

Royal Canal Urban Greenway

Outline Construction Environmental Management Plan

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1 Introduction

1.1 Overview

DBFL Consulting Engineers were appointed by Fingal County Council (FCC) to prepare designs for a section of the Royal Canal Urban Greenway (hereafter referred to as the 'Proposed Development') which is to be constructed along / adjacent to the Royal Canal from the Kildare / Dublin County boundary to the Old Navan Road (near the 12th Lock), where it connects with a previously constructed section of the Greenway.

DBFL have prepared this Outline Construction Environmental Management Plan (OCEMP) to accompany the planning application for the Proposed Development. The OCEMP applies to all works associated with the construction of the proposed civil works including the pre-construction site clearance works. As a contractor has not yet been appointed, this OCEMP has not been formally adopted and further development and commitment to the OCEMP will be undertaken following selection of Contractors and before commencement of site works.

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

The OCEMP provides the environmental management framework for the appointed Contractors and Sub-Contractors as they incorporate the mitigating principles to ensure that the work is carried out with minimal impact on the environment. The construction management staff as well as Contractors and Sub-Contractors staff must comply with the requirements and constraints set forth in this OCEMP in developing their CEMP. The key environmental aspects associated with the construction of the Proposed Development, and the appropriate mitigation and monitoring controls, are identified in the OCEMP.

The implementation of the requirements of the OCEMP will ensure that the construction phase of the project is carried out in accordance with the commitments made by FCC in the planning application process for the scheme, and as required under the planning approval. A detailed Construction Environmental Management Plan (CEMP) will be prepared by the Contractor prior to the commencement of works and will be required to be consistent with the commitments and mitigation measures set out in the OCEMP.

Once adopted, the CEMP is considered a living document that will be updated according to changing circumstances on the Proposed Development and to reflect current construction

activities. The CEMP will be reviewed on an ongoing basis during the construction process and will include information on the review procedures.

1.2 Proposed Development Summary

The Proposed Development is approximately 8.1km in length and is divided into three sections as follows:

- Section 1 – Kildare County Border to Hansfield Railway Bridge (Ch. 0000 – 3200)
- Section 2 – Hansfield Railway Bridge to Kennan Bridge (Ch. 3200 – 5300)
- Section 3 – Kennan Bridge to Talbot Bridge (Chainage 5300 – 8100)

Section 1 extends from Kildare/Dublin County boundary line to Hansfield Railway Bridge.

Section 2 extends from Hansfield rail bridge, through Clonsilla under Callaghan bridge to Kennan bridge at Porterstown Road. In Section 2, the character of the area changes from rural to predominantly suburban in nature. This section is predominately residential on the northern side of the canal with farmlands on the southern side.

Section 3 runs from Kennan bridge (Porterstown Road) to Talbot Bridge (Old Navan Road). This section is predominately urban with extensive residential catchments on both sides of the Canal.

An overview of the route of the Proposed Development and its sections is included in Figure 1-1.



There are a number of constraints and opportunities, both natural (i.e. existing natural environment) and physical (the built environment), which constrain the practical construction strategies for the Proposed Development. These include:

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Under the Wildlife Acts (1976 – 2000) it is illegal to disturb or harm Protected Species and their habitats.

- Another general characteristic of the Study Area is the proximity of the Canal to the Dublin – Maynooth Rail Line which generally follows the route of the Canal. This is a key public transport corridor for the region but also nationally serving commuters and also connecting Dublin to Galway.
- The need to maintain traffic flow for access to local amenities.
- Land ownership, particularly where the works abut or are in the vicinity to residential properties.
- Environmental impacts and engineering constraints such as steep topography, frequent watercourse crossings, and woodlands.

2 Description of the Proposed Development

2.1 Proposed Works

2.1.1 Section 1 – Kildare County Border to Hansfield Railway Bridge (Ch. 0000 – 3200)

The Proposed Development will follow the existing towpath along the northern side of the Royal Canal from the Kildare County Council boundary line to Hansfield Railway Bridge. The Greenway will be constructed as a 2-3m wide unbound surface from the Kildare/Fingal County Council boundary line to Hansfield Bridge (Railway Bridge). Two signal-controlled crossings at Collins Bridge and Pakenham Bridge respectively are also proposed within this section. The greenway then continues through the existing pedestrian underpass by Hansfield Railway Bridge.

The total construction thickness will range from 0.2m on stiff ground and up to 0.5m on soft ground. Construction of the greenway will involve removal of the topsoil layer to a depth of typically 0.15m and build-up of the gravel thickness to a level of up to 0.35m above surrounding ground level.

In keeping with the rural nature of this section of the greenway, no public lighting will be installed.

2.1.2 Section 2 – Hansfield Railway Bridge to Kennan Bridge (Ch. 3200 – 5300)

The greenway extends from Hansfield Bridge through Clonsilla under Callaghan Bridge to Kennan Bridge at Porterstown Road. The character of the area changes from rural to predominantly suburban in nature. This section is predominately residential on the northern side of the canal with farmlands on the southern side.

This involves the construction of a new 4m wide route, the construction of a pocket park adjacent to Hansfield Road, demolition of two houses in this area, construction of 3m greenway from Hansfield Road up to Callaghan Bridge. The Greenway widens back to 4m parallel to the Royal Canal and will take the form of a cantilevered concrete boardwalk. A 70m greenway ramp is to be constructed to access the Old School House lands. A paved surface along the majority of the route within the School House lands is the primary design proposal.

This section will introduce public lighting along the route.

2.1.3 Section 3 – Kennan Bridge to Talbot Bridge (Chainage 5300 – 8100)

The Greenway will be constructed on the northern side of the Royal Canal from Kennan Bridge to Kirkpatrick Bridge via Sheepmoor Lane. The proposed route will be constructed north of the wooded area along the northern embankment from Kennan Bridge to Sheepmoor Lane.

A portion of the route passes below the Dr Troy Bridge and will be constructed as an elevated boardwalk. The scheme will then follow the existing pedestrian/cycle facilities part of the Windmill Court Residential Development followed by the existing roadway along Sheepmoor Lane.

A signalised crossing is proposed to bring the route across Coolmine Road (Kirkpatrick Bridge). The Greenway will then be constructed on the upper level of the northern embankment, from Coolmine Road to the Brompton green area (Ch. 6250-6850).

The Proposed Development is routed near the top of the northern embankment (adjacent to Delwood Park residential back gardens) and into the open space at Brompton.

The ground level of the greenway will be lowered from existing level and security fencing, and defensive planting will be provided between the greenway and the back gardens.

A 30m bridge structure will be constructed to enable the proposed greenway to cross an historic quarry area on the northern embankment (Ch. +6500m) – referred to as the ‘Quarry Bridge’.

A 4m paved greenway will be constructed on the southern side of the Brompton green area (Ch. 6850-7100). Planting and railings will be provided along this section of the greenway. The scheme will include the provision of access to Brompton & Roselawn estates.

The route crosses from the northern side to the southern side of the Royal Canal at chainage 7120-7320 (before Roselawn Road). The Greenway will cross the Canal over an architecturally designed pedestrian and cycle bridge – referred to as the ‘Landmark Bridge’. The Landmark Bridge will be 185m long with a main span of about 50m. The bridge will respect existing uses along the Canal and existing and future operations on the Dublin to Maynooth rail line.

The greenway will continue on the southern side of the Royal Canal, past Castleknock Station and under Castleknock Road through a proposed greenway underpass.

A paved 4m wide greenway will be constructed on the southern towpath from Granard Bridge to the 12th Lock Hotel. Due to a pinch point between the hotel and the canal a 3m wide greenway is only feasible from the 12th Lock Hotel to Talbot Bridge/Old Navan Road (150m). The works will tie into the current Ashtown section of the Royal Canal Greenway at Talbot Bridge.

2.2 Construction Programme Sequencing

The proposed construction methodology is set out in detail in Appendix A and is summarised herein. This methodology is preliminary and subject to change following the detailed design and preparation of the CEMP by the appointed contractor.

It is expected that the works will be carried out in several phases (to be determined) over an expected 2-year construction period.

While there are a number of construction forms set out in the Construction Methodology Report, the following typical sequence will be applicable to each of the main greenway sections:

- Establishment of site office and compound. Mobilise construction plant;
- Establishment of appropriate traffic control measures to provide adequate separation and protection of work areas and accesses from live traffic at the interfaces with the public roads;
- Proposed tree works;
- Proposed demolition works;
- Installation of tree protection measures;
- Site Clearance and preparation;
- Excavation to formation level for new pavement construction;
- Preparation of pavement subgrade and placement of pavement / surfacing; and
- Import of fill material;
- Hard and soft landscaping works following the completion of principal greenway works.

Specifically, regarding the construction of the two bridges and two boardwalks, refer to the Construction Methodology Report in Appendix A for further details. The typical sequence will be as follows:

- Enabling Temporary Works for bridge Installation
- Delivery set down and installation of bridge structures
- Removal of Temporary Work

Prior to construction the appointed contractor will draw up detailed traffic accommodation measures to be included in the Construction Stage Temporary Traffic Management Plan (CSTTMP), as informed by the Outline Construction Traffic Management Plan (OCTMP) included in Appendix B, for approval by FCC.

3 Construction Environmental Management Plan (CEMP)

3.1 Overview

This OCEMP will be used to develop a Construction Environmental Management Plan (CEMP) by the contractor to meet the requirements of ISO 14001, and all site works shall be undertaken in compliance with the CEMP. The CEMP shall include details of the topics listed below:

- Environmental Policy
- Environmental Register
- Project Organization and Responsibilities
- Project Communication and Co-ordination
- Training
- Operational Control
- Checking and Corrective Action
- Environmental Protection Measures
- Complaints Procedure.

The CEMP shall detail all the environmental aspects and impacts associated with this contract such as waste management, pollution prevention, protection of flora and fauna and water quality in watercourses. The Environmental Register shall provide the framework for identifying the potential environmental impacts generated by construction and the associated works. The environmental procedures and activity specific method statements shall detail the working methods necessary for managing and mitigating these impacts, whether it is by prevention or mitigation. Prior to the commencement of construction activities, the environmental procedures and activity-specific method statements shall be completed providing site-specific requirements at the location of the various construction elements along the Proposed Development.

3.2 Environmental Policy

If the contractor does not already have an environmental policy, they shall be required to develop an Environmental Policy with consideration for impacts on the natural and built environment. All project personnel will be accountable for the environmental performance of the project and will be made aware of the Environmental Policy at induction. The environmental policy will consider and make commitments with regard to the protection of Natura 2000 sites, and any proposed

Natural Heritage Area (pNHA) and / or Natural Heritage Area (NHA) sites, emissions to the atmosphere, maintenance of water quality, resource usage, energy consumption and waste management.

The nearest Natura 2000 site that could be affected by the Proposed Development is the Rye Water Valley/Carton Special Area of Conservation (SAC), located approximately 1.3km to the west of the scheme.

The Royal Canal is a protected area of national importance and is designated as a proposed Natural Heritage Area (pNHA) with the objective of conserving species and habitats of national importance.

Under the Wildlife Amendment Act, 2023 the entire Royal Canal is formally designated as a pNHA under the site code 002103 (National Parks and Wildlife Service (NPWS)) including the central channel and adjoining banks, hedgerows, towpath, grassland, open water, related scrub and woodland features. The pNHA designation indicates that the site has a B rating and is of national importance. According to the report accompanying the pNHA designation, the ecological value of the canal lies in the diversity of species along its linear habitats.

3.3 Environmental Register

Once appointed, the Contractor will prepare a register of all sensitive environmental features which have the potential to be affected by the construction works, together with details of commitments and agreements made during the planning process and the Contract Documentation, with regards mitigation of potential environmental impacts.

The Environmental Register provides the relevant information for the preparation of construction method statements and will be regularly updated during the works.

The Environmental Register will consider sensitive environmental features as listed below (please note this list is not exhaustive and will be amended and expanded upon as required by the contractor):

- Identification off all waterways for the protection against ingress of suspended solids or any pollutant;
- Air emissions;
- Noise and Vibration emissions;
- Light emissions;

-
- Sanitary and domestic sewage discharge
 - Waste generation;
 - Treatment of contaminated materials
 - Treatment of Asbestos Containing Materials
 - Treatment of invasive species;
 - Use of hazardous materials;
 - Energy usage;
 - Water usage;
 - Discharge of wastewater;
 - Traffic generation;
 - Biodiversity;
 - Landscape and Visual impacts;
 - Soils, Geology and Hydrogeology;
 - Archaeology, Architectural and Cultural Heritage.

3.4 Project Organisation and Responsibility

The Contractor appointed by FCC to undertake the construction works shall be responsible for developing, and managing, the project specific Construction Environmental Management Plan (CEMP) incorporating the methodologies described in this preliminary plan. The plan will be developed in consultation with FCC.

The Contractor shall be responsible for ensuring that all members of the Project Team, including sub-contractors, comply with the procedures set out in the CEMP. The Contractor will ensure that all persons working on site are provided with sufficient training, supervision and instruction to fulfil this requirement.

The Contractor will ensure that all persons allocated specific environmental responsibilities are notified of their appointment and confirm that their responsibilities are clearly understood.

The adopted CEMP will define the roles and responsibilities of the project team. The overall responsibility lies with the Site Manager whose responsibility it will be to approve key personnel

required for employment on the project. They will liaise with the Site Environmental Manager (SEM).

3.4.1 Environmental Clerk of Works

The Role of the Environmental Clerk of Works (EnvCoW) is to provide independent, on-site environmental expertise. They ensure that construction activities are undertaken in compliance with all relevant environmental legislation, planning conditions and best practice standards.

The EnvCoW's responsibilities include but are not limited to:

- Monitor adherence to statutory environmental obligations, planning conditions, and project-specific commitments.
- Verify that all relevant environmental permits, licences, and consents are in place prior to the commencement of works.
- Ensure that the contractor's method statements incorporate appropriate mitigation measures.
- Undertake regular inspections of construction activities and undertake regular inspection of emergency safeguard measures (Spill control kits and equipment)
- Record and report environmental observations, including any non-compliance events and recommended corrective actions.
- Produce weekly or monthly monitoring reports, depending on project requirements, to provide a transparent record of environmental performance.
- Provide practical, on-site guidance to construction personnel on environmental protection measures.
- Advise on immediate containment and clean-up measures in the event of environmental incidents

The EnvCoW acts as both an advisor and a monitor, bridging the gap between project design intentions and site implementation.

3.4.2 Ecological Clerk of Works

The Role of the Ecological Clerk of Works (EcCoW) is to provide independent, on-site environmental expertise. They ensure that construction activities are undertaken in compliance with all relevant ecological legislation, planning conditions and best practice standards.

The EcCoW's responsibilities include but are not limited to:

- Monitor adherence to statutory ecological obligations, planning conditions, and project-specific commitments.
- Verify that all relevant ecological permits, licences, and consents are in place prior to the commencement of works.
- Ensure that the contractor's method statements incorporate appropriate mitigation measures.
- Undertake regular inspections of construction activities and emergency safeguard measures, including spill control kits and equipment.
- Record and report ecological observations, including any non-compliance events and recommended corrective actions.
- Produce weekly or monthly monitoring reports, depending on project requirements, to provide a transparent record of environmental performance.
- Provide practical, on-site guidance to construction personnel on ecological protection measures.
- Advise on immediate containment and clean-up measures in the event of environmental incidents.

The EcCoW acts as both an advisor and a monitor, bridging the gap between project design intentions and site implementation.

3.4.3 The Project Manager

The Project Manager will lead the works on site. They will be responsible for the management and control of the activities and will have overall responsibility for the implementation of the CEMP. They will be assisted in this by the Site Environmental Manager.

3.4.4 Site Manager

A site manager will be appointed by the contractor to over-see the day-to-day management of working areas within the site. The Site Manager's environmental management responsibilities include, but are not limited to:

- Close liaison with the Site Environmental Manager (SEM) to ensure adequate resources are made available for implementation of the CEMP;
- Liaising with the Project Team in assigning duties and responsibilities in relation to the CEMP to individual members of the main contractor's project staff;

- Ensure that all personnel undergo suitable and sufficient environmental and ecological induction prior to starting work;
- Undertake a programme of regular environmental inspections in liaison with the SEM and site staff;
- Ensuring that the risk assessments for control of noise and environmental risk are prepared and effectively monitored, reviewed and communicated on site;
- Managing the preparation and implementation of method statements; and
- Ensuring that the SEM reviews all method statements and that relevant environmental protocols are incorporated and appended.

3.4.5 Site Environmental Manager (SEM)

A Site Environmental Manager will be appointed by the contractor to ensure that the CEMP is effectively implemented. The main duties and responsibilities of the SEM include and are not limited to the following:

- Liaise with the Site Manager during the finalisation of the CEMP to assign individual duties and responsibilities bearing in mind the overall organisational structure, the nature of the Environmental Commitments and Requirements and the Proposed Development specific characteristics;
- Ensuring that the CEMP is finalised, implemented and maintained.
- Liaising with FCC's Environmental Manager on all Method Statements, any alterations to live documents and any other works.
- Being familiar with the information in the pre-construction surveys, construction requirements, the competent authority's decision, and all relevant Method Statements.
- Being familiar with the baseline data collated during the compilation of the planning documentation;
- Assisting management in liaising with the FCC and the provision of information on environmental management during the construction of the Proposed Development;
- Liaising with the Project Team in assigning duties and responsibilities in relation to the CEMP, to individual members of the main contractor's project staff;
- Overseeing, ensuring coordination and playing a lead role in third party consultations required statutorily, contractually and in order to fulfil best practice requirements;

- Liaising with management in agreeing site specific Method Statements with Third Parties;
- Ensuring that all relevant works are undertaken in accordance with the relevant legislation;
- Bring any legal constraints that may occur during certain tasks to the attention of management;
- Keeping up to date with changes in environmental practices and legislation and advising staff of such changes and incorporating them into the CEMP;
- Hold copies of all permits and licenses provided by waste contractors;
- Ensuring that any operations or activities that require certificates of registration, waste collection permits, waste permits, waste licences, etc have appropriate authorization;
- Gathering and holding documentation with respect to waste disposal;
- Liaising with contractors and consultants prior to works;
- Procuring the services of specialist environmental contractors when required;
- Ensuring that all specialist environmental contractors are legally accredited and proven to be competent;
- Ensuring that environmental and ecological induction training is carried out on all personnel on site and ensuring that toolbox talks include aspects of environmental awareness and training;
- Respond to all environmental incidents in accordance with legislation, the CEMP and company policy/procedures;
- The SEM is responsible for notifying the relevant statutory authority when environmental incidents occur and producing the relevant reports as required;
- Ensuring that all relevant works have (and are being carried out in accordance with) the required permits, licenses, certificates and planning permissions;
- Carrying out regular documented inspections of the site to ensure that work is being carried out in accordance with the CEMP and relevant site-specific Method Statements;
- Responsible for reviewing all environmental monitoring data and ensuring that they all comply with stated guidelines and requirements; and
- Liaising with management in preparing and inspection of site-specific method statements for activities where there is a risk of pollution or adverse effects on the environment.

3.4.6 Design Manager

The main duties and responsibilities of the Design Manager, having regard to the implementation of the CEMP, include:

- Be familiar with the CEMP and relevant documentation referred to within; and
- Participate in Third Party Consultations and liaising with third Parties through the SEM.

3.4.7 Supervisors

The supervisors' environmental management responsibilities include, but are not limited to:

- Ensuring all personnel affected by a method statement are briefed and fully understand it's content;
- Ensuring all personnel affected by a method statement are briefed and fully understand its content;
- Implementing environmental management activities required by the CEMP and works method statements;
- Ensuring that all inspections are carried out as prescribed in the CEMP;
- Ensuring that the procedures agreed during third party consultations are followed;
- Reporting immediately to the SEM, EnvCoW and EcCoW any incidents where there has been a breach of agreed environmental or ecological management procedures, where there has been a spillage of a potentially harmful substance, where there has been an unauthorised discharge to ground, water or air, damage to habitat, etc.; this will then be relayed to members of FCC, National Parks and Wildlife Service, Inland Fisheries Ireland and Waterways Ireland and
- Attending environmental review meetings and preparing any relevant documentation as required by management.

3.4.8 All Project Personnel

All project personnel have the following responsibilities:

- Attend environmental and ecological training as required; and
- Reporting immediately to their supervisor or SEM any spillage incidents or observations regarding adverse effects to the environment.

3.5 Project Communication and Co-Ordination

Environmental issues and performance aspects will be communicated to the workforce on a regular basis. Weekly project meetings, which follow a set agenda incorporating the environment, will be held alongside overall management meetings.

All staff and sub-contractors involved in all phases of the project will be encouraged to report environmental issues.

3.6 Training

All employees and subcontractors involved with the Proposed Development will be given a comprehensive induction prior to commencement of the works on site, which will include environmental and ecological awareness training. The training will ensure that all personnel are familiar with the following:

Training will include:

- Overview of the Environmental Manager and their role;
- Overview of the goals and objectives of the Environmental Policy and Construction Environmental Management Plan;
- The contents of the CEMP and the consequences of departure from the procedures therein;
- Awareness in relation to risk, consequence and methods of avoiding environmental risks as identified within the Environmental Register and with the planning conditions;
- The requirements of due diligence and duty of care;
- Requirements associated with community engagement and stakeholder consultation;
- Identification of environmental and ecological constraints and notable features related to the site, e.g. sensitive receptors such as Myxas snail; and
- Procedures associated with incident notification and reporting.

A record will be kept of a signed register on the project files of all attendees of the environmental induction.

Toolbox talks based on specific activities being carried out will be given to personnel by the nominated project representative. These will be based on specific activities being carried out and

will include environmental and ecological issues, particularly in relation to Proposed Development, including the impact on water quality namely:

- Oil/Diesel spill prevention and safe refuelling practice;
- Storage of materials including oil/diesels and cement;
- Emergency response processes used to deal with spills;
- Preventing disturbance to wildlife, specifically to report if they are to come across wild faunal species that need movement, e.g. Bats, Amphibians, Otter or Badger - which should be conveyed to the local NPWS Ranger and Biodiversity Officer.
- Consideration of importance of containment of vehicle washing, containments of concrete /cement / grout washout etc, bank protection using hessian to prevent excessive scour and mobilisation of suspended solids, maintenance of vegetation corridors etc.

3.7 Operational Control

Site works will be checked against the CEMP requirements. Any mitigation measures that have been agreed with the statutory authorities, or are part of planning conditions, will be put into place prior to the undertaking of the works for which they are required, and all relevant staff will be briefed accordingly.

Method statements that are prepared for the works will be reviewed / approved by the Client Project Manager and where necessary the relevant environmental specialist. All method statements for works in, near or liable to impact on the Royal Canal or other waterway must have prior agreement with Waterways Ireland, Inland Fisheries Ireland (IFI) and the National Parks and Wildlife Service (NPWS) as necessary.

A Quality Management System (QMS) will also be put into operation for the project. Document control will be in accordance with this QMS and copies of all audits, consents, licences, etc will be maintained by the SEM and their team and kept on site for review at any time.

Prior to commencement of works, activity-specific method statements shall be prepared for works adjacent to watercourses, protected habitats, protected structures, bridge construction, boardwalk construction, significant vegetation clearance and utility diversions. Method statements shall be reviewed by the SEM and, where required, the EnvCoW, EcCoW or project specialists.

3.8 Checking and Corrective Action

Daily inspections of the site and the works will be undertaken by the ECoW to minimise the risk of environmental damage and to ensure compliance with the CEMP. Any environmental incidents are to be reported immediately to the Site Supervisor and ECoW. The ECoW will undertake periodic inspections and complete an assessment of the project's environmental performance with regard to the relevant standards/legislation and the contents of the CEMP. Following these inspections, the ECoW will produce a report detailing the findings which will be provided to the Client Project Manager and reviewed at the following project meeting.

3.9 Environmental Control Measures

Licensing requirements will be in place and specific procedures to manage the key environmental aspects of the project, as detailed in the environmental register will be developed by the contractor prior to work commencing. Environmental control and mitigation measures are covered in Section 4.

3.10 Complaints Procedure

The SEM or a nominated liaison officer will be available for members of the public or interested parties to make complaints or inquiries about the construction works. The CEMP will contain details of the complaints procedures and a monitoring system will be implemented to ensure that any complaints are addressed and comments are documented, so that a satisfactory outcome is achieved for all parties.

4 Environmental Commitments & Mitigation Measures

Project Environmental and ecological mitigation will be detailed in the construction stage CEMP and should be in accordance with this OCEMP. The construction stage CEMP will provide a framework for compliance auditing and inspection to ensure that these construction practices and mitigation measures are adhered to.

This OCEMP has been prepared to implement the mitigation measures identified in the EIAR. All mitigation and monitoring measures set out in the EIAR shall be deemed incorporated into this OCEMP. Where this OCEMP provides additional detail, methodology or management procedures, such provisions shall supplement, and not replace, the mitigation measures identified in the EIAR.

4.1 General

The mitigation measures and environmental commitments identified within the EIAR have informed the development of this Outline Construction Environmental Management Plan (OCEMP). The mitigation measures described within this section establish the construction-stage management framework for the Proposed Development and shall be incorporated into the Contractor's Construction Environmental Management Plan (CEMP) prior to commencement of works.

A consolidated Environmental Commitments Register is provided in Section 6. The register summarises all construction-phase mitigation measures and environmental commitments identified within the EIAR and provides traceability to the relevant EIAR chapter and section. The Contractor shall comply with all commitments contained within the register throughout the construction period.

4.2 Compound Locations

Temporary construction compound space will be required to provide stores, offices, material storage, parking and welfare facilities for the contractor and employers representatives. The exact location layout and size of the compound(s) will be at the discretion of the contractor with the agreement of FCC. While final construction compound locations will be determined by the contractor, several potential compound locations have been identified. The potential locations, presented in Figure 4-1, are as follows:

Hansfield area – An existing grassed / planted area between the existing towpath and the adjacent lands has been acquired by FCC. The area is to be cleared and excavated to facilitate the Proposed Development works. The area can be accessed from Hansfield Road and will require the

demolition of the existing properties proposed as part of the works to be carried out prior to full establishment of the compound. Once established this will likely operate as the main compound for the remaining works.

Sheepmoor Lane – An open grassed area has been acquired by FCC for the intent of using this space for maintenance and storage. During the construction phase this area may be used as a satellite compound / storage area.

Castleknock area – A grassed section of the Laurel Lodge Park, accessed via Park Lodge. Due to its setting this will likely only act as a satellite compound for storage of materials associated with the adjacent works and access for HGVs and large plant will be limited.



Figure 4-1 Possible Construction Compound Locations (Source: Google Maps)

The selection of final construction compound locations will be the responsibility of the Appointed Contractor, subject to adherence to the mitigation measures herein – particularly with reference to Biodiversity. The contractor must ensure that temporary compounds, storage areas and welfare facilities avoid ecologically sensitive habitats, retained trees, protected species locations, flood-prone areas and areas of archaeological sensitivity wherever practicable.

All temporary working areas shall be reinstated following construction. Reinstatement shall include restoration of topsoil, reseeding, landscaping and replacement planting where required in accordance with the approved landscape proposals.

4.3 Traffic and Transportation

The OCEMP includes the Construction Methodology Report as Appendix A and the Outline Construction Traffic Management Plan (Outline CTMP) as Appendix B. Together, these documents provide the planning-stage framework for managing construction effects, including construction worker travel, construction vehicle movements, delivery timing, construction access, compound parking, haul routes, temporary traffic management and stakeholder notification. The appointed

contractor will prepare a detailed construction-stage CEMP and Construction Stage Temporary Traffic Management Plan (CSTTMP) before works commence.

