CONSTRUCTION AND ENVIRONMENTAL MANAGEMENT PLAN

Project: **Laois Kilkenny Electricity Reinforcement Project – Unit 1: A new 400kV/110kV Substation at Coolnabacky townland, Co. Laois.**

Client: **ESB Engineering and Major Projects**

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1 INTRODUCTION

The Laois Kilkenny Electricity Reinforcement Project (Planning reference ABP PL REF. 11/VA0015) aims to reinforce the electricity grid in the Laois and Kilkenny area through upgrading of existing overhead electricity lines and substations, as well as the construction of new overhead electricity lines (OHLs) and new substations and their connection to the national transmission system with short lengths of underground cables (UGCs).

The planning application for this development included an Environmental Impact Statement (EIS) and a Natura Impact Statement (NIS). Planning Permission, granted by An Bord Pleanala, was accompanied by 11 planning conditions, condition 11 requiring the submission of a Construction Environmental Management Plan (CEMP) prior to commencement of development addressing various items listed in the condition.

The permitted development comprises a number of units within County Kilkenny and County Laois (ABP PL REF. 11.VA0015). This CEMP covers construction activity in relation to Unit 1: Coolnabacky 400kV/110kV Gas Insulated Switchgear (GIS) Substation

For completeness all units associated with the Laois Kilkenny Reinforcement Project are listed below:

- Unit 1: New 400/110 kV GIS substation at Coolnabacky townland, Co. Laois.
- Unit 2: New connection to Coolnabacky from the existing Moneypoint-Dunstown 400kV line (c. 1.4km).
- Unit 3: New 110kV connection to Coolnabacky substation from the existing Athy-Portlaoise 110kV line.
- Unit 4: A new 110kV / 38kV / MV substation in Ballyragget, Co. Kilkenny.
- Unit 5: The construction of a new 110 kV overhead line between Ballyragget and Coolnabacky (c. 26km).
- Unit 6: An Upgrade of the existing Ballyragget-Kilkenny 110kV overhead line (c. 22km).
- Unit 7: A New Bay in the Existing Kilkenny 110kV station. Under ABP Reference 305108 additional works to Unit 7 were approved.
- Unit 8: Modifications to existing Athy-Portlaoise 110kV line.

The project has now progressed and Units 4, 6 and 7 (including the modifications approved under ABP Reference 305108 in February 2020) have now been completed as well as some accommodation works related to Unit 1. Unit 5 is likely to commence construction in Q3 2023.

ESB submitted a Construction Environmental Management Plan (CEMP) to Laois County Council (LCC) in compliance with Condition 11 of the planning conditions and received approval in April 2018. A number of the units as detailed above have been constructed since approval of that CEMP, including some site access works related to the Coolnabacky site, which is referred to as Unit 1. However, it was agreed since April 2018 between ESB and LCC, that for the construction of the substation at Coolnabacky, a more detailed and specific CEMP would be required.

This Construction and Environmental Management Plan (CEMP) describes the decommissioning and installation of boreholes and the civil engineering and building works for Coolnabacky 400 kV/110kV Substation to be carried out by Kilwex Ltd on behalf of ESB.

The electrical fit out, transformer installation and commissioning, which will take place upon completion of the building construction, shall be managed under separate submissions.

The Civil CEMP contains mitigation measures and environmental practices that will take place during construction to ensure no potential pollution pathway will exist to the bedrock aquifer, either during

the construction phase or going forward into the operational phase.

This CEMP has been developed specifically for this project and outlines construction practices and environmental management measures which will be implemented during the construction phase, to ensure that the project is constructed in accordance with best practice and with minimal impact on the surrounding environment. All operations shall be completed in compliance with the relevant environmental legislation. A table of the relevant legislation is listed in **Appendix 1 Relevant Legislation List to the Project.**

Section 4.2 of the CEMP contains key construction activities that will literally form the foundations and concrete structures for future electrical equipment to be housed at the substation. With this, the CEMP provides detail and gives the reader confidence that the steps taken in constructing these works will be done to the highest industry standards and tested where applicable to ensure they are fit for purpose for the next phase of the development. The mitigation contained in the following CEMP document will ensure there is no potential pollution pathway created from the main civil construction works to surrounding lands, surface waters or groundwaters.

