Office of Public Works

River Bride (Blackpool)Certified Drainage Scheme

Preliminary Maintenance Plan

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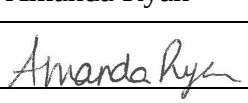
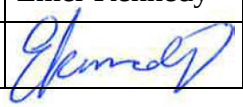
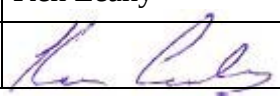
		Signature			
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1 Introduction

Under Section 37 of the Arterial Drainage Act 1945 as amended, the Office of Public Works (OPW) is statutorily obliged to maintain all drainage (or flood relief) scheme works elements (including watercourses, embankments, flood defences, pumping stations), which have been completed as part of schemes confirmed under the Arterial Drainage Act 1945 as amended, in proper repair and effective condition. This maintenance work is crucial to the function of the flood defence scheme; not carried out there would be a consequent erosion in the standard of defence provided by the scheme, as well as an increase in the risk of flooding of people's homes, businesses and infrastructure, and negative impacts on human interests and livelihoods.

Channel and embankment maintenance operations can encompass a variety of activities, including silt and vegetation management, aquatic vegetation cutting, bank protection, bush cutting/branch trimming, tree cutting, mulching, mowing and structure maintenance.

Maintenance is a responsibility of the OPW. All OPW maintenance work is undertaken in accordance with Environmental Procedures and the OPW Environmental Guidance: Drainage Maintenance (2019) along with additional measures where the Environmental Protocols show deficiencies, to ensure adverse impacts on the environment are considered and minimised. OPW drainage maintenance activities will also be subject to a separate Ecological and Appropriate Assessment process to ensure no adverse impacts arise.

Future channel maintenance will apply to the River Bride (Blackpool) Certified Drainage Scheme. The location of channel maintenance is shown as general interferences on the drawings from RB_201 to RB_212 of the Confirmation Drawings. Specific maintenance activities are described in detail in this report.

2 Details of Proposed Maintenance Activities

Further detail of the proposed maintenance activities and requirements is described in the following section and is separated into channel maintenance and flood scheme/structure maintenance. The extents of maintenance within the scheme is as outlined on the previously issued Confirmation drawings (RB_201 to RB_212) and has not changed since Confirmation issue.

Consultation will be required with the relevant stakeholders as necessary during the planning of these maintenance works including landowners, Inland Fisheries Ireland (IFI), the National Monuments Service (NMS), Cork City Council (CCC), and National Parks and Wildlife Service (NPWS) to ensure that the works are carried out with minimal environmental impact.

2.1 Channel Maintenance

A channel maintenance programme will be required throughout the reach of the watercourses impacted by the proposed works. The channel maintenance programme will pay particular attention to locations where silt, gravel and debris are likely to accumulate, such as at structures, sharp bends, culvert inlets, blockages from trees etc. At this stage, the exact nature and scale of channel and embankment maintenance work likely to be required for the River Bride (Blackpool) Certified Drainage Scheme is unknown.

The design of the scheme is such that all significant maintenance works within the riverbed have been focused into areas where pre-defined interventions are planned. The strategic removal of course sediment at the downstream end of the catchment, within a heavily engineered section of the watercourse concentrates the maintenance works to the sediment trap and the immediate channel downstream. This has number of bed check devices, and a further control with the installation of a debris screen.

Limited geomorphic impacts from the planned works upstream are predicted, and it is expected that only at the winter channel overflow will occasional erosion control and sediment removal in this reach be required.

The river restoration planned through the Dulux works will be subject to adjustments and redistribution of the rock armour forming the low flow channel in the early part of the scheme. Limited access by a machine will be required, it is expected that the channel form will settle down after a couple of flood seasons.

The purpose of any channel maintenance is to ensure that the scheme elements are kept in “proper repair and effective condition”. Channel maintenance to that end will include the removal of silt/gravel build-ups and vegetation to maintain the as-designed channel cross section but this will not require removal of material below the existing bed. This removal of silts to maintain the designed cross section is not considered dredging. The following measures will also be incorporated into the channel maintenance methodology:

a) This work is carried out as much as possible from the riverbank without in stream tracking,

b) Any unavoidable in stream work is carried out between May and September,

c) Tree removal is limited to fallen trees, overhanging branches or newly established trees in-channel/ bank (where their presence impacts on the channel hydraulic capacity),

d) Tree roots are not pulled from the riverbank.

