Glanmire Road Improvements and Sustainable Transport Works, Co. Cork

Outline Construction Environmental Management Plan

Cork County Council

Project reference: 60559532

03 May 2018
Quality information

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Senior Environmental Consultant

Revision History

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1. Introduction

The Glanmire Road Improvements and Sustainable Transport Works, Co. Cork (‘the proposed development’) is one of several initiatives of the Irish government to address significant public infrastructure deficits, where the lack of infrastructure is considered to have hindered the development of housing in the Ballinglanna, Glanmire and Dunkettle region.

The proposed development will involve a series of road improvements and pedestrian / cyclist improvements in the area of Glanmire, which is located approximately 5km to the northeast of central Cork City. The town is bounded by steep hills to the west and the M8 motorway to the east.

The proposed development is divided into 16 individual ‘projects’ which have been illustrated in the overview map Figure 1 (Appendix A). A detailed description of the proposed development is provided in Section 3.

1.1 Role of Outline and Construction Phase CEMPs

This Outline Construction Environmental Management Plan (CEMP) sets out the procedures, standards, work practices and management responsibilities to address potential environmental effects that may arise from construction of the proposed

The Outline CEMP will form part of the Contract Documents for the construction stage and remains at all times a live document. It shall be further refined and expanded by the appointed Contractor into a full Contractor CEMP as more information becomes available and more certainty in terms of the proposed layout, construction methods, programme and potential environmental impacts are confirmed. The full Contractor CEMP will be prepared prior to commencement of construction and with the approval of Cork County Council (hereafter referred to as ‘CCC’).

The Contractor CEMP shall fully address the requirements identified in this outline CEMP, and any updated or new supplementary environmental reports made available to the Contractor as necessary. The CEMP shall also comply with the requirements of the relevant authorities/environmental bodies.

The Contractor CEMP shall be developed and updated as necessary during the course of the design and construction phases, and will be reviewed on a regular basis by CCC. As an absolute minimum requirement, the CEMP shall be reviewed by the Contractor every three months and revised where necessary for submission to CCC together with any supporting information.

Notwithstanding the above requirements, the CEMP shall be reviewed by the Contractor and agreed with CCC and relevant environmental staff (including the Ecological Clerk of Works or other suitably experienced ecologist) least two weeks prior to the construction stages listed below:

- Setting-up the site compound(s);
- Commencement of each stage of the works as agreed with CCC;
- Commencement of any site activity that may potentially have an effect on wildlife or the environment; and,
- Commencement of the landscaping works.

Towards the end of the construction phase, the CEMP shall be further refined by the appointed Contractor into a Handover Environmental Management Plan (HEMP) that shall contain essential environmental information needed by CCC for the future maintenance and operation of the proposed development.

1.2 Objectives

The specific objectives of this outline CEMP and any subsequent Contractor CEMP are to:

- Act as a continuous link and reference document for environmental issues between the design, construction, testing and commissioning stages of the proposed development;
- Demonstrate how construction activities and supporting design shall properly integrate the requirements of environmental legislation, planning consent conditions, policy, good practice, and those of the environmental regulatory authorities and third parties;
- Record environmental risks and identify how they will be managed during the construction period;
- Record the objectives, commitments and mitigation measures to be implemented together with programme and date of achievement;
- Identify key staff structures and responsibilities associated with the delivery of the proposed development and environmental control and communication and training requirements as necessary;
- Describe the Contractor’s proposals for ensuring that the requirements of the environmental design are achieved, or are in the process of being achieved, during the contract period;
- Act as a vehicle for transferring key environmental information at handover to the body responsible for operational management. This shall include details of the asset, short and long-term management requirements, and any monitoring or other environmental commitments;
- Provide a review, monitoring and audit mechanism to determine effectiveness of, and compliance with, environmental control measures and how any necessary corrective action shall take place;

1.3 Scope

Given the sensitivities of the Glashaboy River, and the built and vegetated features in its environs, the primary aims of this document are the protection of water quality and protected or otherwise significant ecological and cultural heritage features.

Information on potential ecological impacts and related sensitivities of the aquatic environment has been informed by the Ecological Impact Assessment Report (EIA) (AECOM, 2018a), Appropriate Assessment Screening Report (AECOM, 2018b), and Environmental Impact Screening Report (AECOM, 2018c) produced for the proposed development.

Potential impacts to and mitigation for Archaeological and Built Heritage have been informed by the detailed impact assessment report by Irish Archaeological Consultants (IAC, 2018).
2. Regulatory & Policy Framework

2.1 Introduction

Throughout the lifecycle of any construction project, environmental management procedures are required to ensure that all appropriate legislation, policy and construction best practice are complied with, and the environmental effects of a development is minimised within best practicable means. Consideration will also be given to relevant adjacent developments in the management of future construction activities on site.

The environmental legislation, policy and best practice guidance contained within this Outline CEMP are applicable at the time of writing. However, it is acknowledged that these can be subject to change. As such, the Contractor shall be responsible for complying with current legal, policy and best practice guidance requirements applicable to their scope of works through the design and during construction of the proposed development.

Through effective implementation of the CEMP, the Contractor shall demonstrate how construction activities and supporting design will properly integrate the requirements of environmental legislation, policy, good practice, and those of the environmental regulatory authorities and third parties.

2.2 Legislation

The appointed Contractor must comply with and implement all relevant Irish and EU safety, health and environmental legislation. The Contractor shall be responsible for ensuring that any developments or changes to regulation and environmental legislation are complied with, even if they are not noted within this outline CEMP.

Irish legislation is available from the www.irishstatutebook.ie.

2.2.1 Policy & Guidance

This outline CEMP makes reference to various industry standard best practice guidance and policy documents that can be used to address significant environmental risks. In addition the National Road Authority's Construction Guidance the fourth edition of CIRIA's 'Environmental good practice on site guide' (C741; Coventry and Woolveridge, 1999) and CIRIA's ‘Control of water pollution from linear construction projects’ (C648; Murnane et al., 2006) should also be consulted for practical guidance about managing construction sites to control environmental impacts and how to deliver sustainable construction on site by effectively managing a range of environmental issues. At a minimum, the Contractor shall adhere to this guidance.

Under no circumstances will responsibility be accepted by CCC for errors, omissions or damage arising as a result of use of any of the guidance documents referred to in this Outline CEMP. It will be the Contractor’s responsibility to conform to the latest relevant guidance and policy and the level to which the guidance and policy should be adopted.
3. Description of the Proposed Development

3.1 Overview and Programme

Whilst predominately relating to widening or improvement of existing public pathways and roadways, there are significant ‘greenfield’ portions of the proposed path/cycleway which will require construction on previously undeveloped land, in addition to a series of proposed crossings of the Glashaboy River. P15 would include the construction of a shared pedestrian path and cycle way (3-4 m width; hereafter the greenway).

Subject to the relevant planning approvals, the proposed development would be constructed in 2018/2019, with an estimated construction programme lasting 6-12 months. A construction programme will be provided in the Contractor CEMP developed by the Contractor.

3.2 River Crossings

The proposed greenway would cross the Glashaboy River via new structures five times. From south to north, these proposed greenway crossings will require new bridges:

- Immediately north of the existing Glanmire Bridge (P16);
- Circa 100m upstream of Glanmire Bridge, onto low-lying undeveloped floodplain to the west of the Glashaboy River (P15);
- Circa 200m upstream of Glanmire Bridge from the floodplain onto poorly drained scrubby grasslands and gravel to the west of the Riverside Football Club (FC) playing pitches (P15).
- Circa 500m upstream of Glanmire Bridge at the northern end of Riverside Football Club (FC) near an existing weir, across to John O’Callaghan Park (P15);
- Circa 300m upstream of the previous bridge, near the meeting of the Butlerstown and Glashaboy Rivers where both banks are within John O’Callaghan Park (P15);

There will be no instream works in the Glashaboy or Butlerstown Rivers as all bridges will be clear span.

There will be no new structures across the Butlerstown River albeit several projects cross the River by existing bridges.

3.3 Drainage

The proposed road drainage will facilitate the efficient collection of surface water while minimising the impact of runoff on the receiving environment. Where possible, the surface water will be attenuated prior to discharge. The principle type of drainage system will consist of a piped network with kerb and gullies, which will be integrated into the existing drainage network. Treatment will be provided in the form of hydrocarbon and silt inceptors. The drainage will be designed in accordance with TII Standards and the requirements of Cork County Council.

3.4 Lighting

The design team has advised that lighting would be designed after Part 8 planning determination, subject to approval, and would be designed in accordance with British Standard Code of Practice for the Design of Road Lighting (BS 5489).

3.5 Individual projects (P#)

Full details of the project description (including widths of pedestrian, greenway, and road alignments, signage/and road marking requirements) are included within the Part 8 planning package. Projects may be refined during detailed design and/or as a condition of planning. The named projects are listed below; and illustrated in Figure 1 (Appendix A):

- Project No. 1 R639/Church Hill Junction;
- Project No. 2 Prohibit Right Turn M8 Merge;
- Project No. 3 Glanmire Bridge/Village;
- Project No. 4 R639/L3010/Old Youghal Road (Riverstown Crossroads);
- Project No. 5 R639/Hazelwood Road Junction;
· Project No. 6 L3010/East Cliff Road Junction;
· Project No. 7 Riverstown Bridge;
· Project No. 8 New Link Road (L3010 to Hazelwood Road);
· Project No. 9 L2999 Dunkettle Road;
· Project No.10 Flaring at Tivoli Roundabout;
· Project No.12 R639/R615 Junction;
· Project No.13 Brook Inn Junction;
· Project No. 14 Footway Improvements Fernwood to Riverstown;
· Project No. 15 Proposed Greenway;
· Project No. 16 Glanmire Bridge; and,
· Project No. 20 East Cliff Road Pinch Point.
4. **Roles & Responsibilities**

The Contractor shall employ a suitably experienced and qualified Construction Environmental Management Plan Co-ordinator (CEMPC) or Environmental Site Representative (ESR) to undertake co-ordination and implementation of the Contractor’s CEMP, in respect of all environmental requirements. The CEMPC or ESR shall be present on-site whenever work is in progress.

The CEMPC/ESR shall be the point of contact for dealing with environmental issues for CCC, the Contractor’s employees, sub-contractors, relevant authorities/environmental bodies, and members of the public. The CEMPC/ESR will also be responsible for controlling the construction impacts arising from the activities of the Contractor and his sub-contractors in accordance with the CEMP.

The CEMPC/ESR should be a Chartered Member (CEnv or CEcol) of the Chartered Institute of Ecology and Environment Management (CIEEM), the Institute of Environmental Management and Assessment (IEMA), Chartered Institution of Water and Environmental Management (CIWEM) or hold an equivalent professional qualification in the ecological and environmental field. Whilst the CEMPC/ESR may have specialist experience in one particular field, they shall also be experienced generally, in the wider aspects of ecology and environmental management.

A CEMPC/ESR shall be ‘on call’, available 24 hours per day and shall be aware at all times of activities being undertaken on site. They shall maintain a daily log, recording all environmental issues, events and dealings with third parties. The ESR(s) need not be as widely experienced as the CEMPC, but shall be equally well qualified.

The CEMPC/ESR shall prepare, implement, manage, review and revise the versions of the CEMP with the sole purpose of ensuring that the environment is safeguarded at all times from anticipated or unexpected adverse impacts during construction.

Details of the proposed CEMPC/ESR shall be included within the CEMP. Should the Contractor wish to appoint an alternative member of staff to the role of CEMPC/ESR, details shall be submitted to CCC for approval at least 28 days prior to the proposed date for the change in personnel and included within the CEMP.

