Outline Construction Environmental Management Plan

Gas to Bord na Mona, Edenderry

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1. INTRODUCTION

AWN Consulting, Trinity Consultants Company, has prepared this outline Construction Environmental Management Plan (oCEMP) on behalf of Gas Networks Ireland (GNI) in respect of the Proposed Development, which comprises the construction, commissioning, and operation of the c. 23.65 kilometre (km) GNI 143 Ballykilleen Pipeline and all ancillary and associated temporary works. The proposed GNI 143 Ballykilleen Pipeline is designed to connect the existing BGE77 pipeline (also known as Pipeline to the West (PTTW)) to the Edenderry Renewable Energy Complex.

The oCEMP provides a framework from which the construction stage CEMP will be developed by the appointed construction contractor(s). The construction contractor will update this CEMP to include any additional mitigation required to ensure compliance with any subsequent consent conditions relevant to the proposed development. It will also set out in detail the overarching vision of how the construction Contractor of the proposed development will manage the site in a safe and organised manner.

The CEMP documents all mitigation measures in this EIAR to ensure implementation of procedures to control pollution and nuisances arising from site clearance and construction activities. Pollution and nuisances will be prevented where possible and managed in accordance with best environmental protection practices.

The CEMP will be implemented and adhered to by the construction Contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager, Resource Manager and Ecological Clerk of Works where relevant. All personnel working on the Site will be trained in the implementation of the procedures.

The oCEMP has been prepared to account for activities at the site during the excavation and construction phase of the project. The main issues that have been considered within this document are as follows;

- Description of the Project;
- Legislation and Guidance;
- Site Operations;
- Environmental Mitigation During Construction;
- Emergency Preparedness/Environmental Incidents Plan;
- CEMP Training Plan; and
- Review and finalisation of the CEMP

Additional mitigation measures may be added following consultation with relevant consultees in preparation of specific method statements prior to commencement of works.

2. DESCRIPTION OF THE PROJECT

The Proposed Development, consisting of the construction, commissioning, and operation of a c. 23.65-kilometre (km), 300-millimetre (mm) nominal bore (NB) underground steel gas transmission pipeline with a maximum operating pressure of 85 barg (the GNI 143 Ballykilleen Pipeline). The Proposed Development also includes associated ancillary fibre ducting, new offtake installation comprising a hot tap tie in location (the Kilwarden Offtake Installation) located in the townland of Kilwarden, Co. Meath, and new Above Ground Installation (the Ballykilleen AGI) located in the Edenderry Renewable Energy Complex located in Kilcumber, Co. Offaly. These elements collectively constitute the Proposed Development that is the subject of this EIAR.

The Proposed Development site comprises a linear pipeline route approximately 243.4 hectares (ha) (including associated construction works compounds) that traverses counties Meath and Offaly and the following townlands: Aghnagillagh, Ardnamullan, Ballyboggan, Ballynakill, Castlejordan, Clongall, Harristown, Kilwarden, Park, and Ticroghan (Co. Meath); and Ballycolgan, Ballykilleen, Clonmore, Drumcooly, Esker More, Lenamarran, Monasteroris, Mountwilson, Rathgreedan, Rathmore, Roosk, Shean, and Thornwell (Co. Offaly) (hereinafter referred to as the 'Site' or 'Proposed Development Site'). The location of the Proposed Development is shown in Figure 2-1.

The purpose of the proposed GNI 143 Ballykilleen Pipeline to connect from the existing 750mm NB BGE77 pipeline (also known as Pipeline to the West (PTTW)) to the Edenderry Renewable Energy Complex. The Proposed Development is intended to facilitate the conversion of the existing Cushaling Peaker Plants within the Edenderry Renewable Energy Complex from their current single-fuel operation (liquid fuel, primarily hydrotreated vegetable oil (HVO)) to dual-fuel operation, with natural gas as the primary fuel and HVO retained as backup. The Edenderry Power Station is required to operate in accordance with its Industrial Emissions (IE) Licence, reference P0482-04.

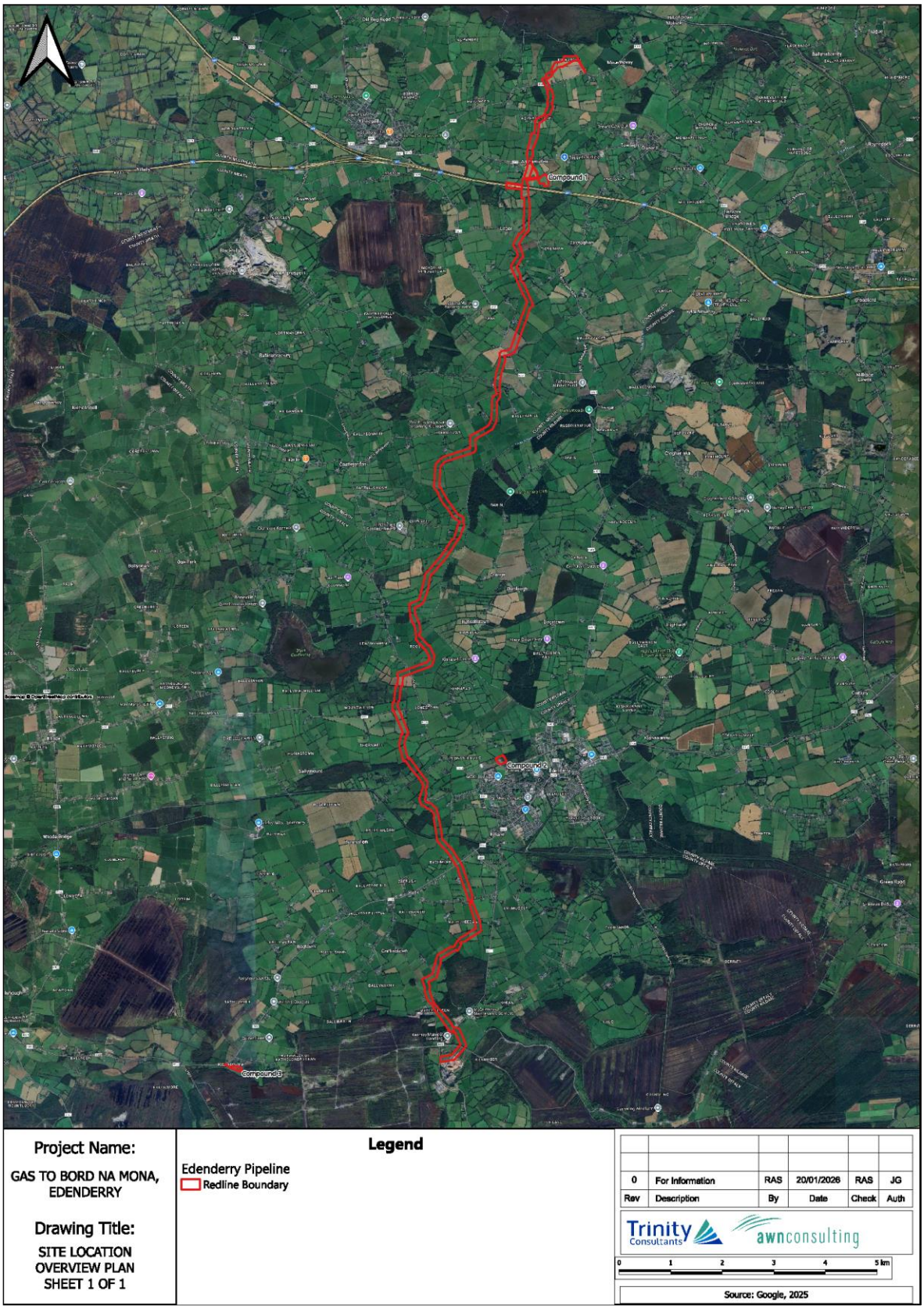
The proposed development comprises a steel gas transmission pipeline (300 mm NB) extending south from the proposed offtake installation at Kilwarden (Kilwarden Offtake Installation). The pipeline continues south/southwest through Meath, enters County Offaly and proceeds southwards. The pipeline stays west of the River Boyne and the settlement of Edenderry. The proposed development terminates at the AGI at Ballykilleen (Ballykilleen AGI).

Temporary Compound 01 will be located at the northern portion of the site close to the Kilwarden Offtake Installation. To the south of the proposed offtake, Temporary Construction Compound 02 is located at Ardnamullan. Temporary Construction Compound 03 is located within the townlands of Monasteroris, positioned to the east of the pipeline corridor. Temporary Construction Compound 04 is located to the west of the pipeline terminus within the townland of Esker More. The Temporary Construction Compound 05 at the Ballykilleen AGI is to be located on lands at Ballykilleen. The compounds include the following; site offices, crane and truck parking, pipe storage, secure lock up containers, car parking, material laydown areas, welfare facilities and material storage areas. See Section 4.1.5.1 below for further details on Temporary Construction Compounds.

The Ballykilleen AGI will include of a PRS Kiosk (c. 49 sq.m. with a parapet height of 3.15m and vent terminations are 5.4m in height.), a PBU Kiosk (c. 23.4 sq.m. with a parapet height of 3.7m and boiler flues extend to 5.67m in height), a Gas Analyser Kiosk (c. 7 sq.m with a parapet height of c. 2.9m.and vent terminations extend to 3.5m in height) and a E&I Kiosk (c. 15.75 sq.m. with a parapet height of c. 3m.). Solar panels are provided on the roof of the PBU Kiosk.

The proposed Kilwarden Offtake Installation is c. 0.220 ha. and is accessed off a laneway adjoining the existing R161. The compound provides for a concrete roadway, temporary pig trap base and 3 no. car parking spaces and is enclosed by a 1.2m high timber post and wire stock proof fencing. A 2.4m high palisade security fence surrounds the offtake installation.

Figure 2-1 Site Location Overview



3. LEGISLATION AND GUIDANCE

All entities including parties, contractors, and consultants involved in this project must adhere to the legal regulations of Ireland as well as international and regional protocols and agreements Ireland is a part of. In cases of legislative updates, the most recent version will be followed, and all pertinent new legislation will be appropriately observed. This document presents the latest legislation as of its issuance date.

The appointed construction contractor(s) bears the responsibility of maintaining awareness of the most current iterations of legislation relevant to the project throughout the contract's duration. The Designer is expected to recognise key environmental risks and corresponding measures outlined in the oCEMP, with the final detailed design duly incorporating these considerations.

The appointed construction contractor(s) are obligated to understand and comply with the Environmental Considerations detailed in Section 5 of the oCEMP, any specific planning conditions linked to the Proposed Development, and additional pertinent documents as stipulated by the Employer and planning authority.

3.1 Relevant Legislation

It is important to recognise that the appointed construction contractor(s) will need to have a clear understanding of their responsibilities according to legal requirements. These legal obligations encompass, but are not limited to:

- Planning and Development Act and subsequent amendments, 2000-2025.
- Planning and Development Regulations 2001 to 2025.
- The Birds Directive: Council Directive 2009/147/EC on the conservation of wild birds;
- The Habitats Directive: Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora;
- The European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. 477 of 2011), as amended, 2015 (S.I. No. 355 of 2015);
- Water Framework Directive (WFD): Directive 2000/60/EC of the European Parliament and Council establishing a framework for Community Action in the field of water policy, as amended;
- European Communities Environmental Objectives (Surface Waters) Regulations, 2009, S.I. No. 272 of 2009, as amended, 2012 (S.I. No. 327 of 2012), 2015 (S.I. No. 386 of 2015), 2019 (S.I. No. 77 of 2019);
- European Communities Environmental Objectives (Groundwater) Regulations 2010, S.I. No. 9 of 2010, as amended, 2016 (S.I. No. 366 of 2016);
- European Communities (Environmental Liability) Regulations, 2008, S.I. No. 547 of 2008, as amended, 2011 (S.I. No. 307 of 2011), 2015 (S.I. No. 293 of 2015);
- Waste Framework Directive 2008/98/EC of the European Parliament and Council on waste, as amended 2018 (S.I. No. 851 of 2018);
- Waste Management Acts of 1996 to 2021;
- The Water Pollution Acts of 1977 & 1998;
- The Wildlife Acts 1976 to 2022;
- Water Policy Regulations 2003, S.I. No. 722 of 2003, as amended;
- Water Conservation Regulations 2008, S.I. No. 527 of 2008;
- European Communities (Drinking Water) Regulations 2014, S.I. No. 122 of 2014, as amended 2017 (S.I No. 464 of 2017);
- Guidelines on protection of fisheries during construction works in and adjacent to waters (IFI, 2016);

