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Member of the SNC-Lavalin Group

Munster Term Maintenance Contract No. 4

Curraheen Little Embankment Defects - Natura Impact Statement

Transport Infrastructure Ireland

9 April 2024

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Document history

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Contents

1. Introduction

AtkinsRéalis was commissioned by Transport Infrastructure Ireland (TII) to prepare a Natura Impact Statement (NIS) for works proposed to address defects to works undertaken on the Curraheen Little Embankment in 2023 (hereafter "the original works"). The original works were subject to AA on the basis of an NIS (AtkinsRéalis Doc. Ref. 5162555DG0046 rev 2). The site location is shown in Figure 1-1 below.

This document comprises the NIS for the proposed works and is intended to provide TII, in its capacity as the competent authority, with objective information to inform its AA determination regarding the implications of those works for European sites.

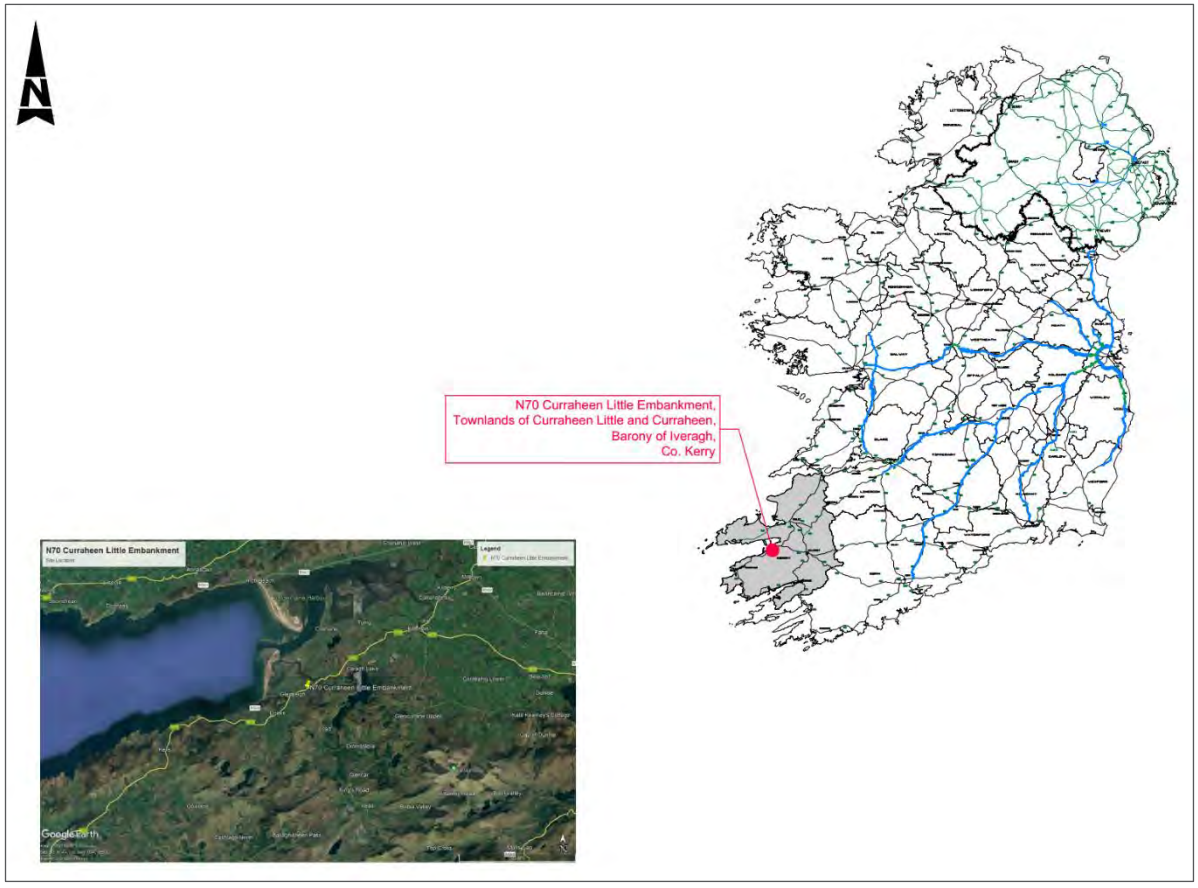

Figure 1-1 - Site location (see at original scale in Appendix A).

1.1. Background

1.1.1. Original Works

In October 2022, a slope failure was noted by Kerry County Council within a section of embankment supporting the N70 national road c. 50m east of Curraheen Little Bridge (KY-N70-017.00), in the townland of Curraheen, between Killorglin and Glenbeigh. This had occurred within section of embankment located on the north-western side of the N70 carriageway, where the Knockaunglass stream flows in a north-easterly direction along the toe of the embankment. During 2023, as part of Term Maintenance Contract No. 3, this original slope failure was addressed by reprofiling the embankment to a 1:2 slope over a length of c. 65m centred on the main slope failure. This involved the following: -

1. Permanent realignment of the stream along the new embankment bottom (by a maximum of c. 10m) over a length of c. 50m,

2. Provision of a new chamber, concrete pipe and headwall to convey discharge from an existing culvert outfalling at the top of the embankment to the newly realigned stream channel,

3. Reinforcement to TII Specification CC-SCD-00550 (Drainage - Rock Armour: Scour Protection) of 7.5m of the bank of the newly realigned stream channel opposite the new culvert headwall,

4. Reprofiling of the slopes on the opposite bank to accommodate the new stream alignment,

5. Removal of existing masonry wall along the N70 and provision of over-the-edge drainage, fencing and vehicle restraint system, and

6. Diversion of existing EIR overhead line through duct under the road.

In addition, a new concrete fish pass was installed on the steeply sloped concrete apron immediately downstream of the bridge and upstream of the realigned stream channel.

1.1.2. Defects

During the post-works monitoring by Geotechnical Engineers from AtkinsRéalis, the following issues were noted:

- In October 2023, high-flow conditions in the stream following heavy rain resulted in significant erosion and undercutting to the toes of the embankments on both sides of the realigned stream channel, as well as scour to the stream bed (see Figure 1-2 below).

Figure 1-2 - Erosion and scour in the stream channel and embankment toes in October 2023 (prior to topsoil slippage from the right-hand side in this photograph).

- In January 2024, a section of topsoil from the newly constructed roadside embankment separated from the underlying material and slipped towards the stream. This section is c. 9m wide and extends from the toe of the slope up to c. 300mm below the crest. As shown in Figures 1-3 and 1-4 below, this topsoil has slumped into the stream channel, deflecting the flow to the north and thereby causing further significant erosion to the opposite embankment. A geotechnical investigation by AtkinsRéalis as to the cause of the slippage concluded the following: -

  "The slippage is considered to be the result of an increased thickness of topsoil across the length and in particular along the crest of the embankment. The depth of topsoil along the crest of the slope is in excess of 300mm, and typically 400 to 500 mm at particular locations.

  This increased thickness of topsoil near the crest of the slope, when saturated after heavy rainfall is likely to have resulted in a progressive failure of the topsoil layer down the slope to the toe of the embankment. As the erosion of the berm along the toe of the embankment which occurred in October 2023 also appears to have undercut the topsoil layer at this location, this may have been a contributing factor in the topsoil slippage.

  As the embankment had also not been landscaped, there were no trees or shrub roots to provide additional stability to the topsoil layer."

Figure 1-3 - Topsoil slippage in January 2024.

Figure 1-4 - Erosion of the toe of the opposite embankment due to deflection of the stream by slumped topsoil from the roadside embankment.

As these defects occurred within 12 months of completion of the original works, they will be addressed as defects to those works, but under Term Maintenance Contract No. 4 (as No. 3 has now closed). The proposed solution to address these defects is described in the following Sections 1.2 to 1.4 below.

During a site visit by Ecologists from AtkinsRéalis in January 2024 (after the topsoil slippage had occurred), two further issues were noted. These were (1) that there was an additional minor slippage of the pre-existing surface soil and vegetation from the near-vertical slope on the northern side of the plunge pool at the bottom of the sloped apron/fish pass and (2) that the fish pass had become obstructed by stones and other debris (see Figure 1-5). Re (1), this is a minor slippage and is not associated with the works, so no intervention is proposed here. Re (2), obstruction of the fish pass will be addressed as part of the Routine Maintenance programme under the Contract and so does not form part of the proposed works considered in this NIS.

Figure 1-5 - New fish pass blocked by stones and debris.

1.2. Design Solution

Erosion, scour and embankment slippage are proposed to be addressed and recurrence of same prevented by reinforcement of the stream bed and the stream banks/toes of the embankments with rock armour (of grade HM_A300-1000) and reprofiling of the embankments, along with thinning of the topsoil layer to 100mm throughout (except where greater depth is required for tree/shrub planting). Figures 1-6 to 1-8 below (and at original scale in Appendix A) show the overall plan of the proposed works and typical cross-sections through the proposed finished embankment and stream channel.

The dimensions of the stream channel will be reinstated as per the design of the original works, i.e. preserving the current horizontal alignment over its length of 49.75m and low-flow wetted width of 2.00m, and restoring the design bed level, with a typical gradient of 1:20.82 (4.80%). The top 400mm of the existing substrate material will be salvaged and reinstated. In addition, c. 6 no. stone baffles 1,500mm long × 500mm wide × 500mm deep (embedded 350mm deep into the stream bed) will be installed from alternating sides of the channel, typically at 7.5m centres, as shown in Figures 1-6 and 1-8 below (and at original scale in Appendix A). The final placement of baffles and spacing will be determined on site under the supervision and advice of the Contractor's ecologist and a Fisheries Officer from Inland Fisheries Ireland (IFI). These baffles are intended to provide flow sinuosity and variation to encourage in-stream habitat heterogeneity and facilitate fish passage.

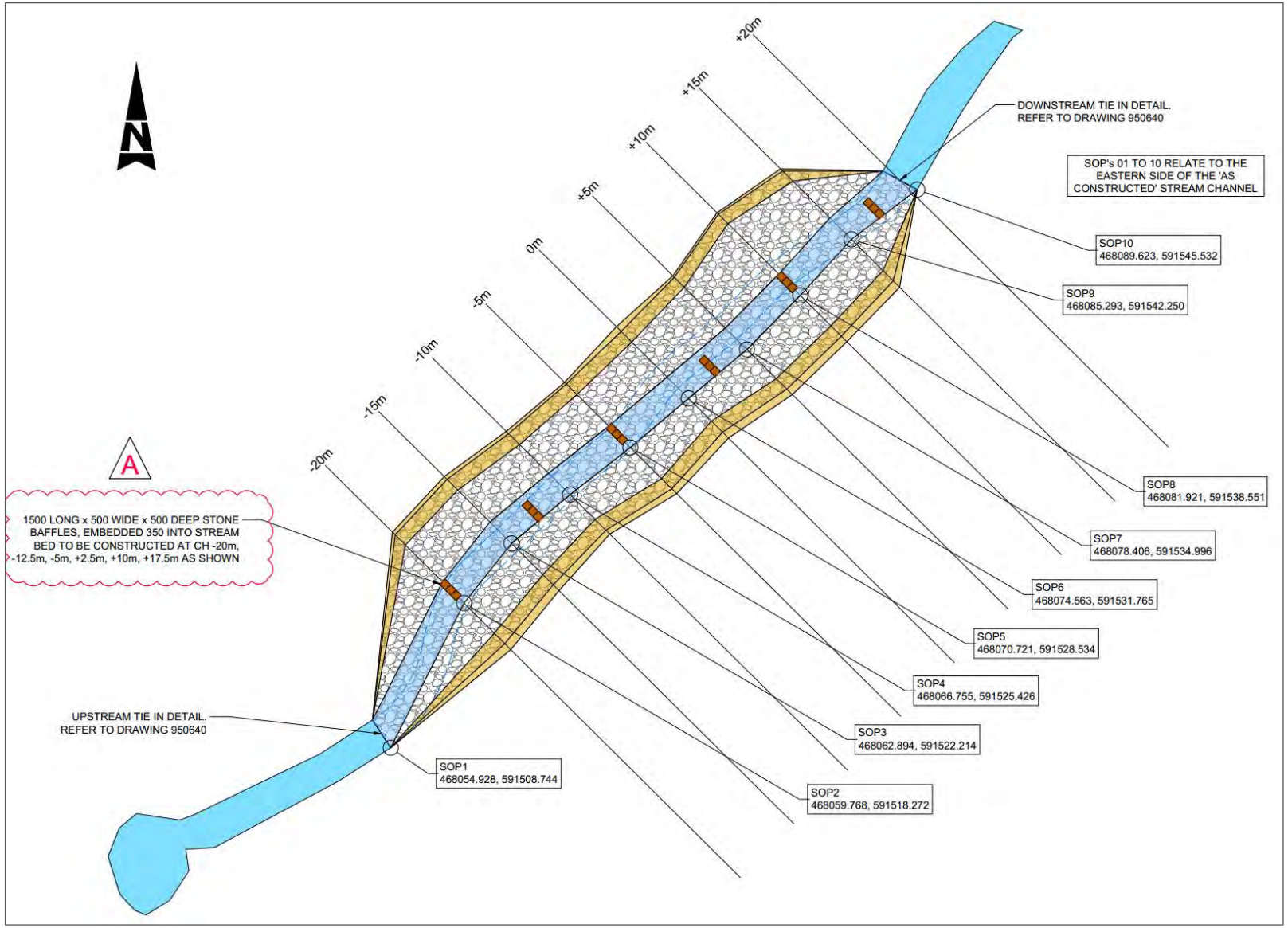

Figure 1-6 - Overall plan of the proposed works.

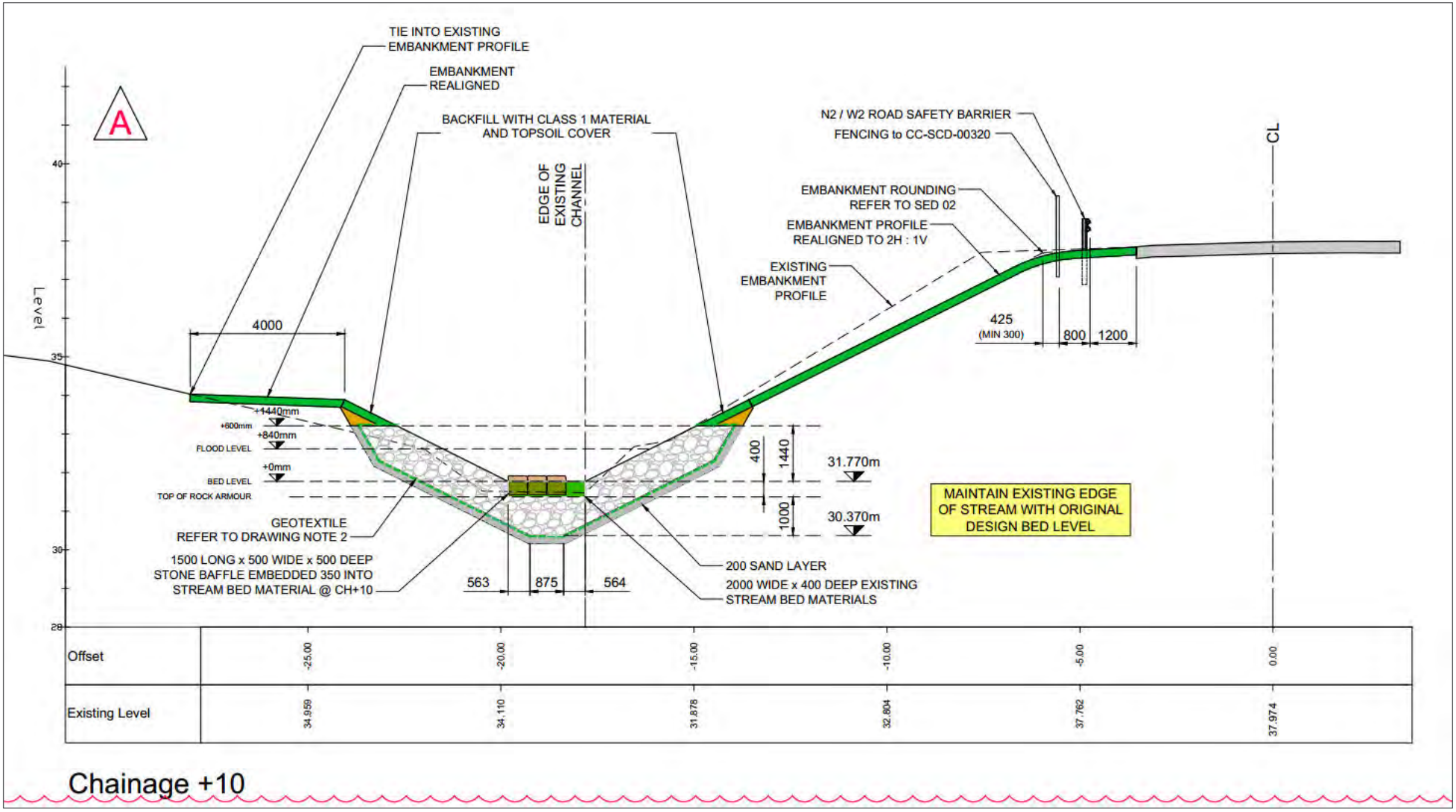

Figure 1-7 - Cross-section through the proposed stream channel and embankments at Ch. +10, also showing the existing profiles.

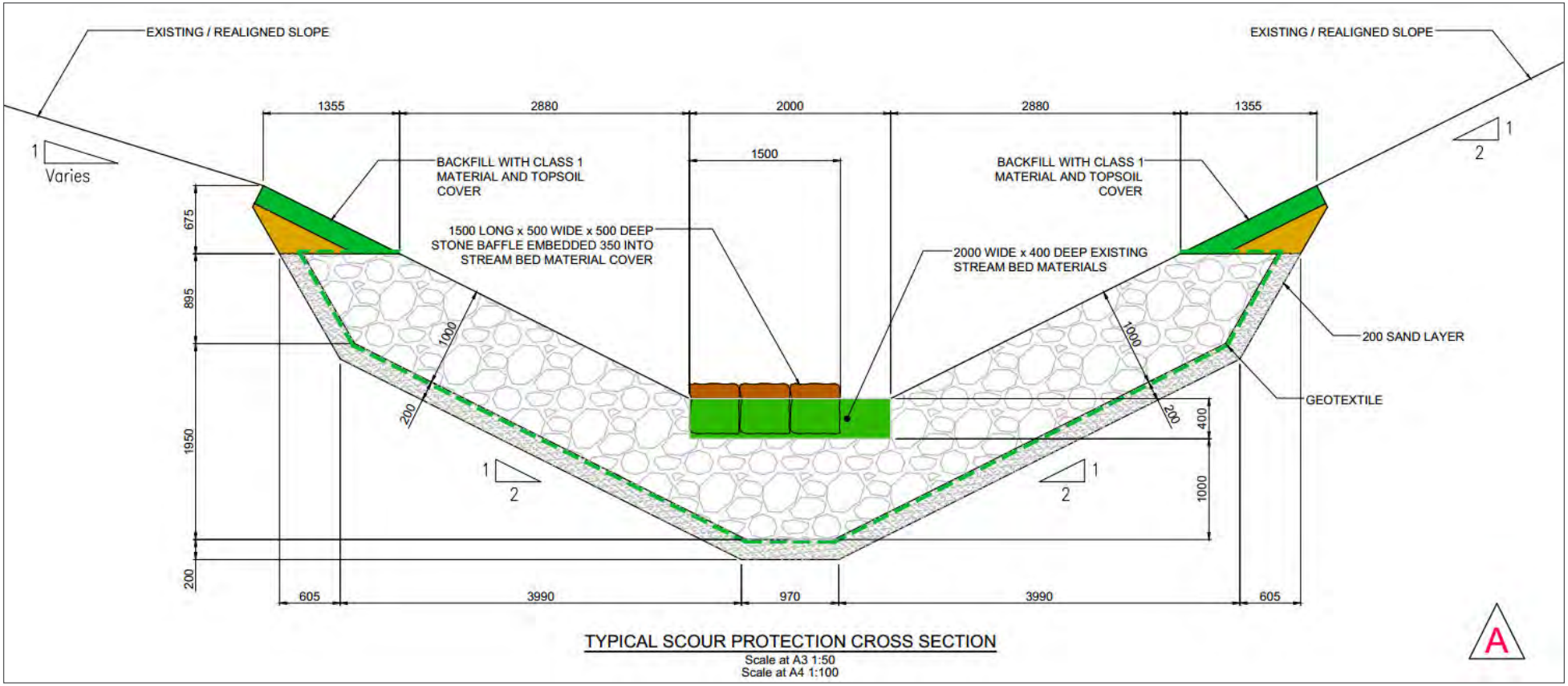

Figure 1-8 - Typical cross-section through the proposed stream channel.

1.3. Works Methods

1.3.1. Site Access and Compound

The site access and compound location will be as per the original works, i.e. the Contractor will access the site via a gate on the northern side of the N70 road just west of Curraheen Little Bridge and the site compound will be located within the field immediately inside this gate. Turning east, a temporary access road will run parallel to the stream to an area of hardstanding at the top of the northern embankment (as shown in Figure 1-9 below). The works areas will be accessed from this point. The total area which will be required for the works is significantly reduced from that which was needed for the original works and there will be no requirement for vegetation clearance or tree felling.

Figure 1-9 - Contractor sketch showing the indicative locations and layouts of the site access and compound areas, access road and hardstanding area north of the stream.

1.3.2. Plant/Machinery and Materials

The main plant and machinery likely to be required during construction includes 1 no. 13-ton tracked excavator, 1 no. 5-ton tracked excavator, and 1 no. 9-ton dumper. The construction compound, welfare facilities and staff vehicles will be located near the site access, at least 20m away from the stream.

Materials to be used are limited to sand, geotextile, rock armour, Class 1 fill and topsoil (specifications for these materials are provided on the drawings in Appendix A). Sand, geotextile and rock armour will be imported to site from a local quarry. Quantities of Class 1 fill and topsoil required are small and a proportion of this will arise and be reused on site, with any quantities to be imported likely very limited. No steel, other metals, concrete, other cementitious materials, or any sealants, paints etc. will be used for the proposed works.

1.3.3. Sequencing

Double silt fences as per the original works (and described in the mitigation section of this NIS) will be erected along both banks of the stream for the duration of works. Sedi-mats or a series of hessian silt curtains will be installed in the stream downstream of the works area for the duration of construction.

Embankment reprofiling works will be completed before rock-armouring of the stream commences. In order to access the roadside embankment from the northern side, a temporary crossing will be needed. This will be formed by laying 1 or 2 no. 6m-long twin-wall pipes on the stream bed (likely 2 no. 900mm diameter HDPE pipes side-by-side) and backfilling. The pipes used will be of the largest possible diameter and the bankside erosion and run-off control measures will link across this temporary crossing to avoid any gap.

As part of the embankment reprofiling, pockets of deeper topsoil will be created where required for tree and shrub planting to be undertaken from late October in accordance with the Landscape Plan and Specification. The locations of these pockets will be marked with stakes during the reprofiling works so that they can be identified by the landscape contractor at the time of planting. Once reprofiling is complete, the topsoil will be immediately seeded with a highway grass mix.

Once the embankment reprofiling works have been completed, the temporary crossing will be removed and the installation of rock armour to the stream bed and stream banks/toes of the embankments will commence.

The works to install rock armour to the bed and banks of the stream/toes of the embankments will begin at the downstream end and progress upstream in sections of c. 6m each. In wet conditions, the length of these sections can be decreased to c. 3m-4m, to minimise the risk of water quality impacts. During very dry conditions, when there is less risk of silt-laden run-off entering the stream, the length of these sections may be increased up to c. 10m. Each section will be completed as follows: -

1. A section of the stream will be isolated by creating sandbag dams at the upstream and downstream ends and over-pumping the stream around this section using a 4-inch or 6-inch pump. Sandbags will be hessian bags half-filled with sand and securely tied to ensure no sand enters the stream. These will be “walked in” to create good seal between them and stream bed, and built up in a stretcher bond to the desired height.

2. Fish present in the isolated area will be rescued by electrofishing carried out by IFI staff or another person authorised under Section 14 of the Fisheries (Consolidation) Act, 1959 (as amended) and released into the stream at a suitable location downstream of the works. Fish rescue will be required for each section in sequence.

3. Once fish rescue is complete, the works area will be dewatered by pumping to a vegetated area at least 20m from the stream. This area will be selected so that any run-off discharges to the stream downstream of the works area.

    a. Some water is likely to continue to seep into the works area post-dewatering. This will flow to a sump within the works area and will be pumped to the vegetated area described above.

    b. Works will be undertaken in dry conditions and a secondary pump will be stored on site as a back-up in the event of heavy rain resulting in high discharge in the stream.

    c. All pump intakes will be fitted with a screen or mesh to prevent intake of aquatic life.

4. The top 400mm of the existing stream bed material will be excavated and stockpiled on site for re-use.

5. A 13-ton tracked excavator will be used and a 200mm sand layer will be placed on the bottom of the excavation and a Secutex or similar approved geotextile will be placed by hand along the excavation on top of the sand layer.

6. A 9-ton dumper will deliver the HM_A300-1000 rock armour to the works area. The rock armour will then be placed by mechanical means.

7. Once the new stream bed and channel have been created, the 13-ton excavator will lay the first 50mm deep layer of salvaged bed material along the stream bed.

8. The stone baffles will be placed into the channel, the final placement and spacing to be determined on site under the supervision and advice of the Contractor's ecologist and a Fisheries Officer from IFI.

9. Once the baffles are in place, the remaining 350mm deep layer of salvaged bed material will be laid on the stream bed, leaving the top of the baffles c. 150mm proud of the stream bed.

10. Once the stream bed is complete, a final re-grade of the toe of the embankments at the stream edge will be carried out.

11. Once approved by the site Resident Engineer, the water management will be re-arranged for works on the next section upstream (by moving the downstream dam to become the upstream dam for the next section and leaving the upstream dam in place to become the downstream dam for the next section, and moving the pumping arrangements accordingly).

These works are to be undertaken in accordance with CIRIA document *C683 The Rock Manual - The use of rock in hydraulic engineering (2nd edition)*.

Tree and shrub planting as per the Landscape Plan and Specification will be undertaken between late October and March. Access to the embankments for the landscape contractor will be on foot, so there will be no need for a temporary crossing to facilitate these works.

1.3.4. Programme

The main works described above are expected to take c. 4-8 weeks. In-stream works are usually restricted to the period 1st July to 30th September. However, should weather and watercourse conditions be suitable in June, an application for a derogation under the Local Authorities (Works) Act, 1949 to commence works before 1st July will be submitted to the Minister of the Environment, Climate and Communications on behalf of Kerry County Council. IFI has indicated that it would be open to this possibility.

Sowing of the grassland seed mix will be done immediately on completion of embankment works. However, tree planting is generally limited to between late October and late March. The embankment will be staked and pockets created during the main works and the site revisited when suitable for planting. Full details of the Landscape Plan and Specification are included in Appendix B.

1.3.5. Flood Risk

The risk from flooding is primarily controlled by locating the site compound, stockpiles and any plant and machinery in active use well outside of the flood zone, and leaving only the minimum materials and equipment in the flood zone at any time. This risk is also very reduced by limiting the works to c. 6m sections at a time, reducing to 3m-4m sections during wetter conditions (as defined in Section 7 below).

It is expected that 1 no. 6-inch pump would be sufficient to cope with normal rainfall, with another pump available should water levels begin to rise. Should a significant rainfall event be forecast, all materials and equipment will be removed from the flood zone and works postponed until water levels return to normal. Further details on flood monitoring and response is provided in the mitigation section of this NIS.

1.4. Post-works Monitoring

Following completion of the works there will be a 12-month defects period. During this period, AtkinsRéalis will carry out inspections of the works on behalf of TII. These inspections will be undertaken on a quarterly basis and will identify any defects and assess the behaviour of the stream channel.

The implementation of the Landscape Plan and Specification (see Appendix B) will also be monitored during the defects period.

Any geotechnical, hydromorphological, ecological or landscape issues that are identified during this period shall be addressed as defects of the works. These include issues relating to fish passage, woodland regeneration and re-growth of invasive alien plant species.

2. Scope of Study

2.1. Legislative Context

Natura 2000

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora ("the Habitats Directive") is a legislative instrument of the European Union (EU) which provides legal protection for habitats and species of Community interest. Article 2 of the Directive requires the maintenance or restoration of such habitats and species at a favourable conservation status, while Articles 3 to 9, inclusive, provide for the establishment and conservation of an EU-wide network of special areas of conservation (SACs), known as Natura 2000, which also includes special protection areas (SPAs) designated under Article 4 of Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds ("the Birds Directive"). Both SACs and SPAs are commonly referred to as "European sites" or "Natura 2000 sites".

SACs are selected for natural habitat types listed on Annex I to the Habitats Directive and the habitats of species listed on Annex II to the Habitats Directive. SPAs are selected for species listed on Annex I to the Birds Directive and other regularly occurring migratory species. The habitats and species for which a Natura 2000 site is selected are referred to as the "qualifying interests" of that site and each is assigned a "conservation objective" aimed at maintaining or restoring its "favourable conservation condition" at the site, which contributes to the maintenance or restoration of its "favourable conservation status" at national and European levels.

Appropriate Assessment

Article 6 of the Habitats Directive deals with the management and protection of Natura 2000 sites. Articles 6(3) and (4) set out the decision-making process, known as "Appropriate Assessment" (AA), for plans or projects in relation to Natura 2000 sites. Article 6(3) states: -

> *"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public."*

The first sentence of Article 6(3) provides a basis for determining which plans and projects require AA, i.e. those "*not directly connected with or necessary to the management of [one or more Natura 2000 sites] but likely to have a significant effect thereon, either individually or in combination with other plans or projects*". In *Waddenzee* (C-127/02), the Court of Justice of the European Union (CJEU) ruled that significant effects must be considered "likely" if "*it cannot be excluded, on the basis of objective information*", that they would occur. This clearly sets a low threshold, such that AA is required wherever there is a reasonable possibility of significant effects on a Natura 2000 site. In the same judgment, the CJEU established that the test of significance relates specifically to the conservation objectives of the site concerned, i.e. "significant effects" are those which, "*in the light, inter alia, of the characteristics and specific environmental conditions of the site*", could undermine the site's conservation objectives. In addition to the effects of the plan or project on its own, the combined effects arising from the plan or project under consideration and other plans and projects must also be assessed (see Section 8.1 below for more details).

The last part of the first sentence of Article 6(3) defines AA as an assessment of the "*implications [of the plan or project] for the site in view of the site's conservation objectives*". In the second sentence, Article 6(3) requires that, prior to agreeing to a plan or project, the competent authority must "ascertain" that "*it will not adversely affect the integrity of the site concerned*". In *Sweetman v. An Bord Pleanála* (C-258/11), the CJEU ruled that a plan or project "*will adversely affect the integrity of that site if it is liable to prevent the lasting preservation of the constitutive characteristics of the site that are connected to the presence of a priority natural habitat whose conservation was the objective justifying the designation of the site in the list of sites*". On that basis, EC (2018) described the "integrity of the site" as "*the coherent sum of the site's ecological structure, function and ecological processes, across its whole area, which enables it to sustain the habitats, complex of habitats and/or populations of species for which the site is designated*". As such, the "integrity" of a specific site is defined by its conservation

objectives and is "adversely affected" when those objectives are undermined. In *Waddenzee*, the CJEU ruled that the absence of adverse effects can only be ascertained "*where no reasonable scientific doubt remains*".

The "precautionary principle" applies to all of the legal tests in AA, i.e. in the absence of objective information to demonstrate otherwise, the worst-case scenario is assumed. Where the tests established by Article 6(3) cannot be satisfied, Article 6(4) applies (see explanation in Section 2.2 below).

Competent authority

The requirements of Articles 6(3) and (4) are transposed into Irish law by, inter alia, Part 5 of the European Communities (Birds and Natura Habitats) Regulations, 2011 (as amended) ("the Habitats Regulations") and Part XAB of the Planning and Development Act, 2000 (as amended) ("the Planning and Development Acts"). As per the second sentence of Article 6(3), it is the "competent national authorities" who are responsible for carrying out AA and, by extension, for determining which plans and projects require AA. The competent authority in each case is the authority responsible for consenting to or licensing a plan or project, e.g. local authorities, An Bord Pleanála, Transport Infrastructure Ireland (TII) or a Government Minister. In all cases, it is the competent authority who is ultimately responsible for determining whether or not a plan or project requires AA and for carrying out the AA, where required.

2.2. Appropriate Assessment Process

The AA process can be described as being made up of three distinct stages, as described below, the need to progress to each stage being determined by the outcome of the preceding stage.

Stage 1: Screening – This stage involves a determination by the competent authority as to whether or not a given plan or project required AA. As explained in Section 2.1, AA is required in respect of any plan or project not directly connected with or necessary to the management of a Natura 2000 site, but for which the possibility of likely significant effects on one or more Natura 2000 sites cannot be excluded. The CJEU's Judgment on *Eco Advocacy v. An Bord Pleanála* (C-721/21) and the Opinion of Advocate General Kokott in the same case set out the principles for identifying any aspects of a plan or project which may constitute what the CJEU termed in *People Over Wind* (C-323/17) "*measures intended to avoid or minimise harmful effects on a Natura 2000 site*" and, as such, cannot be taken into account in making an AA Screening determination. Consideration of the potential for in-combination effects is also required at this stage.