The construction-stage CEMP will incorporate the requirements of the OCEMP, the mitigation measures set out in this EIAR and any conditions attached to the planning decision.

The appointed contractor will be required to prepare a detailed CSTTMP, based on the Outline CTMP, prior to commencement of works. The CSTTMP will confirm the detailed construction access arrangements, delivery management procedures, worker parking controls, workforce travel arrangements, haul routes, temporary traffic management layouts, inspection procedures and any approvals required from Fingal County Council and other relevant stakeholders. This approach ensures that the potential impacts associated with construction workers' travel and delivery vehicles have been considered at planning stage and will be managed through construction-stage controls. The following initiatives will be implemented to avoid, prevent or reduce any identified significant adverse effects on the environment arising as a result of the construction period:

- During the pre-construction phase, the site will be securely fenced off/hoarded off from adjacent properties, public footpaths and roads;
- Appropriate on-site parking (temporary parking for the duration of construction works) and compound area will be provided to prevent overflow onto the local network;
- Construction operatives shall park at the Hansfield main compound and shall be transported from the compound to active work areas by vans, minibuses or other managed transport. No construction worker parking shall be permitted within temporary work areas or on adjoining public roads. Prior to commencement of construction, the appointed contractor shall prepare and implement a Construction Mobility Management Plan to encourage shared travel and sustainable modes and minimise construction worker trip generation.
- Construction deliveries shall be managed through a booking and scheduling system and spread across the working day. HGV deliveries shall be scheduled outside peak traffic periods where practicable. The assessed construction traffic level is a maximum of nine HGV movements per day. These requirements shall be incorporated into the CSTTMP prepared prior to commencement of construction.
- Truck wheel washes will be installed at construction entrances;

- Any specific recommendations with regard to construction traffic management made by Fingal County Council will be adhered to;
- Potential localised traffic disruption during construction will be managed through the CSTTMP. Measures will include temporary lane restrictions or one-way alternating traffic where required, signed diversion routes, temporary pedestrian and cyclist arrangements, controlled construction access points, traffic marshals where necessary, advance warning signage and stakeholder notification. The extent and duration of temporary restrictions will be minimised. All temporary traffic management measures will be designed, implemented and maintained by suitably qualified personnel in accordance with Chapter 8 of the Traffic Signs Manual and the Guidance for the Control and Management of Traffic at Road Works.
- Material storage zones will be established in the compound area and will include material recycling areas and facilities;
- 'Way finding' signage will be provided to route staff / deliveries into the site and to designated compound / construction areas;
- Transportation of site machinery and materials will be scheduled outside peak traffic periods where practicable and will not take place between 19:00 and 07:00 unless otherwise agreed for specific exceptional activities. Where works are required in the vicinity of schools during the school term, deliveries, plant movements and temporary traffic management changes will be restricted during school drop-off and pick-up periods;
- Dedicated construction haul routes will be identified and agreed with Fingal County Council prior to commencement of activities on-site; and
- On completion of the works, all construction materials, debris, temporary hardstands etc. from the site compound will be removed off-site and the site compound area reinstated in full on completion of the works.

4.4 Population and Human Health

Mitigation measures proposed throughout the various chapters of the EIAR are designed to avoid significant adverse impacts. These measures contribute to the protection of population and human health by minimising temporary construction effects and maximising the accessibility, connectivity, safety and recreational benefits of the completed greenway.

During construction, mitigation measures include:

- Implementation of the Outline Construction Environmental Management Plan (OCEMP) and Outline Construction Traffic Management Plan (OCTMP);
- Measures to minimise noise, vibration, dust and air quality impacts on nearby residents, schools, healthcare facilities and other sensitive receptors including controls on construction working hours, careful selection and management of construction plant, dust suppression measures, construction traffic management measures, and ongoing monitoring and implementation of mitigation measures identified under relevant headings;
- Maintenance of safe pedestrian, cyclist and vehicular access throughout the construction period, including temporary traffic management and signage;
- Management of construction traffic, working hours and material storage locations to minimise disturbance to local communities through the implementation of relevant mitigation measures set out under relevant headings;
- Protection of water quality and implementation of pollution prevention measures;
- Community notification and stakeholder engagement measures to inform residents and facility users of construction activities and temporary access arrangements.

4.5 Biodiversity

The following mitigation measures relating to the protection of biodiversity will apply during the construction phase of the Proposed Development. Reference should be made to Chapter 8: Biodiversity of the EIAR for further information and details on the required mitigation measures.

Updated pre-construction ecological surveys shall be undertaken where required prior to commencement of works to confirm the status of identified ecological receptors and validate mitigation measures outlined within the EIAR and associated ecological reports.

4.5.1 Ecological and Environmental Clerk of Works

For all periods of work as part of the Proposed Development both an Environmental Clerk of Works (EnvCoW) and two Ecological Clerk of Works (ECoW) will be appointed and will be on site to ensure the mitigation measures set out in this report are followed. This includes the following during active construction works; daily inspections of works next to the canal, of site compounds, of the storage of material, of the pollution control measures and any works in close proximity to active and potential Badger setts, potential Otter holts and trees. An ECoW will also inspect all mature

trees that require removal for potential bat roosting features, in addition to an on-site arborist who will inspect all trees for their health.

4.5.2 Compound Selection and Design

Temporary construction compound space will be required to provide stores, offices, material storage, parking and welfare facilities for the contractor and employers representatives. Three indicative compound locations have been considered herein. These locations have been specifically chosen to minimise impacts to the environment and on Key Ecological Receptors (KERs), being chosen at locations separated from the Royal Canal by substantial buffers and in areas of lower ecological value.

In addition, the site compounds will be located outside any designated tree protection zone. No excavation works within tree root protection areas will be permitted to install temporary services for site cabins and facilities. Any temporary services within tree root protection areas will be above ground and protected accordingly. No operating generators or toxic liquids will be stored within the tree root protection areas of retained trees during construction. Overhanging tree canopies will be avoided when transporting, installing and removing site cabins near tree crowns. A banksman will be present during this process to ensure that all operations are carried out in a controlled manner, and no part of the cabin meets overhanging tree crowns.

The proposed location of the compounds has been chosen to avoid any potential degradation of valuable habitats on site, with the proposed locations as outlined above situated on amenity grassland and/or existing artificial surfaces such as car parking. The site compound must make provisions for the following:

- Only plant and materials necessary for the construction of the works will be permitted to be stored at the compound location.
- Site Security to restrict unauthorized entry;
- Bunded storage of fuels and refuelling area. Bunds shall be 110% capacity of the largest vessel contained within the bunded area.
- A separate container will be located in the contractor's compound to store absorbents used to contain spillages of hazardous materials. The container will be clearly labelled, and the contents of the container will be disposed of by a licenced waste contractor at a licenced site. Records will be maintained of material taken off site for disposal.

- A maintenance programme for the bunded areas will be managed by the site environmental manager. The removal of rainwater from the bunded areas will be their responsibility. Records will be maintained of materials taken off site for disposal.
- The site environmental manager will be responsible for maintaining all training records.
- Ensuring a drainage collection system is present at a designated washing area and monitor throughout the construction phase to ensure it is adequate to prevent run-off into local surface watercourses/infrastructure.
- Refuelling will take place in a designated bunded area away from surface water gullies, drains and water bodies, and in the event of refuelling outside of this area, fuel will be transported in a mobile double skinned tank;
- All machinery and plant used will be regularly maintained and serviced and will comply with appropriate standards to ensure that leakage of diesel, oil and lubricants is prevented.
- All temporary construction compounds and site entrances are to be removed upon completion of the construction phase. Such areas are to be reinstated in accordance with the landscape architects' plan and engineer's drawings.
- Construction material (supplies and waste) will be stored in appropriate containers that are not accessible by any local fauna; large materials which may provide an opportunity for entrapment, such as upturned culverts and basins will be covered to prevent accidental entrapment of species.
- All construction waste is to be removed from site on completion of the construction phase by appropriately licensed waste collectors, who will transport all waste to appropriately licensed waste facilities.
- Oil / fuel storage areas are to be decommissioned on completion of the construction phase. Any remaining liquids are to be removed from site and disposed of at an appropriate licensed facility. Fingal County Council's Environmental Control Section is to be notified of the proposed destination for disposal of any liquid fuels.

4.5.3 Landmark Bridge Construction Mitigation

As detailed in the construction methodology report, Landmark Bridge will be approximately 230m in length and will have a maximum single span of 30m across the Royal Canal itself (Chainages +7115 to 7350).

Refer to Chapter 8: Biodiversity of the EIAR for further information and details on the required mitigation measures in relation to sedimentation, pollutant events, and the required construction methodologies.

4.5.4 Habitat

In line with standard engineering design to comply with the Surface Water Regulations, the construction of the proposed development will be subject to specific construction management measures to avoid direct and indirect impacts on the water courses adjacent to the site. These measures are specific to the protection of water quality in the Royal Canal and The Rusk River (CH. 2460) and their associated drainage networks.

4.5.5 Flora

- The contractor to ensure that the appropriate tree felling licence is in place before tree removal can commence.
- All proposed tree removal to be strictly in accordance with the Arboricultural Impact Assessment (AIA);
- Tree protection measures to be employed in line with AIA requirements and in consultation with the EcCOW.
- Although it is not anticipated that there will be any interface with invasive species, procedures will be put in place to prevent the spread of any Japanese Knotweed, Himalayan Knotweed and three corner garlic within or outside the works area prior to any works commencing;
- Boot cleaning disinfection trays with Virkon Aquatic 1% should be onsite and all staff and visitors should use these on arrival and before leaving the site - to prevent the spread of invasive species;
- Wheel washes to be placed at all site entrance and egress points. All vehicles entering or exiting the site to make use of wheel washes before leaving or entering site;
- Any vegetation clearance or demolition of buildings required will only be undertaken subject to prior inspection and monitoring and directed by a suitably qualified ecologist;

4.5.6 Birds

No vegetation will be removed during the breeding bird season (1st March to 31st of August), where it is necessary to remove vegetation within this time period a project specific derogation licence will be sought from the National Parks and Wildlife Service.

4.5.7 Mammals, Amphibians and Aquatic Invertebrates

A general mitigation for all small mammals and amphibians is that an open excavation will be covered before the end of a working day or have exit ramps placed to allow mammals / amphibians to escape if trapped.

Particular care shall be exercised in areas identified as supporting *Myxas glutinosa*. Construction activities shall avoid direct encroachment into the canal, minimise sediment mobilisation and prevent reductions in water quality. Site-specific controls shall be implemented in consultation with the EcCoW.

Additionally, the following mitigation measures are summarised from the Biodiversity EIAR Chapter and associated ecological reports prepared for the Proposed Development, and will be implemented in relation to the presence of:

Badgers

- No heavy machinery should be used within 30m of badger setts;
- During badger breeding season (December to June) No works should be undertaken within 50m of active badger setts with a 150m exclusion for pile-driving works;
- Temporary timber hoarding should be installed 30m from sett areas in a full radius during works as a means of screening from indirect disturbance and to prevent the disturbance of vegetation near the setts. This only applies to Glen Garbh, where important foraging habitat is located to the north of the proposed Greenway;
- Adjoining areas of badger habitat to always remain accessible. Contractor to install temporary badger passes, underpasses or tunnels to allow badger access if needed.
- A pre-construction badger survey should be undertaken prior to works commencement.
- The appointed ecological clerk of works would ensure the badger mitigation measures are implemented.
- The requirement for a derogation for indirect disturbance should be agreed with the NPWS, in consultation with the Fingal County Council (FCC) Biodiversity Officer, for the active setts identified given that they are located within 30m of the preferred route.
- The landscape masterplan will include planting choices which provide varied habitats for Badger foraging and will be laid out in such a way as to screen certain sections of the

greenway from Badger setts and commuting zones. This is discussed further in the operational mitigation below.

Otter

Specific mitigation measures are detailed in the Otter Report completed for this scheme (Triturus Environmental Ltd 2022c). These measures as well as others are summarised as follows:

- As the proposed works are likely to disturb potential (although inactive) breeding/resting areas, a derogation license will be required from NPWS, given their close proximity of <10m.
- Furthermore, a pre-construction Otter survey of these potential holts will be required to determine if the areas have become active in the interim period between initial surveys and the construction phase of the Greenway.
- The avoidance of undisturbed areas supporting the breeding and resting areas of Otters can be achieved by the consideration of alternatives, avoidance by project design (changing the project design to retain areas used by species), altering the way in which activities or works are undertaken and or using appropriate methods or machinery to avoid impacts (NPWS,2021). These measures have been followed in the design phase of the project.

Further mitigation measures include:

- Construction within 30m of the potential holts, and any other holts identified in the interim, will be appropriately screened as described in the mitigation measures for Badger above.
- Areas that have previously been identified as a latrine, while not requiring a derogation license, should be avoided or minimally impacted where possible.

Bats

'Bat-sensitive lighting' for this development would have the following design principles:

- No vegetation will be removed during the summer season (1st April to 31st of August), to prevent the disturbance of temporary roosting activity.
- If lighting is required near site boundaries, the lighting poles will be installed on the boundary and will face inwards (i.e. towards the centre of the site). This will ensure that lighting is not directed outside the site boundaries.
- No lighting will be in operation outside of working times.
- All lights around the site boundary will be fitted with directional hoods and/or luminaires to direct the light downwards onto targeted areas and to prevent unnecessary light-spill.

- The intensity of lighting will be kept to the minimum level required for safety and security.
- Low-UV LEDs or low / high pressure sodium lamps will be the preferred bulb type, as they have least adverse effect on bats. Mercury, metal halide or high-UV LED bulbs will not be used.

These measures will apply both to temporary lighting during the construction of the proposed development, and to permanent lighting during the operation of the development.

In addition, mitigation measures derived from those in the Bat Report (Bat Eco Services, 2022) are as follows:

- Bats found along the canal may be impacted through the removal of foraging and commuting habitats, this has been mitigated for in the landscape design for the proposed route, where further enhancement will take place through the planting of night scented flowering plants, as well as new planting of trees. This will form part of operational mitigation measures.
- Bat boxes should be included in the landscaping plan for the proposed route and will be installed operationally.
- Any mature trees subject to removal should be surveyed for Potential Bat Roost value before felling by an appropriately qualified ecologist. If a bat roost is found, felling should be reconsidered. If felling is unavoidable, an endoscopic survey must be conducted and if roosting bats are found, a derogation license from NPWS will be required for the removal of bats by a suitably qualified ecologist.

Amphibians

While Frog and Newt have not been recorded on site to date. They may be encountered during the works. If they are recorded during any ditch-related activities (Surface water drainage/removal of adjacent vegetation) the EcCoW will need to be notified and will oversee their relocation.

Endangered Glutinous Snail (*Myxas glutinosa*)

An ecology survey was carried out by Triturus Environmental Ltd. in June 2025. The survey found that *Myxas* species were most prevalent within the Royal Canal sections between the Confey Slipway and Collins Bridge (Ch. 540-565), as well as at Pakenham Bridge.

Greenway widths have been narrowed to avoid any widening into the canal or extension of the greenway into the canal.

In addition, the contractor should as a minimum:

- Surface water drainage should be directed away from the canal and towards the adjacent drainage channel.
- Silt fencing should be installed along the north bank of the canal to prevent silt impacting snails within the canal.
- Avoid increased riparian shading.
- Avoid bank erosion and turbidity.
- Maintain high construction hygiene throughout the site, particularly in the region between Confey Slipway and Pakenham bridge.
- In consultation with a suitably qualified ecologist consider the installation of artificial refugia (reef balls).
- Extreme care should be taken with any works being performed near the snail habitats mentioned above. The EcCoW should be consulted before works commence in these areas to ensure the correct mitigation measures are maintained.

4.5.8 Management of Invasive Species

A detailed Invasive Species Management Plan will be prepared to identify the location of possible invasive species, particularly three-cornered garlic, in the works areas. This is to ensure that the proposed works at these locations do not result in the spread and introduction of invasive species.

The Invasive Species Management Plan will include:

- Detailed site-specific management measures in the treatment and control of the identified invasive species during the construction phase;
- Be prepared by a suitably qualified professional in the area of invasive species, in conjunction with the contractor;
- Comply with the relevant guidelines;
- Provide for the ongoing treatment and monitoring of invasive species following completion of the Works;
- Ensure that any watercourses are adequately protected during and after construction activity;
- Ensure that the proposed works will not result in any spread of any invasive species on land, either through the movement of soil, machinery or equipment; and

- Ensure that best practice control measures are implemented throughout the construction phase to prevent the spread of invasive species.
- Boot cleaning disinfection trays with Virkon Aquatic 1% should be onsite and all staff and visitors should use these on arrival and before leaving the site - to prevent the spread of invasive species

The contractor will employ the services of a suitably qualified professional to complete Invasive Species Surveys prior to commencement and will update the CEMP to incorporate the Invasive Species Plan to be easily viewed within the report.

As a minimum the following best practice measures will be implemented on site to prevent the introduction of invasive species:

- Any invasive species identified on site to be fenced off, clearly marked and checked by EcCoW before any works may commence in the vicinity.
- If it is not possible to avoid infested areas, invasive species are to be dealt with in accordance with the relevant invasive species management measures set out in the Biodiversity EIAR Chapter and the Invasive Species Management Plan to be prepared for the construction stage.
- Good construction site hygiene to be employed in all works areas. All personnel and visitors to disinfect boots before entering or leaving site. Vehicles entering or leaving site to be thoroughly washed in appropriately spaced wash areas. Run-off from vehicle wheel wash areas to be appropriately managed without discharge to adjacent watercourses.
- Any imported material to be formally documented as invasive free and confirmed by ECOW before acceptance on site.
- Any potentially contaminated material arising from site must either be treated on site or re-use within the site boundaries to mitigate the risk of spread.
- Following completion of works, a monitoring program should be established to ensure no additional spread of invasive species has occurred, and that ongoing treatment of invasive species has been effective.
- All operatives to be briefed in the procedures for handling invasive species should they be identified on site after commencement of construction works.

4.6 Water

Chemical Pollution of Hydrogeological and Surface Water Receptors

To prevent accidental pollution of groundwater, the Royal Canal, the Rusk Watercourse and associated drainage infrastructure:

- Refuelling of construction plant shall only take place within designated refuelling areas located away from the Royal Canal, watercourses and drainage features.
- Bulk fuel, oils, lubricants, chemicals and other potentially polluting substances shall be stored within bunded storage areas providing a minimum storage capacity of 110% of the largest container.
- Mobile plant shall be regularly inspected and maintained to minimise the risk of leaks.
- Spill kits appropriate to the activities being undertaken shall be maintained at all active work locations.
- Drip trays shall be used beneath stationary plant and equipment where there is a risk of leakage.
- Concrete washout, concrete cutting and cement handling areas shall be located away from surface water receptors and drainage systems.
- Washout of concrete wagons shall not be permitted within the site.
- No discharge of untreated water arising from construction activities shall be permitted to the Royal Canal, the Rusk Watercourse or any drainage system.
- Welfare facilities shall be connected to temporary storage tanks, with wastewater removed off-site by a licensed contractor, unless a temporary network connection has been approved.

Pollution of Surface Waters by Suspended Solids

Construction activities adjacent to the Royal Canal corridor have the greatest potential to generate sediment-laden runoff.

To minimise the release of suspended solids:

- Construction works shall be undertaken on a phased basis to minimise the extent of exposed ground at any one time.

- Earthworks within the canal corridor shall be sequenced to minimise the duration of exposure of bare soils.
- Temporary stockpiles shall be located away from the canal edge, watercourses, drainage paths and overland flow routes.
- Silt fencing, settlement measures, check dams, sediment traps and other appropriate sediment control measures shall be installed where required.
- Existing vegetation adjacent to the canal shall be retained wherever practicable to provide erosion protection.
- Exposed surfaces shall be stabilised as soon as practicable following completion of works.
- Temporary drainage measures shall be maintained and inspected regularly throughout the construction period, particularly following heavy rainfall events.
- Any pumped water arising from excavations shall be treated, where necessary, prior to discharge.

Physical Modification of the Royal Canal Corridor, Watercourses and Drainage Features

Works within the Royal Canal corridor shall be undertaken in a manner that minimises disturbance to the canal environment and existing hydraulic conditions.

Accordingly:

- The Landmark Bridge shall comprise a clear-span structure avoiding permanent encroachment into the active canal channel.
- Existing canal banks shall be retained wherever practicable.
- Temporary works within the canal corridor shall be limited to the minimum extent necessary.
- Construction access routes adjacent to the canal shall be carefully managed to minimise disturbance to canal banks and riparian areas.
- Any temporary disturbance to canal banks shall be reinstated upon completion of the works.
- Drainage and crossing works shall be undertaken in a manner that maintains flow conveyance and avoids adverse impacts on channel stability.

- Existing culverts, drains and outfalls shall remain operational unless otherwise agreed with the relevant authority.

Changes to Runoff and Flow Regimes

The Proposed Development has been designed to manage runoff close to source and minimise changes to existing drainage characteristics.

Accordingly:

- Temporary construction drainage shall be provided where necessary to divert runoff away from active work areas.
- Existing drainage patterns shall be maintained where practicable throughout construction.
- Surface water shall be directed to appropriate treatment and attenuation measures prior to discharge.
- Temporary drainage infrastructure shall be inspected and maintained throughout the works.
- Construction compounds and hardstanding areas shall incorporate appropriate runoff management measures.

Water Quality Monitoring

Water quality monitoring shall be undertaken during construction at locations adjacent to active works within the Royal Canal corridor and at other locations where identified within the CEMP.

Monitoring shall include:

- Visual inspections;
- Turbidity monitoring, where appropriate;
- Inspection of sediment control measures;
- Inspection of drainage controls and pollution prevention infrastructure.

If monitoring identifies elevated turbidity, visible pollution, hydrocarbon contamination or failure of sediment control measures attributable to construction activities, then:

- the relevant activity shall cease immediately;
- the source of contamination shall be identified;
- corrective measures shall be implemented;

- monitoring shall be repeated to confirm effectiveness prior to recommencement of works.

The Contractor shall be responsible for implementation of monitoring requirements. Monitoring records shall be maintained on site and made available to FCC, the Employer's Representative and the Environmental Clerk of Works.

The contractor will be required to implement industry best practice pollution prevention measures in accordance with guidance documents (for example CIRIA Guideline Document C532 Control of Water Pollution from Construction Sites), during both construction and operation in order to control the risk of pollution to surface waters. In addition, pollution of aquatic systems during the construction phase will be reduced by the implementation of the protection measures as outlined in relation to biodiversity

In the event of a high magnitude flood event (between 0.1 to 1% AEP) during the construction of the Proposed Development within flood zone B, flood protection will be focussed on the pinch point of the flooding extent maps. The drainage ditch lining the current pathway alongside the Royal Canal has the ability to retain a large volume of water. However, as a preventative measure there should be sandbags lining the ditch in the vicinity of the area at risk of flood. The following measures will be followed in the event of a flood event:

- Remove all possible pollutants in work areas near area at risk of flooding.
- Pre-emptively remove equipment and chemicals from the work area when heavy rain is forecast or is ongoing whilst staff are on site. Under the current flood zone B extents, flood water it is unlikely to reach the pathway, however; due to the constrictions of protection if flooding does occur, removal of pollutants is the most prudent mitigation for accidental pollution events.
- Add additional geotextile sandbags around any exposed work surfaces to ensure floodwaters are kept out of these areas. Extra geotextile bags will be stored precautionarily within the site compound to the east of the Hansfield Railway Bridge, which will be checked prior to the commencement of works by the main route ECoW.
- For sedimentation mitigation during a flood event, silt curtain will be installed lining the Royal Canal on the side closest to the works under the supervision of the main route ECoW and EnvCoW. This will allow for removal of any accidental sediment input. This silt curtain will remain in place, if deployed, until the flooding conditions have subsided. This determination will be made by the onsite EnvCoW and main route ECoW. This silt curtain will be available on-site and will be available within the site compound to the east to the

Hansfield Railway Bridge, which can be accessed quickly. The main route ECoW will ensure this is present prior to the commencement of the works

4.7 Land, Soils and Geology

Construction works shall be undertaken in accordance with the mitigation measures identified in Chapter 11 (Land and Soils) of the EIAR. The Contractor shall implement measures to minimise soil disturbance, maximise reuse of excavated materials, prevent erosion and sediment transport, and protect soil and groundwater quality.

The following mitigation measures relating to the protection of soils, geology and hydrogeology will apply during the construction phase of the proposed development:

- The construction works will be carried out with the least feasible disturbance of soils, thereby minimising the amount of excavated soil. The inert excavated soil will be reused within the scheme wherever possible.
- All soil storage will be located outside of species rich areas, ecologically sensitive areas, areas prone to flooding or with tall herb vegetation and covered to avoid sediment run-off and wind blow;
- Areas near Badger activity with soil storage areas will be regularly monitored by EcCoW.
- Where applicable, design measures will be put forward to minimise the excavation of soil that cannot be reused due to their mechanical properties or contamination;
- All waste produced as part of the proposed development will be dealt with in accordance with the relevant waste and environmental management legislation;
- The contractor will be required to submit a Construction Waste Management Plan (CWMP) to the local authority for approval which will address all types of material to be disposed of;
- Where soil stripping and excavation occurs, the resulting excavated soil fractions will be segregated into material that can be disposed of in the appropriate manner in accordance with Waste Management legislation;
- Excess topsoil, inert soil, and all hazardous soil waste will be separately removed off site to an appropriately licenced facility by a licensed contractor;
- Non-hazardous waste exceeding inert Waste Acceptance Criteria (WAC) will be sent to a licensed non-hazardous landfill for disposal/recovery;

- Construction personnel will be required to wear appropriate Personnel Protection Equipment (PPE) and carry out other protective measures outlined in this OCEMP when handling hazardous waste;
- All associated hazardous waste residuals will be stored within temporary bunded storage areas prior to removal by an appropriate EPA approved waste management contractor for off-site treatment/recycling/disposal. Any other building waste will be disposed of within on-site skips for removal by a licensed waste contractor;
- For the importation of topsoil and imported good-quality granular soils materials, the material will be sourced from nearby sites where possible, to reduce transport distances;
- To minimise any impact on the underlying subsurface strata from material spillages, fuels, oils, solvents and paints used during construction will be stored within specially constructed bunded areas or within bunded containers;
- Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles, will take place away from surface water ditches, gullies or drains;
- Spill kits and hydrocarbon absorbent packs will be stored in the site compound and at strategic intervals within the works area and relevant personnel will be fully trained in the use of this equipment;
- Fuel for vehicles will be stored in a mobile double skinned tank;
- Silt and sediment barriers will be installed at the perimeter of earthworks construction areas to limit transport of erodible soils outside of the site; and
- Where applicable, all excavated and/or stripped surfaces will be covered with a required depth of topsoil to encourage the growth of the vegetation after the construction stage, to eliminate erosion and negative visual impacts.

4.8 Landscape, Townscape and Visual

The following specific mitigation measures relating to the protection of landscape and visual will apply during the construction phase of the Proposed Development:

- Where practicable, site hoarding will be erected to restrict views of the site, however without detracting from existing views of the canal;
- Hours of construction activity will be restricted in accordance with guidance from FCC;

- Temporary fencing, compounds, material storage areas and construction lighting shall be managed to minimise visual intrusion and impacts on residential amenity for the duration of the works.

This shall apply together with the relevant measures set out in the Landscape, Townscape & Visual chapter of the EIAR prepared for the Proposed Development.