- Litter Pollution Act of 1997, as amended, 2017 (Bill 58 of 2017); Litter Pollution Regulations 1999, S.I. No. 359 of 1999);
- European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014), as amended 2019 (S.I. No. 233 of 2019);
- Waste Management (Facility Permit and Registration) Regulations 2007, S.I. No. 821 of 2007, as amended, 2008 (S.I. No. 86 of 2008), 2015 (S.I. No. 198 of 2015), 2019 (S.I. No. 250 of 2019);
- Waste Management (Collection Permit) Regulations 2007, S.I. No. 820 of 2007), as amended, 2015 (S.I. No. 197 of 2015), 2016 (S.I. No. 24 of 2016);
- Waste Management (Licensing) Regulations 2004 (S.I. No. 395 of 2004) as amended 2010 (S.I. No. 350 of 2010);
- Environment (Miscellaneous Provisions) Act 2011, as amended 2015;
- Waste Management (Landfill Levy) Regulations 2008, as amended;
- Waste Management (Hazardous Waste) Regulations, 1998, as amended, 2000 (S.I. No. 73 of 2000);
- Waste Management (Shipment of Waste) Regulations 2007, S.I. No. 419 of 2007;
- Waste Management (Movement of Hazardous Waste) Regulations, 1998 (S.I. No. 147 of 1998);
- European Communities (Shipments of Hazardous Waste Exclusively within Ireland) Regulations 2011, S.I. No 324 of 2011;
- European Communities (Transfrontier Shipment of Waste) Regulations 1994 (S.I. No. 121 of 1994);
- Waste Management (Transfrontier Shipment of Waste) Regulations 1998, as amended, 2014 (S.I. No. 861 of 2014);
- Waste Management (Tyres and Waste Tyres) Regulations 2007 (S.I. No. 664 of 2007), 2017, as amended (S.I. No. 400 of 2017) and 2018 (S.I. No. 96/2018);
- European Union Batteries and Accumulators Regulations 2014, S.I. No. 283 of 2014, as amended, 2014 (S.I. No. 349 of 2014), 2015 (S.I. No. 347 of 2015);
- Waste Management (Registration of Brokers and Dealers) Regulations 2008, SI No. 113 of 2008;
- Waste Management (Prohibition of Material Disposal by burning) Regulations 2009, S.I No. 286 of 2009, as amended 2013 (S.I. No. 504 of 2013), 2017 (S.I. No. 599 of 2017), 2019 (S.I. No. 684 of 2019);
- European Communities (Waste Directive) Regulations 2011, S.I. No. 126 of 2011, as amended 2016 (S.I. No. 315 of 2016);
- European Waste Catalogue (EWC) and Hazardous Waste List 2002;
- Waste Management (Food Waste) Regulations 2009, S.I. No 508 of 2009, as amended, 2015 (S.I. No. 430 of 2015);
- Protection of the Environment Act 2003;
- European Union (Properties of Waste Which Render It Hazardous) Regulations 2015, S.I. No. 233 of 2015, as amended, 2018 (S.I. No. 383 of 2018);
- Air Pollution Act, 1987 (Air Quality Standards) Regulations, 1987, as amended, 2011 (S.I. No. 180 of 2011), 2016 (S.I. No. 659 of 2016); Air Pollution Act, 1987 (Emission Limit Values for use of Asbestos) Regulations, 1990, S.I. No. 28 of 1990);
- EC (Control of Emissions of Gaseous & Particulate Pollutants from Non-Road Mobile Machinery) Regulations 2007, S.I. No.147 of 2007, as amended, 2011 (S.I. No. 263 of 2011), 2012 (S.I. No. 407 of 2012), 2013 (S.I No. 417 of 2013), 2016 (S.I. No. 2016/1628);
- The EU Regulation 2037/2000 (CFC's, HCFC's, Halons) - Ozone Depleting Substances.
- Control of Substances that Deplete the Ozone Layer Regulations 2006, S.I. No 281 of 2006, as amended, 2011 (S.I. No. 465 of 2011);
- EU F Gas Regulations 2006, as amended, 2014, S.I. No. 517 of 2014, 2019 (S.I. No. 367 or 2019);
- Environmental Protection Agency Act 1992 (Noise) Regulations, 1994 S.I. 174 of 1994;
- Environmental Noise Regulations 2006, S.I. No. 140 of 2006;
- European Communities (Environmental Noise) Regulations 2018 (S.I. No. 549 of 2018;

- European Communities (Noise Emission by Equipment for use Outdoors) Regulations, 2001, S.I No. 632 of 2001, as amended, 2006 (S.I No. 241 of 2006);
- European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Amendment Regulations 1996, S.I No. 359 of 1996 and 2001, S.I No. 632 of 2001);
- Local Government (Planning and Development) Act 1963 (S.I. No. 28 of 1963), as amended 1993 (S.I. No. 12 of 1993);
- Wildlife Act, 1976 (Protection of Wild Animals) Regulations, 1990, S.I. No. 112 of 1990 and Wildlife Amendment Act, 2000 (S.I. No. 38 of 2000);
- European Communities Conservation of Wild Bird Regulations 1985, as amended;
- Noxious Weed Act, 1936, S.I. No. 38 of 1936;
- Noxious Weed Order, 1937, S.I. No. 103 of 1937;
- Flora (Protection) Order, 2015, S.I. No 356 of 2015;
- The Forestry Act, 1946, S.I. No. 13 of 1946, as amended, 2009 (S.I. No. 40 of 2009) & Forestry Act, 2014, S.I. No. 31 of 2014;
- Forestry Regulations, S.I. No. 191 of 2017, as amended 2020 (S.I. No. 32 of 2020);
- The National Monuments Act 1930, S.I. No. 2 of 1930, as amended, 2004 (S.I. No. 22 of 2004);
- European Union (Environmental Impact Assessment and Habitats) (Section 181 of the Planning and Development Act 2000) Regulations, 2013 (S.I. No. 403 of 2013), 2015 (S.I. No. 301 of 2015), 2019 (S.I. No. 418 of 2019); and,
- European Union (Environmental Impact Assessment and Habitats) (Environmental Impact Assessment) Regulations, 2018, S.I. No. 296 of 2018, 2019 (S.I No. 191 of 2020).

3.2 Relevant Industry Guidelines

- BS 5837/2012. Trees in relation to design, demolition and construction;
- BS 3998; 2010. Tree Work. Recommendations;
- CIRIA (2001). C532. Control of water pollution from construction sites. Guidance for consultants and contractors;
- CIRIA (2006). C648. Control of water pollution from linear construction projects. Technical Guidance;
- CIRIA (2008). C679. Invasive species management for infrastructure managers and the construction industry.;
- CIRIA (2015). C741. Environmental Good Practice on Site;
- CIRIA (2015). C753. The SuDS Manual;
- Environmental Protection Agency (2021). 'Best Practice Guidelines for the preparation of resources & waste management plans for construction & demolition projects';
- Invasive Species Ireland (2016). Best Practice Management Guidelines. Japanese knotweed;
- NRA (2005a). Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes;
- NRA (2005b). Guidelines for the Treatment of Badger Prior to the Construction of National Road Schemes;
- NRA (2008). Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes;
- NRA (2006). Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, During and Post Construction of National Road Schemes; and,
- NRA (2010). Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant
- Species on National Roads (Revision 1).
- Sustainability & Environmental Appraisal (March 2020) LA 120 Environmental management.

4. SITE OPERATIONS

4.1 Site Establishment and Temporary Construction Works

Initial establishment works involves setting up a protective barrier around the construction zones using fencing materials that are designed to restrict unauthorised access. Security fencing helps control who can enter the construction area and prevents theft, vandalism, and accidents. In areas adjacent to the public domain hoarding will typically be used in order to provide privacy by screening ongoing construction activities from public view.

4.1.1 Temporary Construction - Access and Laydown Areas

5 no. Temporary Construction Compounds and Laydown Areas (Type A) (see Section 4.1.5 below) will act as primary access points for all construction traffic and access points for HGV and Plant Machinery, including access for linepipe deliveries at these locations.

Laydown Areas (Type B) (see Section 4.1.5 below) will act as secondary access points. Light goods vehicles and construction plant can access the site at these locations. HGVs and Linepipe deliveries will not access the site at these locations.

In addition, during construction, temporary access roads to the construction working width for the transmission gas pipeline route will be created at each of the designated road crossing, with the exception of the M4 crossing (RDX04).

Temporary access gates will be installed on both sides of the road crossing, with the selected entry point depending on the location of active works. Inside each access point, a temporary laydown area will be established to provide car parking, material storage, and welfare facilities.

To establish the temporary construction access existing agricultural gates will be repurposed where possible as the temporary access points, provided they align with the pipeline route. In some cases, these gates may require widening to accommodate heavy machinery or to facilitate movement across the road between work zones. Each entranceway will include:

- The topsoil in these areas will be stripped to a typical depth of 300 mm and stored separately from the subsoil for future reinstatement.
- A stone chipping may be used within the laydown area;
- Set-back temporary security gates;
- Appropriate traffic management, sightlines, and visibility measures;
- Temporary fencing to define the works boundary.
- Where roadside drainage is present temporary culverting may be required.

Immediately inside each entrance, laydown areas will be established to provide space for:

- Car parking for crews;
- Temporary staging and storage of pipe, fittings, and construction materials;
- Plant and machinery holding areas;
- Temporary welfare cabins.

Laydown areas will be constructed using stripped subsoil or imported stone as required and will incorporate drainage controls to manage runoff, protect adjacent land, and avoid sedimentation of drains or ditches. Topsoil will be stripped and stored separately for reinstatement after construction

4.1.2 Temporary Construction - Running Track

A temporary haul road or 'running track' will be established along the entire pipeline route within greenfield lands to allow safe movement of machinery, pipe, and personnel along the pipeline route. GNI143-GNI-PL-MIS-0005 provides a typical cross section of this haul road / running track alongside the pipeline construction works. Construction personnel will access the pipeline haul road or 'working spread' at each of the designated road crossings. For the majority of the pipeline route there will be a seamless haul road established withing the Proposed Development site to facilitate construction of the pipeline and transportation of personnel and materials along the route. The construction working spread along the pipeline will be interrupted at certain locations requiring construction traffic diversions on private and public road network, including:

- M4 crossing (RDX04): To access the work area located on the opposite side of the M4 crossing (RDX04), construction personnel must use the private agricultural access roads running parallel to the M4, and existing M4 overbridge.
- Yellow River (RVX02): Access to the northern section of RVX02 will be provided via RDX09, while the southern section will be accessed via RDX10.
- Grand Canal (WCX23):Access to the northern section of WCX23 will be provided via RDX13, while the southern section will be accessed via RDX14.

The running track and temporary haulage road will:

- Be c. 8m wide and formed using compacted stone placed over geotextile membrane where ground conditions require additional support;
- Ensure all-weather access for construction vehicles;
- Be located fully within the designated working width to avoid unnecessary land disturbance;
- Include bog mats in soft ground areas or flood zones (e.g., at the Yellow River floodplain) to prevent rutting and protect topsoil.

The running track is temporary works and will be fully removed following pipeline installation. The underlying ground will be regraded and reinstated using stored topsoil to restore agricultural land to pre-construction condition.

4.1.3 Temporary Construction - Culverts Watercourse Crossings

At watercourse crossings temporary culvert will be is installed to allow for an uninterrupted running track for the duration of the construction works, and removed once reinstatement of the working area is completed. These watercourse structures will be subject to OPW section 50 agreement. The temporary culvert crossings will include:

- Pre-cast concrete or steel culvert pipes installed within the channel;
- Surrounding sandbags or stone to seal culvert placement;
- Graded approaches constructed from stone to allow vehicles to cross;
- Flume pipes if water must be diverted to maintain flow during trench excavation.

Temporary culverts will be sized to maintain natural flow conditions and minimise the risk of upstream backing or downstream scour. Sediment control measures such as silt fencing, straw bales, or settlement controls will be installed downstream.

All temporary culverts will be removed once pipeline installation is complete, and the watercourse banks will be reinstated to their original profile.

4.1.4 Temporary Construction - Temporary Bridge Structures

Temporary bridges or temporary culverts with a running track crossover will be required to cross watercourses including the Kilwarden River. On this basis, the Proposed Development falls within the scope of works requiring consent under Section 50 of the Arterial Drainage Acts as per the OPW guidance set out in publication Construction, Replacement or Alteration of Bridges and Culverts: A Guide to Applying for Consent under Section 50 of the Arterial Drainage Act, 1945. Rev. 201905-3.

It is anticipated that the prefabricated bridge structure will rest on timber bogmats placed on each side to serve as temporary abutments. The typical temporary bridge installation and dismantling process is outlined in Table 4-1 for reference. The temporary bridge will remain operational for the duration of the construction works, with installation and dismantling phases expected to take approximately 4 weeks. During operations, regular maintenance and monitoring will be undertaken under the guidance of an Environmental Clerk of Works (ECoW) to ensure the crossing functions effectively and that any potential issues are promptly addressed.

Table 4-1 Temporary Bridge Installation and Dismantling

Stage	Description
Site Preparation	Define and demarcate working areas, maintaining a minimum 10m clearance from the riverbank except for approach roads/ramps. Verify that working areas align with land acquisition and working width drawings. Conduct clearing works, including topsoil stripping and stockpiling for later reinstatement. Measures will be implemented to manage runoff and prevent sedimentation of nearby watercourses. All temporary works areas related to the crossing shall be designed to drain runoff away from the watercourse banks to prevent contamination of the watercourse.
Crane and Bridge Preparation	A stoned pad will be constructed adjacent to the river for a suitable crane. The pad will use compacted stone, avoiding the use of concrete. A crane will be positioned to facilitate efficient and safe lifting operations. Load-bearing checks will be carried out to confirm the stability of the crane pad and lifting equipment. The prefabricated bridge structure designed by the contractor, will feature safety elements such as guardrails, raised curbs, and safety rails.
Abutment Installation	Install a bogmat abutment on one side of the river. Abutments will be placed at least 2m back from the top of the riverbank. The crane will lift and place the bogmat abutment on the other side of the river.
Bridge Installation	The crane will lift the prefabricated bridge structure and position it on the abutment across the river. Construct approach ramps on both sides using stone materials. The ramps will be graded to match the bridge elevation and will be stabilised to prevent erosion.
Construction Activities	Transport materials and equipment across the bridge. Complete the haul road and establish a stoned working area on both sides. Fence off the working areas to maintain minimum 10m clearance from the riverbank. Conduct pipeline installation as per sec 3.3 below.
Dismantling and Removal	Once construction activities are completed, materials and equipment will be transported back across the bridge. Stone and other materials will be removed, using the bridge for transport. Use the crane to lift out the bridge and abutments.
Site Reinstatement	Both sides of the watercourse will be restored to their original condition. This includes re-grading the land to match pre-construction levels and re-grassing to replicate pre-existing vegetation. Stockpiled topsoil will be redistributed. All temporary structures, including fencing, will be removed.

	Post-reinstatement monitoring will be conducted to ensure the site has fully returned to its pre-construction state, with corrective actions taken if necessary. This includes confirming stabilisation of the riverbanks and absence of erosion or sedimentation.