In general, the duties of the CEMPC/ESR shall include the following:

- Implementation of the CEMP procedures;
- Routine environmental monitoring, recording and reporting;
- Maintaining and auditing the CEMP and documents that underpin it;
- Environmental training including daily toolbox talks to site staff and design staff; and,
- Any other activities that may be necessary in order to protect wildlife and the environment during the works.

In addition, other environmental specialists as listed in Table 1 must be available to provide advice on the CEMP during construction.

4.1 **Role of Ecological Clerk of Works**

The Ecological Clerk of Works (ECoW) will be available throughout construction to advise on mitigation implementation. The ECoW will advise the Contractor on ecological licensing requirements; for instance relating to disturbance of features with suitability for roosting bats, or habitats containing invasive species, amphibians, or nesting birds.

The ECoW will also advise so that all construction works are carried out adopting good practice at all times in relation to ecological issues. The ECoW will advise the Contractor on ecological licensing requirements; for instance relating to disturbance of features with suitability for roosting bats, or habitats containing invasive species, amphibians, or nesting birds.

The ECoW will also advise where specialist sub-consultants are required to complete pre-construction surveys identified below (e.g. for bats or rare flora).

4.2 **Role of Archaeological Clerk of Works**

As stated in IAC’s 2018 report, a suitably qualified archaeologist will be available throughout construction to advise on mitigation implementation. The archaeologist will supervise relevant monitoring and advise the Contractor on archaeological licensing requirements; for instance relating to disturbance of archaeological features.

The archaeologist will have full provision made available for the resolution of any archaeological remains that may be identified, should that be deemed the appropriate manner in which to proceed.
### Table 1. Key Contractor Team Roles and Responsibilities (indicative)

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| Contractor’s Project Director | - Assign specific environmental duties to competent members of the Contractor’s Team.  
- Identify the environmental training needs of personnel under their control and arrange appropriate training programmes and ensure records are being maintained.  
- Ensure that significant environmental aspects identified for the proposed development are managed.  
- Promote the continual improvement of environmental performance. |
| CEMP Coordinator              | - Develop, maintain and audit the CEMP (and supporting documents/plans) to ensure all aspects, impacts, statutory requirements and Environmental Statement commitments etc. are reflected in the Plan.  
- Develop and implement a programme of regular environmental inspections, monitoring, recording and reporting by the Environmental Site Representative(s) in accordance with procedures set out in the CEMP.  
- Ensure that the works are constructed in line with the CEMP.  
- Liaise with CCC.  
- Attend regular construction meetings to ensure environmental issues are discussed and addressed by the Contractor’s Team.  
- Comply with duties under relevant legislation and company procedures in relation to environmental incident investigation and reporting.  
- Provide support and training to the workforce with regard to understanding environmental aspects, impacts, regulatory requirements, best practice, constraints and methods of working.  
- Nominate the Environmental Site Representative(s).  
- Appoint environmental specialists as required.  
- Ensure identified environmental specialists are in attendance on-site as required by the CEMP.  
- Review non-conformance reports provided by the Environmental Site Representative(s) and/or CCC’s Environmental Advisors to identify any underlying issues or patterns to identify suitable ameliorative measures. |
| Environmental Site Representative(s) | - Provide an on-call 24hr resource as a first point of contact for environmental issues/incidents.  
- Complete programme of regular environmental inspections, monitoring, recording and reporting in accordance with the CEMP.  
- Provide direction on corrective action to be taken by the Site Manager in response to identified non-conformances.  
- Report all identified non-conformances separately to CCC and the CEMPC.  
- Ensure that corrective actions are completed fully by the Site Manager.  
- Maintain daily records of environmental issues, events and consultations with third parties.  
- Ensure identified environmental specialists are in attendance on-site as required by the CEMP.  
- Maintain records of environmental awareness training/inductions delivered to site staff. |
| Contractor’s Project Manager  | - Ensure that the CEMP is produced, maintained and implemented and distributed to all relevant parties.  
- Monitor the completion of corrective actions by the Site Manager and take action as required to expedite completion.  
- Ensure that all personnel for whom they are responsible are aware of the CEMP and implement the relevant requirements.  
- Evaluate the competence of all sub-contractors and suppliers and ensure that they are made aware of, and comply with the CEMP and associated procedures. |
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| **Site Manager** | - Establish a consultation and communication system with all relevant interested parties associated with the proposed development, including employees, partners, sub-contractors, designers and third parties, etc., where relevant.  
- Ensure that all personnel undergo suitable and sufficient environmental induction before starting work, and periodic refresher environmental awareness training throughout the construction phase.  
- Ensure staffs attend the appropriate environmental courses that are organised by the Environmental Manager (CEMPC). Ensure the Environmental Manager is maintaining records of training delivered to site staff.  
- Monitor the performance of personnel and activities under their control and ensure arrangements are in place so that all personnel can work in a manner which minimises risks to them and to the environment.  
- Undertake a programme of regular environmental inspections in liaison with the Environmental Site Representative(s).  
- Provide resources and support to complete corrective actions identified by the Environmental Site Representative(s) and provide status reports as required to CCC.  
- Assist and support the Environmental Manager (CEMPC) and statutory bodies in the investigation of any incidents.  
- Notify the Environmental Site Representative(s) of all environmental issues or incidents arising over the course of operations. |
| **Environmental and Archaeological Specialists (including Ecological Clerk of Works (ECoW) and Suitably Qualified Archaeologist)** | - Attend site as required to monitor the protection of assets in accordance with the requirements of relevant legislation, the construction contract and the CEMP.  
- Identify potential risks (including those triggering licensing) to wildlife (ECoW) and archaeological features (suitably qualified archaeologist), and develop suitable control measures.  
- Provide status reports and updates to the Site Manager and Environmental Site Representative(s) in the completion of their activities.  
- Liaise with the Environmental Site Representative(s) as required to provide specific training to site staff. |
4.3 Awareness and Training

Environmental training should be provided to site construction personnel to inform them of their responsibilities and liabilities with reference to protection of water quality and ecology. Training should include office-based workshops prior to commencement of site works, site-based Toolbox talks prior to or during the works, or use of notice boards in site offices to display important information. Key environmental topics to address in toolbox talks are included in Appendix C.

All staff will have been trained in site-specific environmental protection during daily pre task talks; including use of spill kits (installation and removal of terrestrial booms and the use of plastic sheeting, upon which contaminated soil is placed to prevent leaching to groundwater), silt fencing installation and maintenance, and emergency response protocols.

All site personnel shall have FAS ‘Safe Pass’ certification. Training records (including toolbox talks) shall be retained and available for inspection upon request.

4.4 Interaction with Licensing and other Plans

The CEMPC/ESR shall oversee and advise the Contractor on compliance with additional requirements to the CEMP including licensing requirements, mitigation measures and monitoring requirements specified in the following:

- Air Quality Management Plan;
- Water Quality Management Plan;
- Noise and Vibration Management Plan;
- Traffic Management Plan;
- Waste Management Plan;
- Landscape management Plan;
- Invasive Species Management Plan; and,
- Soil Management Plan.
5. Method Statements

An environmental review will be carried out to ensure all risks and emergency equipment required for works tasks are identified in method statements.

Task-specific method statements will be developed by the Contractor and Inland Fisheries Ireland where appropriate (e.g. silt protection measures to protect sensitive watercourses). Task-specific method statements will include as a minimum:

- Setting out of the works area;
- Silt fencing installation;
- Vegetation clearance; and,
- Earthworks.
6. Programming of Works

6.1 Planning of Works by Watercourses to Minimise Siltation

Works to P3, P5, P7, P10, P15, P16 and P17 (Figure 1; Appendix A) are located adjacent to watercourses and should be planned for dry periods and these works should cease during extended periods of heavy rainfall, as defined and agreed between the Contractor, the ECoW and the local authority.

Vegetation clearance and soil stripping of land should also be phased to limit the quantum of soils exposed at any time.

Excavations will only remain open for the shortest possible time to reduce groundwater ingress;

6.2 Seasonal Restrictions for Ecological Features

Species-specific seasonal restrictions on construction activities will be put in place as outlined in Table 2. The ECoW will advise the Contractor on site-specific application of these restrictions to individual projects
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<th>Ecological Feature</th>
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<th>May</th>
<th>Jun</th>
<th>July</th>
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<td>Nesting birds in vegetation, bridges and stonewalls</td>
<td>Clearance of vegetation</td>
<td>Nesting bird season</td>
<td>Clearance of vegetation</td>
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<td>and works to structures permitted</td>
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<td>No clearance of vegetation or works to relevant structures permitted unless confirmed to be devoid of nesting birds by an ecologist</td>
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<tr>
<td>Bat: Trees and structures (Glanmire Bridge) with suitability for roosting bats</td>
<td>Bat hibernation season</td>
<td>Intrusive works to potentially suitable features may take place, subject to advice of ecologist</td>
<td>Bat breeding season</td>
<td></td>
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<td>No intrusive works to trees or structures unless ecologist advises otherwise (note 1)</td>
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<td>Vegetation removal and earthworks at sensitive locations (projects adjacent to the Glashaboy River (including P3, P15, P16, P17 and Riverstown Rivers (including P5, P7, and P12))</td>
<td>High siltation potential</td>
<td>Top soil can be stripped subject to advice of ecologist on mitigation to minimise siltation</td>
<td>High siltation potential</td>
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<td>Exposure of bare soils to be avoided, unless ecologist advises appropriate protections are in place</td>
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<td>Wetlands with potential for common frog spawn (P15: wet grasslands and Riverside FC ditches/pond)</td>
<td>Frog spawning season</td>
<td>Works can proceed, subject to advice of ecologist who may require protection of surrounding refugia habitats</td>
<td>Smooth newt breeding season</td>
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<td>No removal of wetland habitats with newts, unless licensed translocation has been completed and ecologist advises works may proceed</td>
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<td>Wetlands with potential smooth newt breeding populations (P15: Riverside FC ditches/pond)</td>
<td>Works can proceed, subject to advice of ecologist who may require protection of surrounding refugia habitats</td>
<td>Smooth newt breeding season</td>
<td>Works can proceed, subject to advice of ecologist who may require protection of surrounding refugia habitats</td>
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6.3 Schedule of Works Operation Record (SOWOR)

A ‘Schedule of Works Operation Record’ (SOWOR) is a document format which can be used to programme individual work tasks, and audit compliance of works with planning conditions and law relating to environmental protection. A sample of a SOWOR is included in Appendix B.

The SOWOR will be maintained by the ECoW. However, the Contractor will comply with the requirements of the SOWOR as instructed by the ECoW. Any changes to the SOWOR will be agreed between the Contractor, the local authority and the ECoW during the course of the works.

Digital copies of the SOWOR, method statements, and all other project documentation will be maintained by the contractor at their site offices. Hard copies of the SOWOR and method statements including maps will be held in vehicles on-site by both the ECoW and the Contractor(s) (i.e. a copy held by each).

The draft SOWOR contains a row for each work item.

Once the Contractor’s programme has been developed, and during works when the programme changes, it will be the Contractor’s responsibility to:

- Update the numbered work tasks in the draft SOWOR to identify all activities to be executed, and the estimated durations for same; and
- Communicate any changes in the programme to the ESR before work tasks commence to allow time to plan for changes to the supervision schedule.
7. Environmental Impacts and Mitigation Requirements

7.1 General Site Management

7.1.1 Working Hours/Periods

On-site construction works shall be permitted to take place between 07:00hrs and 19:00hrs Monday to Friday and between 08:00hrs and 13:00hrs on Saturdays.

Working outside these hours will only take place in exceptional circumstances or when the Contractor is working adjacent to operational areas and disruption to sensitive receptors and sensitive core activities associated with operation of the other areas is kept to a minimum.