4.9 Archaeological, Architectural and Cultural Heritage

The following mitigation measures relating to the protection of cultural heritage will apply during the construction phase of the Proposed Development:

- Archaeological monitoring of all groundworks is required including drainage, utility service trenches and any other groundworks deemed appropriate by the appointed archaeologist.
- The work should be carried out under licence from the NMS (National Monuments Service) and any finds, features or deposits detected during the scheme will be reported to the NMS to discuss how best to proceed with the findings.
- Preservation by record or preservation in situ may apply depending on the location and nature of the archaeology.
- A report on the findings will be compiled on completion of the work and submitted to the relevant authorities including the NMS and FCC.
- Particular care shall be exercised during works adjacent to protected structures and historic canal infrastructure. Construction activities shall be undertaken in accordance with recommendations contained within the Cultural Heritage assessment and under archaeological monitoring where required.

4.10 Noise and Vibration

The Construction Environmental Management Plan (CEMP) shall detail appropriate mitigation measures to manage any risk of noise impacting the community.

The contract documents will clearly specify that the Contractor undertaking the construction of the works will be obliged to take specific noise abatement measures. These measures will typically include:

- No plant used on site will be permitted to cause an ongoing public nuisance or wildlife disturbance due to noise.

- The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations.
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract.
- Vehicles required to wait on site will switch off engines.
- Compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers.
- Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use.
- Any plant, such as generators or pumps, which is required to operate before 07:00hrs or after 19:00hrs will be surrounded by an acoustic enclosure or portable screens.
- Location of plant shall consider the likely noise propagation to nearby sensitive receptors.
- During the course of the construction programme, supervision of the works will include ensuring compliance with the noise limits prescribed using methods outlined in BS 5228-1.
- For mobile plant items such as dump trucks, excavators and loaders, the installation of an acoustic exhaust and/or maintaining enclosure panels closed during operation can reduce noise levels by up to 10 dB. Mobile plant will be switched off when not in use and not left idling;
- For percussive tools such as pneumatic concrete breakers and tools several noise control measures include fitting muffler or sound reducing equipment to the breaker 'tool' and ensuring any leaks in the air lines are sealed. Erection of localised screens around breaker or drill bit when in operation in proximity to noise sensitive locations (NSLs) boundaries are other suitable forms of noise reduction;
- Where compressors, generators and pumps are located in areas in proximity to NSLs and have potential to exceed noise criterion, these will be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation;

- Resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can be controlled by fixing resilient materials in between the surfaces in contact;
- Demountable enclosures can also be used to screen operatives using hand tools and may be moved around site as necessary; and
- All items of plant will be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.
- Selection of Quiet Plant
- The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item of plant will be selected wherever possible.
- Should a particular item of plant already on the site be found to generate high noise levels, the first action will be to identify whether said item can be replaced with a quieter alternative.
- For static plant such as compressors and generators used at work areas such as construction compounds etc., the units will be supplied with manufacturers' proprietary acoustic enclosures where possible.
- The contractor will evaluate the choice of excavation, breaking or other working method, having regard to ground conditions and site constraints. Where alternative lower-noise equipment is available and can achieve equivalent structural, excavation or breaking results in the given ground conditions, it will be selected to minimise potential disturbance.
- Activities such as bridge installation, boardwalk construction, piling (if required), demolition and works adjacent to residential areas shall be subject to additional control measures including works planning, monitoring and localised mitigation where necessary.

Construction vibration management measures for the scheme shall include:

- A vibration monitoring programme should be adopted at the nearest properties during the most critical phases of construction e.g. rock breaking etc. to assure the property owners that the prescribed limits are not exceeded.

4.11 Air Quality and Climatic Factors

The contractor is required to implement the following measures in relation to air quality and climate during construction:

- The coordination, implementation and ongoing monitoring of dust produced by site activities. The key aspects of controlling dust are listed below:
 - The development of a documented system for managing site practices regarding dust control;
 - Spraying of exposed earthwork activities and site haul roads during dry weather;
 - Provision of wheel wash at exit points, away from the canal;
 - Covering of stockpiles, which will be under the monitoring of the SEM, EcCoW and EnvCoW;
 - Control of vehicle speeds, speed restrictions and vehicle access; and
 - Sweeping of hard surfaced roads.
- Erection of a 2.4m high hoarding will be provided around work areas where allowable to minimise the dispersion of dust from working areas.
- Stockpiles will be located as far away as possible from sensitive receivers and covered/dampened during dry weather;
- Generators will be located as far away as practicable from sensitive receivers;
- The Contractor shall seek to reduce construction-related greenhouse gas emissions through efficient plant utilisation, minimisation of idling, optimisation of deliveries, reuse of excavated materials where suitable and local sourcing of materials where practicable.
- Where Asbestos Contaminated Material (ACM) is uncovered on site during construction, the ACM will be double-bagged and removed from site by a competent contractor and disposed of in accordance with the relevant procedures and legislation.

At all times, the measures used to control dust will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust will be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

To minimise effects to the climate through harmful emissions, the following controls shall be put in place:

- On-site and delivery vehicles will be prevented from leaving engines idling, even over short periods.
- Material wastage due to poor timing or over ordering on site will be minimised to reduce the embodied carbon footprint of the site.
- The travel distance required to complete the delivery of material and supplies shall be taken into account during procurement and minimised where possible.

4.12 Resource and Waste Management

Construction works shall be undertaken in accordance with the mitigation measures identified in Chapter 15: Material Assets - Resource and Waste Management of the EIAR and the requirements of this OCEMP.

The Contractor shall prepare and implement a project-specific Resource and Waste Management Plan (RWMP) prior to commencement of construction. The RWMP shall establish procedures for the management of excavated materials, imported materials, construction and demolition waste, hazardous waste, by-products and reusable materials arising during the construction phase.

The Contractor shall apply the waste hierarchy throughout the construction phase, prioritising:

- Prevention of waste generation;
- Reuse of materials on-site where practicable;
- Recycling and recovery of materials;
- Off-site beneficial reuse where appropriate; and
- Disposal only where no feasible alternative exists.

Suitable excavated materials shall be segregated, assessed and reused within the Proposed Development where practicable. Materials unsuitable for reuse shall be managed in accordance with applicable waste management legislation and transferred by appropriately authorised contractors to suitably authorised receiving facilities.

Construction waste shall be segregated at source wherever practicable to maximise opportunities for reuse, recycling and recovery. Dedicated waste storage areas shall be established within construction compounds and shall be designed and managed to prevent pollution, nuisance and risks to human health or ecological receptors.

Hazardous wastes shall be stored separately from non-hazardous wastes within clearly identified and appropriately bunded storage areas. Hazardous materials shall only be transported and disposed of by suitably authorised contractors and facilities.

Where materials are proposed for management as by-products rather than wastes, the Contractor shall demonstrate compliance with the requirements of Article 27 of the European Communities (Waste Directive) Regulations and any associated legislative requirements.

The Contractor shall maintain records of:

- Waste generation;
- Waste transfer;
- Material reuse;
- Material recovery;
- Recycling activities;
- Disposal activities; and
- Any by-product determinations or notifications.

Construction personnel shall receive appropriate training regarding waste management procedures, waste segregation requirements and resource efficiency measures.

Management of invasive species material and any contaminated soils encountered during construction shall be undertaken in accordance with the project Invasive Species Management Plan, the Resource and Waste Management Plan and all relevant statutory requirements.

The Contractor shall seek to minimise material consumption and waste generation through efficient procurement, material storage, just-in-time delivery practices and the reuse of suitable site-won materials where practicable.

4.13 Material Assets (Utilities)

Prior to the commencement of excavation works in the vicinity of known or suspected utility infrastructure, the Contractor shall obtain the most up-to-date utility records from the relevant utility providers and confirm the location of underground services through appropriate survey and verification techniques, including utility detection surveys, trial holes and hand excavation where required.

Excavation works within the vicinity of existing utilities shall be undertaken in accordance with the requirements of the relevant utility owner and in compliance with safe digging practices. Appropriate protection measures shall be implemented where required to avoid damage to existing utility infrastructure and interruption of service.

A strategic telecommunications fibre network is known to be present within sections of the canal corridor at shallow depth. Prior to undertaking works within the vicinity of the asset, the Contractor shall confirm its location and depth in consultation with the utility owner. Any excavation works adjacent to the fibre duct shall be undertaken using suitably controlled excavation methods and under appropriate supervision in accordance with the utility owner's requirements.

4.14 Emergencies

- The contractor shall prepare an Emergency Response Plan detailing the procedures to be undertaken in the event of a spill of chemical, fuel or other hazardous wastes, a fire, or non-compliance incident with any permit of license issues;
- The Emergency Response requirements will be displayed at several locations throughout site and at sensitive locations.
- The contractor shall ensure that relevant staff are trained in the use of spill kits.
- The contractor will prepare a site plan showing the location of all surface water drainage lines and proposed discharge points. This will also include the location of all existing and proposed surface water protection measures, including monitoring points, sediment traps, settling basins, interceptors etc.
- Environmental incidents, pollution events, damage to protected habitats, accidental disturbance of protected species or archaeological discoveries shall be reported immediately to the SEM and relevant specialists, with notification of the appropriate statutory authorities where required.

5 Traffic Management

5.1 Traffic Management Plans

An Outline Construction Traffic Management Plan (OCTMP) has been included in Appendix B of this report. The Contractor will develop a Construction Stage Temporary Traffic Management Plan (CSTTMP) in consultation with FCC Roads & Transportation Department prior to commencement of the works. This CSTTMP will be prepared in accordance with the constraints outlined in the OCTMP which will be set out in the tender documentation prior to commencement. Some of the requirements of the plan are outlined below. Further details on the methodology for implementation of these elements are set out in the Construction Methodology Report (Appendix A) prepared for the Proposed Development.

5.2 Environmental Controls

All roads, accesses, drains and ditches will be kept clear of all dirt, mud and material arising from the execution and completion of the Works and suitable clearing equipment and labour will be provided by the Contractor for this purpose.

Attention will also be given to the loading of lorries carrying bulk materials into the Site and spoil from the Site to ensure that these will not be overloaded or are loaded in such a way that spillage is avoided. All trucks entering and exiting the site will be covered with a tarpaulin.

Any dirt or mud adhering to the tyres or chassis of any vehicles will be thoroughly cleaned off before the vehicle is permitted to leave the Site. In the case of delivery to the Site, vehicles will be thoroughly cleaned before they leave the point of collection. The Contractor will be equally responsible for the vehicles of his sub-contractors and suppliers and the like.

The Contractor will allow for the installation and maintenance of an automatic wheel-washing unit on the entrance to the site. This will be available for use at all times. Maintenance will include for cleaning out of the equipment and disposal of any material gathered within. The Contractor must ensure that the required equipment for supplying water and power to the wheel washing facility are available and in good working order. At the end of the Contract, the Contractor must remove the wheel washing facilities in total from site.

Local roads outside the site will be visually inspected daily for dirt and debris tracked from site and washed as required.

5.3 Vehicle Movement and Deliveries

Access routes to and from the site, delivery times and off-loading proposals will be formally agreed with the Local Authority as part of the CSTTMP. In developing the construction and logistics plans, the Contractor will fully include representatives of the FCC Roads & Transportation Department, and other interested parties, in a consultation process to ensure that intentions are properly communicated, agreed and do not unduly affect the surrounding residential and retail properties. The CSTTMP will demonstrate how pedestrians, cyclists and motorised vehicles can pass through the works areas at the road interfaces safely, and that measures are in place to ensure traffic operates in as efficient a manner as possible. The same will apply for users of the existing towpath along the canal banks.

Details of the agreed access routes to and from the site shall be provided to suppliers and other relevant third parties prior to attending site.

All site staff including delivery drivers are required to abide by the normal rules of the road.

Adequate parking and set-down areas shall be provided for personnel and deliveries to avoid queuing at the site entrances and prevent disruption to neighbouring business and local traffic.

All deliveries of materials, plant and machinery to the site and removals of waste or other material, will take place within the permitted hours of work. Vehicle movements will be planned to ensure arrival and departure times are maintained inside the agreed working hours. No day-time or night-time parking of vehicles will be permitted outside agreed areas.

The key to efficient material/plant deliveries will be the effective management and co-ordination/timing of all deliveries. Deliveries will be co-ordinated to prevent queuing of vehicles adversely affecting traffic flow and to minimise disruption to local traffic. They will be timed and coordinated to avoid conflict with collection of waste, other deliveries (including for adjoining properties) and rush hour traffic. Large deliveries will be scheduled outside peak hours to minimise disruption. The Contractor will consider out of hours deliveries and collections to facilitate the smooth continuation of works and minimise disruption.

During the project procurement phase, the Contractor will produce a schedule of deliveries, adopting a 'just in time' approach to avoid potential conflicts and unnecessary storage and handling.

5.4 Road Safety

The Contractor will organise the construction site so that vehicles and pedestrians are kept separate. Gatemen will ensure that the interface between deliveries and road traffic will be controlled at delivery gates.

All vehicles entering site will be restricted to suitable speed limits and will be directed to the relevant area by the gateman.

Construction site vehicle incidents can and should be prevented by the effective management of transport operations throughout the construction process. The gateman will assist in the entry and leaving from the site.

Key issues in dealing with temporary traffic management on site are:

- Keeping pedestrians and vehicles apart
- Minimising vehicle movements
- People on site
- Turning vehicles
- Visibility
- Signs and instructions

Accidents occur from site establishment to finishing works and managers, workers, visitors to sites and members of the public can all be at risk. Inadequate planning and control are the root causes of many construction vehicle accidents.

Most construction transport accidents result from the inadequate separation of pedestrians and vehicles. This will be avoided by careful planning and by controlling vehicle operations during construction work.

The following actions will be taken to help keep pedestrians and vehicles apart:

- Entrances and exits - The construction company will provide separate entry and exit gateways for pedestrians and vehicles with a gateman in attendance to interface with the traffic and public to facilitate safe access and egress of vehicles.
- Walkways - firm, level, well-drained pedestrian walkways will be provided.
- Crossings - where walkways cross roadways, The Contractor will provide a clearly signed and lit crossing point where drivers and pedestrians can see each other clearly;

- Visibility - The contractor will make sure drivers driving out onto public roads can see both ways along the footway before they proceed;
- Obstructions - The contractor will not block walkways so that pedestrians must step onto the roadway;
- The contractor will take steps to make sure that all workers are fit and competent to operate the vehicles, machines and attachments they use on site.

People who direct vehicle movements will be trained and authorised to do so. Accidents can occur when untrained or inexperienced workers drive construction vehicles without authority. Access to vehicles will be managed and personnel alerted to the risk.

The Contractor will provide:

- Mirrors and reversing cameras will be provided on site vehicles to aid drivers in seeing movement all-round the vehicle;
- Reversing alarms will be provided on site vehicles to alert pedestrians and site personnel to the hazard of moving vehicles;
- Properly trained gatemen and spotters will be appointed to control vehicle manoeuvres on site and at access/exit gates.
- The site, particularly access routes, will be lit to provide adequate visibility to alert drivers and pedestrians of potential hazards. Additional lighting may be required after sunset or during inclement weather;
- All personnel on site are required to wear high visibility clothing.
- Warning signs and instructions shall be provided where required around site to inform vehicle operators and other personnel of potential hazards. Standard road signs are to be used where appropriate.
- The Contractor will make sure that all drivers and pedestrians know and understand the routes and traffic rules on site.

The Contractor will provide induction training for drivers, workers and visitors and send relevant instructions out to visitors before attending site. The Contractor will make sure that all the drivers and supply chain personnel are competent and have relevant training and certification appropriate for their job.

6 Summary

This Outline Construction Environmental Management Plan (OCEMP) has set out the procedures, standards, work practices and management responsibilities to address potential environmental effects that may arise from construction of the Proposed Development.

This OCEMP has also addressed the environmental impacts and health and safety concerns associated with construction traffic during the scheme, and has set out procedures, standards and work practices to address these issues.

This Outline CEMP is indicative only; however, it is expected that the adopted CEMP to be prepared by the Contractor will incorporate the items outlined above and ensure that all requirements identified as part of the planning approvals process will be included in the adopted CEMP.

The following Environmental Commitments Register consolidates all construction-phase mitigation measures, management measures and environmental commitments identified within the EIAR. The register provides traceability to the relevant EIAR chapter and section and identifies locations where specific controls are required. The appointed contractor shall comply with all commitments contained within the register.

Ref.	Topic	EIAR Chapter	EIAR Sub-Section	Mitigation / Commitment	Location
GEN-01	General Environmental Management	5, 7, 13, 17	Various	Maintain stakeholder communication procedures and provide a dedicated contact for construction-related queries and complaints.	Throughout (as required)
GEN-02	General Environmental Management	5, 7	Various	Maintain and investigate environmental complaints and implement corrective actions where required.	Throughout (as required)
GEN-03	General Environmental Management	5, 7, 14	Various	Notify affected parties in advance of disruptive works where practicable.	Throughout (as required)
GEN-04	General Environmental Management	14	14.6.1	Implement the OCEMP and all associated management plans throughout construction.	Throughout (as required)
PP-01	General Pollution Prevention	11, 12	Various	Store fuels, oils and chemicals in bunded storage areas with minimum 110% containment.	Compounds and storage areas
PP-02	General Pollution Prevention	11, 12	Various	Undertake refuelling and maintenance in designated areas.	Throughout (as required)
PP-03	General Pollution Prevention	11, 12	Various	Maintain spill kits at all active work locations.	Throughout (as required)
PP-04	General Pollution Prevention	11, 12	Various	Use drip trays where appropriate beneath plant and equipment.	Throughout (as required)

Ref.	Topic	EIAR Chapter	EIAR Sub-Section	Mitigation / Commitment	Location
PP-05	General Pollution Prevention	11, 12	Various	Regularly inspect plant and equipment for leaks and defects.	Throughout (as required)
PP-06	General Pollution Prevention	11, 12	Various	Implement an Emergency Response Plan for spillages and pollution incidents.	Throughout (as required)
PP-07	General Pollution Prevention	11, 12	Various	Control concrete handling and washout operations to prevent contamination.	Compounds and active work areas
AQ-01	Air Quality	5	5.6.1	Undertake routine dust inspections throughout construction.	Throughout (as required)
AQ-02	Air Quality	5	5.6.1	Apply dust suppression measures as required during dry, windy or dusty conditions.	Throughout (as required)
AQ-03	Air Quality	5	5.6.1	Protect exposed stockpiles from wind erosion using covering, seeding or equivalent measures.	Stockpile locations
AQ-04	Air Quality	5, 11, 14	Various	Prevent mud and debris tracking onto public roads through wheel washing and road cleaning measures.	Site access locations
AQ-05	Air Quality	5	5.6.1	Cover loads leaving the site where there is a risk of dust generation.	Site access locations
AQ-06	Air Quality	5	5.6.1	Prohibit burning of waste and materials on site.	Throughout (as required)

Ref.	Topic	EIAR Chapter	EIAR Sub-Section	Mitigation / Commitment	Location
AQ-07	Air Quality	5	5.6.1	Stabilise or reinstate exposed surfaces as soon as practicable following completion of works.	Throughout (as required)
CLI-01	Climate	6, 15	Various	Maximise reuse of excavated and site-won materials where suitable.	Throughout (as required)
CLI-02	Climate	6, 15	Various	Prioritise prevention, reuse and recycling in accordance with the waste hierarchy.	Throughout (as required)
CLI-03	Climate	6	6.5.1	Source materials locally where practicable.	Throughout (as required)
CLI-04	Climate	6	6.5.1	Apply Green Public Procurement principles where feasible.	Throughout (as required)
CLI-05	Climate	6	6.5.1	Review materials and construction methods to reduce embodied carbon where practicable.	Throughout (as required)
NV-01	Noise & Vibration	7	7.8.1	Implement construction noise and vibration controls in accordance with BS 5228.	Throughout (as required)
NV-02	Noise & Vibration	7	7.8.1	Maintain plant and equipment in good working order.	Throughout (as required)
NV-03	Noise & Vibration	7	7.8.1	Select quieter plant and equipment where practicable.	Throughout (as required)

Ref.	Topic	EIAR Chapter	EIAR Sub-Section	Mitigation / Commitment	Location
NV-04	Noise & Vibration	7	7.8.1	Shut down plant and equipment when not in active use.	Throughout (as required)
NV-05	Noise & Vibration	7	7.8.1	Use temporary acoustic screening where required adjacent to sensitive receptors.	Sensitive receptor locations
NV-06	Noise & Vibration	7	7.8.1	Undertake noise and vibration monitoring where required.	Sensitive receptor locations
BIO-01	Biodiversity	8	8.9.2.1.3	Obtain and comply with all required derogation licences relating to protected species prior to commencement of relevant works.	Protected species locations
BIO-02	Biodiversity	8	8.9.2.2.1	Incorporate all biodiversity mitigation measures into the final CEMP.	Throughout (as required)
BIO-03	Biodiversity	8	8.9.2.2.2	Appoint two Ecological Clerks of Works (ECoWs) and an Environmental Clerk of Works (EnvCoW) for the duration of the construction phase.	Throughout (as required)
BIO-04	Biodiversity	8	8.9.2.2.2	No ecological works shall proceed without the presence of the relevant ECoW.	Throughout (as required)

Ref.	Topic	EIAR Chapter	EIAR Sub-Section	Mitigation / Commitment	Location
BIO-05	Biodiversity	8	8.9.2.2.5	Restrict construction compounds to the approved compound locations only.	Hansfield, Sheepmoor Lane and Castleknock compounds
BIO-06	Biodiversity	8	8.9.2.2.5	No excavation or storage shall occur within retained tree root protection areas.	Tree protection areas
BIO-07	Biodiversity	8	8.9.2.2.5	Materials and structures capable of trapping wildlife shall be secured or covered.	Compounds and work areas
BIO-08	Biodiversity	8	8.9.2.2.12	Vegetation clearance shall be undertaken outside the bird nesting season (March to August inclusive).	Throughout (as required)
BIO-09	Biodiversity	8	8.9.2.2.12	Where vegetation clearance during nesting season is unavoidable, a pre-clearance nesting bird survey shall be undertaken by the ECoW.	Relevant vegetation clearance areas
BIO-10	Biodiversity	8	8.9.2.2.12	Retained trees and vegetation shall be protected using exclusion fencing.	Throughout (as required)
BIO-11	Biodiversity	8	8.9.2.2.13	Excavations shall be covered overnight or fitted with escape ramps to prevent entrapment of fauna.	Throughout (as required)
BIO-12	Biodiversity	8	8.9.2.2.13	Pipes and ducts shall be capped when not in use.	Throughout (as required)

Ref.	Topic	EIAR Chapter	EIAR Sub-Section	Mitigation / Commitment	Location
BIO-13	Biodiversity	8	8.9.2.2.14	Works shall be undertaken during daylight hours where practicable to minimise disturbance to wildlife.	Throughout (as required)
BIO-14	Biodiversity	8	8.9.2.2.14	External lighting shall be directed away from the Royal Canal and adjacent habitats.	Throughout (as required)
BIO-15	Biodiversity	8	8.9.2.2.14	Lighting within bat commuting and foraging habitat shall not exceed specified levels.	Royal Canal corridor, woodland, treelines and hedgerows
BIO-16	Biodiversity	8	8.9.2.2.15.1	Tree protection fencing shall be installed prior to commencement of works.	Retained tree locations
BIO-17	Biodiversity	8	8.9.2.2.15.1	Woodland clearance shall be supervised by the Woodland ECoW.	Ch. +5450 to +5550 and Ch. +6300 to +7170
BIO-18	Biodiversity	8	8.9.2.2.15.1	Works shall cease and ecological reassessment undertaken where previously unidentified sensitive ecological receptors are discovered.	Ch. +5450 to +5550 and Ch. +6300 to +7170
BIO-19	Biodiversity	8	8.9.2.2.15.1	Retained woodland habitat shall be fenced to prevent access by machinery and personnel.	Ch. +5450 to +5550 and Ch. +6300 to +7170

Ref.	Topic	EIAR Chapter	EIAR Sub-Section	Mitigation / Commitment	Location
BIO-20	Biodiversity	8	8.9.2.2.15.1	Mammal gaps shall be incorporated into temporary exclusion fencing where appropriate.	Ch. +5450 to +5550 and Ch. +6300 to +7170
BIO-21	Biodiversity	8	8.9.2.2.15.1	Native tree and hedgerow planting shall be implemented in accordance with the Landscape Plan.	Landscape planting areas
BIO-22	Biodiversity	8	8.9.2.2.15.2	Former Annex I grassland areas shall be fenced and designated as ecological exclusion zones.	West of Hansfield Railway Bridge
BIO-23	Biodiversity	8	8.9.2.2.15.2	No machinery, storage or pedestrian access shall occur within protected grassland exclusion zones.	West of Hansfield Railway Bridge
BIO-24	Biodiversity	8	8.9.2.2.15.2	Ecological exclusion areas shall be clearly signed and identified during site inductions and toolbox talks.	West of Hansfield Railway Bridge
BIO-25	Biodiversity	8	8.9.2.2.16.1	Pre-construction badger surveys shall be completed prior to commencement of works.	Throughout (as required)
BIO-26	Biodiversity	8	8.9.2.2.16.1	No heavy machinery shall operate within 30m of badger setts.	Badger sett locations
BIO-27	Biodiversity	8	8.9.2.2.16.1	No works shall occur within designated zone of active badger setts during the breeding season without appropriate approvals.	Active badger sett locations

Ref.	Topic	EIAR Chapter	EIAR Sub-Section	Mitigation / Commitment	Location
BIO-28	Biodiversity	8	8.9.2.2.16.1	Temporary badger crossings shall be provided where required to maintain habitat connectivity.	Throughout (as required)
BIO-29	Biodiversity	8	8.9.2.2.16.1	Any newly identified badger sett shall result in cessation of works, ecological assessment and consultation with NPWS.	Throughout (as required)
BIO-30	Biodiversity	8	8.9.2.2.16.2	Pre-construction otter surveys shall be completed prior to commencement of works.	Throughout (as required)
BIO-31	Biodiversity	8	8.9.2.2.16.2	No works shall occur within designated zone of an active otter holt without an applicable derogation licence.	Otter holt locations
BIO-32	Biodiversity	8	8.9.2.2.16.2	Protective screening shall be installed adjacent to the known breeding otter holt.	Western section of scheme
BIO-33	Biodiversity	8	8.9.2.2.16.2	Any newly identified active otter holt shall result in cessation of works, ecological assessment and consultation with NPWS.	Throughout (as required)
BIO-34	Biodiversity	8	8.9.2.2.16.3	All mature trees to be removed shall be assessed for bat roost potential prior to felling.	Tree removal locations
BIO-35	Biodiversity	8	8.9.2.2.16.3	Discovery of an active bat roost shall require cessation of works and consultation with NPWS.	Bat roost locations

Ref.	Topic	EIAR Chapter	EIAR Sub-Section	Mitigation / Commitment	Location
BIO-36	Biodiversity	8	8.9.2.2.16.4	Existing bridge structures with known nesting bird potential shall be inspected prior to works.	Bridge locations
BIO-37	Biodiversity	8	8.9.2.2.16.4	Active bird nests shall be protected until young have fledged.	Nest locations
BIO-38	Biodiversity	8	8.9.2.2.17	Implement the Invasive Species Management Plan (ISMP).	Recorded INNS locations
BIO-39	Biodiversity	8	8.9.2.2.17.3	Undertake a pre-construction invasive species survey and update baseline mapping.	Throughout (as required)
BIO-40	Biodiversity	8	8.9.2.2.17.4	Fence and clearly demarcate invasive species exclusion zones.	Recorded INNS locations
BIO-41	Biodiversity	8	8.9.2.2.17.4	Implement biosecurity measures for plant, machinery, vehicles and personnel.	Throughout (as required)
BIO-42	Biodiversity	8	8.9.2.2.17.5	Provide invasive species awareness training during site induction and toolbox talks.	Throughout (as required)
BIO-43	Biodiversity	8	8.9.2.2.17.6	Excavation within invasive species areas shall be undertaken under ecological supervision.	Recorded INNS locations
BIO-44	Biodiversity	8	8.9.2.2.17.6	No movement of regulated invasive species material off site shall occur without required licences and waste authorisations.	Recorded INNS locations