4.1.5 Temporary Construction Compounds

Three categories of Temporary Construction Compounds will be utilised during construction of the Proposed Development:

- Temporary Construction Compounds
- Laydown Area (Type A)
- Laydown Areas (Type B)

These will be established at strategic locations along the proposed pipeline route. These facilities will be temporary in nature and will provide areas for the storage of materials, welfare facilities, administrative functions, and accommodation of construction personnel, plant and equipment necessary for the delivery of the Proposed Development. The following works will be required establish each of these areas:

- The topsoil in these areas will be stripped to a typical depth of 300 mm and stored separately from the subsoil for future reinstatement.
- A stone chipping may be used within these area;
- Temporary security fencing and gates; and
- Where practicable, compounds will utilise existing entrances or access points to avoid the creation of new access roads and minimise disturbance to existing infrastructure.
- Traffic management, sightlines, and visibility measures.
- On completion of construction works, these areas will be reinstated to their original condition, with topsoil replaced and land restored accordingly.

Additional measures for the establishment of these areas are detailed in the EIAR submitted with the planning application.

4.1.5.1 Temporary Construction Compounds

5 no. Temporary Construction Compounds will be located on site at the following locations:

- Temporary Construction Compound 01 - Located at Kilwarden Offtake Installation;
- Temporary Construction Compound 02 - Located near RDX04;
- Temporary Construction Compound 03 - Located near Edenderry town;
- Temporary Construction Compound 04 - Located near Killeenmore townsland; and
- Temporary Construction Compound 05 - Located at Ballykilleen AGI.

The Temporary Construction Compounds will serve as primary construction access points.

These compounds will facilitate key construction activities by providing space for site offices, welfare cabins, plant and machinery storage, and car parking.

Temporary Construction Compound 02, 03 & 04 has capacity for the storage of the full project line pipe quantity.

4.1.5.2 Laydown Areas (Type A)

7 no. Laydown Areas (Type A) will be located at the following locations:

- RDX01;
- RDX02 & RDX03 (Combined);
- RDX07;
- RDX10;
- RDX12;
- RDX14; and
- RDX17.

The Laydown Areas (Type A) will serve as primary construction access points, alongside the Temporary Construction Compounds.

These locations will facilitate the movement of heavy plant, delivery vehicles including line pipe deliveries), and construction traffic associated with the main pipeline spread.

4.1.5.3 Laydown Areas (Type B)

8 no. Laydown Areas (Type B) will be located at the following locations:

- RDX05;
- RDX06;
- RDX08;
- RDX09;
- RDX11;
- RDX13;
- RDX15; and
- RDX16.

The Laydown Areas (Type A) will serve as secondary construction access points, facilitating light vehicles and construction plant access.

These areas will primarily facilitate the crossing of construction vehicles and plant from one side of the road to the other in order to maintain continuity of the pipeline working spread.

4.2 Consents, Permits, and Licenses

The appointed construction contractor(s) will secure all statutory consents and licences required to commence on-site construction activities in advance of works commencing, allowing for the appropriate notice period. The inclusion of these approval processes in the project timeline is to be overseen by the appointed construction contractor(s). These will include, but are not limited to:

- Site notices, and construction commencement notices.
- Licence to connect to existing utilities where required.
- Road Opening Licences under Section 13(6) of the Roads Act 1993 (as amended) – Consents to carry out roadworks which including the breaking open, boring or tunnelling under any public road to place, adjust, repair, alter or renew any apparatus.
- Construction Wastewater and Trade Effluent discharges (including foul water, construction water, or other water arising from the works) require:
  - discharge to sewer discharge licences issued by Uisce Éireann under Section 16 of the Local Government (Water Pollution) Acts and Regulations.
  - discharge to surface water (or storm sewer), or discharge to groundwater under Section 4 of the Local Government (Water Pollution) Act 1977, as amended in 1990.
- Water Supply Consents:
  - Consents for connection to water supply mains (mains water supply, local authority fire hydrants, other mains supply in private ownership); and

- Consent for abstraction from groundwater / surface water (abstraction of > 25 m^3 of water or more per day, for any purpose must be registered with the EPA in accordance with European Union (Water Policy) (Abstractions Registration) Regulations 2018 (S.I. No. 261 of 2018).

The specific consents and licenses required can vary based on factors such as project size, location, potential environmental impacts, and the type of construction activities involved. The appointed construction contractor(s) will consult with local authorities and regulatory bodies prior to commencement of works.

4.3 Expected Construction Duration and Site Personnel

It is expected that the construction of the Ballykilleen AGI and GNI143 Ballykilleen Pipeline will be completed during normal construction hours i.e., 7am to 7pm Monday to Friday, and 8am to 2 pm on Saturdays. However, it is possible that the contractor may wish to carry out certain operations outside these hours i.e., Sunday or evening hours during long summer days etc. Such occurrences will be kept to a minimum and take place over a short timeframe and as such are unlikely to cause excessive disturbance.

It is estimated that there will initially be 30-40 site personnel on site on a typical day, however during peak construction periods this is expected to fluctuate up to a maximum of 80 site personnel and contractors on site per day. Site personnel will include management, engineers, construction crews, supervisors, environment health and safety personal, and pipeline specialist contractors.

Estimates for the duration of the construction works are included in Table 4-2 below. The overall start-to-finish duration could take up to 22 months if the construction activities for the hot tap, pipeline and AGI do not run concurrently. Construction is anticipated to commence in Q1 2028. Commissioning of the Proposed Development is estimated to take place over 1 – 2 months.

Table 4-2 Estimated Construction Duration

Works Area	Estimated Construction Duration (Months)
Kilwarden Offtake Installation	4
GNI 143 Ballykilleen Pipeline	10
Ballykilleen AGI	8

4.4 Services And Utilities

Temporary site offices and welfare facilities for construction employees will need to be established. The offices and site amenities will need to have their own power supply (generator), water deliveries and foul water collection. The appointed construction contractor(s) will ensure that sufficient facilities are available at all times to accommodate the number of employees on site.

Electrical connections will be made by suitably qualified personnel following consultation with the relevant authorities and will be cognisant of subsequent construction works. High voltage connections will be established for heavy duty equipment and site facilities, as required.

During construction it is anticipated that a temporary supply will come from onsite Generator or via the MV network. All electrical works, including any connection to the ESB network will be carried out by a suitably qualified contractor.

Managing surface water and rainwater at a construction site compound is essential to prevent erosion, flooding, and environmental contamination. Proper management helps maintain a safe and organised working environment while minimising the impact on the surrounding environment.

Prior to commencing any construction activities, the appointed construction contractor(s) shall conduct a comprehensive utility locating survey, where necessary, using advanced technologies such as ground-penetrating radar (GPR) and electromagnetic induction methods. This survey will accurately identify the location and depth of all existing underground services, including high voltage (HV) cables, water and gas pipelines, and telecommunication lines. Based on the results of the utility locating survey, exclusion zones will be demarcated around identified utilities. These zones will indicate areas where construction activities are restricted or subject to specific safety protocols.

4.5 Material Handling and Storage

During the construction phase a significant amount of construction materials will be delivered to the site. Temporary Construction Compounds will contain specified areas for storage of materials that will need to be held on site.

Waste receptacles will be stored adjacent to the construction areas as required and will move in each of the sub-phases as the construction works progress. The segregated receptacles will be maintained close to each other in a designated Waste Storage Area (WSA) insofar as possible and will be clearly signed to identify the types of waste to be placed in each in accordance with the requirements of the Resource and Waste Management Plan prepared by WSP and submitted with the planning application. Segregated skips will be located in the material storage area, as required, and wheelie bins (or other suitable waste receptacles) for the offices and welfare facilities will be provided in strategic locations around the compound.

The majority of construction waste materials generated will be soil from excavation works which is not reused on site. It is envisaged that the majority of topsoil and subsoil will be stockpiled for reuse on site for backfilling. Soil requiring removal offsite will be temporarily stockpiled away from watercourses and construction activities. Suitable locations will be determined as site clearance works and excavations progress taking into account the measures set out in Section 5 of the oCEMP. Material will be removed from site regularly to ensure only minimum stockpiling is required.

4.6 Construction Traffic Management

Traffic management and road signage will be in accordance with the *Department of Transport: Traffic Signs Manual - Chapter 8: Temporary Traffic Measures and Signs for Road Works* and in agreement with Meath County Council and Offaly County Council, respectively. Construction traffic management and mitigation measures to minimise the impacts associated with the construction phase upon the peak periods on the surrounding road network are set out in Chapter 13 – Material Assets - Traffic and Transportation of this EIAR. The project Outline Construction Traffic Management Plan prepared by CST Group is included as Appendix 13.2 of the EIAR.

4.7 Visitor Management

Visitors will only be allowed to enter the site when permitted in vehicles via a designated entrance or via designated pedestrian access gates. A dedicated, secured footpath to the main site offices will be established for registration and obtaining PPE prior to entering the site. A log will be maintained by security to control access to the site. Visitors will be required to attend a site-specific induction to allow access to the site unless being accompanied by an inducted member of the site team.

5. ENVIRONMENTAL MITIGATION DURING CONSTRUCTION

5.1 Land, Soil, Geology, Water (Hydrogeology and Hydrology)

5.1.1 Mitigation for Ground Disturbance, Excavations, and Reinstatement

5.1.1.1 Management of Ground Disturbance and Excavation

In order to minimise impacts on land, soils and underlying geological materials during construction, including excavation, material storage and reinstatement works, the following mitigation measures will be implemented:

- Prior to commencement of construction, the main contractor will prepare and adhere to a method statement identifying the minimum area of land disturbance required to carry out the works safely and effectively.
- Earthworks and excavations will be carefully managed to minimise unnecessary disturbance, degradation of soil structure and loss of soil quality. Movement and handling of soils will be controlled to limit compaction and physical damage.
- Topsoil and subsoil will be stripped, stored and managed separately to prevent mixing and preserve soil integrity. Subsoil excavated from trenches will be stored on the opposite side of the excavation to topsoil to maintain segregation and reduce unnecessary handling.
- Temporary soil stockpiles will be located within defined working areas and managed to maintain physical stability and prevent degradation of soil structure.
- Construction materials, including aggregates and imported fill, will be stored in clearly defined and designated areas within secure compounds to prevent contamination of underlying soils.
- Access routes, haul roads and entrance areas will be designed to minimise soil compaction and surface damage, with movements restricted to defined haul routes and essential site traffic only.
- Excavations will be kept open for the minimum practicable duration prior to backfilling and reinstatement to avoid prolonged exposure of soils and geological materials.
- Reinstatement will be undertaken as soon as practicable following pipeline installation or equipment removal, including appropriate replacement of subsoil and topsoil layers and reinstatement of ground levels to pre-construction conditions.
- Trench supports or sheet piling may be used where required to ensure excavation stability, protecting surrounding soils and preventing excessive disturbance of geological materials.

With implementation of these measures, the potential impacts on land, soils and geology during construction will be effectively minimised.

5.1.1.2 Measures for the Reuse and Disposal of Excavated Material

Where excavated soil is intended for reuse on site, topsoil will be stockpiled separately to the subsoil at designated locations. Stockpiled topsoil and subsoil will be kept free from disturbance for the duration of construction to reduce risk of physical damage and compaction pending reuse across the site for backfilling and landscaping.

All excavated material will be segregated and tested prior to establishing reusability for backfilling. This will be especially applicable in the areas of recorded soil quality exceedance identified during site investigation and discussed in Section 5.3.7. If any contamination is identified, it will handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site. Where contaminated soil is removed off site it will be brought for appropriate recycling, recovery or disposal at a licensed facility as described in Appendix 14.1 of Chapter 14.

All excavated materials will be visually inspected by suitably qualified persons assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed to establish reusability for backfilling and for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately managed by a suitably permitted/licensed waste contractor. It is expected that 95% of excavated material (c. 252,067 m^3) will be retained and reused for backfilling purposes on site.

Any excess soil requiring removal from site will be tested to identify any potential contamination. If no contamination is identified, the soil from the greenfield area will be managed as a by product. However, should it be determined that any of the soil excavated is contaminated, this will be segregated, classified for disposal purposes and appropriately managed by a suitably permitted/licensed waste disposal contractor.

If any waste soil requires removal from site, it will be classified by an experienced and qualified environmental professional to ensure that the waste soil is correctly classified for transportation and recovery/disposal offsite.

The potential reuse of excavated material as a byproduct under Regulation 27 of the European Union (Waste Directive) Regulations 2011–2020 (as amended) will be considered where feasible and subject to meeting the relevant regulatory criteria and approval by the Environmental Protection Agency. Similarly, the applicability of Regulation 28 (End of Waste status) will be considered for relevant waste streams where recovery criteria can be satisfied. Further detail is provided in the site-specific Resource and Waste Management Plan (RWMP) in Appendix 14.1 of Chapter 14 of the EIAR.

5.1.1.3 Criteria for Sourcing of Aggregates

The Proposed Development will require deliveries of imported engineering fill, including sands and gravels, to support construction activities such as pipeline bedding and the formation of temporary construction compounds and laydown areas.

Imported CL.503 material will be required to provide a suitable bedding layer that will be placed in accordance with IS 328:2021, GNI/AO/SP/007, Guidelines for Managing Openings in Public Roads 2017 (The Purple Book) and compacted in the trench before laying the pipeline. All suppliers will be vetted for:

- Aggregate compliance certificates/declarations of conformity for the classes of material specified for the Proposed Development,
- Environmental Management status; and
- Regulatory and Legal Compliance status of the Company

All imported fill and aggregate that may be required for the Proposed Development will be sourced from reputable suppliers.