7.1.2 Site Housekeeping

- Good housekeeping is an important part of good environmental practice and helps to maintain a more efficient and safer site. The site should be tidy, secure, and have clear access routes that are well signposted. The appearance of a tidy, well-managed site can reduce the likelihood of theft, vandalism, complaints and/or specific hazards that could affect the safe operation of the other businesses in the area, such as bird hazards and wind-blown litter.

- As outlined in the fourth edition of the Construction Industry Research and Information Association’s (CIRIA’s) ‘Environmental good practice on site guide’ (C741), when considering good housekeeping, the Contractor will implement the following steps:
  - Adequately plan the site with designated areas of materials and waste storage;
  - Segregate different types of waste as it is produced and arrange frequent removal;
  - Keep the site tidy and clean;
  - Ensure that no wind-blown litter or debris leaves the site, use covered skips to prevent wind-blown litter;
  - Keep hoardings tidy – repair and repaint when necessary, removing any fly posting or graffiti;
  - Frequently brush-clean wheel washing facilities;
  - Keep roads free from mud by using a road sweeper; and,
  - Ensure site is secure.

7.1.3 Equipment

The following equipment will be maintained in proper working order at the Contractor’s compound and/or works locations in quantities as appropriate for the Project:

- Wheel washer facility (including bowser to fill, and another bowser to empty);
- Foot bath with ‘Virkon’ disinfectant;
- Silt fencing (double layer) to the specification of Hytex Terrastop premium standard;
- Sand bags (marked bags, double-bagged; non calcareous, washed sand only; bags under-filled to allow easy covering with new bags as required);
  - Used in lieu of silt fencing where required due to sightlines;
  - In combination with silt fences where embedment must be avoided near sensitive habitats; and
  - As a bund around the refuelling and wheel wash.
- Two sets of new, clean empty sandbags to provide a third layer to double-bagged sandbags where the ECoW determines this is required due to deterioration;
- One spill kit will be maintained at the site compound, and will contain;
  - Terrestrial oil booms (80mm diameter x 1000mm; 10 no);
  - Water booms and attachment clips (130mm diameter x 3000mm; 10 no.); and
  - Oil soak-up granules (minimum 10 no. 20 litre bags);
• Each work crew will also carry a mobile spill kit as specified under method statements.

7.2 Ecology
A summary of the key ecological baseline data is included in Appendix E.

7.2.1 Key Potential Ecological Impacts
In the absence of mitigation measures, and as stated in the EcIA accompanying the Part 8 planning package, construction of the proposed development could result in:

• Pollution of aquatic habitats and species in the Glashaboy and Butlerstown Rivers and associated designated sites downstream in the Glashaboy Estuary/Lough Mahon;
• Net loss and damage of hedgerows, treelines, woodland plantations, wet grasslands, dry grasslands (including road verges);
• Loss of rare or protected plant species (if found to be present by pre-construction surveys);
• Spread of several invasive plant species known to occur within the proposed development footprint;
• Disturbance and/or injury to the nests, eggs, or individuals of several species of breeding birds potentially including species of high conservation concern such as grey wagtail;
• Disturbance and/or injury to amphibians (assumed present); and,
• Disturbance and/or injury to roosting bats (if present) in trees and structures identified as having suitability for roosting bats.

7.2.2 Ecological Mitigation Measures

7.2.2.1 Ecological Clerk of Works
The ECoW should as a minimum be:

• A Full member of the Chartered Institute of Ecology and Environmental Management;
• A Chartered member of a relevant environmental institute; and,
• A holder of relevant protected species licenses.

The ECoW will advise where specialist sub-consultants are required to complete pre-construction surveys identified below (e.g. for bats or rare flora).

7.2.2.2 Pre-construction Surveys
As per the EcIA Report (AECOM, 2018a) the following pre-construction surveys will be required to inform the ecological mitigation measures in the detailed CEMP:

• Arboricultural surveys;
• Rare flora surveys;
• Surveys of trees with suitability for roosting bats;
• Surveys of two houses with suitability for roosting bats;
• Surveys at river crossing points for otter breeding or resting sites;
• Surveys of common frog and smooth habitats (if seasonal restrictions on working in wetland habitats cannot be accommodated); and,
• Surveys of nesting bird habitats (if seasonal restrictions on vegetation clearance cannot be accommodated).

7.2.2.3 Physical Protection of Sensitive Habitats
The ECoW will advise the contractor on habitats in sensitive areas which should be demarcated with orange barrier fencing to protect them from construction activities. These will include relevant features on EcIA Figures 2 A-E (Appendix A); for instance the semi natural grassland adjacent to P5, the complex of drainage ditches and the pond at Riverside FC (P15), and mature trees throughout.

Provision of sufficient protection for trees is to be retained in areas close to construction works (as described in BS 5837:2012).
Grasslands and other semi-natural areas will not be used for storage or parking.

7.2.2.4  Birds

The proposed development site and environs is considered likely to contain, as a minimum, breeding populations of the species of 'Medium' and 'High' conservation concern.

To avoid committing an offence by disturbing nesting birds, their eggs or young, vegetation clearance will be restricted to the non-breeding season (i.e. clearance must be carried out from September to February inclusive). Vegetation clearance must be programmed in advance of earthworks, which is scheduled for spring/summer at times likely to have reduced rainfall. For the avoidance of doubt, it should be noted that birds may nest in field margins and low hedging, in addition to trees.

Where clearance is required during the restricted period, the ECoW or other suitably experienced ecologist will advise the Contractor on measures required to avoid disturbing nesting birds, eggs or young (e.g. establishing exclusion areas around probable nesting locations around which clearance may proceed). Nesting surveys will have a ‘shelf-life’ of three days within which clearance must be completed, after which surveys must be repeated.

7.2.2.5  Amphibians

A network of drainage ditches and a pond within the proposed development site provide potential breeding potential for the common frog and smooth newt. Additional suitable frog spawning sites were noted in wet grasslands. Both species are subject to similar protection under the Wildlife.

To minimise the potential for disturbance of common frog spawn during site clearance or topsoil stripping works, mitigation is required where such works occur during the breeding season for both species (i.e. January to March for the common frog and March to August for the smooth newt). If works are required during this period, the ECoW or other suitably experienced ecologist will search wetlands within the footprint of the proposed works for frogs/frog spawn and smooth newts prior to commencement of works, or otherwise advise the Contractor on appropriate mitigation measures.

The ECoW or other suitably experienced ecologist will determine if a derogation licence is required from the NPWS and, having obtained any relevant licences, translocate the frog spawn or eggs outside of the footprint, to areas of retained wetland (so-called receptor sites). The ECoW or other suitably experienced ecologist will instruct the Contractor to provide signage and temporary fencing at all such receptor sites. These receptor sites should remain fenced for the duration of construction.

7.2.2.6  Bats

A task-specific method statement will be developed to identify the trees of moderate or high suitability for roosting bats located within or adjacent to the working area. These will be demarcated using orange barrier fencing around the root protection zone.

Roosting bats (trees)

Any trees with moderate or high suitability to roosting bats which are proposed for felling will have been subject to pre-construction surveys following BCT survey guidance (Collins, 2016).

Where pre-construction surveys do not confirm presence of roosting bats and subject to agreement with the NPWS, trees should be control-felled in accordance with the guidance of the NRA (2006b) on the treatment of bats during construction.

If surveys do confirm presence of roosting bats, felling protocols (and associated mitigation) would depend on the numbers and species present, and would be subject to licensing from the NPWS. Measures could include licensed endoscopic inspections of potential roost features immediately prior to felling.

Roosting bats (structures)

The two Dunkettle Road properties of moderate suitability to roosting bats which are proposed for demolition will have been subject to pre-construction surveys following BCT survey guidance (Collins, 2016). Where these surveys do not confirm presence of roosting bats and subject to agreement with the NPWS, buildings may be demolished in accordance with the guidance of the NRA (2006b) on the treatment of bats during construction.

If surveys do confirm presence of roosting bats, protocols for demolition (and associated mitigation) would depend on the numbers and species present, and would be subject to licensing from the NPWS. Measures could include hand removal of tiles under supervision of an ecologist licensed to handle bats.
7.2.2.7 Invasive species

An Invasive Species Management Plan will be produced by the appointed Contractor to advise CCC on the appropriate methods for removal of Japanese knotweed, giant knotweed, three-cornered garlic, two-spined acaena, and winter heliotrope.

The Contractor will fence areas of invasive species shown in the EcIA maps (Figure 2A-E), and any additional areas highlighted by pre-construction surveys. The Contractors will place suitable signage to alert site personnel of the presence of invasive species. Works in these areas containing invasive species may not take place until the Invasive Species Management Plan has been implemented, and the local authority and ECow have advised it is safe to do so.

The Contractor will consult closely with CCC on options to minimise cost and programme impact, having regard for the ongoing treatment of knotweed populations within the footprint of the proposed development. The areas of knotweed and three-cornered garlic present are significant, and costs to remove material to landfill may be prohibitive. The extents of land required as receptor sites for buried or bunded above-ground material would be considerable, and an ecologist will be consulted to assess the potential impact from works to bury or bund invasive material.

7.3 Landscape Mitigation

A summary of the key landscape baseline data is included in Appendix E.

The Contractor shall develop a Landscape Management Plan (LMP), to be agreed with CCC and the ECow or other suitably experienced ecologist to ensure mitigation adheres to ‘A Guide to Landscape Treatments for National Road Schemes’ (TII, 2006). Appropriate consultation with the relevant local authority and statutory agencies should be carried out.

The LMP will include relevant compensatory habitat creation and enhancement proposals from the EcIA, as agreed with CCC (AECOM, 2018a), which are summarized in Table 3 below:

Table 3. Areas, lengths, and specifications of compensatory habitat provision required

<table>
<thead>
<tr>
<th>Habitat (Fossitt Code)</th>
<th>Area of Special Conservation Importance in Cork</th>
<th>Area/Length of loss</th>
<th>Area/Length of compensation required</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry Meadows (GS2)</td>
<td>Dry calcareous grassland</td>
<td>3,000 m²</td>
<td>4,500 m²</td>
<td>Species-rich mix; specification, to follow “MM10 Wildflower Seed Mixture for Brown Earths” (or similar). Cutting (and removal of arisings) will be required by CCC park staff as per seed mix instructions.</td>
</tr>
<tr>
<td>Wet grassland (GS4)</td>
<td>Species-rich grassland</td>
<td>700 m²</td>
<td>1050 m²</td>
<td>Species-rich mix; specification, to follow “EC05 Wetland Wild Flora” (or similar). Cutting (and removal of arisings) will be required by CCC park staff as per seed mix instructions;</td>
</tr>
<tr>
<td>(Mixed) woodland plantation (WD1)</td>
<td>None</td>
<td>3,300 m²</td>
<td>5,000 m²</td>
<td>Native canopy (ash, alder, hawthorn, wych elm, pedunculate oak) and understory species hazel, blackthorn, holly, wild privet, dog-rose. Woodland of Salix cinerea and Alnus glutinosa to match existing. Ground flora will seed in from adjacent areas.</td>
</tr>
<tr>
<td>Wet woodland (WN4)</td>
<td>None</td>
<td>2,000 m²</td>
<td>4,000 m²</td>
<td>At least 5 species per 30 m section from mix of native canopy (ash, alder, hawthorn, wych elm, pedunculate oak) and understory species hazel, blackthorn, holly, wild privet, dog-rose, sweet-briar Rosa rubiginosa. Field layer seed mix specification, advice to follow “EC04 Hedgerow Wild Flower Mixture1” (or similar).</td>
</tr>
</tbody>
</table>

1 Source: Design By Nature - Monavea, Carlow, Available from http://www.wildflowers.ie/mixes/ec/ec05.htm”. Accessed April 2018
7.4 Archaeology Architecture and Cultural Heritage

7.4.1 Key Potential Impacts from Archaeology, Architecture and Cultural Heritage

The reader is referred to the detailed impact assessment by IAC (2018), the summary findings of which (reported in the report section entitled ‘abstract’) are that:

“No adverse impacts are predicted upon the archaeological or architectural resources as a result of a number of the proposed schemes going ahead. This is due to the developed suburban nature of the portions of the study area. The proposed works associated with the realignment of the Dunkettle Road; a new bridge at Glanmire and works to the south of Glanmire House, will have a number of direct impacts on the existing built heritage resource and the potential archaeological resource.”