Ref.	Topic	EIAR Chapter	EIAR Sub-Section	Mitigation / Commitment	Location
BIO-45	Biodiversity	8	8.9.2.2.17.7	Invasive species material shall be disposed of at appropriately authorised facilities.	Recorded INNS locations
BIO-46	Biodiversity	8	8.9.2.2.17.8	Herbicide application shall be overseen by a suitably qualified pesticides advisor.	Recorded INNS locations
BIO-47	Biodiversity	8	8.9.2.2.17.14	Implement post-treatment monitoring of invasive species throughout the construction phase.	Recorded INNS locations
BIO-48	Biodiversity	8	8.9.2.2.18	Implement ecological monitoring programmes for protected habitats and species during construction.	Throughout (as required)
BIO-49	Biodiversity	8	8.9.2.2.18	Undertake annual monitoring of protected grassland habitats.	West of Hansfield Railway Bridge
BIO-50	Biodiversity	8	8.9.2.2.18	Undertake annual monitoring of retained woodland habitats.	Ch. +5450 to +5550 and Ch. +6300 to +7170
BIO-51	Biodiversity	8	8.9.2.2.18	Undertake annual monitoring of badger, otter, bat and bird populations during construction.	Throughout (as required)
BIO-52	Biodiversity	8	8.9.2.2.18	Undertake quarterly monitoring of glutinous snail populations during construction.	Royal Canal corridor
ACH-01	Archaeology & Cultural Heritage	9	9.6.1	Undertake archaeological monitoring of ground disturbance works.	Throughout (as required)

Ref.	Topic	EIAR Chapter	EIAR Sub-Section	Mitigation / Commitment	Location
ACH-02	Archaeology & Cultural Heritage	9	9.6.1	Cease works in affected areas where previously unknown archaeological remains are identified and consult the National Monuments Service.	Throughout (as required)
ACH-03	Archaeology & Cultural Heritage	9	9.6.2	Record identified heritage features in advance of construction where required.	Heritage feature locations
ACH-04	Archaeology & Cultural Heritage	9	9.6.2	Protect heritage structures from construction impacts.	Old Navan Road Underpass and heritage structure locations
ACH-05	Archaeology & Cultural Heritage	9	9.6.3	Protect the bronze shoe sculptures during construction works.	Sculpture locations
ACH-06	Archaeology & Cultural Heritage	9	9.6.3	Maintain or suitably divert heritage walking routes where temporary closures are required.	Route closure locations
LV-01	Landscape & Visual	10	10.10	Protect existing vegetation and landscape features identified for retention.	Throughout (as required)
LV-02	Landscape & Visual	10	10.10	Implement approved landscape and planting proposals.	Landscape areas
LV-03	Landscape & Visual	10	10.10	Reinstate disturbed landscape areas following completion of works.	Throughout (as required)

Ref.	Topic	EIAR Chapter	EIAR Sub-Section	Mitigation / Commitment	Location
LV-04	Landscape & Visual	10	10.10	Use approved materials and finishes in accordance with the scheme design.	Throughout (as required)
LS-01	Land & Soils	11	11.6.1	Strip topsoil and subsoil separately and store separately.	Throughout (as required)
LS-02	Land & Soils	11	11.6.1	Limit soil stripping to active work areas.	Throughout (as required)
LS-03	Land & Soils	11	11.6.1	Topsoil stockpiles shall not exceed 2m in height.	Stockpile locations
LS-04	Land & Soils	11	11.6.1	Protect soil stockpiles from erosion and sediment loss.	Stockpile locations
LS-05	Land & Soils	11	11.6.1	Stabilise exposed soils as soon as practicable.	Throughout (as required)
LS-06	Land & Soils	11	11.6.1	Restrict construction plant to designated haul routes where practicable.	Throughout (as required)
LS-07	Land & Soils	11	11.6.1	Reinstate disturbed soils and landscape areas following completion of works.	Throughout (as required)
WAT-01	Water Environment	11, 12	Various	Install and maintain erosion and sediment control measures throughout construction.	Throughout (as required)
WAT-02	Water Environment	11, 12	Various	Phase earthworks to minimise exposed ground areas.	Throughout (as required)

Ref.	Topic	EIAR Chapter	EIAR Sub-Section	Mitigation / Commitment	Location
WAT-03	Water Environment	12	12.5.4	Locate stockpiles away from watercourses, drainage systems and overland flow paths.	Stockpile locations
WAT-04	Water Environment	12	12.5.4	Treat pumped construction water where required prior to discharge.	Excavation locations
WAT-05	Water Environment	12	12.5.4	No untreated water shall be discharged to the Royal Canal or receiving drainage network.	Throughout (as required)
WAT-06	Water Environment	12	12.5.4	Protect canal banks and reinstate disturbed areas following completion of works.	Royal Canal corridor
WAT-07	Water Environment	12	12.5.4	Maintain existing drainage systems, culverts and outfalls during construction unless otherwise agreed.	Throughout (as required)
WAT-08	Water Environment	12	12.5.4	Undertake water quality monitoring and inspections during construction.	Royal Canal corridor and sensitive receptors
PHH-01	Population & Human Health	13	13.9	Implement the OCEMP and associated environmental management plans throughout the construction phase.	Throughout (as required)
PHH-02	Population & Human Health	13	13.9	Maintain safe pedestrian, cyclist and vehicular access throughout construction where practicable.	Throughout (as required)
PHH-03	Population & Human Health	13	13.9	Provide temporary traffic management measures and signage where required.	Throughout (as required)

Ref.	Topic	EIAR Chapter	EIAR Sub-Section	Mitigation / Commitment	Location
PHH-04	Population & Human Health	13	13.9	Implement measures to minimise noise and vibration impacts on nearby sensitive receptors.	Throughout (as required)
PHH-05	Population & Human Health	13	13.9	Implement dust and air quality control measures throughout the construction phase.	Throughout (as required)
PHH-06	Population & Human Health	13	13.9	Protect water quality through implementation of pollution prevention and surface water management measures.	Throughout (as required)
PHH-07	Population & Human Health	13	13.9	Manage construction traffic, working hours and material storage locations to minimise effects on local communities.	Throughout (as required)
PHH-08	Population & Human Health	13	13.9	Implement stakeholder communication and community notification procedures during construction.	Throughout (as required)
PHH-09	Population & Human Health	13	13.9	Implement all relevant mitigation measures identified in the EIAR to protect population and human health receptors.	Throughout (as required)
TT-01	Construction Management	14	14.6.1	Prepare and implement a detailed CSTTMP prior to commencement of works.	Throughout (as required)

Ref.	Topic	EIAR Chapter	EIAR Sub-Section	Mitigation / Commitment	Location
TT-02	Site Security	14	14.6.1	Securely fence or hoard construction areas from adjacent properties, roads and footpaths.	Throughout (as required)
TT-03	Construction Parking	14	14.6.1	Provide temporary contractor parking and compound facilities to prevent overspill parking on the public road network.	Construction compounds
TT-04	Construction Parking	14	14.6.1	Construction operatives shall park within the Hansfield Compound and use managed transport to active work areas.	Hansfield Compound
TT-05	Sustainable Travel	14	14.6.1	Prepare and implement a Construction Mobility Management Plan.	Throughout (as required)
TT-06	Deliveries	14	14.6.1	Manage deliveries through a booking and scheduling system.	Throughout (as required)
TT-07	Deliveries	14	14.6.1	Schedule HGV movements outside peak traffic periods where practicable.	Throughout (as required)
TT-08	Trackout Prevention	14	14.6.1	Provide wheel wash facilities at construction entrances.	Construction access points
TT-09	Traffic Management	14	14.6.1	Implement temporary traffic management measures in accordance with the CSTTMP.	Throughout (as required)

Ref.	Topic	EIAR Chapter	EIAR Sub-Section	Mitigation / Commitment	Location
TT-10	Traffic Management	14	14.6.1	Provide temporary pedestrian and cyclist management arrangements where required.	Throughout (as required)
TT-11	Traffic Management	14	14.6.1	Provide diversion routes, warning signage and traffic marshals where required.	Temporary restriction locations
TT-12	Traffic Management	14	14.6.1	Implement all temporary traffic management in accordance with the Traffic Signs Manual and national guidance.	Throughout (as required)
TT-13	Materials Management	14	14.6.1	Establish material storage and recycling areas within designated compounds.	Construction compounds
TT-14	Site Access	14	14.6.1	Provide wayfinding signage directing workers and deliveries to designated compounds and work areas.	Construction access points
TT-15	Deliveries	14	14.6.1	Avoid deliveries, plant movements and traffic management changes during school drop-off and pick-up periods where works occur near schools.	Locations adjacent to schools
TT-16	Haul Routes	14	14.6.1	Agree dedicated construction haul routes with Fingal County Council prior to commencement of works.	Throughout (as required)

Ref.	Topic	EIAR Chapter	EIAR Sub-Section	Mitigation / Commitment	Location
TT-17	Reinstatement	14	14.6.1	Remove compounds, temporary hardstands and construction materials and fully reinstate affected areas on completion of works.	Construction compounds and temporary working areas
UTL-01	Utility Records	16	16.5.1	Obtain the most up-to-date utility information from all relevant utility providers prior to construction.	Throughout (as required)
UTL-02	Utility Surveys	16	16.5.1	Verify utility locations through surveys, trial holes, slit trenches and other appropriate investigations.	Utility crossing locations
UTL-03	Utility Protection	16	16.5.1	Confirm utility protection measures, diversions and construction methodologies following utility investigations.	Throughout (as required)
UTL-04	Existing Services	16	16.5.1	Maintain existing utility services throughout construction unless otherwise agreed with the utility owner.	Throughout (as required)
UTL-05	Utility Coordination	16	16.5.1	Undertake all works in the vicinity of utilities in consultation with the relevant utility owner.	Utility crossing locations
UTL-06	Utility Diversions	16	16.5.1	Carry out utility diversions in accordance with utility owner requirements and approved methodologies.	Utility diversion locations

Ref.	Topic	EIAR Chapter	EIAR Sub-Section	Mitigation / Commitment	Location
UTL-07	Service Interruptions	16	16.5.1	Agree planned service interruptions in advance and notify affected stakeholders where required.	Affected service areas
UTL-08	New Connections	16	16.5.1	Obtain all necessary approvals and agreements for temporary utility connections associated with construction activities.	Construction compounds
UTL-09	Strategic Fibre Network	16	16.5.1	Verify the location and depth of the euNetworks fibre ducting prior to excavation works.	euNetworks fibre network crossing locations
UTL-10	Strategic Fibre Network	16	16.5.1	No mechanical excavation shall occur within the exclusion zone surrounding the fibre ducting until protection measures have been implemented.	euNetworks fibre network crossing locations
UTL-11	Strategic Fibre Network	16	16.5.1	Undertake all works near the euNetworks fibre asset in consultation with the asset owner and in accordance with approved safe systems of work.	euNetworks fibre network crossing locations
LUP-01	Land Acquisition	17	17.5	Temporary and permanent land acquisition requirements shall be minimised as far as practicable.	Throughout (as required)
LUP-02	Stakeholder Liaison	17	17.5	Establish a dedicated point of contact for communication with affected landowners and occupiers.	Throughout (as required)

Ref.	Topic	EIAR Chapter	EIAR Sub-Section	Mitigation / Commitment	Location
LUP-03	Access Management	17	17.5	Maintain access to residential, commercial and agricultural properties where practicable during construction.	Throughout (as required)
LUP-04	Access Management	17	17.5	Provide advance notice and alternative access arrangements where temporary restrictions are required.	Affected properties
LUP-05	Site Security	17	17.5	Provide temporary fencing, hoarding and site security measures to protect adjacent lands and properties.	Throughout (as required)
LUP-06	Accommodation Works	17	17.5	Implement accommodation works where required to maintain viability and functionality of affected landholdings.	Affected landholdings
LUP-07	Accommodation Works	17	17.5	Provide stockproof fencing, replacement gates, drainage maintenance, alternative services or access arrangements where required.	Affected landholdings
LUP-08	Construction Footprint	17	17.5	Restrict compounds, storage areas and temporary working areas to designated locations and the minimum area necessary.	Compounds and temporary working areas
LUP-09	Reinstatement	17	17.5	Reinstate lands temporarily occupied during construction following completion of works.	Temporary land take areas

Ref.	Topic	EIAR Chapter	EIAR Sub-Section	Mitigation / Commitment	Location
LUP-10	Compensation	17	17.5	Provide compensation in accordance with the statutory provisions governing compulsory acquisition and disturbance.	Affected landownerships
LUP-11	Design Mitigation	17	17.5	Maintain the selected route alignment and design approach which minimises permanent land take, severance and property impacts.	Throughout the Proposed Development

Appendix A : Construction Methodology Report

Royal Canal Urban Greenway

Construction Methodology

170239-DBFL-XX-XX-RP-C-0003

Sept 2026



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1 Introduction

1.1 Overview

DBFL Consulting Engineers was appointed by Fingal County Council (FCC) to prepare the design for a section of the Royal Canal Urban Greenway (hereafter referred to as the 'Proposed Development'), which is to be constructed adjacent to the Royal Canal from the Kildare / Fingal County boundary to the Old Navan Road (near the 12th Lock), where it connects with a previously constructed section of the Greenway.

As part of the preliminary design for the Proposed Development, DBFL has prepared this report to outline the proposed construction strategies. The aim of the report is to provide an overview of the proposed construction methodologies and to present early options aimed at lessening the potential impacts of the proposed cycle and pedestrian infrastructure on the existing environment, both during construction and in the long term during the operational stage.

This Construction Methodology should be read in conjunction with the EIAR, the OCEMP, the Preliminary Design Report, the Outline Construction Traffic Management Plan and the planning drawings submitted with the application. The methodology provides the planning-stage basis for the likely construction approach and will be developed further by the appointed contractor prior to commencement of works.

1.2 Proposed Development Summary

The Proposed Development is approximately 8.1km in length and is divided into three sections as follows:

- Section 1 – Kildare County Border to Hansfield Railway Bridge (Ch. 0000 – 3200)
- Section 2 – Hansfield Railway Bridge to Kennan Bridge (Ch. 3200 – 5300)
- Section 3 – Kennan Bridge to Talbot Bridge (Chainage 5300 – 8100)

Section 1 extends from Kildare/Dublin County boundary line to Hansfield Railway Bridge.

Section 2 extends from Hansfield Rail Bridge, through Clonsilla under Callaghan Bridge, to Kennan Bridge at Porterstown Road. In Section 2, the character of the area changes from rural to predominantly suburban. This section is predominantly residential on the northern side of the canal, with farmlands on the southern side.

Section 3 runs from Kennan Bridge (Porterstown Road) to Talbot Bridge (Old Navan Road). This section is predominantly urban, with extensive residential catchments on both sides of the Canal.

An overview of the route of the Proposed Development and its sections is included in Figure 1-1.

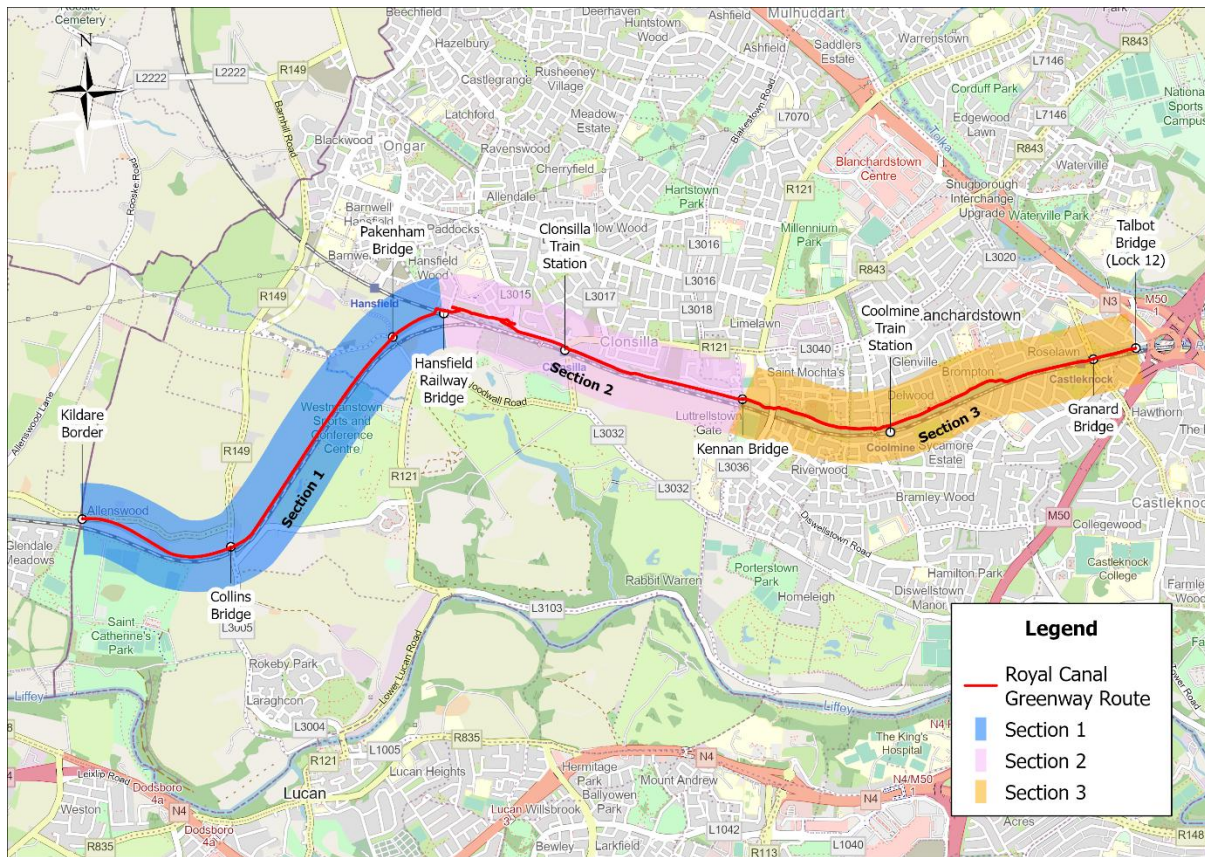


Figure 1-1 Proposed Development Route Overview

1.3 Physical Constraints and Opportunities

There are a number of constraints and opportunities, both natural (i.e. existing natural environment) and physical (the built environment), which constrain the practical construction strategies for the Proposed Development. These include:

- The Royal Canal is a protected area of national importance and is designated as a proposed Natural Heritage Area (pNHA) with the objective of conserving species and habitats of national importance.
- The Royal Canal is also a Water Framework Directive Register of Protected Areas site (WFD RPA).
- The Royal Canal itself is the main Protected Structure (RPS 944a, 10th Lock 944b, 11th Lock 944c and 12th Lock 944d) along the scheme extent.
- A number of the bridges along the canal are also protected structures, single-arch limestone humpback road bridges.

- Sensitive habitats, including canal-side grassland, woodland, hedgerow, treeline and bankside habitats, occur along parts of the corridor. Areas of Annex I grassland habitat are also identified in the EIAR and have informed the design and construction approach.
- Species of national and international importance identified within the Royal Canal corridor include otter and bats, such as common pipistrelle, soprano pipistrelle and Leisler's bat. Under the Wildlife Acts (1976 – 2023), it is illegal to disturb or harm protected species and their habitats.
- Another general characteristic of the Study Area is the proximity of the Canal to the Dublin – Maynooth Rail Line, which generally follows the route of the Canal. This is a key public transport corridor for the region and nationally, serving commuters and connecting Dublin to Galway.
- The need to maintain traffic flow and access to local amenities.
- Land ownership, particularly where the works abut or are in the vicinity of residential properties.
- Environmental impacts and engineering constraints such as steep topography, frequent watercourse crossings, and woodlands.

2 Proposed Works & Mitigation

2.1 Proposed Works

2.1.1 Section 1 – Kildare County Border to Hansfield Railway Bridge (Ch. 0000 – 3200)

The Proposed Development will follow the existing towpath along the northern side of the Royal Canal from the Kildare County Council boundary line to Hansfield Railway Bridge. The Greenway will be constructed as a 2-3m wide unbound surface from the Kildare/Fingal County Council boundary line to Hansfield Bridge (Railway Bridge). The greenway will continue through the existing pedestrian underpass by Hansfield Railway Bridge.

The total construction thickness will range from 0.2m on stiff ground and up to 0.5m on soft ground. Construction of the greenway will involve removal of the topsoil layer to a depth of typically 0.15m and build-up of the gravel thickness to a level of up to 0.35m above surrounding ground level.

The unbound surface and generally limited excavation approach reflect the rural/peri-urban character of Section 1 and the objective of retaining the existing canal-side character where practicable. The alignment follows the existing towpath corridor and will be locally narrowed where required to maintain buffers to sensitive canal-edge habitats.

2.1.2 Section 2 – Hansfield Railway Bridge to Kennan Bridge (Ch. 3200 – 5300)

The greenway will be constructed on the northern side of the Royal Canal from Hansfield to Kennan Bridge via Porterstown Old Schoolhouse lands between Callaghan and Kennan bridges.

The route through St Joseph's and the Porterstown Old School House lands reflects design development undertaken to reduce direct intervention along constrained sections of the canal towpath while maintaining route continuity and connectivity to existing and planned active travel infrastructure.

This involves the construction of a new 4m wide route, the construction of a pocket park adjacent to the Hansfield Road access, and construction of a 3m greenway up to Callaghan Bridge, which widens back to 4m parallel to the existing pedestrian route on the northern side of the Royal Canal between Callaghan Bridge and Porterstown Old School House lands.

A 70m greenway ramp is to be constructed to access the Old School House lands. A paved surface along the majority of the route within the School House lands is the primary design proposal.

The works in this section will include ecological, arboricultural and construction-stage controls relating to tree removal, badger mitigation, dust, noise, waste handling, public access and traffic management, as set out in the EIAR and OCEMP.

2.1.3 Section 3 – Kennan Bridge to Talbot Bridge (Chainage 5300 – 8100)

The Greenway will be constructed on the northern side of the Royal Canal from Kennan Bridge to Kirkpatrick Bridge via Sheepmoor Lane. The proposed route will be constructed north of the wooded area along the northern embankment from Kennan Bridge to Sheepmoor Lane.

The scheme will follow the pedestrian/cycle facilities as part of the Windmill Court Residential Development followed by the existing roadway along Sheepmoor Lane.

The Greenway will be constructed on the upper level of the northern embankment, from Coolmine Road (Kirkpatrick Bridge) to the Brompton green area (Ch. 6250-6850).

The Proposed Development is routed near the top of the northern embankment (adjacent to Delwood Park residential estate back gardens) and into the open space at Brompton. The ground level of the greenway will be lowered from existing levels and security fencing, and defensive planting will be provided between the greenway and the back gardens.

A bridge structure will be constructed to enable the proposed greenway to cross a historic quarry on the northern embankment (Ch. +6500m) – referred to as the 'Quarry Bridge'.

A 4m wide paved greenway will be constructed on the northern side of the Royal Canal, south of the Brompton green area (Ch. +6850-7090m). Planting and railings will be provided along this section of the greenway. The scheme will include the provision of access to Brompton and Roselawn estates.

The route crosses from the northern side to the southern side of the Royal Canal at chainage +7090-7350m (before Roselawn Road). The Greenway will cross the Canal over an architecturally designed pedestrian and cycle bridge – referred to as the 'Landmark Bridge'. The bridge will respect existing uses along the Canal and existing and future operations on the Dublin to Maynooth rail line.

The greenway will continue on the southern side of the Royal Canal, past Castleknock Station and under Castleknock Road through a proposed greenway underpass.

A paved 4m wide greenway will be constructed on the southern towpath from Granard Bridge to the 12th Lock Hotel. Due to a pinch point between the hotel and the canal, a 3m wide greenway is

only feasible from the 12th Lock Hotel to Talbot Bridge/Old Navan Road (150m). The works will tie into the current Ashtown section of the Royal Canal Greenway at Talbot Bridge.

2.2 Proposed Pavement Construction Forms

As outlined in the works above, the Proposed Development is to be made up of a number of fundamental pavement construction forms and surface materials depending on location.

- Unbound Pavement
- Bituminous Flexible Pavement
- Existing Roadway

Each of the above constructed elements is discussed below providing an overview of the proposals and measures intrinsic to project design which will avoid impact on the ecological aspects of the scheme. The report goes on to look at the safe delivery of the works from a traffic management perspective.

During construction, the works will be supervised by an appropriately qualified resident engineer who will oversee the works and record all aspects of the works. This will facilitate the efficient delivery of designer responses, ongoing reporting, and oversight to monitor whether the Contractor carries out the works in accordance with the permitted design and associated detailed design and specification.

2.2.1 Unbound Pavement

Section 1 (within the rural setting) will largely follow the existing canal towpath and will be constructed to reflect the existing unbound gravel surfacing, with widening of the towpath where necessary. The cross section will be 2m wide from the commencement of the scheme and widens to 3m at Pakenham Bridge.

In these more rural settings, this unbound pavement construction is considered the most appropriate, as per the TII Publication – DN-GEO-03047 – *Rural Cycleway Design (Offline & Greenway)*, 2025, and shall be constructed in line with the requirements therein.

With this proposed form of construction, the existing towpath and/or existing grassed areas and vegetation would be cleared with limited additional excavation to formation (approximately 250-300mm below existing ground level). Ground improvement shall be carried out using 6F2 capping material and shall be placed in accordance with CC-SPW-00600 (TII Specification for Road Works) as required based on the findings of the site investigation. The pavement will be formed by placing approximately 200mm of imported granular subbase material (UGM A to CC-SPW-00900) on a

geotextile separator and finished with approximately 75mm of gravel surface course (well graded with maximum aggregate size of 6mm). Using either a drag box or suitable plant the 6mm gravel surface course shall be laid to falls and levels, compacted using a suitable roller until satisfactory compaction is achieved. The width of the greenway will range from 2m to 3m and restrained on each side with a concrete edging kerb.

Where works are located near identified Annex I grassland habitat, the greenway has been locally narrowed to provide appropriate buffers to sensitive habitats, with buffer arrangements to be implemented in accordance with the EIAR, OCEMP and approved drawings.

No disturbance will be permitted to the grassland habitat buffer zones on the canal bank during construction. Following construction of the Greenway, much of this marginal habitat could be converted to a species-rich grassland using the methods set out in the Route Options Assessment Report.

In sections where it is determined that the expected volume of construction and/or maintenance traffic along the unbound greenway requires it, the greenway shall be constructed as a surface dressed route in accordance with TII Standard Construction Detail CC-SCD-00706.

A typical construction section is provided as part of the drawing package, and a typical example is provided in Figure 2-1 for illustration.