5.1.2 Measures for the Control of Pollution from Fuels, Oils and Construction Chemicals

The following mitigation measures will be implemented during the construction phase in order to prevent any spillages of fuels and other construction chemicals and prevent any resulting discharge of pollutants to soil, surface water or groundwater systems:

- All plant and machinery will be regularly maintained and serviced to minimise the risk of release of hydrocarbons. This will only be undertaken by qualified personnel;
- Designation of bunded maintenance and refuelling areas on the Site;

- Provision of spill kit facilities across the Site, strategically located in high risk areas;
- Where mobile fuel bowsers are used, the following measures will be undertaken:
  - Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use;
  - The pump or valve will be fitted with a lock and will be secured when not in use;
  - All bowsers to carry a spill kit and operatives must have spill response training;
  - Portable generators or similar fuel containing equipment will be placed on suitable drip trays.

In the case of drummed fuel or other potentially polluting substances which may be used during the construction phase, the following measures will be adopted:

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area;
- Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be stored within temporary bunded areas, doubled skinned tanks or bunded containers to a volume of 110% of the capacity of the largest tank/container. Drainage from the bunded area(s) shall be diverted for collection and safe disposal.
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage;
- All drums to be quality approved and manufactured to a recognised standard;
- If drums are to be moved around the Site, they will be secured and on spill pallets; and
- Drums will be loaded and unloaded by competent and trained personnel using appropriate equipment.

Refuelling and maintenance of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in a designated area or within the construction compound (or where possible off the site) which will be away from surface water drains – a minimum 50 m buffer zone will be adhered to. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) will be complied with.

5.2 Water (Hydrology and Hydrogeology)

5.2.1 Mitigation of General Construction Activities

5.2.1.1 Sediment Control Plan (SCP)

The appointed contractor(s) will develop a works specific Sediment Control Plan (SCP), which will form part of the CEMP (the principles of which are detailed here), in advance of any construction activities commencing. The reduction and prevention of suspended solid pollution will be required during all elements of construction.

The following mitigation measures will be implemented as part of the SCP during the construction phase in order to manage the potential impact associated with excavation, stockpiled materials, and reducing sediment runoff at source.

- Prior to commencement of construction the appointed contractor(s) will prepare and adhere to a method statement identifying the extent of the areas likely to be affected and demonstrating that this is the minimum disturbance necessary to achieve the required works.
- The appointed contractor(s) will identify pathways of preferential flow within the project area and implement suitable mitigation measures to ensure contaminated water from the sites is treated

before being released into any watercourse. Pathways of preferential flow are influenced by the site's topography and are subject to change as works are undertaken. Consequently, the appointed contractor(s) will need to determine these pathways on site and agreed with the Ecological Clerk of Works (EcoW).

- Clean water will be kept separate from contaminated water to reduce the volume to be treated. Any surface water run-off collecting in excavations will likely contain a high sediment load. This will not be allowed to directly discharge to any stormwater sewer, drainage ditch or watercourse.
- Where works are required within designated flood zones, topsoil stripping will be avoided where practicable, and trenchless construction methods will be employed where feasible to minimise sediment disturbance and migration.
- To further support environmental protection measures, the contractor shall deploy bog mats along the construction running track in designated flood zone areas. These mats will be placed directly on top of the existing topsoil to minimise ground disturbance and prevent sediment from entering adjacent watercourses.
- To prevent rainwater from inundating the construction area through the open pipeline trenches, running track, cut-off drains / interceptor ditches will be installed to intercept uncontaminated surface water and prevent it from entering the work zone.
- Run-off velocities and erosive energy will be reduced by extending the lengths of flow paths for rainwater run-off, building interceptor ditches and channels, and lining steep, unavoidable interceptors or conveyance channels with low-gradient designs to minimise secondary erosion. Additionally, ditches will be lined with filter fabric, rock, or polyethylene to prevent channel erosion.
- Designated areas for stockpiling excavated material will be identified >50 m distance from the Yellow River and Kilwarden River and >20 m distance from any other surface water body. Silt fences will be installed around stockpiles to limit movement of entrained sediment in surface water runoff. Stockpiles will be tightly compacted to reduce runoff and graded to aid in runoff collection.
- During earthworks and excavation works care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. Movement of material will be minimised to reduce the degradation of soil structure and generation of dust.
- Hard surface site roads and public roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads will be restricted to essential site traffic only.
- A stabilised entranceway consisting of an aggregate on a geotech mesh/fabric base that will be located at any entry or exit point of the construction site. Aggregate will be established at the site entrance points from the construction site boundary extending for at least 10 m.
- Depending on the soil conditions, haul roads will be stabilised utilising materials such as crushed rock, gravel and a layer of geotextiles to improve load-bearing capacity and prevent deformation under heavy traffic. Sediment produced, as a result of the construction processes, will be contained from entering nearby watercourses using a combination of settlement ponds and silt fences. Regular maintenance, including grading, resurfacing, and drainage management, is required to keep hauls road in good condition during the works.
- Dust suppression measures (e.g. damping down during dry periods), power washing facility or wheel cleaning facility, road sweeping, and general housekeeping will ensure that the surrounding environment are free of nuisance dust and dirt on roads.
- Silt fencing will be installed along the working area adjacent to any rivers and watercourses, during the construction phase, to ensure no silt entry to the adjacent surface waters. Silt fences will be a permeable woven geotextile fabric (Hy-Tex Terrastop Premium silt fence, or similar) and not a mesh. The silt fences will be positioned to allow an appropriate working area. The silt fencing will be installed as per manufacturer's guidelines.
- Monitoring of the effectiveness of the silt fences will be undertaken and maintenance of the fence will be undertaken if it comes into disrepair or significant amounts of silt begin to build up. Once

the construction phase is complete, all fencing will be removed and disposed of to a licensed waste facility.
- Excavation works will not be carried out during or following heavy rainfall (extreme weather events).
- No unnecessary tracking or excavating in grassland/vegetated areas will occur (to prevent sediment laden run-off).
- Excavations will remain open for as little time as possible before placement of fill and be revegetated and remediation as soon as practicable.
- Reinstatement and revegetation will be carried out as soon as practicable after pipeline installation and commissioning is completed.
- The proposed construction berm constructed within the Flood Zone A will provide protection against the predicted 1% AEP flood event. Once constructed, the berm will be covered with a suitable geotextile layer across the berm surface, to reduce the mobilisation of suspended solids during flood or rainfall events.
- Additional remediation works and recontouring activities may be necessary following the completion of the primary works, especially after periods of heavy rainfall. These post-completion measures aim to ensure the stability and success of revegetation. Remediation may involve addressing any erosion or sediment displacement that has occurred due to the rainfall.
- Regular inspection of surface water run-off and sediment control measures will be carried out during the construction phase. A log the regular inspections will be maintained, and any significant blockage or spill incidents will be recorded for root cause investigation purposes and updating procedures to ensure incidents do not reoccur.

5.2.1.2 Management of Construction Surface Water

The discharges of groundwater, surface water, hydrostatic testing water, water arising from trenchless construction works, or precipitation ('construction water') from the construction site will be managed and controlled for the duration of the construction works. Construction water that contains a high sediment load and potential for other pollutants will require removal. All discharges to surface waters will be suitably treated prior to discharge. There will be no direct discharge of untreated, silty, or contaminated water from any element of the works without appropriate treatment, attenuation, settlement and silt trapping.

The control and treatment measures for construction water to be implemented include minimisation and mitigation measures set out below:

- Construction working areas, compounds, laydown areas and access routes will be restricted to the minimum extent required to reduce soil compaction and disturbance of natural drainage.
- Temporary drainage features, including interceptor drains and cut-off ditches, will be installed upslope of excavation and working areas to intercept clean surface water and prevent increased inflows to construction areas.
- Temporary hardstandings and compacted areas within compounds will be designed with controlled drainage to prevent uncontrolled surface runoff.
- No permanent diversion, infilling or obstruction of existing drainage ditches or watercourses will occur as part of the Proposed Development.
- Existing drainage pathways will be maintained throughout construction, with temporary crossings installed where required to maintain flow continuity.
- During construction, surface waters drainage, including any excavation dewatering, will be treated to allow settlement prior to discharge.
- All surface water runoff will be intercepted and directed to the appropriate on-site treatment system for the removal of pollutants prior to discharge. Clean water from compound roofs etc will be kept separate from contaminated water to reduce the volume to be treated.

- A staged treatment system (treatment-train) will be in place during construction works that will ensure the quality of the discharge water is maintained and will comprise hydrocarbon interception for removal of petrol/diesel, settlement tanks for silt removal, and pH balancing (as required). Final treatment will be via appropriately sized silt bags or silt socks, allowing water to settle out or filter before discharge. Used silt bags will be disposed of in an environmentally appropriate manner.
- The level of suspended solids in any direct discharges to fisheries waters as a consequence of construction works shall not exceed 25 mg/l of suspended solids, nor result in the deposition of silts on gravels or any element of aquatic flora and fauna (as per IFI (2016) Guidelines).
- Regular inspection of the staged treatment system and discharge quality will be carried out during the construction phase. A log of the regular inspections will be maintained, and any exceedance of 25 mg/l of suspended solids will be recorded for root cause investigation purposes and updating procedures to ensure incidents do not reoccur.
- Whenever possible, water pumped out from excavations will be discharged onto permeable vegetated areas after undergoing sediment removal through filtration.
- When discharging clean water into watercourses, measures like baffles, geotextiles, sediment mat, or riprap will be set up at the discharge point to avoid disturbing the watercourse. The design of the outfalls and the construction method statements for their installation shall be agreed with IFI prior to construction.
- Discharge to surface water (or storm sewer), or discharge to groundwater under Section 4 of the Local Government (Water Pollution) Act 1977, as amended in 1990.
- Should any discharge of contaminated construction water be required during the construction phase the discharge will be removed from site via road tanker or similar to a licenced / permitted facility.

5.2.1.3 Management of Hydrostatic Testing Water

- Water required for hydrostatic testing will be sourced from an existing supply either from nearby municipal supply point (mains water supply, local authority fire hydrants) or alternatively, abstraction from another water supply in private ownership from groundwater / surface water that is permitted and registered with the EPA under the European Union (Water Policy) (Abstractions Registration) Regulations 2018 (S.I. No. 261 of 2018).
- The discharge of hydrostatic testing water will be carefully controlled with respect to rate, location and method, to avoid localised erosion, flooding or scouring.
- Where discharged on site, hydrostatic testing water will be released at controlled rates to vegetated areas or managed drainage systems following verification of water quality.
- Where necessary, hydrostatic testing water will be removed from site by tanker for appropriate disposal or re-use.

5.2.1.4 Control of Fuels, Oils, and Chemicals

The following mitigation measures will be implemented during the construction phase in order to prevent any spillages to ground of fuels and other construction chemicals and prevent any resulting to surface water and groundwater systems:

- All plant and machinery will be regularly maintained and serviced to minimise the risk of release of hydrocarbons. This will only be undertaken by qualified personnel
- Designation of bunded maintenance and refuelling areas on the Site;
- Provision of spill kit facilities across the Site strategically located in high risk areas;
- Where mobile fuel bowsers are used, the following measures will be taken:

    - Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use;
    - The pump or valve will be fitted with a lock and will be secured when not in use;
    - All bowsers to carry a spill kit and operatives must have spill response training;

- Portable generators or similar fuel containing equipment will be placed on suitable drip trays.

In the case of drummed fuel or other potentially polluting substances which may be used during the construction phase, the following measures will be adopted:

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area;
- Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be stored within temporary bunded areas, doubled skinned tanks or bunded containers to a volume of 110% of the capacity of the largest tank/container. Drainage from the bunded area(s) shall be temporarily diverted for collection and safe disposal.
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage;
- All drums to be quality approved and manufactured to a recognised standard;
- If drums are to be moved around the Site, they will be secured and on spill pallets; and
- Drums will be loaded and unloaded by competent and trained personnel using appropriate equipment.

These measures are consistent with CIRIA guidance on the control of water pollution from construction sites.

In addition to the measures above, all excavated materials will be visually assessed by suitably qualified persons for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

Refuelling and maintenance of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in a designated area or within the construction compound (or where possible off the site) which will be away from surface water drains, a minimum 50m buffer zone will be adhered to. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) will be complied with.

5.2.1.5 Control of Concrete

Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil.

Wash water from cleaning ready-mix concrete wagons and mixers will be contaminated. Wagons and mixers must be washed off-site or in a bunded, impermeable designated washout area. Washout to be removed off site and disposed of appropriately at a licenced facility or reused for concrete creation. Washout area is to be located as far away from the watercourse as is practicably possible.

No wash-down or wash-out of ready-mix concrete vehicles during the construction works will be carried out at the site within any riparian or ecological buffer zone. Wash-outs will only be allowed to take place in designated areas with an impervious surface where all wash water is contained and removed from site by road tanker or discharged to foul sewer subject to agreement with Uisce Éireann.

5.2.1.6 Welfare Facilities and Materials Storage

Site welfare facilities will be established to provide sanitary facilities for construction workers on site. The appointed contractor(s) will ensure that sufficient facilities are available at all times to accommodate the number of employees on site. Welfare facilities will be situated >50 m distance from the Yellow River Kilwarden River, and Grand Canal, and >20 m distance from any other surface water body. Foul water from the offices and welfare facilities on the site will be contained within the portable toilets and collected by a licensed waste sewerage contractor.

Construction materials, including aggregates etc. will be stored >50 m distance from the Yellow River Kilwarden River, and Grand Canal and >20 m distance from any other surface water body, to prevent any blockage to flood water flow paths from occurring during high rainfall events.

All materials will be stored in compounds and will be stored in a manner that is safe and in line with best industry practice. Fuels and chemicals will be stored in an appropriately bunded area/with double skinned tanks.

Aggregate materials such as sands and gravels will be stored in clearly marked receptacles within a secure compound area to prevent cross-contamination.

5.2.1.7 Mitigation of Impacts from Open-cut Watercourse Crossings

In combination with the general surface water and groundwater mitigation measures outlined above, the specific measures below will be implemented. The mitigation measures set out below address the potential impacts on surface water and groundwater quality, as well as the potential impacts on surface water and ground water flow and quantity.

