in extreme flow volumes or increased frequency will be risk assessed in the context of the scheme design.<br>• The EPA will continue to monitor water quality at the existing locations during the operational phase of the scheme as part of its WFD obligations.<br>• The O&M Manual will specify an inspection regime for all permanent elements of the scheme to ensure they remain in good working condition. This will include periodic structural inspections of flood defences, inspections and cleaning of culverts and flap valves, removal of debris from channels, and testing of pumping stations.<br>– Operational protocols for preparing for and responding to flood events will also be detailed in the O&M Manual. Repairs and remediation works will be carried out on permanent scheme elements as needed. |

## 22.7 Air Quality

The environmental impacts and associated commitments provided in **Chapter 13: Air Quality**, are summarised in **Table 22-14**.

### 22.7.1 Construction Phase

**Table 22-14: Air Quality Environmental Commitments for the Construction Stage**

| Location / Receptor | Description of Mitigation |
|---|---|
| **Communication** | |
| All Location | • The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board should also include head/regional office contact details. |
| **Site Management** | |
| All Locations | • During working hours, dust control methods will be monitored in addition to the daily meteorological conditions. Dry and windy conditions are favourable to dust suspension. The below mitigations must be implemented during working hours and if undertaking dust generating activities during dry and windy weather conditions additional mitigations, localised to the works area, can be put in place as appropriate.<br>• A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out. |
| **Preparing and Maintaining the Site** | |
| All Locations | • Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.<br>• Erect solid screens or barriers around dusty activities (such as stockpiles, excavations, material handling areas etc). or the site boundary that are at least as high as any stockpiles on site.<br>• Avoid site runoff of water or mud, which when dried out can lead to dust emissions. |
| **Operating Vehicles / Machinery and Sustainable Travel** | |
| All Locations | • Ensure all vehicles switch off engines when stationary - no idling vehicles.<br>• Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable. |
| **Operations** | |
| All Locations | • Only use cutting, grinding, or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g., suitable local exhaust ventilation systems.<br>• Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.<br>• Use enclosed chutes and conveyors and covered skips.<br>• Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate. |
| **Waste Management** | |
| All Locations | • Bonfires and burning of materials is prohibited. |
| **Measures Specific to Demolition** | |
| All Locations | • Ensure effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground. |
| **Measures Specific to Track out** | |
| All Locations | • Avoid dry sweeping of large areas. |

| Location / Receptor | Description of Mitigation |
|---|---|
| | • Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.<br>• Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.<br>• Record all inspections of haul routes and any subsequent action in a site logbook. |
| **Monitoring** | |
| All Locations | • Undertake daily on-site and off-site inspections, where receptors (including roads) are nearby, to monitor dust, record inspection results in the site inspection log. This should include regular dust soiling checks (visual inspections) of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary.<br>• Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions. |
| **Medium Risk Area Measures** | |
| River Moy and Quignamanger Works Areas | • Develop and implement a stakeholder communications plan that includes community engagement before works commence on site. Community engagement includes explaining the nature and duration of the works to residents and businesses.<br>• Keep site fencing, barriers and scaffolding clean using wet methods.<br>• Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site keep covered.<br>• Cover, seed, or fence stockpiles to prevent wind whipping.<br>• Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.<br>• Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.<br>• Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.<br>• Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.<br>• For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.<br>• Hard surfaced haul routes (including public roads) must be regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.<br>• Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).<br>• Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.<br>• Access gates to be located at least 10 m from receptors where possible. |

## 22.8 Climate

The environmental impacts and associated commitments provided in **Chapter 14: Climate**, are summarised in **Table 22-15** and **Table 22-16**.