Stage 2: Appropriate Assessment – This stage involves a detailed assessment of the implications of the plan or project, individually and in combination with other plans and projects, for the integrity of the Natura 2000 site(s) concerned. This stage also involves the development of appropriate mitigation to address any adverse effects and an assessment of the significance of any residual impacts following the inclusion of mitigation. In *Kelly v. An Bord Pleanála* (IEHC 400), the High Court ruled that a lawful AA must contain complete, precise and definitive findings based on examination and analysis, and conclusions and a final determination based on an evaluation of the findings. In the same judgment, the High Court stressed that, in order for the findings to be complete, precise and definitive, the AA must be carried out in light of best scientific knowledge in the field and cannot have gaps or lacunae. In *Holohan v. An Bord Pleanála* (C-461/17), the CJEU clarified that AA must "*catalogue the entirety of habitat types and species for which a site is protected*" (i.e. the qualifying interests of the site) and assess the implications of the plan or project for the qualifying interests, both within and outside the site boundaries, and other, non-qualifying interest habitats and species, whether inside or outside the site boundaries, "*provided that those implications are liable to affect the conservation objectives of the site*". The proposer of a plan or project requiring AA is furnishes the competent authority with the scientific evidence upon which to base its AA by way of a Natura Impact Statement (NIS) or Natura Impact Report (NIR). If it is not possible to ascertain that the plan or project will not adversely affect one or more Natura 2000 sites, authorisation can only be granted subject to Article 6(4).

Stage 3: Article 6(4) – If a plan or project does not pass the legal test at Stage 2, alternative solutions to achieve its aims must be considered and themselves subject to Article 6(3). If no feasible alternatives exist, authorisation can only be granted where it can be demonstrated that there are imperative reasons of overriding public interest (IROPI) justifying its implementation. Where this is the case, all compensatory measures must be taken to protect the overall coherence of Natura 2000.

The three stages described above are illustrated in Figure 2-1 below.

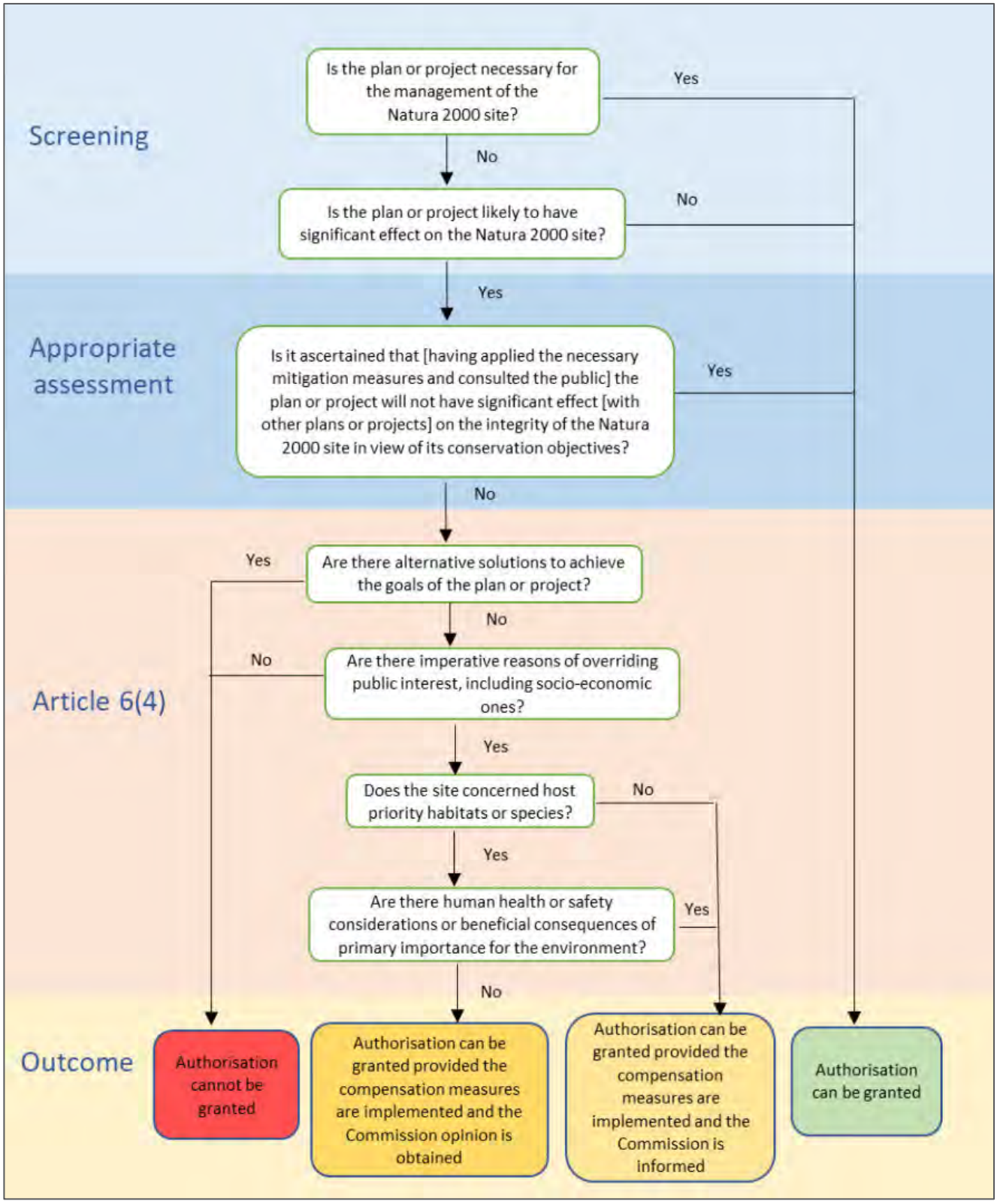

Figure 2-1 - Stages of the Appropriate Assessment process (EC, 2021a).

3. Methodology

3.1. Sources of Guidance

This report was prepared with due regard to the relevant European and Irish legislation, case law and guidance, including but not limited to: -

- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna. *Official Journal of the European Communities* L 206/7-50.
- Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds. *Official Journal of the European Union* L 20/7-25.
- European Communities (Birds and Natural Habitats) Regulations, 2011. *S.I. No. 77/2011* (as amended) ("the Habitats Regulations").
- Planning and Development Act, 2000. *No. 30 of 2000* (as amended) ("the Planning and Development Acts").
- Planning and Development Regulations, 2001. S.I. No. 600/2001 (as amended) ("the Planning Regulations").
- EC (2019). *Managing Natura 2000 sites – The provisions of Article 6 of the Habitats Directive 92/43/EEC.* European Commission, Brussels. *Official Journal of the European Union* C 33/1-62.
- EC (2021a). *Assessment of plans and projects in relation to Natura 2000 sites: Methodological guidance on the provisions of Articles 6(3) and (4) of the Habitats Directive 92/43/EEC.* European Commission, Brussels. *Official Journal of the European Union* C 437/1-107.
- EC (2021b). *Guidance document on the strict protection of animal species of Community interest under the Habitats Directive. C(2021) 7301.* European Commission, Brussels.
- DG Env (2022a). *Guidance document on assessment of plans and projects in relation to Natura 2000 sites – A summary.* Directorate-General for Environment, European Commission, Brussels. Publications Office of the European Union, Luxemburg.
- DEHLG (2010a). *Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. Revised 11/02/2010.* Department of the Environment, Heritage and Local Government, Dublin.
- DEHLG (2010b). *Circular NPW 1/10 & PSSP 2/10. Dated 11/03/2010.* Department of the Environment, Heritage and Local Government, Dublin.
- NPWS (2012). *Marine Natura Impact Statements in Irish Special Areas of Conservation. A Working Document. April 2012.* National Parks & Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin.
- NPWS (2021). Guidance on the Strict Protection of Certain Animal and Plant Species under the Habitats Directive in Ireland. *National Parks & Wildlife Service Guidance Series* 1, Department of Housing, Local Government and Heritage, Dublin.
- Mullen, E., Marnell, F. and Nelson, B. (2021). Strict Protection of Animal Species – Guidance for Public authorities on the Application of Articles 12 and 16 of the EU Habitats Directive to development/works undertaken by or on behalf of a Public authority. *National Parks & Wildlife Service Guidance Series* 2, Department of Housing, Local Government and Heritage, Dublin.
- OPR (2021). *Appropriate Assessment Screening for Development Management. OPR Practice Note PN01.* Office of the Planning Regulator, Dublin.

- Case law, including *Waddenzee* (C-127/02), *Sweetman v. An Bord Pleanála* (C-258/11), *Kelly v. An Bord Pleanála* (IEHC 400), *Commission v. Germany* (C-142/16), *People Over Wind* (C-323/17), *Holohan v. An Bord Pleanála* (C-461/17), *Eoin Kelly v. An Bord Pleanála* (IEHC 84), *Heather Hill* (IEHC 450) and *Eco Advocacy v. An Bord Pleanála* (C-721/21).

- Sundseth, K. and Roth, P. (2014). *Article 6 of the Habitats Directive – Rulings of the European Court of Justice.* Ecosystems LTD (N2K Group), Brussels.

3.2. Desk Study

Baseline data regarding the receiving environment, including Natura 2000 sites, was gathered through a thorough desk study.

The boundaries of Natura 2000 sites were downloaded from *NPWS: Maps and Data* <https://www.npws.ie/maps-and-data>. Information on sites, including their overall structures and functions, qualifying interests, conservation objectives and threats/pressures and activities therein, was found in the Site Synopsis, Natura 2000 Standard Data Form, Conservation Objectives and supporting documents for each site. Spatial data for site-specific conservation objectives of Natura 2000 sites, and boundary data for other designated sites, such as Natural Heritage Areas, was also retrieved from *NPWS: Maps and Data.* Reporting under Article 17 of the Habitats Directive (NPWS, 2019a-c; *Article 17 web tool*) and Article 12 of the Birds Directive (NPWS, 2024c; *Article 12 web tool*) provided further information on the habitats and species concerned at the national level.

Information relating to recent and historical records of species was obtained from the National Biodiversity Data Centre (NBDC) *Biodiversity Maps* <https://maps.biodiversityireland.ie/Map>, while data for other features of the natural environment, e.g. known occurrences of non-qualifying interest Annex I habitats and the Department of Agriculture Food and the Marine's forest inventory, were viewed on the *Environmental Sensitivity Mapping* (*ESM) Webtool* <https://airomaps.geohive.ie/ESM/>. Spatial data for known populations of Freshwater Pearl Mussel (*Margaritifera margaritifera*) received from the National Parks & Wildlife Service (NPWS) was also reviewed. In addition, TII provided an excerpt from Tailte Éireann's National Land Cover Map[1] for the area surrounding the proposed works.

The Environmental Protection Agency (EPA) map viewer *EPA Maps (Water)* <https://gis.epa.ie/EPAMaps/Water> and spatial data for river, lake, canal, transitional and coastal waterbodies downloaded from the *EPA Geoportal* <https://gis.epa.ie/GetData/Download> was used to identify any hydrological connection between the proposed works and Natura 2000 sites or connected features. Satellite and aerial imagery from Google Earth, Bing Maps and Ordnance Survey Ireland (OSi) was reviewed to identify hedgerows, treelines and other potential ecological features.

In addition, reports from ecological surveys and site visits previously undertaken at the location of the proposed works were also reviewed, having due regard to the *Advice note on the lifespan of ecological reports and surveys* (CIEEM, 2019).

In order to inform the assessment of potential in-combination effects, planning applications from the surrounding area were reviewed using the National Planning Application Database, An Bord Pleanála's online map viewer and the EIA Portal.

3.3. Site Visits

The site visit was for the original works was undertaken on 5th January 2023 by Owen O'Keefe, Senior Ecologist at AtkinsRéalis. The purpose of this site visit was to gather baseline data relating to the potential ecological constraints. This site visit focussed on identifying the presence or likely presence of aquatic and riparian Annex I habitats, Otter (*Lutra lutra*), Kingfisher (*Alcedo atthis*), suitable habitat for Atlantic Salmon (*Salmo salar*), Sea Lamprey (*Petromyzon marinus*) and River/Brook Lamprey (*Lampetra fluviatilis* or *L. planeri*), invasive alien plant species, e.g. Japanese Knotweed (*Fallopia japonica*) or Himalayan Balsam (*Impatiens glandulifera*), and other ecological features within the proposed works area and the Knockaunglass Stream.

[1] https://www.tailte.ie/en/blog/a-new-national-landcover-map-for-ireland.html

During the original works (April to June 2023), a pre-construction survey and regular site visits were undertaken by the Contractor's ecologist, Dr Caroline Shiel, as part of the monitoring requirements under the NIS for those works. Additional ecological information in the monitoring reports produced by the Contractor's ecologist has been incorporated into this NIS.

A further site visit was undertaken on 26th January 2024 by Owen O'Keefe and Caroline Downey, both Ecologists from AtkinsRéalis. The purpose of this site visit was to see the erosion, scour and topsoil slippage which had occurred and to survey the changes to the habitats around the site following the original works, as well as noting any potential obstacles to fish passage and any regrowth of invasive alien plant species.

3.4. Statement of Authority

The Screening for Appropriate Assessment report was prepared by Owen O'Keefe with field assistance from Caroline Downey and peer review and support from Paul O'Donoghue.

Caroline Downey is a Graduate Ecologist at Atkins holding a BSc (Hons) in Ecology and Environmental Biology from University College Cork. Caroline has worked in ecological consultancy since 2023. A focus of Caroline's work to date has been supporting the preparation of AA Screening Reports and NIS. Caroline assisted with the 2024 site visit which informed this NIS.

Owen O'Keefe is a Senior Ecologist at Atkins. Owen holds a BSc (Hons) in Ecology from University College Cork (2015) and is a Full Member of the Chartered Institute of Ecology and Environmental Management (MCIEEM). He has 8 years' professional experience in ecological consultancy, specialising river ecosystems and Appropriate Assessment.

Paul O'Donoghue is an Associate Director at Atkins. Paul holds a BSc (Hons) in Zoology, an MSc in Behavioural Ecology and a PhD in Avian Ecology and Genetics. Paul is a Chartered member of the Society for the Environment (CEnv) and a Full Member of the Chartered Institute of Ecology and Environmental Management (MCIEEM). Paul has over 19 years' experience in ecology; including extensive experience in the preparation of Habitat Directive Assessments/Natura Impact Statements, i.e. Appropriate Assessment under Article 6(3) of the Habitats Directive.

4. Existing Environment

4.1. Designated Sites

The proposed works are not located within or immediately adjacent to any designated sites of nature conservation interests. However, there is a number of sites of both national and international importance in the surrounding area.

Approximately 500m downstream of the proposed works, Castlemaine Harbour is designated internationally as a Wetland of International Importance (WII) under the Ramsar Convention[2] (site code: 470), an SAC (site code: 000343) and an SPA (site code: 004029), and nationally as a statutory Natura Reserve (S.I. No. 10/1990) and a proposed Natural Heritage Area (pNHA) (site code: 000343). The area of Castlemaine Harbour closest to the proposed works is also designated as the Rossbehy/Caragh Creek Wildfowl Sanctuary (site code: 29).

The proposed works are also within 200m of the Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC (site code: 000365), part of which is also designated as an SPA (site code: 004038) and as a National Park (these designations being >20km east of the proposed works).

Lough Yganavan and Lough Nambrackdarrig are located 3.8km and 2.7km, respectively, from the proposed works and are within the wider Caragh River Catchment. These are designated together as an SAC (site code: 000370) and a pNHA (site code: 000370). They are also designated separately as statutory Natura Reserves (S.I. No. 72/1988 and S.I. No. 73/1988, respectively).

The Iveragh Peninsula SPA (site code: 004154) and Dingle Peninsula SPA (site code: 004153), both of which adjoin the Outer Dingle Bay coastal waterbody, are also potentially connected to the proposed works.

Tables 4-1 and 4-2 below indicate the shortest straight-line distance between the internationally and nationally designated sites mentioned above and the proposed works. Connectivity, i.e. pathways for impacts and effects, between the proposed works and these sites are examined in Section 5.2.

Table 4-1 - Internationally designated sites in close proximity to the proposed works.

Site name	Proximity
Castlemaine Harbour WII/SAC/SPA	c. 500m
Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC	c. 160m
Lough Yganavan and Lough Nambrackdarrig SAC	c. 2.5km
Iveragh Peninsula SPA	c. 4.0km
Dingle Peninsula SPA	c. 9.9km

Table 4-2 - Nationally designated sites in close proximity to the proposed works.

Site name	Proximity
Castlemaine Harbour Nature Reserve/pNHA	c. 500m
Killarney National Park SPA/National Park	>20km
Lough Yganavan and Lough Nambrackdarrig pNHA	c. 2.5km
Lough Nambrackdarrig Nature Reserve	c. 2.7km
Lough Yganavan Nature Reserve	c. 3.8km

[2] Convention on Wetlands of International Importance especially as Waterfowl Habitat (as amended).

4.2. Habitats and Species

4.2.1. General Context

The proposed works are located along the N70 national road and the Knockaunglass stream in the vicinity of Curraheen Little Bridge. Curraheen Little Bridge carries the N70 national road across the Knockaunglass stream c. 600m upstream of Castlemaine Harbour. The older (upstream) half of the bridge is a single-span masonry arch barrel. The newer (downstream) half is of concrete construction, with two cylindrical pipes laid side-by-side.

Habitats present in the wider vicinity of the proposed works include: -

- Damp 'Improved agricultural grassland' (GA1) and 'Wet grassland' (GS4),
- Drier 'Improved agricultural grassland' (GA1), 'Hedgerows' (WL1) and 'Treelines' (WL2),
- Roads and their verges, i.e. 'Buildings and artificial surfaces' (BL3) and 'Dry meadows and grassy verges' (GS2),
- Houses and agricultural buildings, i.e. 'Buildings and artificial surfaces' (BL3), and gardens, i.e. generally a mosaic of 'Amenity grassland (improved)' (GA2) and 'Flower beds and borders' (BC4),
- Semi-natural broad-leaved woodland (WN),
- Annex I 'Northern Atlantic wet heaths with *Erica tetralix*' (4010) and 'European dry heaths' (4030).

Areas which were previously 'Scrub' (WS1) in abandoned fields at the site compound location and to the north of the stream, as well as former broadleaved woodland on both sides of the stream, have been since been converted to 'Improved agricultural grassland' (GA1).

The proposed works are limited to the stream channel and the recently re-graded and re-seeded embankments and grass areas. There will be no works in any area of scrub, woodland or any interference with structures. The works areas are shown in their entirety in Figures 4-1 to 4-3 below.

Figure 4-1 - Proposed site access and compound location (January 2024), previously bramble-gorse scrub now grassland.

Figure 4-2 - View east along access to the main works area (January 2024). Note earth bank intercepting any run-off from the compound area to the stream.

Figure 4-3 - Overview of the main works area (January 2024).

4.2.2. Knockaunglass Stream

The Knockaunglass stream is a first-order watercourse draining the slopes of Seefin Mountain to Castlemaine Harbour. The embankment slippage is c. 550m upstream of Castlemaine Harbour. The only crossings are the Curragheen Little Bridge, c. 50m upstream of the slippage, and the former Farranfore-Valentia Harbour railway line, c. 250m downstream.

The Knockaunglass stream is a high-energy system, owing to the steep gradient and the valley form. Within the works area, the substrate is dominated by cobbles and boulders, with a relatively low proportion of smaller particle sizes. In places, scour has led to the exposure of the sub-soil/clay. The original works has not significantly altered the substrate particle size distribution.

Immediately downstream of Curraheen Little bridge, there is a smooth, steep concrete apron and a c. 45° bend to the right into a deep (>1.5m) pool. As part of the original works, a concrete, step-pool fish pass was installed on top of this apron. In the present works area, the depth is generally not more than 20cm at any point.

There is a large amount of rubbish and debris in the stream and embedded in its banks, including household and agricultural refuse, comprising large quantities of glass (jars and bottles), metals (cans and parts of machinery or vehicles) and plastics (containers for livestock worming, children's toys etc.).

Prior to the original works, the only vegetation in the stream was a very small amount of green filamentous algae, likely *Cladophora* sp., and some moss on large boulders (above the waterline). There was also some marginal vegetation, such as Opposite-leaved Golden-saxifrage (*Chrysosplenium oppositifolium*) and the non-native Montbretia (*Crocosmia* × *crocosmiiflora*) along the stream edges. No in-stream or marginal vegetation has yet re-established since the original works.

Water Quality

A review of *EPA Maps* found that there has been no water quality monitoring undertaken on the Knockaunglass stream itself. Therefore, baseline Q-values or Water Framework Directive (WFD) status are not available for this watercourse. However, data was available for the Caragh and Behy River catchments. The Caragh River and Knockaunglass stream both discharge to Caragh Creek (part of Castlemaine Harbour), while the Behy River also discharges to Castlemaine Harbour a short distance to the west.

Q-values available for monitoring stations in the Caragh River catchment from 1990 and 2022 generally range from Q4 'Good' to Q5 'High', with the exception of one station in the upper reaches registering Q2-3 'Poor' and one station between Lough Caragh and the N70 registering Q3-4 'Moderate' (both in 2022). Q-values in the Behy River catchment include Q4 'Good' at 4 No. stations in upper sections in 2022, Q4-5 'High' in the middle section in 1990 and Q3-4 'Moderate' at Glenbeigh village in 2022. Figure 4-4 below maps the latest river Q-values for the Behy and Caragh River catchments.

The Knockaunglass stream is included within the WFD monitoring unit 'Caragh_050'. The current status of this unt is 'Good' and 'Not at risk' of missing its targets for the current WFD cycle. While the Knockaunglass stream is within this unit, there does not appear to be any monitoring undertaken on the stream itself. Downstream, the WFD transitional waterbody 'Castlemaine Harbour' has 'Poor' status and is 'At risk' of missing its targets. There are no national water monitoring stations or hydrometric gauges on the Knockaunglass stream itself.

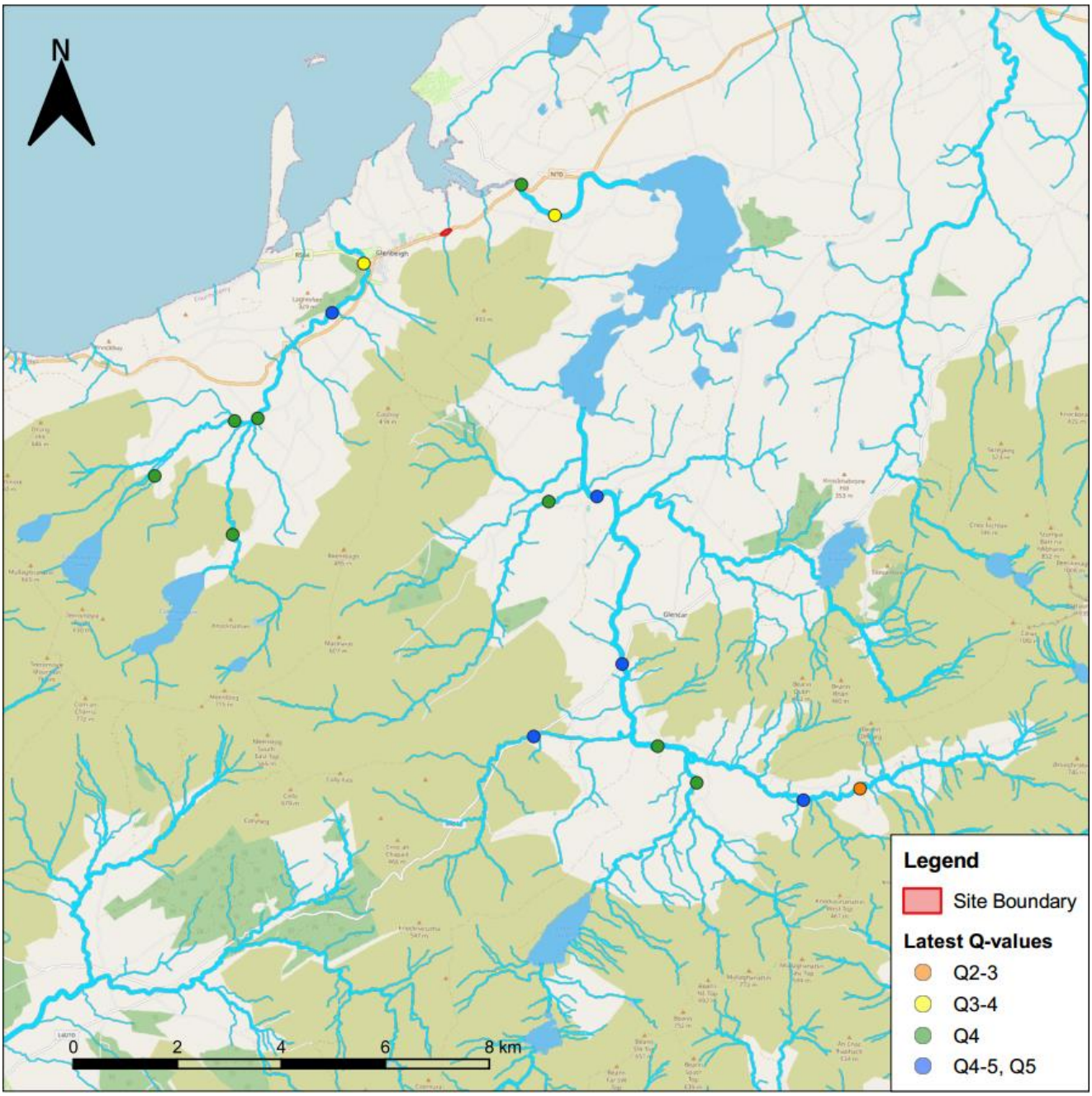

Figure 4-4 - Latest river Q-values for the Behy and Caragh River catchments.

Aquatic Fauna

Salmonids, Lampreys and Other Fish

Fish species most likely to be present within the Knockaunglass stream include Atlantic Salmon (*Salmo salar*) and Brown Trout (*S. trutta*). While the stream is likely accessible to both of these species as far as the proposed works, no evidence of any redds or spawning areas were observed during the site visits. As noted below, almost 50 no. trout (mostly juveniles) were encountered during fish rescue as part of the original works, but no salmon.

Sea Lamprey (*Petromyzon marinus*) and River Lamprey (*Lampetra fluviatilis*) may be present in the stream, but as per salmon and trout above, the section within the works area is unlikely to provide suitable spawning habitat. Furthermore, there was no habitat suitable for juvenile lampreys ("ammocoetes") observed during the site visits. The stream is likely unsuitable for all life stages of Brook Lamprey (*L. planeri*). As noted below, no lampreys were encountered during fish rescue as part of the original works.

As noted below, the presence of the catadromous species European Eel (*Anguilla anguilla*) in the Knockaunglass stream was confirmed during fish rescue as part of the original works. However, it is unlikely that inward migrating juveniles ("elvers") are able to pass the steep concrete apron immediately downstream of the bridge.

During the diversion of the stream as part of the original works, a total of 7 no. eels, 7 no. adult trout and 11 no. juvenile trout were rescued from the old stream channel. During dewatering of the pool at the bottom of the bridge apron to facilitate the installation of the fish pass, c. 30 no. juvenile trout and several eels were rescued from the pool. No salmon or lampreys were encountered.

Freshwater Pearl Mussel

The Knockaunglass stream is not within any *Margaritifera*-sensitive Area, i.e. any area subject to the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, 2009. The Behy catchment to the west of the proposed works and the Caragh catchment upstream of Lough Caragh are both designated as *Margaritifera*-sensitive Areas. [redacted]

Riparian Birds

No suitable nesting habitat for Kingfisher (*Alcedo atthis*) was observed during any of the site visits. The upstream half of the bridge may provide suitable nesting habitat for Irish Dipper (*Cinclus cinclus hibernicus*) and/or other riparian birds. No evidence of these species, such as droppings on boulders along the stream, was observed during any of the site visits.

4.2.3. Mammals

Bats

[redacted]

As part of pre-construction surveys for the original works, the Contractor's ecologist, Dr Caroline Shiel, surveyed Curraheen Little Bridge for roosting bats. No bats were recorded. [redacted]

A derelict two-storey house and an associated low stone shed to the north of the temporary access road were assessed [redacted]. The house was surveyed internally for signs of bats. The ceiling of the upper story was vaulted with no access to the limited attic space. No signs of bats were recorded in the house. The stone shed directly north of the house was also surveyed for bats. No bats were recorded.

Prior to vegetation clearance for the original works, the Contractor's ecologist undertook a bat activity survey. A static bat detector was deployed on a tree on the southern bank of the stream from 20 minutes before sunset on 25th April 2023 until 20 minutes after sunrise the following morning. [redacted]

The felling of a mature birch tree with potential bat roost features during the original works was supervised by the Contractor's ecologist. Individual boughs were removed using a tree shears attachment on the excavator. This allowed each bough to be placed gently on the ground. Once on the ground, boughs were inspected for crevices with potential for roosting bats. No bats were recorded.

Further downstream of the works area, there is an uninhabited two-storey house with slate roof (c. 225m away) and a cottage with corrugated roof (c. 290m away). [redacted]

[redacted]

Otter

An examination of the records for Otter (*Lutra lutra*) on the National Biodiversity Data Centre's Biodiversity Maps (NBDC, 2023) showed that this species or evidence of its presence have been recorded in river, lake, estuarine and coastal habitats in the wider area surrounding the proposed works, including multiple locations in the River Behy catchment and along the shores of Lough Caragh, Castlemaine Harbour and Dingle Bay. There are no existing records from the Knockaunglass stream itself.

No evidence of recent presence of otters along the Knockaunglass stream was observed during any of the site visits or the ecological monitoring undertaken by the Contractor's ecologist, nor were any potential otter holts or couches. Notwithstanding the absence of direct evidence, given the suitability of the habitat for otters and known occurrence of this species in the wider area, the presence of otters along the stream at least occasionally cannot be entirely ruled out.

Other Mammals

No evidence of Badger (*Meles meles*) or other protected mammal species was observed during the site visits by AtkinsRéalis. The site does provide suitable habitat for badger setts and feeding, as well as suitable habitat for other mammals.

During the original works, the Contractor's ecologist noted feeding signs of badgers and a latrine on the lane and under trees to the south of the dwelling house. Badger trails were recorded heading north from the buildings along a laneway leading towards woodland. No badger setts were recorded in the vicinity of the works.

The Contractor's ecologist also recorded a Pine Marten (*Martes martes*) scat on the stream bank c. 225m north of the works area.

4.3. Invasive Alien Species

Invasive alien species are species which are caused to spread outside their natural range due to human activities and become problematic in their new habitats. Such species can have significant negative effects on biodiversity and related ecosystem services, human health and safety, and the economy. *Ireland's invasive and non-native species – trends in introductions* (O'Flynn *et al*., 2014) presented a risk assessment of 377 recorded non-native species and 342 non-native potential invaders and categorised them as 'High-impact', 'Medium-impact' and 'Low-impact' species, according to their environmental, social and economic impacts.

Part 1 of the Third Schedule to the Habitats Regulations lists invasive alien plants requiring legal restrictions to prevent their spread. Regulation 49(2) and (3) of the Habitats Regulations make it an offence to cause or allow the spread the of any of these species (or their hybrids, cultivars etc.), except where all reasonable steps have been taken and due diligence exercised to avoid committing the offence. As such, these species are of particular concern with regard to site development and construction works.

In addition, the EU Invasive Alien Species (IAS) Regulation (No. 1143/2014) (as amended) establishes rules to prevent, minimise and mitigate the negative effects of IAS within the EU. The species to which this Regulation applies are included in the official *List of Invasive Alien Species of Union concern* (DG Env, 2022b). Given the environmental, social and economic effects of these species and the legal restrictions on them at an EU level, they are also of concern for planning and development.

Prior to the original works, the highly invasive non-native shrub Rhododendron (*Rhododendron ponticum*) was present at several locations in the vicinity, as was the non-native tree Sycamore (*Acer pseudoplatanus*). The non-native shrub *Fuchsia magellanica* was also present along the top of the roadside embankment. The non-native Montbretia (*Crocosmia* × *crocosmiiflora*) was frequently present along the stream and woodland edges. Rhododendron is a High-impact species and is restricted under the Habitats Regulations. Sycamore is a Medium-impact species and is not subject to any restrictions. Montbretia and Fuchsia were not assessed in O'Flynn *et al*. (2014) and are not subject to restrictions. None of these species are of Union concern.

During the original works, all of the Rhododendron, Sycamore, Montbretia and Fuchsia within the works area were removed. As of January 2024, no regrowth of any of these species within the works area has been observed. One Rhododendron infestation is c. 10m north-east of Curraheen Little Bridge remains, but this is not within the original or proposed works area (see Figure 4-5 below). Further areas of the non-native plant species listed above are present in the woodlands and scrub to the north, remote from any of the works.

Figure 4-5 - Remaining Rhododendron on the roadside embankment just downstream of Curraheen Little Bridge, outside of the works area (January 2024).

5. Connectivity to Natura 2000 Sites

5.1. Zone of Influence

The "Zone of Influence" of a plan or project is the area which may experience ecological effects as a result of its implementation, including any ancillary activities. The various impacts of a plan or project will each have their own characteristics, e.g. nature, extent, magnitude, duration etc. Accordingly, the area subject to each impact ("zone of impact") will vary depending on characteristics of the impact and the presence of pathways for its propagation. Ecological features within or connected to one or more zones of impact could, depending on their sensitivities, be affected by the plan or project under consideration. The area containing such features may be regarded as the Zone of Influence. As such, in establishing the Zone of Influence for a plan or project, regard must be had to the characteristics of its potential impacts, potential pathways for impacts and the sensitivities of ecological features in the receiving environment.