Other measures will include regular scheduled maintenance of the river channel and pruning of trees (including removal of trees where necessary), planning and control measure. In general, channel maintenance will typically consist of the following activities:

- The channels will be monitored by means of a walkover survey from the banks on a regular basis (likely quarterly for the first couple of years and annually thereafter, and also following a significant flood event). The walkover surveys will aim to identify issues with implications for flood risk (e.g. fallen trees, excessive vegetation build-up, overgrown trees, illegal dumping, accumulation of granular deposits, etc.). In-channel debris will typically be removed by a long reach excavator working from the banks. Excessive overhanging vegetation will typically be pruned back or removed by hand using a cherry picker, depending on access.
- Removal of build-up of foreign or natural material that impedes the flow of water within the watercourse or river channel in order to maintain the hydraulic conveyance to pass the design flood. This will include periodic removal of material within the channel by means of suitably rigged excavators or similar equipment. Where access is required to the watercourse, this will be carried out as close as practical to the area of channel subject to maintenance to minimise the length of tracking along the channel. Maintenance works are to be carried out from the bank/dry side where possible depending on flow conditions and other constraints. For example, maintenance activities to remove bed material build up will be ideally carried out during low flow periods to minimise the risk of siltation and material transport downstream. This will be carried out by a long reach excavator but due to space constraints within the scheme, this may not be possible within certain areas and in stream access will be required. Typically, this material would be deposited on the riverbanks subject to space constraints or may be disposed offsite to an appropriately licenced waste facility.
- This would be carried out on average every 4-6 years but shall be assessed on an annual basis by means of a site walkover survey. This applies to all extents of the scheme watercourses as indicated on the previously issued Confirmation Drawings RB_201 to RB_212. No change in extent of watercourses subject to channel maintenance is proposed as a result of finalising detailed design of the scheme.
- Critical areas where this will be carried out include upstream and downstream of bridges, culverts, the scheme sedimentat trap and areas where local widening of the channel is proposed.

- The volume of future material to be removed from the scheme extents is impossible to predict and is dependent on future flow regime within the river, climate change and land use management upstream. As a worst-case scenario, it is envisaged that 180 m^3 material will be removed on an annual basis at the sediment trap. The sediment trap does not have to fully emptied each time, and some material in the low flow channel will be retained. Once the river has adjusted to the works upstream an annual removal of sediment is considered sufficient. A set of marker posts will be installed along the sediment trap to trigger removal. Based on sequential filling of the sediment trap and with each bay filling to different depths, ie 1st bay is likely to be filled first and to a higher depth, then a worst-case scenario would be to remove 180m^3. This shall be based on a trigger of 0.4m fill depth in the first bay, and 0.3m in the second and third.
- Cutting back and removal of overgrowth and fallen trees. This prevents snagging of debris upstream or at hydraulic structures such as bridges and culverts which reduces the risk of blockages. Furthermore, removal of vegetation reduces the risk of material build up at these locations. This can be typically carried out by less invasive mechanical means such as using weed cutting boats or similar less intrusive equipment. During low flow events, manual intervention into the river may be possible subject to health and safety assessment and methods of working. Emergency removal of fallen trees may be required at intermittent periods or as required following regular inspection of the channel extent such as pre and post flood events. This is to be carried out during the appropriate environmental period (i.e. outside the breeding bird season) or if required as emergency works shall be carried out in consultation with a suitably qualified ecologist.
- Inspection of watercourse for evidence of scour or riverbank erosion. This includes ongoing inspection of placed rock armour, erosion protection membranes, stone slabs in culverts (proposed as part of the scheme), existing riverbanks and other in-stream features.
- Invasive species survey and treatment management plan: This includes annual survey and treatment (where required) of invasive species along the channel extent. Treatment of invasive species commenced in 2016 and is currently on-going. This treatment will continue through construction and an Invasive Species Management Plan shall be implemented as part of the maintenance regime of the scheme.

2.2 Maintenance of Structures and Equipment

The inspection regime will ensure that there is no deterioration in the structural integrity of the defences which may occur as a result of a vehicular collision for example. It is expected that the flood defences will otherwise be relatively maintenance free.

The embankment and flood wall structures will be monitored by means of a walkover survey from the banks on an annual basis (See Table 1 below). The walkover surveys will aim to identify issues with implications for flood risk (e.g. damage to structures, settlement of embankments, etc.).

Culverts will be inspected on an annual basis and following a significant flood event. Any debris present in the culvert will be cleared by hand. A full CCTV survey and clearing of silt/sediment from the culvert is expected to take place approximately every ten years. Removal of debris will be carried out as required.