Figure 2-1 Example of Unbound Surface Greenway (Royal Canal Greenway between Maynooth and Leixlip <https://www.linkedin.com/company/waterways-ireland/posts/>)

2.2.2 Bituminous Flexible Pavement

Section 2 (moving into the more urban setting) will in part follow the existing canal towpath, with widening of the towpath where necessary to approximately 4m, or 3m at particular pinch points on the approach to Callaghan Bridge. The route will also deviate from the existing towpath in parts to construct a new 3m wide bituminous cycle facility further north, away from the canal, via the Old Schoolhouse Lands. These sections will be constructed as a bituminous pavement build-up.

Section 3 (continuing through the more urban setting) will also largely comprise a newly constructed route to the north of the canal as a bituminous pavement build-up. This will generally be 4m in width, ranging from approximately 5m to 10m above the existing canal banks. Works will also include a widening of the existing towpath south of the canal, after the proposed landmark bridge (Ch. 7350) constructed largely as a 4m wide bituminous pavement which narrows to 3m at Talbot Bridge, with pinch points at 12th lock up to 2.4m wide.

Given the potential higher usage, as set out in DN-GEO-03047 – *Rural Cycleway Design (Offline & Greenways)*, bituminous construction is considered the most appropriate. This shall be constructed in accordance with CC-SPW-00900 and the recommendations of the TII Design Manual for Roads and Bridges (TII DMRB).

With this proposed form of construction, the existing towpath, paved greenway and/or existing grassed areas and vegetation would be cleared with limited additional excavation to formation (approximately 250-300mm below existing ground level). Ground improvement shall be carried out using 6F2 capping material placed in accordance with CC-SPW-00600 as required based on the findings of the site investigation.

A 200mm layer of imported granular subbase material (UGM A to CC-SPW-00900) will be placed and compacted on a geotextile separator. The upper pavement surface will be made up of a 50mm base layer of dense asphalt concrete (AC20) overlain by a 25mm surface layer of stone mastic asphalt (SMA 10), both meeting the requirements of the TII Specification for Road Works, and to EN 13108-1 and EN 13108-6 respectively. Wherever practicable, bituminous mixtures shall be spread, levelled and tamped by a self-propelled paving machine. Hand laying shall be carried out in confined spaces where it is impracticable for a paver to operate, such as narrow sections of the proposed route alongside embankments, boundaries, and vegetation to be retained.

Concrete kerb restraints will be provided on either side of the pavement construction to provide a neat maintainable solution.

A typical detail of this proposed arrangement is shown in Figure 2-2.

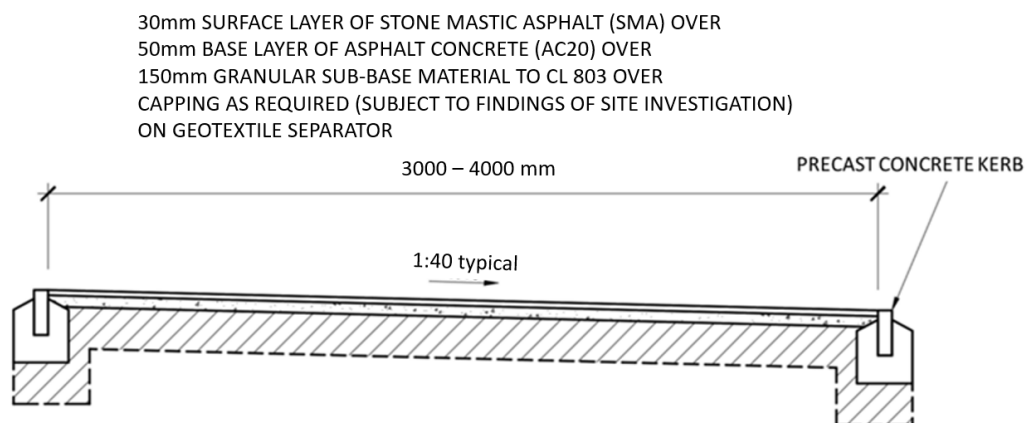


Figure 2-2 Typical Detail of Bituminous Pavement Construction Form

A typical construction section in the context of the greenway is provided as part of the drawing package and some similar greenway examples are provided in Figure 2-3 for illustration.



Figure 2-3 Examples of Bituminous Greenways (Netherlands and Ireland)

On either approach to the Quarry Bridge, the proposed construction consists of a 4m wide new bituminous pavement constructed through existing landscaped areas. It shall be constructed in accordance with CC-SPW-01100 - Specification for Road Works Series 1100 – Kerbs, Footways and Paved Areas and the recommendations of the TII Design Manual for Roads and Bridges (TII DMRB). The construction detail shall be in keeping with TII Standard Construction Detail CC-SCD-01104 in relation to materials and depths.

With this proposed form of construction, the existing grassed areas and vegetation will be cleared with limited additional excavation. The pavement will be formed by removal of the existing topsoil, containing organic matter that can shrink and swell, to formation (approximately 250-300mm below existing ground level), with ground improvement using 6F2 capping material placed in accordance with CC-SPW-00600 - Specification for Road Works Series 600 - Earthworks as required based on the findings of the site investigation, on a geotextile separator.

A 200mm layer of imported granular subbase material (UGM A to CC-SPW-00900) will be placed and compacted on a geotextile separator. The upper pavement surface will be made up of a 50mm base layer of dense asphalt concrete (AC20) overlain by a 25mm surface layer of stone mastic asphalt (SMA 10), both meeting the requirements of the TII Specification for Road Works, and to EN 13108-1 and EN 13108-6 respectively.

2.2.3 Existing Pavement

There are several locations where the Proposed Development will make use of existing roadways and pathways, with minor alterations to the geometry and surfacing as required.

Within Section 2, the Proposed Development will make use of a recently constructed pedestrian and cycle route through the St. Joseph's Clonsilla development, approximately 4m – 4.5m wide, entering the north of the Hansfield Railway Bridge, and returning to the canal banks at Hansfield Road [from approximately Chainage +3350 to +3650].

Similar to this, within Section 3 the Proposed Development shall follow the pedestrian and cycle route through the Windmill Court Residential Development lands [from approximately Chainage +5560 to +5940].

Section 3 also includes a portion of existing roadway along Sheepmoor Lane. This will involve localised improvements to the road pavement and widening of the roadway to achieve an optimum width of 4m along Sheepmoor Lane where practicable.

In addition, the eastern portions of Section 3 follow the existing paved surfaces in the vicinity of Castleknock Train Station and approach to the 12th Lock.

In such scenarios, where there are existing deteriorated bound surfaces and where site investigation confirms that full-depth new flexible pavement is not required, surface dressing is proposed in accordance with CC-SPW-00900. Surface preparation will be carried out to clean the existing surface of weed growth and debris and to apply a tack coat where required. Using a mini-paving machine, a base layer regulating course to CC-SPW-00900 shall be laid to fill potholes / irregularities and achieve falls and levels, to form the required 3-4m wide surface, which will vary depending on the width of existing bound surfaces. Following appropriate compaction and confirmation of levels, a surface dressing adhesive of hot sprayed bitumen emulsion shall be sprayed on the regulated surface, with chippings applied in accordance with CC-SPW-00900.

2.3 Other Construction Works

Aside from the main sections of greenway, there are several other construction works required throughout the scheme, as follows.

2.3.1 Embankments and Retaining Structures

Due to the topography, minor retaining structures into the embankment will be required along some portions, particularly in the Hansfield area (Ch. +3760 to +4100 approximately).

A sloped section (approximately 70m in length) and associated retaining works will also be constructed to rise from the towpath to the upper level of the Old Schoolhouse lands. This sloping section largely follows the existing contours as the route deviates to the upper level of the embankment, with an approximately 4 metre longitudinal level difference.

2.3.2 Pre-Cast Concrete Cantilevered Boardwalk

In addition to the bituminous pavement, Section 2 also includes a portion of 4m wide cantilevered boardwalk with pre-cast concrete surfacing on a piled steel structure raised above the existing

surface – refer to Figure 2-4 – from approximately Chainage +4140 to +4540. This was considered the most appropriate design solution to protect underlying ecological habitats along the canal.

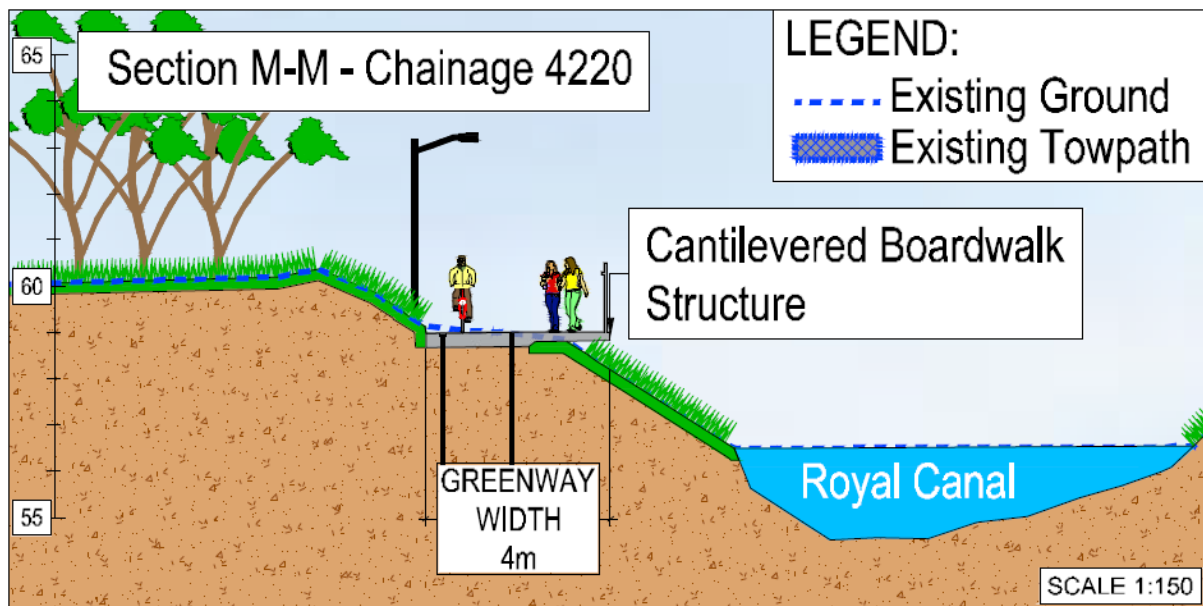


Figure 2-4 3D image of the proposed 4m wide cantilevered boardwalk east of Callaghan Bridge

The reinforced pre-cast concrete deck is proposed to be constructed in 1m long sections, each 4m wide with a depth of 0.3m on the inside edge, stepping to 0.2m depth as it extends outwards. The reinforcement quantity is anticipated to be approximately 200kg/m³ of concrete. Fixing is proposed to be via 32mm diameter micro-piles, with appropriate grouting, anchored to the deck reinforcement.

Construction of the boardwalk will take place from Clonsilla Road Bridge (Ch. 4230) for 370m before the route diverts to the north (Ch. 4600) and continues parallel to the existing pedestrian route as bituminous bound surface up to Porterstown Road Bridge.

Access from Clonsilla Road Bridge is severely limited, as depicted in Figure 2-6. The retaining wall between the bridge and a private residence to the north prevents direct access from the bridge to the proposed greenway, and the existing towpath below the bridge lacks the width to practicably provide access from the west of the bridge.

Access can more easily be provided from the Porterstown Road bridge approximately 800m from the construction zone. Figure 2-6 shows the boardwalk construction zone.



Figure 2-5 East elevation of Clonsilla Road Bridge showing limited access.



Figure 2-6 Boardwalk Construction Zone

Piling works would require curing time before precast units can be placed and secured. It would therefore be advisable for the piling operation to be completed in full before the installation of the precast units. A working platform will be constructed to allow piling rigs access to the extent of the works area. The piling team would begin from the West, at the Clonsilla Road Bridge, and proceed eastward. Once the piling is complete the precast units could be installed moving westward. Installed precast units would act as a platform for construction to proceed. Construction loads will be factored into the piling and precast panel structural design.

As an alternative, a temporary rail and winch system could be installed to position the precast units more efficiently for installation. Steel rails would be installed along the length of the construction zone after the piling operation is complete. The precast units would then be carted on a flatbed car or dolly attached to a winch system as shown in Figure 2-7. The dolly would be fitted with a hydraulic arm or gantry crane able to lift the units into place. Figure 2-8 shows an

example of a rail system utilised to launch watercraft and which could be adopted for this use case.

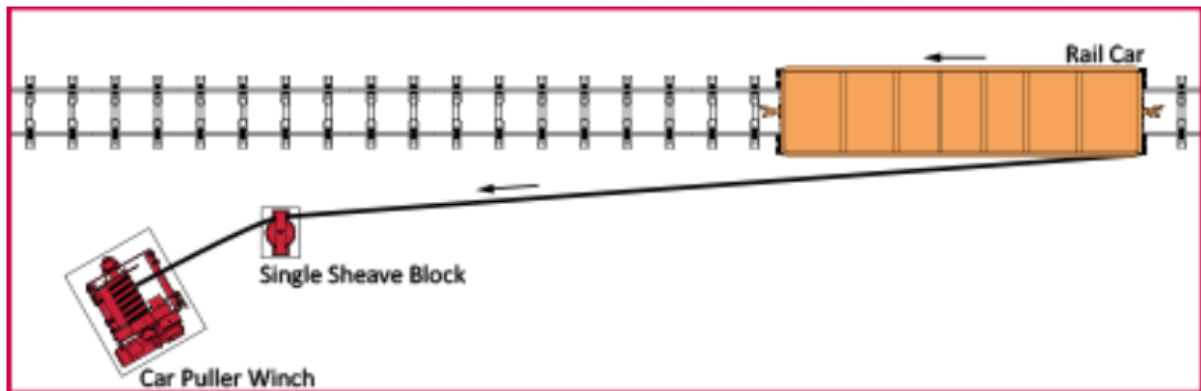


Figure 2-7 Example winch and rail system



Figure 2-8 Example of rail system used in the marine sector.

2.3.3 Porterstown Road Boardwalk and retained earth fill

The route between Porterstown Road and the constructed portion of greenway at the Windmill Court development has numerous constraints. To mitigate impacts posed by these constraints, the greenway will maintain an elevated profile and be constructed in two forms along this section:

Retained Earth Fill

The elevated greenway will be constructed above sloping ground and, as such, an earth retaining structure is proposed on the canal side to retain earth fill and mitigate environmental impact.

Existing ground will be excavated to a foundation datum and set aside for reuse. The retained earth wall will consist of precast retaining units anchored into the existing ground for stability. Appropriate reinforcing fill material, typically 6F2, will be placed and compacted in layers to build the greenway to design levels. The excavated material will be replaced to fill excavated voids. Figure 2-10 illustrates the typical arrangement proposed. TensarTech™ or similar approved example system can be seen in Figure 2-11.

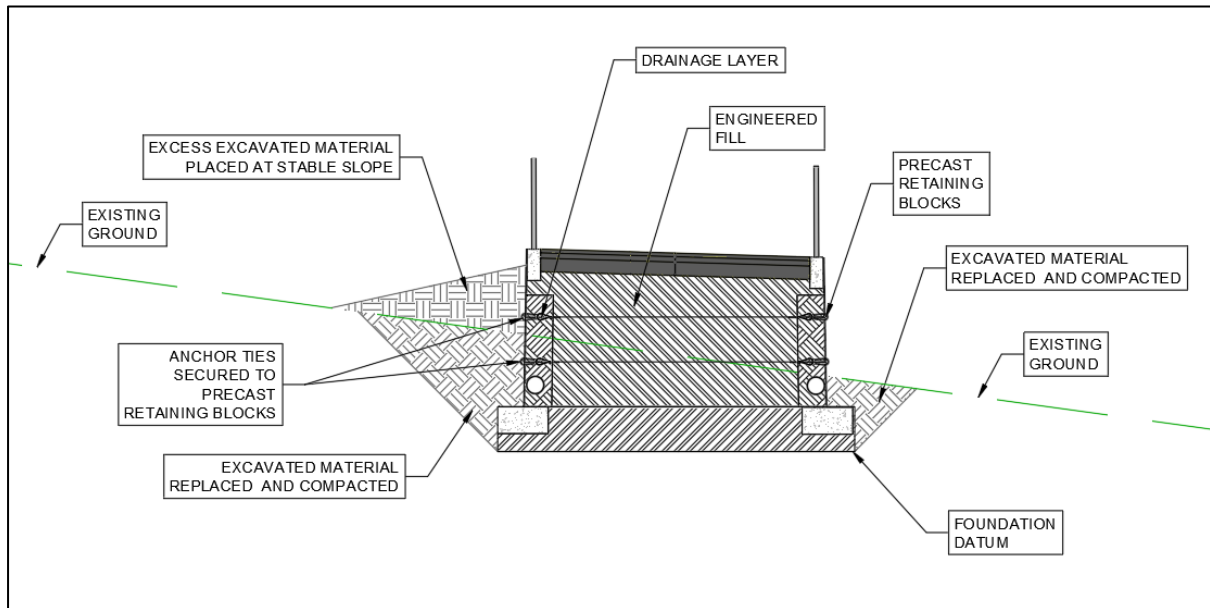


Figure 2-9 Typical Retained Earth Fill Section



Figure 2-10: Example retaining system (Source: [TensarTech® GreenSlope System | Tensar](#))

Steel Frame Boardwalk

The greenway route is proposed to cross below Dr Troy Bridge. It was found that an existing 900mm gas main runs somewhat parallel with Dr Troy Bridge. From discussions held with GNI, it was determined that a retained earth fill solution would not be appropriate near the gas main and

that an elevated steel deck boardwalk would be preferable for maintenance and protection of the gas main during construction.

This will comprise a steel deck structure on appropriately spaced UCs piled and grouted. Spans will be chosen such that piles can be installed on either end of the Dr Troy bridge. A temporary and removable piling mat will be constructed within the works area to provide a level running surface for the piling rig. The surface will be formed by a metal deck with bituminous screed to provide consistency of finish with the adjacent flexible pavement sections. Where the boardwalk ties into the greenway on either end of this section, retaining structures would be constructed to accommodate bridge abutments.

A typical construction section in the context of the greenway is provided as part of the drawing package and a typical sketch detail of potential structural elements is shown in Figure 2-11 for illustration.

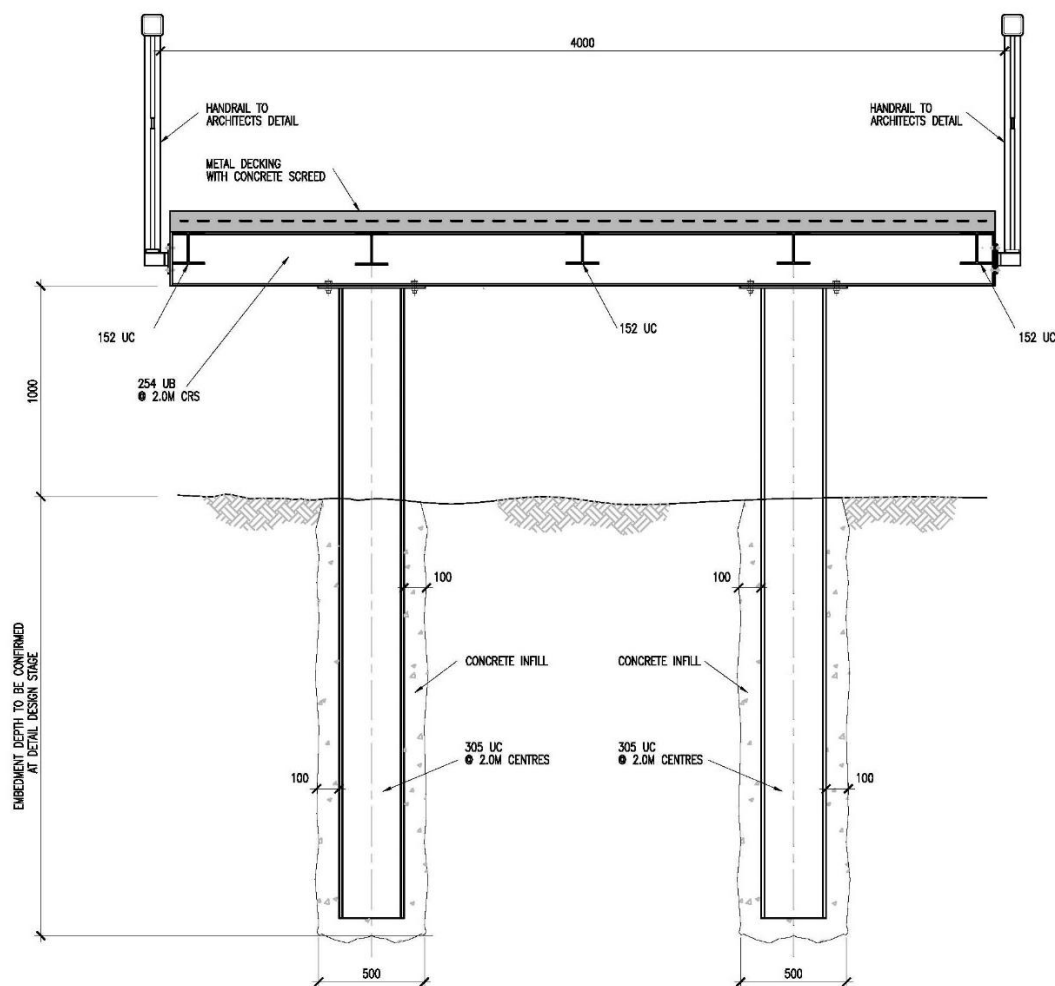


Figure 2-11 Typical Sketch Detail of Steel Deck Boardwalk

2.3.4 Delwood Area Works including Quarry Bridge

In addition to the general greenway route in Section 3, the works include the construction of a bridge structure crossing an existing quarry along the northern bank (referred to as the 'Quarry Bridge'). At a rock inlet which is a historic quarry section (Ch. +6500m), this 30m single-span composite steel beam and concrete deck bridge is proposed, incorporating some earth-retaining elements. See Figure 2-12 and Figure 2-13 for indicative plan and elevation of the proposed construction elements.

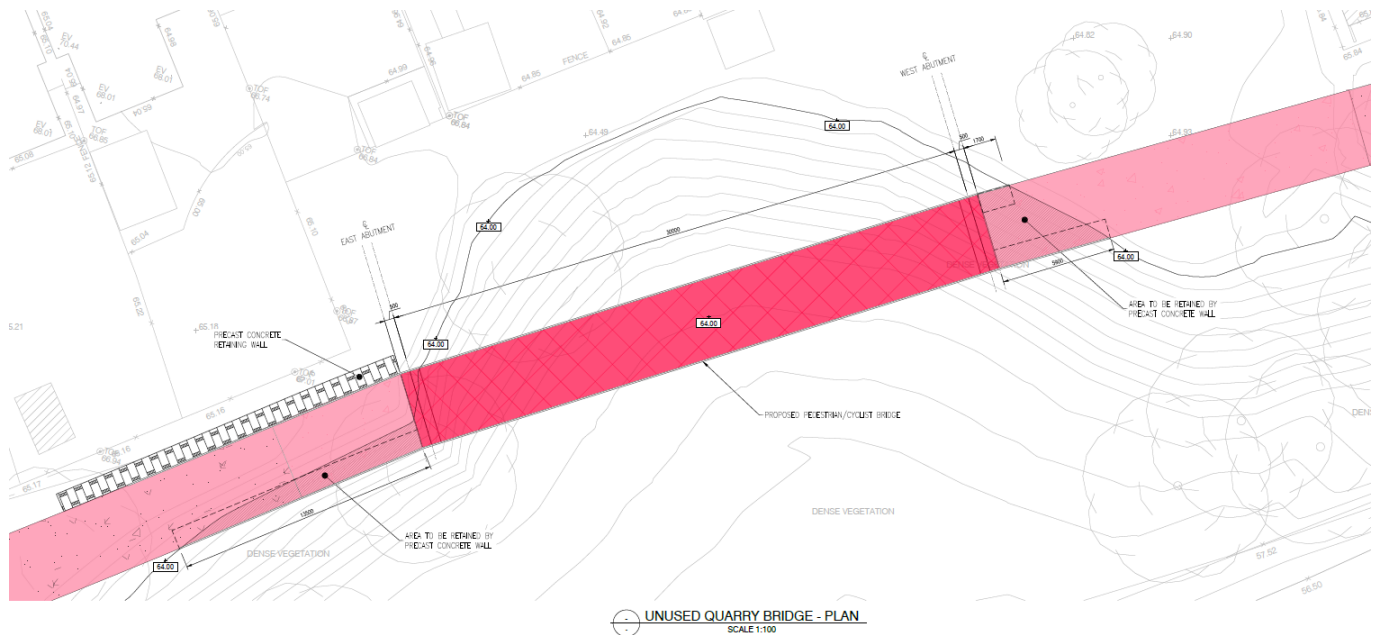


Figure 2-12 Quarry Bridge construction elements – Plan

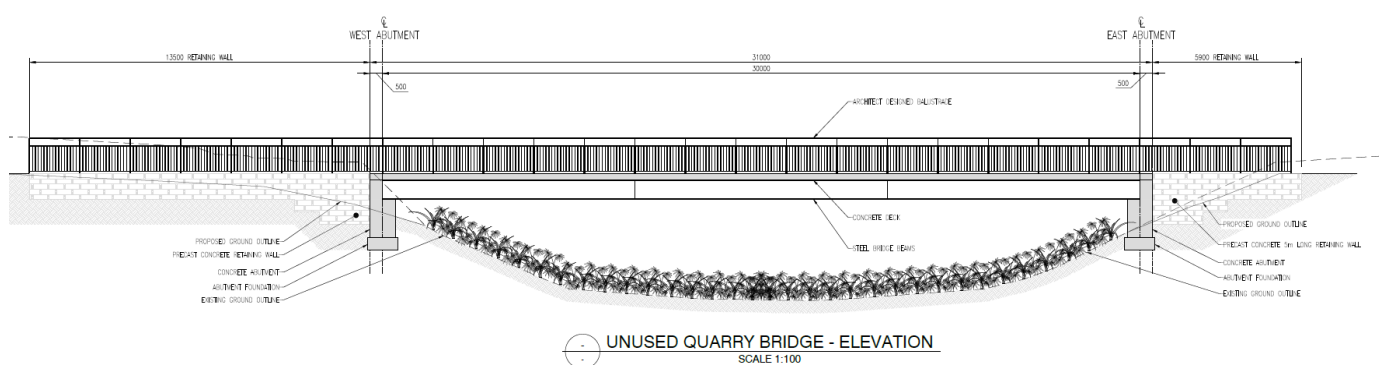


Figure 2-13 Quarry Bridge construction element – Elevation

To minimise the impact on highly sensitive trees (Oak-Ash-Hazel Woodland WN2) and habitats, the route is to be constructed near the top of the northern embankment (adjacent to Delwood Park residential back gardens) and into the open space at Brompton. To prevent the greenway

overlooking the back gardens of the residents of Delwood Park and for security reasons, the ground level of the greenway will be lowered. Encroachment from some of the adjacent properties into the wooded area will be cleared and any rubble removed during construction.

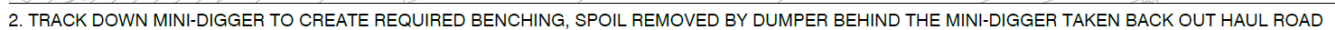
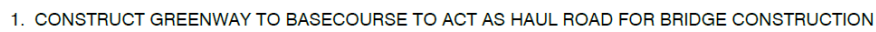
Security fencing and defensive planting will also be installed between the greenway and the back gardens to increase security and reduce visual intrusion.