### 22.8.1 Construction Phase

**Table 22-15: Climate Environmental Commitments for the Construction Phase**

| Location / Receptor | Description of Mitigation |
|---|---|
| Embodied Carbon Materials | • 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;<br>• Similarly, all concrete poured in-situ for the Proposed Scheme will consist of 50% GGBS cement;<br>• All reinforcing steel employed on site will be 85% minimum recycled steel.<br>• The use of these low embodied carbon materials in construction will reduce the construction phase emissions ad comply with the requirements of CAP23 (also a key message in CAP24).<br>• The use of non-concrete assets shall be optimised in the design e.g. gravel footpaths, grassed drains etc. to minimise the need for concrete.<br>• 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.<br>• 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.<br>• 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.<br>• A regular maintenance schedule for all construction plant machinery shall be undertaken to maintain optimum machinery efficiency.<br>• Sustainable timber post fencing will be specified over steel in boundary treatments where possible.<br>• Engines will be turned off when machinery is not in use.<br>• 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 |

### 22.8.2 Operational Phase

**Table 22-16: Climate Environmental Commitments for the Operational Phase**

| Location / Receptor | Description of Mitigation |
|---|---|
| All Locations | • Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods.<br>• Ensure all plant and machinery are well maintained and inspected regularly.<br>• The Project Carbon Management Plan handed over by the Contractor post construction will be maintained through the operation and maintenance phase. |

## 22.9 Noise and Vibration

The environmental impacts and associated commitments provided in **Chapter 15: Noise and Vibration**, are summarised in **Table 22-17**.

### 22.9.1 Pre-Construction Phase

Prior to the commencement of construction, the contractor will set out and agree a schedule of noise monitoring with the Local Authority to include the number and locations at which noise monitoring will be carried out, the frequency and duration of the monitoring and the reporting of results.

## 22.9.2 Construction Phase

**Table 22-17: Noise and Vibration Environmental Commitments for the Construction Phase**

| Location / Receptor | Description of Mitigation |
|---|---|
| **Best Practice Management** | |
| All Locations | Works will be carried out using Best Practicable Means (BPM) to minimise noise and vibration, such measures shall include:<br>• Limiting the hours of construction to daytime only unless absolutely necessary.<br>• Work practices, equipment noise control and screening shall be in compliance with BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise, and BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration (together referred to as B.S. 5228). Typical work practices include:<br>– Scheduling of noisy works to normal working hours.<br>– Adopting quiet working methods, using plant with lower noise emission levels<br>– Adopting working methods that minimise vibration generation particularly with regard to demolition.<br>– Plant such as pumps and generators used on or near sensitive locations will be contained within an acoustic enclosure.<br>– Plant and machinery used on-site will comply with the European Commission (EC) (Construction Plant and Equipment) Permissible, Noise Levels Regulations, 1988 (S.I. No. 320 of 1988).<br>– All noise producing equipment will comply with S.I. No 632 of 2001 European Communities (Noise Emission by Equipment for Use Outdoors) Regulations 2001.<br>– Ensuring that all plant is properly maintained, (mechanisms properly lubricated, faulty silencers replaced, worn bearings replaced, cutting tools sharpened etc.).<br>– Closing acoustic covers to engines when in use or idling.<br>– Use of electrically powered equipment in preference to internal combustion powered equipment.<br>– Use of hydraulic equipment in preference to pneumatic equipment.<br>– Use of wheeled plant in preference to tracked plant.<br>– Locating plant as far away from noise and vibration sensitive receptors as practicable.<br>– Installation of site hoardings or perimeter noise barriers.<br>– Use of temporary acoustic enclosures or screens around specific noisy static plant.<br>– Avoiding the unnecessary revving of engines and switch off equipment when not in use.<br>– Starting-up plant and vehicles sequentially rather than at the same time.<br>– Keeping internal haul routes well maintained to minimise impulsive noise and vibration from vehicles running over discontinuities in the running surfaces.<br>– Fitting rubber linings to chutes, hoppers and dumper vehicles to reduce impact noise from material transfer.<br>– Minimising drop heights of materials.<br>– Carrying out regular inspections of mitigation measures (BPM audits) to ensure compliance with noise and vibration commitments.<br>– Providing regular briefings for all site-based personnel so that noise and vibration issues (including the requirement to employ BPM at all locations at all times) are understood and that generic and site-specific mitigation measures are explained and adhered to.<br>– Ensuring that unloading is carried out within the work site rather than on adjacent roads or laybys.<br>– Phasing of materials deliveries to be controlled on a ‘just in time’ basis to minimise noise and congestion on roads around the site.<br>– 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.<br>– Channels of communication between the Contractor, the relevant Planning Section (Local Authority) and residents will be established at project commencement. |