2 THE DEVELOPMENT

2.1 Site and Project Overview

The substation will be constructed in a 6.7-hectare field in the townland of Coolnabacky approximately 2km north of the village of Timahoe, County Laois. See **Figure 1** below.

Figure 1: Construction location Coolnabacky 400/110kV Substation Site

The permitted development consists of the following:

- 110kV GIS building
- 400kV GIS building
- 2 no. Transformers positioned in bund enclosures
- Associated compound and all other infrastructure contained within as shown in layout in **Appendix 2 – Site Logistics Plan.**

2.1.1 Unit 5 - Ballyragget – Coolnabacky OHL Interface

The interface mast BC150 for Unit 5 is located within the substation site of Unit 1. This is the final structure in the Ballyragget to Coolnabacky 110kV OHL circuit which will connect Coolnabacky substation to Ballyragget substation in Co. Kilkenny. The foundations and lower section of the Interface Mast BC150 was constructed as part of the Ballyragget – Coolnabacky OHL in early 2022, under a previous compliance submission to LCC in December 2021.

The remaining structure will be assembled under the Unit 5 Ballyragget to Coolnabacky Overhead Line project. At the interface mast, the Ballyragget to Coolnabacky circuit transitions from an Overhead Line to an Underground Cable before transversing around the northern and eastern perimeter of the site and terminating in the Coolnabacky 110kV substation.

Future work (electrical work) associated with Unit 5 which will occur at the Coolnabacky Unit 1 site will include the stringing of the overhead line and pulling of the cables into position before terminating accordingly. All works will be carried out in full compliance with the commitments set out in the appropriate CEMP's for Units 1 and Unit 5.

2.1.2 Existing Site Infrastructure

There are five existing overhead line (OHL) structures, or masts, on site with associated foundations, measuring in depth from 3.2m to 4.1m, as shown in the **Table 1** below.

Table 1: Details of Existing Overhead Line Structures at Coolnabacky Site

Circuit/Unit	Description	Quantity	Size
New Ballyragget Coolnabacky 110 kV Overhead Line (Unit 5)	Line Cable interface mast (LCIM) base and foundations in place LCIM 150	1no. mast (4 foundations per)	4.3m x 4.3m 1.5m thick (varies) at depth of 3.205m
Athy Portlaoise 110 kV Modifications (Unit 8)	New Temporary LCIMs complete and OHL diversion in place AM98, AM98A, AM99	3no. masts (4 foundations per/ 12 foundations) Fully Constructed	4.3m x 4.3m 1.5m thick (varies) at depth of 3.205m
New Coolnabacky 400 kV Overhead Line (Unit 2)	End Mast base and foundations in place	1no. mast (4 foundations)	9m x 9m 1.5 thick (Varies) at depth of 4.1m from lowest ground level

The Conceptual model in **Section 3.3.2** illustrates the latest understanding of potential interaction between existing infrastructure units and the shallow aquifer.

2.2 Planning Compliance:

In addition to ESB's Minimum Environmental Requirements, this CEMP was developed in compliance with Condition 11 of the planning permission ABP PL REF. 11.VA0015.

All planning conditions pertinent to the civil construction of Coolnabacky Substation are listed below, together with references to the relevant subsections within the CEMP:

Condition No. 2

'(a) The mitigation measures identified in the environmental impact statement, Natura impact statement, and associated documentation on file, shall be implemented in full, except as may be required to comply with the following conditions.

- All mitigation as set out in the EIS and NIS and all associated documents submitted as part of the planning application are collated in **Section 7 – Mitigation Measures** of the CEMP and will be implemented in full during the pre-commencement, construction and operational phases of the permitted development.