- The working areas at each watercourse will be kept to the minimum area required to carry out the proposed works and the area should be marked out and cordoned off in advance of work commencement.
- No watercourse crossings by vehicles or plant (i.e. fording) will occur at any location along the pipeline route.
- Where access is required, temporary culverts and/or bridges will be installed to allow vehicles to cross watercourses, thereby mitigating disruption to both flow and water quality.
- No unnecessary tracking or excavating in grassland/vegetated areas will be avoided to prevent sediment laden run-off.
- Silt fencing will be installed along the working area adjacent to the watercourse, during the construction phase, to ensure no silt entry to the adjacent surface waters.
- Silt fencing will be embedded to ensure silt retention and deposition and be positioned a minimum of 5m from the watercourse.
- Clearance of surrounding grasses and riparian vegetation to facilitate installation of silt fencing will be avoided.
- Monitoring of the effectiveness of silt fencing will be undertaken, and maintenance will be undertaken if it comes into disrepair or significant amounts of silt begin to build up. Once the construction phase is complete, all fencing will be removed and disposed of to a licensed waste facility.
- Works to stream banks and instream works to be conducted during times of settled weather and low water flows. Working during times of heavy rainfall is to be avoided.
- Following the dewatering process but prior to initiating the construction activities, systematically extract the exposed bed material from sections that will undergo disruption, especially in areas where machinery will be operating.
- Excavated stream bed material will be stockpiled separately from all other material, in a designated area at least 15m from any watercourse. Once crossing works are complete, this material will be used to reinstate the stream bed to its original level.

- De-watering may be required within the trench for pipeline works. Should this be required, water will be discharged into a vegetated area at least 20m from any watercourse. Water will be discharged via a silt bag and/or settlement tank. Silt fencing will surround the discharge area.
- Prior to the commencement of works a photographic record of the existing condition of the watercourses before any construction activities commence will be undertaken. This documentation will serve as a reference point for reinstalment activities after the completion of works.
- The works area for the flume crossings will be isolated from surface water using sandbags or suitable containment methods to create a seal that span the full width of the watercourse. Heavy gauge plastic may be required in order to ensure a watertight seal is obtained. This keeps a stretch of the river dry and the water is transferred downstream of the works area through gravity fed flumes.
- Sufficiently large flume pipes will be sized to ensure they are capable of accommodation flood flow water volumes are inserted into the watercourses, respectively, ensuring they extend past the area of the proposed trench and running track.
- Following the dewatering process but prior to initiating the construction activities, the exposed bed material will be systematically extracted from sections that will undergo disruption, especially in areas where machinery will be operating.
- De-watering from the isolated stream bed and from within the trench during pipeline works may be required. Water within the contained area contaminated with suspended solids or other potential pollutants shall not be released directly to surface water. It will be pumped to a suitable treatment system before discharge into the downstream watercourse.
- No vehicles or machinery will cross the streambed.
- Once crossing works are complete, the previously excavated stream bed material will be used to reinstate the stream bed to its original level.
- Should riverbed material excavated be deemed unfit for reinstatement of the riverbed, stone of the same size and geology shall be sourced for reinstatement purposes.
- Prior to reinstatement and removal of the flume the work area will be re-watered to avoid sudden ingress of water causing erosion of the replaced bed or bank material.
- Works to stream banks and instream works to be conducted during times of settled weather and low water flows. Working during times of heavy rainfall will be avoided.
- Watercourse banks will be reformed to their original profile. Geocoir will be laid and secured to the newly profiled bank to avoid any risk of erosion or run-off during high intensity rainfall events. A fast growing, deep rooting grass seed mix will be spread along these banks, as well as native plants and fencing, as appropriate, and agreed with the landowner.
- Once the dams and flume are removed, the watercourse will be allowed to flow normally for the remainder of construction.
- Prior to reinstatement and removal of the flume the work area will be re-watered to avoid sudden ingress of water causing erosion of the replaced bed or bank material.

Regular review of the works area will be undertaken to ensuring effective mitigation of impacts associated with the temporary damming/fluming works by an Environmental Officer or the ECoW. Best practice guidance will be followed for the proposed works including Inland Fisheries Ireland 'Guidelines on protection of fisheries during construction works in and adjacent to waters' (IFI, 2016) and Transport Infrastructure Ireland's 'Guidelines for the crossing of watercourses during the construction of national road schemes' (TII, 2008).

5.2.2 Mitigation of Impacts from Temporary Structures at Watercourse Crossings

In combination with the general surface water and groundwater mitigation measures outlined above, the specific measures below will be implemented. The mitigation measures set out below address

the potential impacts on surface water and groundwater quality, as well as the potential impacts on surface water and ground water flow and quantity

- Temporary structures at watercourse crossings will require consent from the Office of Public Works (OPW) under Section 50 of the Arterial Drainage Acts as per the OPW guidance set out in publication Construction, Replacement or Alteration of Bridges and Culverts: A Guide to Applying for Consent under Section 50 of the Arterial Drainage Act, 1945. Rev. 201905-3.
- All temporary culvert, flume or bridge crossings of watercourses will be subject to written agreement with Inland Fisheries Ireland with respect to sizing, location, duration and timing.
- All temporary culverts and flumes will be sized to pass anticipated flows without causing upstream impoundment or downstream scour.
- Structures will be inspected regularly and maintained to ensure hydraulic capacity is maintained throughout their operational period.
- The temporary bridge at the Kilwarden River (RVX01) will span the channel and avoid direct bed disturbance, with abutments set back from the bank to preserve flow conveyance.
- Temporary structures will be removed following completion of works, and the channel reinstated to original flow conditions.

As part of the Section 50 consent process, OPW will assess the hydraulic capacity, alignment, installation methodology and flood conveyance of all proposed temporary structures to ensure that there is no impediment to the free flow of water, no increased flood risk, and no unacceptable risk of erosion or instability upstream or downstream of the crossing locations.

5.2.3 Protection of Watercourses and Fisheries Habitat

In accordance with guidance and recommendations issued by Inland Fisheries Ireland, no fording of watercourses by vehicles or plant will occur at any stage of the Proposed Development.

All temporary watercourse crossing structures will be subject to written agreement with Inland Fisheries Ireland in respect of their design, sizing, timing, duration and method of installation. Clear-span bridge-type structures will be prioritised where practicable. Where culverts or flumes are required, these will be designed to pass the full range of anticipated flows, including flood flows, without ponding, scour or alteration of stream hydraulics.

No instream works shall be undertaken without prior agreement with Inland Fisheries Ireland, and works within watercourses will be programmed to avoid sensitive fisheries periods, with instream works normally restricted to the July–September window unless otherwise agreed.

A precautionary approach to sediment control will be applied at all watercourse crossings, ensuring that there is no discharge of silt-laden water, concrete residues, hydrocarbons or other deleterious substances to surface waters. Measures will include fluming, isolation of works areas, staged settlement, silt fencing and reinstatement of channel beds and banks using natural materials.

Biosecurity measures will be implemented to prevent the introduction or spread of invasive aquatic or riparian species, including the cleaning of machinery and equipment prior to entering and leaving watercourse working areas.

5.2.4 Mitigation of Impacts from Trenchless River and Watercourse Crossings

In combination with the general surface water and groundwater mitigation measures outlined above, the specific measures below will be implemented. The mitigation measures set out below address the potential impacts on surface water and groundwater quality, in addition to the migration set out in Section 5.2.1.

- A minimum vertical clearance of 1.6 m will be maintained between the pipeline and the true bed level of all watercourses and canals.
- Launch and/or reception points for trenchless drilling/excavations will be located a minimum of 10 m from the top of the watercourse bank, and outside riparian buffer zones and flood zones (A and B), except where not practicable due to site-specific engineering constraints.
- Welfare facilities will be situated a minimum of 50 m from the Yellow River, Kilwarden River and the Grand Canal, and a minimum of 20 m from any other surface water body.
- All construction plant, refuelling, maintenance activities, and material storage associated with trenchless crossings, will be stored a minimum of 50 m from the Yellow River, Kilwarden River and the Grand Canal, and a minimum of 20 m from any other surface water body.
- All drilling fluids (where used) will be contained within closed systems, with returns managed and removed off-site for disposal at a licenced / permitted facility.

5.3 Biodiversity

5.3.1 Appointment of Ecological Clerk of Works

A suitably qualified Ecological Clerk of Works (ECoW) will be appointed at the outset of the construction works to ensure that all environmental and ecological commitments are adhered to throughout the project. The ECoW will provide guidance on the required mitigations to the Project Team, and in particular the Site Manager. The Site Manager shall ensure that all personnel working on-site are trained and aware of the mitigation measures detailed below. While the Ecological Clerk of Works (ECoW) oversees ecological and environmental compliance, they are not solely responsible. All project staff, including the appointed contractor(s) environmental personnel, share the responsibility for ensuring that environmental best practices are adhered to. The appointed contractor(s) staff must work together to maintain high environmental standards and mitigate impacts, thereby ensuring the success of the project's environmental commitments.

The ECoW will monitor works practices with targeted efforts and attendance at site at project start up to ensure mitigation measures and best practice measures are in place. The frequency of the ECoW's attendance on site will be dictated by the nature of the works. The ECoW will be fully appraised of all of the mitigation measures included in the project.

The appointed ECoW will be appropriately qualified, with commensurate experience in the role of ECoW for work on similar construction projects. The appointed Ecologist or environmental scientist will have the authority to stop works or temporarily halt or delay ongoing works where further consideration or on-site improvements of mitigation may be necessary.

5.3.2 Habitats

- If protected or notable species are encountered during operations at the Site the Ecological Clerk of Works (ECoW) or NPWS will be contacted for advice;
- All trees that are to be retained, both within and adjacent to the Proposed Development boundary (where the root protection area of the tree extends into the Proposed Development boundary), will be fenced off at the outset of works and for the duration of construction to avoid structural damage to the trunk, branches or root systems of the trees. Temporary fencing will be erected at a sufficient distance from the tree so as to enclose the Root Protection Area (RPA) of the tree. The RPA will be defined based upon the recommendation of a qualified arborist;
- Where fencing is not feasible due to insufficient space, protection for the tree/hedgerow will be afforded by wrapping hessian sacking (or suitable equivalent) around the trunk of the tree and strapping stout buffer timbers around it;

- The area within the RPA will not be used for vehicle parking or the storage of materials (including soils, oils and chemicals). The storage of hazardous materials (e.g. hydrocarbons) or concrete washout areas will not be undertaken within 10 m of any retained trees, hedgerows or treelines;
- The construction contractor will seek to avoid removing any hedges or trees during bird nesting season and where this is not possible, an ecologist will be engaged to ensure compliance with the Wildlife Act 1976, as amended. The Applicant (GNI) employ their own internal policies on Tree Cutting and Hedge Trimming that applies the Biodiversity Mitigation Hierarchy on all projects to avoid and minimise any tree/hedgerow loss, where practicable. The Applicant will engage with the Local Authority to identify and agree suitable biodiversity measures and/or lands to achieve biodiversity net gain before completion of the project.
- To prevent the introduction of Invasive Alien Species (IAS) to the site stringent biosecurity measures will be implemented by the Construction Contractor. All vehicles entering the site will undergo a mandatory pre-entry inspection for signs of soil, seeds, pests, or other potential IAS contaminants. If a vehicle is suspected of carrying potential IAS, it will be refused entry and immediately isolated.
- The mitigation measures outlined in Chapter 5 (Land, Soils and Geology) Section 5.6.1, and Chapter 6 (Hydrology and Hydrogeology) Section 6.6.2 will be implemented in full during the construction. These mitigation measures will be implemented as part of the site Construction Environmental Management Plan (CEMP). The CEMP will be implemented and adhered to by the construction Contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager and Ecological Clerk of Works where relevant. These measures are designed to prevent the contamination of groundwater, surface water, and downstream ecosystems. These measures are not designed for the protection of European Sites.
- The retention of existing green corridors such as hedgerows and promotion of biodiversity through native species landscaping will be undertaken where feasible. All areas of hedgerow vegetation removed will be fully reinstated with an appropriate native planting mix of local provenance including the following species:
  - Elder (*Sambucus nigra*)
  - Hazel (*Corylus avellana*)
  - Hawthorn (*Crataegus monogyna*)
  - Blackthorn (*Prunus spinosa*)
  - Whitebeam (*Sorbus aria*)
  - Rowan (*Sorbus aucuparia*)
  - Birch (*Betula Spp.*) (wetter areas)
  - Guelder Rose (*Viburnum opulus*)

Prior to commencement of works on site a suitably qualified arborist will undertake a survey of the proposed pipeline route BS5837: Trees in relation Design, Demolition and Construction – Recommendations (BSI, 2012). Any trees or areas of mature vegetation that are removed to facilitate the full footprint of the Proposed Development will be quantified and replanted on a like-for-like basis. As only low vegetation and hedgerows can be planted directly above the proposed pipeline, any additional mature trees that are to be replaced will be planted in the surrounds of the offtake location. A landscape plan will be prepared by a suitably qualified landscape architect showing the location of the proposed compensatory planting around the proposed offtake location. All replacement planting will be of native stock and of local provenance for the promotion of biodiversity.

5.3.2.1 Orchid transplanting

The following mitigation will be applied only if it does not impact on the ability to establish a function working width to facilitate the Proposed Development:

- The area containing orchids will be isolated via fencing and area avoided completely. The locations of individual orchids on site will be identified and a marker flag put proximate to each plant to aid positioning of fencing process. Protective fencing must be erected before the commencement on any works. The fencing will have a birth of 2m from the cluster of orchids on either side of the bank and will run along the existing boundary of the road. The fencing will have signage and have a draping of tarp to protect the orchids and surrounding soil from dust. The tarp will allow light to penetrate the soil. Fencing will remain in place until all works within 350m from the coterie have concluded.