| Location / Receptor | Description of Mitigation |
|---|---|
| | – Records of any noise complaints relating to the construction operations will be investigated as soon as possible and reported to the Local Authority.<br>• Where works need to be completed outside normal working hours or where proposed works indicate that the noise or vibration levels may be exceeded, permission for these works must be sought from the Local Authority in advance of any works taking place.<br>• The application for such works will require a detailed noise control plan and follow up report to be prepared. This plan will include:<br>(i) A justification for the works being carried out in the manner proposed,<br>(ii) An assessment indicating what alternatives have been considered,<br>(iii) A statement of the noise control measures from B.S. 5228 to be adopted and how Best Practicable Means will be used to control noise,<br>(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.<br>• A noise and vibration monitoring programme will be implemented for the duration of the construction phase.<br>• Full details of the Contractor's provision for noise and vibration monitoring and procedures including provisions for publication of monitoring results will be submitted to and approved by the Local Authority prior to commencement of work. The Local Authority shall have discretion to vary the monitoring requirements and publication of results during the course of construction. |
| **Rock Breaking and Consaws Noise Management** | |
| All Locations | • Full acoustic screening of rock breakers and consaws has been assumed for the assessment of noise from construction activities.<br>– Site hoarding or temporary noise barriers will be used to block line of site from rock breaking or consaw activities where Noise Sensitive Locations (NSLs) are located within 25 m of these activities.<br>– Locations where rock breakers and consaws are used will not be known until construction is in progress and therefore locations of the temporary noise barriers will be determined at construction stage.<br>• A formal stakeholder engagement process will be put in place for the duration of the construction phase, including the provision of information to local residents regarding works likely to cause significant noise or vibration and/or works planned to take place outside of core working hours and also establish a process for handling all enquires including complaints. |
| **Monitoring** | |
| All Locations | • Prior to the commencement of construction, the contractor will set out and agree a schedule of noise monitoring with the Local Authority to include the number and locations at which noise monitoring will be carried out, the frequency and duration of the monitoring and the reporting of results.<br>• No specific requirements for vibration monitoring have been identified, however should this be required a similar process to the above for noise will be followed by the contractor. |

## 22.10 Material Assets: Waste and Utilities

The environmental impacts and associated commitments provided in **Chapter 16: Material Assets: Waste and Utilities**, are summarised in **Table 22-18**, **Table 22-19** and **Table 22-20**.

### 22.10.1 Pre-Construction Phase

**Table 22-18: Material Assets: Waste and Utilities Environmental Commitments for the Pre-Construction Phase**

| Location / Receptor | Description of Mitigation |
|---|---|
| All Locations (Utilities) | • All existing services will be confirmed prior to construction using service records, further Ground Penetrating Radar (GPR) surveys and slit trenches to ensure that their position is |

| Location / Receptor | Description of Mitigation |
|---|---|
| | accurately identified before excavation works commence across all sections of the Proposed Scheme.<br>• Enabling works on utilities shall be programmed to maintain connections, or at least minimise downtimes, to public and private customers where conflicts arise.<br>• Early consultation shall be undertaken with service providers to enable providers to reroute their service during non-peak periods to maintain connections to customers.<br>• For unknown utilities encountered during construction works, further liaison with utility providers will be required to establish the preferred solution.<br>• Where diversions, or modifications are required to utility infrastructure:<br>– It will be planned in advance by the appointed contractor and adequate notice (not less than 14 days) will be given to all impacted properties.<br>– 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 as far as is practicable. |
| All Locations (Waste) | • WMP will be prepared in accordance with the *Best Practice Guidelines for the Preparation of Resources & Waste Management Plans for Construction and Demolition Projects* (EPA, 2021). The WMP will, as a minimum address the following aspects of the Proposed Scheme:<br>– Analysis of the waste arising/material surpluses<br>– Methods proposed for the prevention, reuse, and recycling of wastes.<br>– Material handling procedures<br>– Proposals for disposal of waste at appropriately licensed facilities only<br>– Proposals for education and a workforce and plan dissemination programme. |