- To further demonstrate the application of mitigation measures detailed in the EIS and NIS, routine inspections and environmental monitoring will be in place to ensure environmental management practices and measures are effective. An Environmental Monthly Monitoring Report will be produced by Kilwex capturing results of environmental monitoring, waste streams, ecological movements etc. **Section 8 – Monitoring Measures**

(b) The construction of the proposed development shall be supervised by suitably qualified and experienced environmental personnel, to ensure that all environmental mitigation and monitoring measures are implemented in full.'

- The Contractor has retained the services of Coyle Environmental to support, supervise and advise on all environmental elements of the permitted development including the implementation of all environmental mitigation and monitoring measures. Functions of the environmental personnel are detailed in **Section 6.3** and mitigation measures are outlined in **Section 7**.

Condition No. 3

Prior to commencement of development, and following consultation with the National Parks and Wildlife Service, the following shall be submitted to and agreed in writing with the relevant planning authority:

(i) installation details for bird flight diverters,

- This condition applies to Unit 5 and will be implemented under a separate compliance submission for the Ballyragget to Coolnabacky 110 kV OHL (Unit 5). Overhead lines are not part of this Unit 1 development.

(ii) details of pre-construction surveys for badgers, otters and bats,

- Details of the preconstruction surveys are available in **Section 2.3.3** Ecology

(iii) (iii) in the event of these surveys identifying these species, measures for their protection shall be identified and incorporated into the construction management plan, and

- Measures for protection for any species identified are included in **Section 5** Environmental Management.

(iv) (iv) reporting procedures for the above.

- Please see **Section 9** Auditing Measures.

Condition No. 4

'Works in the vicinity of rivers and streams shall comply with the "Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites" issued by the Eastern Regional Fisheries Board'.

- **Section 5.1.1** refers to robust surface water management measures which are in compliance with the requirements of the above guidance.

Condition No. 5

'Water supply and drainage arrangements, including the disposal of surface water, shall comply with the requirements of the planning authority for such works'.

- **Section 5.1.1** provides details on onsite drainage including the management of surface & ground water. **Section 4.1.3, 4.1.4 & 4.2.7** provide details on pond arrangements during construction and operational phases

- **Section 4.1.2.1** provides details of water supply for the construction phase of the project.

Condition No. 6

'The proposed wastewater treatment and disposal systems to serve the two substations shall be designed, constructed and maintained in accordance with the requirements of the 'Code of Practice - Wastewater Treatment and Disposal Systems Serving Single Houses', issued by the Environmental Protection Agency (2010), and in accordance with the details set out in the documentation submitted by the undertaker on file and at the oral hearing. Construction stage details of the measures for the collection and final disposal of wastewater shall be submitted to and agreed in writing with the relevant planning authority, prior to the commencement of development at each substation site'.

- During the construction phase a temporary holding tank will be installed for the duration of the works. **Section 4.1.2.1** and **Appendix 5 Resource Waste Management Plan** provides details on waste management and wastewater from the site welfare facilities.

Condition No. 7

'The two substation sites shall be landscaped using only indigenous deciduous tree and hedging species. The proposed landscaping at the Ballyragget substation shall be supplemented by the dense planting of indigenous tree and hedging species along the entire northern boundary of the site'.

- Landscaping will be carried out in accordance with the landscape design outlined in the planning application. Only indigenous, deciduous trees and hedging species will be planted in this development.

Condition No. 8

'All road surfaces, culverts, watercourses, verges and public lands shall be protected during construction, and in the event of any damage occurring, shall be reinstated to the satisfaction of the relevant planning authority'.

- Pre-condition surveys of any road surfaces, culverts, field drains, verges and public lands will be carried out in the immediate adjoining and adjacent lands. Condition monitoring will be undertaken during routine site inspections as outlined in **Section 5 Environmental Management** and any issues directly attributable to the development shall be addressed to the satisfaction of the planning authority.

Condition No. 9

'Prior to commencement of development, and following consultation with the Department of Arts, Heritage and the Gaeltacht, a methodology shall be submitted to and agreed in writing with the relevant planning authority for the replacement of existing polesets that are situated in close proximity to existing archaeological features'.