In its guidance on selecting Natura 2000 sites to include in AA, *Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities* (DEHLG, 2010a) recommends inclusion of sites in the following three categories: -

- Any Natura 2000 sites within or adjacent to the plan or project area,
- Any Natura 2000 sites within the Zone of Influence of the plan or project (generally within 15km for plans, to be established on a case-by-case basis for projects, having regard to the nature, scale and location of the project, the sensitivities of the ecological receptors and the potential for in-combination effects), and
- Following the precautionary principle, any other Natura 2000 sites for which the possibility of significant effects cannot be excluded, e.g. for a project with hydrological impacts, it may be necessary to check the full extent of the catchment for Natura 2000 sites with water-dependent qualifying interests.

In addition, *Assessment of plans and projects in relation to Natura 2000 sites: Methodological guidance on the provisions of Articles 6(3) and (4) of the Habitats Directive 92/43/EEC* (EC, 2021a) recommends consideration of Natura 2000 sites hosting fauna which could move to the plan or project area or its zone(s) of impact, and the potential for the plan or project to sever ecological connectivity within or between Natura 2000 sites. *Appropriate Assessment Screening for Development Management* (OPR, 2021) emphasises the importance of employing the source-pathway-receptor model (rather than arbitrary distances such as 15km) when selecting Natura 2000 sites for inclusion in AA.

Based on the above considerations, the Zone of Influence for the proposed works was defined as the combination of the following zones of impact: -

- For direct impacts, all areas within and immediately adjoining the works area (red-line boundary).
- For temporary disturbance to birds and other fauna, as well as effects associated with the spread of invasive alien species, all areas within a precautionary buffer of 500m from the works area.
- For water quality impacts, the Knockaunglass stream within and downstream of the works area, as well as the transitional waters at the mouth of the Caragh River.
- For indirect effects, all other areas with potential ecological connectivity to the above zones of impact, i.e. the Caragh River catchment, the remainder of the Castlemaine Harbour transitional waterbody and the Outer Dingle Bay coastal waterbody.

Using QGIS3, spatial data for waterbodies and catchments from *EPA Geoportal* were viewed in conjunction with aerial imagery from *Bing Maps* to identify pathways and zones of impact from the proposed works, and other potential ecological connections to the wider landscape. These were then mapped in relation to Natura 2000 sites using spatial data from *NPWS: Maps and Data* (see Figures 5-1 and 5-2).

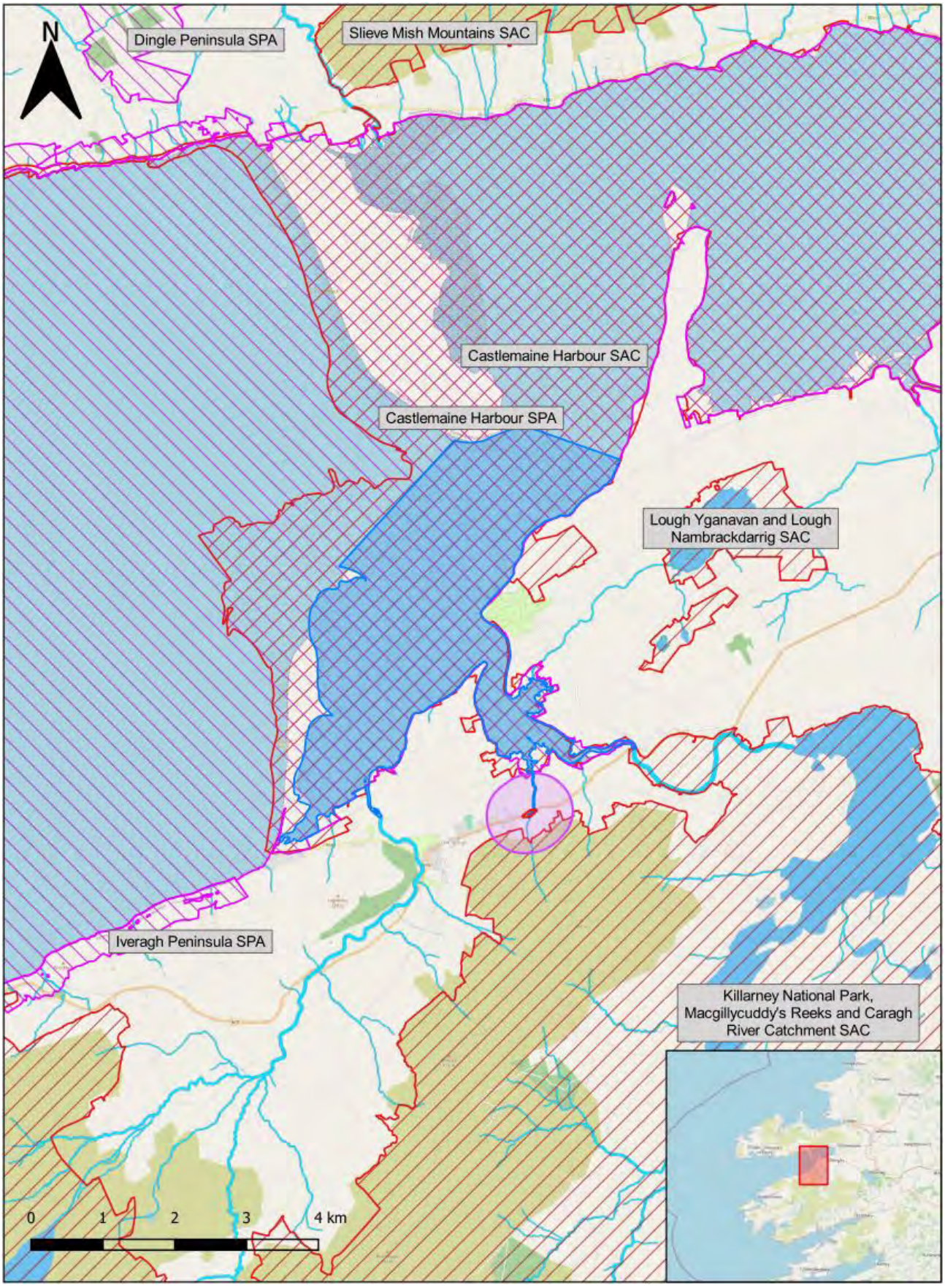

Figure 5-1 - The works footprint (red) and zones of impact for disturbance (purple) and water quality impacts (blue) in relation to Natura 2000 sites.

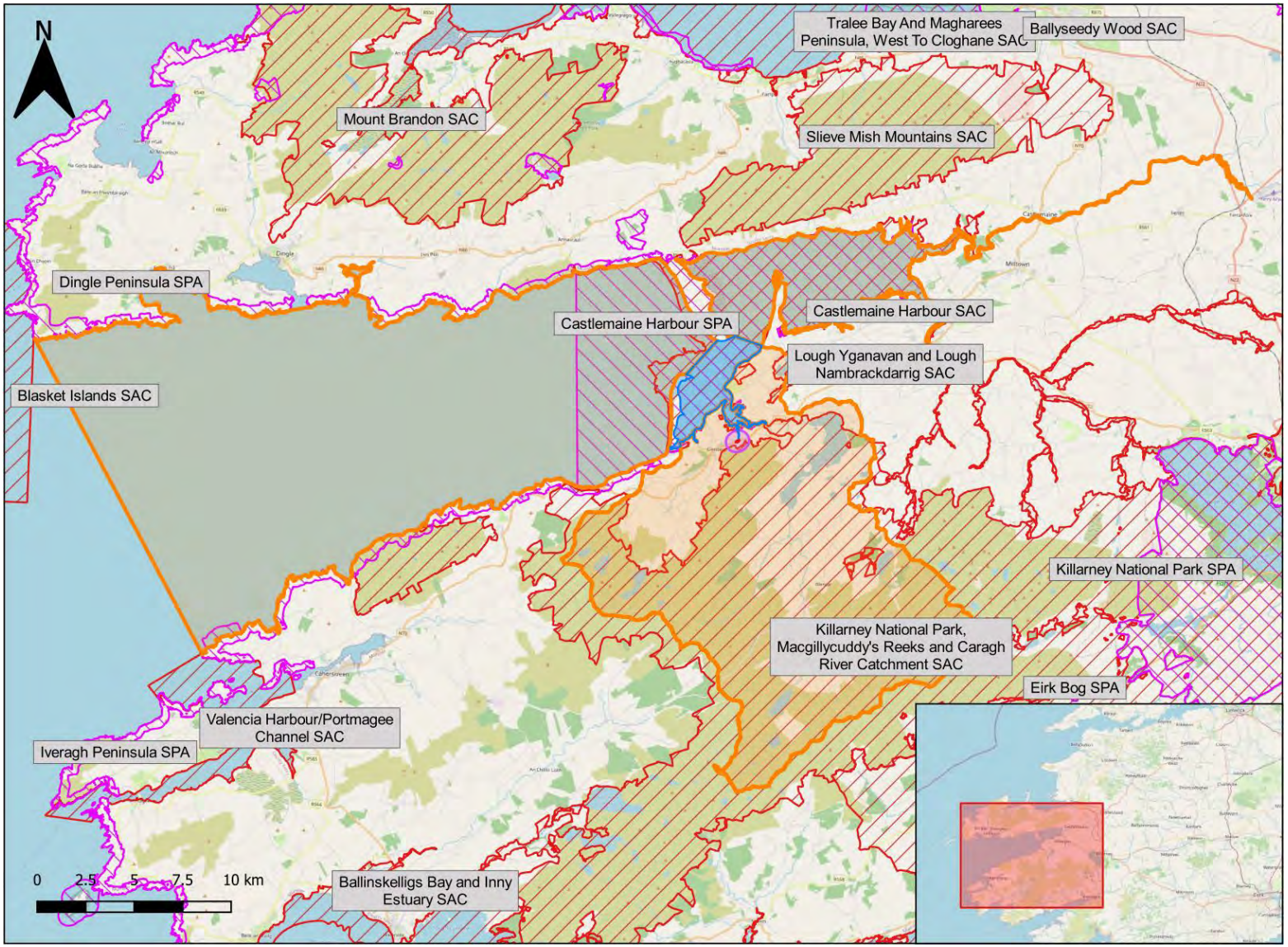

Figure 5-2 - The zone of impact for indirect impacts (orange) in relation to Natura 2000 sites.

5.2. Identification of Sites

Direct Impacts

Direct impacts include those such as habitat loss and fragmentation which occur as a direct result of works. Such impacts are limited to the works footprint and the immediate vicinity. The proposed works are not located within or adjacent to any Natura 2000 sites. Therefore, there will be no such impact any Natura 2000 site.

Disturbance and Invasive Alien Species

Disturbance impacts include noise, visual and other forms of disturbance to animal species. The extent of such impacts is highly dependent on their magnitude and the sensitivity of the receptors. In the case of the proposed works, a precautionary distance of 500m from the works was used. The proposed works are located c. 160m from the Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC (site code: 000365) and just over 500m from the Castlemaine Harbour SAC (site code: 000343) and Castlemaine Harbour SPA (site code: 004029). Therefore, all three sites are included within the scope of this assessment.

Given the uncertainty and complexity of effects relating to the spread of invasive alien species, it is not possible to define a zone of impact. However, there is considered to be a particular risk to the Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC from species such as Rhododendron, which is present within the works area and could, in the absence of appropriate controls, be caused to spread by the works.

Water Quality Impacts

Water quality impacts include pollution of surface waters and groundwater by sediment, hydrocarbons (e.g. diesel, hydraulic oils and lubricating oils) and other deleterious matter arising from the proposed works. In the case of the proposed works, these include fine sediment from excavations and earthworks, fuels and other hydrocarbons from vehicles, plant and machinery, and waste from on-site welfare facilities.

The zone of impact includes the Knockaunglass stream within and downstream of the works area, as well as the Caragh Creek/outer Castlemaine Harbour (as illustrated in Figure 5-1). Two Natura 2000 sites occur within this zone of impact, namely the Castlemaine Harbour SAC and Castlemaine Harbour SPA. Both of these sites are designated for a range aquatic habitats and species which are sensitive to water quality impacts. Therefore, both sites are included within the scope of this assessment.

Indirect Effects

The only additional Natura 2000 sites within or intersecting zone of impact for indirect impacts are the Lough Yganavan and Lough Nambrackdarrig SAC (site code: 000370), which is within the Caragh River catchment, and the Iveragh Peninsula SPA (site code: 004154) and Dingle Peninsula SPA (site code: 004153), both of which adjoin the Outer Dingle Bay coastal waterbody.

None of the qualifying interests of these three Natura 2000 sites are dependent on the ecological structures or functions of the zones of impact illustrated in Figure 5-1 for the restoration or maintenance of their favourable conservation condition within those sites. Given the lack of ecological connectivity between the zones of impact of the proposed works and the qualifying interests of these sites, the possibility of likely significant effects on these sites can be ruled out at this stage.

Summary

Based on the above examination, the following Natura 2000 sites are selected for assessment: -

- Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC (site code: 000365)
- Castlemaine Harbour SAC (site code: 000343)
- Castlemaine Harbour SPA (site code: 004029)

5.3. Site Descriptions

5.3.1. Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC

Overview

The following description is taken from the Site Synopsis for the site (NPWS, 2013b).

This very large site encompasses the mountains, rivers and lakes of the Iveragh Peninsula, and the Paps Mountains which stretch eastward from Killarney towards Millstreet. The majority of the site is in Co. Kerry, with a small portion in Co. Cork. This is the most mountainous region in Ireland and includes Carrauntoohil, the highest peak in the country at 1,039 m. The underlying geology is almost entirely Old Red Sandstone, although Carboniferous limestone occurs on the eastern shores of Lough Leane, and rhyolitic lavas occur above Lough Guitane. The dramatic sandstone ridges and valleys have been shaped by glacial processes and many of the lakes are impounded by glacial moraines. Located close to the Atlantic in the south-west of Ireland, the site is subject to strong oceanic influences. Generally, Lusitanian flora and fauna is well-represented, while the high peaks and cliffs support arctic-alpine relicts.

Overall, the site is of high ecological value because of the diversity, quality and extensiveness of many of the habitats, and impressive list of rare species of flora and fauna. In recognition of its importance the Killarney National Park has been designated a World Biosphere Reserve.

Qualifying Interests and Conservation Objectives

The Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC was selected for the following qualifying interests: -

- Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) (3110)
- Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoëto-Nanojuncetea* (3130)
- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation (3260)
- Northern Atlantic wet heaths with *Erica tetralix* (4010)
- European dry heaths (4030)
- Alpine and Boreal heaths (4060)
- *Juniperus communis* formations on heaths or calcareous grasslands (5130)
- Calaminarian grasslands of the *Violetalia calaminariae* (6130)
- *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) (6410)
- Blanket bogs (* if active bog) (7130)
- Depressions on peat substrates of the *Rhynchosporion* (7150)
- Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles (91A0)
- *Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) (91E0)
- **Taxus baccata* woods of the British Isles (91J0)

- Kerry Slug (*Geomalacus maculosus*) (1024)
- Freshwater Pearl Mussel (*Margaritifera margaritifera*) (1029)
- Marsh Fritillary (*Euphydryas aurinia*) (1065)
- Sea Lamprey (*Petromyzon marinus*) (1095)
- Brook Lamprey (*Lampetra planeri*) (1096)
- River Lamprey (*Lampetra fluviatilis*) (1099)
- Atlantic Salmon (*Salmo salar*) (1106)
- Lesser Horseshoe Bat (*Rhinolophus hipposideros*) (1303)
- Otter (*Lutra lutra*) (1355)
- Killarney Fern (*Trichomanes speciosum*) (1421)
- Slender Naiad (*Najas flexilis*) (1833)
- Killarney Shad (*Alosa fallax killarnensis*) (5046)

The conservation objectives of the Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC are as follows (NPWS, 2017): -

- To maintain the favourable conservation condition of 'Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation', '*Juniperus communis* formations on heaths or calcareous grasslands', 'Calaminarian grasslands of the *Violetalia calaminariae*', Kerry Slug, Sea Lamprey, Brook Lamprey, River Lamprey, Atlantic Salmon, Lesser Horseshoe Bat, Otter, Killarney Fern and Slender Naiad in the Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC.

- To restore the favourable conservation condition of 'Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*)', 'Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoëto-Nanojuncetea*', 'Northern Atlantic wet heaths with *Erica tetralix*', 'European dry heaths', 'Alpine and Boreal heaths', '*Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)', 'Blanket bogs (* if active bog)', 'Depressions on peat substrates of the *Rhynchosporion*', 'Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles', '*Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)', '**Taxus baccata* woods of the British Isles', Freshwater Pearl Mussel, Marsh Fritillary and Killarney Shad in the Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC.

The Conservation Objectives document for the site (NPWS, 2017) also states the following: "*Please note that this SAC overlaps with Killarney National Park SPA (004038) and Iveragh Peninsula SPA (004154) and is adjacent to Ballinskelligs Bay and Inny Estuary SAC (000335), Castlemaine Harbour SAC (000343), Castlemaine Harbour SPA (004029), Blackwater River (Cork/Waterford) SAC (002170) and Blackwater River (Kerry) SAC (002173). […] The conservation objectives for this site should be used in conjunction with those for the overlapping and adjacent sites as appropriate.*"

Threats, Pressures and Activities

The main land use within the site is grazing by sheep. In and around the National Park deer grazing is also common. The extensive grazing has caused damage to many of the terrestrial habitats, resulting in degradation of heath and blanket bogs and prevention of woodland regeneration. In the upland habitats the erosion caused by grazing is exacerbated by the exposed nature of the terrain. Apart from grazing, the woodlands are particularly threatened by Rhododendron (*Rhododendron ponticum*) invasion: approximately two thirds of the oak woodlands are affected, although a Rhododendron removal programme is underway in the National Park. The yew wood has been adversely affected by heavy grazing for many years, but it is intended to control this in the near future

by erection of a deer fence. The bogs are sensitive to grazing and are also threatened by turbary, burning and afforestation. Most of the lakes are very acid-sensitive and therefore vulnerable to afforestation within the catchment areas. Lough Leane has been subject to some eutrophication, although water quality appears to have improved since phosphates were removed from the sewage in 1985.

Table 5-1 below lists the threats, pressures and activities with negative impacts on the site, as per its Natura 2000 Standard Data Form (NPWS, 2018b).

Table 5-1 - Threats, pressures and activities with negative impacts on the Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC.

Rank	Threat, pressure or activity (code)	Threat, pressure or activity (description)	Inside, outside or both
Low	A03	mowing / cutting of grassland	inside
Medium	A04	grazing	outside
High	A04	grazing	inside
Medium	A08	Fertilisation	outside
Low	A08	Fertilisation	inside
Medium	B	Sylviculture, forestry	inside
Medium	B	Sylviculture, forestry	outside
Medium	C01.03	Peat extraction	inside
Medium	E01	Urbanised areas, human habitation	outside
Low	E01.03	dispersed habitation	outside
Medium	E01.03	dispersed habitation	inside
Low	F02.03	Leisure fishing	inside
Medium	F03.01	Hunting	inside
Low	G01.02	walking, horse-riding and non-motorised vehicles	inside
Low	G02.01	golf course	outside
Medium	G02.06	attraction park	inside
High	I01	invasive non-native species	inside
Medium	J01	fire and fire suppression	inside
Medium	K01.01	Erosion	inside

NPWS (2018b) and Eionet (2022).

5.3.2. Castlemaine Harbour SAC

Overview

The following description is taken from the Site Synopsis for the site (NPWS, 2015c).

This is a large site located on the south-east corner of the Dingle Peninsula, Co. Kerry. It consists of the whole inner section of Dingle Bay, i.e. Castlemaine Harbour, the spits of Inch and White Strand/Rosbehy and a little of the coastline to the west. The River Maine, almost to Castlemaine, and much of the River Laune catchment, including the Gaddagh, Gweestion, Glanooragh, Cottoner's River and the River Loe, are also included within the site.

Castlemaine Harbour is of major ecological importance. It contains a range of coastal habitats of excellent quality, including many that are listed on Annex I to the Habitats Directive, and two which are listed with priority status (fixed dunes and alluvial forests). It also includes long stretches of river and stream which are excellent habitats for salmon, lampreys and otter. Inch dunes are recognised as among the finest in the country, with particularly well-developed dune slacks. The site supports internationally important waterfowl populations, rare plant species, the rare Natterjack Toad, as well as populations of several animal species that are listed on Annex II to the Habitats Directive. Part of the site is designated an SPA and is listed as a Wetland of International Importance under the Ramsar Convention. Part of Castlemaine Harbour is a Statutory Nature Reserve, while Inch and Rosbehy are Wildfowl Sanctuaries

Qualifying Interests and Conservation Objectives

The Castlemaine Harbour SAC was selected for the following qualifying interests: -

- Estuaries (1130)
- Mudflats and sandflats not covered by seawater at low tide (1140)
- Annual vegetation of drift lines (1210)
- Perennial vegetation of stony banks (1220)
- Vegetated sea cliffs of the Atlantic and Baltic coasts (1230)
- *Salicornia* and other annuals colonising mud and sand (1310)
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) (1330)
- Mediterranean salt meadows (*Juncetalia maritimi*) (1410)
- Embryonic shifting dunes (2110)
- Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) (2120)
- *Fixed coastal dunes with herbaceous vegetation (grey dunes) (2130)
- Dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae*) (2170)
- Humid dune slacks (2190)
- *Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) (91E0)
- Sea Lamprey (*Petromyzon marinus*) (1095)
- River Lamprey (*Lampetra fluviatilis*) (1099)

- Atlantic Salmon (*Salmo salar*) (1106)
- Otter (*Lutra lutra*) (1355)
- Petalwort (*Petalophyllum ralfsii*) (1395)

The conservation objectives of the Castlemaine Harbour SAC are as follows (NPWS, 2011): -

- To maintain the favourable conservation condition of 'Estuaries', 'Mudflats and sandflats not covered by seawater at low tide', 'Annual vegetation of drift lines', 'Perennial vegetation of stony banks', '*Salicornia* and other annuals colonising mud and sand', 'Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)', 'Mediterranean salt meadows (*Juncetalia maritimi*)', 'Embryonic shifting dunes', 'Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)', 'Dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae*)', 'Humid dune slacks', Sea Lamprey, River Lamprey, Atlantic Salmon and Petalwort in the Castlemaine Harbour SAC.

- To restore the favourable conservation condition of *Fixed coastal dunes with herbaceous vegetation (grey dunes)', '*Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)' and Otter in the Castlemaine Harbour SAC.

At present, there is no site-specific conservation objective for 'Vegetated sea cliffs of the Atlantic and Baltic coasts' in the Castlemaine Harbour SAC.

Threats, Pressures and Activities

Table 5-2 below lists the threats, pressures and activities with negative impacts on the Castlemaine Harbour SAC, as per its Natura 2000 Standard Data Form (NPWS, 2018a).

Table 5-2 - Threats, pressures and activities with negative impacts on the Castlemaine Harbour SAC.

Rank	Threat, pressure or activity (code)	Threat, pressure or activity (description)	Inside, outside or both
Medium	A04	grazing	inside
Medium	A04	grazing	outside
Low	C01.01.02	removal of beach materials	inside
High	E01	Urbanised areas, human habitation	outside
Medium	E01.03	dispersed habitation	outside
High	F01	Marine and Freshwater Aquaculture	inside
Medium	F02.03	Leisure fishing	inside
High	G01.02	walking, horse-riding and non-motorised vehicles	inside
Medium	G02.08	camping and caravans	inside
Medium	I01	invasive non-native species	inside
High	J02.01.03	infilling of ditches, dykes, ponds, pools, marshes or pits	inside

NPWS (2018a) and Eionet (2022).

5.3.3. Castlemaine Harbour SPA

Overview

The following description is taken from the Site Synopsis for the site (NPWS, 2014c).

Castlemaine Harbour SPA is a large coastal site occupying the innermost part of Dingle Bay. It extends from the lower tidal reaches of the River Maine and River Laune to west of the Inch and Rosbehy peninsulas (c. 16 km from east to west). The average width of the estuary is 4-5 km though it is c. 11 km wide at the outer limit. The site comprises the estuaries of the River Maine and the River Laune, both substantial rivers, and has extensive areas of intertidal sand and mud flats. A number of other rivers, e.g. the Caragh and the Emlagh, flow into the site, as well as numerous small streams. Conditions in the bay are very sheltered due to the presence of three protruding sand spits on its seaward side. These spits overly gravel bars. Two of the spits, Rosbehy and Inch, are included within the site. Salt marshes fringe much of the shoreline. A very large dune system occurs on the Inch peninsula. A substantial area of shallow marine water is included in the site.

Castlemaine Harbour SPA is a very important ornithological site, with one species, Light-bellied Brent Goose, occurring in numbers of international importance. In addition, it supports nationally important populations of a further fifteen species. Of particular note is that five species that occur regularly are listed on Annex I to the Birds Directive, i.e. Red-throated Diver, Great Northern Diver, Golden Plover, Bar-tailed Godwit and Chough. Castlemaine Harbour is a Wetland of International Importance under the Ramsar Convention and parts of the site are designated as a Statutory Nature Reserve and as Wildfowl Sanctuaries.

Qualifying Interests and Conservation Objectives

The Castlemaine Harbour SPA was selected for the following qualifying interests: -

- Red-throated Diver (*Gavia stellata*) (A001)
- Cormorant (*Phalacrocorax carbo*) (A017)
- Light-bellied Brent Goose (*Branta bernicla hrota*) (A046)
- Wigeon (*Anas penelope*) (A050)
- Mallard (*Anas platyrhynchos*) (A053)
- Pintail (*Anas acuta*) (A054)
- Scaup (*Aythya marila*) (A062)
- Common Scoter (*Melanitta nigra*) (A065)
- Oystercatcher (*Haematopus ostralegus*) (A130)
- Ringed Plover (*Charadrius hiaticula*) (A137)
- Sanderling (*Calidris alba*) (A144)
- Bar-tailed Godwit (*Limosa lapponica*) (A157)
- Redshank (*Tringa totanus*) (A162)
- Greenshank (*Tringa nebularia*) (A164)
- Turnstone (*Arenaria interpres*) (A169)
- Chough (*Pyrrhocorax pyrrhocorax*) (A346)

- Wetland and Waterbirds (A999)

The conservation objectives of the Castlemaine Harbour SPA are to maintain the favourable conservation condition of all of the above qualifying interests in the site (NPWS, 2022).

Threats, Pressures and Activities

Table 5-3 below lists the threats, pressures and activities with negative impacts on the site, as per its Natura 2000 Standard Data Form (NPWS, 2020a).

Table 5-3 - Threats, pressures and activities with negative impacts on the Castlemaine Harbour SPA.

Rank	Threat, pressure or activity (code)	Threat, pressure or activity (description)	Inside, outside or both
Medium	A08	Fertilisation	outside
Medium	E01.01	continuous urbanisation	outside
Low	E01.03	dispersed habitation	outside
High	F01	Marine and Freshwater Aquaculture	inside
Medium	G01	Outdoor sports and leisure activities, recreational activities	inside
High	I01	invasive non-native species	inside

NPWS (2020a) and Eionet (2022).

6. Assessment of Adverse Effects

6.1. Identification of Potential Impacts

This section identifies potential impacts on the qualifying interests of the Natura 2000 sites concerned following the source-pathway-receptor model, i.e. by identifying the impacts from the proposed works (sources) to which the qualifying interests (receptors) are sensitive and establishing whether are not there are pathways for those impacts.

6.1.1. Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC

Table 6-1 - Identification of potential impacts on the Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC.

Qualifying interest	Identification of potential impacts	Potential impact
Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*)	There are no examples of either of these lake habitats within the likely extent of any water quality impacts from the proposed works. The nearest examples within the Zone of Influence occur in Lough Caragh. However, there are no pathways for impacts from the proposed works to these habitats. Therefore, the possibility of any impacts can be ruled out at this stage.	No
Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoëto-Nanojuncetea*		No
Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	For the purpose of this NIS, all rivers and streams in the SAC are assumed to represent this habitat type. The nearest examples within the SAC are the upper reach of the Knockaunglass stream itself and the Caragh River below Lough Caragh and above the tidal limit. These areas are outside the likely extent of any water quality impacts from the proposed works. Therefore, the possibility of any impacts can be ruled out at this stage.	No
Northern Atlantic wet heaths with *Erica tetralix*	This habitat type is not present in the immediate vicinity of the proposed works. The nearest examples are on the slopes of Seefin Mountain, to the south and upstream of the proposed works (*ESM Webtool*). As such, there are no pathways for impacts. Therefore, the possibility of any impacts can be ruled out at this stage.	No
European dry heaths	The nearest examples of this habitat to the proposed works are immediately north-west of the works area (*ESM Webtool*). However, these are not within the works area or the SAC. The nearest examples within the SAC are on the slopes of Seefin Mountain, to the south and upstream of the proposed works (*ESM Webtool*). As such, there are no pathways for impacts. Therefore, the possibility of any impacts can be ruled out at this stage.	No
Alpine and Boreal heaths	This habitat type does not occur in close proximity to the proposed works, the nearest examples being on the other side of Seefin Mountain (*ESM Webtool*). Therefore, the possibility of any impacts can be ruled out at this stage.	No
Juniperus communis formations on heaths or calcareous grasslands	Known to occur on islands and headlands of the Upper Lake and Muckross Lake (and potentially other isolated locations). This habitat type does not occur in close proximity to the proposed works. Therefore, the possibility of any impacts can be ruled out at this stage.	No
Calaminarian grasslands of the *Violetalia calaminariae*	Examples occurs at the disused copper mine on the north shore of Muckross Lake and at Ross Island, at a former copper and lead mine. This habitat type does not occur in close proximity to the proposed works. Therefore, the possibility of any impacts can be ruled out at this stage.	No

Qualifying interest	Identification of potential impacts	Potential impact
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)	This grassland habitat type does not occur in close proximity to the proposed works. Therefore, the possibility of any impacts can be ruled out at this stage.	No
Blanket bogs (* if active bog)	Neither of these peatland habitats occur in close proximity to the proposed works. Therefore, the possibility of any impacts can be ruled out at this stage.	No
Depressions on peat substrates of the *Rhynchosporion*		No
Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	The woodlands in close proximity to the proposed works do not conform to the Annex I description as oak is not the dominant canopy species. There are no examples of this woodland type connected to the works area. Therefore, the possibility of any impacts can be ruled out at this stage.	No
*Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)	There is no woodland within the works area, site compound location, access route or anywhere which will be accessed as part of the proposed works. Some examples of this Annex I habitat may be present further downstream along the Knockaunglass stream, but any such examples are small in size and located outside the SAC. Therefore, the possibility of any impacts can be ruled out at this stage.	No
**Taxus baccata* woods of the British Isles	This priority woodland habitat type does not occur in close proximity to the proposed works. Therefore, the possibility of any impacts can be ruled out at this stage.	No
Kerry Slug	No suitable habitat for this species occurs in the vicinity of the proposed works. Therefore, the possibility of any impacts can be ruled out at this stage.	No
Freshwater Pearl Mussel	The Knockaunglass stream is not within a *Margaritifera*-sensitive Area and there are no records of this species in the stream. [redacted] However, as noted in NPWS (2017), pearl mussel glochidia rely on juvenile (0+ and 1+) salmonids, rather than migrating adults, and the presence of such fish is sufficient (high abundances are not required). As such, only a profound reduction in juvenile salmonid abundance would impact pearl mussel glochidia. The only pathway for such an effect from the proposed works would be through very significant impacts, across multiple consecutive years, on salmon and trout [redacted] Given the nature, scale and duration of the proposed works, such impacts can be ruled out and, consequently, the possibility of any impacts on Freshwater Pearl Mussel can be ruled out.	No
Marsh Fritillary	No habitat suitable for this species occurs within the footprint of the proposed works. While suitable habitat may occur in close proximity to the works, there will be no loss of or damage to any such habitats. Therefore, the possibility of any impacts can be ruled out at this stage.	No
Sea Lamprey	These four fish species are all potentially present in the Knockaunglass stream during part of their lifecycle and are likely to migrate up the Caragh River from Caragh Creek, which is within the likely maximum	**Yes**
Brook Lamprey		**Yes**

Qualifying interest	Identification of potential impacts	Potential impact
River Lamprey	extent of any water quality impacts from the proposed development. As such, the possibility of an ex-situ impact on these qualifying interests cannot be excluded at this stage.	**Yes**
Salmon		**Yes**
Lesser Horseshoe Bat	[redacted] No potential roosts were identified within the works area during the surveys and there are no known roosts of this species within 2.5km of the works [redacted] the possibility of an ex-situ impact cannot be excluded at this stage.	**Yes**
Otter	No evidence of otters was observed during the site visits. However, as the habitat present is suitable for otters and is within the foraging range of this species from the SAC, the possibility of ex-situ impacts cannot be excluded at this stage.	**Yes**
Killarney Fern	No suitable habitat for this species occurs in the vicinity of the proposed works. Therefore, the possibility of any impacts can be ruled out at this stage.	No
Slender Naiad	The nearest occurrence of this aquatic macrophyte is in Lough Caragh. No suitable habitat occurs nearer the proposed works and the population in Lough Caragh is not dependent on the ecological structures or functions of the likely zone of impact for water quality impacts from the proposed development. Therefore, the possibility of any direct or indirect impacts can be ruled out at this stage.	No
Killarney Shad	As this species is restricted to Lough Leane, which is outside the Zone of Influence of the proposed works. Therefore, the possibility of any impacts can be ruled out at this stage.	No

6.1.2. Castlemaine Harbour SAC

Table 6-2 - Identification of potential impacts on the Castlemaine Harbour SAC.