IAC’s (2018) report states the following specifics regarding potential impacts along the Dunkettle Road (Projects 2, 9, 16):

- “The western side of the Dunkettle Road will be maintained as part of the proposed schemes. As such, the demesne walls (that survive) that are associated with Dunkettle House and Woodlands, will remain in situ. This includes the principal entrance into Dunkettle House (protected structure). The vernacular terrace on the western side of the road will also be preserved, along with the red brick recessed entrance to The Rectory.

- As part of the road realignment there will be an adverse impact on a modified vernacular house and vernacular cottage on the eastern side of the Dunkettle Road. This will be caused by the demolition of the structures. As part of the road realignment, sections of the demesne wall associated with Ballinglanna House will be subject to negative adverse impacts due to their removal as part of the proposed scheme. This includes the gated entrance to the west of the entrance into Ballinglanna House and the more recent entrance into Ballinglanna House.

- As part of the proposed scheme an area of greenfield will be impacted upon to the north of the existing Dunkettle Road. It is possible that ground works associated with the proposed scheme may impact on buried features of archaeological potential that may survive beneath the current ground level with no surface expression.

- The proposed scheme will involve the removal of a section of stone-built wall along the northern edge of the Dunkettle Road. The wall is poorly preserved, having been affected by the insertion of modern entances.

- The proposed scheme will result in a direct and adverse impact on the boundary wall associated with the semi-detached houses that are listed as protected structures in Glanmire village.

IAC’s (2018) report states the following regarding potential impacts to Glanmire Bridge and Glanmire House (Project 3):

- Glanmire Bridge, which is a protected structure and a recorded monument, will be retained as part of the proposed schemes. However, a new bridge will be erected to the north of the existing structure, which will have an adverse indirect impact on the setting of the existing bridge.

- Furthermore, it is possible that the construction of the new bridge may adversely impact on archaeological deposits or artefacts that have the potential to survive within the channel and banks of the Glashaboy River.

- To the west of Glanmire Bridge, the realignment of pedestrian access will result in an adverse impact on the demesne wall associated with Glanmire House (protected structure). The wall will be removed as part of the proposed works.”

7.4.2 Mitigation Measures

As stated by IAC (2018), all proposed mitigation measures are subject to approval by the National Monuments Service of the Heritage and Planning Division, Department of Culture, Heritage and the Gaeltacht and Cork County Council.

The reader is referred to the drawings in the impact assessment report by IAC (2018), which accompany the following measures therein:

Projects 1, 2, 3, 9, 16

- “It is recommended that following the removal of the remains of the demesne wall associated with Rich mond, that a replacement wall be constructed to form the boundary between the demesne and the new..."
road. The wall should be of random rubble construction, reusing the stone on site if possible. In addition, the gate pillars associated with the secondary entrance should be relocated and re-used at the new entrance into the house.

- The recessed entrance associated with the protected former principal entrance into Richmond should be incorporated into the scheme. Due to the poor condition of the gateway, this area should be cordoned off during construction works and a condition survey should be carried out prior to works proceeding in order to ensure that vibration from the proposed works does not lead to the collapse of the walls.

- It is recommended that a written and photographic record is made of the interior and exterior of the two structures that will be demolished on the eastern side of the Dunkettle Road. This should be carried out by a suitably qualified historic buildings specialist.

- At Ballinglanna, due to the presence of the proposed four armed junction, it is unlikely that the demesne walls that will be impacted upon can be reconstructed as new boundary treatments. However, where possible random rubble stones walls should be established as road boundaries in order to maintain the character of the area.

- It is recommended that all topsoil stripping within the footprint of the newly aligned Dunkettle Road is subject to archaeological monitoring. This should be carried out by a suitably qualified archaeologist with full provision made available for the resolution of any archaeological remains that may be identified, should that be deemed the appropriate manner in which to proceed.

- No further mitigation is deemed necessary in relation to the northern boundary wall along the Dunkettle Road or the boundary walls to the west of the protected structures in Glanmire. The removal of same will not impact on the character of the structures.

- It is recommended that a full measured and photographic survey be carried out of the northern elevation of Glanmire Bridge, prior to the erection of the new bridge. This should include the setting of the structure and be carried out by a suitably qualified historic buildings specialist and surveyor.

- It is recommended that should the new bridge at Glanmire require in channel works, that an underwater archaeological assessment be carried out along the relevant section of the river to be impacted upon. This should be carried out under licence to the DoCHG and may result in further archaeological mitigation, such as preservation in situ or by record and/or monitoring.

- It is recommended that, where possible, the demesne wall associated with Glanmire House, be rebuilt in order to help maintain the overall character of the area.

**Project 15**

- If any riverbank works required as part of the four new bridges across the Glashaboy River, it is recommended that an underwater archaeological assessment be carried out. This should be carried out under licence to the DoCHG and may result in further archaeological mitigation, such as preservation in situ or by record and/or monitoring.

- It is recommended that any topsoil stripping required for the proposed greenway is subject to archaeological monitoring. This should be carried out by a suitably qualified archaeologist with full provision made available for the resolution of any archaeological remains that may be identified, should that be deemed the appropriate manner in which to proceed.

**Projects 46 and 8**

- It is recommended that any topsoil stripping that is required is subject to archaeological monitoring. This should be carried out by a suitably qualified archaeologist with full provision made available for the resolution of any archaeological remains that may be identified, should that be deemed the appropriate manner in which to proceed.

**Projects 4, 5, 7, 10, 12, 13, 14, 20**

- No mitigation required.
7.5 Surface Water

Watercourses are mapped in Figure 3 Appendix A. A summary of the relevant baseline data to archaeology architecture and cultural heritage is included in Appendix E. The proposed development crosses the Riverstown River (once), the Glashaboy River (five times), and is elsewhere located adjacent to the Glashaboy River and its tributary the Butlerstown River. All these rivers discharge into the transitional waters of the Glashaboy River Estuary and eventually Lough Mahon in Cork Harbour downstream.

The construction phase of the proposed development could result in increased siltation of the surrounding waterbodies. In particular P8, P9, P15 and P16 (Figure 1; Appendix A) may lead to increases in siltation when felling trees, removing other vegetation, or exposing soils close to the Glashaboy River. The following section details mitigation measures focused on treatment of surface water during construction. This section prescribes the mitigation measures necessary for the Contractor to minimise impacts and monitor effects upon the water environment during construction.

7.5.1 Water Quality Management Plan

The Contractor shall be responsible for developing a Water Quality Management Plan (WQMP) that relates to its construction activities. The WQMP should be included within the CEMP. The Plan shall apply to all works carried out by the Contractor and any sub-contractors under its control, and should be agreed between the Contractor, Inland Fisheries Ireland, and the local authority.

The Contractor shall include procedures for dewatering the site during construction works in the WQMP. The WQMP will also address licensing requirements, monitoring requirements, discharge points and maintenance requirements in relation to the management of surface water.

The WQMP should include specifics on the technical specification, installation, and maintenance of silt fencing, and other pollution control tools. Any deviation from the agreed WQMP should be reviewed and agreed by all parties including Inland Fisheries Ireland.

7.5.2 In-Stream Works

In-stream works will be avoided in all areas through the use of clear span structures.

7.5.3 Mapping of Sensitive Areas

The Contractor will clearly identify the Glashaboy and Riverstown Rivers on all maps in method statements and site plans, in addition to the ditches, pond, and wet grassland habitats identified in the EcIA mapping (Appendix A).

7.5.4 Measures to Minimise Siltation

7.5.4.1 Use of Silt Fencing

The first step towards preventing silt pollution from the proposed development shall be to minimise the generation of silt-laden runoff. This can be achieved by the Contractor carefully planning the site works so that activities likely to generate silt-laden runoff are carried out during drier weather, and erosion of surface soils and excavations is controlled. The second step is to treat surface water containing silt prior to it entering watercourses. Emergency response measures are required in the event that either of these two steps fail.

Prior to commencement of construction, a double layer of high-performance silt fencing will be installed between sources of siltation and watercourses where vegetation clearance, temporary stockpiling of soil or other materials, or access/egress routes are required. Alternate silt protection measures will be required where the installation of timber posts is not feasible (i.e. on hardstanding; see Section 7.5.4.2 below).

Silt fencing should be to the specification of Hytex Terrastop premium standard (Appendix D) or similar.

The Contractor shall produce site-specific method statements for the removal of vegetation for projects adjacent to the Glashaboy River (including P3, P15, P16, P17) and Riverstown Rivers (including P5, P7, and P12) (see Figure 1; Appendix A) pose the greatest risk of siltation, particularly during or following heavy rain or flood conditions.

7.5.4.2 Measures where Silt Fencing Impractical

Where silt fencing cannot be installed (i.e. areas of hard standing), straw bales or other measures will be adopted to prevent silt-laden water from flowing overground or via the existing network into watercourses. Additional potential measures or a combination of potential measures for individual projects will be outlined in the WQMP but may include the following:
- Infiltration through grassland;
- Settlement tanks;
- Filtration through straw bales;
- Use of flocculants; and/or,
- Use of hessian material.

7.5.4.3 Discharges
The Contractor shall determine if a discharge consent is required for the discharge of groundwater or surface water arising from pumping, if required;

7.5.5 Vegetation Removal and Soil Management
As a minimum, the Contractor shall:

- Put in place measures that will minimise erosion by reducing disturbance and stabilising exposed materials;
- Minimise areas stripped of vegetation using a phased approach during the planning and construction phase;
- Fell trees only once a Permit to Fell has been filled in, submitted and approved by the relevant parties;
- Removal of hedges and trees in winter, cutting of vegetation to maintain short sward will also reduce run-off and erosion;
- Consideration shall be given to ground water level and ground saturation to prevent excessive overland flow and associated scouring and mobilisation of suspended solids; and,
- Consider, and document, control measures to minimise the release of mobilised sediment which results, despite the erosion control measures.

7.5.6 Refuelling and Storage practices
Proper use and storage of oils, fuels and other materials shall include the following measure:

- Plant/machinery shall be re-fuelled at the site compound at the start of each working day and additionally as required (refuelling will take place at least 50m from all watercourses). Drip-trays will be employed at the refuelling location within the compound, and the spill kit will be kept there for the duration of the contract and be checked daily if fit-for-purpose;
- The Contractor and ESR will inspect the refuelling area at the compound at least daily during operation of the compound to verify that drip-trays are being used consistently by site staff (and are being regularly emptied to a bowser).
- Refuelling of plant and machinery shall take place at least 10 m away from drains or dewatering points using a mobile fuel bowser and restricted to designated areas on hard standing. Only double bunded fuel bowsers shall be used. Vehicles must not be left unattended during refuelling operations, and drip trays must be placed under the fuelling point during fuelling;
- All fuel/ oil storage areas shall be covered and bunded to 110% of storage capacity.
- Drip trays will be used underneath mobile plant and drums whilst in use on site; and
- There will be no stockpiling of excavated materials by watercourses, to avoid any runoff entering them.
- Storage of materials (including fuel and chemicals) will be located away from water bodies, within designated and bunded areas. Refuelling operations will also take place away from ditches and watercourses;
- Stockpiles shall be kept to a minimum, to control erosion from areas of exposed ground. Stockpiles shall be minimised to reduce silty runoff and located well away from drains and dewatering points.
- Oils, fuels and chemicals will be stored away from drains and watercourses and secondary containment will be provided.
- Leaking or empty oil drums shall be removed from site immediately and disposed of via an appropriately licensed waste disposal contractor;
- All hazardous substances on-site shall be controlled within enclosed storage compounds that shall be fenced off and locked when not in use to prevent theft and vandalism;
• Care must be taken whilst using shuttering oils when preparing formwork. This requires operatives to be trained in the proper handling of materials, the sensitive nature of the wider drainage system, and the consequences of accidental spillage; and,
• Concrete mixing must be undertaken in designated impermeable areas, at least 10 m away from drainage or dewatering points to reduce the risk of runoff entering a watercourse, or the sub-surface, or groundwater environment.