Pumping stations and flap valves will be inspected bi-annually or after a severe flood event.

Regular maintenance of the scheme elements is required and the requirements for each element is outlined in further detail in Table 1 summarises the maintenance requirements of the scheme, including seasonal constraints, frequency and duration. below, including typical frequency required for maintenance tasks.

While the more routine and predictable types of maintenance works are described in the following table and the previous text in this document, it should also be noted that any issue that may occur, which has the potential to threaten the effectiveness or adequacy of any element of the Drainage Scheme, will be addressed as required.

3 Maintenance Schedule

Table 1 summarises the maintenance requirements of the scheme, including seasonal constraints, frequency and duration.

Table 1: Ongoing routine maintenance

Element	Instream?	length/ number / extent	Maintenance Task	Predicted Average Frequency	Season	Routine Maintenance Activities / Defect Resolution
Embankment	Some	406m	Mowing	6 months	Spring & Autumn	Ride-on mower, strimmer required.
			Visual inspection & repair	Annually / as required	After mowing / as required	Should localised consolidation occur, topping up of the embankment may be required. This will include topping up with topsoil and re-seeding. In the unlikely event that high flows may cause localised erosion of the embankment, repair will be requirement immediately. This will include excavating locally around the area of erosion as required and reinstating with impermeable material and replacement of seeded topsoil and erosion protection membrane on top.
Floodwalls	Yes, majority	2210m	Structural inspection and vegetation control	Annually / after major storm events or vehicle impact	Fisheries window / summer low river flow Post-storm permitted by exception.	Visual inspection from opposite bank; where closer inspection is required access by wading. Min two persons at all times. Vegetation control as required; infrequent. Two-person min crew. Manual with truck for vegetation removal.

Element	Instream?	length/ number / extent	Maintenance Task	Predicted Average Frequency	Season	Routine Maintenance Activities / Defect Resolution
			Sealant replacement	20 years	Fisheries window / summer low river flow	Repair/replacement of polyurethane joint sealant and close cell joint filler board every 20 years (typical). This will include removal of the old joint from the top of the wall (including coping) to the top of the wall base. This will require a small/narrow excavation at the location of each wall joint only to expose the base on both wet and dry side of the wall. Works in river using a small excavator is likely. The existing joint will be removed, replaced with a new joint and the local area reinstated as existing. Manual labour required, estimate 2 workmen.
			Repointing mortar joints in cladding or existing masonry walls (say 25% of area)	20 years	Fisheries window / summer low river flow	Repointing mortar joints: Cleaning of wall to remove vegetation and loose mortar, raking out of joints, and pointing of mortar in affected areas. For walls close to the river, this will involve instream works (by hand) to remove the existing mortar to a specified depth and reinstatement with new mortar. Scaffolding within the river may be constructed or alternatively a cherry picker may be used. Appropriate flow diversion methods may be required, and appropriate environmental mitigation measures put in place to ensure that mortar does not enter the river channel. Manual labour required, estimate 2 workmen.
Flap Valves, Penstocks, Other movable/wearable elements	Yes	Not quantified	Visual Inspection & vegetation control	Bi-annually	Any	Inspection to check for broken components or blockages. Inspection of seals. Vegetation control.
			Replacement	25 years	Any	
Pumping Stations	No	8 no.	Inspections & regular running of pumping station	Bi-annual testing / after major storm events	Any	As per manufacturer's recommendations which will include regular running of pumping stations, removal of blockages, replacement of parts, condition assessment and repairs
			Testing of telemetry system and equipment	Dry run at least bi-annually	Any	As per manufacturer's recommendations. This is to include inspection of ultrasonic gauges

Element	Instream?	length/ number / extent	Maintenance Task	Predicted Average Frequency	Season	Routine Maintenance Activities / Defect Resolution
			Inspection of riser pipework - Check for broken seals and blockages.	Quarterly and before and after heavy rainfall events	All	Localised repair of discrete components. Two-man crew, van required. Remote lifting equipment for heavier pump components. Lifting davits provided in the permanent design.
			Sump manholes - Inspection and removal of blockages	Bi-annual testing / after major storm events		Two-man work crew. Maintenance truck with water tanker.
			Electrical Works Replacement	20 years	Any	Electrician; two-man crew. Van.
			Running costs (electricity)	Annual	Any	
Culverts	Yes, all	981m	Visual inspection	Annual / after major storm event	Any	Inspection from access points to identify and if necessary, remove debris and reinstate stone slabs (as necessary). Structural inspection to be also carried out. (Note: Confined space and other H&S procedures required)
			Clearing of silt	10 years	Fisheries window / summer low river flow	Some replacement gravel may be required to ensure min embedment depths are maintained.
			Full CCTV survey	10 years	Fisheries window / summer low river flow	Two-man crew, van, traffic management.
Whole of the scheme	Yes	~7km	Full visual inspection	1 year/ inspection 10 years remediate	Any	Two-man crew, traffic management.