Qualifying interest	Identification of potential impacts	Potential impact
Estuaries	These habitats are present in Caragh Creek (part of Castlemaine Harbour) c. 500m downstream of the proposed works, i.e. within the likely maximum extent of water quality impacts from the proposed works. Therefore, there is potential for impacts on these habitats.	**Yes**
Mudflats and sandflats not covered by seawater at low tide		**Yes**
Annual vegetation of drift lines	These habitats are present along the high-water line in Castlemaine Harbour downstream of the proposed works, i.e. adjoining the likely maximum extent of water quality impacts. Therefore, the possibility of such impacts occurring cannot be entirely excluded (should a pollution event coincide with high water levels due to spring tides or storm surge).	**Yes**
Perennial vegetation of stony banks		**Yes**
Vegetated sea cliffs of the Atlantic and Baltic coasts	This habitat is likely present along the cliffs adjoining Castlemaine Harbour. However, the habitat is not subject to any inundation. As such, there are no pathways for impacts to this habitat. Therefore, the possibility of any impacts can be ruled out at this stage.	No
Salicornia and other annuals colonising mud and sand	This habitat is likely present along the edges of Caragh Creek (part of Castlemaine Harbour) downstream of the proposed works and is subject to regular inundation. As such, it is within the likely maximum extent of water quality impacts from the proposed works. Therefore, there is potential for impacts.	**Yes**
Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	These habitats are likely present adjoining Caragh Creek (part of Castlemaine Harbour) downstream of the proposed works, i.e. adjoining the likely maximum extent of water quality impacts, and are subject to	**Yes**

Qualifying interest	Identification of potential impacts	Potential impact
Mediterranean salt meadows (*Juncetalia maritimi*)	periodic inundation. Therefore, the possibility of such impacts occurring cannot be entirely excluded (should a pollution event coincide with high water levels due to spring tides or storm surge).	**Yes**
Embryonic shifting dunes	These habitats are present just beyond the high-water line in Castlemaine Harbour (on Inch and Rosbehy spits). However, these habitats are not subject to inundation. As such, there are no pathways for impacts from the proposed works. Therefore, the possibility of impacts can be ruled out at this stage.	No
Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)		No
*Fixed coastal dunes with herbaceous vegetation (grey dunes)	These habitats are present beyond the high-water line in Castlemaine Harbour (on Inch and Rosbehy spits) and are not subject to inundation. As such, there are no pathways for impacts from the proposed works. Therefore, the possibility of impacts can be ruled out at this stage.	No
Dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae*)		No
Humid dune slacks		No
*Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)	There is no woodland within the works area, site compound location, access route or anywhere which will be accessed as part of the proposed works. Some examples of this Annex I habitat may be present further downstream along the Knockaunglass stream, but any such examples are small in size and located outside the SAC. Therefore, the possibility of any impacts can be ruled out at this stage.	No
Sea Lamprey	These three fish species are all potentially present in the Knockaunglass stream during part of their lifecycle and are likely to migrate through Caragh Creek, which is within the likely maximum extent of any water quality impacts from the proposed development. As such, the possibility of an impacts on these qualifying interests cannot be excluded at this stage.	**Yes**
River Lamprey		**Yes**
Salmon		**Yes**
Otter	No evidence of otters was observed during the site visits. However, the habitat present is suitable for otters and is within the foraging range of this species from the SAC. Furthermore, otters are dependent on fish and other aquatic prey in Caragh Creek, which is within the SAC and the zone of impact for water quality impacts. Therefore, there is potential for direct and indirect impacts on this species.	**Yes**
Petalwort	This species or suitable habitat for it do not occur within the zones of impact from the proposed works. The nearest locations of this species are in dune slacks on Inch and Rosbehy spits. Therefore, there are no pathways for impacts and the possibility of any impacts can be ruled out at this stage.	No

6.1.3. Castlemaine Harbour SPA

Table 6-3 - Identification of potential impacts on the Castlemaine Harbour SPA.

Qualifying interest	Identification of potential impacts	Potential impact
Red-throated Diver, Cormorant, Light-bellied Brent Goose, Wigeon, Mallard, Pintail, Scaup, Common Scoter, Oystercatcher, Ringed Plover, Sanderling, Bar-tailed Godwit, Redshank, Greenshank and Turnstone	All of these species are likely to feed at least occasionally within or near the zone of impact for water quality impacts from the proposed works and the quality of their feeding habitat is linked to water quality. Therefore, there are pathways for potential impacts on these species.	**Yes**
Chough	This Annex I bird species occurs on the sand dunes on Inch spit, and potentially Rosbehy spit. These areas are beyond the zones of impact from the proposed works. While some potentially suitable foraging habitat occurs within the zone of impact for disturbance from the proposed works, these areas are remote from the SPA and already subject to high levels of disturbance from the N70 road. Therefore, the possibility of impacts on this species can be excluded at this stage.	No
Wetland and Waterbirds	Wetland habitat for waterbirds occurs in Caragh Creek (part of the SPA) c. 500m downstream of the proposed works, i.e. within the likely extent of any water quality impacts. Therefore, there is potential for impacts on the quality of this habitat.	**Yes**

6.1.4. Summary

The qualifying interests for which potential impacts could not be ruled out at this stage are as follows: -

- Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC
    - Sea Lamprey
    - Brook Lamprey
    - River Lamprey
    - Salmon
    - Lesser Horseshoe Bat
    - Otter
- Castlemaine Harbour SAC
    - Estuaries
    - Mudflats and sandflats not covered by seawater at low tide
    - Annual vegetation of drift lines
    - Perennial vegetation of stony banks
    - *Salicornia* and other annuals colonising mud and sand
    - Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
    - Mediterranean salt meadows (*Juncetalia maritimi*)

    - Sea Lamprey
    - River Lamprey
    - Salmon
    - Otter
- Castlemaine Harbour SPA
    - All bird species listed as Qualifying Interests, except Chough
    - Wetland and Waterbirds

The potential impacts on these Qualifying Interests are analysed and the significance of their effects evaluated in Section 6.2.

6.2. Analysis and Evaluation of Effects

This section analyses the potential impacts identified in Section 6.1 and evaluates the significance of their effects in view of the relevant conservation objectives, as defined by their specific attributes and targets.

6.2.1. Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC

Table 6-4 – Evaluation of effects on the Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC.

Qualifying interest	Description of effects	Adverse effect
Sea Lamprey	The attributes of the conservation objective for the three lamprey species relate to distribution, population structure of juveniles, juvenile density in fine sediment, extent and distribution of spawning habitat and availability of juvenile habitat. The proposed works will not impact on any spawning or juvenile habitat in the SAC or affect the connectivity for lampreys along rivers in the SAC. Therefore, there will be no effect on Brook Lamprey and the only potential effects on Sea or River Lamprey relate to ex-situ impacts via water quality in Caragh Creek, the relevant attributes being (indirectly) population structure of juveniles and juvenile density in fine sediment. The targets for these attributes relate to the number or age classes present and proportion of sample sites positive for juveniles. While the magnitude of any water quality impacts from the proposed works are unlikely to be so great as to have a measurable effect on these targets, they cannot be quantified at this stage. Therefore, the possibility of adverse effects on these targets cannot be entirely excluded.	**Uncertain**
Brook Lamprey		No
River Lamprey		**Uncertain**
Salmon	The attributes of the conservation objective for Atlantic Salmon relate to distribution (extent of anadromy), abundance of adult spawning fish, fry and out-migrating smolts, number and distribution of redds, and water quality. As identified in Table 6-1, the only pathway from the proposed works to the salmon population in the SAC is for an ex-situ water quality impact on fish migrating through Caragh Creek. As the specific target for water quality related only to the Q-values at sample sites within the SAC, this target will not be affected. However, the abundance of inward migrating adults and out-migrating smolts in Caragh Creek may be affected by water quality impacts here. The specific targets for these attributes are that the Conservation Limits for adult fish are consistently exceeded and that there is no significant decline in smolt abundance. As the magnitude of any water quality impacts from the proposed works cannot be quantified at this stage and given the threat to out-migrating smolts, in particular, from pollution of the estuarine environment, the possibility of adverse effects cannot be entirely excluded.	**Uncertain**
Lesser Horseshoe Bat	While no potential Lesser Horseshoe roosts were identified within the works area during the surveys and there are no known roosts of this species within 2.5km (the mean foraging range of this species) of the works, [redacted] As such, the possibility of adverse effects through disturbance cannot be excluded.	**Uncertain**
Otter	While no evidence of otters was observed during the site visits, the habitat present is suitable for otters and is within the foraging range of this species from the SAC, the possibility of adverse effects through disturbance and loss or fragmentation of foraging or commuting habitat cannot be excluded.	**Uncertain**

6.2.2. Castlemaine Harbour SAC

Table 6-5 - Evaluation of effects on the Castlemaine Harbour SAC.

Qualifying interest	Description of effects	Adverse effect
Estuaries	The attributes and targets of the conservation objectives for these two estuarine habitats relate to maintaining the total area of the habitats and maintaining the extents, distribution and condition of specific community types occurring within them. While the proposed works will not give rise to any change in the area of any of these habitats or communities, water quality impacts could negatively affect their condition. Therefore, there is a risk of adverse effects.	**Yes**
Mudflats and sandflats not covered by seawater at low tide		**Yes**
Annual vegetation of drift lines	The attributes of the conservation objectives for these habitats relate to habitat area and distribution, physical structure (functionality and sediment supply), vegetation structure (zonation) and composition (typical species and sub-communities, negative indicator species). As identified in Table 6-2, the proposed works will not affect the area or physical structure of the habitat, but pathways exist for water quality impacts in the event of pollution coinciding with inundation. However, given the dilution capacity of Caragh Creek/outer Castlemaine Harbour and that the proposed works will be undertaken in spring/summer, when inundation is less likely, any possible water quality impacts would not negatively affect the vegetation in these habitats. Therefore, the possibility of adverse effects can be excluded.	No
Perennial vegetation of stony banks		No
Salicornia and other annuals colonising mud and sand	The attributes of the conservation objective for this habitat relate to habitat area and distribution, physical structure (sediment supply, creeks and pans, flooding regime), vegetation structure (zonation, height, cover) and composition (typical species and sub-communities, negative indicator species). As this pioneer community depends on regular inundation, the pathway for potential water quality impacts from the proposed works exists year-round. Due to the likely duration of any such impacts, they will not affect the habitat area, distribution, or physical structure. However, given their nature, they may negatively affect the vegetation structure composition. Therefore, there is a risk of adverse effects on this habitat.	**Yes**
Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	The attributes of the conservation objectives for these habitats relate to habitat area and distribution, physical structure (sediment supply, creeks and pans, flooding regime), vegetation structure (zonation, height, cover) and composition (typical species and sub-communities, negative indicator species). As identified in Table 6-2, the proposed works will not affect the area, distribution or physical structure of the habitat, but pathways exist for water quality impacts in the event of pollution coinciding with inundation. However, given the dilution capacity of Caragh Creek/ Castlemaine Harbour and that the proposed works will be undertaken in spring/summer, when inundation is less likely, any possible water quality impacts would not negatively affect the vegetation in these habitats. Therefore, the possibility of any adverse effects can be excluded.	No
Mediterranean salt meadows (*Juncetalia maritimi*)		No
Sea Lamprey	The attributes of the conservation objective for these lamprey species relate to extent of anadromy, population structure of juveniles, juvenile density in fine sediment, extent and distribution of spawning habitat and availability of juvenile habitat. The proposed works will not impact on any spawning or juvenile habitat in the SAC or affect the connectivity for lampreys along rivers in the SAC. Therefore, the only potential effects on Sea or River Lamprey relate to ex-situ impacts via water quality in Castlemaine Harbour, the relevant attributes being (indirectly) population structure of juveniles and juvenile density in fine sediment. The targets for these attributes relate to the number or age classes present and proportion of sample sites positive for juveniles. While the magnitude of any water quality impacts from the proposed works are unlikely to be so great as to have a measurable effect on these targets, they cannot be quantified at this stage. Therefore, the possibility of adverse effects on these targets cannot be entirely excluded.	**Uncertain**
River Lamprey		**Uncertain**

Qualifying interest	Description of effects	Adverse effect
Salmon	The attributes of the conservation objective for Atlantic Salmon relate to extent of anadromy, abundance of adult spawning fish, fry and out-migrating smolts, number and distribution of redds, and water quality. As identified in Table 6-2, the only pathway from the proposed works to the salmon population in the SAC is for an ex-situ water quality impact on fish migrating through Caragh Creek/Castlemaine Harbour. As the specific target for water quality related only to the Q-values at sample sites within the SAC, this target will not be affected. However, the abundance of inward migrating adults and out-migrating smolts in Castlemaine Harbour may be affected by water quality impacts here. The specific targets for these attributes are that the Conservation Limits for adult fish are consistently exceeded and that there is no significant decline in smolt abundance. As the magnitude of any water quality impacts from the proposed works cannot be quantified at this stage and given the threat to out-migrating smolts, in particular, from pollution of the estuarine environment, the possibility of adverse effects cannot be entirely excluded.	**Uncertain**
Otter	While no evidence of otters was observed during the site visits, the habitat present is suitable for otters and is within the foraging range of this species from the SAC, the possibility of adverse effects through disturbance and loss or fragmentation of foraging or commuting habitat cannot be excluded. Disturbance or habitat loss during the construction stage could form a barrier to connectivity for otters along the Knockaunglass stream and poor re-establishment of the vegetation, particularly woodland, along the riparian corridor would represent fragmentation of this foraging and commuting habitat for otters.	**Uncertain**

6.2.3. Castlemaine Harbour SPA

Table 6-6 – Evaluation of effects on the Castlemaine Harbour SPA.

Qualifying interest	Description of effects	Adverse effect
Red-throated Diver, Cormorant, Light-bellied Brent Goose, Wigeon, Mallard, Pintail, Scaup, Common Scoter, Oystercatcher, Ringed Plover, Sanderling, Bar-tailed Godwit, Redshank, Greenshank and Turnstone	As noted in Table 6-3, all of these species are likely to feed at least occasionally within or near the zone of impact for water quality impacts from the proposed works. As such, there is a risk to the quality of their feeding habitats owing to the potential for water quality impacts from the proposed works. The specific attributes of the conservation objectives for all of these species relate to the long-term population trends and distribution within the SPA. Given the nature and likely duration of any water quality impacts from the proposed works, they do not have the potential to negatively affect these attributes. Therefore, adverse effects on these conservation objectives can be excluded. Furthermore, as the works will be carried out in spring/summer, there will be no effects whatsoever on winter migrants.	No
Wetland and Waterbirds	The only attribute defining the conservation objective for Wetland and Waterbirds relates to habitat area. The only potential impact from the proposed works to this qualifying interest relates to water quality, and the proposed works will not have direct or indirect impact on the habitat area, there will be no adverse effect on this conservation objective.	No

6.2.4. Summary

The qualifying interests for which the possibility of adverse effects could not be excluded are as follows: -

- Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC
    - Sea Lamprey
    - River Lamprey
    - Atlantic Salmon
    - Lesser Horseshoe Bat
    - Otter
- Castlemaine Harbour SAC
    - Estuaries
    - Mudflats and sandflats not covered by seawater at low tide
    - *Salicornia* and other annuals colonising mud and sand
    - Sea Lamprey
    - River Lamprey
    - Atlantic Salmon
    - Otter

As the possibility of adverse effects on the above qualifying interests could not be ruled out, appropriate mitigation is required in order to avoid or reduce the impacts of the proposed works on those qualifying interests such that they no longer represent adverse effects in view of the relevant conservation objectives.

7. Mitigation

7.1. Requirement and Approach

Section 6 of this NIS found that, in the absence of appropriate mitigation, the proposed works have the potential to adversely affect the conservation objectives for a number of qualifying interests of the Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC and Castlemaine Harbour SAC. The potential for such effects arises due to the risk of water quality impacts and disturbance associated with the works. This section prescribes measures to address these impacts and, thereby, eliminate the possibility of adverse effects.

The development of the mitigation measures prescribed in this section has followed the "mitigation hierarchy", which prioritises avoidance over reduction, and actions at source over pathway over receptor, as follows: -

1. Eliminate the source of the impact,
2. Minimise or reduce the impact at its source,
3. Block or weaken the pathway for effects, and
4. Abate effects at the receptor.

This approach assists with more complete removal of the effects, minimises the risk of effects occurring by less obvious pathways, also protects non-target receptors, and minimises the risks of unintended harm associated with measures focussed at or near the receptors.

7.2. Mitigation Measures

7.2.1. Design Phase

A number of mitigation and enhancement measures have been incorporated into the proposed works design to minimise any losses of biodiversity and, where possible, deliver a biodiversity gain. These measures include the design of the stream channel, and Landscape Plan and Specification, as described below.

Stream Channel

The following measures shall apply to the stream channel: -

1. The dimensions of the channel will be reinstated as per the design of the original works, i.e. preserving the current horizontal alignment over its length of 49.75m and low-flow wetted width of 2.00m, and restoring the design bed level, with a typical gradient of 1:20.82 (4.80%).
2. 6 no. stone baffles measuring 1,500mm long × 500mm wide × 500mm deep and embedded 350mm deep into the stream bed will be installed from alternating sides of the channel at 7.5m centres, final placement and spacing to be determined on site under the supervision and advice of the Contractor's ecologist and a Fisheries Officer from IFI.

These measures will ensure that there is no significant change to the extent of stream habitat or the hydrology, hydromorphology or physical habitat characteristics of the stream, particularly with regard to the ability of fish to move upstream.

In addition, the top 400mm of the existing substrate material will be salvaged and reinstated. This will fill the voids in the rock armour base and also accelerate the establishment of benthic biota (invertebrates, algae, microbes etc.) in the new channel and also assist in matching the substrate particle size distribution and, consequently, flow variation of the new channel to that of the existing.

Landscape Plan

A detailed Landscape Plan and Specification for the works area has been prepared by Eamonn Byrne Landscape Architects on behalf of AtkinsRéalis and in discussion with TII's Environmental Policy and Compliance section, and is presented in Appendix B to this NIS. The Landscape Plan and Specification forms part of the Contract and will be implemented by the appointed Contractor (Cumnor).

The Landscape Plan will provide for the reestablishment of riparian vegetation, in particular areas of woodland located along the Knockaunglass stream to provide bank stability, aquatic habitat heterogeneity, dappled shading of the stream channel, sources of allochthonous inputs, and screening of lighting impacts from the road. This will also reinstate cover and habitat connectivity for species in the wider landscape.

The main area of planting will include a strip of native woodland along the roadside which will both screen the works area and re-create lost woodland habitat. A strip of woodland will also be planted along the western side of the realigned stream. This planting, along with natural recolonisation, will help to recreate a wooded/sheltered corridor along the river.

Reuse of topsoil and its associated seed bank is to be maximised where practical. However, depending upon site conditions when works commence, and the condition of soils, this may not be possible. In this case topsoil will be removed and disposed of off-site; with appropriate topsoil imported to site for finishing landscape works. While standard agricultural topsoil will be used to reinstate the agricultural field; lower nutrient soils must be used elsewhere within the landscaping. The NIS considers the risk associate with importation / export of materials from the site.

The Species Action Plan for Lesser Horseshoe Bat (NPWS & VWT, 2022) repeatedly references the need for habitat protection or restoration, including habitats such as riparian woodland along rivers and stream. While there are no known roosts of this species within 2.5km of the proposed works, this strategy has informed the landscaping proposals.

7.2.2. Construction Phase

This section details the mitigation measures which will be implemented by the Contractor during the construction phase. These measures have been developed in consultation with the Contractor and will be incorporated into the Contractor's Risk Assessment Method Statement (RAMS).

General Precautions

The following overarching measures shall apply to the construction phase: -

1. All works shall be undertaken within the agreed site boundary. No works shall be undertaken outside the site boundary.

2. As part of site induction, all persons entering the works area shall receive a 'tool-box talk' covering the environmental and ecological sensitivities of the site and the measures being implemented to avoid and minimise impacts on those sensitivities, as well as the responsibilities of persons on site in implementing those measures.

3. Working hours shall be restricted to between 08:00 and 17:00.

4. IFI and the NPWS shall be notified in advance of works commencing.

Ecological Supervision

The Contractor shall retain the services of a suitably qualified and experienced Ecological Clerk of Works (ECoW) for the duration of the works.

The qualifications and experience of the ECoW shall include, as a minimum: -

- BSc (Hons) or above in Ecology or a related environmental discipline,

- Full membership of the CIEEM or equivalent membership of a similar professional body,
- Demonstrable experience in providing ecological/environmental oversight on construction sites, including sites where IAPS and sensitive watercourses are present.

The main duties of the ECoW shall include the following: -

1. Assist the Contractor in ensuring that the measures in this NIS, any conditions of consents/licences and relevant TII guidelines are fully and properly implemented during construction.
2. Undertake pre-construction surveys for legally restricted IAPS, any breeding or resting places of species listed on Annex IV to the Habitats Directive, and nesting birds.
3. Oversee the continued implementation of the IAPS Management Plan for the original works, as described below.
4. Advise the Contractor on any requirement for a derogation licence under Regulation 54 of the Habitats Regulations due to the presence of breeding or resting places of species listed on Annex IV to the Habitats Directive, as identified during the pre-construction surveys.[3]
5. Directly supervise key activities on site, including: -
    a. Set-up of water quality protection measures,
    b. Isolation, over-pumping and dewatering of the first in-stream works section,
    c. Relaying of existing bed material into the new stream bed in the first in-stream works section,
    d. Rearrangement of the water management from the first to the second in-stream works section,
    e. Re-opening of the channel once the final in-stream works are complete, and
    f. Evacuation of the flood zone in the event of the flood response procedure (as described below) being triggered.
6. Carry out weekly inspections of the site and document the implementation of the measures in this NIS, any conditions of consents/licences and relevant TII guidelines. The ECoW's records shall be available to TII or TII's Representative, the NPWS and IFI, on request.
7. Provide monthly updates to TII or TII's Representative on the implementation of the mitigation measures detailed in this NIS and any ecological/environmental incidents on site.

Water Quality

The following measures shall apply to prevent water quality impacts generally: -

1. During all stages of construction, site management shall ensure that good housekeeping is maintained at all times and that all site personnel are made aware of the importance of the freshwater environments and the requirement to avoid pollution.
2. Safe handling of all potentially hazardous materials will be emphasised to all site personnel.
3. Tools and equipment shall not be cleaned in any watercourse and wash water shall not be discharged directly into any watercourse or road drains without appropriate treatment.
4. An outline Emergency Response Procedure (ERP) has been prepared by the Contractor (Appendix C).

[3] The Contractor, with the assistance of the Contractor's ecologist, shall be responsible for applying for any such licence and observing its conditions.

a. Prior to commencement of works, the appointed Contractor, with the assistance of their ecologist, shall elaborate detailed, project-specific ERP on the basis of the outline ERP in Appendix D and the mitigation measures in this NIS. The final ERP shall be agreed with TII.

b. The ERP shall be adhered to in order to address any pollution incidents on site, including from flooding (taking account of the flood monitoring and response procedure described below).

5. Notwithstanding that the proposed works will be carried out in summer, when there is a reduced risk of heavy rainfall, the Contractor shall make daily checks for elevated water levels/flows in the stream and weather warnings or flood alerts from Met Éireann and/or Kerry County Council.

    a. Should water levels in the stream or overland flows pose a risk of overwhelming water quality control measures, or a weather warning for extreme rainfall or a flood alert covering County Kerry be in place,

        i. All areas of exposed soil shall be securely covered with hessian matting,

        ii. All stockpiles shall also be securely covered, and

        iii. Works carrying the greatest risk of pollution, i.e. works within the flood zone, shall be suspended and all vehicles, plant, equipment, construction materials and personnel shall be removed from the flood zone.

    b. Works may resume once any flood waters have receded and any warning/alert been lifted.

In addition, the measures in the following sub-sections shall apply to control the risk of water quality impacts from specific sources.

Surface Water Run-off

The following measures shall be implemented to minimise the quantity of surface water run-off from the works area[4] entering the stream, and to minimise any potential contamination of such run-off by fine sediment or other deleterious matter: -

1. Where possible, run-off from outside of the works area shall be intercepted before entering the works area and diverted around it.

2. To prevent rutting of land in high-traffic areas: -

    a. The haul road within the lands available shall be excavated to a depth of 300mm, a geotextile layer placed on the bottom of the excavation, and the haul road constructed with a 225mm layer of stone and topped off with a compacted 75mm layer of Clause 804 gravel or equivalent.

    b. The site compound shall be excavated and coated with a 200mm layer of compacted Clause 804 gravel to create a safe working platform. The compound will be secured using Heras fences.

3. At the beginning of site set-up, double silt fences shall be erected along both sides of the stream.

    a. The silt fences shall be formed using two rows of timber stakes and hessian fabric and the two rows shall be 500mm apart, with silt mats between.

    b. All silt fences shall be inspected by the Contractor and their ecologist on set-up and, thereafter, on a daily basis by the Contractor and weekly by their ecologist. Silt fences shall be maintained in good condition and any defects shall be rectified as soon as they are identified.

    c. Records shall be kept of the installation, checks, maintenance and removal of all silt fences.

[4] In this section, the “works area” includes the site compound, stockpiles and temporary settlement pond.

4. Run-off from the site compound and material stockpiles will be collected by a shallow toe drain which will discharge to a shallow settlement pond.

    a. The toe drain and settlement pond shall be installed before the site compound and stockpiles.

    b. A silt fence (as described above) shall be installed around the settlement pond. These silt fences shall also be subject to regular checks and maintenance, as described above.

    c. Settlement ponds from the compound and stockpiling shall be checked on a daily basis by the Contractor and weekly by the Contractor's ecologist.

    d. Sediment build-up shall be removed from the settlement pond at regular intervals and removed off-site.

    e. Records shall be kept of checks and sediment removal from settlement ponds.

5. Stockpiles shall not be located within 20m of any watercourse and any stockpiles left overnight shall be covered.

6. During set-up for the embankment reprofiling works, low earth bunds shall be formed along both sides of the stream channel.

    a. Double silt fences (as described above) shall be installed on top of the bunds. These silt fences shall also be subject to regular checks and maintenance, as described above.

    b. The surface of the earth bunds between the silt fence and stream channel shall be covered by hessian fabric (secured by stakes) to prevent run-off of fine sediment from the bunds.

    c. The earth bunds and silt fences along the new stream channel shall link across the temporary crossing to ensure that there is no gap.

In-stream Sediment

The following measures shall be implemented to mitigate impacts from in-stream sediment: -

1. Before works commence, Sedi-mats or a series of hessian silt curtains shall be installed in the stream c. 15m downstream of the works area to capture any suspended fine sediment before it settles further downstream.

    a. These shall remain in place for the full duration of the works and only be removed once there is no longer any perceptible turbidity associated with the works, as advised by the Contractor's ecologist. This may be for a matter of weeks post-works.

    b. As the works progress upstream, additional Sedi-mats or silt curtains shall be installed c. 15m downstream of the new works areas.

2. Isolation of the first in-stream works section, over-pumping, fish rescue, dewatering and checks to ensure that water management is working effectively shall be completed in a single day and in-stream works shall not commence until these items are complete. Similarly, rearrangement of the measures for the second and subsequent in-stream works sections shall also be completed in single days and in-stream works in each section shall not commence until all items are complete.

Hydrocarbons

The following measures shall be implemented to control the risk of pollution from hydrocarbons, including fuels, hydraulic oils etc. on site: -

1. Storage of any fuels, oils and other hydrocarbons on site shall be in secure tanks/containers bunded to 110% capacity.

2. Refuelling shall not be permitted within 50m of any watercourse.

3. All vehicles, plant, equipment etc. shall: -

    a. Be free of any mechanical defects, and be well maintained so as to prevent fuel or oil leaks,

    b. Be mechanically sound and checked before arriving on site,

    c. Not be left idling when not in use, and

    d. Be parked/stored on drip trays overnight.

4. Driving on site and shall be kept to a minimum.

5. All site personnel shall be familiar with their responsibilities under the ERP. In particular: -

    a. All construction personnel shall be trained in the use of the spill containment/pollution control kits which will be kept on site.

    b. Any spillage of fuels, lubricants or hydraulic oils shall be immediately contained and a pollution control kit used. The contaminated soil shall be removed off site and properly disposed of.

    c. Any spillage of fuels, lubricants or hydraulic oils, shall be reported immediately to the ECoW.

6. Additional drip trays and spill kits shall be accessible from the storage container.

Invasive Alien Species

Terrestrial

The following relates to the continued implementation of the IAPS Management Plan for the original works and shall be implemented prior to mobilisation and before any works commence on site: -

1. The Contractor's ecologist shall carry out a detailed survey to map the distribution and extents of all IAPS within and adjoining the red-line boundary.

2. Any IAPS identified during the pre-construction survey shall be clearly demarcated. The areas of infestation and appropriate buffer zones shall be isolated with fencing or warning tape and 'Biosecure Zone' signs.

3. The Contractor's ecologist shall update the IAPS Management Plan, as appropriate, taking into account:

    a. The specific IAPS present and the scale and extent of infestation,

    b. The sensitivity of the local environment, particularly the Knockaunglass stream,

    c. The growth stage/season of the plants, and

    d. The construction sequence/programme.

4. The IAPS Management Plan shall be updated in agreement with the Contractor and TII or TII's Representative and in accordance with the following: -

    - TII (2006) *A Guide to Landscape Treatments for National Road Schemes in Ireland. GE-ENV-01102. February 2006.* Transport Infrastructure Ireland, Dublin.

    - TII (2012) *Guidelines on the Implementation of Landscape Treatment on National Road Schemes in Ireland. GE-ENV-01103. July 2012.* Transport Infrastructure Ireland, Dublin.

- TII (2017) *The Management of Waste from National Road Construction Projects. GE-ENV-01101. December 2017.* Transport Infrastructure Ireland, Dublin.

- TII (2020a) *The Management of Invasive Alien Plant Species on National Roads – Standard. GE-ENV-01104. December 2020.* Transport Infrastructure Ireland, Dublin.

- TII (2020b) *The Management of Invasive Alien Plant Species on National Roads – Technical Guidance. GE-ENV-01105. December 2020.* Transport Infrastructure Ireland, Dublin.

5. The following measures form the basis of the IAPS Management Plan.

The following shall be implemented during the construction stage (including advance works): -

6. The IAPS Management Plan shall be implemented by the Contractor with the advice and assistance of the Contractor's ecologist.

7. The 'toolbox talk' for all persons entering the site shall include an overview of the IAPS present on site, their identification, the importance of controlling them/preventing their spread, and the responsibilities of site staff in avoiding any spread of IAPS.

8. The Contractor shall ensure that all vehicles, plant, equipment and PPE intended for use on site are dry, clean and free from debris and plant material prior to being brought to site.

9. A dedicated and clearly marked cleaning facility/wash-down area shall be strategically placed in a contained area on site for use by staff, vehicles and machinery.

    a. All vehicles and equipment that have been used in a contaminated zone shall be thoroughly pressure-washed in the wash-down area each time they leave site and once work in that zone is complete. This includes footwear, personal protective equipment (PPE), tools, and other light equipment.

    b. This facility shall be located at least 20m from any watercourse and be appropriately bunded to prevent run-off.

    c. Material gathered in this facility shall be appropriately stockpiled and treated along with other contaminated material.

10. Soil management during the works shall be in accordance with Section 5.5 of TII (2006).

11. All imported materials (e.g. fill and topsoil) shall be sourced from licensed suppliers who shall certify that in advance of delivery that any such materials are free from IAPS material, especially propagules such as seeds or rhizome fragments.

12. The Contractor shall implement appropriate controls on the movement of machinery and materials in IAPS-contaminated zones.

    a. Where it is necessary to work in contaminated zones, every effort shall be made not to use vehicles with caterpillar tracks.

    b. Vehicles leaving contaminated zones shall be confined to marked haulage routes protected by root barrier membranes or be pressure-washed before leaving the zone.

13. The removal of any regrowth of Montbretia (*Crocosmia* × *crocosmiiflora*) shall be achieved by the excavation of the entire stand and disposal to a licensed landfill.

14. The removal of any regrowth of Rhododendron (*Rhododendron ponticum*) shall be achieved, in the case of plants <20cm high, by manual pulling, ensuring that all of the roots are removed, and in the case of mature plants, mechanical uprooting. All material arising shall be disposed to a licensed landfill.

15. Any further measures required in relation to any additional species which may be identified on site during the Contractor's ecologist's pre-construction survey shall be included in the IAPS Management Plan.

16. Any Ash trees or fallen Ash branches or leaf litter to be removed shall be assumed to be infected with *Hymenoscyphus fraxineus*, the causal agent of 'Ash dieback disease'. Any Ash material arising that is suspected to have ash-dieback disease shall be dealt with in line with published best practice – such as e.g. Scottish Environmental Protection Agency (SEPA) advice on *Disposal of trees and plants infected with specific plant diseases*.[5]

17. The removal of IAPS shall not be undertaken without the water quality protection measures described above being fully in place.

18. In relation to stockpiling of IAPS-contaminated material: -

    a. Any such material shall be stockpiled separately from other material and clearly marked as contaminated.

    b. The length of time for which such material is stored on site shall be kept to a minimum.

    c. Measures hall be implemented to prevent any run-off from stockpiles of contaminated material which could convey IAPS propagules to watercourses.

19. Only vehicles that are deemed to be biosecure (i.e. sealed so that no soil can escape) shall be used to transport IAPS-contaminated material and be thoroughly pressure-washed in the wash-down area before leaving site.

20. Following completion of works in a given area of the site, bare soil shall be planted (as per the Landscape Plan and Specification) at the earliest opportunity, i.e. native vegetation shall be established as quickly as possible to stabilise the soil and minimise opportunities for re-colonisation by IAPS.

21. The Contractor's ecologist shall oversee and record the implementation of the IAPS Management Plan and all works relating to IAPS, as per TII (2020a,b). In particular, the Contractor's ecologist shall: -

    a. Inspect the demarcation and signage of contaminated zones, the cleaning/wash-down facility and IAPS material stockpiling area prior to their use,

    b. Directly supervise and document all IAPS removal works,

    c. Carry out weekly inspections of the site for compliance with the biosecurity measures detailed in the IAPS Management Plan, and

    d. Provide monthly updates to TII or TII's Representative on the implementation of the IAPS Management Plan.