7.6 Waste (including Excavated Materials)

The Contractor shall be responsible for developing the Waste Management Plan (WMP) related to its construction activities. The WMP shall apply to all works carried out by the Contractor and any sub-contractors under its control. In preparing the plan, the Contractor shall take into account any measures set out in any planning consent document, the relevant legislation, and industry best practice.

Certain uncontaminated materials (excavated from the site during the works which will primarily be soil and stone) may be reused in the works, and therefore would not require removal from the site. In developing the WMP, the Contractor shall consider the reuse of materials where practicable, where permitted under the relevant waste legislation, and where the material meets the engineering requirements.

7.6.1 Waste Management Strategy

The Contractor shall comply with the objectives of the Southern Region Waste Management Plan 2015-2021. The Contractor shall establish a system for the management of wastes in accordance with the Waste Management Hierarchy:
• Prevention;
• Minimisation;
• Reuse;
• Recycling; and,
• Disposal.

This hierarchy outlines that waste prevention and minimisation are the first priority in managing wastes, followed by waste reuse and recycling. Disposal of waste shall only be considered as a last resort.

7.6.2 Waste Identification & Classification

The Contractor shall establish a procedure to identify and classify all waste arising at the site in accordance with the European Waste Catalogue (EWC) Code. For each waste stream identified by the Contractor, and for each additional waste stream that may arise during the course of the works, the Contractor shall identify the following:
• The appropriate EWC Code;
• A suitable Waste Collection Contractor in possession of a valid Waste Collection Permit for the collection of the particular waste;
• The waste recovery or disposal site, including the transfer station where the waste may be transferred to upon leaving the site, in possession of a valid Waste Facility Permit or Waste License, as appropriate; and,
• The recovery or disposal method for the waste.

Only Contractors in possession of a valid Waste Collection Permit shall collect wastes from the site. The Contractor responsible for the waste shall ensure that the Waste Collection Contractor:
• Is permitted to collect the particular waste;
• Uses a waste collection vehicle identified on the Waste Collection Permit; and,
• Transfers the waste to a waste facility identified on the Waste Collection Permit.

Prior to the commencement of the proposed development, the Contractor shall determine the quantity of waste expected to arise from its works, and CCC or its representatives shall be advised accordingly.

The Contractor shall advise CCC or its representatives in advance if it proposes to act as the Waste Collection Contractor, subject to agreement. In the event that Contractor acts as the Waste Collection Contractor, it shall ensure that it has the relevant Waste Collection Permit(s) in place prior to commencement of the proposed development.
7.6.3 Management of Excavated materials

Where the Contractor proposes to maximise the reuse of excavated soil in order to minimise the generation of waste, it shall set out how it proposes to manage and document this reuse. This shall include the following:

- Identification and recording of the location from where the material was excavated;
- Delineation of areas where excavated soil is intended for reuse (where permitted); If unexpected obvious contamination is detected during the site works, works should immediately cease until this contamination is investigated.
- Delineation of areas of contaminated and uncontaminated soil (if present);
- Sampling of excavated soil (the number and location of soil samples);
- The proposal for the laboratory to carry out the testing;
- The suite of parameters for which the soil is to be tested; and,
- The criteria for assessing whether the soil is contaminated or uncontaminated.
- The Contractor shall establish the controls necessary to manage the generation, handling and storage of waste at the site.

These controls may rely on the other Plans within the CEMP, for example the protection of stockpiles of contaminated soil against rainwater ingress and leachate runoff, the bunding of hazardous waste storage areas containing liquids (e.g. oils, paints), and the management of waste collection vehicles both within the site and when leaving the site (dust and noise).

The Soil Management Plan should be developed for the site which should indicate waste soil classifications to enable the appointed Contractor to identify appropriate disposal/transfer routes for proposed excavated material, based on the nature of the material i.e. made ground or natural soil.

Arisings will be generated during the works. These should be segregated, stockpiled on site and sampled. Soil waste classification should be completed on these materials in order to identify an appropriate waste receiving facility.

Prior to the transfer of material from the site for export or to a specific waste permitted/licensed site, the appropriate waste classification data should be submitted to the permit/licence holder to confirm the suitability of the material in writing for the transfer to their facility.

In order to control off-site soil movements and undertaken appropriate waste disposal/recovery, a comprehensive docketing system should be detailed in the site construction waste management plan and implemented on the site. A daily record (including preparing and reconciling waste transfer notes) of soil excavation at the site should be maintained by the appointed Contractor.

The documentation to be maintained in relation to soil wastes includes the following:

- The names of the agent(s) and the transporter(s) of the wastes;
- The name(s) of the person(s) responsible for the ultimate recovery or disposal of the wastes;
- The ultimate destination(s) of the wastes;
- Written confirmation of the acceptance and recovery or disposal of any hazardous waste consignments;
- The tonnages and EWC (European Waste Catalogue) Code for the waste soil materials;
- Details of each individual consignment dispatched from site will require:
  - Description of waste (grid cell number, stockpile number or type and origin of soil);
  - Date and time of dispatch from site;
  - Name of haulage company and details of Contractor and Haulier docket numbers;
  - Vehicle registration number and driver name;
  - Volume/weight of waste removed and name of waste receiving facility;
  - Date and time of arrival at waste receiving facility; and,
  - Details of any rejected consignments.
- Waste Transfer Forms for hazardous soil wastes transferred from the site (stamped at receiving facility);
- The Trans-frontier Shipment of Waste forms for hazardous soil wastes transferred abroad; and,
- The results of any analysis conducted on excavated soil.
It is recommended that waste transfer notes are issued in triplicate. On dispatch, the note should be signed by the issuing operative and one copy retained at the site office. The remaining two copies should accompany the load and signed or stamped by the receiving facility. One of these signed copies should be returned to the site office for reconciliation. It is noted that a suitably licensed hauler should be appointed to transfer waste soil from site.

7.7 Air Quality

Fugitive emissions of airborne particulate matter are readily produced through the action of abrasive forces on materials and therefore a wide range of site preparation and construction activities have the potential to generate this type of emission, including:

- Earthworks, including the handling, working and storage of materials;
- Construction activities; and,
- The transfer of dust-making materials from the site onto the local road network.

Particulate matter in air is made up of particulates of a variety of sizes, and the concept of a ‘size fraction’ is used to describe particulates with sizes in a defined range. These definitions are based on the collection efficiency of specific sampling methods and each size fraction is especially associated with different types of impacts. In this assessment the term ‘dust’ is used to mean particulate matter in the size fraction 1 µm – 75 µm in diameter, as defined in BS 6069:1994 (BSI, 1994). Dust impacts are considered in terms of the change in airborne concentration and the change in the rate of deposition of dust onto surfaces.

The size fraction called ‘PM10’ is composed of material with an aerodynamic diameter of less than 10 µm in diameter and overlaps with the size fraction for dust. Air quality objectives (EU Directive and SI 180/2011) for PM10 has been set for the protection of human health and the term PM10 is only used in this assessment of construction phase impacts when referring to the potential impact of emissions of particulate matter from construction activities on human health receptors. The short term, 24 hour mean objective for airborne concentrations of PM10 is the appropriate air quality objective in this case.

Table 4 general construction activities and the corresponding possible dust control measures.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Possible Dust Control Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drilling</td>
<td>• Use dust-extraction equipment such as filters, on exhaust air emissions from drill rigs.</td>
</tr>
<tr>
<td>Loading/Unloading</td>
<td>• Reduce drop heights wherever practicable.</td>
</tr>
<tr>
<td></td>
<td>• Protect activities from wind.</td>
</tr>
<tr>
<td>Material storage</td>
<td>• Dampen material.</td>
</tr>
<tr>
<td></td>
<td>• Protect from wind and store under cover.</td>
</tr>
<tr>
<td></td>
<td>• Screen material to remove dusty fractions prior to external storage.</td>
</tr>
<tr>
<td>Overburden handling</td>
<td>• Protect exposed material from wind (by keeping material within voids or protecting them by topographical features).</td>
</tr>
<tr>
<td></td>
<td>• Spray exposed surfaces of mounds regularly to maintain surface moisture unless mound surface has formed a crust after rainfall or is grassed.</td>
</tr>
<tr>
<td></td>
<td>• Minimise handling.</td>
</tr>
<tr>
<td>Soil handling and storage</td>
<td>• Restrict the duration of the activity. Seal and seed storage mound surfaces as soon as is practicable.</td>
</tr>
<tr>
<td></td>
<td>• Protect surfaces from winds until disturbed areas are sealed and stable.</td>
</tr>
<tr>
<td>Transport by vehicle within and off-site</td>
<td>• Restrict vehicle speed.</td>
</tr>
<tr>
<td></td>
<td>• Water unsurfaced roads and paved roads.</td>
</tr>
<tr>
<td></td>
<td>• Wheel or body wash at an appropriate distance from site entrance. This should always be within the site, and the roadway from the washing facility to the highway shall be hard-surfaced.</td>
</tr>
<tr>
<td></td>
<td>• Load and unload in areas protected from wind.</td>
</tr>
<tr>
<td></td>
<td>• Minimise drop heights.</td>
</tr>
<tr>
<td></td>
<td>• Sheet or cover loaded vehicles.</td>
</tr>
<tr>
<td></td>
<td>• Use water sprays/spray curtains to moisten material.</td>
</tr>
<tr>
<td></td>
<td>• Sweep/wash paved roads.</td>
</tr>
<tr>
<td></td>
<td>• Use paved roads where practicable.</td>
</tr>
</tbody>
</table>
7.8 Traffic Management

Construction staff will comprise of site operatives travelling to the site via car and van.

A Traffic Management Plan (TMP) will be prepared by the Contractor to be agreed with CCC prior to construction activity. The plan will require construction traffic to be managed to avoid peak traffic conditions on the surrounding road network where possible. The TMP will comprise a series of measures to minimise the impacts associated with construction trips including wheel washing etc. The TMP will include measures to mitigate the effect of online road works.

During construction, adequate land within the curtilage of the site will be allocated to accommodate temporary car and truck parking for construction staff and operations.

The anticipated hours of construction activity is likely to be 07:00hrs – 19:00hrs. Therefore site operatives are projected to arrive before the AM Peak Hour (08:00 – 09:00) and depart after the PM peak hour (17:00 – 18:00). HGV trips are anticipated to arrive and depart the site at a uniform rate throughout the day, to avoid pressure on the morning and evening peak hour periods. Car sharing will be encouraged throughout the construction phase for site operatives, to reduce the traffic impact upon the surrounding road network.

7.9 Noise and Vibration

The construction phase of the proposed development has the potential to increase noise levels at noise sensitive locations surrounding the proposed development. Impact from the construction phase will depend on the number and type of equipment employed during the works.