Construction of the greenway on the northern side of the canal will be via the existing canal access location at Coolmine Road primarily – shown in Figure 2-14 – and via the Brompton green area and adjacent streets as a secondary route from the east.

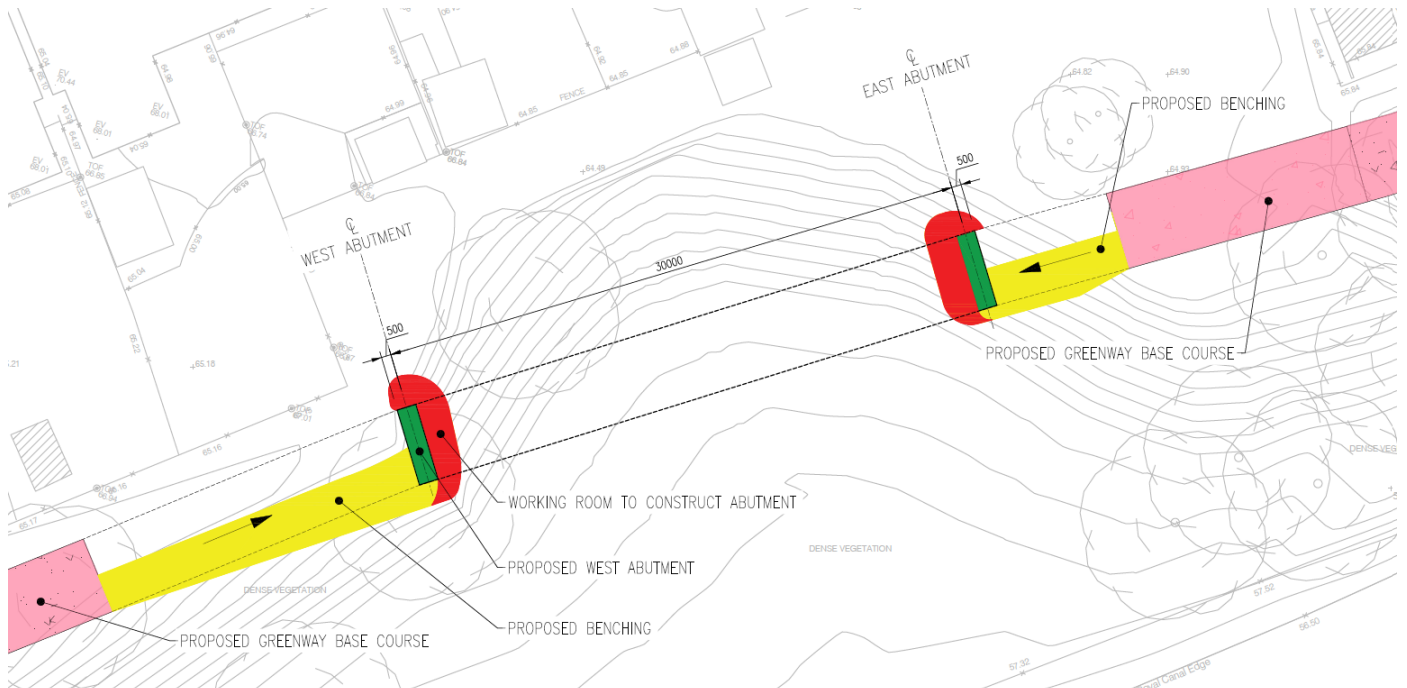


Figure 2-14 Existing Access Route from Coolmine Road to canal's northern bank

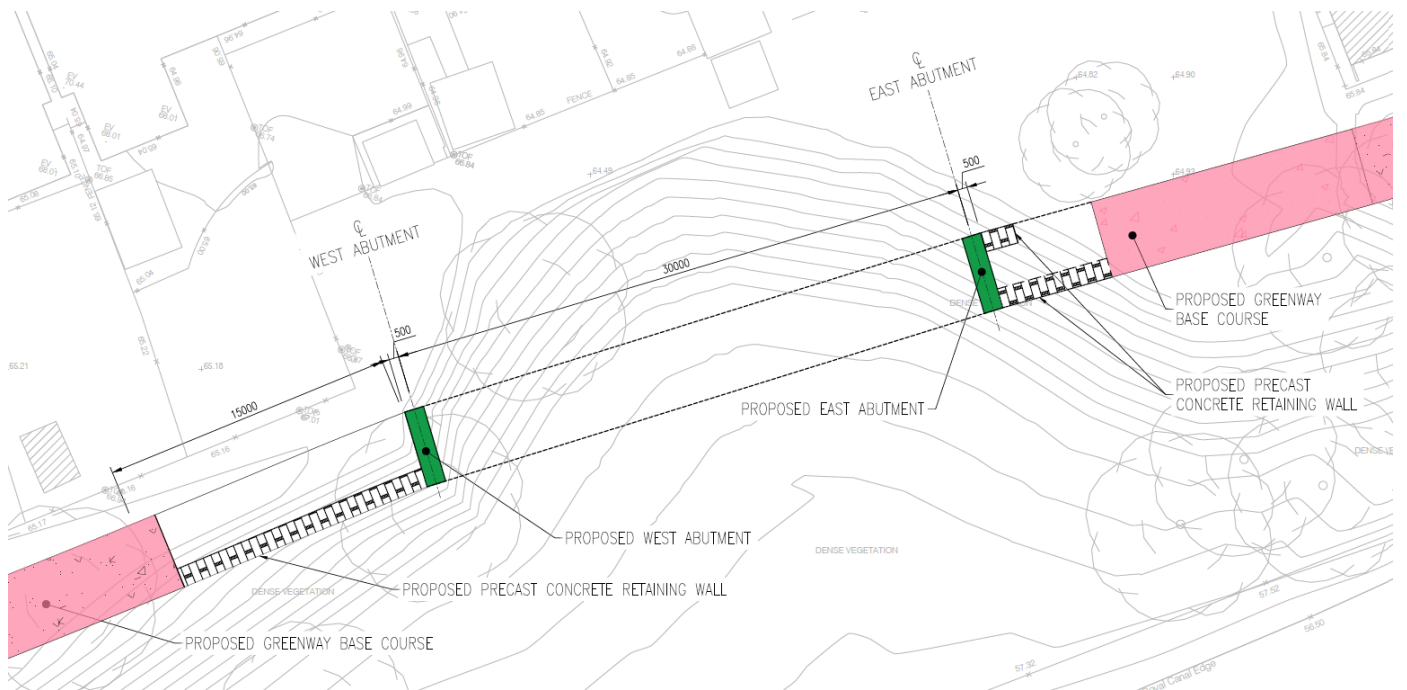
To construct the Quarry Bridge, the greenway will be constructed to base course from either side of the bridge via Coolmine Road (west) and Brompton. The constructed route will act as a haul road for the construction of the bridge. Mini-diggers will track to the bridge location and spoil will be removed by dumpers. The steel beams will be craned into position from both sides and bolted in-situ. Beam sections should ideally be installed in single-span sections. However, where this is not practicable due to crane limitations, scaffolding would be installed below the bridge span to allow operatives to bolt beam sections together mid-span. The constructability plan for the Quarry Bridge is outlined in Figure 2-16 and Figure 2-17, overleaf.



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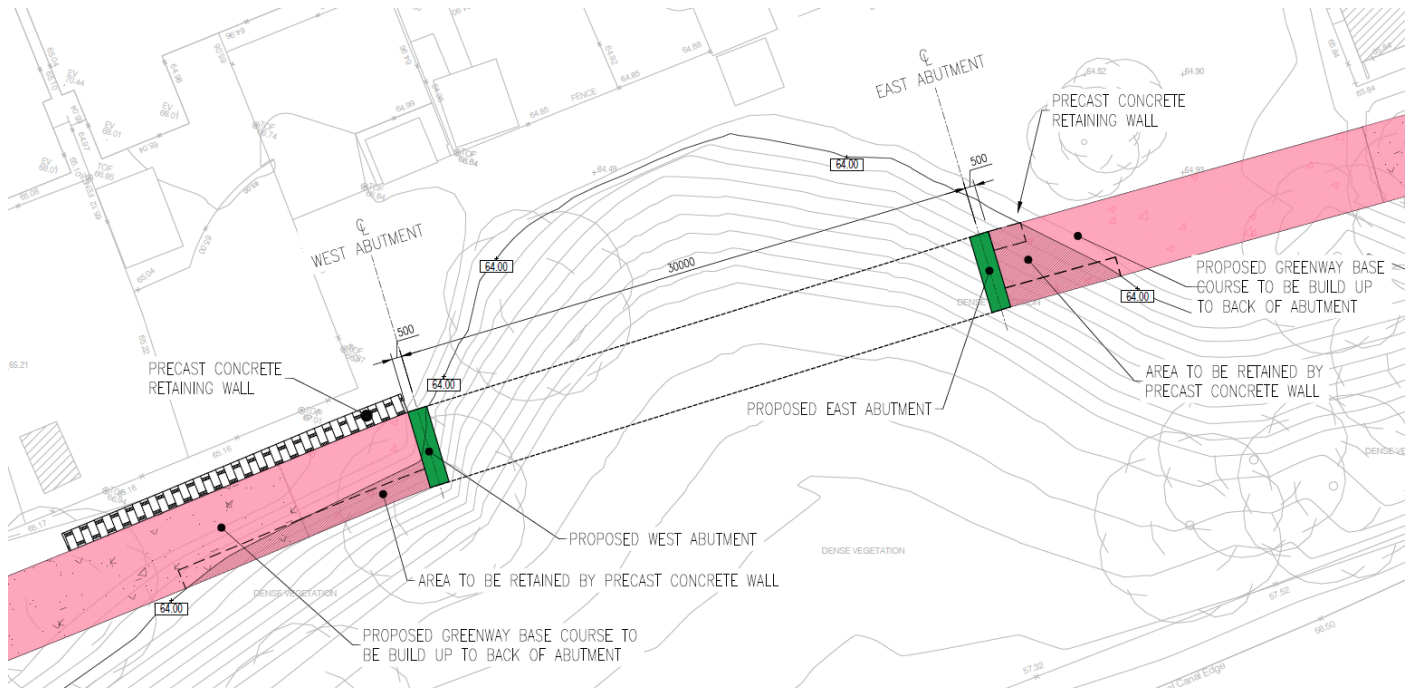


3. EXCAVATE FOR ABUTMENT, PLACE ABUTMENT FORMWORK, POUR ABUTMENT FROM MIXER TRUCK BACKED UP TO TRUCK PUMP UNIT ON HAUL ROAD. (EACH SIDE SEPARATE)

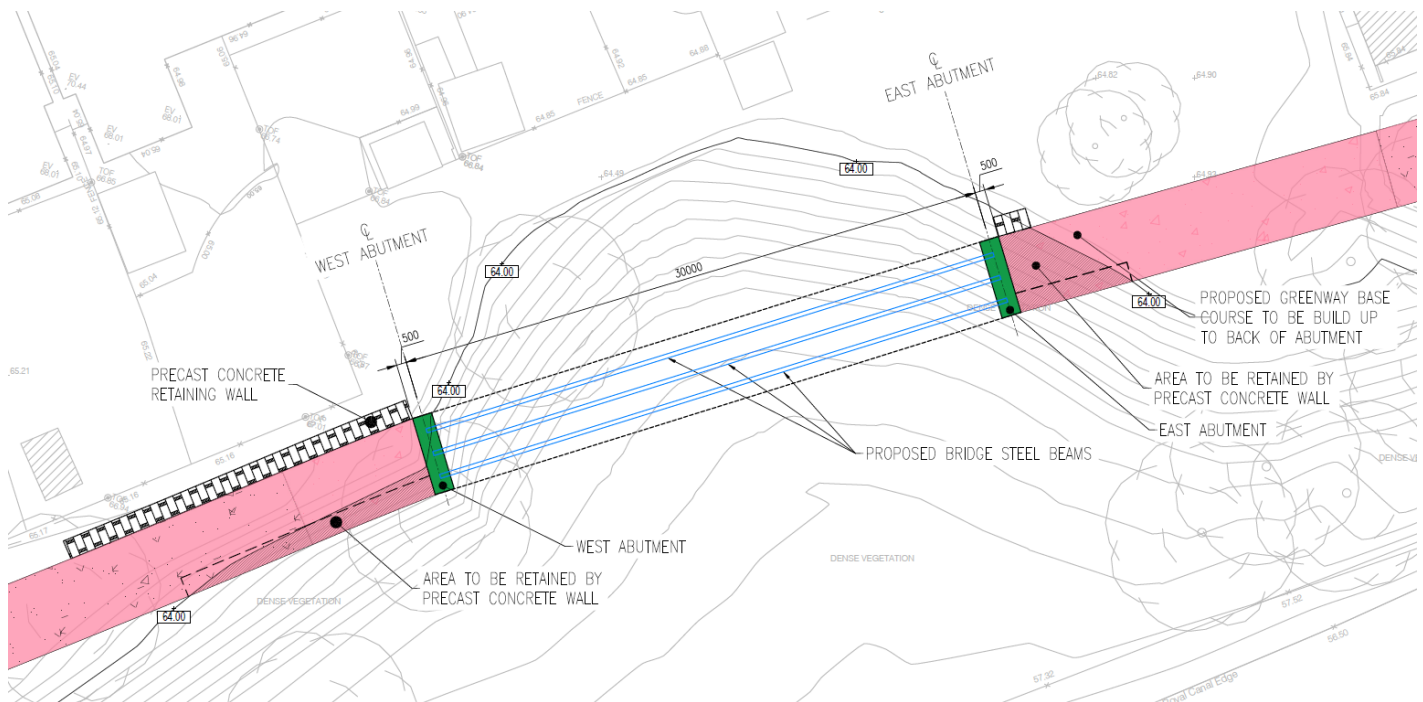


4. WORK BACK UP THE ACCESS SLOPE BUILDING PRECAST CONCRETE WALL AND COMPACTING IN LAYERS

Figure 2-16 Quarry – Indicative Constructability Plan Steps 3 and 4



5. BUILD UP FULL HEIGHT, FULL WIDTH BASECOURSE HAUL ROAD UP TO ABUTMENT BOTH SIDES. WALL UNITS TO HOUSES AS REQUIRED



6. LAND STEEL BEAMS 3 SECTIONS. ALLOW FULL SCAFFOLD (OPERATIVES ONLY) UNDER BRIDGE. CRAINED IN BOTH SIDES, BOLT IN SITU

Figure 2-17 Quarry – Indicative Constructability Plan Steps 5 and 6

The construction of the greenway on the northern embankment is not expected to impact on the rail network or the use of the canal. Construction works shall be undertaken during the daytime, minimising noise and nuisance impacts.

Due to the topography, sections east of the Quarry Bridge, will need to span hollows to maintain an appropriate vertical alignment and to link the greenway to the adjacent Landmark Bridge approach. It is proposed that a steel deck boardwalk, as described in 2.3.3 above and as illustrated in Figure 2-11, be constructed.

2.3.5 Landmark Bridge

The other bridge on the Proposed Development will traverse the canal itself (referred to as the 'Landmark Bridge'). The steel bridge will be approximately 200m in length and will have a maximum single span of 30m across the Royal Canal itself. The proposed bridge will be architecturally designed to be aesthetically pleasing and to fit into the surrounding environment – refer to Figure 2-15. The foundation arrangement shall comprise appropriately sized piled foundations to the dense sands and gravels or bedrock where available.

A geological fault is noted in a direction skew to the canal in this area, however, it is not viewed as a significant geotechnical risk item as the sands and gravels overlying the variable bedrock are considered to be sufficiently dense to facilitate a piled foundation. This will be confirmed through further site investigation at specimen design stage.

Similar to the bridge at the quarry, the approaching greenway will be initially constructed on either side of the canal, therefore providing an access route to construct the abutments and crane the steel beams into position.

Alternatively, the steel beams could be transported and craned into position from a barge.

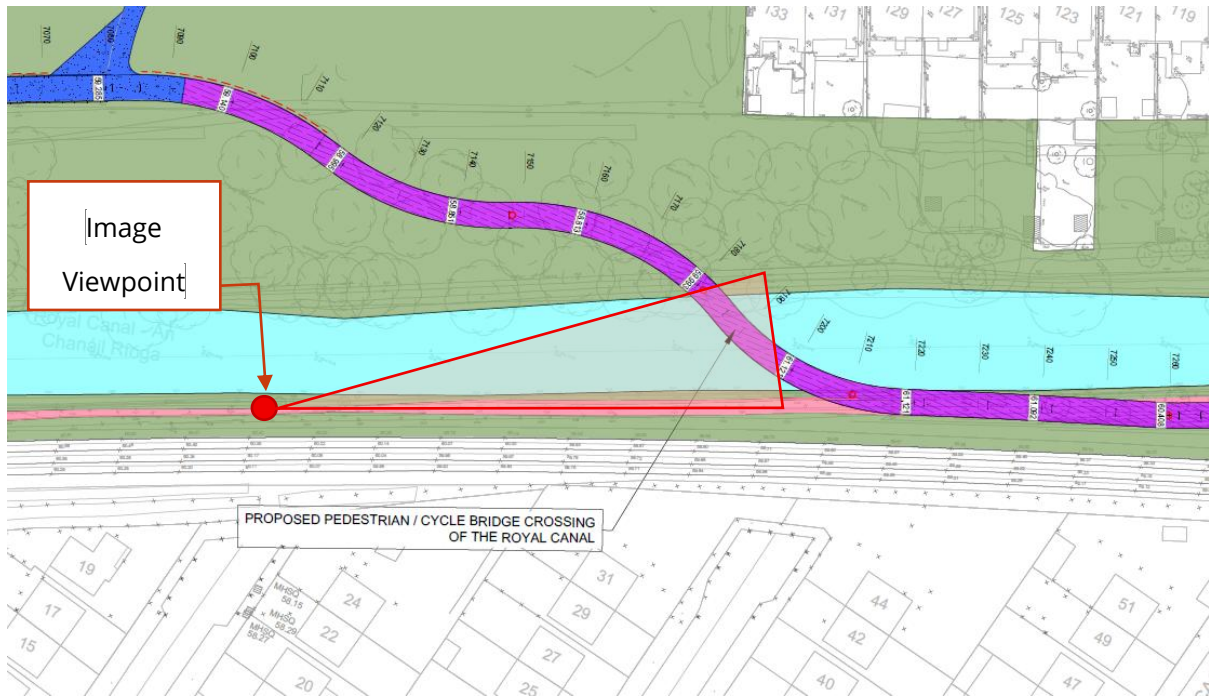


Figure 2-18 3D Rendered Image of Landmark Bridge Main Span

The proposed bridge shall tie in on the southern towpath east of an existing pinch point at Ch. 7000-7160, created by the railway masonry retaining wall and the towpath. As the towpath begins to widen from Ch. 7220 eastwards towards Granard Bridge, there is sufficient available width for construction of the bridge abutment and greenway at this location, while maintaining at least 4.5m separation from Iarnród Éireann assets. The piles shall also be positioned so as to maintain the

operation of the existing towpath on the southern side to enable the towing of barges and for maintenance purposes. A 3m height clearance will also be maintained along this existing towpath under the bridge sections for maintenance machinery.

2.3.6 Proposed Underpass

Section 3 also includes a new underpass to be constructed beneath Castleknock Road on the southern side of Granard Bridge (which is a protected structure with Reg. No. 11354002). This will provide a clear 3.5m to 4m greenway leading to the 5m wide underpass, with a minimum 2.7m clear height.

The proposed underpass has been designed, taking account of the existing geometry and ensuring the bridge and roadway (and services therein) overhead are not undermined. The total covered length of the proposed underpass is approximately 16m, with approaches of approximately 40m in length to the west and east to tie-in with the greenway either side.

The anticipated construction method for same will be a cut-and-cover technique, representative of the TII Standard Construction Details CC-SCD-02501, CC-SCD-02502, and CC-SCD-02503, with an indicative section at the bridge shown in Figure 2-19. The excavation shall be carried out with cognisance of the railway line to the south and the bridge structures both to the north and south, with appropriate retention of material if the indicative sloped excavation is not achievable.

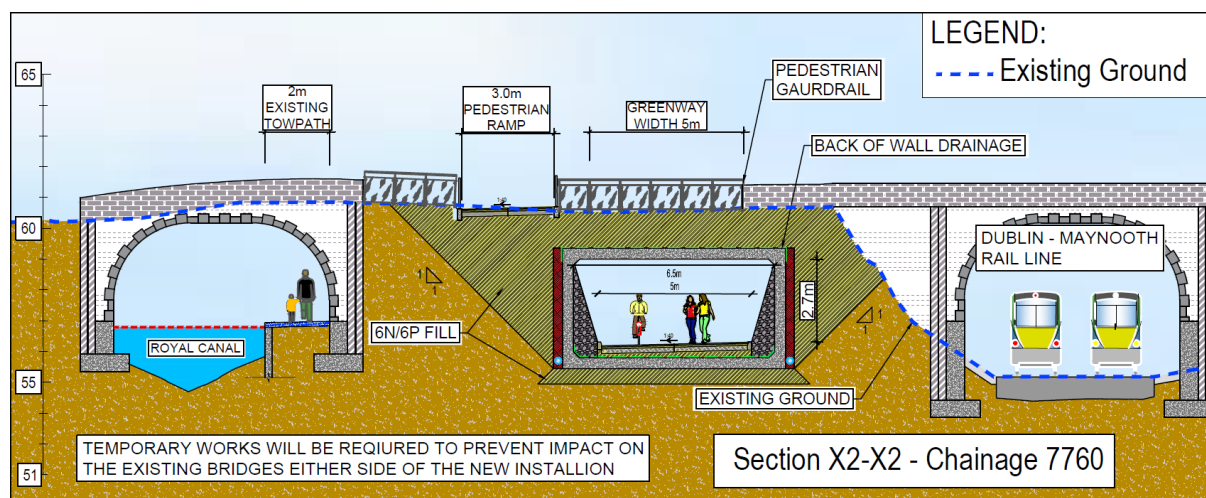


Figure 2-19 Indicative section of underpass construction in relation to Granard Bridge

While the minimum clearance from the underpass culvert's top of concrete to the road surface is 600mm, a clearance of 1.3m is considered more prudent in this scenario to account for potential underground services within the roadway above.

The utilities identified within the roadway / footpath crossing the Granard Bridge at this location are as follows (according to available utility survey and record drawings):

- MV/LV (10KV/20KV/400V/230V) Underground Cable Routes (at a depth of approx. 0.4m BGL according to utility survey);
- 1 no. 9" dia. watermain (depth not determined in utility survey);
- 1 no. 525mm dia. foul drain (depth not determined in utility survey);
- 180 PE-80 25 mbar gas mains (depth not determined in utility survey); and
- Multiple telecommunications ducts (at depths up to approx. 1m BGL according to utility survey).

These will be appropriately protected and temporarily propped during the excavation works.

In the case where the through road needs to be closed to carry out the excavation in full, traffic shall be directed towards the nearby Kirkpatrick Bridge.

2.4 Demolition

The demolition works will comprise the demolition of two houses and ancillary structures on the approach to Hansfield Road to facilitate the routing of the Proposed Development. In addition, there will be general clearance of street furniture at crossings along the route.

The demolition works shall be in accordance with the specific demolition items set out in the following National Standards and guides:

- I.S EN 1991-1-6:2005 – Actions on Structures: General Actions – Actions During Execution (Including National Annex)
- BS 6187:2011 – Code of practice for full and partial demolition
- HSE Publication HSG264: Asbestos, The survey guide
- BS 5228 – Code of practice for noise and vibration control on construction and open sites – Part 1: Noise
- BS 5228 – Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration

All reasonable precautions shall be taken to prevent pollution of the site, works and the general environment, including streams and waterways.

All demolition waste shall be segregated and, where practicable, sent for recycling, in accordance with guidelines set out by the National Construction and Demolition Waste Council (NCDWC).

A waste management plan following guidelines as set out by the NCDWC shall be produced at construction stage outlining the proposals with respect to waste recycling, segregation and details of landfill proposals with target percentage of each element. The following legislation should be noted:

- Protection of the Environment Act 2003.
- Waste Management (Amendment) Act 2001.
- Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste.
- EU Council Decision on Waste Acceptance (2003/33/EC).
- WMA Amendment Act (#2) 2001.
- Protection of the Environment Act No. 27 2003.
- Best practice Guidelines on the preparation of Waste Management Plans for Construction and Demolition Waste

2.5 Mitigation Measures

Mitigation measures to be applied during construction are set out in the relevant EIAR chapters and summarised in the OCEMP prepared for the Proposed Development. These include controls for ecology, water quality, invasive species, dust, noise and vibration, construction traffic, waste, material handling, soil management, lighting, working near the railway and canal, and reinstatement of temporary working areas.

3 Traffic Management & Access

The Contractor shall develop a Construction Stage Temporary Traffic Management Plan (CSTTMP) in consultation with the FCC Roads & Transportation Department prior to commencement of construction. This CSTTMP will be prepared in accordance with the constraints set out in the tender documentation to be prepared for the scheme. Further detail on some of the likely requirements of the plan is outlined in the Outline Construction Environmental Management Plan (Outline CEMP) prepared for the Proposed Development, with details below on some of the methodology proposed for the implementation of same.

3.1 General Storage, Compounds and Parking

Temporary construction compound space will be required to provide stores, offices, material storage, parking and welfare facilities for the contractor and Employer's Representative. The exact location, layout and size of the compound(s) will be at the discretion of the contractor, with the agreement of FCC, within the red line. A number of potential compound locations have been identified as part of this planning application, including an area at Hansfield adjacent to the properties proposed to be demolished, which provides a central location along the scheme, along with other satellite locations along the route. While final construction compound locations will be determined by the contractor, the potential locations, presented in Figure 3-1, are as follows:

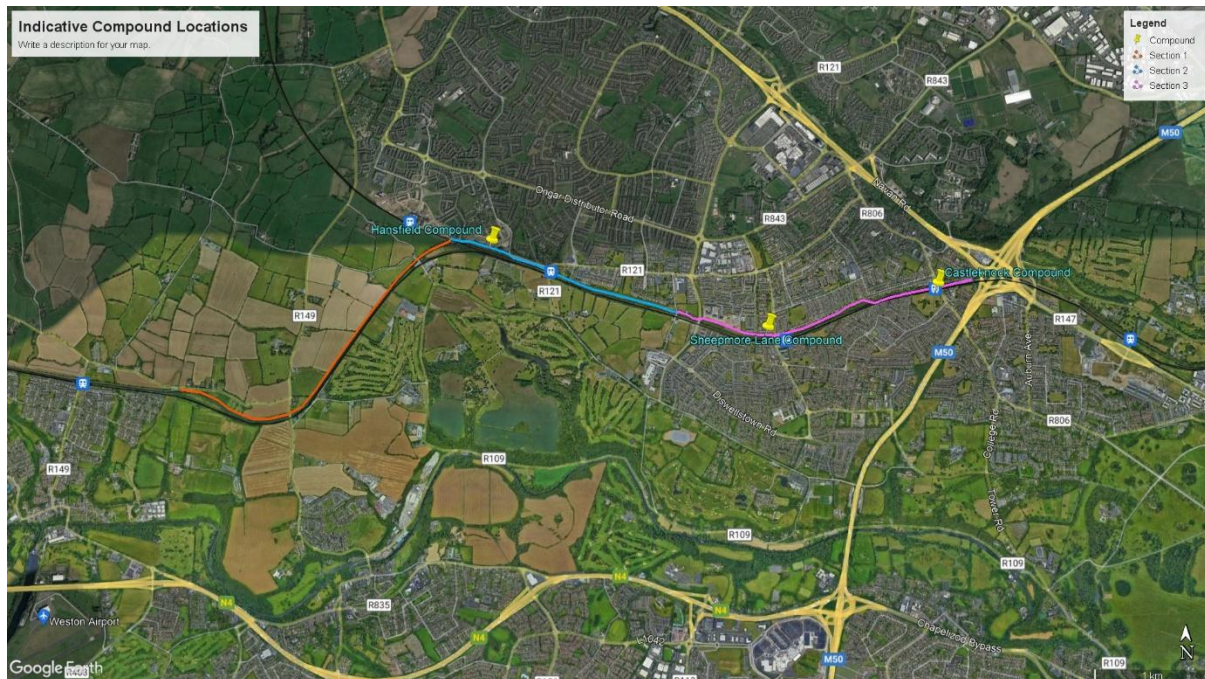
Hansfield site – An existing grassed / planted area between the existing towpath and the adjacent lands has been acquired by FCC. The area is to be cleared and excavated to facilitate the Proposed Development works. The area can be accessed from Hansfield Road and will require the demolition of the existing properties proposed as part of the works to be carried out prior to full establishment of the compound. Once established this will likely operate as the main compound for the remaining works.