- This condition is not applicable to Unit 1 (Coolnabacky Substation) as there are no poleset replacements in this development. Condition no.10 identifies Archaeological requirements associated with these works.

Condition No. 10

'The undertaker shall facilitate the archaeological appraisal of the site and shall provide for the preservation, recording and protection of archaeological materials or features which may exist within the site. In this regard, the undertaker shall:-

(a) notify the planning authority in writing at least four weeks prior to the commencement of any site operation (including hydrological and geotechnical investigations) relating to the proposed development,

(b) employ a suitably qualified archaeologist prior to commencement of development. The archaeologist shall assess the site and monitor all site development works. The assessment shall address the following issues:-

(i) the nature and location of archaeological material on the site, and

(ii) the impact of the proposed development on such archaeological material, and

(c) particular care shall be taken in replacing polesets close to archaeological features.

'A report, containing the results of the assessment, shall be submitted to the planning authority and, arising from this assessment, the undertaker shall agree in writing with the planning authority details regarding any further archaeological requirements (including, if necessary, archaeological excavation) prior to commencement of construction works. In default of agreement on any of these requirements, the matter shall be referred to An Bord Pleanála for determination'.

- Archaeological consultant, Byrne Mullins, has been retained to advise and supervise the excavation work. Once commencement date is agreed, the planning authority will be notified 4 weeks in advance of commencement. Please see **Section 6.3.5 Archaeology**, which outlines the roles and actions to be undertaken as part of the permitted development.

Condition No. 11

'The construction of the development shall be managed in accordance with a Construction Management Plan, which shall be submitted to, and agreed in writing with, the planning authority prior to commencement of development. This plan shall provide details of intended construction practice for the development, including:

- This CEMP has been prepared to address the provisions of Condition 11. Details of compliance has been outlined throughout this document with specific section references set out below.

(a) location of any site and materials compound(s) including area(s) identified for the storage of construction refuse;

- Details relating to site compound and storage of materials is included in the Site Logistics Plan. Please see **Appendix 2.**

(b) location of areas for any construction site offices and staff facilities;

- Details relating to site offices and staff facilities are included in the Site Logistics Plan. Please see **Appendix 2.**

(c) details of site security fencing and hoardings;

- Details relating to site security fencing and hoarding are included in the **Appendix 3 Earthmoving Plan** and **Section 4.1.1 Site Preparation**

(d) details of on-site car parking facilities for site workers during the course of construction;

- Details relating to site parking facilities for workers are included in the **Appendix 2 Site Logistics Plan.**

(e) details of the timing and routing of construction traffic and any required directional signage, to include proposals to facilitate the delivery of abnormal loads to the site;

- Details relating to timing and routing of construction traffic are included in **Section 5 Environmental Management** and **Appendix 4- Traffic Management Plan**

(f) measures to obviate queuing of construction traffic on the adjoining road network;

- Details relating to management of construction traffic on the adjoining roads are included in **Section 5.6 Traffic Management** and **Appendix 4** - **Traffic Management Plan.**

(g) measures to prevent the spillage or deposit of clay, rubble or other debris on the public road network;

- All excavated material is being retained on site. Please see **Appendix 4 - Traffic Management Plan.**

(h) alternative arrangements to be put in place for pedestrians and vehicles in the case of the closure of any public road or footpath during the course of site development works;

- It is not envisaged that this development will require closure of any public roads or footpaths.

(i) provision of parking for existing properties during the construction period;

- There are two neighbouring dwellings to this development, and it is not envisaged that parking for either will be impacted during the construction work.

(j) details of appropriate mitigation measures for noise, dust and vibration, and monitoring of such levels;

- Appropriate measures are outlined in **Section 5 Environmental Management** and **Section 7 Mitigation Measures.**

(k) containment of all construction-related fuel and oil within specially constructed bunds to ensure that fuel spillages are fully contained; such bunds shall be roofed to exclude rainwater;

- Details relating to fuel and oil management is outlined in **Section 5.3**

(l) off-site disposal of construction/demolition waste and details of how it is proposed to manage excavated soil;

- There are no demolitions works in this project. All excavated spoil is to remain on site and stored in berms, which form part of the permanent works.