Construction noise sources will result in a temporary impact on the noise climate in the area. The temporary and transient nature of the construction phase on this type of proposed development are not predicted to give rise to excessive and sustained construction noise levels at individual receptors as the construction works will be separated geographically and chronologically.

Similarly construction activities will be largely limited to day time works. The list of machinery that typically operates during the construction phase of a proposed development such as this is detailed in Table 5.

Table 5. Typical noise levels generated by construction phase equipment

<table>
<thead>
<tr>
<th>Activity</th>
<th>Plant (BS 5228 Ref)</th>
<th>Noise Levels @10m dB LAeq</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Preparation &amp; Excavation</td>
<td>Wheeled Loader (C.2/27)</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>Tracked Excavator (C.2/29)</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td>Dozer (C.2/10)</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>Backhoe mounted hydraulic breaker (C.5/1)</td>
<td>88</td>
</tr>
<tr>
<td></td>
<td>Hand-held pneumatic breaker (C.5/6)</td>
<td>95</td>
</tr>
<tr>
<td>General Site Activities</td>
<td>Articulated Dump Truck (C.4/1)</td>
<td>81</td>
</tr>
<tr>
<td></td>
<td>Large Lorry Concrete Mixer (C.4/21)</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td>Diesel Generator (C.4/76)</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>Water Pump (diesel)(C.4/88)</td>
<td>68</td>
</tr>
<tr>
<td>Hardstanding Construction Works</td>
<td>Road Roller (C.5/19)</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>Asphalt Paver (+Tipper Lorry) (C.5/30)</td>
<td>75</td>
</tr>
</tbody>
</table>

Although the construction phase has the potential to have a short-term adverse impact on ambient noise levels, typical noise and vibration mitigation measures will reduce those impacts which will be transient and temporary. As such, the construction phase impacts are not predicted to be significant.

An increase of 3 dB (A) on existing traffic noise is required before it may be noticed by the public (example ref: UK DOETR ‘Guidance on the Methodology for Multi-Modal Studies’, Paragraph 4.3.5). With reference to the ‘Calculation of Road Traffic Noise’ document (CRTN), and if all other factors remain equal, this would represent an increase in traffic flow of 100%.
There is potential for ground vibration due to the construction phase works which will mainly be derived from excavation. Vibration may be defined as regularly repeated movement of a physical object about a fixed point. The magnitude of vibration is expressed in terms of Peak Particle Velocity (PPV) expressed in millimetres per second (mm/s).

Common practice in Ireland has been to use guidance from internationally recognised standards. Vibration standards come in two varieties, those dealing with human comfort and those dealing with cosmetic or structural damage to buildings. In both instances, the magnitude of vibration is expressed in terms of PPV in mm/s.

The Contractor will address noise and vibration in the CEMP, through measures such as the following where appropriate:

- Machines will be fitted with suitable silencers;
- Equipment is to be task-specific;
- Vehicles engines to be switched off when not in use;
- Acoustic screens will be deployed if required;
- Offsite fabrication;
- Construction phase noise levels at noise sensitive locations shall not exceed 70dB(A) between 0700 to 1900 hours Monday to Saturday and 45dB(A) at any other time;
- Site noticeboard clearly stating allowed working hours;
- Noise levels shall be monitored and where trigger levels are exceeded and/or complaints occur both the noise level and complaint shall be record and held on file;
- Contractors will highlight in their method statement and/or risk assessment specific activities that will create significant noise and vibration levels. In addition to this, Contractors will demonstrate how they will mitigate/manage these emissions;
- Neighbours will be informed in advance of the activities taking place, highlighting those which may be perceive as more intrusive;
- Contractors will endeavour to programme unavoidable noisy/vibrating activities in between periods that causes the least possible disruption/nuisance to local stakeholders;
8. **Monitoring**

A water quality monitoring programme including shall be implemented by the Contractor in the Glashaboy and Butlerstown Rivers. Monitoring shall be undertaken both upstream and downstream of any discharge points from the works. Parameters for testing and discharge limits will be agreed with IFI and the local authority, and detailed in the WQMP.

The ECoW will advise the Contractor on any monitoring requirements for ecological features, including those relating to licensing.

A suitably qualified archaeologist will advise the Contractor on any monitoring requirements for archaeological features.
9. Emergency Response

There is the potential for spillage incidents (e.g. from a damaged fuel drum), or the failure of silt control measures (e.g. following damage to silt fencing after extreme flood or rainfall events).

The Contractor shall develop an Emergence Response Plan based on relevant guidance such as the UK document *Pollution Prevention Guidelines Incident Response Planning: PPG 21*

Relevant Contractor staff, including cover staff, shall be trained in the use of spill kits.

A spill kit shall be maintained at the refuelling location within the compound in good working order, and checked daily. Spill kits will additionally be carried with each working crew.

In the event of a fuel or oil spill, the bulk of the spill will be immediately contained by a spill kit (booms for both land and water spills; granules additionally used on land). The contaminated absorbent material and soil will then be placed on hardstanding in a stockpile underlain and covered by plastic to prevent leachate generation, until such times as it can be removed off-site by an appropriately licensed waste management company.

Any hydrocarbon leakages or spillages will be notified to the ESR.

These Emergency Response requirements will be displayed at several locations throughout site and at all sensitive locations.

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2 Available online from the Scottish Environmental Protection Agency [https://www.sepa.org.uk/media/100557/ppg-21-pollution-incident-response-planning.pdf](https://www.sepa.org.uk/media/100557/ppg-21-pollution-incident-response-planning.pdf)
10. **Concluding Remarks**

This plan shall be further refined and expanded by the appointed Contractor into a full Contractor CEMP as more information becomes available and more certainty in terms of the proposed layout, construction methods, programme and potential environmental impacts. The full Contractor CEMP will be prepared prior to commencement of construction and with the approval of CCC.
11. References


Appendix A Figures
Figure 2.a  
Ecological Constraints at P2, P9, and P10: Dunkettle road upgrade

Notes:
- Breeding birds could occur in any vegetation and any built structures and are a potential constraint throughout triggering seasonal works mitigation.
- Alien butterbur Petasites spp. and traveller’s-joy Clematis vitalba are widespread on roadsides throughout and whilst not mapped will be a constraint triggering habitat enhancement measures.
- Stonewalls (BL1) are common occur throughout and have not been mapped, but require mitigation as per Ecological Impact Assessment Report.
- There were no trees with low suitability to roosting bats identified.
- Rare and invasive flora surveys were completed in winter; pre-construction surveys have been proposed to inform post-consent mitigation.
- Where vegetation is not mapped, it is not an “important ecological feature” as defined in the EcIA Report, either because it is not of significant value (e.g. ornamental shrubs), or because it will not be significantly impacted.
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Figure 2.c  
Ecological Constraints at P6, P7 and P8: New Link Road

Legend
- Projects comprising proposed development
- Species
- Invasive species
- Suitability of trees to roosting bats
  - Moderate
- Habitats
  - (Mixed) broadleaved woodland (WD1)
  - Hedgerows (WL1)
  - Depositing/lowland rivers (FW2)

Notes:
- Breeding birds could occur in any vegetation and any built structures and are a potential constraint throughout triggering seasonal works mitigation.
- Alien butterbur Petasites spp. and traveller’s-joy Clematis vitalba are widespread on road sides throughout and whilst not mapped will be a constraint triggering habitat enhancement measures.
- Stonewalls (BL1) are common occur throughout and have not been mapped, but require mitigation as per Ecological Impact Assessment Report.
- There were no trees with low suitability to roosting bats identified.
- Rare and invasive flora surveys were completed in winter; pre-construction surveys have been proposed to inform post-consent mitigation.
- Glashaboy River connected to Cork Harbour SPA requiring pollution control and instream avoidance: contains breeding and foraging otter Lutra lutra, kingfisher Alcedo atthis, grey wagtail Motacilla cinerea, dipper Cinclus cinclus, and salmonids.
Figure 2.d
Ecological Constraints at P5 and P12: Proposed signalised junction

Notes:
- Breeding birds could occur in any vegetation and any built structures and are a potential constraint throughout triggering seasonal works mitigation.
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Legend
- Projects comprising proposed development
- Invasive species
- Dry meadows and grassy verges (GS2)
- Hedgerows (WL1)
- Treelines (WL2)
- Depositing/lowland rivers (FW2)
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Scot’s Pine (BT1)

Two-spined acaena Acaena ovalifolia

Extensive knotweeds including giant knotweed Fallopia sachalinensis

Beech (BTL2)

Artificial pond

Gunniera species (within garden)

Glanmire Bridge

Riverside FC

P17

P15

P16

P20

Notes:
- Breeding birds could occur in any vegetation and any built structures and are a potential constraint throughout triggering seasonal works mitigation.
- Alien butterbur Petasites spp. and traveller’s-joy Clematis vitalba are widespread on roadsides throughout and whilst not mapped will be a constraint triggering habitat enhancement measures.
- Stonewalls (BL1) are common occur throughout and have not been mapped, but require mitigation as per Ecological Impact Assessment Report.
- There were no trees with low suitability to roosting bats identified.
- Rare and invasive flora surveys were completed in winter; pre-construction surveys have been proposed to inform post-consent mitigation.
- Where vegetation is not mapped, it is not an “important ecological feature” as defined in the EcIA Report, either because it is not of significant value (e.g. ornamental shrubs), or because it will not be significantly impacted.
- Glashaboy River connected to Cork Harbour SPA requiring pollution control and instream avoidance: contains breeding and foraging otter Lutra lutra, kingfisher Alcedo atthis, grey wagtail Motacilla cinerea, dipper Cinclus cinclus, and salmonids.
Appendix B SOWOR Format
<table>
<thead>
<tr>
<th>MS Reference</th>
<th>Method Statement Work Activity No.</th>
<th>Description</th>
<th>Estimated duration of activity</th>
<th>Date Started</th>
<th>Dates Work Conducted</th>
<th>Date Completed</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Compound (MS–01)</td>
<td>1.1</td>
<td>Works prior to setting up the compound</td>
<td>Estimated 1 day (all work items 1.1 - 1.6)</td>
<td>To be completed on site</td>
<td>To be completed on site</td>
<td>To be completed on site</td>
<td>See Section 4.2 of Method Statement - Mitigations</td>
</tr>
</tbody>
</table>
Appendix C Toolbox Talk Items

The following items will underpin daily toolbox talks delivered to Contractors, with input from the ECoW

1) Introduction
   - Key sensitivities: the Glashaboy River woodlands, invasive species, protected species.
   - Silt release risks and authority of the ECoW to stop works.
   - Strict adherence to agreed works/accesses/storage areas.
   - Avoidance of instream works.
   - Restriction on all water abstraction.

2) Mitigation: Pollution control
   - Steam-cleaning of vehicles and survey equipment before and after leaving site.
   - Refuelling/fuel storage protocols including set-back distances.
   - Procedures for installing silt fences.
   - Measures for vegetation removal.

3) Mitigation: Invasive species protocols
   - Legal obligations of contractor.
   - Biosecurity protocols for cleaning equipment and PPE.

4) Communication, Supervision and Reporting
   - Role of ECoW.
   - Use of SOWOR.
   - Works Programme and changes to SOWOR.
   - Environmental incident reporting.

5) Emergency Response Plan (s)
   - Signage at compound explaining Plan.
   - Steps and reporting chain in response to spillage incidents.
   - Weather considerations and steps to enhance silt control measures if required.
   - Authority of ECOW to stop works.
Appendix D Silt Fencing Specification
Many construction activities result in disturbed or bare ground that is vulnerable to weather erosion (e.g. building areas, haul roads, pipelines, spoil heaps and quarries). The consequential silt laden run-off, plus site debris, often contaminates surrounding land, watercourses, lakes and drains - resulting in significant environmental pollution and potentially costly fines.