Sheepmoor Lane site – An open grassed area has been acquired by FCC for the purpose of using this space for maintenance and storage. During the construction phase, this area may be used as a satellite compound / storage area.

Castleknock site – A grassed section of the Laurel Lodge Park, accessed via Park Lodge. Due to its setting this will likely only act as a satellite compound for storage of materials associated with the adjacent works and access for HGVs and large plant will be limited.

Compound layouts will be developed to avoid sensitive ecological areas where practicable and to provide suitable controls for fuel storage, refuelling, wheel washing, stockpiling, waste segregation

and runoff management. Stockpiles will be located away from the canal, existing drains and overland flow paths where practicable, and will be kept to the minimum volume and duration necessary for the works.



all construction materials are removed as part of the Proposed Development. It shall therefore be brought to formation level for the proposed works.

3.2 Temporary Impact on Schools and Surrounding Businesses

There are a number of schools in the vicinity of the scheme, particularly from the Clonsilla area eastwards. To minimise impact on school traffic, works in the vicinity of the schools will, as far as reasonably practicable, be undertaken during summer months (June to September), and when schools are closed. Should works be necessary when schools are open, restrictions will be imposed on the contractor in respect of Temporary Traffic Management (TTM) to ensure impact on traffic during school drop-off and pick-up times is minimised.

There will be a minor impact on residents and businesses during the course of the works where road crossings are being constructed. Traffic volumes shall be managed by way of proper TTM and advance information signs informing local traffic of the works and giving them the opportunity to use alternative routes, particularly in the case where a bridge crossing may need to be closed such as during the Granard Bridge underpass construction. The TTM will be designed and installed in accordance with Chapter 8 of the Traffic Signs Manual and Guidance for the Control and Management of Traffic at Road Works.

3.3 Temporary Traffic Management at Road Crossings

Traffic management at road crossings should be straightforward as it generally comprises routine works with which contractors would be familiar. This section of the report outlines how the construction will be delivered in a safe and efficient manner from a temporary traffic management perspective.

TTM will be established alongside the existing road to allow for the creation of safe working areas, offering space to progressively construct the new crossings and associated infrastructure and tie-ins to the greenway. The TTM will be established by trained and competent contractors in accordance with **Guidance for the Control & Management of Traffic at Road Works** (refer to Figure 3-2 for example layout).

All works will generally be constructed within this safely managed area. The works area will be accessed directly from the public road. The maximum length of the works area will be agreed in advance with the local roads authority and will be dependent on proposed traffic control measures and levels of visibility. Materials will be brought to the works area daily and used within the working day. No excess materials will be retained in the works area. The final surfacing will be undertaken in long sections during off peak hours to ensure minimal impact on traffic.

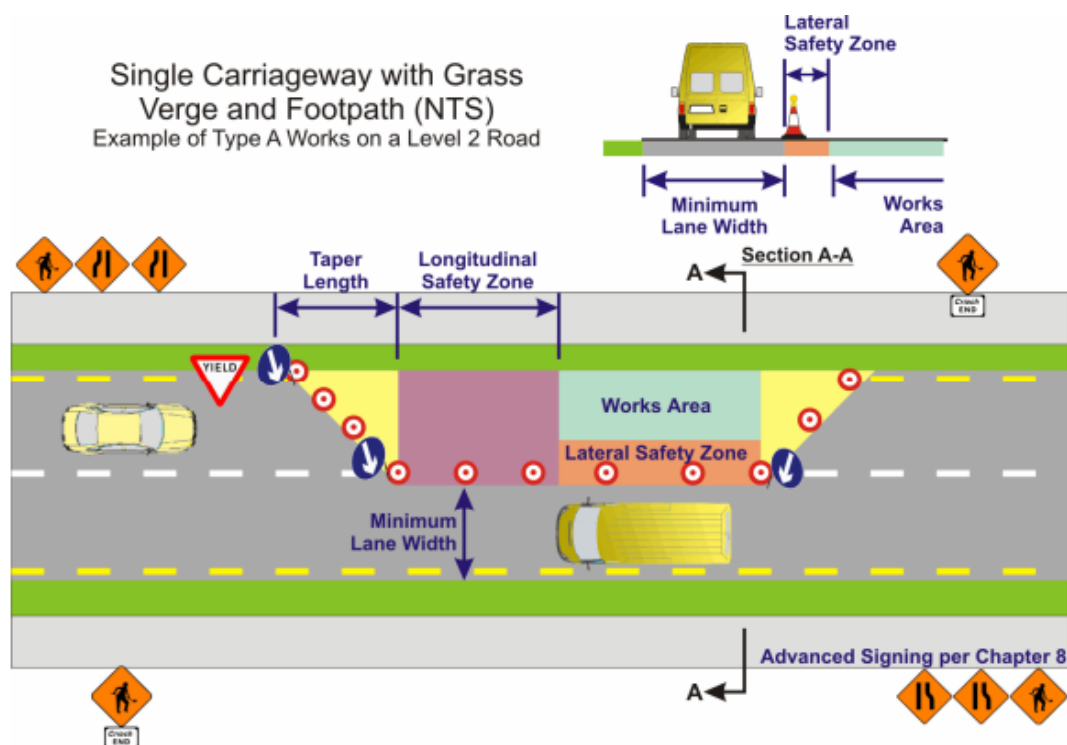


Figure 3-2 Example Shuttle Temporary Traffic Management Area Works Alongside Road

3.4 Temporary Traffic Management for Offline Works

Details of the proposed works, and the mitigation measures in respect of ecological impact, have been outlined in Section 2 above. This section of the report outlines how the construction will be delivered in a safe and efficient manner from a temporary traffic management perspective.

TTM will be established at the access points and along the existing banks to allow for the creation of safe access points at agreed locations along the route for the safe delivery of plant, materials and labour, and to maintain access along the towpath for emergency towing of barges and for access to designated fishing points if practicable. The selected access points from the public road, as identified below, will also have space for the short-term holding of materials (maximum 1 week) and provide space for plant drop-off, as well as the linear movement of plant, materials and labour along the route and transition from the road. The access will be controlled in a similar fashion to that for the works alongside the road. The works area indicated would generally be used for the short-term holding of materials and access, as opposed to physical works.

The works area will be away from the road and will move progressively from the access points along the route of the greenway. Small plant items will be delivered to the entry locations, and these will progress along the route. Excavator mounted pile drivers will be used to install the support posts/piles. Other plant and cranes will be used to move the bridge structural elements from the entry drop off location to the installation location.

Although construction-stage access points will be formally agreed with the works contractor, preliminary access points for works away from the road are anticipated to be from the existing bridge accesses. All bridges crossing the route have existing access points to the works area, with the exception of Callaghan Bridge and Dr Troy Bridge, although the scheme runs beneath both of these. Specific traffic management arrangements will be made at each of these locations but are likely to involve partial closure of the nearside lane to allow for safe and controlled access, similar to the progressive works alongside the road.

3.5 Temporary Traffic Management for Bridge Structures

The construction of the bridge structures will require specific temporary traffic management arrangements for each aspect of the work. These will be developed in agreement with the local roads authority.

Bridge construction methodologies will be developed to maintain, where practicable, canal maintenance access, navigation requirements and Iarnród Éireann operational requirements. Any temporary closures or restrictions will be minimised and agreed in advance with the relevant stakeholders.

There are three main elements associated with the construction of the bridge structures: the support foundation (proposed to be piles), ground beam / abutment and superstructure.

The piles will be installed in-situ. The type and form will be dependent on the underlying geology. A site investigation will be carried out during detailed design phase to ascertain precise requirements. Irrespective of the piling option employed, restrictions will be put in place, as outlined previously, to avoid impact on the surrounding ecology. A temporary and removable piling mat will be constructed within the works area to provide a level running surface for the piling rig. Traffic may need to be temporarily diverted to allow access and egress of the piling rig from the road to the working area.

Given the sloped nature of the embankment at the location of the proposed Quarry Bridge, large stone filled bags will be used to create a level and retained surface onto which a timber piling mat will be placed – an example of this arrangement is shown in Figure 3-3. Following installation of the piles, the mat will be removed together with the stone filled bags. The stone will be used elsewhere in the project to prevent waste.



Figure 3-3 Typical Geotextile Filled Bags and Timber Piling Mat (Temporary)

The ground beams and abutments will be constructed in-situ. These elements will be in-situ reinforced concrete elements. The traffic management for these elements would be similar to works away from the road. A dedicated works area will be created to allow for construction of the groundworks. Specific traffic management measures would be put in place through these areas. While the bridges are in relatively close proximity, one bridge will be undertaken at a time to avoid excessive temporary traffic management being put in place at the same time. The temporary traffic management will be used to provide access and a location for the temporary storage of materials similar to works away from the road. No road closures will be necessary for these works.

The steel superstructure for the Landmark Bridge will be fabricated off site and brought to site on a special vehicle and then craned into position. If necessary, use may be made of lands at Brompton, subject to approval, as a temporary set-down area for the structure.

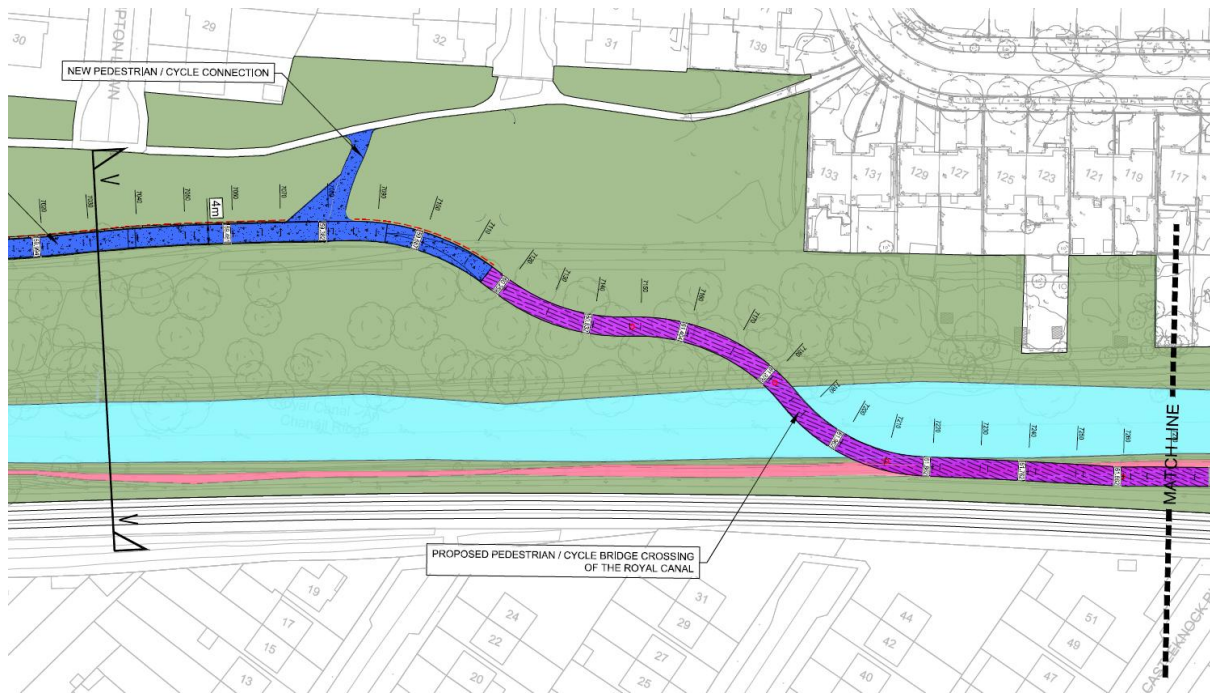


Figure 3-4 Layout for Delivery and Installation of Landmark Bridge

During the crane operations, the area would temporarily be closed to the public and diversions for pedestrians and cyclists put in place as needed. Advance notifications would be directed to the local press and all diversion signage erected. The process will be undertaken during off-peak times to minimise impact. Protective mats will also be placed on the grassed area to avoid excessive damage to the existing surface from the crane. A typical example of craned bridge installation is shown in Figure 3-5.



Figure 3-5 Typical Bridge Lifting Operations (One Lift)

The superstructure for the Quarry Bridge is proposed to be installed following the indicative constructability plan as outlined in Section 2.3.4. The construction of the superstructure will be undertaken within the works area making use of the existing space available.

4 Construction Programme and Phasing

Pending approval for the Proposed Development to proceed, it is estimated that construction of the Proposed Development infrastructure, if undertaken as one contract, will take approximately 24 months to complete.

The construction programme will be developed having regard to ecological seasonal constraints, including vegetation clearance, nesting birds, bat activity, badger mitigation, aquatic species protection and any required pre-construction surveys. Where seasonal constraints affect sequencing, works will be programmed to avoid sensitive periods where practicable or will be subject to specialist ecological supervision.

For the purposes of this assessment, it is assumed that the infrastructure works will be undertaken under one contract. The indicative phasing set out herein represents a possible sequence considering the known constraints and impacts of various works elements, and in a manner which seeks to optimise the continued operation of the existing greenway facilities during the construction of the new infrastructure.

Given the complexity of the works in the Delwood area, including both the Quarry Bridge and the Landmark Bridge (Chainage +6500 to +7350), it is envisaged that these works will commence at the beginning of the construction programme and will largely continue independently of the main greenway works until such time as the tie-ins are required. Given the likelihood of a long lead-in time for the manufacture and delivery of the superstructure elements, early engagement with the supplier will be critical. The existing towpath on the southern bank of the canal will remain operational to allow the greenway to function during construction, unless temporary closures are required at a particular stage of the bridge installation.

In tandem with this, it is envisaged that the main works will commence on the western end of the scheme, working eastwards towards the Hansfield rail bridge. This is considered appropriate to complete the rural portion of the greenway early in the programme. Subject to agreement by Irish Rail and Waterways Ireland, these works will likely require the incremental closure of sections of the existing greenway to the general public. This is due to the works required in constructing the new surface directly on and/or immediately adjacent to the existing towpath. Space shall be provided for emergency towing of barges as necessary.

The works will then continue through the Hansfield area. Clearance of vegetation and demolition of properties as required will commence to enable the area to be used as a construction compound. Access to the rest of the greenway can be granted via the existing pedestrian / cycle

route at St Joseph's and along the existing towpath toward Callaghan Bridge. The existing towpath on the canal banks will remain operational to allow the canal to function during construction.

The next stage will likely require the incremental closure of sections of the existing towpath for the general public from Hansfield Road (Ch. +3770), beneath the Callaghan Bridge, through to the Kennan Bridge (Ch. 5320). This is due to the works required in constructing the cantilevered boardwalk and new paved greenway directly on and/or immediately adjacent to the existing towpath. This also includes the upgrade of the existing towpath to bound surface (min 2m width) where the cycle route diverts through the Old Schoolhouse Lands. Space shall be provided for emergency towing of barges as necessary.

The works will continue along the upper northern embankment from Kennan Bridge to Sheepmoor Lane, with the existing towpath remaining operational on the southern banks. These works will need to be coordinated with the works in the adjacent third-party lands and, as such, can be carried out independently of the overall sequence as needed.

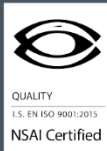
The final stage of the main greenway construction will be from the tie-in to the Landmark Bridge, running eastwards along the southern banks, past Granard Bridge, and to the scheme end at Talbot Bridge. Given the space available, it is envisaged that some level of access could be maintained for the general public, unless temporary closures are required at a particular stage of the construction or where there is a particular pinch point.

Similar to the bridges, the proposed underpass at Granard Bridge will be carried out independently of the main greenway construction and will be phased at an appropriate time to minimise impact on traffic as a result of the potential road closure, such as during off-peak periods when schools are closed.

This phasing will lead to incremental improvements along the route as the scheme progresses and allows for a high level of access being maintained to the existing facilities.

5 Conclusion

This outline Construction Methodology has provided initial proposals for the delivery of the Proposed Development. The report has presented the proposed construction forms and strategies for delivery and operation of the greenway. This methodology shall be read in conjunction with the Outline CEMP.



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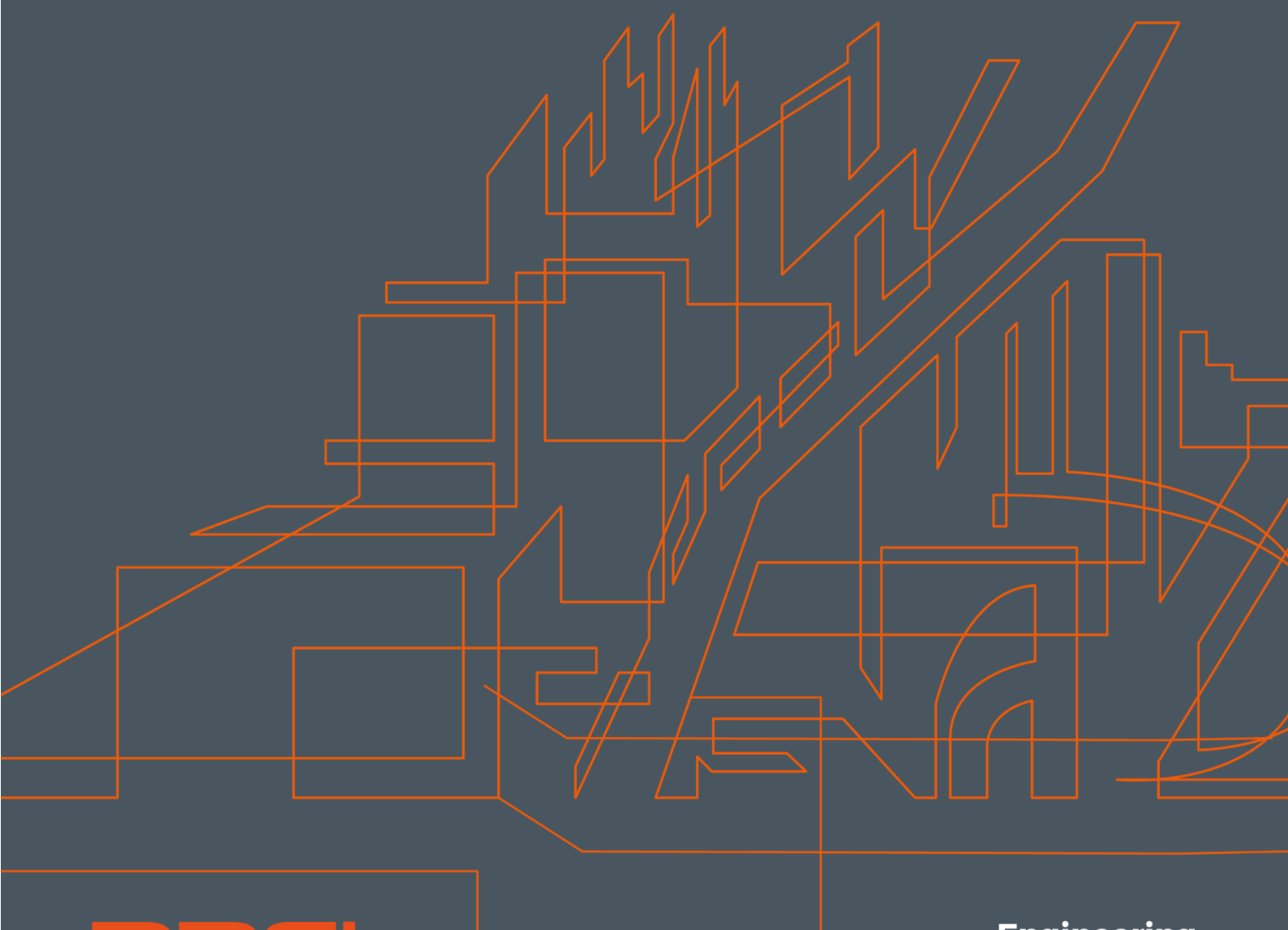
Appendix B : Outline Construction Traffic Management Plan

Royal Canal Urban Greenway

Outline Construction Traffic Management Plan

170239-DBFL-XX-XX-RP-C-0005

Sep 2026



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1 Introduction and Purpose

1.1 Purpose of this Outline CTMP

This Outline Construction Traffic Management Plan (Outline CTMP) has been prepared to accompany the planning application and EIAR for the Royal Canal Urban Greenway. It provides a project-specific framework for managing construction traffic, temporary traffic management, public access, delivery movements, site compounds, construction parking and stakeholder notification during the construction phase of the Proposed Development.

The plan is deliberately set at planning-stage level. It identifies the required traffic management approach, key locations of sensitivity and the commitments that must be carried forward by the Contractor into a fully detailed Construction Stage Temporary Traffic Management Plan (CSTTMP) before any works commence on site.

1.2 Role within the planning documentation

- It supports the construction phase assessment in EIAR Chapter 14, Material Assets: Traffic and Transportation.
- It provides a standalone response to the requirement that an Outline CTMP be included with the planning documentation.
- It sits alongside the Outline CEMP and Construction Methodology Report and should be read together with those documents.
- It summarises traffic-related commitments that should be transferred into tender documentation, planning compliance documentation and the Contractor CEMP.

This Outline CTMP provides the planning-stage information required to inform the EIAR assessment of construction traffic effects, including construction worker travel, delivery vehicle movements, compound access, parking, haul routes and delivery timing.

1.3 Status of this plan

This Outline CTMP is not a substitute for the Contractor's detailed CSTTMP. The detailed plan will be required to include dimensioned drawings, traffic control layouts, diversion plans, signage schedules, traffic marshal locations, construction access drawings, temporary footway and cycleway arrangements, risk assessments and stakeholder approvals.

2 Project Description and Construction Context

2.1 Overview of the Proposed Development

The Royal Canal Urban Greenway comprises an approximately 8.1 km shared pedestrian and cycle greenway along and adjacent to the Royal Canal towpath. The route extends from the Kildare County Council boundary in the west to Talbot Bridge at Old Navan Road in the east, where it ties into the Ashtown Greenway. The project forms part of the wider Royal Canal Greenway corridor and provides an active travel link for pedestrians and cyclists.

The project includes new and upgraded surface treatments, boardwalks, embankment and retaining structures, bridges, road crossings, lighting, landscaping, drainage, service diversions and three temporary construction compound areas.

2.2 Principal scheme sections

Section	Extent	Chainage	Receiving environment	Traffic management relevance
Section 1	Kildare County Border to Hansfield Railway Bridge	Ch.0000 to Ch. 3200	Rural and peri-urban canal towpath, adjoining Westmanstown Golf Club and Westmanstown Sports Centre. Existing towpath on northern embankment.	2m to 3m unbound surface following existing towpath. Works include limited excavation, widening and tie-in through Hansfield railway underpass.
Section 2	Hansfield Railway Bridge to Kennan Bridge	Ch. 3200 to Ch. 5300	Transition from rural to suburban character. Residential lands to the north and farmland to the south. Interfaces with Hansfield Road, Callaghan Bridge and Porterstown Road.	3m to 4m bituminous route, ramp to Old School House lands, pocket park at Hansfield, existing links through St. Josephs, and a precast concrete cantilevered boardwalk between Callaghan Bridge and Old School House lands.
Section 3	Kennan Bridge to Talbot Bridge	Ch. 5300 to Ch. 8100	Predominantly urban corridor with residential catchments both sides of the canal, the Dublin to Maynooth rail line adjacent to the corridor, steep banks and local pinch points.	4m bituminous greenway where feasible, Sheepmoor Lane shared road section, Quarry Bridge, Landmark Bridge, boardwalks, Granard Bridge underpass, and tie-in to Ashtown Greenway at Talbot Bridge.

Table 2-1: Principal scheme sections and traffic management relevance

2.3 Key construction elements influencing traffic management

- Demolition of two dwellings and ancillary structures on the approach to Hansfield Road.
- Construction of a 2m to 3m unbound greenway in Section 1 along the northern towpath.
- Construction of 3m to 4m bituminous greenway and ramps in Section 2.
- Construction of a 4m wide precast concrete cantilevered boardwalk east of Callaghan Bridge.
- Construction of retaining structures and elevated sections between Porterstown Road and Windmill Court.
- Construction of Quarry Bridge, Landmark Bridge and associated ramped approaches.
- Construction of the cut-and-cover Granard Bridge underpass beneath Castleknock Road.
- Toucan crossings, zebra crossing, road tie-ins, lighting, signage, public realm and landscaping works.

3 Policy, Guidance and Statutory Basis

3.1 Applicable guidance

Guidance or statutory reference	Application to this Outline CTMP
Traffic Signs Manual Chapter 8	Temporary traffic measures and signs for roadworks. All temporary diversions, lane closures, one-way working, signage and safety measures for the scheme are to be prepared in accordance with this guidance.
Guidance for the Control and Management of Traffic at Road Works	Applied to the planning-stage approach for road crossings, temporary traffic management, signage, traffic control and protection of road users during construction.
Cycle Design Manual, NTA, 2023	Basis for active travel design and construction interfaces affecting pedestrian and cycle provision.
Traffic Management Guidelines, DoELG, DoT and DTO, updated 2022	Traffic management policy and design context for works affecting existing road users.
Design Manual for Urban Roads and Streets, 2019	Urban street design context in Clonsilla, Coolmine, Castleknock and Talbot Bridge areas.
TII Rural Cycleway Design (Offline and Greenway), DN-GEO-03047, 2025	Basis for rural and offline greenway construction, including unbound and bituminous construction forms.
TII Specification for Road Works, Series 600, 900 and 1100	Earthworks, pavement materials, kerbs, footways and paved areas referenced in the Construction Methodology.
Roads Act 1993, as amended	Statutory context for cycleway provision and road authority functions.
Safety, Health and Welfare at Work (Construction) Regulations 2013	Contractor obligations for safe works, including road, footpath and cycle track interfaces.

Table 3-1: Applicable guidance and statutory references

3.2 Contractor obligations

- The Contractor shall appoint competent and suitably qualified traffic management personnel to prepare and implement the CSTTMP.
- All works affecting roads, footways, cycleways and canal access routes shall be subject to task-specific risk assessment and method statements.

- All temporary traffic management shall be coordinated with the PSDP, PSCS, local authority roads department, emergency services and relevant asset owners.
- The Contractor shall maintain records of inspections, road opening licence compliance, complaints, incidents and corrective actions.

3.3 Planning-stage commitments

The planning-stage commitment is that construction will be undertaken using a combination of sequenced work areas to be confirmed by the appointed Contractor, defined compound access, limited-duration road crossing works, off-peak deliveries, protection for vulnerable road users and advance stakeholder notification.