- Waste management is detailed in **Section 5.8 Waste Management** and in **Appendix 5 – Resource & Waste Management Plan**

(m) means to ensure that surface water run-off is controlled such that no silt or other pollutants enter watercourses;

- Surface water management is outlined in the following sections, **Section (s) 4.1.3, 4.1.4 & 5.1.1** and **Appendix 6** – **ESB Drainage Drawings**

(n) hours of site development and construction; and

- Working hours during construction are 7am to 7pm Monday to Friday with Saturday works from 7am to 1pm. Working hours will not exceed this timeframe unless for certain specified tasks which will be identified and agreed with the local authority in advance.

(o) provision for the prevention of the invasive spread of plant species.

- Invasive Species Management is outlined in **Section 5.7.1**

A record of daily checks that the works are being undertaken in accordance with the Construction Management Plan shall be kept for inspection by the planning authority'.

- Details of daily checks are contained in **Section 8 Monitoring** and **Section 9 Auditing**.
- Records will be made available on request to the planning authority.

The CEMP aims to provide the environmental management framework that will be adhered to during the pre-commencement phase of the development. It outlines the work practices, construction management procedures, management responsibilities, mitigation measures and monitoring proposals that are required to be implemented during construction of this project.

The mitigation measures presented in the Environmental Impact Statement (EIS) and a Natura Impact Statement (NIS) prepared for this project at planning stage, which are relevant to the Coolnabacky Substation, are addressed in **Section 7 Mitigation Measures**.

2.3 Existing Environment

This section of the CEMP summarises the existing conditions of the site as set out in the Environmental Impact Statement (EIS) submitted as part of the planning application, along with information obtained from Geological Surveys of Ireland Database (GSI) 2022 and recent site surveys/walkovers carried out by specialist contractors in 2022 and 2023.

Measures for management of these features and existing conditions are further detailed throughout the CEMP.

2.3.1 Geological Features

The following geological features are present at the permitted development:

- Gravels derived from limestones identified in outcrop to the north, west and south of the site
- Shallow poorly drained mineral (manly basic) (BminSP) present in the north, west, and south of the site
- The bedrock is overlain by a consistent layer of 6-7m of low permeability boulder Clay.

2.3.2 Hydrological / Hydrogeological

The following describes details associated with the hydrogeological and hydrological features present.

2.3.2.1 Hydrological

- The site is located within the Timahoe (Barrow) River Catchment area.
- A shallow, spring fed field drain lies along the north-western and northern boundary of the site flowing eastwards. A field drain channel along the eastern boundary of the site drains to this field drain.
- This field drain then extends to the Timahoe River c. 500 m downstream from the site.
- The Timahoe River feeds into the Bauteogue River which then forms part of the River Barrow and Nore SAC c. 4.5 km downstream from the site.
- The site boundary field drain were identified as fed by spring and diffuse groundwater, supporting Tufa forming streams (**See Section 2.3.3.1 Petrifying Springs with Tufa Formation**)

2.3.2.2 Hydrogeological

- The site is located on two aquifers:
    1. A Regionally Important Karstified (diffuse) bedrock aquifer (>10 m below the site) which is a source of drinking water for the region and
    2. A shallow, perched locally important sand/gravel aquifer which is not in hydraulic continuity with the bedrock aquifer below, due to the presence of a >6m layer of impermeable clay in between both aquifers
- The underlying bedrock geology comprises limestone of the Ballyadams Formation, a regionally important bedrock aquifer which is described as a thick bedded formation.
- Groundwater Vulnerability category for the underlying bedrock aquifer is recorded as 'Moderate'
- The site is mostly underlain by 6-7m stiff grey sandy and gravelly clay and silt with slightly gravelly clay
- Groundwater in the sand and gravel deposits on the site will not be in hydraulic continuity with the bedrock aquifer underlying the site because of the low permeability of the intervening 6m+ of Clay as per **Section 3.3.3 - Summary Conceptual Model.**