However, due to the on-going nature of construction works, it is generally not possible to protect exposed surfaces until the project is complete. So stormwater from such sites remains one of the largest un-addressed non-point sources of water pollution in the UK. But, with the introduction of Hy-Tex Terrastop™ Premium silt fence, there is now a practical, economic and effective method to reduce run-off pollution.

Terrastop™ Premium is a special, high quality, permeable, technical filter fabric that can be installed as an entrenched vertical barrier fence, and is designed to intercept and detain run-off, trapping harmful silt through settlement and filtration before it leaves the site.

Performance: Although the benefits of silt fences have only recently become recognised in Britain, the concept is not new. Silt fences have been used extensively in other countries for many years, and their proven performance (Intercepting up to 86% of suspended solids [Horner et al. 1990]) has made them a standard Best Management Practice on a diverse range construction projects, while in-depth research and practical experience has identified the most important characteristics for effective results.

Based on this invaluable knowledge, Hy-Tex Terrastop™ Premium has been designed to exceed the highest standards, incorporates many unique features, and is also "CE Mark" certified for erosion control applications in accordance with mandatory European requirements.

Key Features: General purpose non-woven and woven geotextiles are unsuitable for silt fence use because they often tear or fray, require costly additional wire support fences to withstand the forces of stormwater/silt build-up, weaken quickly due to lack of UV protection, and clog or inadequately filter sediment because of inappropriate hydraulic properties. Terrastop™ Premium is manufactured specifically as a silt fence so has a high tensile strength, UV stabilised, woven structure with tear resistant non-fraying reinforced edges, that is durable and self supporting between fixing posts for reliability, as well as having a visually pleasing subtle green colour.

While the important special fibrillated fibre weft yarn, combined with a high quality weave, provides enhanced filtration, maintains a high flow rate and is less prone to clogging.

Installation Aids: Silt fences also often fail through poor installation or aftercare, therefore Terrastop™ Premium incorporates pre-marked lines for burial depth and maximum silt accumulation level to ensure correct set-up and maintenance; as well as a top ribbon strip to simplify post attachment and tensioning. While the ideal exposed fence height of 0.60m avoids problems of excessive water damming and wind resistance damage.
Hy-Tex Terrastop™ Premium Silt Fence

Installation Guidelines

SCOPE
1. This practice covers common installation requirements for temporary silt fence applications.
2. This practice is applicable to the use of silt fences as vertical permeable interceptors designed to remove suspended soil from overland, non-concentrated water flow. The function of a temporary silt fence is to trap and allow settlement of soil particles from sediment-laden water and to filter particles from water permeating through the fabric. The purpose is to greatly limit the transport of eroded soil from the construction site by water runoff.
3. The practices presented herein are intended to ensure good workmanship and quality and are not necessarily adequate for all purposes in view of the wide variety of possible sediments and performance objectives.
4. This standard does not purport to address all safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate health and safety practices and determine the applicability of regulatory limitations prior to use.

CONDITIONS WHERE PRACTICE APPLIES
1. Below disturbed areas where erosion would occur in the form of sheet and rill erosion, and where ponded run-off will not cause damage.
2. Where the size of the drainage area is no more than 0.80 hectares. The contributing drainage area is no greater than 0.80 hectares.
3. The practices presented herein are intended to ensure good workmanship and quality and are not necessarily adequate for all purposes in view of the wide variety of possible sediments and performance objectives.
4. This standard does not purport to address all safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate health and safety practices and determine the applicability of regulatory limitations prior to use.

DESIGN CRITERIA
1. An effort should be made to locate silt fence at least 1.50 to 2.00m beyond the base of disturbed slopes with grades greater than 7%.
2. Properly supported silt fence which stands 0.60 metres above the existing grade tends to promote effective sediment control (higher fences are more expensive and vulnerable to excessive wind resistance or may impound volumes of water sufficient to cause failure of the structure).
3. A minimum 150mm of silt fence shall be embedded. 4. Maximum post spacing shall be 1.50m.

CONTROLLING MATERIAL SPECIFICATIONS
1. The material used for temporary silt fence shall be Hy-Tex Terrastop™ Premium, or similar approved, with CE certification for EN13235: erosion control works and conforming to the following specification requirements:
   - Grab tensile strength [ASTM D4632]: minimum 0.98kN/m warp, 0.95kN/m weft. Water permeability [NBN EN ISO 11058]: minimum 0.015 m/s. Opening size [EN ISO 12956]: maximum 250µm. Composition: 400kLo UV stabilised woven polypropylene with split warp yarns and split weft yarns, burial depth and maximum silt accumulation marker lines, top tying-off and tensioning ribbon, tear resistant non-fraying edges and 0.75m fabric width.
2. The contractor shall provide to the engineer all certifications required by the controlling material specification.
3. Silt fence materials shall be subject to sampling and testing in accordance with, and to verify conformance with, the controlling material specification.
4. All posts shall be a minimum length of 1.20m, have sufficient strength to resist damage during installation and to support the applied loads due to material build up behind the silt fence.
5. Silt fence should not be used in areas where rock or hard surfaces prevents the full and uniform anchoring of the barrier.

INSTALLATION
1. Silt fences sections should be continuous and transverse to the flow: The silt fence should follow the contours of the site as closely as possible. Place the fence such that the water cannot runoff around the end of the fence, extending ends upslope enough to allow water to pond behind the fence (See figure 2).
2. A trench shall be excavated approximately 100mm wide and 100mm deep on the upslope side of the proposed silt fence location.
3. Bury bottom 150mm of silt fence (To top of RED MARKER LINE on Terrastop™ Premium) in a “L” configuration in the trench so that no flow can pass under the silt fence. Backfill the trench and compact the soil over the geotextile so that the compacted soil completely fills the trench.
4. Compaction prior to installing posts is generally recommended. Compact the backfill soil immediately next to the silt fence geotextile. Compact the upslope side first, and then the downslope side. The soil adjacent to the buried silt fence geotextile shall be compacted to achieve no less than 50% of its original insitu strength, unless otherwise specified.
5. When joints are unavoidable, the fabric shall be spliced together only at a support post, with a min. 300mm overlap, and securely sealed so that there are no gaps, voids, or other loss of integrity of the barrier, ideally by wrapping the overlap around the post.
6. Place the posts tight to the downslope side of the silt fence at 1.50m spacing. Drive posts a minimum of 500mm into the ground. Increase depth to 600mm if fence is placed on a slope of 3:1 or greater.

[Note 3]: Where 500mm depth is impossible to attain, posts should be adequately secured/braced to stop overturning shall be in place due to sediment loading.
7. Fasten the filter fabric securely and taut to the upslope side of the posts using top ribbon (see figure 3), wire/cable ties threaded through the silt fence, or 25mm long heavy-duty wire staples (The fabric shall not be attached to existing trees). Where required, tighten top edge of fabric by looping top ribbon over posts, and strain/brace posts to maintain fence tension and stability (See figure 1).

[Note 4]: If a silt fence is to be constructed across a ditch line or swale, the fence length must be sufficient to eliminate endflow. Where deficiencies exist, as determined by the engineer, additional silt fence segments shall be placed to eliminate endflow.

MAINTENANCE
1. The contractor shall inspect all temporary silt fences immediately after each rainfall, and at least daily during prolonged rainfall. The contractor shall immediately correct any deficiencies.
2. The contractor shall also make a daily review of the location of silt fences in areas where construction activities are ongoing. Inspect natural contour and drainage runoff to ensure that the silt fences are properly located for effectiveness. Where deficiencies exist, as determined by the engineer, additional silt fence segments shall be placed to eliminate endflow.
3. Repair damaged or otherwise ineffective silt fences or replace promptly.
4. Either remove sediment deposits when the accumulation reaches one third the height of the exposed fence (Top of BROAD WHITE/BLACK MARKER BAND on Terrastop™ Premium), or install a second silt fence as directed by the engineer.
5. The silt fence shall remain in place until the engineer directs it be removed. Upon removal the contractor shall remove and dispose of any excess sediment accumulations, dress the area to give it a pleasing appearance, and vegetate the bare areas in accordance with contract requirements.
6. Removed silt fence may be used at other locations provided the geotextile and other material requirements continue to be met to the satisfaction of the engineer.

Figure 1: Hy-Tex Terrastop™ Premium

Figure 2: Silt Fence Placement

Figure 3: Ribbon attachment to post

Disclaimer: All information is provided in good faith, but without warranty. Nor does it form part of any contract, or intended contract, with the Buyer/User. Further conditions apply, details available on request.
Appendix E Summary Environmental Baseline

E.1 Ecology

The Ecological Impact Assessment (EcIA) Report (AECOM, 2018a) should be consulted for a detailed description of habitats and fauna present within the likely impact area of the proposed development.

All ecological features identified in the field surveys for the EcIA, which qualified as ‘important ecological features’ and were likely to be significantly impacted are mapped in EcIA Figures 2A-E (Appendix A).

Caveat regarding accuracy of ecological baseline data

The ecological baseline informing the EcIA was recorded between November 2017 and March 2018. It is important to highlight that the EcIA recommended pre-construction surveys to address the limitations in the seasonality of these surveys. The ECoW or other suitably experienced ecologist will assist the Contractor in updating the EcIA maps using the findings of the pre-construction surveys to inform mitigation requirements for rare flora, nesting birds, and bats.

Habitats

With the exception of Annex 1 ‘Estuary’ habitats within the lower reaches of the Glashaboy Estuary, there were no Annex 1 habitats identified during the EcIA surveys. Habitats which are the subject of avoidance, mitigation and/or compensation measures in the EcIA namely include:

- **Grasslands**
  - One area of wet grassland within the footprint of the proposed development on banks of the Glashaboy River between Glanmire Bridge and Riverside FC;
  - One field of dry meadow grassland habitat occurred in the ‘circus field’ by P12 northwest of the Hazelwood retail park (which has been mapped);
  - Roadside verges throughout;

- **Wooded habitats**
  - Semi-mature and mature plantation woodland habitats throughout, particularly in the Glashaboy River Corridor;
  - Remnant riparian treelines of former ‘gallery’ woodland along the Glashaboy River;
  - Mature planted treelines and hedgerows along property boundaries along Dunkettle Road and other roadsides;
  - One area of semi-natural (wet) woodland within the footprint of the proposed development consisting of a dense immature willow *Salix cinerea* and alder *Alnus glutinosa*-dominated copse on a low-lying area of floodplain between Glanmire Bridge and Riverside Football Club (invasive knotweed plants *Fallopia* spp. were also abundant here);

- **Wetland habitats**
  - The freshwater reach of the Glashaboy River, crossed a total of 5 times by new bridge structures along the proposed P15 greenway;
  - The tree-lined Riverstown River, crossed once by the proposed development via an existing bridge by P14;
  - A network of drainage ditches (and a single small pond) located within recolonising bare ground and scrub grassland in the southwestern corner of Riverside FC, which drain the playing fields and adjacent land into the Glashaboy River;

- **Other significant habitats**
  - Recolonising bare ground at Riverside FC of value to invertebrates;
  - Old stone walls of red sandstone or limestone (or old brick) along roadsides, property boundaries, and culvert headwalls providing habitat to a variety of plants, and fauna species including birds, and invertebrates.
Protected or rare plants

By assessing the habitat requirements of the flora species identified in the desktop study, at least one species of bryophyte and two vascular plant species were identified in the EcIA as potentially occurring in habitats present within the proposed development site.