Element	Instream?	length/ number / extent	Maintenance Task	Predicted Average Frequency	Season	Routine Maintenance Activities / Defect Resolution
			Vegetation clearance,	Annual / after major storm events	Location dependant. In-channel maintenance is permitted in fisheries window Out of channel vegetation clearance must be outside of bird nesting season	Season for vegetation clearance to be agreed with NPWS and IFI based on extent of works required. Potential conflict between fisheries window and bird nesting season.
Trash screens / Roughing screen	Yes	2 of each	Cleaning of Debris	Every 2 months & after storm events	All	Small excavator
Winter channel	Yes	78m	Visual inspection	Annual / after major storm event	Any	Inspection from formal access point to identify and if necessary, remove debris and sediment build up.
Sedimentation trap	Yes	180m^3 maximum	Visual inspection Clearing of Debris and sediment removal if required	Annual / after major storm event	Any	Small excavator
River channel maintenance	Yes	~7km	Visual inspection Removal of in-channel debris and foreign material Pruning of overhanging vegetation	Every 3 months & after flood events. Annual	Any time of year, disruption of riverbed by exception and subject to IFI approval.	Small excavator & cherry-picker

Element	Instream?	length/ number / extent	Maintenance Task	Predicted Average Frequency	Season	Routine Maintenance Activities / Defect Resolution
Bridge	Yes	4 no.	Visual inspection	Annual / after major storm event	Fisheries window / summer low river flow Post-storm permitted by exception.	Inspection from access points to identify and if necessary, remove debris and reinstate stone slabs (as necessary). Structural inspection to be also carried out. (Note: Confined space and other H&S procedures required)
Access stairs	No	3 no.	Visual inspection, local repairs or replacement	10 years	Any	Two-man work crew.
Access tracks and ramps	No	Not quantified	Visual inspection, weeding, local repairs or replacement	10 years	Any	Two-man work crew.
Fencing and gates	No	Not quantified	Visual inspection, local repairs or replacement	5 years	Any	Two-man work crew.
Foul and combined manholes	No	Not quantified	Inspection to check the seals in surface, foul and combined manholes which form part of the flood relief scheme. Inspection to check that sealed manholes operate correctly including inspection of locking mechanisms where required.	Annually	Any	Foul water drainage including combined sewers to be maintained by Irish Water.
Surface water drainage including valves	No	Not quantified	Inspection of pipes/drains and removal of any blockages. CCTV survey to be undertaken at long term periods	Annually. Full CCTV (10 year period)	Any	Two-man work crew. CCTV survey equipment. Surface water drainage system to be maintained by Local Authority.
Filter drains	No	Not quantified	Visual Inspection	5 years	Any	Site walkover. Culvert inspection.
			CCTV survey	10 years	Any	Two-man work crew. CCTV survey equipment
			Granular Fill Replacement	20 years	Any	Excavator. Occasional removal (every 20-25 years) of the gravel infill will be required to remove sediment more efficiently. The gravel can either be cleaned and

Element	Instream?	length/ number / extent	Maintenance Task	Predicted Average Frequency	Season	Routine Maintenance Activities / Defect Resolution
						reused, or new material used as a replacement. Cleaning and replacing gravel is the preferred option as it is more sustainable than disposing of the gravel. The geotextile surrounds to the trench and to the pipes may also require replacement at this time. Similarly, the layer of topsoil and grass will need to be replaced following removal and replacement of gravel infill and also to remove sediment build-up in the grass. Small lengths will probably be cleaned using a small excavator to remove and replace the material. There are specialist companies that can clean long lengths of linear filter drain (e.g. alongside roads) using specialist machinery. The machinery can easily deal with single size material of 40mm and Type B filter material (partial infiltration). The machinery lifts the filter material from the trench, segregates and cleans it and then returns it to the trench. Typically, the machines will clean the gravel to depths of 300mm or exceptionally 600mm. Disposal of silt and debris that is removed is achieved via a belt which can discharge to a truck running alongside, or it can be deposited well back on the verge if permitted. The amount of spoil is usually in the order of 5-10 tonnes for every 100m of drain cleaned to 300mm depth.