The following shall be implemented after completion of construction and during the establishment of new planting as per the Landscape Plan and Specification.

22. The works area shall be monitored for regrowth of IAPS over a minimum of 2 years. Any regrowth of treated IAPS on site shall be accurately mapped and reported to TII. The removal of IAPS may be considered successful after two consecutive growing seasons with no sign of regrowth from the removed stands.

Aquatic

The following biosecurity measures shall be implemented to control risks from aquatic invasive alien species and pathogens: -

[5] https://www.sepa.org.uk/media/154389/wst-g-037-disposal_of_trees_plants_with_specific_diseases.pdf

1. In-stream works shall be restricted to those described in this NIS. No other access into watercourses shall be permitted for plant, equipment or personnel.

2. The 'toolbox talk' for all persons entering the site shall include an overview of aquatic invasive alien species and pathogens, the importance of preventing their spread, and the responsibilities of site staff in avoiding any such spread.

3. Equipment, tools or PPE shall be treated using Virkon Aquatic or equivalent disinfectant before and after contact with the stream and any other watercourse. This shall be undertaken in the cleaning facility/wash-down area described above.

4. The Contractor's ecologist shall carry out weekly inspections for compliance with the aquatic biosecurity measures.

Terrestrial Habitat Loss/Fragmentation

The following measures shall be implemented to address loss and fragmentation of terrestrial habitats associated with both the proposed works and the original works: -

1. As part of the pre-construction survey, the Contractor's ecologist shall identify any breeding or resting places of species listed on Annex IV to the Habitats Directive, e.g. otter holts, and assist the Contractor in applying any derogation licence under Regulation 54 of the Habitats Regulations which might be required. Where any such licence is granted, the works to which it relates shall be carried out in strict accordance with its conditions and the ECoW shall assist the Contractor in this regard.

2. Following completion of works in a given area of the site, the appropriate landscape treatment as per the Landscape Plan and Specification in Appendix B shall be applied.

7.2.3. Operational Phase

During the period of establishment of the new landscaping (as per the Landscape Plan and Specification), the works area will be regularly monitored for any regeneration of Rhododendron and/or other invasive alien plant species. Any such regeneration/infestation shall be treated in accordance with the following guidance: -

- TII (2020a) *The Management of Invasive Alien Plant Species on National Roads – Standard. GE-ENV-01104. December 2020.* Transport Infrastructure Ireland, Dublin.

- TII (2020b) *The Management of Invasive Alien Plant Species on National Roads – Technical Guidance. GE-ENV-01105. December 2020.* Transport Infrastructure Ireland, Dublin.

- Maguire, C.M., Kelly, J. and Cosgrove, P.J. (2008) *Best Practice Management Guidelines Rhododendron (*Rhododendron ponticum*) and Cherry Laurel (*Prunus laurocerasus*).* Invasive Species Ireland for the Northern Ireland Environment Agency and the National Parks & Wildlife Service.

The fish pass installed as part of the original works will continue to be inspected on an annual basis as part of TII's routine maintenance programme. Any obstructions or other defects presenting an obstacle to fish using the fish pass will be addressed as part of that programme.

7.3. Assessment of Residual Effects

Given the full and proper implementation of the mitigation prescribed in this section, the potential for residual impacts and effects from the proposed works can be summarised as follows: -

- The probability, likely magnitude and likely maximum extent of any water quality impacts from the proposed works have been reduced such that they no longer present any risk of adverse risks to water quality and will not result in adverse effects on Sea Lamprey, River Lamprey, Atlantic Salmon or Otter, which are qualifying interests of Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC or Castlemaine Harbour SAC.

- The probability and magnitude of any ex-situ disturbance to Lesser Horseshoe Bat from the Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC or Otter from the same Natura 2000 site or the Castlemaine Harbour SAC have been reduced such that they no longer present any risk of adverse effects on these sites.

- As noted, there is no Lesser Horseshoe Bat with 2.5km of the proposed works area. While Lesser Horseshoe Bat may occur in small numbers in the wider landscape, ex-situ impacts on Lesser Horseshoe Bat from the Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC arising from the loss of riparian vegetation will be mitigated in the short term by the Landscape Plan and Specification. Similarly, landscaping will quickly restore river habitat that might be used by Otter which are a QI of Castlemaine Harbour SAC. Given the limited scale and location of these impacts, the works do not represent a risk of adverse effects to the conservation status of Lesser Horseshoe Bat or Otter from on the SACs in question.

8. Potential In-combination Effects

8.1. Requirement for Assessment

The requirement for AA arising out of Article 6(3) of the Habitats Directive covers plans and projects that, "*either individually or in combination with other plans or projects*", are likely to have a significant effect on one or more Natura 2000 sites. This means that AA is required for any plan or project that, in combination with other plans or projects, would have a significant effect on one or more Natura 2000 sites, irrespective of the presence or absence of such effects from that plan or project on its own. Therefore, regardless of the significance of the effects of the plan or project individually, the potential for significant effects in combination with other plans and projects must be considered in all cases.

8.2. Approach and Methodology

The objective of this requirement is to capture significant effects potentially arising from the cumulation or other interaction of non-significant effects from multiple plans and projects. Consequently, the assessment of potential in-combination effects is not a pair-wise assessment, rather, it considers the totality of the effects arising from all plans and projects affecting the Natura 2000 site(s) in question. In identifying the plans and projects to be included in this assessment, it is important to define an appropriate geographical scope and timescale over which potential in-combination effects are to be considered and the sources of information to be consulted, as described below. It is also important to consider the nature of the interactions between effects, which may be additive, antagonistic, synergistic or complex.

For practical reasons, the effects from the proposed works which are considered in the assessment of potential in-combination effects are the residual effects described in Section 7.3 above, rather than the potential effects in the absence of any mitigation. For this reason, this assessment is documented following the description of the mitigation measures and residual effects.

8.2.1. Geographical Scope

In defining the geographical scope for identifying potential in-combination effects, it is important to remember that effects are evaluated in view of the conservation objectives of the Natura 2000 site(s) concerned. As such, two or more effects relating to the same conservation objective for a given Natura 2000 site would combine even if their geographical extents did not overlap. For example, the loss of a small area of an Annex I habitat type listed as a qualifying interest of a Natura 2000 site would combine with the loss of an entirely unconnected area of the same habitat type from a remote part of the same site to produce an in-combination effect, the significance of which would need to be evaluated in view of the relevant conservation objective. On that basis, the scope of the assessment of in-combination effects extends to all plans and projects affecting the same conservation objectives as the plan or project under consideration, irrespective of whether those effects are significant or not.

However, given the scale of the proposed works and localised extents of the impacts associated with them in this case, it was deemed sufficient to include only areas in close proximity to the proposed works and their zones of impact in the geographical scope for identifying potential in-combination effects. For plans and larger-scale projects, this geographical scope was extended to the full areas of the three Natura 2000 sites concerned and adjoining areas.

8.2.2. Timescale

The proposed works will be completed by the middle of summer 2024. Given the nature and magnitude of their residual effects, there will be complete recovery of effects to Natura 2000 sites within a brief period following their completion, with no effects whatsoever remaining beyond the end of 2024. On that basis, there are no effects from the proposed works which could act in combination with effects from other plans and projects beyond the end of 2024. Therefore, other plans and projects considered in this assessment included those with potential effects between now and the end of 2024.

8.2.3. Sources of Information

The following sources of information were consulted to gather information on other plans and projects: -

- *Kerry County Development Plan, 2022-2028.* Kerry County Council, Tralee.
- *National Planning Application Database* <https://housinggovie.maps.arcgis.com/apps/webappviewer/index.%20html?id=9cf2a09799d74d8e9316a3d3a4d3a8de > [accessed via an ArcGIS Feature Service in QGIS3 on 19/03/2024].
- *Kerry County Council Online Planning Enquiry* <https://www.kerrycoco.ie/planning/online-planning-enquiry/> [accessed 19/03/2024].
- *EIA Portal* <https://www.gov.ie/en/publication/9f9e7-eia-portal/> [accessed via an ArcGIS Feature Service in QGIS3 on 19/03/2024].
- *EPA Maps (Water)* <https://gis.epa.ie/EPAMaps/Water> [accessed 19/03/2024].
- *Ireland's Marine Atlas* <https://atlas.marine.ie/> [accessed 19/03/2023].

The threats, pressures and activities with negative impacts on the Natura 2000 sites selected for inclusion in this assessment (see Section 5.3 of this NIS) were used to identify plans and projects which, by their nature, are likely to give rise to potential impacts on the sites concerned.

8.3. Assessment

Plans

The current Kerry County Development Plan (CDP) set out the policies and objectives of Kerry County Council with regard to the proper planning and sustainable development within its functional area for the period from 2022 to 2028. Volume 6 of the CDP includes a Biodiversity Action Plan (BDP) for the county, also covering the period 2022-2028. The CDP went through an AA process, as detailed in the Natura Impact Report (NIR) included in Volume 5. The AA identified the sensitivities of Natura 2000 sites in Co. Kerry plus a 15km buffer, and the aspects of the CDP with potential to adversely affect those sites. Amendments were recommended and then incorporated into the CDP "*to ensure that the policies and objectives proposed and supported by the CDP are underpinned by the principles of sustainability of which the protection of Natura 2000 European Sites forms part*". As such, the adopted CDP provides for the protection of Natura 2000 sites (and biodiversity more generally). Therefore, there will be no adverse effects from the proposed works in combination with the CDP and, furthermore, the CDP will itself reduce the risk of in-combination effects arising from other projects.

Projects

Large-scale Projects

Larger-scale projects within and in the vicinity of the three Natura 2000 sites concerned, as identified through the *EIA Portal*, were limited to a single grant of permission for continuation of use and expansion of an existing quarry and concrete manufacturing. This quarry and concrete factory area located in the townlands of Rangue and Knocknaboola, Killorglin, and are situated outside of Natura 2000 sites. This permission included conditions to ensure that it does not have significant negative effects on the environment. Given the nature, scale and locations of this project and the controls on its environmental effects, it is considered that it does not have any potential to give rise to adverse effects on any Natura 2000 sites in combination with the proposed works.

Small-scale Projects

As identified through the *National Planning Application Database* (NPAD and *Kerry Viewer (Planning Enquiry)*, smaller-scale projects, in the vicinity of the proposed works and along the Knockaunglass stream and surrounding area, which have been granted planning permission are all domestic projects such as retention of existing dwelling houses and associated structures, modifications to same, or the construction of new domestic dwellings or extensions to dwellings, including associated septic tanks or other domestic wastewater treatment. Regarding

potential impacts to water quality, these projects will have to comply with the EPA's *Code of Practice for Domestic Waste Water Treatment Systems (Population Equivalent ≤10)* (EPA, 2021). These developments have conditions attached to their planning permission relating to sustainable development, such as siting of septic tanks, foul surface water and effluent drainage, and clean surface water run-off drainage. Therefore, it is not anticipated that these projects that have been granted permission will have any significant effects in combination with the proposed works. There are currently no projects in this area awaiting a planning decision.

Licensed Activities

A review of licensed activities through EPA Maps found that there are 5 No. such activities in the vicinity of the Natura 2000 sites concerned or within their catchments. These included: -

- Integrated Pollution Control (IPC) licences for: -
    - The manufacture of pesticides, pharmaceuticals or veterinary products, and the recovery or disposal of waste, at Glannagilliagh Landfill, Glannagilliagh, Killorglin,
    - The use of coating materials in processes with a capacity to use at least 10 tonnes per year of organic solvents, at Banshagh, Killorglin, and
    - The use of coating material in processes with a capacity to use at least 10 tonnes per year of organic solvents, the recovery or disposal of waste, at Gortroe, Killarney, and
- Industrial Emissions (IE) licences for: -
    - The rearing of pigs in an installation where the capacity exceeds 2,000 places for production pigs which are over 30kg, at Nantinan, Milltown, and
    - The treatment and processing of animal and vegetable raw materials for the production of food or feed, at Dromore, Farranfore.

Based on the nature and scale of these activities, a risk of significant in-combination effects on Natura 2000 sites via water quality impacts must be considered. However, given the conditions attached to the IPC and IE licences and enforcement of the same by the EPA, this risk is considered to be controlled such that there will not be any adverse effects in combination with the proposed works.

Wastewater Treatment Plants

There are 11 No. Wastewater Treatment Plants (WwTPs) in the catchments of the Natura 2000 sites concerned. These are summarised in Table 8-1 below.

Table 8-1 - WwTPs in the catchments of the Natura 2000 sites concerned (p.e. = population equivalent).

Location	Category (p.e.)	Treatment	Design p.e.	Agglomeration p.e.	Remaining capacity (%)
Rossbeigh	<500	Primary	500	136	73
Glenbeigh	>500	Secondary	800	1,477	-85
Killorglin	>500	Secondary	5,000	3,700	26
Milltown	>500	Secondary	3,500	1,767	50
Castlemaine	<500	Primary	300	300	0
Fieries	>500	Tertiary	1,500	826	45
Farranfore	<500	Secondary	187	300	-60
Castleisland	>500	Tertiary	6,000	3,107	48
Gneeveguilla	<500	Secondary	550	270	51
Barraduff	<500	Secondary	1,316	118	91

Location	Category (p.e.)	Treatment	Design p.e.	Agglomeration p.e.	Remaining capacity (%)
Killarney	>500	Tertiary	54,000	21,861	60

As shown in Table 8-1 above, most of the WwTPs concerned are operating with significant unused capacity. However, the Glenbeigh WwTP, which discharges to the Behy River c. 1.7km west of the proposed works, is operating at 85% over capacity. This may be contributing to the 'Poor' WFD status of Castlemaine Harbour a short distance downstream. However, given the timing and short duration of any water quality impacts from the proposed works, and the mitigation measures prescribed in Section 7, there will be no significant in-combination effects with any potential pressure from the Glenbeigh WwTP. The Castlemaine and Farranfore WwTPs are also operating at or over capacity and are located within the catchment of Castlemaine Harbour. However, given the scale of these WwTPs and their distance from the SAC and the proposed works, in-combination effects can be ruled out.

Aquaculture

Much of Castlemaine Harbour is a designated shellfish water, listed as "Cromane" on Schedule 3 of the European Communities (Quality of Shellfish Waters) Regulations, 2006 (*EPA Maps*). A review of the Marine Institute's *Ireland's Marine Atlas* found that there is extensive aquaculture within Castlemaine Harbour, with the native Blue Mussel (bottom grown) being the main commercial species, and the non-native Pacific Oyster and Manila Clam also being produced. In addition, the overview of the Castlemaine Harbour Ramsar Site (RSIS, 2023) states that "*Castlemaine Harbour is used extensively for oyster, mussel and clam aquaculture and holds the largest natural mussel bed in Ireland*". Given the nature, magnitude and duration of any residual effects from the proposed works, and the controls on the quality of shellfish waters under the Regulations, no adverse effects are anticipated from the combination of the proposed works with aquaculture in Castlemaine Harbour.

Other Activities

Farmers and landowners may also undertake general agricultural operations in areas adjacent to the proposed works and along the river, which could potentially give rise to impacts of a similar nature to those arising from the proposed works. This could potentially result in additional an increased risk to water quality. Many agricultural operations are periodic, not continuous in nature, and qualify as Activities Requiring Consent (ARCs) that require consultation with the NPWS in advance of the works, e.g. reclamation, infilling or land drainage within 30m of the river, removal of trees or any aquatic vegetation within 30m of the river, and harvesting or burning of reed or willow (NPWS, 2024a). Agricultural operations must also comply with the European Communities (Environmental Impact Assessment) (Agriculture) Regulations, 2011 (as amended) in relation to:

- Restructuring of rural land holdings,
- Commencing use of uncultivated land or semi-natural areas for intensive, and
- Land drainage works on lands used for agriculture.

Stage 2 AA is required under Regulation 9 if it is likely to have a significant effect on a Natura 2000 site. The drainage or reclamation of wetlands is controlled under the Planning and Development (Amendment) (No. 2) Regulations, 2011 and the European Communities (Amendment to Planning and Development) Regulations, 2011. Therefore, any in-combination effects of agricultural operations and the proposed works are not likely to be significant.

8.4. Conclusion

As detailed in the preceding sections, it can be concluded that, based on the small scale of the proposed works and the duration of the works themselves and any impacts arising from them, they will not give rise to adverse effects on any of the Natura 2000 sites within the Zone of Influence of the proposed works, in combination with other plans or projects.

9. Conclusion

This NIS has examined the details of the proposed works along the Knockaunglass stream at Curraheen Little, Co. Kerry and the Natura 2000 sites in their Zone of Influence. It has analysed the potential impacts of the proposed works on the receiving natural environment and evaluated their effects, both individually and in combination with other plans and projects, in view of the conservation objectives of the relevant Natura 2000 sites. This report has been prepared in line with the Habitats Directive, as transposed into Irish law by the Habitats Regulations, relevant case law and guidance from the European Commission, the Department of the Environment, Heritage and Local Government and the Office of the Planning Regulator, on the basis of objective information and adhering to the precautionary principle.

Given the prescription of the mitigation measures detailed in Section 7 of this NIS, it can be concluded beyond reasonable scientific doubt that the proposed works will not, either individually or in combination with other plans or projects, give rise to any impacts which would constitute adverse effects on the Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC, Castlemaine Harbour SAC, Castlemaine Harbour SPA or any other Natura 2000 site, in view of their conservation objectives. Therefore, it is the recommendation of the authors of this report that TII, as the competent authority in this case, may determine that the proposed works, either individually or in combination with other plans or projects, will not adversely affect the integrity of any Natura 2000 site, provided that the mitigation prescribed in this NIS is fully and properly implemented.

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Appendices

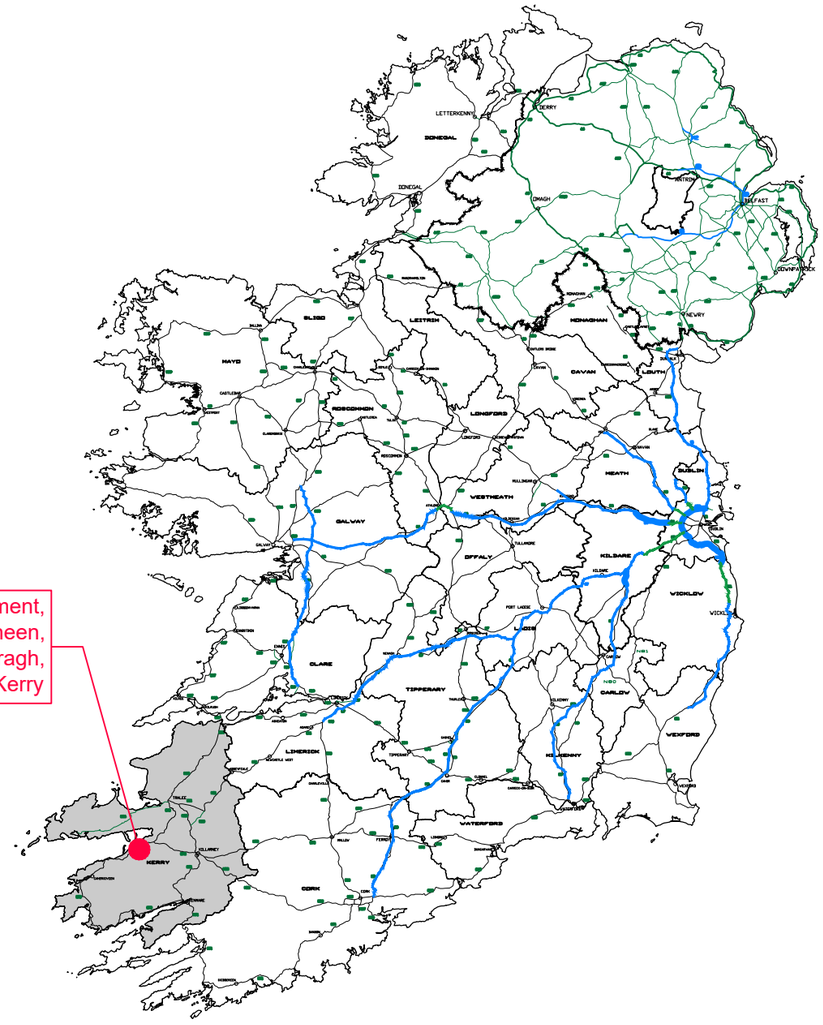
Appendix A. Design and Construction Drawings

A3

0 10 50

DO NOT SCALE

N70 Curraheen Little Embankment,
Townlands of Curraheen Little and Curraheen,
Barony of Iveragh,
Co. Kerry



GENERAL NOTES

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2. ONLY WRITTEN DIMENSIONS SHALL BE USED. NO DIMENSIONS SHALL BE SCALED FROM THE DRAWINGS
3. ALL LEVELS ARE IN METRES AND ARE TO MALIN HEAD DATUM
4. ALL COORDINATES ARE IN METRES AND ARE TO IRISH TRANSVERSE MERCATOR
5. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE SPECIFICATION

Rev	Description	By	Date	Chk'd	Auth
A	TOWNLANDS UPDATED	AOS	04.24	VD	MJ
-	ISSUED FOR CONSTRUCTION	AOS	04.23	VD	MJ
-	ISSUED FOR TENDER	AOS	01.23	PC/VD	MJ
-	ISSUED FOR REVIEW	AOS	01.23	PC/VD	MJ

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Fax (+353) 091 779 830

Client: TRANSPORT INFRASTRUCTURE IRELAND

Project: MUNSTER BRIDGES TERM MAINTENANCE CONTRACT Nr. 3

Purpose: ISSUED FOR CONSTRUCTION

Title: N70 Curraheen Little Embankment at Glenbeigh, Co. Kerry

Site Location Map

Original Scale	Des/Drawn	Checked	Authorised
N.T.S.	AOS	PC/VD	MJ
	Date 18.01.23	Date 18.01.23	Date 18.01.23

Status	Drawing Number	Rev
C	5162555-ATK-ZZ-XX-DR-ST-950002	A

File: 5162555-ATK-ZZ-XX-DR-ST-950002.dwg
Date: Apr 09, 2024 - 3:10pm Plotted by:

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A3

DO NOT SCALE

CURRAHEEN LITTLE

KILNABRACK UPPER

CURRAHEEN (ED Glanbehy)

Contractor's Access Road

GENERAL NOTES

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4. ALL COORDINATES ARE IN METRES AND ARE TO IRISH TRANSVERSE MERCATOR
5. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE SPECIFICATION

DRAWING NOTES

1. SITE EXTENTS AS SHOWN EXCLUDE ADDITIONAL PUBLIC LANDS REQUIRED TO FACILITATE TRAFFIC MANAGEMENT
2. AREA OF SITE AS SHOWN = 6375m².
3. THE ACTUAL SITE EXTENTS ARE SUBJECT TO AGREEMENT WITH THE LANDOWNERS AND ANY AREA REQUIRED BY THE CONTRACTOR FOR TEMPORARY WORKS THAT CANNOT BE CARRIED OUT WITHIN THE SITE AS SHOWN
4. TOWNLAND BOUNDARIES SHOWN THUS

DRAWING LEGEND :

SITE EXTENTS

WORKS SITE (6375 m²)

Bonneagar Iompair Éireann
Transport Infrastructure Ireland

Rev	Description	By	Date	Chk'd	Auth
A	TOWNLAND BOUNDARIES ADDED	AOS	04.24	VD	MJ
-	ISSUED FOR CONSTRUCTION	AOS	04.23	VD	MJ
-	ISSUED FOR TENDER	AOS	01.23	PC/VD	MJ
-	ISSUED FOR REVIEW	AOS	01.23	PC/VD	MJ

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Client: TRANSPORT INFRASTRUCTURE IRELAND

Project: MUNSTER BRIDGES TERM MAINTENANCE CONTRACT Nr. 3

Purpose: ISSUED FOR CONSTRUCTION

Title: **N70 Curraheen Little Embankment at Glenbeigh, Co. Kerry**

Site Extents Plan

Original Scale	Des/Drawn	Checked	Authorised
1:1000	AOS	PC/VD	MJ
	Date 18.01.23	Date 18.01.23	Date 18.01.23

Status	Drawing Number	Rev
C	5162555-ATK-ZZ-XX-DR-ST-950003	A

File: 5162555-ATK-ZZ-XX-DR-ST-950003.dwg
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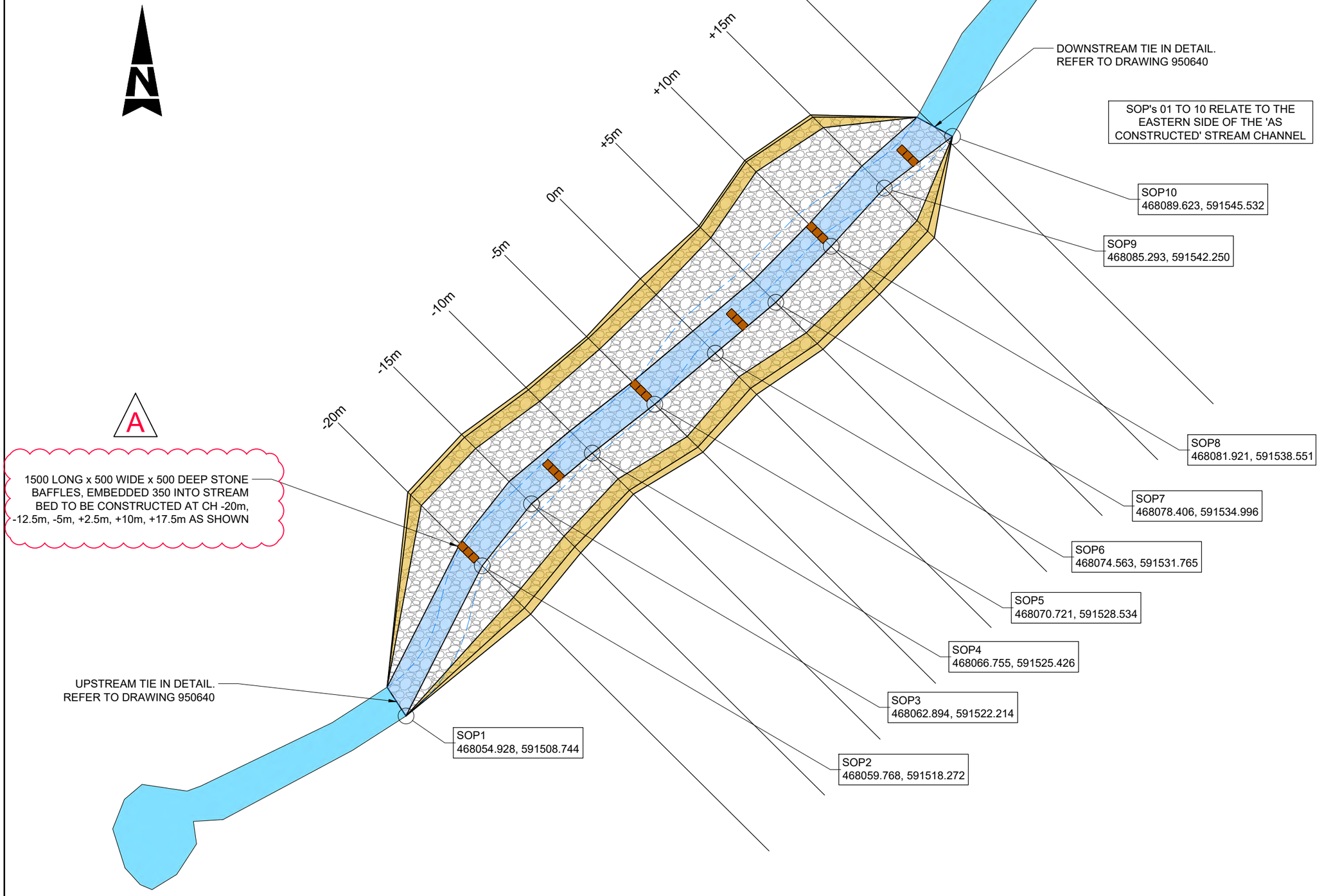
A3

DO NOT SCALE



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3. ALL LEVELS ARE IN METRES AND ARE TO MALIN HEAD DATUM
4. ALL COORDINATES ARE IN METRES AND ARE TO IRISH TRANSVERSE MERCATOR
5. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE SPECIFICATION

DRAWING NOTES

1. THE DESIGN FLOOD IS 0.840m DEEP WITH A 3.55m/s VELOCITY
2. GEOTEXTILE SHALL BE SECUTEX H 331 Z or SECUTEX H 441 Z OR EQUIVALENT APPROVED BY THE EMPLOYERS REPRESENTATIVE
3. THE EXISTING 150mm STREAM BED MATERIAL ON 350mm THICK CLASS 6B COARSE GRAVEL SHALL BE EXCAVATED, STORED ON SITE AND REINSTATED TO FILL THE VOIDS IN THE PROPOSED ROCK ARMOUR WITHIN THE STREAM CROSS SECTION. THE ARMOUR LAYER POROSITY IS 32% TO 40%. FOR A 1m THICK ARMOUR LAYER, THE MAX VOID VOLUME WOULD BE 0.4m³ PER SQUARE METRE.
4. WHILE DESIGN FLOOD DEPTH IS 0.840m, THE PROPOSED SCOUR PROTECTION SHALL EXTEND TO A MINIMUM OF 1.440m ABOVE STREAM BED LEVEL
5. THE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE MODEL CONSTRUCTION SPECIFICATION IN CIRIA C683 " The Rock Manual".
6. ROCK ARMOUR SHALL BE CAREFULLY PLACED ON THE GEOTEXTILE LINER BY MECHANICAL MEANS
7. ROCK ARMOUR SPECIFICATION SHALL BE

Item	Category to EN 13383-1
Grading	HMA 300-1000
Shape	$LT_{Declared}$
Proportion of crushed or broken surfaces, RO	RO_{NR}
Particle Density	2.5
Resistance Parameters:	
to Breakage	CS_{80} (Compressive strength in MPa)
to Wear	$M_{DE}30$
to freezing and thawing	FT_A
to salt Crystallisation	MS_{NR}
Signs of Sonnenbrand	SB_A

DRAWING LEGEND

- ORIGINAL STREAM ALIGNMENT
- AS CONSTRUCTED STREAM ALIGNMENT
- REALIGNED STREAM
- ROCK ARMOUR SCOUR PROTECTION
- CLASS 1 MATERIAL AND TOPSOIL BACKFILL

Rev	Description	By	Date	Chk'd	Auth
A	ISSUED FOR CONSTRUCTION	[redacted]	03.24	[redacted]	
-	ISSUED FOR REVIEW	[redacted]	12.23	[redacted]	

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Client: TRANSPORT INFRASTRUCTURE IRELAND

Project: MUNSTER BRIDGES TERM MAINTENANCE CONTRACT Nr. 3

Purpose: ISSUED FOR CONSTRUCTION

Title: N70 Curraheen Little Embankment at Glenbeigh, Co. Kerry
Proposed Scour Protection
Overall Layout Plan

Original Scale	Des/Drawn	Checked	Authorised
1:250	[redacted] Date 19.12.23	[redacted] Date 19.12.23	[redacted] Date 19.12.23

Status	Drawing Number	Rev
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File: 5162555-ATK-ZZ-XX-DR-ST-950630 to 950640.dwg
Date: Mar 12, 2024 - 4:40pm Plotted by: [redacted]

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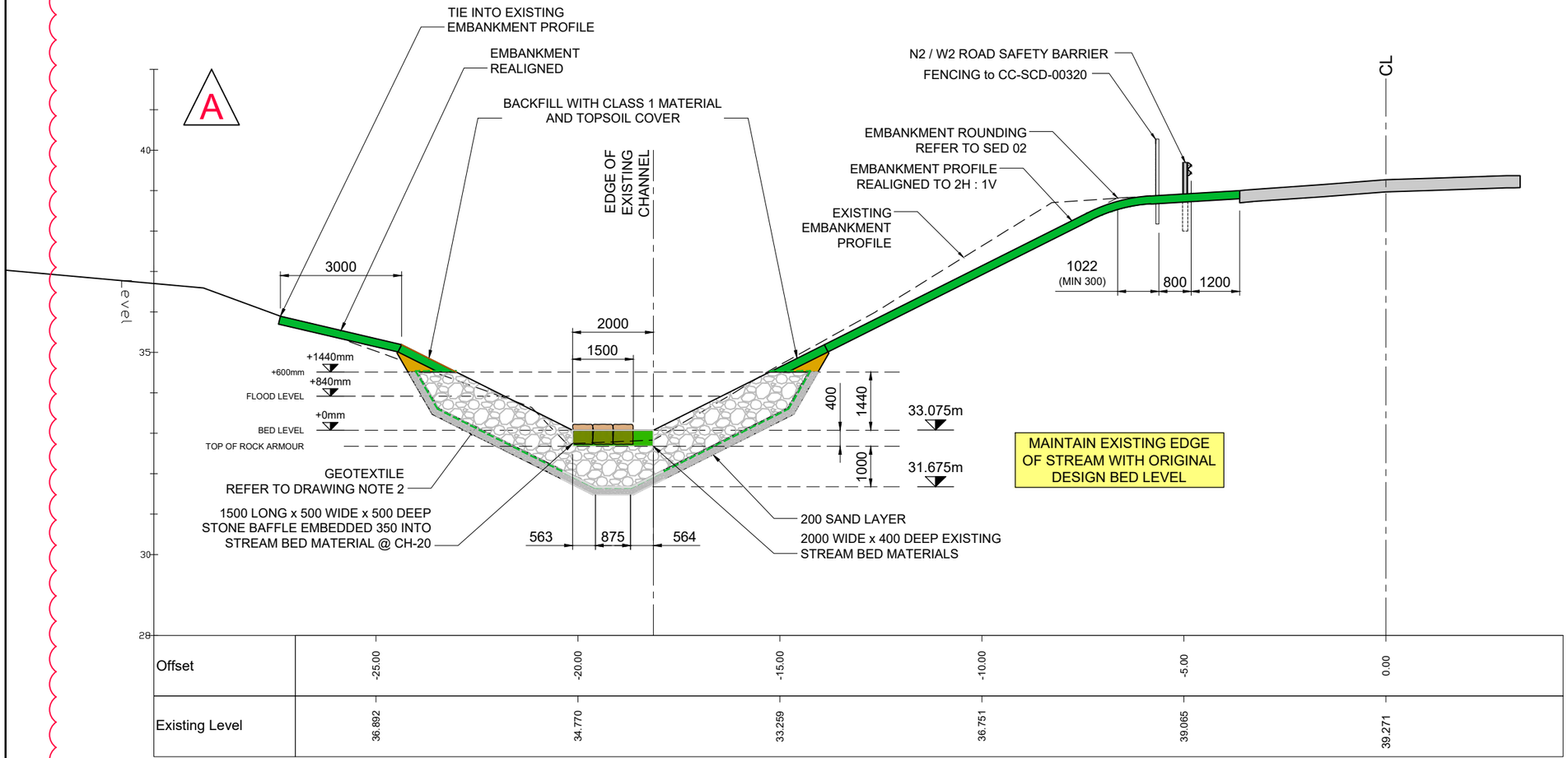
A3