## 22.10.2 Construction Phase

**Table 22-19: Material Assets: Waste and Utilities Environmental Commitments for the Construction Phase**

| Location / Receptor | Description of Mitigation |
|---|---|
| All Locations (Utilities) | • 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.<br>• Any damage to services as a result of the Proposed Scheme shall be repaired / replaced without delay.<br>• Safety procedures will be put in place to minimise the risk to utility provider personnel and the general public during works on services.<br>– 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.<br>• Alternative connections shall be provided before any connections are severed. Supply to existing services will be maintained as far as possible during construction.<br>• All proposed relocation / diversion works shall be delivered through the appropriate service provider processes e.g. Uisce Eireann Developer Services – Diversion process.<br>• 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.<br>– Works affecting 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).<br>• 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).<br>– 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. |

| Location / Receptor | Description of Mitigation |
|---|---|
| | – A no-tip zone will also be established within 10 m of power lines.<br>– All proposed poles will be placed at a sufficient distance from proposed earthworks. |
| All Locations (Waste) | The contractor will be obliged to implement and maintain the measures and actions contained within in the EIAR during the construction phase. Measures to be implemented on site shall include:<br>• **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.<br>• **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.<br>• **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, use of disposal bins, etc.) is to be conducted during the construction phase.<br>• **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. The excavated material will be reused for side-slope protection of the new embankment at Shanaghy Heights and regrading adjacent to the new flood walls. The Construction Environmental Management Plan (CEMP) will detail that minimal excavations will be maintained using shoring or trench boxes. This plan 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.<br>• 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.<br>– 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.<br>– 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. |
| **Monitoring** | |
| All Locations (Utilities) | • Methods such as ground penetrating radar (GPR), slit trenching and consultation in the verge areas can be used to verify or locate existing services. |
| All Locations (Waste) | • 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.<br>• 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.<br>• Segregation of construction site waste shall be carefully monitored with waste audits taking place at regular intervals. |

### 22.10.3 Operational Phase

**Table 22-20: Material Assets: Waste and Utilities Environmental Commitments for the Operational Phase**

| Location / Receptor | Description of Mitigation |
|---|---|
| All Locations (Waste) | • The waste hierarchy principles shall be fully implemented throughout the operational and maintenance phase to ensure that the circular economy approach is supported.<br>– Prevention, preparing for reuse, recycling and recovery will be enforced with appropriate waste management facilities chosen to accept disposed waste.<br>• The drainage design for the Proposed Scheme includes for four pumping stations and petrol interceptors.<br>– Notwithstanding these controls, given the sensitive nature of the receiving environment any sediments or vegetated material for disposal during maintenance should be considered hazardous unless testing of material is available to prove otherwise and it must be disposed of accordingly in an appropriately licensed facility.<br>– Sediment and plant waste is likely to require pre-treatment prior to disposal at a landfill site. This can take place either as the material is extracted or at the landfill site itself.<br>• Any waste arising from the operational and maintenance phases of the Proposed Scheme will be deposited at an appropriate facility in accordance with the current national waste policy.<br>– This is necessary so that all waste is disposed of to the best possible facility type in order to adhere to the circular economy and resource opportunity strategies.<br>• All waste to be removed from the site will be required to be collected by valid waste collection permitholders. All facilities to which waste will be taken will have appropriate waste licenses or permits, under the Waste Management Act 1996 to 2016, as amended, and the regulations thereunder. |

## 22.11 Material Assets: Land and Properties

The environmental impacts and associated commitments provided in **Chapter 17: Material Assets: Land and Property**, are summarised in **Table 22-21** and **Table 22-22.**

### 22.11.1 Construction Phase

**Table 22-21: Material Assets: Land and Properties Environmental Commitments for the Construction Phase**

| Location / Receptor | Description of Mitigation |
|---|---|
| All Locations | • Existing accesses to property, including homes and businesses, will be maintained during construction of the Proposed Scheme; otherwise, reasonable temporary access will be provided.<br>• 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.<br>• All lands temporarily acquired, will be re-instated to pre-construction conditions unless otherwise agreed with the landowner.<br>• Boundary treatment for all lands permanently acquired will be provided to mirror pre-construction conditions unless otherwise agreed with the landowner.<br>• Consultation with relevant landowners is ongoing and where instances of temporary or permanent landtake is required, Compulsory Purpose Order (CPO)/contractual agreements will be in place between MCC and the relevant landowners, prior to the commencement of the construction phase. |