2.3.3 Ecology

The following provides details of ecological features as identified during recent surveys:

- The site is identified as a low-lying, level field of dry calcareous and neutral grassland
- This habitat appears rough, species poor and dominated by a swathe of Creeping Bent Grass (*Agrostis stolonifera*), Dock (*Rumex spp*) with occasional Buttercup (*Ranunculus repens)* and Dandelion (*Taraxacum spp)*
- The site is bound by stunted hedgerows comprising extensive species including Hazel (*Corylus avellana*), Ash (*Fraxinus excelsior*) and Willow (*Salix spp*.)
- Interstitial scrub including stands of Blackthorn (*Prunus spinosa*) and Bramble (*Rubus* spp.) appear abundant along the northern boundary lining the field drain.
- Both scrub and hedgerow habitat potentially provides sub-optimal foraging and refuge conditions for passing birds and commuting bat populations
- No rare or protected plant species were recorded during the site visits
- No invasive plant species stands were recorded during site visits
- No volant or non-volant mammals were observed during the site visits
- No active protected mammal habitats were identified

2.3.3.1 Petrifying Springs with Tufa Formation

- As mentioned in Section 2.3.2.1, the boundary streams exhibit 'Tufa' forming deposits within the channel substrate.
- Tufa is a white to straw-coloured deposit of calcium carbonate (lime).

- The petrifying or 'tufa forming' spring, after undergoing complex chemical processes, emerges at the surface and precipitates calcium carbonate resulting in the Tufa features.
- This rare feature is present in varying concentrations along the length of the boundary stream and in particular along the Northern boundary section.

2.3.4 Archaeological

- An Archaeological Impact Assessment Report was prepared by Byrne Mullins Archaeologists on behalf of ESB in March 2022 and submitted to Laois County Council.
- Archaeological testing was undertaken in advance of permitted development works
- No archaeological findings were identified on site at that time.

2.4 Construction Development Programme

The Unit 1 development, as described in the planning permission, will be developed in two Parts. **Figure 2** shows the Preliminary Development Programme for the Coolnabacky Substation Unit 1 development in its entirety.

Preceding Part(s) 1 & 2, there are also pre-commencement activities undertaken i.e. borehole decommissioning and installation, ecology walkover surveys, baseline environmental monitoring etc.

The development programme sets out the sequence of construction activities from for the entire development, up until when the substation is Operational. Part 1 is focused on civil construction works and Part 2 focuses on electrical installation works. Both parts are classed under the high level umbrella term of 'Construction Phase'.

Phase (Planning Permission)	Parts	Project Phase	Activities/Tasks	Construction Sub Phase/ Stage		Contractor	CEMP Section
Prior to Commencement of Development		Pre Commencement	Discharge of Pre-Commencement Conditions and delivery of previous commitments.	Pre-Civil Construction: Ecology walkover surveys, baseline surface water & groundwater monitoring, noise, dust & vibration			
Construction of Unit 1 Development at Coolnabacky	**Part 1**	Pre-Civil Construction	Borehole Decommissioning & Installation.	Modification and installation of boreholes to accommodate groundwater monitoring programme as required.		IE Consulting	Section 3
				EARTHMOVING PLAN	**CONSTRUCTION**		
		Main Civil Construction **Phase 1**	Enabling works & site Establishment, Drainage & Surface Water Management, Main Construction of 110 kV Building	**Stage 1: Site Preparation** - Mobilise to site - Fencing & Security of Site - Ecological Buffer Zone - Overhead Cable Avoidance - Fencing & Protection of Boreholes		Kilwex Construction	Section 4.1
				Stage 2: Site Establishment - Site Acccess Route & hardstanding - Site Compound and Laydown Area - Permanent Berm Drainage (land drain & catchpits)			
				Stage 3: Excavate Ponds and associated Drainage - Excavate & Install Drainage connections between berm and ponds - Move spoil to berm - Excavate Ponds to formation level - remove spoil to berm area - Dewatering Procedure to be applied			
				Stage 4: Construct Drainage Ponds & Associated Infrastructure - Excavations for remaining drainage works - Install hydro brake, manhole at pond outlets, stone apron at stream - Install impermeable HDPE liner, Geotextile fleece & stone - Install remainder of pipe work to ponds			