DO NOT SCALE



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Chainage -20

GENERAL NOTES

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Item	Category to EN 13383-1
Grading	HMA 300-1000
Shape	$LT_{Declared}$
Proportion of crushed or broken surfaces, RO	RO_{NR}
Particle Density	2.5
Resistance Parameters:	
to Breakage	CS_{80} (Compressive strength in MPa)
to Wear	$M_{DE}30$
to freezing and thawing	FT_A
to salt Crystallisation	MS_{NR}
Signs of Sonnenbrand	SB_A

Rev	Description	By	Date	Chk'd	Auth
A	ISSUED FOR CONSTRUCTION	[redacted]	03.24	[redacted]	[redacted]
-	ISSUED FOR REVIEW	[redacted]	12.23	[redacted]	[redacted]

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Client: TRANSPORT INFRASTRUCTURE IRELAND

Project: MUNSTER BRIDGES TERM MAINTENANCE CONTRACT Nr. 3

Purpose: ISSUED FOR CONSTRUCTION

Title: N70 Curraheen Little Embankment at Glenbeigh, Co. Kerry Proposed Scour Protection Sheet 1 of 8

Original Scale	Des/Drawn	Checked	Authorised
1:125	Date 19.12.23	Date 19.12.23	Date 19.12.23

Status	Drawing Number	Rev
C	5162555-ATK-ZZ-XX-DR-ST-950631	A

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Date: Mar 12, 2024 - 4:41pm Plotted by: [redacted]

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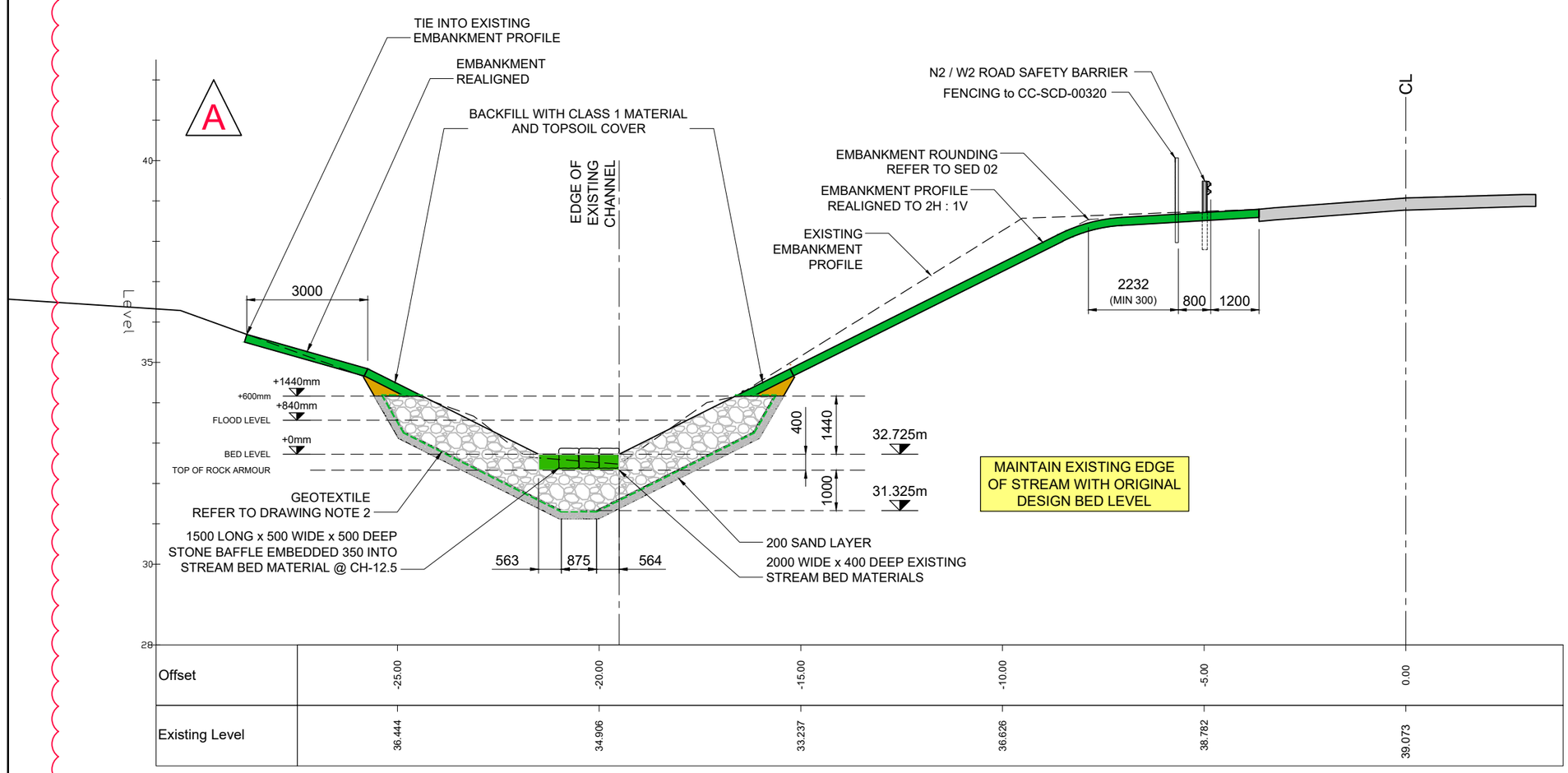

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Existing Level	36.444	34.906	33.237	36.626	38.782	39.073

Chainage -15

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Item	Category to EN 13383-1
Grading	HMA 300-1000
Shape	$LT_{Declared}$
Proportion of crushed or broken surfaces, RO	RO_{NR}
Particle Density	2.5
Resistance Parameters:	
to Breakage	CS_{80} (Compressive strength in MPa)
to Wear	$M_{DE}30$
to freezing and thawing	FT_A
to salt Crystallisation	MS_{NR}
Signs of Sonnenbrand	SB_A

DO NOT SCALE

A3

0 10 50

File: 5162555-ATK-ZZ-XX-DR-ST-950630 to 950640.dwg
Date: Mar 12, 2024 - 4:41pm Plotted by:

Rev	Description	By	Date	Chk'd	Auth
A	ISSUED FOR CONSTRUCTION	[redacted]	03.24	[redacted]	[redacted]
-	ISSUED FOR REVIEW	[redacted]	12.23	[redacted]	[redacted]

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Client: TRANSPORT INFRASTRUCTURE IRELAND

Project: MUNSTER BRIDGES TERM MAINTENANCE CONTRACT Nr. 3

Purpose: ISSUED FOR CONSTRUCTION

Title: N70 Curraheen Little Embankment at Glenbeigh, Co. Kerry Proposed Scour Protection Sheet 2 of 8

Original Scale	Des/Drawn	Checked	Authorised
1:125	[redacted] Date 19.12.23	[redacted] Date 19.12.23	[redacted] Date 19.12.23

Status	Drawing Number	Rev
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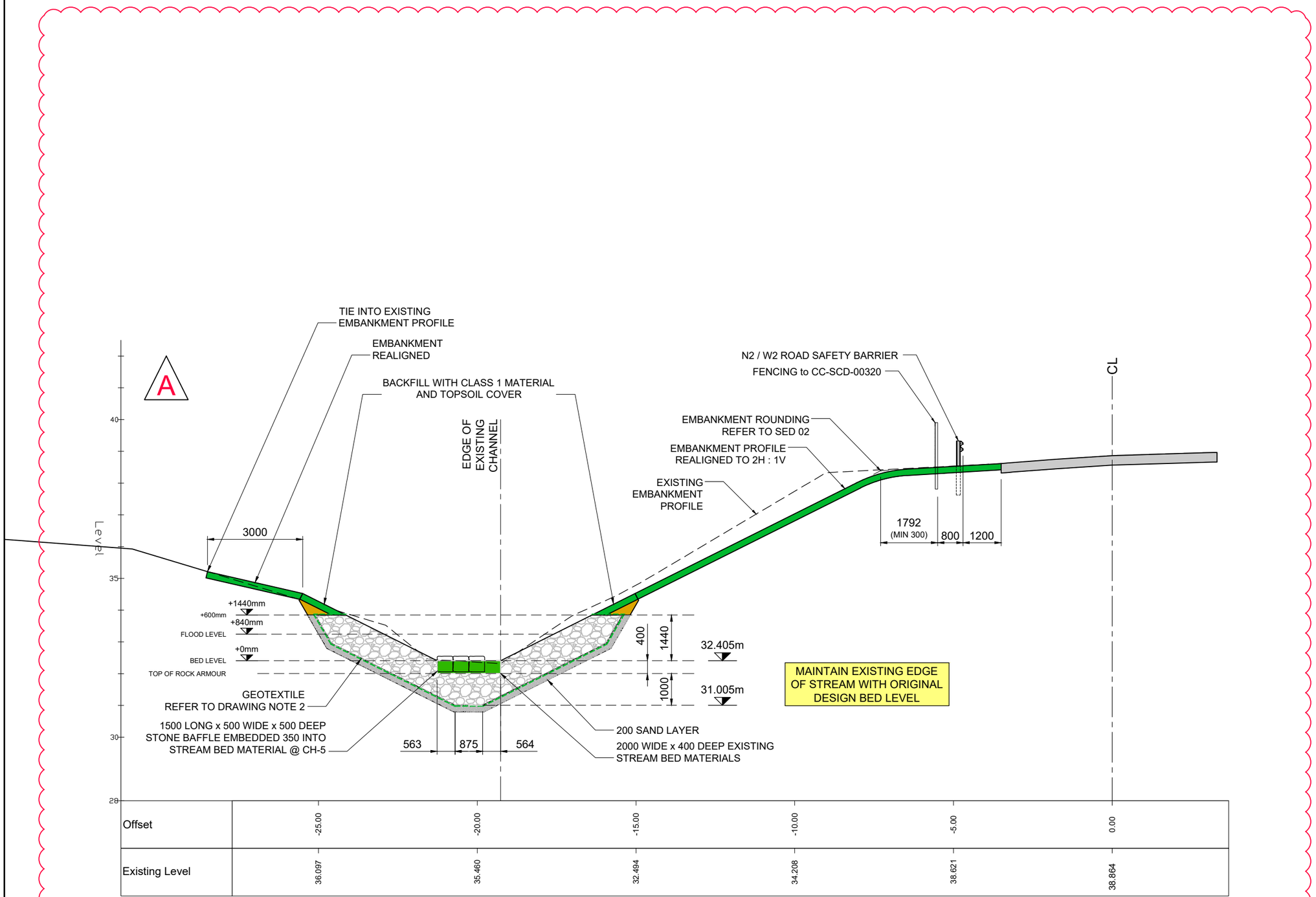

Chainage -10

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to Wear	$M_{DE}30$
to freezing and thawing	FT_A
to salt Crystallisation	MS_{NR}
Signs of Sonnenbrand	SB_A

Rev	Description	By	Date	Chk'd	Auth
A	ISSUED FOR CONSTRUCTION		03.24		
-	ISSUED FOR REVIEW		12.23		

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Client: TRANSPORT INFRASTRUCTURE IRELAND

Project: MUNSTER BRIDGES TERM MAINTENANCE CONTRACT Nr. 3

Purpose: ISSUED FOR CONSTRUCTION

Title: N70 Curraheen Little Embankment at Glenbeigh, Co. Kerry Proposed Scour Protection Sheet 3 of 8

Original Scale	Des/Drawn	Checked	Authorised
1:125	Date 19.12.23	Date 19.12.23	Date 19.12.23

Status	Drawing Number	Rev
C	5162555-ATK-ZZ-XX-DR-ST-950633	A

A3 DO NOT SCALE

File: 5162555-ATK-ZZ-XX-DR-ST-950630 to 950640.dwg
Date: Mar 12, 2024 - 4:43pm Plotted by:

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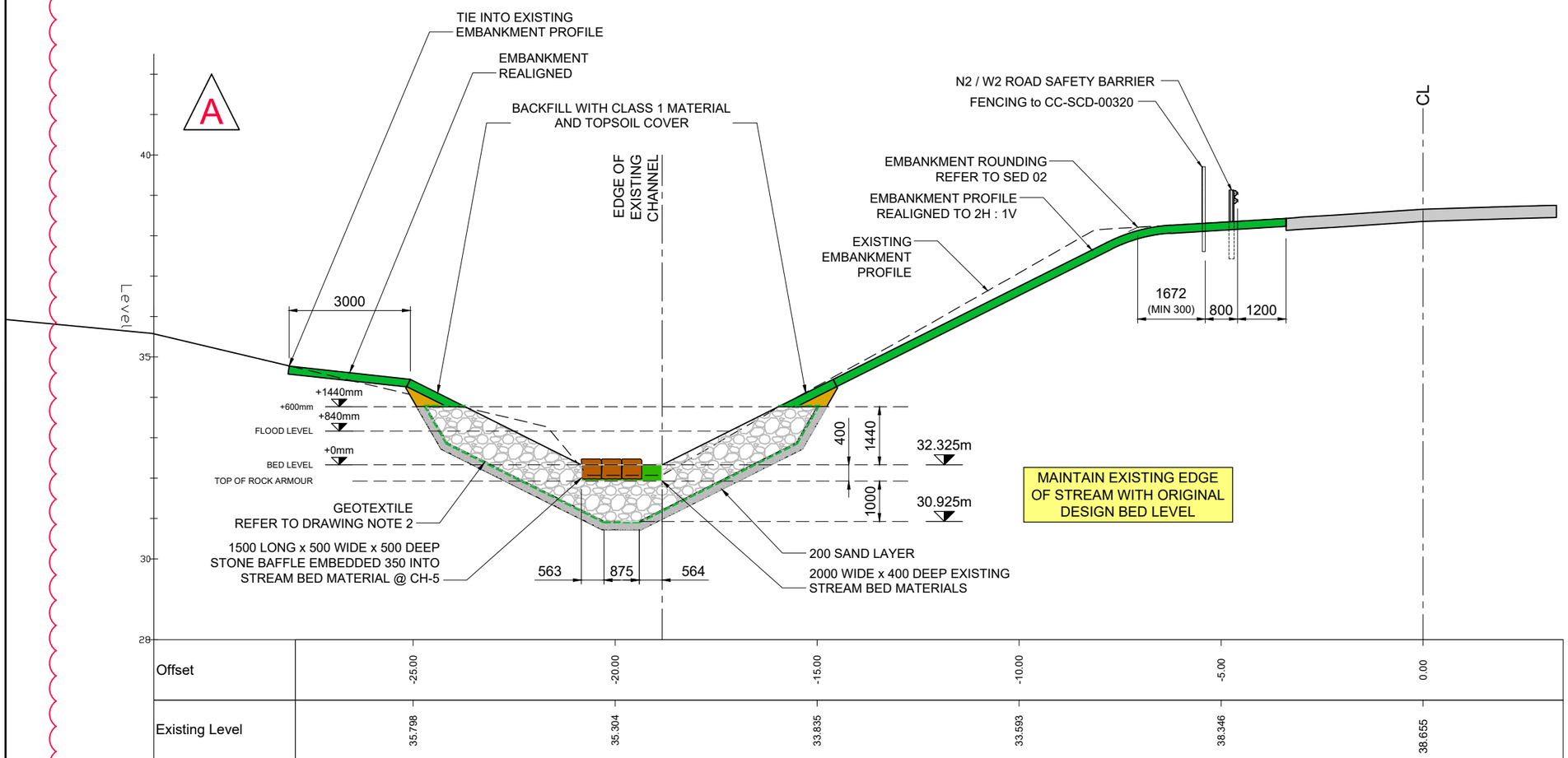

Offset	-25.00	-20.00	-15.00	-10.00	-5.00	0.00
Existing Level	35.798	35.304	33.835	33.593	38.346	38.655

Chainage -5

GENERAL NOTES

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4. WHILE DESIGN FLOOD DEPTH IS 0.840m, THE PROPOSED SCOUR PROTECTION SHALL EXTEND TO A MINIMUM OF 1.440m ABOVE STREAM BED LEVEL
5. THE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE MODEL CONSTRUCTION SPECIFICATION IN CIRIA C683 " The Rock Manual".
6. ROCK ARMOUR SHALL BE CAREFULLY PLACED ON THE GEOTEXTILE LINER BY MECHANICAL MEANS
7. ROCK ARMOUR SPECIFICATION SHALL BE

Item	Category to EN 13383-1
Grading	HMA 300-1000
Shape	$LT_{Declared}$
Proportion of crushed or broken surfaces, RO	RO_{NR}
Particle Density	2.5
Resistance Parameters:	
to Breakage	CS_{80} (Compressive strength in MPa)
to Wear	$M_{DE}30$
to freezing and thawing	FT_A
to salt Crystallisation	MS_{NR}
Signs of Sonnenbrand	SB_A

Rev	Description	By	Date	Chk'd	Auth
A	ISSUED FOR CONSTRUCTION	[redacted]	03.24	[redacted]	[redacted]
-	ISSUED FOR REVIEW	[redacted]	12.23	[redacted]	[redacted]

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Client: TRANSPORT INFRASTRUCTURE IRELAND

Project: MUNSTER BRIDGES TERM MAINTENANCE CONTRACT Nr. 3

Purpose: ISSUED FOR CONSTRUCTION

Title: N70 Curraheen Little Embankment at Glenbeigh, Co. Kerry Proposed Scour Protection Sheet 4 of 6

Original Scale	Des/Drawn	Checked	Authorised
1:125	Date 19.12.23	Date 19.12.23	Date 19.12.23

Status	Drawing Number	Rev
C	5162555-ATK-ZZ-XX-DR-ST-950634	A

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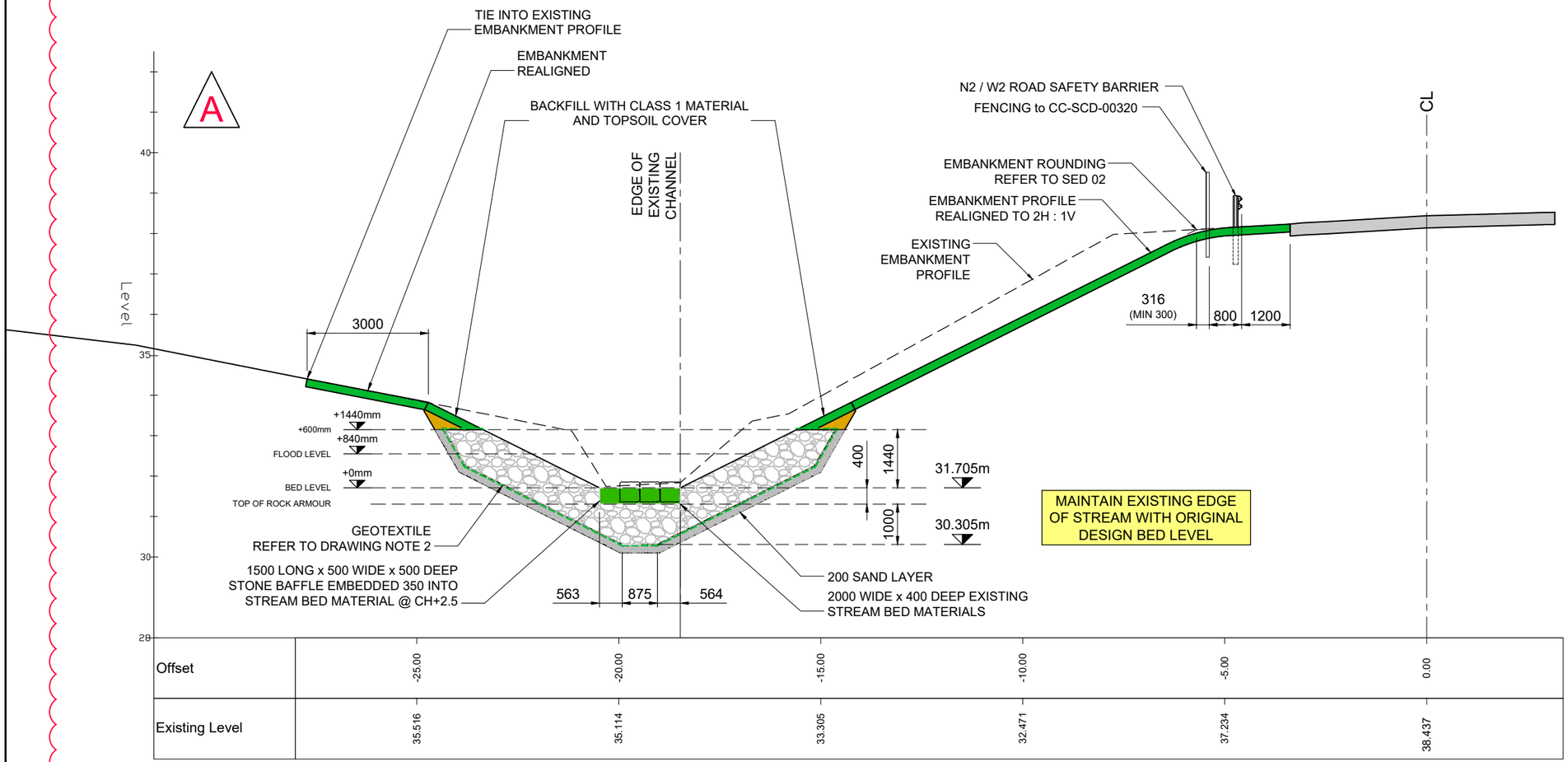

Chainage 0

GENERAL NOTES

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4. ALL COORDINATES ARE IN METRES AND ARE TO IRISH TRANSVERSE MERCATOR
5. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE SPECIFICATION

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Signs of Sonnenbrand	SB_A

Rev	Description	By	Date	Chk'd	Auth
A	ISSUED FOR CONSTRUCTION	[redacted]	.3.24	[redacted]	[redacted]
-	ISSUED FOR REVIEW	[redacted]	12.23	[redacted]	[redacted]

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Project: MUNSTER BRIDGES TERM MAINTENANCE CONTRACT Nr. 3

Purpose: ISSUED FOR CONSTRUCTION

Title: N70 Curraheen Little Embankment at Glenbeigh, Co. Kerry Proposed Scour Protection Sheet 5 of 8

Original Scale	Des/Drawn	Checked	Authorised
1:125	[redacted] Date 19.12.23	[redacted] Date 19.12.23	[redacted] Date 19.12.23

Status: C

Drawing Number: 5162555-ATK-ZZ-XX-DR-ST-950635

Rev: A

File: 5162555-ATK-ZZ-XX-DR-ST-950630 to 950640.dwg
Date: Mar 12, 2024 - 4:45pm Plotted by: [redacted]

DO NOT SCALE

A3

0 10 50

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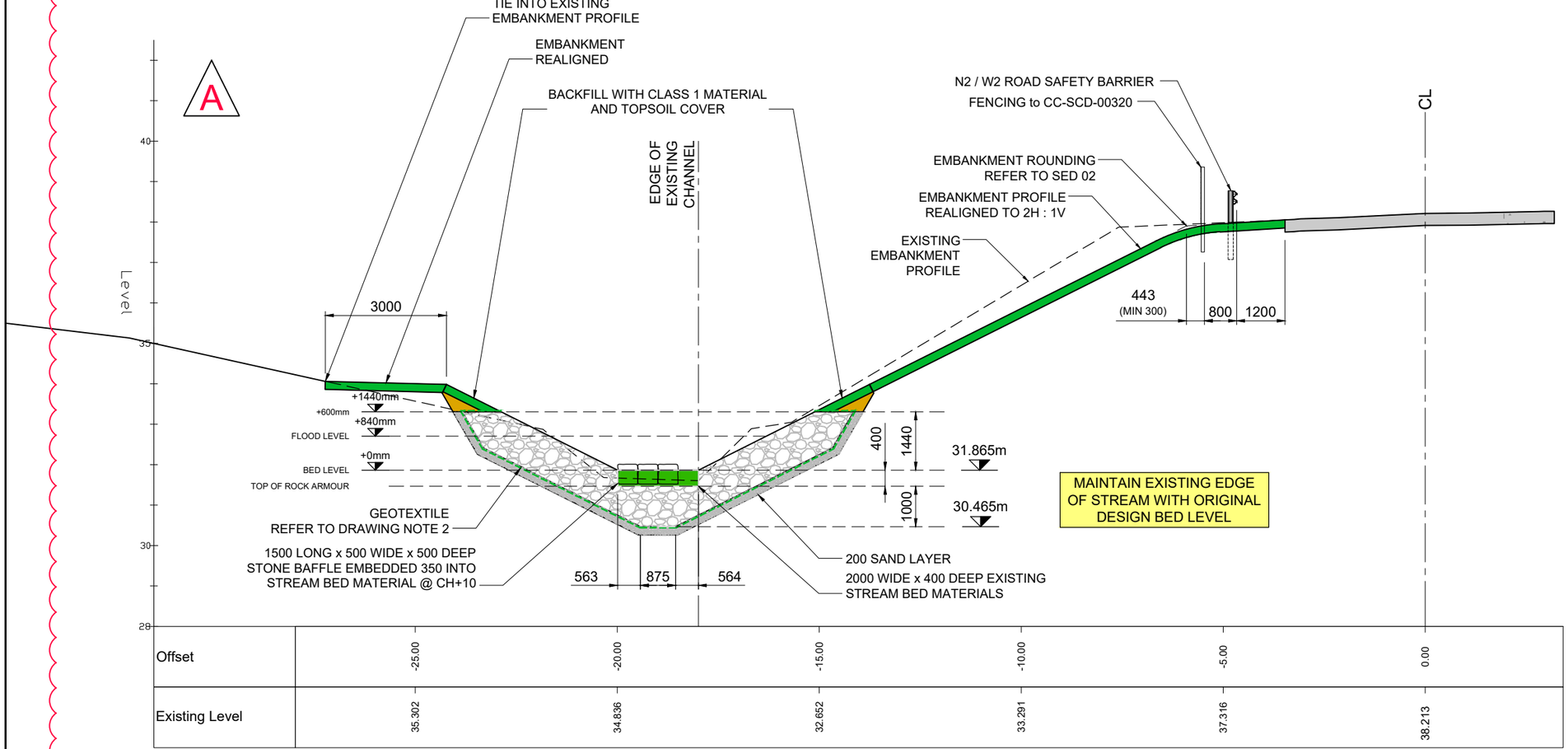

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Existing Level	35.302	34.836	32.652	33.291	37.316	38.213

Chainage +5

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Purpose: ISSUED FOR CONSTRUCTION

Title: N70 Curraheen Little Embankment at Glenbeigh, Co. Kerry Proposed Scour Protection Sheet 6 of 8

Original Scale	Des/Drawn	Checked	Authorised
1:125	Date 19.12.23	Date 19.12.23	Date 19.12.23

Status	Drawing Number	Rev
C	5162555-ATK-ZZ-XX-DR-ST-950636	A

DO NOT SCALE

A3

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Date: Mar 12, 2024 - 4:46pm Plotted by:

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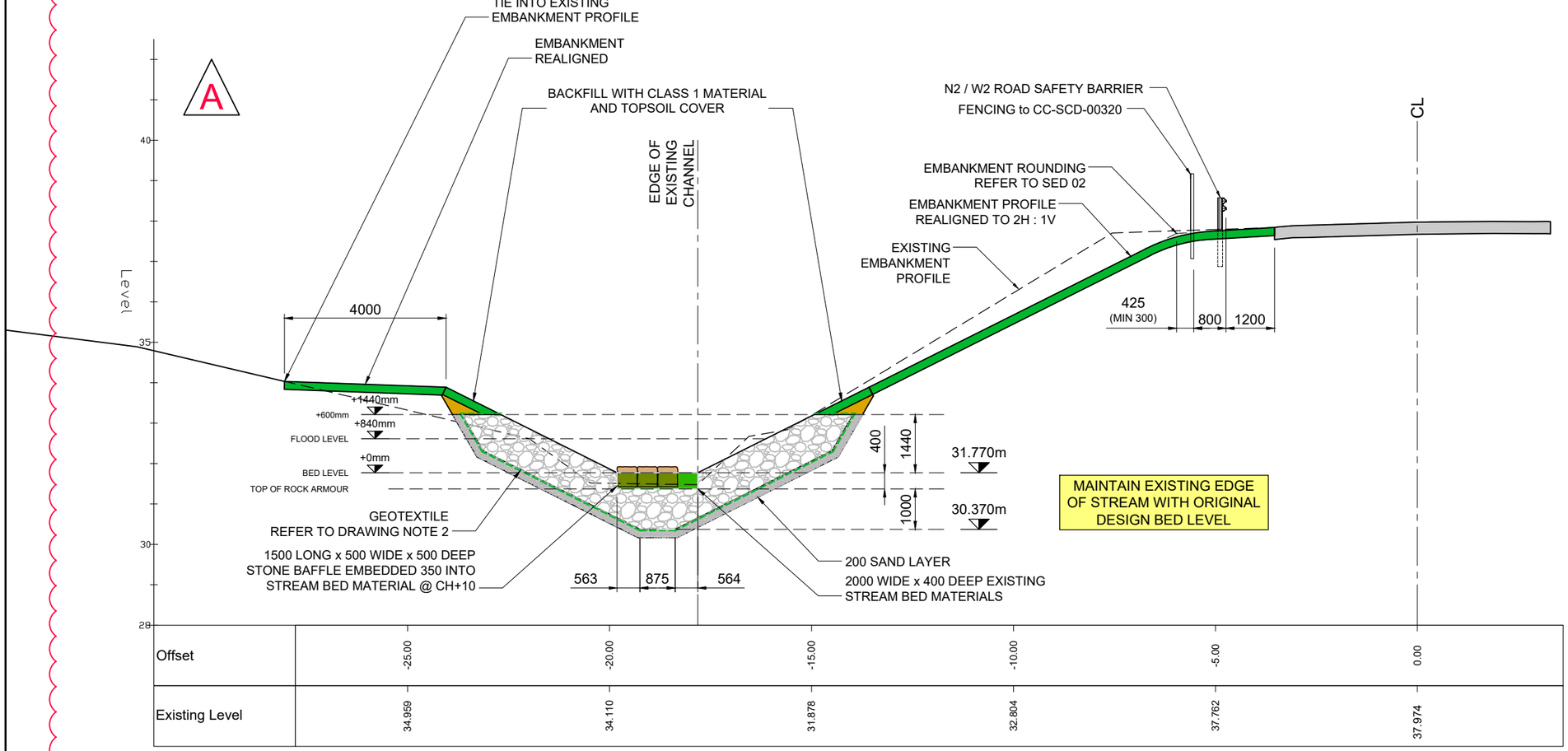

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Existing Level	34.959	34.110	31.878	32.804	37.762	37.974

Chainage +10

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A	ISSUED FOR CONSTRUCTION		.3.24		
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Purpose: ISSUED FOR CONSTRUCTION

Title: N70 Curraheen Little Embankment at Glenbeigh, Co. Kerry Proposed Scour Protection Sheet 7 of 8

Original Scale	Des/Drawn	Checked	Authorised
1:125	Date 19.12.23	Date 19.12.23	Date 19.12.23

Status	Drawing Number	Rev
C	5162555-ATK-ZZ-XX-DR-ST-950637	A

DO NOT SCALE

A3

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Date: Mar 12, 2024 - 4:47pm Plotted by:

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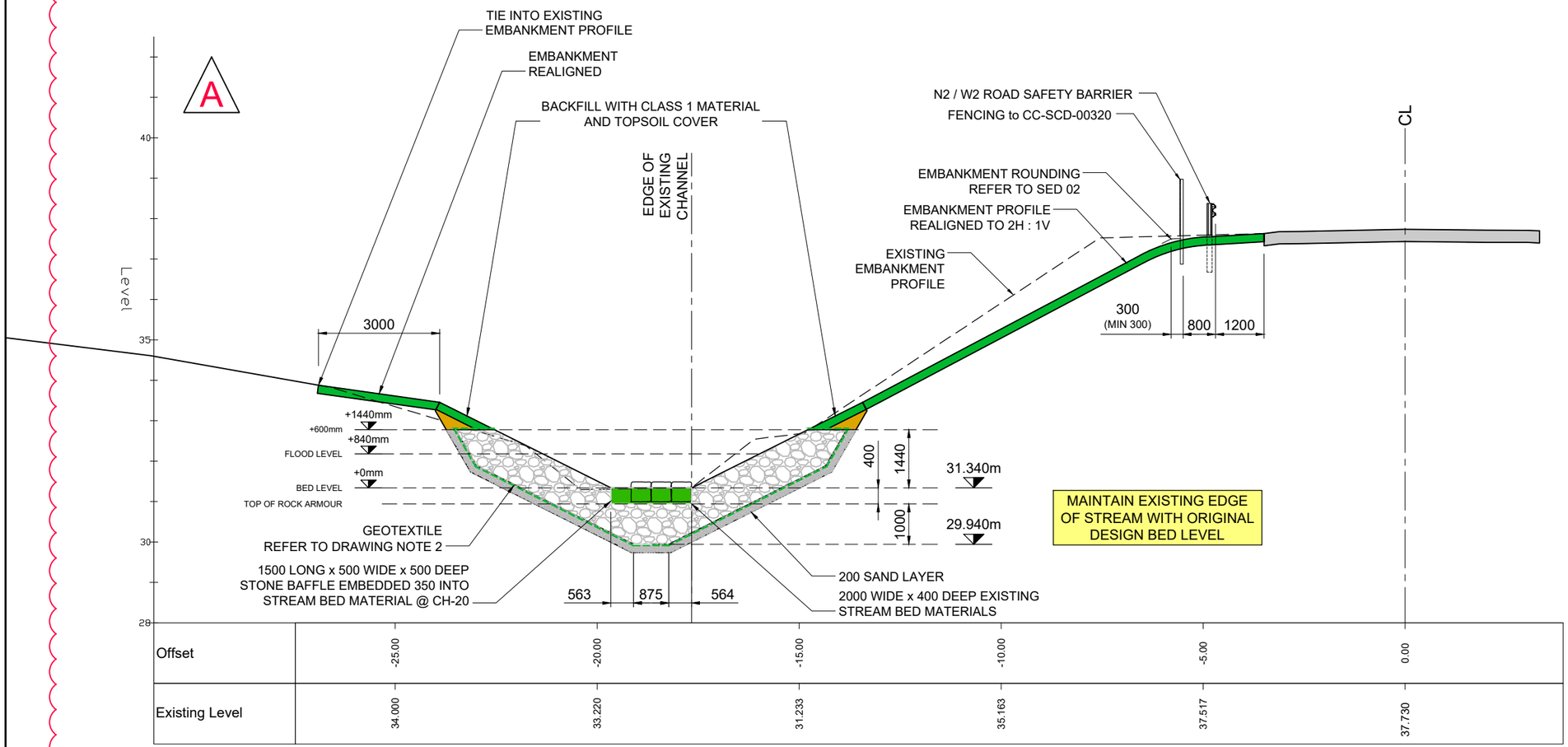

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Existing Level	34.000	33.220	31.233	35.163	37.517	37.730

Chainage +15

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Signs of Sonnenbrand	SB_A

DO NOT SCALE

A3

Rev	Description	By	Date	Chk'd	Auth
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Title: N70 Curraheen Little Embankment at Glenbeigh, Co. Kerry Proposed Scour Protection Sheet 8 of 8

Original Scale	Des/Drawn	Checked	Authorised
1:125	Date 19.12.23	Date 19.12.23	Date 19.12.23

Status	Drawing Number	Rev
C	5162555-ATK-ZZ-XX-DR-ST-950638	A

File: 5162555-ATK-ZZ-XX-DR-ST-950630 to 950640.dwg
Date: Mar 12, 2024 - 4:59pm Plotted by:
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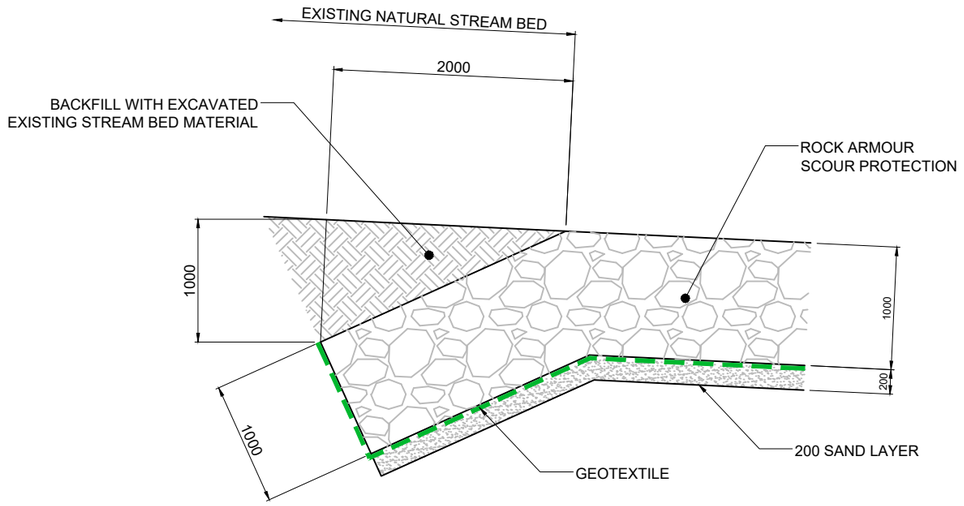
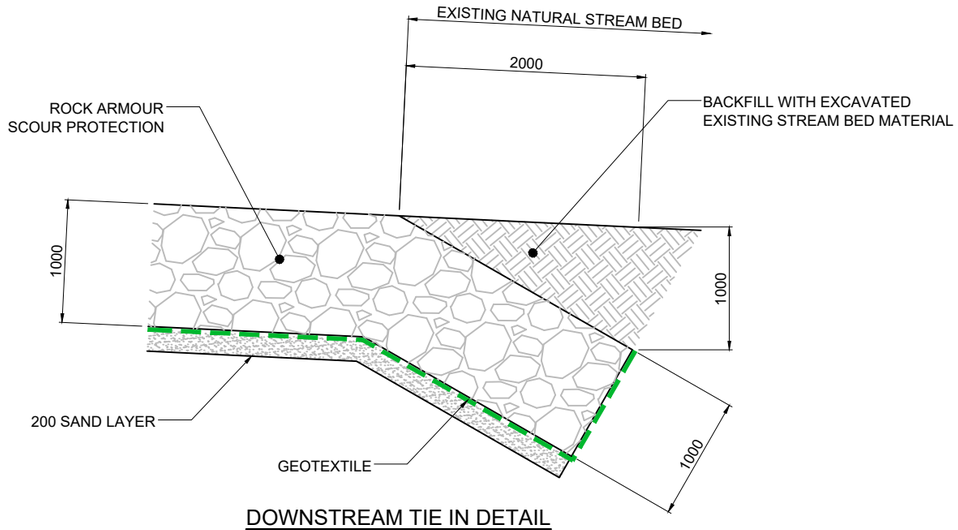


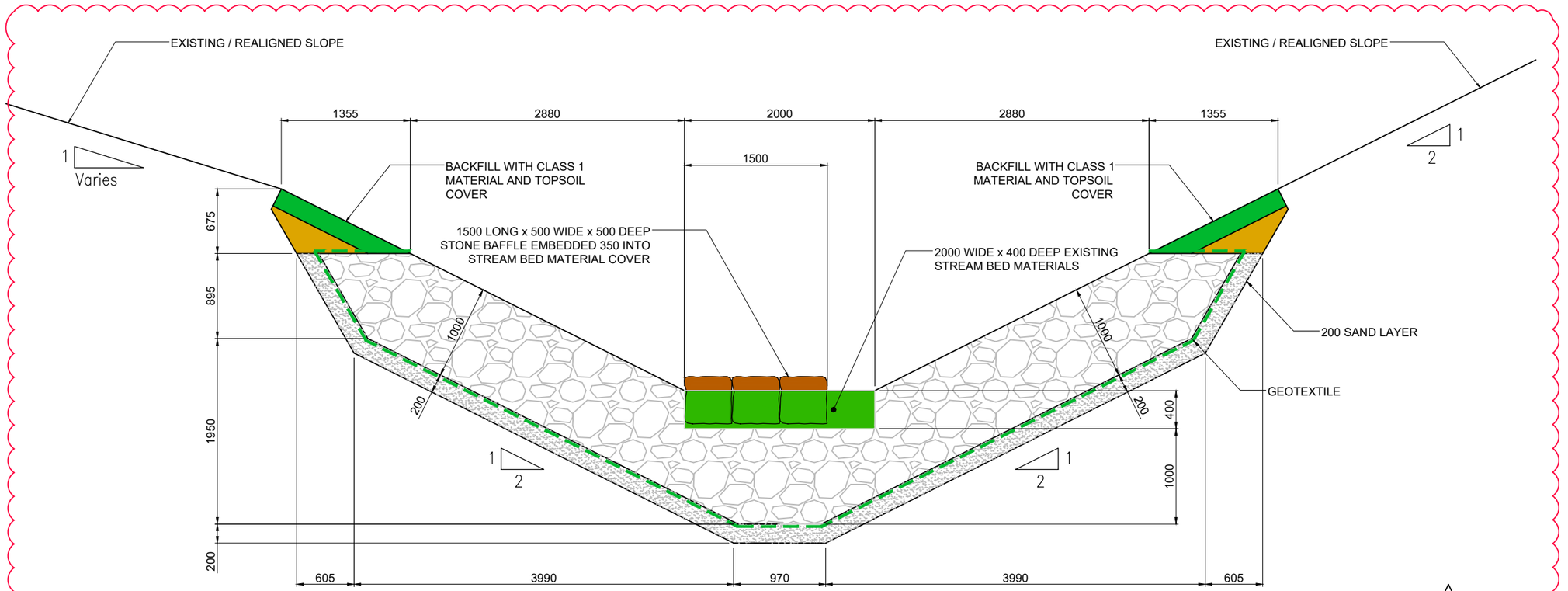
UPSTREAM TIE IN DETAIL

Scale at A3 1:50
Scale at A4 1:100



DOWNSTREAM TIE IN DETAIL

Scale at A3 1:50
Scale at A4 1:100



TYPICAL SCOUR PROTECTION CROSS SECTION

Scale at A3 1:50
Scale at A4 1:100

A

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Signs of Sonnenbrand	SB_A

DO NOT SCALE

A3

File: 5162555-ATK-ZZ-XX-DR-ST-950630 to 950640.dwg
Date: Mar 12, 2024 - 5.03pm Plotted by:

Bonneagar Iompair Éireann
Transport Infrastructure Ireland

Rev	Description	By	Date	Chk'd	Auth
A	ISSUED FOR CONSTRUCTION	[redacted]	03.24	[redacted]	[redacted]
-	ISSUED FOR REVIEW	[redacted]	12.23	[redacted]	[redacted]

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Project: MUNSTER BRIDGES TERM MAINTENANCE CONTRACT Nr. 3

Purpose: ISSUED FOR CONSTRUCTION

Title: N70 Curraheen Little Embankment at Glenbeigh, Co. Kerry Scour Protection Details

Original Scale	Des/Drawn	Checked	Authorised
1:50	Date 19.12.23	Date 19.12.23	Date 19.12.23

Status	Drawing Number	Rev
C	5162555-ATK-ZZ-XX-DR-ST-950640	A

V:\5162555\6 Dwgs-Graphics\61 AutoCad\N70 Curraheen Little Embankment\5162555-ATK-ZZ-XX-DR-ST-950630 to 950640.dwg

Appendix B. Landscape Plan and Specification

PLANTING LEGEND:

SYM.	DESCRIPTION
	WOODLAND PLANTING– REFER TO SCHEDULE.
	TOP SOIL AND GRASS SEEDED (AGRICULTURAL GRASS SEED MIX)– REFER TO SCHEDULE.
	TOP SOIL AND GRASS SEEDED (HIGHWAY GRASS SEED MIX, APPLIED BY HYDOSEEDING)– REFER TO SCHEDULE.
	EXISTING VEGETATION (RETAINED)
	EXISTING INVASIVE SPECIES (SEEK ECOLOGICAL ADVICE)
	SITE BOUNDARY
	PROPOSED REALIGNED CHANNEL

PLANTING NOTES

1. REFER ALSO TO SPECIFICATION FOR LANDSCAPE WORKS BY EAMONN BYRNE LANDSCAPE ARCHITECTS LTD.

2. PROVIDE 300MM MINIMUM DEPTH OF TOPSOIL TO ALL AREAS. REUSE EXISTING SITE TOPSOIL WHERE PRACTICAL.

3. ALL AREAS TOP SOILED ARE TO BE GRASS SEEDED, NOTE THIS INCLUDES THE AREAS THAT WILL BE PLANTED WITH HEDGES AND WOODLAND DURING THE FIRST WINTER BARE ROOT TREE & SHRUB PLANTING SEASON COMMENCING IN MID–NOVEMBER.

4. THE AREA TO BE RETURNED TO AGRICULTURE, PRIOR TO GRASS SEEDING THE TOPSOIL SHALL BE CULTIVATED TO A FINE TILTH AND SOWN WITH AN AGRICULTURAL SEED MIX–REFER TO PLANTING SCHEDULE. THE REMAINING AREAS INCLUDING ALL EMBANKMENTS AND VERGES ARE TO BE SOWN WITH A HIGHWAY SEED MIX APPLIED BY HYDOSEEDING–REFER TO PLANTING SCHEDULE.

5. STANDARD TREE PITS SHALL BE BACKFILLED WITH A PRE–MIXED SOIL/COMPOST MIXTURE INCORPORATING A SLOW RELEASE FERTILIZER.

6. ALL HEAVY STANDARD TREES TO BE DOUBLE STAKED WITH SINGLE CROSSBAR & TIED TO ENSURE NO DAMAGE TO BARK OF NEWLY PLANTED TREES

7. TO EACH TRANSPLANT TREE & SHRUB PLANTING STATION THE CONTRACTOR SHALL SUPPLY AND INCORPORATE A SLOW RELEASE FERTILISER.

8. RABBIT/ DEER PROTECTION REQUIRED FOR WOODLAND TRANSPLANTS: TUBEX 'NATURE SHELTER' SIZE 1.2M x STANDARD DIAMETER. RABBIT SPIRAL GUARDS WITH BAMBOO CANES CAN BE USED FOR HEDGEROW TRANSPLANTS. PROVIDE MESH GUARDS FOR ALL WOODLAND AND HEDGEROW HOLLY (ILEX AQUIFOLIUM) PLANTS.

9. HEDGE PLANTING BEDS SHALL BE CULTIVATED TO A MEDIUM TILTH AND 300MM DEEP. A SLOW RELEASE FERTILISER SHALL BE INCORPORATED IN A SECOND PASS FOLLOWING INITIAL CULTIVATION. THE CONTRACTOR SHALL PLACE A 50MM LAYER OF ORGANIC MULCH TO COVER THE COMPLETE AREA OF HEDGE AREAS. BEFORE APPLICATION OF THE MULCH THE AREA SHALL BE WEED FREE.

10. TRANSPLANT PITS SHALL BE EXCAVATED TO A DEPTH OF 300MM DIAMETER AND 300MM DEPTH BELOW EXISTING GROUND LEVEL. ALL PITS SHALL BE EXCAVATED TO SUFFICIENT DEPTH AND WIDTH TO ACCOMMODATE THE PLANT WITHOUT DISTURBING ITS ROOTS. DURING THE BACKFILLING THE FINAL SOIL LEVEL AROUND THE TREE SHOULD BE RAISED TO 40MM ABOVE THE SURROUNDING SOIL LEVEL. ALLOW FOR SLOPE GRADIENT WHEN DETERMINING APPROPRIATE DEPTH OF PLANTING PIT.

11. A CIRCLE OF RADIUS 500MM SHOULD BE KEPT COMPLETELY WEED FREE AROUND ALL STANDARD TREES AND EACH TRANSPLANT PLANTING STATION USING A COMBINATION OF MULCH MATS/SPATS AND HERBICIDE TREATMENT.

12. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ESTABLISH THE LOCATION OF SERVICES PRIOR TO PLANTING. TREES WITHIN PLANTING MIXES SHOULD BE PLACED AWAY FROM ANY OVERHEAD POWER LINES.

13. ALL NATIVE TREES AND SHRUBS TO BE IRISH PROVENANCE. NO IMPORTED OAK TREES ARE ARE ALLOWED TO PREVENT THE INTRODUCTION OF THE OAK PROCESSIONARY MOTH (Thaumetopoea processionea).

14. IT IS THE RESPONSIBILITY OF THE CONTRACTOR AVOID DISTURBANCE TO EXISTING STANDS OF INVASIVE SPECIES. PLANTING WORKS TO TAKE INTO ACCOUNT SPECIFIED SITE CONTROL STRATEGY.

WOODLAND PLANTING SCHEDULE

Trees

Number	Species	Specification	Girth	Height	Density
46 No.	Alnus glutinosa	1+1 :Transplant :B		60–80cm	2Ctr
35 No.	Betula pubescens	1+1 :Transplant :B		40–60cm	2Ctr
24 No.	Crataegus monogyna	1+1 :Transplant :B		60–80cm	2Ctr
57 No.	Quercus petraea	1+1 :Transplant :B		40–60cm	2Ctr

Shrubs

Number	Species	Specification	Pot Size	Height	Density
24 No.	Corylus avellana	1+1 :Branched :2 brks :CE		40-60cm	2Ctr
24 No.	Ilex aquifolium	Leader With Laterals :C	2L	40-60cm	2Ctr
24 No.	Prunus spinosa	1+1 :Branched :2 brks :BR	2L	40-60cm	2Ctr

STANDARD TREES

Trees

Number	Species	Specification	Girth	Height	Density
10 No.	Alnus glutinosa	Heavy Standard :Clear Stem 175–200 :B	12–14cm		Counted
7 No.	Betula pubescens	Heavy Standard :Clear Stem 175–200 :B	12–14cm		Counted
3 No.	Quercus petraea	Heavy Standard :Clear Stem 175–200 :RB	12–14cm		Counted

HEDGE PLANTING SCHEDULE

Trees

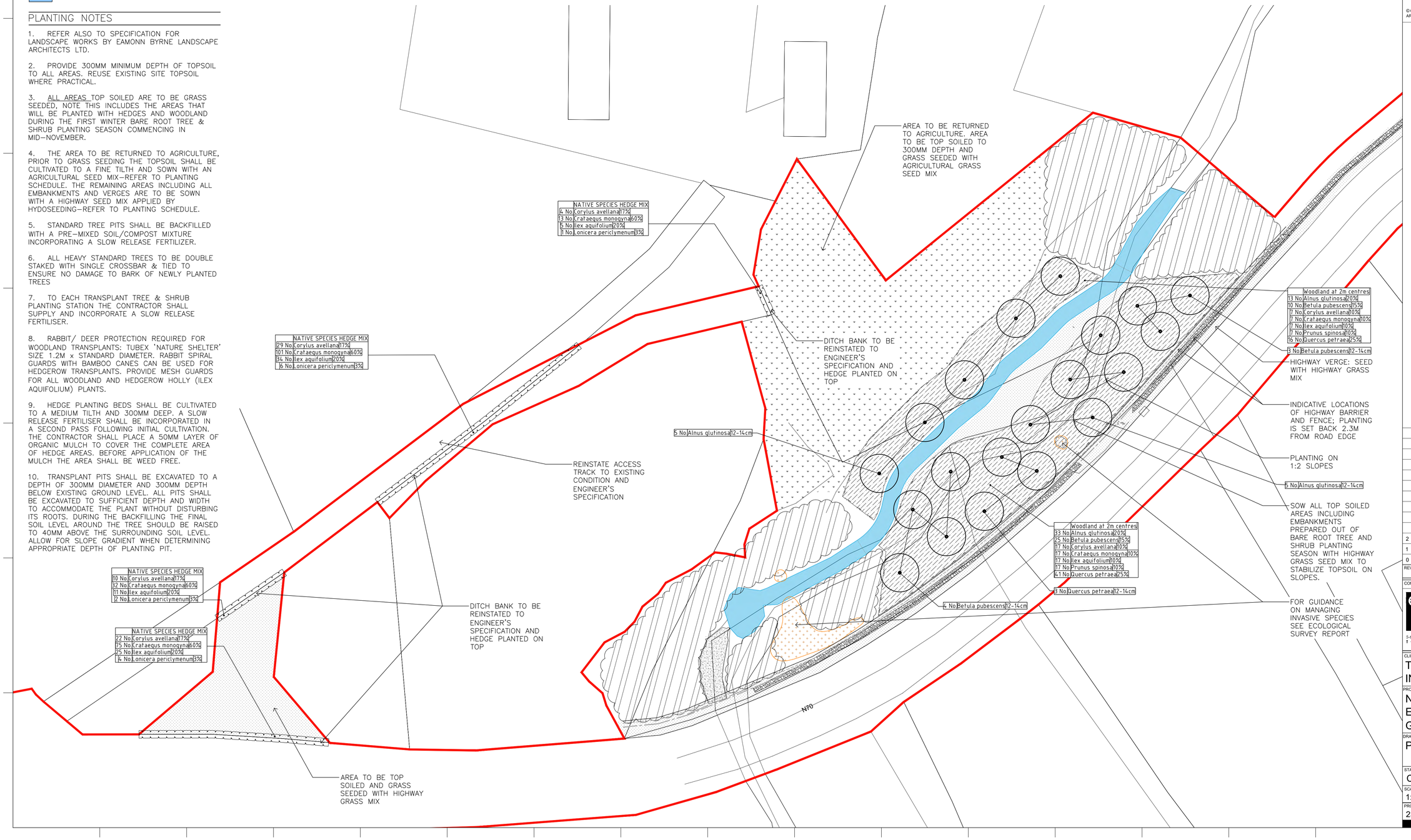
Number	Species	Specification	Girth	Height	Density
65 No.	Corylus avellana	1+1 :Transplant :BR		40-60cm	0.4Ctr Double Staggered at 0.4m offset
221 No.	Crataegus monogyna	1+1 :Transplant :BR		40-60cm	0.4Ctr Double Staggered at 0.4m offset
75 No.	Ilex aquifolium	1+1 :Transplant :C		40-60cm	0.4Ctr Double Staggered at 0.4m offset

Climbers

Number	Species	Pot Size	Specification	Height	Density
13 No.	Lonicera periclymenum	2L	Branched :3/4 brks :Caned	80-100cm	0.4Ctr Double Staggered at 0.4m offset

AGRICULTURAL GRASS SEED MIX (914m2): TOP 5 GRAZING MIXTURE, SOWN AT 35g/m2
GERMINAL SEEDS, Germinal Ireland Ltd, Horse and Jockey, Thurles, Co. Tipperary, E25 D286
Tel. 0504 41100

HIGHWAY & EMBANKMENT GRASS SEED MIX (1600m2): A18 ROAD VERGE & EMBANKMENTS MIXTURE, SOWN AT 35g/m2
GERMINAL SEEDS, Camp Road, Witham St. Hughs, Lincoln, LN6 9QJ
Tel. 0044 (0)1522 868714
expert@germinalamenity.com



KEY PLAN:

NOTES:

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2. DO NOT SCALE DRAWING. USE THE WRITTEN DIMENSIONS ONLY.
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7. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH BUILDING REGULATIONS AND THE REQUIREMENTS OF THE LOCAL AUTHORITY AND STATUTORY UTILITY PROVIDERS.

REVISION:	DESCRIPTION:	DATE:
2	.	02.03.2023
1	.	13.02.2023
0	.	01.02.2023

CONSULTANT: LANDSCAPE ARCHITECT

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T +44 (0)1904 623 144 E mail@eb-la.com
www.eb-la.com

CLIENT:
TRANSPORT INFRASTRUCTURE IRELAND

PROJECT:
N70 CURRAHEEN LITTLE EMBANKMENT AT GLENBEIGH CO. KERRY

DRAWING TITLE:
PLANTING PLAN

STATUS:
CONSTRUCTION

SCALE @ A1:	DATE:	DRAWN:	CHECKED:	APPROVED:
1:250	01.02.2023			

PROJECT NO.:	DRAWING NO.:	REVISION:
23013	CD-PP-0-01	2

FILE REF:

23013

Eamonn Byrne Landscape Architects Ltd

Transport Infrastructure Ireland

N70 Curraheen Little Embankment at Glenbeigh Co. Kerry

Specification for landscape works

31-03-2023

Contents

Q28
Topsoil and soil ameliorants

System outline

115 A Topsoil system for and seeding and planting

1. Description: For all grass seeding, heavy standard trees, woodland and hedge planting - refer to Eamonn Byrne Landscape Architects drawing Planting Plan CD-PP-0-01.
2. Depth: 300mm to all areas.
3. Composition
   - 3.1. Topsoil: Site-sourced topsoil.
   - 3.2. Ameliorants: None
   - 3.3. Accessories: None

Products

300 Preparation materials generally

1. Purity: Free of pests and disease.
2. Foreign matter: On visual inspection, free of fragments and roots of aggressive weeds, sticks, straw, subsoil, pieces of brick, concrete, glass, wire, large lumps of clay or vegetation, and the like.
3. Contamination: Do not use topsoil contaminated with subsoil, rubbish or other materials that are:
   - 3.1. Corrosive, explosive or flammable.
   - 3.2. Hazardous to human or animal life.
   - 3.3. Detrimental to healthy plant growth.
4. Subsoil: In areas to receive topsoil or planting media, do not use subsoil contaminated with the above materials.
5. Objectionable odour: None.
6. Give notice: If any evidence or symptoms of soil contamination are discovered on the site or in topsoil or planting media to be imported.

305 Permitted materials

1. Materials: Composted bark
   Composted green waste
   Spent mushroom compost
2. Give notice: before ordering or using.
3. Declaration of compliance in accordance with BS EN 13650: Required

310 Materials not permitted

1. Materials: Peat
   Products containing peat
   River and canal dredgings

315 Imported topsoil to BS 3882

1. Description: For all grass seeding, heavy standard trees, woodland and hedge planting as necessary.
2. Quantity: Provide as necessary to make up any deficiency of topsoil existing on site and to complete the work.
3. Standard: To BS 3882.

4. Classification: Multipurpose
    4.1. Soil textural class to BS 3882, Figure 1: Sandy clay loam
5. Source: Submit proposals
    5.1. Product reference: Submit proposals

360 Sanitized and stabilized composted materials certified to PAS 100

1. Description: For tree pits for heavy standard trees.
2. Standard: In accordance with PAS 100
3. Source: Submit proposals
    3.1. Product reference: Submit proposals
4. Horticultural parameters
    4.1. pH (1:5 water extract): 7.0-8.7
    4.2. Electrical conductivity (maximum, 1:5 water extract): 200 mS/m
    4.3. Moisture content (m/m of fresh weight): 35-55%.
    4.4. Organic matter content (minimum): 25%
    4.5. Grading (air dried samples): 99% passing 25 mm and 90% passing 10 mm screen mesh apertures
    4.6. Carbon:Nitrogen ratio (maximum): 20:1.
5. Texture: Friable.
6. Objectionable odour: Not permitted.
7. Compost Certification Scheme certification: Required
8. Declaration of analysis: Submit.
9. Additional analyses: Not required
10. Samples: Supply 5 kg sample before ordering

380 Mycorrhizal inoculant

1. Description: For tree pits for heavy standard trees.
2. Manufacturer: Contractor's choice
    2.1. Product reference: Contractor's choice

385 Water retention gels

1. Description: For tree pits for heavy standard trees.
2. Type: Agri-polymer gel
3. Manufacturer: Contractor's choice
    3.1. Product reference: Contractor's choice
4. Accessories: None

405 Inorganic fertilizers

1. Description: For tree pits for heavy standard trees and all transplant trees and shrubs.
2. Manufacturer/ source: Submit proposals
    2.1. Product reference: Submit proposals
3. Standard: In accordance with EC Fertilisers standards
4. Purpose: Establishment fertilizer
5. Type: NPK (macronutrient)
6. Availability to plants: Slow-release

Execution

610 Topsoil analysis

1. Soil to be analysed: Imported topsoil
2. Soil analyst: Contractor's choice
3. Samples: Collect in accordance with BS 3882.
4. Submit
   - 4.1. Declaration of analysis: In accordance with BS 3882, clause 6 and Table 1.
   - 4.2. Additional analysis: Not required
   - 4.3. Report detailing soil analyst's recommendations.

620 Importing topsoil

1. Give notice: Before stripping topsoil for transfer to site.
   - 1.1. Notice period: 7 days

625 Sample loads

1. Description: FOR IMPORTED SOIL IMPROVERS/ COMPOST
2. Deliver to site a sample load: of 5 kg
3. Give notice: Allow inspection before making further deliveries to site. Retain for comparison with subsequent loads.
   - 3.1. Notice period: 7 days

630 Documentation for imported topsoil

1. Description: For all grass seeding, heavy standard trees, woodland and hedge planting as necessary.
2. Timing: Submit at handover.
3. Contents
   - 3.1. Full description of all soil components.
   - 3.2. Record of source for all soil components.
   - 3.3. Record drawings showing the location and depth of all soils by type and grade.
   - 3.4. Declaration of analysis: in accordance with BS 3882, clause 6 and Table 1.
4. Number of copies: One

635 Documentation for compost and composted materials

1. Description: For compost and imported soil improvers used in tree pits for heavy standard trees.
2. Timing: Submit at handover.
3. Contents
   - 3.1. Full description of all compost components.
   - 3.2. Record of source for all compost components.
   - 3.3. Analyst's report for each test carried out.
   - 3.4. Declaration of compliance: in accordance with PAS 100 and BSI PD CR 13456.
   - 3.5. Quality Compost Protocol certification: Cré Compostable Certification Scheme.
4. Number of copies: One

650 Notice

1. Give notice before

1.1. Setting out.
1.2. Spreading topsoil.
1.3. Applying herbicide.
1.4. Applying fertilizer.
1.5. Visiting site during maintenance period.

2. Period of notice: 1 week

655 Mechanical tools

1. Restrictions: Do not use within 100 mm of tree and plant stems. Do not damage adjacent planting.

670 Inspecting formations

1. Give notice: Before spreading topsoil for areas to receive forestry planting.
2. Notice period: 7 days

675 Preparation of undisturbed topsoil

1. Standard: In accordance with BS 4428.
   1.1. Grading and cultivation: Category B
2. Hard ground: Break up thoroughly.
3. Clearing: Remove visible roots and large stones with a diameter greater than 50 mm.
4. Areas covered with turf or thick sward: Plough or dig over to full depth of topsoil.
5. Fallow period (minimum): One month
   5.1. Weed control: At appropriate times treat with a suitable translocated nonresidual herbicide.

680 Surplus topsoil to be retained

1. Generally: Spread and level on site:
   1.1. Locations: Any areas where topsoil is required for new planting
   1.2. Protected areas: Do not raise soil level within root spread of trees that are to be retained.

685 Surplus materials to be removed

1. Topsoil removal from site: Topsoil remaining after completion of all landscaping work
2. Subsoil, stones, debris, wrapping material, canes, ties, temporary labelling, rubbish, prunings and other arisings: Remove.

690 Topsoil storage heaps

1. Location: Submit proposals
2. Height (maximum): 1.0 m
3. Width (maximum): 4.0 m
   3.1. Formation: Loose tip and shape from the side only, without running machinery on the heap at any time.
4. Protection
   4.1. Do not place any other material on top of storage heaps.
   4.2. Do not allow construction plant to pass over storage heaps.
   4.3. Prevent compaction and contamination, by fencing and covering as appropriate.

700 Grading of topsoil

1. Topsoil condition: Reasonably dry and workable.

2. Contours: Smooth and flowing, with falls for adequate drainage.
   2.1. Hollows and ridges: Not permitted.
3. Give notice: If required levels cannot be achieved by movement of existing soil.

705 Handling topsoil

1. Standard: In accordance with BS 3882.
2. Aggressive weeds: Give notice and obtain instructions before moving topsoil.
3. Plant: Select and use plant to minimize disturbance, trafficking and compaction.
4. Contamination: Do not mix topsoil with:
   4.1. Subsoil, stone, hardcore, rubbish or material from demolition work.
   4.2. Other grades of topsoil.
5. Multiple handling: Keep to a minimum. Use or stockpile topsoil immediately after stripping.
6. Wet conditions: Handle topsoil in the driest condition possible. Do not handle during or after heavy rainfall, or when the moisture content is greater than the plastic limit.

710 Spreading topsoil on:

1. Description: Areas for grass seeding, heavy standard trees, woodland and hedge planting - refer to Eamonn Byrne Landscape Architects drawing Planting Plan CD-PP-0-01
2. Standard: In accordance with BS 3882.
3. Temporary roads/ surfacing: Remove before spreading topsoil.
4. Layers
   4.1. Depth (maximum): 150 mm.
   4.2. Gently firm each layer before spreading the next.
5. Depth after firming and settlement: Grass areas: 300mm
   Woodland planting areas: 300mm
6. Crumb structure: Do not compact topsoil. Preserve a friable texture of separate visible crumbs wherever possible.

715 Loose tipping of topsoil

1. Standard: In accordance with BS 3882.
2. General: Do not firm, consolidate or compact topsoil when laying. Tip and grade to approximate levels in one operation with minimum of trafficking by plant.

718 Final cultivation

1. Description: Areas for grass seeding, heavy standard trees, woodland and hedge planting - refer to Eamonn Byrne Landscape Architects drawing Planting Plan CD-PP-0-01.
2. Compacted topsoil: Break up to full depth.
3. Tilth: Loosen, aerate and break up topsoil to a tilth suitable for blade grading.
4. Depth: 250 mm
5. Particle size (maximum): 5 mm
6. Timing: After grading and fertilizing, and within a few days before seeding and planting
7. Weather and ground conditions: Suitably dry.
8. Surface: Leave regular and even.
9. Levels: As section D20
10. Undesirable material brought to the surface
    10.1. Remove visible weeds.
    10.2. Remove roots and large stones with any dimension exceeding 40 mm.