## 22.11.2 Operational Phase

**Table 22-22: Material Assets: Land and Properties Environmental Commitments for the Operational Phase**

| Location / Receptor | Description of Mitigation |
|---|---|
| All Locations | • Land take will be dealt with by way of compensation. The details of any individual agreement will be private and confidential and therefore mitigation measures in the form of compensation are not specific or detailed in this EIAR.<br>• Where required, suitable fencing/ boundary treatment shall be erected along the Proposed Scheme.<br>• The maintenance and replacement of Proposed Scheme boundary fencing (where required) will be the responsibility of the local authority.<br>• Prior notice of any maintenance access requirements (via wayleave) will be given to landowners. |
| **Brusna** | |
| BR28 | • Reinstate to existing condition<br>• Reinstate/replace in agreement with landowner |
| BR47 | • Reinstate to existing condition |
| BR60 | |
| BR63 | |
| BR74 | |
| BR71 | Reinstate to existing or improved condition. |
| URBR 1 | |
| BR97 | Reinstate as agreed with landowner. Working hours to be agreed. Access to be facilitated |
| **Bunree** | |
| BU82 | • Reinstate to existing condition - boundary/ site<br>• Compensatory trees to be planted. Fencing at open section of channel to be provided |
| BU35 | • Reinstate to existing condition - road/ boundary<br>• Reinstate access/ trees |
| BU33 | • Reinstate to existing condition - road/ boundary wall<br>• Reinstate access |
| BU67 | • Temporarily acquire site for the works.<br>• Reinstate to existing condition - road/ boundary<br>• Reinstate access |
| BU19 | • Reinstate to existing condition - road/ boundary fence |
| BU14 | • Reinstate access |
| BU58 | • Reinstate to existing condition - road/ boundary |
| BU37 | • Reinstate access |
| BU 86 | |
| BU46 | |
| BU95 | |
| BU9 | |
| BU34 | |
| BU90 | |
| BU40 | Reinstate to existing condition - road/ boundary |
| BU50 | |
| BU102 | • Reinstate to existing condition - road |
| BU104 | • Reinstate access |

| Location / Receptor | Description of Mitigation |
|---|---|
| BU7 | • Reinstate to existing condition - road/ boundary/ site<br>• Reinstate access<br>• Reinstate trees |
| BU32 | Reinstate to existing condition - road |
| **Moy** | |
| M6 | Site leased. Temporarily acquire site for the works. Reinstate to existing condition |
| URM1 | • Temporarily acquire site for the works.<br>• Relocate boat yard to suitable site.<br>• Reinstate to existing condition.<br>• Rebuild slipway |
| M99 | Reinstate to existing or improved condition |
| M44 | • Temporarily acquire site for the works.<br>• Reinstate to existing or improved condition |
| M80 | • Temporarily acquire site for the works. |
| URM10 | • Reinstate to existing condition |
| URM2 | Reinstate to existing condition |
| **Quignamanger** | |
| Q79 | • Removal of Scrub<br>• Implementation of biodiversity and landscaping measures as per landscape design |
| Q45 | Reinstate to existing/ improved condition |
| Q43 | |
| Q68 | Reinstate to existing or improved condition |
| Q69 | |
| Q15 | Reinstate to existing condition - road/ laneway/ boundary |
| **Tullyegan** | |
| T110 | Reinstate to existing condition |
| T75 | |
| T73 | |
| T70 | Reinstate to existing condition. Working hours to be agreed. Access to be maintained during construction |
| T74 | Reinstate as agreed with landowner. Working hours to be agreed. Access to be maintained during construction |
| T71 | |
| T72 | |

## 22.12 Cultural Heritage

The environmental impacts and associated commitments provided in **Chapter 18: Cultural Heritage** are summarised in **Table 22-23**.