5.3.2.2 Blue fleabane seed collection

- Collection of seeds in heads (July to Sept) will be carried out by a suitably qualified individual each flowering season until commencement of construction. Seeds will be planted in suitable habitat adjacent to the Proposed Development approved by an ecologist and free from current and/or future development. The receptor site location will be discussed with the project ecologist. A suitably qualified individual will monitor the flowers and harvest the seeds in accordance with seasonal conditions.

5.3.3 Bats

- Prior to any removal of trees of bat roosting potential, a survey will be carried out by a suitably qualified ecologist to identify whether any active roosts are present.
- In the event that active roosts are identified within any trees of bat roosting potential scheduled for removal, prior to removal, a derogation license will be sought from NPWS and no action taken regarding these trees unless derogation is granted.
- Trees identified as containing active bat roosts within and bounding to the construction corridor will be suitably marked to prevent any accidental damage/removal.
- Tree no. 50 (arborist tag id G084) containing a large, potential maternity, Leisler roost, in addition, will have ground protection and fencing implemented during construction.
- Illumination of treelines and canopies avoided during construction.
- The project ecologist will be consulted regarding all lighting related to the construction phase.
- An arborist will be appointed to oversee implementation of root protection zones prior to works.
- All sections of hedgerow to be removed to facilitate construction will be replaced with a similar species composition.

5.3.4 Breeding birds:

- An Ecological Clerk of Works (ECoW) will be appointed to oversee the construction phase and to oversee the implementation of all mitigation including compliance with Wildlife Acts and Water Pollution Acts and ensure that biodiversity in neighbouring areas including birds will not be impacted.
- All hedgerows requiring removal will be re-planted with a hedgerow mix of similar species composition following construction.
- No removal of ivy from trees to be retained within or adjacent to the works area will take place.
- The effectiveness of the proposed mitigation will be monitored throughout the construction period.
- The construction corridor will be marked out prior to the commencement of construction.
- All construction work will be confined strictly to the construction corridor. Any construction works required outside the construction corridor will require prior approval from the ECoW.
- Lighting during construction will not spill outside the Proposed Development.
- Relevant guidelines and legislation (Section 40 of the Wildlife Acts, 1976 to 2012) in relation to the removal of trees and timing of nesting birds will need be followed e.g. do not remove trees or shrubs during the nesting season (1st March to 31st August). Should this not be possible a

pre-clearance inspection will be carried out by an ecologist and clearance will not take place if nests are present.

5.3.5 Badgers

- An Ecological Clerk of Works (ECoW) will be appointed to oversee the construction phase and to oversee the implementation of all mitigation including compliance with Wildlife Acts.
- Preconstruction surveys for mammals will be carried out along the full route given the time between the original surveys and possible site clearance.
- In the vicinity of badger setts, no construction operations will take place outside of daylight hours.
- To prevent badgers from climbing into pipes, gas pipes arriving onsite will be clean and sealed. Pipes in storage will be sealed. Open-cut trenches will have sloped face at the end of each of working day to allow badgers to exit.
- Fencing outlining the site boundary is planned to be erected for the entirety of the project. As directed by the ECoW mammal access points will be placed and monitored along the pipeline route. In areas of fencing close to known badger setts, access points will be made along existing tracks. Additional, access points will be made close to ecological corridors such as hedgerows, treelines, watercourses and drainage ditches.
- The effectiveness of the proposed mitigation will be monitored by the project ecologist throughout the construction period.
- The construction corridor will be marked out prior to the commencement of construction.
- Any construction works required outside the construction corridor will require prior approval from the project ecologist.
- In the cases where the exclusion zone of a sett crosses into or comes within 5 meters of the construction corridor, protective fencing must be placed along the required exclusion zone perimeter and signage placed on the fencing.
- Construction activities will only take place within 50m of breeding setts outside of the breeding season (December to June inclusive), during which a 30m exclusion zone of these setts will be implemented.
- In the vicinity of badger setts, construction operations will take place only during daylight hours.

5.3.6 Otters

- An Ecological Clerk of Works (ECoW) will be appointed to oversee the construction phase and to oversee the implementation of all mitigation including compliance with Wildlife Acts.
- All mitigation measures outlined in the EIAR Chapters and Natura Impact Statement (NIS) that pertain to protection of waterbodies during the construction stage of the Proposed Development, in particular those relating to surface water run-off, fuel/materials storage and waterbody crossings, will be implemented by the Contractor to protect otter habitat and forage species.
- Preconstruction surveys for mammals will be carried out along the full route given the time between the original surveys and possible site clearance.
- Any visual observations of otter, or evidence of their presence will be reported to the ECoW and site manager immediately, and works will cease immediately within 150m of the observational evidence until the area has been inspected by the ECoW and any necessary measures implemented depending on the findings.

5.3.7 Aquatic biodiversity:

- Silt interception will be integrated into all surface water run-off during construction prior to discharge off the works area.

- Discharge from de-watering of excavations will not be discharged directly to any watercourses, streams, drainage ditches or other waterbodies/features.
- An Ecological Clerk of Works (ECoW) will be appointed to oversee the construction phases and to oversee the implementation of all mitigation including compliance with Wildlife Acts and Water Pollution Acts and ensure that biodiversity within the site and neighbouring areas, including mammals, birds, bats and watercourses, will not be impacted.
- Waterbodies along the Proposed Development will be maintained in their current states and sufficient measures implemented and monitored to prevent downstream impacts on aquatic biodiversity. Waterbodies subject to open-cut trenching will be reinstated through separation during removal, and reinstatement of each waterbodies appropriate substrate immediately following works.
- The full suite of mitigation measures as outlined in the accompanying Natura Impact Statement (NIS) will be implemented to minimise the risk of significant effects on the River Boyne catchment, and the Natura 2000 sites located there. These include measures outlined in the OCEMP in relation to surface water runoff, silt/petrochemical interception, and open-cut trenching.
- In-stream works will only take place between 1st July and 30th September inclusive.
- All in-stream works will be carried out adhering to all measures outlined within the accompanying NIS and CEMP.
- Monitoring of waterbody conditions will be carried out daily for the duration of in-stream works and works adjacent to waterbodies.
- Any pollution events on site will be reported to the Site Manager and ECoW. All works are to cease until pollution source is identified, contained, and rectified.
- Following completion of in-stream works, open-cut sections will be restored to their previous condition. River/stream beds will be restored using original materials removed in reverse sequence of removal to restore original surface substrate. Banks will be returned to their original gradient and bare soil lined with biodegradable material to prevent erosion.
- There will be no spread of invasive species as a result of the Proposed Development. Biosecurity of both plant and animal species will be employed pre and post works and will form part of the Appointed Contractor's CEMP. The biosecurity protocols will include:
    - Implement Check–Clean–Dry procedures for all plant, equipment and PPE before entering and leaving site.
    - Restrict machinery movement and use designated access routes to protect the riparian zone.
    - Identify and demarcate any invasive species areas to prevent disturbance.
    - Inspect, segregate and appropriately manage excavated soils to avoid spread of invasive plant material.
    - Follow IFI field work protocol for field survey work (2010) aquatic biosecurity protocols for all works near watercourses.
    - Deliver toolbox talks to all personnel on invasive species awareness and biosecurity requirements.
- Maintain ongoing environmental supervision to ensure compliance and address issues promptly.

5.4 Air Quality

The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to develop a workable and transparent dust control strategy, the following measures have been proposed by drawing on best practice guidance from Ireland, and the UK Institute of Air Quality Management publication '*Guidance on the Assessment of Dust from Demolition and Construction*' (IAQM, 2024)

5.4.1 Communications

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact information.

5.4.2 Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to the local authority when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.
- Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.

5.4.3 Preparing and Maintaining the Site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dust causing activities or the site boundary that are at least as high as any stockpiles on site.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.

5.4.4 Operating Vehicles / Machinery and Sustainable Travel

- Ensure all vehicles switch off engines when stationary – no idling vehicles.
- Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum-speed-limit of 24 kmph on surfaced and 16 kmph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate)
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)

5.4.5 Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate

- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

5.4.6 Waste Management

- Bonfires and burning of waste materials are legally prohibited.

5.4.7 Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as is practicable.
- Only remove the cover in small areas during work and not all at once.

5.4.8 Measures Specific to Construction

- Avoid scabbling (roughening of concrete surfaces) if possible.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
- For smaller supplies of fine powder materials, ensure bags are sealed after use and stored appropriately to prevent dust.

5.4.9 Measures Specific to Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site logbook.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10 m from receptors where possible.

5.4.10 Monitoring

Monitoring of construction dust deposition along the site boundary to nearby sensitive receptors during the construction phase of the Proposed Development is recommended to ensure mitigation measures are working satisfactorily. The location should be at the site boundary close to dust-causing activities where there is potential to affect nearby residences or commercial properties. Given the length of the site, and that the areas with the largest amount of dust generation will move over time

during the construction phase, the monitoring location should be moved with these activities to capture a worst-case location.

Monitoring can be carried out using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2 m above ground level. The TA Luft limit value is 350 $mg/m^2/day$ during the monitoring period of 30 days (+/- 2 days).

5.5 Climate

Embodied carbon of materials and construction activities will be the primary source of climate impacts during the construction phase. During the construction phase the following best practice measures will be implemented on site to prevent significant GHG emissions and reduce impacts to climate:

- Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods.
- Ensure all plant and machinery are well maintained and inspected regularly.
- Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site. A construction waste management plan will be implemented to minimise construction waste sent to landfills. Recycling of materials will be promoted to and reduce the environmental footprint of the site. The majority of excavated material will be reused on site (c. 95%), which represents emissions savings of approx. 1,262 tCO_2e.
- Sourcing materials locally will be prioritised. This will help to reduce transport related CO_2 emissions and helps support local suppliers, further promoting economic sustainability.
- Material choices and quantities will be reviewed during detailed design, to identify and implement any lower embodied carbon options, where feasible. The Applicant will comply with all applicable requirements and policies regarding green or low-carbon procurement.

In terms of impact on the Proposed Development due to climate change, during construction the Contractor will be required to mitigate against the effects of extreme rainfall/flooding through site risk assessments and method statements. The Contractor will also be required to mitigate against the effects of extreme wind/storms, temperature extremes through site risk assessments and method statements. All materials used during construction will be accompanied by certified datasheets which will set out the limiting operating temperatures. Temperatures can affect the performance of some materials, and this will require consideration during construction. During construction, the Contractor will be required to mitigate against the effects of fog, lighting and hail through site risk assessments and method statements.

5.6 Noise And Vibration

Best practice noise and vibration control measures will be employed by the contractor during the construction phase in order to avoid significant impacts at the nearest sensitive buildings. The best practice measures set out in BS 5228-1 and BS 5228-2 will be complied with.

BS 5228-1 and BS 5228-2 include guidance on several aspects of construction site mitigation measures, which include:

- Selection of quiet plant;
- Noise control at source;
- Screening;
- Hours of work; and
- Liaison with the public.

Further comment is offered on these items in the following paragraphs. Noise control measures that will be implemented include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise monitoring, where required. The contractor will put in place the most appropriate noise and vibration control measures depending on the level of noise or vibration reduction required at individual working areas i.e. based on the construction threshold values for noise and vibration set out in Table 5-1 and Table 5-2, which have been reproduced below for clarity.

Table 5-1 - Construction noise threshold (CNT) levels for the Proposed Development

Period over Which Criterion Applies	Location	CNT ($L_{Aeq,T}$)
Monday to Friday: Daytime (07:00 – 19:00hrs) Saturday: Daytime (07:00-13:00hrs)	BS 5228-1 Category A - All residential NSLs along proposed route with exception of Category C detailed below.	65 dB
	BS 5228-1 Category C - Residential NSLs located in immediate vicinity of road crossing no. RDX07 (R401 Road).	75 dB
Monday to Friday: Evening: (19:00 – 23:00hrs) Saturdays (13:00 – 23:00hrs)	BS 5228-1 Category A - All residential NSLs along proposed route with exception of Category C detailed below.	55 dB
	BS 5228-1 Category C - Residential NSLs located in immediate vicinity of road crossing no. RDX07 (R401 Road).	65 dB
Monday to Friday: Night-time (23:00 – 07:00hrs)	BS 5228-1 Category A - All residential NSLs along proposed route with exception of Category C detailed below.	45 dB
	BS 5228-1 Category C - Residential NSLs located in immediate vicinity of road crossing no. RDX07 (R401 Road).	55 dB

Table 5-2 - Recommended construction vibration thresholds for buildings

Structure Type	Allowable Vibration (in terms of PPV) at the Closest Part of Sensitive Property to the Source of Vibration, at a Frequency of 4Hz and less:	
	Transient Vibration	Continuous Vibration
Reinforced or framed structures. Industrial and heavy commercial buildings	50mm/s	25mm/s
Unreinforced or light framed structures. Residential or light commercial-type buildings	15mm/s	7.5mm/s
Protected and Historic Buildings *Note 1	6mm/s – 15mm/s	3 mm/s – 7.5mm/s
Identified Potentially Vulnerable Structures and Buildings with Low Vibration Threshold	3mm/s	

Note 1: The relevant threshold value to be determined on a case by case basis. Where sufficient structural information is unavailable at the time of assessment, the lower value within the range will be used.

5.6.1 Selection of Quiet Plant

This practice is recommended in relation to static plant such as compressors and generators. It is recommended that these units be supplied with manufacturers' proprietary acoustic enclosures. 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 should be selected wherever possible. Should a particular item of plant already on the site be found to generate high noise levels, the first action should be to identify whether or not said item can be replaced with a quieter alternative.

5.6.2 Noise Control at Source

If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control at source. This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.