720 Finished levels of topsoil after settlement

1. In relation to adjoining paving, kerbs or hard surfaces: 25 mm above
2. In relation to adjacent grass areas: 25 mm above
3. Seeded areas: Extend cultivation into existing adjacent grassed areas sufficient to ensure full marrying in of levels.
4. Sportsfields: To even levels and within the following permitted deviations:
   4.1. From levels or gradients shown on drawings: ±75 mm.
   4.2. From line between boning rods 30 m apart: ±25 mm.
5. Within root spread of existing trees and shrubs to be retained: Do not dig or cultivate.
6. Adjoining soil areas: Marry in.
7. Thickness of turf or mulch: Included.

820 Applying general fertilizer

1. Description: To areas of agricultural grass seed mix - refer to Eamonn Byrne Landscape Architects drawing Planting Plan CD-PP-0-01.
2. Application: Spread evenly, carefully incorporating below mulch materials.
   2.1. Timing: Immediately before cultivation.
   2.2. Application rate: 50 g/m²
   2.3. Other requirements: None.

835 Applying buried gel irrigation system

1. Description: For tree pits for heavy standard trees.
2. Depth: To manufacturer's/ supplier's recommendations

840 Applying mycorrhizal inoculant

1. Description: For tree pits for heavy standard trees.
2. Depth: To manufacturer's/ supplier's recommendations

Completion - Not Used

Ω End of Section

Q30
Seeding/ turfing

General information/requirements

115 A Seeded areas

1. Growth and development: Healthy, vigorous grass sward, free from the visible effects of pests, weeds and disease.
2. Appearance: A closely knit, continuous ground cover of even density, height and colour.

120 Climatic conditions

1. General: Carry out the work while soil and weather conditions are suitable.

145 Watering

1. Quantity: Wet full depth of topsoil.
2. Application: Even and without displacing seed, seedlings or soil.
3. Frequency: As necessary to ensure the establishment and continued thriving of all seeding/turfing.

150 Water restrictions

1. Timing: If water supply is or is likely to be restricted by emergency legislation do not carry out seeding/turfing until instructed. If seeding/turfing has been carried out, obtain instructions on watering.

160 Notice

1. Give notice before
    1.1. Setting out.
    1.2. Applying herbicide.
    1.3. Applying fertilizer.
    1.4. Preparing seed bed.
    1.5. Seeding or turfing.
    1.6. Visiting site during maintenance period.
2. Period of notice: 1 week

170 Setting out

1. Boundaries: Mark clearly.
2. Delineation: In straight lines or smoothly flowing curves as shown on drawings.

Preparation

210 Herbicide

1. Description: For all areas to be seeded
2. Type: Suitable for suppressing perennial weeds.
3. Timing: Allow fallow period before cultivation.
    3.1. Duration: As manufacturer's recommendation

212 Seed bed cleaning before sowing

1. Description: All areas for agricultural grass seed mix and highway & embankment grass seed mix - refer to Eamonn Byrne Landscape Architects drawing Planting Plan CD-PP-0-01.
2. Operations: Remove weeds by hand weeding and hoeing.

250 Soil requirements

1. Type
   1.1. Seeded areas: Soil for grass swards, as section Q28

290 Preparation for hydraulic seeding

1. Clearance: Remove rubbish, and stones with any dimension exceeding: 50 mm.
2. Herbicide
   2.1. General weeds: Selective contact herbicide.
   2.2. Pernicious weeds: Selective hormone herbicide.
3. Grading: Smooth, flowing levels.
   3.1. Cultivation: Ensure grass roots can penetrate substrate.
4. Finished surface: Ribbed or rough textured.
5. Reinforcement: As specialist contractor's recommendation
   5.1. Fixing: As specialist contractor's recommendation

Seeding

311 A Grass seed - agricultural grass seed mix

1. Description: For areas to be returned to agriculture - refer to Eamonn Byrne Landscape Architects drawing Planting Plan CD-PP-0-01.
2. Supplier: Germinal Ireland Ltd.
   Horse and Jockey
   Thurles
   Co. Tipperary
   E25 D286
   0504 41100
   2.1. Mixture reference: Top 5 Grazing Mixture
3. Application rate: 35 g/m²

311 B Grass seed - highway & embankment grass seed mix

1. Description: For areas adjacent highway and adjacent to diverted channel - refer to Eamonn Byrne Landscape Architects drawing Planting Plan CD-PP-0-01.
2. Supplier: Germinal Seeds
   Camp Road
   Witham St. Hughs
   Lincoln
   LN6 9QJ
   +44 (0)1522 868714
   2.1. Mixture reference: A18 Road Verge & Embankments Mixture
3. Application rate: 35 g/m²

319 Quality of seed

1. Description: FOR ALL GRASSED AREAS
2. Freshness: Produced for the current growing season.

3. Certification: Blue label certified varieties.
   3.1. Standard: EC purity and germination regulations.
   3.2. Official Seed Testing Station certificate of germination, purity and composition: Submit when requested.
4. Samples of mixtures: Submit when requested.

330 Sowing

1. General: Establish good seed contact with the root zone.
2. Method: To suit soil type, proposed usage, location and weather conditions during and after sowing
   2.1. Distribution: 2 equal sowings at right angles to each other and diagonally to main axis

335 Grass sowing season

1. Grass seed generally: April to October

340 Pre-emergent herbicide

1. Description: FOR ALL GRASSED AREAS
2. Standard: Pesticide Safety Directorate approved.
3. Application rate: In accordance with manufacturer's written recommendation.
   3.1. Timing: Immediately after sowing.

370 A Hydraulic seeding mulch

1. Description: For areas of highway & embankment grass seed mix - refer to Eamonn Byrne Landscape Architects drawing Planting Plan CD-PP-0-01.
2. Proposed land use: Road verges and steep slope to realigned channel
3. Stabilization: None
4. Supplier:: Salix River & Wetland Services Limited
   The Byre
   Blakenhall Park
   Bar Lane
   Barton Under Needwood
   Staffordshire
   DE13 8AJ
   contracts@salixrw.com
   +44 (0)330 002 1788
5. Product reference:: TerrAffix® Biochar
6. Slurry application: Suitable for soil type, proposed use, location, and weather conditions during and after application.
   6.1. Slurry constituents: Manufacturer's recommendations.

Turfing - Not Used

Protecting/cutting

530 A First cut of grassed areas - agricultural seed mix

1. Timing: When grass is reasonably dry.
   1.1. Height of initial growth: 75 mm
2. Preparation
   2.1. Debris and litter: Remove.

2.2. Stones and earth clods larger than 25 mm in any dimension: Remove

3. Height of first cut: 40 mm
4. Mower type: Contractor's choice
5. Arisings: Spread evenly over cut areas

530 A First cut of grassed areas - highway seed mix

1. Timing: When grass is reasonably dry.
   1.1. Height of initial growth: 50 mm
2. Preparation
   2.1. Debris and litter: Remove.
   2.2. Stones and earth clods larger than 25 mm in any dimension: Remove
3. Height of first cut: 25 mm
4. Mower type: Contractor's choice
5. Arisings: Remove from site

550 Areas not to be cut

1. Do not cut: Embankment to channel
   Areas within woodland planting

590 Cleanliness

1. Soil and arisings: Remove from hard surfaces.
2. General: Leave the works in a clean, tidy condition at Completion and after any maintenance operations.

Maintenance

610 A Failures of seeding

1. Duration: Carry out the following operations from completion of seeding/ turfing until: practical completion.
2. Defective materials or workmanship: Areas that have failed to thrive.
   2.1. Exclusions: Theft or malicious damage.
3. Method of making good: Recultivation and reseeding/ returfing.
4. Timing of making good: Submit proposals

620 Maintaining

1. Description: Highway grass seeded areas
2. Duration: Carry out the following operations from completion of seeding/ turfing until: practical completion.
3. Maximum height of growth at any time: 75 mm
4. Preparation: Before each cut remove all litter and debris.
5. Cutting: As and when necessary to a height of 35 mm.
   5.1. Arisings: Remove
6. Bulb planting areas: Do not cut until bulb foliage has died down.
7. Trimming: All edges.
   7.1. Arisings: Remove.
8. Weed control: Substantially free of broad leaved weeds.
   8.1. Method: Application of a suitable selective herbicide.

9. Stones brought to the surface: Remove regularly.
    9.1. Size: Exceeding 25 mm in any dimension.
10. Areas of settlement: Make good.
11. Watering: Contractor's choice.

Ω End of Section

Q31
External planting

General information/ requirements

112 Site clearance generally

1. General: Remove rubbish, concrete, metal, glass, decayed vegetation and contaminated topsoil.
2. Stones: Remove those with any dimension exceeding 50 mm.
3. Contamination: Remove material containing toxins, pathogens or other extraneous substances harmful to plant, animal or human life.
4. Vegetation: Clear scrub to ground level by flail mowing and remove arisings; retain and protect trees indicated on drawings
   Clear surface vegetation in areas shown on drawings using suitable nonresidual herbicide
5. Large roots: Grub up and dispose of without undue disturbance of soil and adjacent areas.
6. Additional requirements: None.

118 Soil conditions

1. Soil for cultivating and planting: Moist, friable and (except in aquatic/ marginal planting) not waterlogged.
2. Frozen or snow covered soil: Give notice before planting. Provide additional root protection. Prevent planting pit sides and bases and backfill materials from freezing.

120 Climatic conditions

1. General: Carry out the work while soil and weather conditions are suitable.
   1.1. Strong winds: Do not plant.

125 Times of year for planting

1. Deciduous trees and shrubs: Late October to late March.
2. Conifers and evergreens: September/ October or April/ May.
3. Herbaceous plants (including marginal): September/ October or March/ April.
4. Container grown plants: At any time if ground and weather conditions are favourable.
   4.1. Watering and weed control: Provide as necessary.
5. Dried bulbs, corms and tubers: September/ October.
6. Colchicum (crocus): July/ August.
7. Green bulbs: After flowering in spring.
8. Wildflower plugs: Late August to mid November or March/ April.
9. Aquatic plants: May/ June or September/ October.

130 Mechanical tools

1. Restrictions: Do not use within 100 mm of tree and plant stems.

145 Watering

1. Quantity: Wet full depth of topsoil.
2. Application: Even and without damaging or displacing plants or soil.
3. Frequency: As necessary to ensure establishment and continued thriving of planting.

150 Water restrictions

1. General: If water supply is or is likely to be restricted by emergency legislation, do not carry out planting until instructed. If planting has been carried out, obtain instructions on watering.

160 Notice

1. Give notice before
    1.1. Setting out.
    1.2. Applying herbicide.
    1.3. Applying fertilizer.
    1.4. Delivery of plants/ trees.
    1.5. Planting shrubs.
    1.6. Planting trees into previously dug pits.
    1.7. Watering.
    1.8. Visiting site during maintenance period.
2. Period of notice: One week

170 A Soil requirements

1. Type
    1.1. Tree pits for heavy standard trees, tree and shrub pits for transplants and other backfilling: Plant pit backfilling soil system, as section Q28.

200 Plants/ Trees – general

1. Condition: Materially undamaged, sturdy, healthy and vigorous.
2. Appearance: Of good shape and without elongated shoots.
3. Hardiness: Grown in a suitable environment and hardened off.
4. Health: Free from pests, diseases, discoloration, weeds and physiological disorders.
5. Budded or grafted plants: Bottom worked.
6. Root system and condition: Balanced with branch system.
    6.1. Standard: The National Plant Specification (UK)
7. Species: True to name.
8. Origin/ Provenance: Contractor's choice
9. Definition: Origin and Provenance have the meaning given in the National Plant Specification.

215 Plants/ Trees – specification criteria

1. Name, forms, dimensions, provenance and other criteria: As scheduled and defined in the National Plant Specification (available on CS Design Software Limited’s website).

235 Container grown plants/ Trees

1. Growing medium: With adequate nutrients for plants to thrive until permanently planted.
2. Plants: Centred in containers, firmed and well watered.
3. Root growth: Substantially filling containers, but not root bound, and in a condition conducive to successful transplanting.
4. Hardiness: Grown in the open for at least two months before being supplied.
5. Containers: With holes adequate for drainage when placed on any substrate commonly used under irrigation systems.

245 Labelling and information

1. General: Provide each plant/ tree or group of plants/ trees of a single species or cultivar with supplier's labelling for delivery to site, showing:
    1.1. Full botanical name.
    1.2. Total number.
    1.3. Number of bundles.
    1.4. Part bundles.
    1.5. Supplier's name.
    1.6. Employer's name and project reference.
    1.7. Plant specification, in accordance with scheduled National Plant Specification categories.
2. Additional information: Submit on request: Date supplied and consignment details or reference.

246 Labelling and information

1. Standard: To BS 3936.

260 Plant/ Tree substitution

1. Plants/ trees unobtainable or known to be likely to be unobtainable at time of ordering: Submit alternatives, stating:
    1.1. Price.
    1.2. Difference from specified plants/ trees.
2. Approval: Obtain before making any substitution.

265 A Plant handling, storage transport and planting

1. Standard: To CPSE 'Handling and establishing landscape plants'.
2. Frost: Protect plants from frost.
3. Handling: Handle plants with care. Protect from mechanical damage and do not subject to shock, e.g. by dropping from a vehicle.
4. Plant packaging: Suitable wrapping material
    4.1. Minimise plastic:: Submit proposals
5. Packaging of bulk quantities: Pallets or bins sealed with suitable wrapping material
    5.1. Minimise plastic:: Submit proposals
6. Planting: Upright or well balanced with best side to front.

280 Treatment of tree wounds

1. Cutting: Keep wounds as small as possible.
    1.1. Cut cleanly back to sound wood using sharp, clean tools.
    1.2. Leave branch collars. Do not cut flush with stem or trunk.
    1.3. Set cuts so that water will not collect on cut area.
2. Fungicide/ Sealant: Do not apply unless instructed.

285 Protection of existing grass

1. General: Protect areas affected by planting operations using boards/ tarpaulins.
    1.1. Excavated or imported material: Do not place directly on grass.
    1.2. Duration: Minimum period.

290 Surplus material

1. Subsoil, stones, debris, wrapping material, canes, ties, temporary labelling, rubbish, prunings and other arisings: Remove.

Plant containers - Not Used

Preparation of planting beds/ planting materials

300 Herbicide

1. Description: TO CLEAR EXISTING VEGETATION
2. Locations: All planting areas
3. Type: Suitable for supressing perennial weeds.
4. Timing: Allow fallow period before cultivation.
    4.1. Duration (minimum): As manufacturer's recommendation

Planting shrubs/ herbaceous plants/ bulbs

400 Random plant layout

1. Description: Woodland planting areas and hedges
2. Spacing: Refer to Eamonn Byrne Landscape Architects drawing Planting Plan CD-PP-0-01.
3. Density: As plant schedule

405 A Tree and shrub transplant planting pits

1. Timing: Excavate 1-2 days (maximum) before planting.
2. Sizes: Wide enough to accommodate roots when fully spread and 75 mm deeper than root system
3. Pit bottom improvement Break up to a depth of 150 mm, incorporating 25 g of slow release fertilizer per planting pit.

420 Climbing plants

1. Planting: 150 mm clear of supporting structure (climber support) with roots spread outward.
    1.1. Branches: Lightly secured to supports.
2. Climber supports: Softwood
    2.1. Base height: 600 mm above ground
    2.2. Extent: For Lonicera periclymenum only

480 After planting

1. Watering: Immediately after planting, thoroughly and without damaging or displacing plants or soil.
2. Firming: Lightly firm soil around plants and fork and/ or rake soil, without damaging roots, to a fine tilth with gentle cambers and no hollows.
3. Top dressing: Not required

486 A Transplant protection – woodland areas Type A

1. Description: For shrubs in woodland planting areas
2. Manufacturer: Tubex
    12-14 Aberaman Park Aberdare
    CF44 6DA
    South Wales
    UK

sales@tubex.com
+44 (0)1685 888 020

2.1. Product reference: Tubex Nature Biodegradeable Tree Shelters

3. Type: Round
4. Material: Bio-based blend
5. Size: 73-105mm x 600mm height
6. Colour: Light brown
7. Support: Single timber stake
8. General: Ensure that protection methods do not impede natural movement of shrubs or restrict growth.

486 B Transplant protection – hedges Type B

1. Description: For all transplants within new hedgerow planting
2. Manufacturer: Green-tech
Rabbit Hill Business Park
Great North Road
Arkendale
HG5 0FF
North Yorkshire
UK
sales@green-tech.co.uk
+44 (0)1423 369727

2.1. Product reference: Treebio Biodegradable Vole Spiral Guard - 160PS1109

3. Type: Spiral
4. Material: Polylactic acid based blend
5. Size: 20cm x 38mm spiral
6. Colour: Green
7. Support: None
8. General: Ensure that protection methods do not impede natural movement of shrubs or restrict growth.

Planting trees

500 Tree planting

1. Standard: Prepare trees and transplant in accordance with BS 8545

505 A Tree pits for heavy standard trees

1. Sizes: 600 mm diameter x 450 mm deep measured from the upslope side; benched on downslope.
2. Sloping ground: Maintain horizontal bases and near-vertical sides with no less than minimum depth throughout.
3. Excavated material: Separate topsoil and subsoil material and stockpile for backfilling
4. Pit bottoms: Excavate with slightly raised centre: Break up base to a depth of 150 mm.

4.1. Treatment: Not required

5. Pit sides: Scarify.
6. Backfilling material: Topsoil, compost, mycorrhizal inoculant, water retention gel and inorganic fertilizer, as section Q28.

512 Tree pit irrigation and ventilation accessories

1. Locations: For standard trees

2. Manufacturer: Submit proposals
    2.1. Product reference: Submit proposals
3. Type: Perforated plastics irrigation pipe with inlet
4. Pipe diameter: 50 mm
5. Ring diameter: 400 mm
6. Inlet: Black plastics, with cap
7. Installation
    7.1. Pipe: Lay in loop above root ball with slight fall away from inlet pipe. Trim length to ensure a close fit in the tree pit. Connect both ends of pipe securely into plastics tee junction on inlet.
    7.2. Top cap of inlet: Protruding slightly above finished surround level.
    7.3. Backfill material: Carefully compact in layers.

535 Tree stakes

1. Stakes: Softwood, peeled chestnut, larch or oak, straight, free from projections and large or edge knots and with pointed lower end.
    1.1. Preservative treatment: To provide a 20 year service life
2. Stake size (minimum): 60 mm diameter
3. Stake length (minimum): 1500 mm

550 Double staking for

1. Description: Heavy standard trees.
2. Staking
    2.1. Position: Either side of tree position and perpendicular to wind direction.
    2.2. Driving: Vertically at least 300 mm into bottom of pit before planting.
    2.3. Backfilling: Consolidate material around stake.
    2.4. Firming: Sufficiently firm to prevent movement of the rootball/ rootstock.
3. Height of stakes: Cut off at approximately one third of the height of the clear stem of tree
4. Horizontal bracing: Timber cross bar, 75 mm x 38 mm x 900 mm
    4.1. Fixing: Firmly fix using nails on windward side of tree and as close as possible to the stem without making contact with the bark. Position cross bar horizontally and 25 mm from top of stakes
5. Ties: Biodegradable natural fibre
6. Tying: Secure flexible webbing around tree stem firmly without causing constriction or chafing
7. Nails for fixing ties, belts and webbing: To BS 1202-1, galvanized, minimum 25 mm long and with 10 mm diameter heads.
8. Nails for fixing cross bars: To BS 1202-1, galvanized round wire, minimum 75 mm long and 3.75 mm gauge

570 Tree spats/ Mulch mats

1. Description: For heavy standard trees, tree and shrub transplants.
2. Manufacturer: Green-tech
Rabbit Hill Business Park
Great North Road
Arkendale
HG5 0FF
sales@green-tech.co.uk
+44 (0)1423 369727
    2.1. Product reference: Ecomatt Weed Control Fabric Mats - 150WW2580-PRO

2.2. Material: Jute and biodegradeable film

2.3. Size: 500 x 500 mm, 450g gt

3. Recycled content: 90% (minimum) to BS EN ISO 14021
4. Watering: Water soil thoroughly before laying.
5. Laying: In close contact with the soil surface.

5.1. Fitting: Neatly and closely around tree stem, where necessary cutting a slit or flap.

5.2. Fixing: Bamboo pegs

5.3. Overlay: Not required

Woodland/ matrix/ buffer zone planting

625 Cultivation

1. General: Rotary cultivate to full depth of topsoil
2. Consolidation: Leave for one month
3. Soil within root spread of trees to be retained: Do not plough or cultivate.

680 A Setting out - Woodland planting

1. Planting density: 2m grid in staggered rows.
2. Layout: Random groups of no less than 3 or more than 7 of the same species, ensuring that no three plants are aligned in any one direction.

Protecting/ maintaining/ making good defects

710 Maintenance

1. Duration: Carry out the operations in the following clauses from completion of planting until practical completion.
2. Frequency of maintenance visits: Contractor's choice

720 Failures of planting

1. Defects due to materials or workmanship not in accordance with the Contract: Plants/ trees/ shrubs that have failed to thrive.

1.1. Exclusions: Theft or malicious damage after completion.

1.2. Rectification: Replace with equivalent plants/ trees/ shrubs.

2. Replacements: To match size of adjacent or nearby plants of same species or match original specification, whichever is the greater.
3. Timing of making good: In accordance with an agreed defects rectification programme

740 Cleanliness

1. Soil and arisings: Remove from hard surfaces and grassed areas.
2. General: Leave the works in a clean tidy condition at completion and after any maintenance operations.

750 Planting maintenance generally

1. Weed control: Maintain weed free area around each tree and shrub.

1.1. Diameter (minimum): The larger of 1 m or the surface of original planting pit.

1.2. Keep planting beds clear of weeds: By use of approved non-residual herbicides.

2. Planted areas: Fork over beds as necessary to keep soil loose, with gentle cambers and no hollows. Take care not to reduce depth or effect of mulch.

3. Precautions: Ensure that trees and shrubs are not damaged by use of mowers, nylon filament rotary cutters and similar powered tools.
4. Firming up: Gently firm loosened soil around trees/ shrubs. Straighten leaning trees/ shrubs.
5. Trees: Spray crown when in leaf during warm weather.
    5.1. Timing: After dusk.
6. Tree accessories: Check condition of stakes, ties, guys, guards and irrigation and ventilation systems.
    6.1. Broken or missing items: Replace.
    6.2. Loose stakes: Re-firm in the ground or replace as necessary to provide support to the tree.
    6.3. Loose guys: Re-firm anchor points and adjust as necessary to provide support to the tree.
    6.4. Ties: Adjust to accommodate growth and prevent constriction or abrasion.
    6.5. Damage to bark: Cut back neatly with sharp knife. Prevent further damage.
    6.6. Frequency of checks: Contractor's choice
7. Watering: Contractor's choice

770 Woodland planting maintenance

1. Watering: Only as necessary to prevent plants wilting.
2. Loose plants: Refirm surrounding soil, without compacting.
3. Weed control: Cut down and remove weeds prior to setting seed in a 1 m diameter area around each tree.
4. Vegetation except trees and coppice shoots to be retained: Cut within the plantation area.
    4.1. Height (maximum): 75 mm
    4.2. Arisings: Leave between rows.
5. Mechanical, chemical or mulching methods of vegetation control: Submit proposals.
6. Ditches and drains: Keep clear.
7. Watering: Contractor's choice

780 Maintenance instructions

1. General: Before end of the maintenance period, submit printed instructions recommending procedures to be established by the Employer for maintenance of the planting work for one full year: Provide a schedule of any ongoing maintenance problems experienced during the rectification period.

Ω End of Section

Q35
Landscape maintenance

Generally

105 Maintenance objectives

1. Location: All planted and seeded areas.
    1.1. Duration: One year.
2. Aims: To facilitate establishment.
3. Restrictions: None.
4. Results: Adequate establishment.

110 Notice

1. Give notice before
    1.1. Application of herbicide.
    1.2. Application of fertilizer.
    1.3. Watering.
    1.4. Each site maintenance visit.
2. Period of notice: Seven days

130 Reinstatement

1. Damage or disturbance to soil structure, planting, grass, fencing, hard landscaping, structures or buildings: Reinstate to original condition.

155 Watering

1. Supply: No site supply available; submit proposals.
2. Quantity: Wet full depth of topsoil.
3. Application: Do not damage or loosen plants.
4. Compacted soil: Loosen or scoop out, to direct water to rootzone.
5. Frequency: As necessary for the continued thriving of all planting.

160 Water restrictions

1. General: If water supply is, or is likely to be, restricted by emergency legislation, submit proposals for an alternative suitable source of water. Obtain instructions before proceeding.

170 Disposal of arisings

1. General: Unless specified otherwise, dispose of arisings as follows:
    1.1. Biodegradable arisings: Remove to recycling facility.
    1.2. Grass cuttings: Spread evenly.
    1.3. Tree roots and stumps: Remove from site.
    1.4. Shrub and tree prunings: Leave on site in piles distributed under existing vegetation to be retained shown on Eamonn Byrne Landscape Architects drawing Planting Plan CD-PP-0-01.
    1.5. Litter and nonbiodegradable arisings: Remove from site.

190 Litter

1. Extraneous rubbish not arising from the contract work: Collect and remove from site.

195 Protection of existing grass

1. General: Protect areas affected by maintenance operations using boards/tarpaulins. Do not place excavated or imported materials directly on grass.

197 Cleanliness

1. Soil and arisings: Remove from hard surfaces.
2. General: Leave the works in a clean, tidy condition at completion and after any maintenance operations.

Grassed areas - Not Used

Flower beds/ seasonal beddings - Not Used

Shrubs/ trees/ hedges

500 A Establishment of new planting

1. Duration: One year.
2. Weed control
   - 2.1. Method: Keep transplants and heavy standard trees clear of weeds by herbicide spot treatment where weeds have established through mulch mats.
   - 2.2. Area: Maintain a weed-free area around each tree and shrub equivalent to spread of mulch mats.
3. Soil condition: Do not recultivate.
4. Watering: Contractor's choice.

510 Tree stakes and ties

1. Inspection/ maintenance times: After strong winds.
2. Stakes
   - 2.1. Replace loose, broken or decayed stakes to original specification.
   - 2.2. If longer than half of clear tree stem height, cut to this height in spring. Retie to tree firmly but not tightly with a single tie.
3. Ties: Adjust, refix or replace loose or defective ties, allowing for growth and to prevent chafing.
   - 3.1. Where chafing has occurred, reposition or replace ties to prevent further chafing.
4. Removal of stakes and ties: Not required.

520 Refirming of trees and shrubs

1. Timing: After strong winds, frost heave and other disturbances.
2. Refirming: Tread around the base until firmly bedded.
3. Collars in soil at base of tree stems, created by tree movement: Break up by fork, avoiding damage to roots. Backfill with topsoil and refirm.

530 A Tree and shrub shelters

1. Loose or defective shelters: Adjust, refix or replace to original specification and to prevent chafing.
2. Removal: Not required.

555 Pruning trees and shrubs

1. Standard: To BS 7370-4.
2. Special requirements: Prune only to remove dead, damaged or diseased material.

620 Removal of dead plant material

1. Operations: At the end of the growing season, check all shrubs and remove all dead foliage, dead wood, and broken or damaged branches and stems.

630 Dead and diseased plants

1. Removal: Within one week of notification.
2. Replacement: In the next suitable planting season.

670 Weed control with summer herbicide

1. Type: Suitable foliar-acting herbicide.
2. Timing: Allow recommended period for herbicide to take effect before clearing dead weeds.

693 Maintenance of mulch matting/ sheet mulches

1. General: Inspect and reattach or refirm mulch mats and sheet mulches.
2. Type: Biodegradeable mulch mats as clause Q31/570.
    2.1. Do not remove.

710 Woodland planting maintenance

1. Watering: In exceptional circumstances to prevent plants dying.
2. Loose plants: Refirm surrounding soil, without compacting.
3. Ditches and drains: Keep clear.

Green walls - Not Used

Tree work

825 Prevention of disease transmission

1. Standard: To BS 3998.

830 Cleaning out and deadwooding

1. Remove
    1.1. Dead, dying or diseased wood, broken branches and stubs.
    1.2. Fungal growths and fruiting bodies.
    1.3. Rubbish, windblown or accumulated in branch forks.
    1.4. Wires, clamps, boards and metal objects, if removable without causing further damage and not part of a support structure that is to be retained.
    1.5. Other unwanted objects, e.g. tree houses, swings.

835 Cutting and pruning generally

1. Tools: Appropriate, well maintained and sharp.
2. Final pruning cuts
    2.1. Chainsaws: Do not use on branches of less than 50 mm diameter.
    2.2. Hand saws: Form a smooth cut surface.
    2.3. Anvil type secateurs: Do not use.
3. Removing branches: Do not damage or tear the stem.
4. Wounds: Keep as small as possible, cut cleanly back to sound wood leaving a smooth surface, and angled so that water will not collect on the cut area.

5. Cutting: Cut at a fork or at the main stem to avoid stumps wherever possible.
6. Large branches: Remove only if unavoidable
   6.1. Remove in small sections and lower to ground with ropes and slings.
7. Dead branches and stubs: When removing, do not cut into live wood.
8. Unsafe branches: Remove epicormic shoots and potentially weak forks that could fail in adverse weather conditions.
9. Disease or fungus: Give notice if detected. Do not apply fungicide or sealant unless instructed.

865 Bark damage

1. Wounds
   1.1. Do not attempt to stop sap bleeding.
   1.2. Bark: Remove ragged edges using a sharp knife.
   1.3. Wood: Remove splintered wood from deep wounds.
   1.4. Size: Keep wounds as small as possible.
2. Liquid or flux oozing from apparently healthy bark: Give notice.

870 Cavities in trees

1. Investigation: Remove rubbish and rotten wood. Probe the cavity to find the extent of any decay, and give notice.
2. Water-filled cavities: Do not drain.
3. Sound wood inside cavities: Do not remove.
4. Cavity openings: Do not cover

Water areas - Not Used

Hard landscape areas/ fencing - Not Used

Ω End of Section

Appendix C. Contractor's Emergency Response Procedure

EMERGENCY PROCEDURE

BASIC EMERGENCY REQUIREMENTS:

Make it Safe, Stop, Contain, Notify!

Identify the cause of the emergency or incident and act immediately to prevent it from getting worse.

Make sure that appropriate PPE is available to use where necessary.

Report any emergency or incident to the Site Manager and Environmental Team immediately, detailing the nature, cause and location so that appropriate action can be taken

Contact the Local Authority as relevant to the incident.

DO NOT: • Ignore an incident

AFTER AN INCIDENT: • Ensure that any lessons from the incident are communicated to all relevant staff and appropriate action taken elsewhere on site if necessary Update all relevant Method Statements and Toolbox Talks, and ensure new information is communicated to site staff.

EMERGENCY PROCEDURE

FIRE :

Report emergency to Site Manager immediately.

Call fire brigade (the fire may only appear to be out).

Inform landowner / occupier and relevant Construction Team.

DO NOT: • Place yourself at any risk.

POLLUTION INCIDENTS

Make sure you have the appropriate PPE before taking action.

Contain a pollution incident immediately using absorbent materials and booms, or by digging containment facilities or bunds.

Report incident to site manager and the environmental manager(s) and the ECoW If required contact a spill clean-up company for appropriate assistance.

Check all nearby water bodies and watercourses to ensure if any spills or pollution has spread beyond the immediate area and take action as required

DO NOT: Dig ditches to drain polluted matter to watercourses.

Remove booms and bales used to hold polluting materials.

Ignore an incident because you are afraid of the consequences.

AFTER AN INCIDENT: All waste generated by clean-up activities should be disposed of in accordance with current legislative requirements and the site waste management plan and copies of all transfer notes retained.

EMERGENCY PROCEDURE

UNEXPECTED SEDIMENT PROBLEMS:

Check watercourses during periods of high rainfall or construction activities with potential for significant run-off.

Check for broken field drains which could lead to pollution at any time.

Take immediate action if you identify any high sediment which is causing pollution or if unsure if it is significant consult with the ECoW who should determine whether what action is needed

Adhere to mitigation measures as per the NIS Control pollution at source wherever possible. Consider whether the site activity should be halted.

Place straw bales, silt screens etc to help control sediment immediately and/or check measures already in place for efficacy

Monitor the effectiveness of protection measures daily and re-plan as necessary.

Always remove silted bales/screens etc regularly so they do not make problems worse.

Reconsider working practices which may be causing pollution in poor weather conditions and re-plan / re-programme.

Plan in water activities to take account of the risk of flooding

DO NOT: Ignore signs of pollution.

Avoid taking remedial action.

Forget to check remedial measures and replace protective measures as required.

EMERGENCY PROCEDURE

ACCIDENTAL RELEASE OF CEMENT TO WATERCOURSES

Stop the action which is causing pollution immediately

Take immediate remedial action – block spill; place booms and absorbent materials to help soak up the spill.

Inform the ECoW to identify further specific actions

Monitor effects of spill

Learn from the experience and plan site works to avoid pollution happening again.

DO NOT: Think that a concrete spill is not important.

Ignore the accident/incident.

Cover up the incident.

Repeat the action which caused the incident.

Adverse weather

Check watercourses during periods of high rainfall or construction activities with potential for significant run-off.

Consider whether the site activity should be halted during adverse weather

Take immediate action if you identify any material which is causing pollution to a watercourse

Bunds and silt fences can be setup if required

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