## 22.12.1 Construction Phase

**Table 22-23: Cultural Heritage Mitigation Measures for the Construction Phase**

| Locations / Receptors | Description of Mitigation |
|---|---|
| All Locations | • Licenced archaeological monitoring of all ground reduction/topsoil stripping areas within the design footprint and works areas (including compensatory woodland planting areas, temporary storage/compound areas and in-river works areas), during construction stage.<br>• Any identified built heritage features sited along access routes or immediately adjacent to works areas/along streetscapes shall be protected by temporary hi-visibility fencing measures, where required, to avoid any inadvertent strike damage by vehicular movements.<br>• Any commemorative wall-mounted plaques or free-standing artwork installed by the local community (in particular along Ridgepool Road) will require careful removal, temporary storage, and reinstatement post-works, in consultation with relevant local community groups.<br>• All mitigation measures are subject to statutory prior agreement by National Monuments Service/National Museum of Ireland. |
| Emmet Street | • Detailed surveys of historic walls, steps etc. to be retained as part of the Scheme (mainly at Emmet Street River Boundaries) will be required to enable quantification and preparation of specifications for repair and restoration works. |
| **Moy** | |
| RPS 31 | Protective temporary hi-visibility fencing, if required |
| RPS 4 | |
| RPS 8 | |
| 31204116 | |
| CH 05 | |
| CH06 | |
| Pearse Street (incl Emmet Street in part) | |
| RPS 28 / NIAH 31204108 | |
| MA030-074001- / RPS 30 / NIAH 31204112 | |
| MA030-074002-/ RPS 30 / NIAH 31204112 | |
| MA030-074003- / RPS 30 / NIAH 312041123- | |
| RPS 28 / NIAH 31204108 | |
| NIAH 31204107 | |
| Bachelors Walk walling | • Preservation by record (to include for townland boundary element UCH11): written, digital/photogrammetry survey and drawing, including tie-in with Lower bridge, with photographic built heritage record. To also include sample drawn and survey section through walling prior to removal as part of advance works programme. Re-use of salvaged stone where feasible. Submission of digital record to Irish Architectural Archive (IAA) and Ballina Library<br>• On-site archaeological monitoring during wall removal and ground reduction measures for new hard defences, within works area, including in-river |

| Locations / Receptors | Description of Mitigation |
|---|---|
| UCH11 | On-site archaeological monitoring during vegetation clearance, adjacent flood wall removal and ground reduction measures for new hard defences, within works area, including in-river. |
| UCH17 | Protective temporary hi-visibility fencing around the steps to avoid damage from access along the berm. |
| MA030-056001-/ RPS 11/ NIAH 31204105 / UCH15 / UCH10 | • Protective temporary hi-visibility fencing (with 5m buffer at stone culvert area UCH10 if feasible). Removal of existing flood walling by hand at tie-in points with wingwalls, to avoid any inadvertent damage.<br>• On-site archaeological monitoring during adjacent flood wall removal and ground reduction measures for new hard defences, within works area, including in-river. Should any sub-surface/underwater features be encountered these will be preserved in situ or by record (full excavation) as appropriate.<br>• Hydrological impact of accretion extension on the water flow to be monitored to avoid potential scouring impact to bridge. |
| MA030-056002- / UCH15 | On-site archaeological monitoring during adjacent flood wall removal and ground reduction measures for new hard defences, within works area, including in-river. Should any sub-surface/underwater features be encountered these will be preserved in situ or by record (full excavation) as appropriate. |
| Clare Street (Howley Street) walling | • Preservation by record: written, digital/photogrammetry survey and drawing, including tie-in with Lower bridge, with photographic built heritage record. To also include sample drawn and survey section through walling prior to removal as part of advance works programme. Re-use of salvaged stone where feasible. Submission of digital record to IAA and Ballina Library<br>• On-site archaeological monitoring during wall removal and ground reduction measures for new hard defences, within works area, including in-river. |
| CH01 | Preservation by record: written, digital/photogrammetry survey and drawing, with photographic built heritage record. Re-use of salvaged stone where feasible Submission of digital record to IAA and Ballina Library. |
| CH02 | |
| CH03 | |
| CH04 | Protective temporary hi-visibility fencing and exclusion zone during works |
| Cathedral Road walling | • Preservation by record: written, and photographic built heritage record of existing amenity area in context of landscape setting (Upper and Lower Bridges). Submission of digital record to IAA and Ballina Library.<br>• On-site archaeological monitoring during paving/amenity space removal and ground reduction measures for new raised platform, within works area |
| NIAH 31204106 / UCH14 | Preservation by record: written, and photographic built heritage record of existing quay walls with railings in context of existing urban landscape setting (Upper and Lower Bridges). Submission of digital record to IAA and Ballina Library. Careful dismantling and rebuilding of existing ashlar walling and glass panel inserts per detailed Project Conservation Architect specification and instruction; use of match stone for blocking of current rail openings. |
| RPS 33 / NIAH 31204104 / UCH12 | • Protective temporary hi-visibility fencing. Removal of existing flood walling by hand at tie-in points with southerly wingwalls, to avoid any inadvertent damage.<br>• On-site archaeological monitoring during adjacent flood wall removal and ground reduction measures for new hard defences, within works area (including in-river). Should any sub-surface/underwater features be encountered these will be preserved in situ or by record (full excavation) as appropriate.<br>• Hydrological impact of accretion extension on the water flow to be monitored to avoid potential scouring impact to bridge. |
| RPS 35 / NIAH 31204103 / UCH13 | • Preservation by record: written, and photographic built heritage record of existing walling at Ridgepool Road in context of existing urban landscape setting (Salmon Weir). Removal of existing flood walling by hand at tie-in points at IFI building, to avoid any inadvertent damage.<br>• On-site archaeological monitoring during adjacent flood wall removal and ground reduction measures for new hard defences, within works area, including in-river. Should any sub-surface/underwater features be encountered these will be preserved in situ or by record (full excavation) as appropriate. |