The following best practice migration measures will be employed:

- Site compounds will be located away from noise sensitive boundaries within the site constraints.
- The lifting of bulky items, dropping and loading of materials within these areas will be restricted to normal working hours.
- Mobile plant will be switched off when not in use and not left idling.
- For steady continuous noise, such as that generated by diesel engines, noise control measures include fitting a more effective exhaust silencer system to reduce the noise emitted.
- For percussive tools such as pneumatic breakers, a number of noise control measures include fitting muffler or sound reducing equipment to the breaker tool and ensuring any leaks in the air lines are sealed.
- Erecting localised screens around breaker or drill bit when in operation in close proximity to noise sensitive boundaries.
- For concrete mixers, control measures will be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum.
- For compressors, generators and pumps, these will be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation.
- 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.

5.6.3 Screening

Screening is an effective method of reducing construction noise levels at a receiver location and can be used successfully as an additional measure to other forms of noise control. The effectiveness of a noise screen will depend on the height and length of the screen, its mass, and its position relative to both the source and receiver. BS 5228–1 states that on level sites the screen should be placed as close as possible to either the source or the receiver. The construction of the barrier will be such that there are no gaps or openings at joints in the screen material.

Erection of localised demountable enclosures or screens will be used around breakers or drill bits when in operation in proximity to NSLs with the potential to exceed the construction noise thresholds. Annex B of BS 5228–1 (Figures B1, B2 and B3) provide typical details for temporary and mobile acoustic screens, sheds and enclosures that can be constructed on-site from standard materials. A well placed and designed mobile temporary screen around a breaker or excavation can effectively reduce noise emissions by 10 dB(A).

In addition, careful planning of the construction site layout will also be considered. The placement of site buildings such as offices and stores between the site and sensitive locations can provide a good level of noise screening.

5.6.4 Hours of Work

Construction activity will mostly take place during daytime hours Monday to Friday and a half day on Saturdays. In the event of works being proposed outside of these, prior written approval will be sought if necessary.

Consideration should be given to the scheduling of activities in a manner that reflects the location of the site and the nature of neighbouring properties. Each potentially noisy event/activity should be considered on its individual merits and scheduled according to its noise level, proximity to sensitive locations and possible options for noise control.

Depending on the noise emission levels experienced and associated noise impact, the contractor should be flexible and able to conduct certain works at hours which reflect periods when the neighbouring properties have lower sensitivities to noise.

5.6.5 Liaison with the Public

A designated Community Liaison Officer (CLO) will be appointed to site during construction works. Any noise and vibration complaints will be logged and followed up in a prompt fashion by the CLO. In addition, prior to particularly noisy or vibratory construction activity the CLO will inform the nearest sensitive locations of the time and expected duration of the works.

5.6.6 Noise and Vibration Monitoring

During the Construction Phase, the appointed contractor shall carry out noise monitoring at representative NSLs to evaluate and inform the requirement and / or implementation of noise management measures. Noise monitoring will be conducted in accordance with ISO 1996–1 (ISO 2016) and ISO 1996–2 (ISO 2017). The selection of monitoring locations will be based on the nearest representative NSLs to the working area which will progress along the length of the Proposed Development.

On review of the likely vibration levels associated with construction activities, it may be concluded that the construction of the Proposed Development is not expected to give rise to vibration that is either significantly intrusive or capable of giving rise to structural or cosmetic damage to adjacent buildings.

In the case of vibration levels giving rise to human discomfort, in order to minimise such impacts, vibration monitoring is recommended at a selection of sensitive buildings, where proposed works have the potential to be at or exceed the vibration limit values.

5.7 Landscape and Visual

5.7.1 Site Management Procedures

The remedial measures proposed revolve around the implementation of appropriate site management procedures – such as the control of site lighting, storage of materials, placement of compounds, delivery of materials, car parking etc. Visual impact during the construction phase will be mitigated somewhat through appropriate site management measures and work practices to ensure the site is kept tidy, dust is kept to a minimum, and that public areas are kept free from building material and site rubbish.

Site hoarding and fencing will be appropriately scaled, finished and maintained for the period of construction of each section of the works as appropriate. To reduce the potential negative impacts during the construction phase, good site management and housekeeping practices will be adhered to as outlined in Section 4. The visual impact of the temporary construction compounds during the construction phase are of a temporary nature only and therefore require no remedial action other than as stated above.

5.7.2 Tree Protection

Existing trees and hedgerows to be retained are particularly sensitive to negative impacts during the construction phase if proper protection measures are not adhered to. With regard to the protection of the retained trees on site during proposed construction works, reference should be made to BS5837; Trees in Relation Design, Demolition and Construction- Recommendation (BSI 2012). The retention of existing green corridors such as hedgerows and promotion of biodiversity through native species landscaping will be undertaken where feasible along the pipeline route.

As part of baseline surveys an Arborist Report has been prepare in accordance with BS5837; Trees in Relation Design, Demolition and Construction- Recommendation (BSI 2012), showing the constraints along the route corridor, and is provided in Appendix 11.2 of the EIAR. The objective of this survey was to gather information regarding the location of trees, tree groups, and hedgerows.

The survey report details constraints posed by existing trees to the Proposed Development as well as, the likely impact of the Proposed Development on trees within the site. The Arborist report includes detailed plans for tree protection, retention, or removal. Recommendations for the protection of trees and hedgerows during construction work is based on BS 5837: 2012. Any recommendations for tree work are based on BS 3998: 2010 Tree Work - Recommendations.

Tree removal will be minimised to the greatest extent possible, with the Project Arboriculturist overseeing and approving only those removals essential for construction. Any trees or areas of mature vegetation removed to facilitate the full footprint of the Proposed Development will be quantified and replanted on a like-for-like basis. A landscape plan will be prepared by a suitably qualified landscape architect showing the location of the proposed compensatory planting at these locations. All replacement planting will be of native stock and of local provenance to mimic the existing vegetation already established within the intervening landscape.

5.8 Archaeological, Architectural And Cultural Heritage

A suitably qualified archaeological consultant will be appointed to oversee the project from design through to planning and construction phase.

The geophysical survey of the Proposed Development, under license to the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht, will be completed across the entire route planning corridor.

Given the cultural significance of sacred trees in Ireland, the hawthorn tree identified in Ticroghan townland will be avoided and fenced off for the duration of the construction phase to protect it, and its root bed, from harm.

Pre-development archaeological testing, under license to the National Monuments Service of the Department of Housing, Local Government and Heritage, will be undertaken in advance of construction, as follows:

- Trenches will largely target anomalies identified by the geophysical survey, as well as county / barony / townland boundaries. A number of trenches will also be excavated in areas where no

features were highlighted (as per best practice guidelines; c. 10% of the Proposed Development corridor should be tested in total).

- Trenches will be dug by a tracked excavator equipped with a 1.8 m wide toothless ditching bucket. Each trench will be excavated to the surface of archaeological features, deposits or structures, or to the surface of the undisturbed natural soil or bedrock (typically less than 75cm). Topsoil will be removed from the test trenches in horizontal levels of not more than 0.20 m in thickness until sterile subsoil is reached.
- A suitably qualified underwater archaeology specialist will assess the following watercourses along the Proposed Development corridor (WCX02, WCX04, WCX05 and WCX19) and undertake a wade or dive survey as appropriate under license to the National Monuments Service of the Department of Housing, Local Government and Heritage.
- Should archaeological or architectural heritage features, deposits or structures be uncovered during survey will be cleaned by hand, investigated and recorded.
- Archaeological excavation of features, deposits or structured identified, will be undertaken in advance of construction, in consultation with and under license to the National Monuments Service of the Department of Housing, Local Government and Heritage.

Please note that the mitigation strategy detailed here are subject to the approval of the National Monuments Service, Department of Housing, Local Government and Heritage.

5.9 Traffic and Transportation

5.9.1 Traffic Capacity and Network Flow

An outline Construction Traffic Management Plan (CTMP) has been prepared for the Proposed Development (Appendix 13.2 of Chapter 13 of the EIAR) by CST Group and submitted with the planning application. This CTMP will be further developed by the construction contractor to include the measures below to minimise the impacts associated with the construction phase upon the peak periods on the surrounding road network. Overall, the mitigation measures will include:

- Trenchless crossings where proposed by the works contractor
- Carrying out road crossing works under traffic management/road closures and diversions;
- Regular cleaning of the road;
- Surface of the car park will be prepared and finished to a standard sufficient to avoid mud spillage onto adjoining roads;
- Monitoring and control of construction traffic during construction works;
- Material deliveries and collections from site will be planned, scheduled and staggered to avoid unnecessary build-up of construction work related traffic;
- All works carried out within public roadways will be carried out under Traffic Signs Manual Chapter 8 requirements.
- All works to be carried out in accordance with the Construction Traffic Management Plan.
- Routing traffic to work zones to be designated and monitored to reduce construction traffic on local streets and roads.
- Recycling of construction materials used for temporary laydown areas at different ones along the length of the pipeline.
- Carry out regular audits to track compliance with Waste Management practices.

HGV trips are anticipated to arrive and depart the site at a uniform rate throughout the day, to avoid pressure on the morning and evening peak hour periods.

All contractors' vehicles will be required to be parked in designated areas off the adjacent road on temporary gravelled surfaces. There will be no parking permitted on the surrounding road network by the contractor or site operatives.

5.9.2 Roads as Material Assets

Mitigation measures will be implemented as part of the works to ensure that the physical impact on the road as material assets is minimised. Condition surveys of existing road surfaces on construction traffic routes and crossings will be carried out prior to construction and on completion to ensure that any reinstatement works are completed to a satisfactory standard. Condition surveys of the reinstatement will be carried out at set agreed timelines post construction.

All open-cut crossings of regional and local roads will be undertaken under Road Opening Licences issued by the relevant road authorities and carried out in accordance with the Guidelines for Managing Openings in Public Roads (2017). These licences govern the opening, backfilling and reinstatement of the road surface and ensure that permanent reinstatement is completed to the satisfaction of the road authority. Any proposals will be agreed with the local authority prior to commencement of construction.

Where trenchless construction techniques are employed, including the crossing of the M4 motorway (RDX04) and other national roads, the works will be subject to consent under Section 53 of the Roads Act 1993, as the pipeline will be installed beneath the road without disturbance of the road pavement. Section 53 consent controls works carried out under national roads and ensures that the structural integrity and operation of the road is protected.

All necessary consents will be obtained in advance of construction.

During construction, trenchless works will be undertaken in accordance with detailed method statements, with continuous monitoring of drilling parameters to ensure ground stability is maintained. Drilling fluid pressures (where applicable) will be controlled to prevent loss of ground, and works will be halted immediately should any abnormal ground movement be detected. Pre- and post-construction road condition surveys will be undertaken where required, and any damage attributable to the works will be promptly rectified.

5.10 Waste Management

A project specific Resource and Waste Management Plan (RWMP) (Appendix 14.1 of Chapter 14 of the EIAR) has been prepared by AWN Consulting and submitted with the Planning application. The RWMP has been prepared in line with the requirements of the EPA *Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects'* (2021). The mitigation measures outlined in the RWMP will be implemented in full and form part of mitigation strategy for the site. The mitigation measures presented in this RWMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the excavation and construction phases of the proposed development.

1. Prior to commencement, the appointed Contractor(s) will be required to update the RWMP in agreement with Offaly County Council and Meath County Council, respectively, and in compliance with any planning conditions, or submit an addendum to the RWMP to Offaly County Council and Meath County Council, respectively, detailing specific measures to minimise waste generation and resource consumption, and provide details of the proposed waste contractors and destinations of each waste stream.
2. The Contractor will implement the RWMP throughout the duration of the proposed excavation and construction phases and should treat the document as outlined in the guidance as a live document.

A quantity of topsoil and sub soil will need to be excavated to facilitate the proposed development. The project design team have estimated that the majority (95%) of the clean, excavated soil will be reinstated as backfill. Any remaining excavated soil will be removed from site by a licenced waste

contractor. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

In addition, the following mitigation measures will be implemented:

1. Building materials will be chosen to 'design out waste';
2. On-site segregation of waste materials will be carried out where possible to increase opportunities for off-site reuse, recycling and recovery. The following waste types, at a minimum, will be segregated:

    a. Concrete rubble (including ceramics, tiles and bricks);
    b. Metals; and
    c. Timber.
3. Left over materials (e.g. timber off-cuts, broken concrete blocks / bricks) and any suitable construction materials shall be re-used on-site, where possible;
4. All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;
5. Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);
6. A Resource Manager will be appointed by the main Contractor(s) to ensure effective management of waste during the excavation and construction works;
7. All construction staff will be provided with training regarding the waste management procedures;
8. All waste leaving site will be reused, recycled or recovered, where possible, to avoid material designated for disposal;
9. All waste leaving the site will be transported by suitably permitted contractors and taken to suitably registered, permitted or licenced facilities; and
10. All waste leaving the site will be recorded and copies of relevant documentation maintained.

Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Regulation 27 of the EC (Waste Directive) Regulations (2011-2020). EPA approval will be obtained prior to moving material as a by-product.

These mitigation measures will ensure that the waste arising from the construction phase of the proposed development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations and the Litter Pollution Act 1997, the NWMPCE (2024). It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will promote more sustainable consumption of resources.

5.10.1 Responsibility

It will be the responsibility of the construction manager to ensure that a written record of all quantities and natures of wastes removed from the site are maintained on-site in a waste file (in hardcopy or electronically).

It is the responsibility of the project manager or his/her delegate that all contracted waste haulage drivers hold an appropriate waste collection permit for the transport of waste loads and that all waste materials are delivered to an appropriately licensed or permitted waste facility in compliance with the relevant Regulations as outlined in the RWMP.

The contractor, as part of regular site inspection audits, will determine the effectiveness of the waste management strategy and will assist the project manager in implementing the measures under the

RWMP and in determining the best methods for waste minimisation, reduction, re-use, recycling and disposal as the construction phase progresses and waste materials are generated.

Prior to commencement of the excavation and construction activity and removal of any waste off-site, details of the proposed destination of each waste stream will be established, along with waste collection permit numbers.