4 Receiving Transport Environment

4.1 Strategic and local context

The route follows the Royal Canal corridor through rural, peri-urban, suburban and urban contexts. The corridor is adjacent to the Dublin to Maynooth rail line for much of its length, passes through residential catchments, interfaces with several bridges and links to existing pedestrian and cycle facilities, including a connection to the Ashtown Greenway.

4.2 Existing active travel use

Pedestrian and cyclist surveys were undertaken on Tuesday 4 March 2025 between 07:00 and 19:00 at five key locations along the corridor. The recorded 12-hour two-way active travel flows from EIAR Table 14-2 are summarised in the table below. These existing user levels have informed the need to maintain safe pedestrian and cyclist access, or provide clearly signed temporary alternatives, during construction.

Survey location	Pedestrians	Cyclists	Aggregated two-way flows
Clonsilla Train Station / Callaghan Bridge	145	19	164
Kennan Bridge	204	26	230
Kirkpatrick Bridge	1,508	21	1,508
Granard Bridge	1,882	155	2,045
Talbot Bridge	839	465	1,304
Estimated baseline users	916	137	1,053

Note: The pedestrian and cyclist figures are taken from the directional counts presented in EIAR Table 14-2. The aggregated two-way flows and estimated baseline users are retained as reported in the EIAR traffic chapter.

Table 4-1: 2025 recorded weekday 12-hour active travel flows, based on EIAR Chapter 14 Material Assets: Traffic and Transportation, Table 14-2

4.3 Relevant safety context

The safety context below is based on the road safety records and do-nothing scenario assessment presented in EIAR Chapter 14 Material Assets: Traffic and Transportation. The EIAR identifies existing safety issues for pedestrians and cyclists along the corridor, particularly where towpath widths are constrained, where deep cuttings occur near the canal, and at road bridge interfaces.

The Construction Stage Temporary Traffic Management Plan must therefore treat vulnerable road user protection as the primary design requirement.

5 Construction Activities Relevant to Traffic Management

5.1 Principal Construction Activities

- Fencing of construction areas and establishment of construction compounds.
- Implementation of temporary traffic management measures and site access controls.
- Temporary surface water management and environmental protection measures.
- Stripping of topsoil and existing surfacing, with stockpiling and reuse where practicable.
- Earthworks to formation level and importation of capping and pavement materials.
- Tree and vegetation clearance where required.
- Construction of Quarry Bridge, Landmark Bridge, boardwalk sections and the Granard Bridge underpass.
- Utility installation, protection, diversion, trenching, ducting and drainage works.
- Ancillary roadworks including road markings, traffic signals, lighting and signage.
- Landscaping, fencing, boundary treatment and reinstatement works.

5.2 Anticipated construction duration and sequencing

The construction duration is anticipated to be approximately 24 months if undertaken as one contract. References to phasing in this Outline CTMP relate to the construction sequencing of the works and do not indicate separate construction contracts. The Proposed Development is currently anticipated to be delivered under a single construction contract. The appointed Contractor will prepare a detailed construction programme prior to commencement, setting out the sequence, duration and management arrangements for individual work areas. The final sequence will depend on the Contractor's methodology, access arrangements, environmental constraints, utility interfaces, stakeholder requirements, temporary traffic management approvals and any restrictions agreed with relevant stakeholders.

5.3 Material movement principles

For the purposes of the planning-stage assessment, construction traffic is expected to be relatively low, with HGV movements estimated at a maximum of nine per day. HGV movements will be managed through the delivery booking system, agreed haul routes and off-peak scheduling where practicable. The Contractor shall confirm the detailed delivery profile through the construction programme and logistics plan, and any material change to the assumed construction traffic generation shall be agreed with Fingal County Council through the CSTTMP process.

Compound	Project-specific context	Traffic management controls
Sheepmoor Lane satellite compound	Open grassed area acquired by Fingal County Council for maintenance and storage purposes.	Use as satellite storage area. Local resident access to be maintained. HGV and plant access to be controlled due to local road context.
Castleknock area satellite compound	Grassed section of Laurel Lodge Park accessed via Park Lodge. Intended only as satellite storage for nearby works.	HGV and large plant access to be limited. Use should focus on materials associated with adjacent works, with local access and park users protected.

Table 6-1: Construction compound strategy and traffic management controls

An existing Fingal County Council depot located approximately 1 km from the scheme may be available for separate inert material storage, subject to agreement with Fingal County Council and confirmation by the Contractor. This depot is not identified as a temporary construction compound. Any use of the depot shall be managed through the detailed CSTTMP, including agreed haul routes, delivery timing and access controls.

6.2 Parking and workforce movement

- Parking for construction operatives shall be accommodated at the Hansfield main compound only.
- Operatives shall be transported from the main compound to the active work area by vans, minibuses or other managed transport.
- No construction worker parking shall be permitted within temporary work areas or on adjoining public roads.
- The Contractor shall prepare a construction mobility management plan to encourage shared travel and minimise worker trip generation.

7 Construction Traffic Generation and Routing

7.1 Construction vehicle categories

Vehicle category	Likely use on the scheme	Management requirement
Light vehicles	Resident engineer, site supervision, safety and environmental personnel, subcontractor support and inspections.	Minimise trips. Use compound parking. No public road parking.
Vans and minibuses	Transfer of operatives from Hansfield compound to active work areas.	Managed movements along agreed routes and outside sensitive peak periods where practicable.
HGVs	Import of pavement materials, capping, precast units, concrete, drainage materials, fencing, lighting and removal of unsuitable or surplus material.	Delivery booking system, agreed haul routes, off-peak arrivals where practicable and wheel wash at exits.
Plant delivery vehicles	Excavators, piling rigs, dumpers, pavers, rollers, cranes and specialist plant.	Task-specific delivery method statement and access marshal at entry points.
Special vehicles	Bridge superstructure delivery and potentially abnormal loads for Landmark Bridge and Quarry Bridge elements.	Abnormal load assessment, licences, Garda and local authority notification where required, off-peak delivery and temporary set-down controls.

Table 7-1: Construction vehicle categories and management requirements

7.2 Haul route principles

- Dedicated construction haul routes shall be identified and agreed with Fingal County Council prior to commencement.
- Construction traffic shall use the most appropriate local and regional road network available at the time of construction.
- Routes shall avoid unnecessary use of residential streets and school frontages where practicable.
- The Contractor shall assess swept paths for constrained access points and specialist deliveries.

- Wayfinding signage shall be provided to route deliveries to the correct access and compound locations.

7.3 Delivery timing

Delivery vehicles shall be spread across the working day. Transport of site machinery and materials shall take place outside peak traffic periods where practicable and shall not occur between 19:00 and 07:00, unless otherwise agreed for specific exceptional activities such as off-peak lifting or carefully controlled closures.

8 Section 1 Traffic Management Strategy

8.1 Section 1 context

Section 1 extends from the Kildare County Border to Hansfield Railway Bridge, Ch. 0000 to Ch. 3200. The route follows the existing northern towpath in a rural and peri-urban setting and is to be constructed as a 2m to 3m wide unbound surface. The existing towpath and grassed areas will require clearance, limited excavation and pavement build-up.

8.2 Construction access approach

- Access shall be based on existing bridge access points and any additional agreed locations within the project boundary.
- Small plant will be delivered at agreed entry points and will progress linearly along the route.
- Materials shall be brought to work areas daily or on a short-duration basis and shall not be stockpiled in constrained towpath locations beyond what is reasonably necessary.
- Emergency towing of barges shall be maintained where practicable throughout sectional works.

8.3 Public access and towpath closures

It is anticipated that incremental closures of existing public towpath sections may be necessary where construction is directly on or immediately adjacent to the existing towpath. Closures shall be localised, phased and notified in advance. The Contractor shall identify diversion routes and alternative canal access arrangements before implementing closures.

8.4 Key controls for Section 1

Issue	Control
Rural towpath access	Use compact plant and staged construction lengths. Maintain clear segregation between construction activity and any retained public movement.
Material movement	Use periodic deliveries from compounds rather than continuous HGV movements. Avoid retention of excess materials in active areas.
Ecology and canal protection	Keep construction traffic within defined areas and comply with CEMP buffers and restrictions.
Emergency access	Maintain emergency towpath access where practicable and agree any temporary restrictions in advance.

Table 8-1: Section 1 traffic management controls

9 Section 2 Traffic Management Strategy

9.1 Section 2 context

Section 2 extends from Hansfield Railway Bridge to Kennan Bridge, Ch. 3200 to Ch. 5300. It includes suburban residential interfaces, Hansfield Road, Clonsilla Road, Callaghan Bridge, Porterstown Road and the Porterstown Old School House lands. The works include 3m to 4m bituminous greenway, a 70 m ramp to the Old School House lands, a pocket park at Hansfield and a 4m wide cantilevered boardwalk between Callaghan Bridge and Old School House lands.

9.2 Hansfield compound and pocket park area

The Hansfield area will be cleared and excavated to facilitate the scheme and will likely operate as the main compound after demolition of the existing properties. It will also provide parking for operatives. The Contractor shall provide controlled access, gate marshals where required, controls to prevent construction worker parking on local roads, together with a delivery booking system to avoid queuing on the local road network.

9.3 Callaghan Bridge boardwalk construction

Access from Clonsilla Road Bridge is severely limited. The Construction Methodology indicates that access can more easily be provided from Porterstown Road Bridge, approximately 800 m from the boardwalk construction zone. Piling is expected to progress from west to east, after which the installed precast units may form a working platform for subsequent works. The Contractor shall provide a detailed access and movement methodology for this work package.

9.4 Section 2 specific controls

Issue	Control
Hansfield Road and compound establishment	Gate control, no queuing on public roads, worker parking within compound and advance notification of demolition and early compound works.
St. Josephs and existing pedestrian or cycle route	Maintain access where possible. Provide safe temporary routes and clear wayfinding when route continuity changes.
Callaghan Bridge area	Address limited access and constrained working space. Avoid uncontrolled interaction between plant, pedestrians and cyclists.
Porterstown Road Bridge access	Use as a practical access point for boardwalk works where agreed. Provide marshal control and short duration material holding areas only.
Old School House lands ramp	Coordinate earthworks, haulage and retaining works with CEMP sediment, noise and dust controls.

Table 9-1: Section 2 traffic management controls

10 Section 3 Traffic Management Strategy

10.1 Section 3 context

Section 3 extends from Kennan Bridge to Talbot Bridge, Ch. 5300 to Ch. 8100. It is predominantly urban and passes through areas of extensive residential catchment on both sides of the canal. Existing towpath conditions are constrained by the canal, steep banks and the Dublin to Maynooth railway. The section includes Sheepmoor Lane, Dr Troy Bridge, the Delwood and Brompton area, Quarry Bridge, Landmark Bridge, Castleknock Station, Granard Bridge underpass, 12th Lock and Talbot Bridge.

10.2 Kennan Bridge to Sheepmoor Lane

- The greenway progresses on the northern side of the canal from Kennan Bridge to Kirkpatrick Bridge via Sheepmoor Lane.
- Works along Sheepmoor Lane shall account for local residential access and the shared road carriageway context.
- Localised pavement improvements and widening shall be undertaken using short works lengths and resident notification.

10.3 Delwood, Brompton and bridge approaches

The route passes north of the wooded area at Delwood and Brompton before crossing to the southern canal bank via the Landmark Bridge. Construction in this area will rely on access from Coolmine Road, Brompton and the progressively constructed greenway base course. The Contractor shall phase traffic and plant access to avoid concurrent excessive temporary traffic management and shall coordinate closely with residents.

10.4 Granard Bridge to Talbot Bridge

The route continues on the southern towpath, past Castleknock Station and beneath Castleknock Road through the proposed underpass at Granard Bridge. A 4m wide greenway is proposed to the 12th Lock Hotel, reducing to 3m towards Talbot Bridge due to constrained width. Temporary pedestrian and cycle arrangements will be required where construction interfaces with the existing towpath, station access routes, Castleknock Road and Old Navan Road.

11 Public Transport, Rail and Emergency Access

11.1 Rail corridor interface

The Dublin to Maynooth rail line follows the southern side of the Royal Canal for much of the scheme extent. The EIAR identifies the rail corridor as a key public transport corridor and notes that DART+ West proposals will require enhanced capacity and may introduce more onerous clearance requirements. The CSTTMP shall include railway interface controls where construction activity, cranes, deliveries or temporary traffic management affect areas near the rail corridor.

11.2 Public transport access

- Maintain pedestrian and cyclist access to rail stations where practicable.
- Coordinate any temporary restrictions near stations with Irish Rail and public transport stakeholders.
- Provide advance notification and directional signage for temporary route changes.
- Ensure construction deliveries and temporary traffic arrangements do not obstruct station access, bus stops or pedestrian routes unless agreed alternatives are in place.

11.3 Emergency access

Emergency access shall be maintained along the Proposed Development throughout construction. Where temporary restrictions are unavoidable, the Contractor shall agree alternative arrangements with emergency services in advance. Emergency contact details, access routes, gate keys or codes and out-of-hours response arrangements shall be included in the CSTTMP.

12 Schools, Residents and Businesses

12.1 Schools

There are a number of schools in the vicinity of the scheme, particularly from the Clonsilla area eastwards. Works in the vicinity of schools shall, as far as reasonably practicable, be undertaken during summer months from June to September when schools are closed. Where works are necessary during the school term, restrictions shall be imposed on deliveries, plant movements and temporary traffic management changes during school drop off and pick up periods.

12.2 Residents

- Maintain access to residences wherever practicable.
- Notify residents before works affecting access, parking, noise, dust or temporary routing.
- Maintain safe pedestrian access to properties and public spaces.
- Provide contact details for the Contractor's community liaison representative.

12.3 Businesses and local amenities

Minor impacts on businesses and amenities may arise where road crossings are constructed, where bridge crossings require temporary restrictions, or where temporary diversions are needed. Advance information signage shall be used so that local traffic can plan alternative routes, particularly where a bridge crossing may need to be closed, such as during the Granard Bridge underpass construction.

12.4 Communications protocol

Trigger	Minimum communication requirement
Road closure or lane restriction	Advance public notice, local authority approval, diversion map and signage on site.
Towpath closure	Advance notice to Waterways Ireland, signage at access points and provision of alternatives where practicable.
School area works	Advance engagement with school management and restrictions during school peak periods.
Bridge lift or abnormal load	Targeted notification to residents, businesses, emergency services, Garda, Irish Rail and roads authority.
Change in compound access	Update to local residents, delivery suppliers and project stakeholders.

Table 12-1: Communications protocol for construction traffic management

13 Environmental Traffic Controls

13.1 Relationship with the Outline CEMP

The Outline CEMP sets out environmental controls that must be developed by the Contractor into the CEMP prior to construction. Traffic management measures must therefore be coordinated with controls for dust, noise, vibration, water, biodiversity, waste management and land and soils.

Environmental topic	Traffic-related control
Dust and air quality	Use covered loads, dampening where required, wheel wash facilities, road sweeping and restrictions on unnecessary idling.
Noise and vibration	Schedule deliveries during agreed hours, maintain plant, avoid unnecessary reversing and coordinate high-noise movements with sensitive receptors.
Water and canal protection	Prevent mud and sediment tracking to roads and drainage systems. Provide spill response and contain refuelling within appropriate locations.
Biodiversity	Keep plant and construction traffic within defined routes and respect ecological buffer zones along the canal.
Waste management	Segregate demolition and construction waste, reuse materials where feasible and use authorised recovery, recycling or disposal facilities.
Land, soils and geology	Manage excavated materials, avoid unnecessary vehicle movements and reduce risk of soil compaction outside defined works areas.

Table 13-1: Environmental traffic controls

13.2 Wheel wash and road cleanliness

- Truck wheel wash facilities shall be installed at construction entrances where there is potential for mud to be tracked onto public roads.
- The Contractor shall inspect road surfaces adjacent to active access points daily.
- Road sweeping shall be undertaken if mud, debris or dust is deposited on the public road network.
- Spillage response procedures shall be included in the site induction and displayed at compound exits.

14 Stakeholder Communication and Notifications

14.1 Stakeholder groups

Stakeholder	Reason for engagement
Fingal County Council Roads and Transportation	Approval and coordination of CSTTMP, road closures, lane closures, road opening licences and local constraints.
Kildare County Council Roads and Transportation	Coordination at the western county boundary and where construction access or routing affects Kildare roads.
An Garda Síochána	Traffic safety, abnormal loads, closures and events affecting the public road network.
Irish Rail	Works near Dublin to Maynooth rail corridor, station access and railway asset protection.
Waterways Ireland	Towpath access, emergency barge towing access, canal operations and canal user notifications.
Emergency services	Access strategies, temporary restrictions and response arrangements.
Schools	Works near school routes, drop off and pick up restrictions and advance notice.
Residents and businesses	Access, deliveries, noise, dust, working hours and temporary diversion information.

Table 14-1: Stakeholder engagement requirements

14.2 Notification methods

- Advance information signs at affected bridges, road crossings and access points.
- Resident and business letters for works affecting access or adjacent roads.
- School-specific notifications for works in school catchments.
- Project website or Fingal County Council update page where available.
- Emergency contact boards at main compound and key public interfaces.
- Regular coordination meetings between Contractor, Fingal County Council, DBFL, environmental team and asset owners.

15 Monitoring, Inspections and Reporting

15.1 Daily inspection process

The Contractor shall undertake daily checks to confirm that works are being undertaken in accordance with the approved site-specific CSTTMP. Records shall be retained for inspection by Fingal County Council or any other relevant statutory body, as required. Inspections shall include signage, barriers, public routes, delivery areas, wheel wash facilities, road cleanliness, compound access, emergency access and complaint response.

Inspection item	Frequency	Record required
Signage, cones, barriers and traffic control equipment	Daily and after weather events	TTM inspection checklist
Pedestrian and cyclist diversion routes	Daily	Accessibility and obstruction check
Compound entrances and exits	Daily	Gate log and road cleanliness check
Wheel wash and road sweeping	Daily when in use	Maintenance and activation record
Emergency access routes	Daily and after phase changes	Access availability check
Complaints and incidents	As they arise	Complaint and incident register
Changes to temporary traffic management	Before implementation and after installation	Approval and installation sign-off

Table 15-1: Daily inspection process

15.2 Review meetings

- Weekly coordination meetings during active works affecting public roads or towpaths.
- Monthly review of complaints, incidents, near misses and recurring traffic issues.
- Immediate review following any road traffic incident, public complaint cluster or emergency access obstruction.
- Updated CSTTMP drawings and traffic management records following each material phase change.

16 Commitments Register

16.1 Planning and construction traffic commitments

Ref.	Commitment
C01	A Construction Stage Temporary Traffic Management Plan shall be prepared prior to commencement of construction and shall be agreed with Fingal County Council, Kildare County Council where relevant, An Garda Síochána, Irish Rail, Waterways Ireland and other relevant stakeholders.
C02	The CSTTMP shall show specific entry and exit points for construction traffic, including compound access from Hansfield, Sheepmoor Lane and Castleknock area, subject to confirmation at construction stage.
C03	Pedestrians, cyclists, public transport and general traffic shall be considered in that order of priority when temporary traffic management arrangements are developed.
C04	Emergency access shall be maintained along the Proposed Development throughout construction.
C05	Access along the towpath for emergency towing of barges and for access to designated fishing points shall be maintained where practicable.
C06	Parking for construction operatives shall be provided at the Hansfield main compound only, with operatives transferred to work areas. No parking shall be permitted within temporary works areas or on adjacent local roads.
C07	Local roads affected by crossing works shall be maintained as two-way traffic where practicable. Where restricted working is necessary, temporary one-way alternating traffic shall be used for the minimum practicable duration.
C08	Short duration closures may be used for critical activities such as Granard Bridge underpass works or bridge lifting operations, subject to approval, notification and signed diversion arrangements.
C09	Works in the vicinity of schools shall, as far as practicable, be programmed for summer months. Where works must occur during school terms, TTM restrictions will be applied during school drop off and pick up periods.
C10	Delivery vehicles shall be spread across the working day and scheduled outside peak traffic periods where practicable. Transportation of site machinery and materials shall not take place between 19:00 and 07:00.
C11	Truck wheel wash facilities shall be installed at construction entrances and road sweeping shall be implemented where required.
C12	Wayfinding signage shall be provided to route staff, deliveries, pedestrians and cyclists to designated access, compound and diversion routes.

C13	Dedicated construction haul routes shall be identified by the Contractor and agreed with Fingal County Council prior to commencement of activities on site.
C14	Daily checks of traffic management arrangements shall be recorded and made available for inspection by Fingal County Council or any other relevant statutory body, as required.
C15	The Contractor shall obtain and comply with all relevant processes including road opening licences, abnormal load approvals, road closure approvals, lane closure approvals and necessary notifications.
C16	Construction materials, debris and temporary hardstandings shall be removed on completion and compound areas reinstated, except where permanent scheme works are proposed.

Table 16-1: Planning and construction traffic commitments

17 Contractor Requirements for the CSTTMP

17.1 Required contents of the detailed CSTTMP

- Project description and construction sequencing drawings.
- Construction access and egress drawings for all compounds and work areas.
- Agreed haul routes and restricted routes for HGVs and special vehicles.
- Swept path analysis for constrained access points and special deliveries.
- Temporary traffic management layouts for each road crossing and work package.
- Pedestrian, cyclist and canal user diversion drawings.
- Emergency access plan and emergency services consultation record.
- School and residential area protection measures.
- Abnormal load strategy and bridge lift traffic management method statements.
- Parking and workforce travel management plan.
- Road cleanliness, wheel wash and spill response procedures.
- Inspection checklists, audit records and reporting procedures.

17.2 Minimum drawing package

Drawing	Minimum content
OCTMP-01	Overall construction traffic management plan showing route, sections, compounds and principal access points.
OCTMP-02	Hansfield compound access, parking and transfer route plan.
OCTMP-03	Sheepmoor Lane and Kennan Bridge to Kirkpatrick Bridge traffic management plan.
OCTMP-04	Delwood, Quarry Bridge and Brompton construction access plan.
OCTMP-05	Landmark Bridge delivery, set-down, crane and temporary public closure plan.
OCTMP-06	Granard Bridge underpass and Castleknock Road traffic management plan.
OCTMP-07	Pedestrian, cyclist and canal user diversion strategy.
OCTMP-08	Emergency access and stakeholder notification plan.

Table 17-1: Minimum CSTTMP drawing package

17.3 Approvals and licences

The Contractor shall obtain all relevant approvals in the required timeframes, including road opening licences, road closure approvals, lane closure approvals, abnormal load licences, utility permits, temporary works approvals and asset owner approvals.

18 Appendices

18.1 Appendix A - Risk and control schedule

Risk area	Project-specific issue	Outline CTMP control
Road crossings and tie-ins	Interface with local roads and existing footways may require lane restrictions and footpath diversions.	Discrete TTM layouts, short duration works, one-way alternating traffic only where required, advance signage and off-peak surfacing.
Hansfield main compound	Main compound establishment depends on demolition and site clearance and will generate movements to and from Hansfield Road and Clonsilla area.	Demolition and compound establishment to be sequenced early. Parking to be retained within compound. Gate control to manage HGV arrivals.
Callaghan Bridge boardwalk	Restricted direct access from Clonsilla Road Bridge and constrained towpath environment.	Use access from Porterstown Road Bridge where more practical. Use working platform, sequential piling and controlled movement of precast units.
Old School House lands ramp	Level difference and earthworks adjacent to existing towpath and residential lands.	Manage excavated and imported materials within defined areas, retain emergency towpath access where practicable and coordinate with CEMP controls.
Sheepmoor Lane	Shared carriageway section and localised road pavement works create direct interface with local traffic and residents.	Use low-speed working environment, local signage, resident notification and access arrangements to be agreed through the detailed CSTTMP.
Quarry Bridge	Bridge construction in Delwood area requires haulage along newly constructed base course and crane activity from both sides.	Use Coolmine Road and Brompton access. Construct approach route to base course to act as haul route. Install bridge one structure at a time where relevant.
Landmark Bridge	Large steel superstructure delivery and lifting adjacent to Royal Canal, rail corridor and residential areas.	Off-site fabrication, special vehicle delivery, temporary closure of public area during lifting, off-peak lifting and pedestrian/cycle diversions.

Risk area	Project-specific issue	Outline CTMP control
Granard Bridge underpass	Cut-and-cover works beneath Castleknock Road, adjacent to protected structure, utilities and railway corridor.	Utility protection, propping, suitable excavation retention, traffic diversion to Kirkpatrick Bridge if road closure is required.
Canal towpath operation	Construction on and adjacent to the towpath may require staged closure of sections.	Incremental closures only where necessary, emergency barge towing access where practicable and public notices.
Schools and community receptors	Traffic sensitivity during school drop off and pick up periods.	Sequence works in school vicinity during June to September where practicable and restrict deliveries and TTM changes at school peak periods.

Table A-1: Risk and control schedule

18.2 Appendix B - Site induction traffic checklist

No.	Induction topic	Required briefing
1	Access routes	Explain approved access routes, restricted roads and compound entry points.
2	Parking	Confirm no public road parking and worker parking at Hansfield main compound only.
3	Vulnerable users	Explain pedestrian, cyclist, canal user and school route priority.
4	Speed control	Explain site speed limits and marshal instructions.
5	Deliveries	Explain booking system, delivery windows and no queuing requirement.
6	Clean roads	Explain wheel wash, road sweeping and spillage response.
7	Emergency access	Explain emergency route protection and escalation process.
8	Reports	Explain incident, near miss and complaint reporting requirements.

Table B-1: Site induction traffic checklist

18.3 Appendix C - Interface with EIAR mitigation

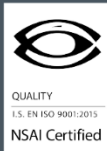
EIAR topic	Relevance to CTMP	OCTMP response
Traffic and Transportation	Construction phase may restrict pedestrians, cyclists, rail access, residential traffic and local road operation.	Prepare CSTTMP, use defined accesses, manage road crossings and maintain emergency access.
Population and Human Health	Construction activity may affect local amenity, access, schools and residents.	Provide advance notifications, school peak restrictions, maintained access and complaint response.
Air Quality and Climate	Construction plant and traffic may generate emissions and dust.	Use delivery controls, wheel wash, covered loads and anti-idling.
Noise and Vibration	Construction traffic, deliveries and plant may result in temporary nuisance.	Avoid unnecessary movements, schedule deliveries and coordinate with sensitive receptors.
Biodiversity	Canal corridor, pNHA, habitats and species require protection.	Keep vehicles within defined routes, avoid buffer encroachment and coordinate with CEMP.
Water	Risk of sediment or contaminant mobilisation from earthworks and traffic.	Use controls for mud, drainage, spill response and clean road procedures.
Waste Management	Waste and surplus materials require haulage and authorised disposal or recovery.	Use material reuse, short-duration storage and controlled waste collection routes.
Utilities	Granard Bridge underpass and ducting works interface with water, foul, gas, electricity and telecoms.	Coordinate utility protection, propping and road closure planning with relevant providers.

Table C-1: Interface with EIAR mitigation

18.4 Appendix D - Compound location drawings

The following DBFL compound location drawings have been submitted as part of the planning application documentation:

- 170239-X-90-X-XXX-DR-DBFL-CE-0291- Compound Locations Sheet 1 of 3
- 170239-X-90-X-XXX-DR-DBFL-CE-0292- Compound Locations Sheet 2 of 3
- 170239-X-90-X-XXX-DR-DBFL-CE-0293- Compound Locations Sheet 3 of 3



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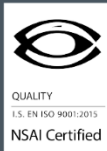
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