| Locations / Receptors | Description of Mitigation |
|---|---|
| CH07 | On-site archaeological monitoring during all flood wall removal and ground reduction measures for new hard defences, within works area. Should any sub-surface features be encountered these will be preserved in situ or by record (full excavation) as appropriate. |
| CH18 | Careful removal prior to construction stage to a designated storage location for safe-keeping for re-installation upon completion of works. The removal, storage, and re-installation plan to be agreed with local community group and artist in advance of works. |
| Ridgepool Rd walling | • Preservation by record: written, digital photogrammetry survey and drawing, including tie-in with Upper Bridge, with photographic built heritage record. To also include sample drawn and survey section through walling prior to removal. Re-use of salvaged stone where feasible. Submission of digital record to IAA and Ballina Library.<br>• On-site archaeological monitoring during wall removal and ground reduction measures for new hard defences, within works area, including in-river. |
| UCH16 | On-site archaeological monitoring at all in-river works areas. Should any underwater finds be encountered, these will be removed, recorded, stored, and archived as appropriate. |
| Barret Street (riverside) railings | On-site archaeological monitoring during wall removal and ground reduction measures for new hard defences, within works area. |
| **Brusna (Glenree)** | |
| CH08 | On-site archaeological monitoring during ground reduction measures for new hard defences, within works area, including in-river |
| CH09 | |
| UCH08 | • Preservation by record: written, digital drawing and photographic archaeological/built heritage record in advance of construction.<br>• On-site archaeological monitoring during in-river works. |
| UCH07 | |
| CH11 | Careful routing of site traffic to avoid inadvertent damage to parapets |
| CH14 | Direct liaison with community to scope feasibility and/or need for re-siting at an appropriate alternative location nearby |
| **Tullyegan** | |
| CH16 | Protective temporary hi-visibility fencing to west parapet, if required |
| UCH09 | • Preservation by record: written, digital drawing and photographic archaeological/built heritage record in advance of construction.<br>• On-site archaeological monitoring during in-stream works. |
| **Bunree / Behy** | |
| UCH02 | Preservation by record: written, digital drawing and photographic archaeological/built heritage record in advance of construction. |
| UCH04 | |
| UCH03 | On-site archaeological monitoring during in-stream works. |
| **Quignamanger** | |
| CH17 | • Preservation by record: written, digital survey and drawing, including tie-in with Upper Bridge, with photographic built heritage record. To also include sample drawn and survey section through walling prior to removal. Re-use of salvaged stone where feasible. Submission of digital record to IAA and Ballina Library.<br>• On-site archaeological monitoring during ground reduction measures for new hard defences, within works area. Followed by preservation by record of any sub-surface foundation remains/upstanding footings (written, digital survey and drawing, photographic record and any archaeological -based recording methods as appropriate – contexts, stratigraphy, finds etc). |
| UCH01 | Preservation by record: written, digital drawing and photographic archaeological/built heritage record in advance of construction. |

# 22.13 Landscape and Visual

The environmental impacts and associated commitments provided in **Chapter 19: Landscape and Visual**, are summarised in **Table 22-24**.