5.10.2 Monitoring

The objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. This is particularly important during the excavation and construction works, where there is a potential for waste management objectives to become secondary to other objectives, i.e. progress and meeting schedule targets. The RWMP specifies the need for a Resource Manager to be appointed, who will have responsibility for monitoring the actual waste volumes being generated and ensuring that contractors and sub-contractors are segregating waste as required. Where targets are not being met, the Resource Manager will identify the reasons for this and work to resolve any issues. Recording of waste generation during the construction phase of the proposed Development will enable better management of waste contractor requirements and identify trends. The data will be maintained to advise on future developments.

5.11 Utilities

Ongoing consultation with third party service providers (e.g. Uisce Éireann, EirGrid, ESB Networks, Aurora) will be undertaken prior to and during construction. All works in the vicinity of existing services will be undertaken in consultation with the relevant utility providers and in accordance with their requirements to minimise the risk of disruption to local communities and businesses. Any planned service interruptions, should they be necessary, will be agreed in advance with the relevant service providers.

Prior to commencement of excavation, the Contractor must undertake appropriate surveys and investigations to confirm the locations of utilities and services in the works area prior to commencing work. It is acknowledged that the location of services shown on drawings is indicative only and that additional or previously unrecorded services may be present. Contractor is responsible for locating all services on site and shall liaise with all Utilities Providers in advance of any works.

All works in proximity of utilities shall be carried out in accordance with statutory requirements and best practice, including compliance with the Health and Safety Authority *Code of Practice For Avoiding Danger From Underground Services*[1].

All applicable standards, guidelines and codes of practice will be adhered to regarding both installation of the gas transmission pipeline and working in the vicinity of existing services, in particular the Gas Networks Ireland (GNI) Guidelines for Designers and Builders – Industrial and Commercial (Non-Domestic) Sites (2018) and the Health & Safety Authority (HSA) Code of Practice for Avoiding Danger from Underground Services (2016).

The mitigation measures set out in the EIAR submitted with the planning application will be implemented and adhered to by the construction Contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager and Ecological Clerk of Works where relevant. All personnel working on the Site will be trained in the implementation of the procedures. The construction Contractor will provide a detailed CEMP that will include any subsequent planning conditions relevant to the Proposed Development and set out further detail of

[1] https://www.hsa.ie/media/4dpjtpaq/underground_services_cop.pdf

the overarching vision of how the construction Contractor of the Proposed Development manage the Site in a safe and organised manner.

6. EMERGENCY PREPAREDNESS/ENVIRONMENTAL INCIDENT PLAN

Environmental incidents are events that result in harm or potential harm to the environment. These incidents include, but are not limited to, hazardous material spills, hydrocarbon spills, chemical spills, leaks, soil erosion, surface water pollution, groundwater pollution, air quality breaches, noise disturbances, and wildlife disruption.

An emergency plan for the construction works will be prepared by the appointed contractor(s) for all works, including specific sections for areas with high risk to the environment i.e. trenchless crossing.

6.1 Categories of Incidents

Incidents are categorised into three levels based on severity:

1. Major Incidents: Pose significant risk to the environment, health, and safety.
2. Moderate Incidents: Have a moderate impact and potential for environmental harm.
3. Minor Incidents: Minimal impact and easily manageable incidents.

Various types of environmental incidents that may occur on the construction site include hazardous material spills, soil erosion and sediment runoff, water contamination, air quality breaches, noise disturbances, and disruption of wildlife habitats.

6.2 Planning and Prevention

Environmental issues and potential emergencies are integral to project planning. Effective preventive and control measures are implemented, communicated to all project workers, including subcontractors, through tools like Contract Environmental Induction, Toolbox Talks, and Method Statement briefings.

Emergency contact details, Drainage Plan/Site Plan (with spill kit locations), will be posted on notice boards. Spill kits are available in the site compound's stores, strategically placed around the site, and within working vehicles. Vehicles carry sufficient spill kits matching their diesel/oil load.

Spill kits will be readily available on site. Proper placement of spill kits is crucial. They will be located as close as possible to potential spill areas and housed in clearly marked containers. These kits are mandatory at fuel storage or refuelling zones and will also be positioned near watercourses when work is being carried out nearby or within surface water drainage catchment. Mobile bowsers must always carry spill kits and drip trays/spill nappies. The choice and quantity of spill containment materials depend on the substance in use and the potential spill volume. Different absorbent types are accessible:

- Oil-Selective Absorbents: These are white or light blue and do not absorb water. They are suitable for spills on both land and water.
- Universal Absorbents: Grey in colour, these are intended for land spills.
- Chemical Absorbents: These could be yellow or grey and are designed for chemical or acid spills on land.

These absorbent types come in various forms:

- Granules, Sand and Shredded Fibres: These are applicable for spills on land.
- Pads: These can be used on land, particularly on hard surfaces, to contain or direct spills.
- Booms: These are designed to confine and absorb spills on water surfaces.

In addition to spill containment materials, spill kits must include appropriate Personal Protective Equipment (PPE), with gloves as a minimum requirement, and a copy of the Emergency Spill Response Plan. They will also feature disposal bags suitable for hazardous waste, including used absorbents and contaminated materials.

Regular inspections are necessary to ensure spill kits are adequately stocked and in good condition. This is especially crucial for kits located in remote areas, as they might be susceptible to vandalism or misuse. After usage, replenishing the spill kit promptly is vital to prepare for potential future spills. A detailed inventory of the kit's contents can be placed within the kit or in the site office at a minimum.

In order to prioritise safety and mitigate potential risks, as with any construction project a proactive approach will be taken towards anticipating and managing extreme weather events during the construction process. Weather forecasting will be reviewed to monitor meteorological conditions closely and identify the occurrence of storm events, lightening, heat or cold weather etc.

6.3 Emergency Response Protocols

There will be a Designated Emergency Coordinator and Responsible Personnel for Emergency Response. This individual(s) will bear primary responsibility for executing the spill response procedure. Nevertheless, other personnel present on-site, including the General Foreman, Area Supervisor, Safety Officers, Fitters, General Operatives and those in charge of refuelling, will also possess awareness of the emergency spill response procedure. It is necessary to provide training for all staff members responsible for addressing spills. These individuals must:

- Be familiar with the whereabouts of spill kits and/or materials, as well as their proper application.
- Grasp the fundamentals of spill containment and possess knowledge of site drainage systems and the locations of surrounding environments where spills might be received.
- Understand the appropriate Personal Protective Equipment (PPE) specifications for managing oils, fuels, and other hazardous substances utilised on the site.
- Possess knowledge about the proper disposal methods for contaminated materials.
- This information can be conveyed in inductions but also will be repeated in toolbox talks on a regular basis.

When an impending extreme weather event is detected through forecasting systems, as part of safety protocols the work zones, construction equipment, materials, and machinery that may be vulnerable to damage or displacement by severe weather will be 'made safe' by being secured or moving to safe locations. The site will be monitored and adjustments to safety measures as needed to address changing conditions.

6.4 Coordination with Emergency Services and Regulatory Authorities

An Emergency Contacts List will be developed prior to commencement of construction. The Designated Emergency Coordinator and Responsible Personnel for Emergency Response will be aware of the appropriate authorities to be notified, if necessary, as well as the emergency services to be contacted if the incident exceeds the site's capacity for containment. The emergency contact list may encompass details for:

- Environmental Protection Agency (EPA);
- EPA 24-hour emergency incident line 0818 33 55 99.;
- Inland Fisheries Ireland (IFI);
- IFI 24-hour pollution line 0818 34 74 24;
- Emergency Services;
- Local Authority;
- An Garda Síochána;

- Health & Safety Authority;
- National Park and Wildlife Services; and
- Specialised cleanup and waste disposal contractor.

6.5 Response to an Incident

All employees will be instructed to bring any environmental incidents they identify to the immediate attention of the Project / Site or Line Manager, after first taking what steps they can to contain/ remediate the incident (without putting the health and safety of themselves or others at risk).

In the event of an incident, prompt actions must be taken: the incident response team and project management will be notified without delay, and relevant emergency response protocols will be activated based on the severity of the incident. Priority shall be given to ensuring the safety of both workers and the surrounding community, with a focus on containing spills and leaks to prevent additional dispersion. Cleanup procedures will be conducted in adherence to guidelines.

6.6 Reporting and Investigation

Immediate Reporting

- Document incident details, including date, time, location, materials involved, and actions taken.
- Notify regulatory agencies and stakeholders as required by law.

Investigation and Root Cause Analysis

- Conduct a thorough investigation to determine the cause of the incident.
- Identify contributing factors and take corrective actions to prevent recurrence.

7. CEMP TRAINING PLAN

The following outline training plan outlines the training objectives and activities designed to educate construction site personnel about the Construction Environmental Management Plan, Construction Health and Safety Plan, Emergency Preparedness and Environmental Incidents Plan. The goal is to ensure that all team members are knowledgeable about the plan's protocols and can respond effectively in case of environmental incidents or emergencies.

7.1 Sample Training Objectives

- Familiarise personnel with the Construction Environmental Management Plan, Emergency Preparedness and Environmental Incidents Plan.
- Provide understanding of environmental incident categories, response protocols, and reporting procedures.
- Ensure proper usage of equipment, communication channels, and safety measures during incidents.
- Educate personnel on their roles and responsibilities within the incident response team.

7.2 Sample Training Sessions

1. Introduction to the Plan
- Overview of the purpose and importance of the Construction Environmental Management Plan, Emergency Preparedness and Environmental Incidents Plan.

2. Evacuation and Safety Procedures
- Overview of evacuation routes and assembly points in case of significant incidents.
- Training on ensuring personal safety and the safety of others during an emergency.

3. Emergency Response Procedures
- Discussion on the different categories of incidents: Major, Moderate, and Minor.
- Description of common types of environmental incidents that may occur on the construction site. (Refuelling spillages, hydrocarbon spillage, hydraulic oil leak, alkaline wash water leak)
- Detailed explanation of the steps to take when an environmental incident occurs.

4. Roles and Responsibilities
- Clarification of roles within the incident response team, including Team Leader, First Aid Responders, Spill Control, Communication, etc.
- Discussion on teamwork, communication, and coordination during incidents.

5. Reporting and Documentation
- Guidance on properly documenting incident details, including filling out incident report forms.
- Explanation of the importance of accurate and timely reporting.

7.3 Training Frequency, Training Material and Resources

New personnel will undergo this training upon induction to the construction site. Providing comprehensive training sessions will equip all construction site personnel with the necessary knowledge and skills to effectively respond to incidents and safeguard the environment and worker safety.

8. REVIEW AND FINALISATION OF THE PLAN

The oCEMP is an essential framework that guides the chosen construction contractor in implementing environmentally responsible practices throughout the construction programme.

The appointed construction contractor(s) will provide a further detailed CEMP that will include any subsequent conditions relevant to the Proposed Development and set out further detail of the overarching vision of how the appointed construction contractor(s) of the Proposed Development manage the Site in a safe and organised manner.

A systematic review and finalisation process ensures the plan's adaptability and effectiveness. Regular audits and inspections serve as crucial checkpoints to assess performance and identify improvements.

Given project dynamics and potential changes, the CEMP remains dynamic, evolving alongside site activities and project alterations.

The plan will be evaluated through routine audits, identifying areas for enhancement and ensuring alignment with project changes and regulations. As circumstances evolve, the CEMP is updated for ongoing suitability.

9. REFERENCES

1. Department of Environment, Heritage and Local Government (DOEHLG), *Quarries and Ancillary Activities, Guidelines for Planning Authorities* (2004).
2. US Environment Protection Agency (USEPA), Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition (periodically updated) (1986).
3. The Scottish Office – Development Department, Planning Advice Note PAN50 Controlling the Environmental Effects Of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings (1996).
4. Institute of Air Quality Management (IAQM), Guidance on the Assessment of Dust from Demolition and Construction (2014).
5. UK Office of Deputy Prime Minister, Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance (2002).
6. USEPA, Fugitive Dust Technical Information Document for the Best Available Control Measures (1997).
7. Waste Management Act 1996 (No. 10 of 1996) as amended 2001 (No. 36 of 2001), 2003 (No. 27 of 2003) and 2011 (No. 20 of 2011). Sub-ordinate and associated legislation includes:
   - European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011) as amended 2011
   - Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820 of 2007) as amended
   - Waste Management (Facility Permit and Registration) Regulations 2007 (S.I. No. 821 of 2007) as amended
   - Waste Management (Licensing) Regulations 2000 (S.I. No. 185 of 2000) as amended
   - Waste Management (Packaging) Regulations 2014 (S.I. No. 282 of 2014)
   - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997)
   - Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015)
   - European Communities (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014)
   - Waste Management (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended
   - Waste Management (Food Waste) Regulations 2009 (S.I. No. 508 of 2009) as amended 2015 (S.I. No. 190 of 2015)
   - European Union (Household Food Waste and Bio-waste) Regulations 2015 (S.I. No. 191 of 2015)
   - Waste Management (Hazardous Waste) Regulations 1998 (S.I. No. 163 of 1998) as amended
   - Waste Management (Shipments of Waste) Regulations 2007 (S.I. No. 419 of 2007)
   - Waste Management (Movement of Hazardous Waste) Regulations 1998 (S.I. No. 147 of 1998)
   - The European Communities (Transfrontier Shipment of Hazardous Waste) Regulations 1988 (S.I. No. 248 of 1988)
   - European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011 (S.I. No. 324 of 2011)
   - European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015) as amended
8. Litter Pollution Act 1997 (No. 12 of 1997) as amended
9. Eastern-Midlands Region Waste Management Plan 2015 – 2021 (2015)
10. Construction Industry Research and Information Association (CIRIA) Control of Water Pollution from construction Sites, Guidance for consultants and contractors (C532).
11. CIRIA, Environmental Good Practice on Site (3rd edition) (C692).