The potential presence of at least two rare vascular species could not be established in the EcIA in the absence of surveys by expert botanists during the flowering season (June-August):

- The “Near-Threatened” little robin *Geranium purpureum* (or its hybrids) has been recorded 200 m from the proposed development and could occur in walls or hedge banks. O’Mahoney (2015) states that this population of little robin (located in 2014 on a hedge bank at Rathcooney Crossroads) may be the last extant population in east Cork. However the presence of little robin in hedges or stonewalls within the proposed development footprint cannot be ruled out, and it is also possible that hybrids of little robin and herb-Robert *Geranium robertianum* occur;

- The “Vulnerable” species chives *Allium schoenoprasum* has been recorded in Cork City to the west within 2 km of the proposed development and could occur on thin soils in riparian habitats and rank grassland.

The potential presence of at least one rare unprotected bryophyte species could not be established without surveys by expert bryologists (i.e. botanists specialising in bryophyte). The bryophyte Hasselquist's hyssop *Entosthodon fascicularis* (“Near Threatened”) was recorded in the EcIA desktop study, and this species could occur on thin soil overlying limestone. It is assumed to be unlikely that any protected bryophytes to occur, given there are no ‘Taxon site locations’ for protected bryophytes in the NPWS’ new ‘FPO bryophytes’ web page.

Invasive species

The invasive plant species identified (outside the main growing season for flowering plants) during EcIA surveys in winter 2017 and 2018 are listed in Table 6. It is an offence to cause or allow to spread three of species (so-called ‘scheduled’ species).

Two non-scheduled invasives have been included in Table 6 because of their known impacts to rare species in the locality (winter heliotrope *Petasites fragrans*; O’Mahoney, 2015), or elsewhere on the island of Ireland (two-spined acaena *Acaena ovalifolia*).

<table>
<thead>
<tr>
<th>Common name</th>
<th>Scientific name</th>
<th>‘Scheduled’ species to European regulations</th>
<th>Frequency within proposed development footprint</th>
</tr>
</thead>
<tbody>
<tr>
<td>Giant knotweed</td>
<td><em>Fallopia sachalinensis</em></td>
<td>Yes</td>
<td>Locally dominant in floodplain near Riverside FC (P15)</td>
</tr>
<tr>
<td>Gunnera</td>
<td><em>Gunnera sp.</em></td>
<td>Yes</td>
<td>Within ornamental area inside property boundary along northern end Dunkettle Road (P9).</td>
</tr>
<tr>
<td>Japanese knotweed</td>
<td><em>Fallopia japonica</em></td>
<td>Yes</td>
<td>Common throughout in roadsides and hedgerows</td>
</tr>
<tr>
<td>Three-cornered leek</td>
<td><em>Allium triquetrum</em></td>
<td>Yes</td>
<td>Abundant throughout in roadside verges in woodlands</td>
</tr>
<tr>
<td>Travellers’ joy</td>
<td><em>Clematis vitalba</em></td>
<td>No</td>
<td>Throughout in roadside scrub and woodlands</td>
</tr>
<tr>
<td>Two-spined acaena</td>
<td><em>Acaena ovalifolia</em></td>
<td>No</td>
<td>Localized to two gravel banks at the entrance of Riverside FC (P15)</td>
</tr>
<tr>
<td>Winter heliotrope</td>
<td><em>Petasites fragrans</em></td>
<td>No</td>
<td>Abundant throughout in roadside verges in woodlands</td>
</tr>
</tbody>
</table>

All know locations of invasive species are mapped in EcIA Figures 2A-E (Appendix A), which will be updated following pre-construction surveys as specified in Section 7.2.2.2.

Fauna

**Bats (roosting)**

Due to the protected structure status of the Glanmire Bridge, the bridge mortar is not regularly repointed. Inspections of the bridge from adjacent roadways using binoculars during EcIA surveys identified numerous crevice opportunities for bats. There is a single street light on the western side of the bridge, but it is otherwise

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3 Schedule Three to S.I. No. 477/2011 as amended.
The bridge is well connected to surrounding habitats via riparian treelines and the Glashaboy River. The Glanmire Bridge is assigned “High” suitability to roosting bats following BCT criteria.

Two properties along the Dunkettle Road proposed for demolition were determined to each be of “Moderate” suitability to roosting bats. These properties could not be accessed to complete surveys; pre-demolition surveys have been proposed to inform survey and licensing requirements.

Ground level inspections of trees within the potential zone of influence of the proposed development recorded the trees in Table 7 below which are all been mapped in EcIA Figures 2A-E (Appendix A).

### Table 7 Summary findings: ground level assessments of tree suitability for roosting bats.

<table>
<thead>
<tr>
<th>Map reference</th>
<th>Species</th>
<th>No. of trees</th>
<th>Location</th>
<th>Suitability to roosting bats (Collins, 2016)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BT1</td>
<td>Scots pine</td>
<td>Individual</td>
<td>Northern end of Riverside FC</td>
<td>High</td>
</tr>
<tr>
<td>BT2</td>
<td>Unknown (dead)</td>
<td>Individual</td>
<td>Eastern end of John O’Callaghan Park</td>
<td>Moderate</td>
</tr>
<tr>
<td>BTL1</td>
<td>Beech</td>
<td>Line of 5</td>
<td>Former avenue to Riverside House</td>
<td>Moderate</td>
</tr>
<tr>
<td>BT3</td>
<td>Oak species (unidentified)</td>
<td>Individual</td>
<td>Southern end of Former avenue to Riverside House; within property boundary</td>
<td>Moderate</td>
</tr>
<tr>
<td>BTL2</td>
<td>Beech</td>
<td>Line of 10</td>
<td>Eastern bank of Glashaboy River; immediately northeast of Glanmire Bridge</td>
<td>Moderate</td>
</tr>
<tr>
<td>BTL3</td>
<td>Mix of different broad-leaved species including ash and weeping willow</td>
<td>Cluster of several trees in plantation within Cólaiste an Phiarsaigh</td>
<td>Low to Moderate</td>
<td></td>
</tr>
</tbody>
</table>

**Bats (foraging/commuting)**

No bat activity surveys could be completed during the EcIA given the planning programme for the proposed development. However desktop records were available from the O’Flynn Housing EIAR (O’Flynn, 2017). Only two bat species were recorded foraging along the East Cliff Road within the zone of influence of the proposed development in the Ballinglanna Housing EIAR (common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*). However several other bat species are presumed to feed or commute throughout particularly in well-vegetated and poorly lit areas such as those within the Glashaboy River corridor.

**Birds**

EcIA field surveys were carried out in winter outside the bird breeding season, however applying professional judgement to bird habitats present, the proposed development site and environs are considered likely to contain breeding populations of up to ten of ten bird species of ‘Medium’ and ‘High’ conservation concern. As reported in the EcIA these could include common buzzard *Buteo buteo*, grey wagtail *Motacilla cinerea*, and kingfisher *Alcedo atthis*. Given the urban nature of the locality, the presence of developed land on most riverbanks, and the absence of significant estuarine muds or sands in the vicinity of the proposed development, there is no likelihood for significant roosting populations of wetland birds. The proposed development will not disturb populations of wintering populations important for designated areas in Cork Harbour downstream.

**Amphibians**

EcIA surveys recorded potential common frog *Rana temporaria* and smooth newt *Triturus vulgaris* breeding habitats at Riverside FC (P15), in the network of drainage ditches (and single connecting pond) located within recolonising bare ground and adjacent scrub grassland (see EcIA Figures 2a-e; Appendix A).

There was also potential breeding habitat for common frog (but not smooth newt) in wet grassland bordering the Glashaboy River between Glanmire Bridge and Riverside Football Club (P15).

**Other protected species**

There were no badger setts, otter holts, or breeding or resting sites of other protected species confirmed within the zone of influence of the proposed development in the EcIA.
Fish

The Glashaboy Estuary becomes the Glashaboy River at its limit near Glanmire, heading north. The Glashaboy River is recognised as a productive sea trout river, but is also home to spawning brown trout *Salmo trutta*, Atlantic salmon *Salmo salar*, European Eel and Lamprey species *Lampetra* sp.
E.2 Architectural, Archaeological and Cultural Heritage

The reader is referred to the detailed baseline assessment by IAC (2018), the summary of which (entitled 'abstract' therein) is partially reproduced here:

"There is a total of 14 recorded monuments located within 250m of the proposed schemes. These sites/structures are all post medieval in date and of the sites, ten are listed as protected structures. The closest sites to the proposed schemes consist of Glanmire Bridge (CO064) and Riverstown Bridge (CO075).

A review of the relevant Local Authority development plan has revealed that there are 21 individual or groups of protected structures located within 250m of the proposed schemes. Of these, ten are listed as recorded monuments and 15 are included in the NIAH survey. The closest structures to the proposed schemes consist of Glanmire Bridge (RPS 00483), Riverstown Bridge (RPS 00394) and the original entrance into Richmond demesne (RPS 001305).

There are no National Monuments or Monuments under Preservation Order, or Architectural Conservation Areas within the vicinity of the proposed schemes. A total of 28 structures listed within the NIAH survey are located within 250m of the proposed scheme. Of these, 20 are subject to statutory protection, either as recorded monuments or protected structures (or both)."
E.3 Water Quality

Relevant watercourses are mapped in Figure 2 Appendix A. The proposed development crosses the Riverstown River (once), the Glashaboy River (five times), and is elsewhere located adjacent to the Glashaboy River and its tributary the Butlerstown River. All these rivers discharge into the transitional waters of the Glashaboy River Estuary and eventually Lough Mahon in Cork Harbour downstream.

As defined under the South Western River Basin Management Plan 2009-2015 (SWRBMP; Water Matters, 2010), the proposed development is within the Glashaboy 'Water Management Unit' (i.e. river catchment); whose overall water quality status was "good" in 2010 at the time the SWRBMP was produced. The most recent water quality status for the Glashaboy River in the EPA's online database is from 2014, at which time monitoring of the Glashaboy near Riverstown recorded a water quality status of Q4-5 ("High"). The most recent EPA data for the quality of transitional waters downstream dates from 2012, at which time the Glashaboy River Estuary was "potentially eutrophic" and Lough Mahon was of "intermediate" status.

E.4 Landscape

The proposed development lies within the Cork City Harbour and Estuary Landscape Character Type Area. This area is also defined as having a Very High Landscape Value, a Very High Sensitivity (extra vulnerable landscapes for example, seascape area with national importance – likely to be fragile and susceptible to change) and is listed as a nationally important Landscape. The Landscape can be characterised by having a mix of urban and rural areas with a large expansive harbour. To the south of the city, the western side of the harbour supports major industrial development, while on higher ground telecommunication masts or water storage towers punctuate the skyline. The harbour includes large islands, which, along with much of the harbour shore, comprises landscape of fertile farmland which slopes gently to the sea. It comprises a mosaic of fertile fields of mixed use on brown podzols. The rural areas around much of the greater harbour area are now characterised by a prevalence of infrastructure such as roads, bridges and electricity power lines and some urban sprawl. The narrow harbour mouth is defined by two hilltops with old military fortifications on their summits (Cork Draft Landscape Strategy, 2007).

The proposed development has the potential to have a positive landscape and visual impact through the provision of additional views provided by the new pedestrian and cyclist bridge at Glanmire.

Vegetation Removal and Works

The majority of the proposed works take place on existing built areas. However several projects (particularly P5, P8, P9 and P15) (Figure 1; Appendix A) will result in significant vegetation removal including the removal of mature trees.

Invasive species scheduled to the European Communities (Bird and Natural Habitat Regulations) 2011-2015 were noted throughout the proposed development as shown in the EcIA mapping. These locations will be updated by pre-construction surveys.
Glanmire Road Improvements and Sustainable Transport Works, Co. Cork

Project reference: 60559532

Prepared for:
Cork County Council

Outline CEMP Glanmire LIAF_Rev5.docx

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