## 22.13.1 Construction Phase

**Table 22-24: Landscape and Visual Environmental Commitments for the Construction Phase**

| Location / Receptor. | Description of Mitigation |
|---|---|
| Visual Receptors<br><br>All Locations | • Temporary storage heaps associated with topsoil are not to exceed 1m height.<br>• The storage compound areas will be reinstated to former use upon completion of the works.<br>• Vehicles exiting compound areas will be subject to wheel wash facilities or road sweepers shall be used in order to maintain clean roads.<br>• Any lighting used will be kept to a minimum, providing for site safety only and shall be directed into the compound and away from adjacent residential properties. Lighting at the site compound shall be shielded to avoid light spill onto adjacent properties and roads.<br>• Prior to commencement of construction, existing trees which are to be retained will be protected with fencing to ensure no works or storage of materials occurs within the root protection zones identified in the tree survey carried out by a qualified arborist. The tree protection works will be in accordance with BS 5837:2012 Trees in relation to construction.<br>• Ash trees suffering from ash-dieback will be removed as part of the scheme. |
| **Monitoring** | |
| All Locations | • Protection of the existing trees to be retained will be monitored during construction in accordance with BS 5837:2012 |

## 22.13.2 Operational Phase

| Location / Receptor. | Description of Mitigation |
|---|---|
| **Proposed Planting** | |
| River Moy | • The existing ash trees suffering from ash dieback on Ridgepool Road are to be replaced with healthy semi-mature street trees in buildouts between parking spaces.<br>• The existing lime trees on Cathedral Road will be supplemented with trees of the same species and size to complete a continuous avenue of trees along the length of the street.<br>• New street trees to the replace the trees lost on Clare Street located will be planted in special triangular wall build-outs.<br>• Woodland planting suitable for river banks is proposed on the north western part of the River Moy to screen the boatyard and dairy buildings. There is also planting proposed for the riverside park on the north-eastern bank of the River Moy. Here the planting is to be located at a minimum of 3 m behind the existing features of the park. The planting is also intended to compensate for the loss of riverside vegetation in other areas. |
| Quignamanger Stream | • Planting to compensate for the loss of riverside vegetation in other areas at the junction of Creggs Road and Quay Road. |
| Bunree / Behy Road Stream | • Significant proportion of the shrubs and trees are to be planted on either side of new open channel in the green area in the Moyvale Park housing estate to the western end of this sub-study area. They are to have thorns to deter access to water |
| Brusna (Glenree) River | • Planting to compensate for the loss of riverside vegetation in other areas and to enhance the riverbank vegetation cover in this area. |

| Location / Receptor. | Description of Mitigation |
|---|---|
| Tullyegan Stream | • Native woodland planting will be planted adjacent to a downstream stretch of the Tullyegan Stream in the Rehins Fort housing estate to compensate for vegetation loss due to the Proposed Scheme. |
| **Proposed Structures** | |
| All Locations | • Reuse of materials, particularly reclaimed stone in the existing walls, where appropriate, is proposed to help blend the new structures into the surrounding landscape and increase the sustainability of the Proposed Scheme.<br>• Any additional new stone required for the stone facing will be sourced as locally as possible to match or complement the stone to be found on the existing bridges, other surrounding structures and the stone to be reused. |
| **Landscape Management** | |
| All Locations | • Long term landscape management and maintenance measures are recommended for implementation during the lifetime of the Proposed Scheme to monitor the health of the proposed planting.<br>– These measures will include a range of arboricultural and landscape maintenance tasks for the purpose of maintaining or improving the health of existing retained vegetation and proposed planting. |

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