Phase (Planning Permission)	Parts	Project Phase	Activities/Tasks	Construction Sub Phase/ Stage		Contractor	CEMP Section
				Stage 5: **110 kV Building Footprint Excavation Works** - Strip topsoil and install stone on haul route - All excavated spoil to be moved to berm - Excavate to formation 110 kV building footprint and install stone - Dewatering Procedure to be applied			
				Stage 6: **Remainder of Civils & Excavation Works** - Excavate and install drainage - Excavate trenches and install cable ducting - Excavate & Install tanks, oil separator etc - Dewatering Procedure to be applied	**110 kV Building Construction:** - Pour Foundations - Structural Steel Frame -Composite Cladding -First Floor -Internal Finishes, Building Services		
		Main Civil Construction **Phase 2**	Construction of 400 kV Building and Transformer bunds within site compound.	**400kV Excavations** - Excavate Building Footprint (Refer to Earthmoving Plan Stage 6) - 400 kV Cable Ducts Excavation - Excavate 400 kV Transformer Bund Footprint (Refer to Earthmoving Plan (Stage 6) - Dewatering Procedure to be applied	**400kV Foundation & Ducting** - Pour Foundations - 400 kV Cable Ducts Installation - Pour Transformer Bund Foundations	Kilwex Construction	Section 4.2
					400 kV Building Construction: -Structural Steel Frame -Composite Cladding -First Floor -Internal Finishes, Building Services		
					400 kV Transformer Bund: - Bund Walls - Bund Testing - Blast Walls installation - Blockwork Sumps & Covers, Drainage stone		
					Landscaping - Berm Planting with native Irish trees - Wetland Planting in ponds - Revegetation planting		

Phase (Planning Permission)	Parts	Project Phase	Activities/Tasks	Construction Sub Phase/ Stage		Contractor	CEMP Section
					--Landscape in accordance with design		
	Part 2	Electrical Installation **Phase 1**	Installation of 110 kV Switchgear in completed 110 kV Building	(indicative) **Stage 1:** Install Switchgear & Testing **Stage 2:** Commission Switchgear, Underground Cable installation & Terminations **Stage 3:** Energise 110 kV Substation		To be Awarded	
		Electrical Installation **Phase 2**	Installation of 400 kV Switchgear in completed 400 kV Building.	(indicative) **Stage 1:** Install Switchgear & Testing **Stage 2:** Commission Switchgear, Underground Cable installation & terminations **Stage 3:** Energise 400 kV Substation		To be Awarded	
		Transformer Delivery & Installation	Delivery and installation of 400 kV Transformers	(indicative) Stage 1: Delivery & Offload Stage 2: Assemble & Fill Stage 3: Commission Stage 4: Energisation of 400 kV Transformer		To be Awarded	
Operation of Unit 1 Coolnabacky Substation		Interfacing & Tying in of Other Units on Laois Kilkenny Project. (Construction phases of Units 2 & 8 to overlap with unit 1)	Overhead Line Diversions from Athy Portlaoise 110 kV OHL (Unit 8)			To be Awarded	
			Overhead Line Diversions from Dunstown Moneypoint 400 kV (Unit 2)			To be Awarded	
		Substation Operation & Maintenance				ESBN	N/A

Figure 2: Coolnabacky 400/110kV (Unit 1) Preliminary Development Programme

Part 1 of the preliminary development programme Includes:

- Borehole Decommissioning & Installation
- Main Civil Construction Phase 1
    - Mobilisation & Site Fencing
    - Berms works including installation of temporary ponds
    - Install settlement ponds (Permanent)
    - 110 KV Building works
- Main Civil Construction Phase 2
    - 400 kV Building works
    - Transformer Bunds works

Part 2 of the preliminary development programme Includes:

- Electrical Installation Phase 1
    - Installation of 110 kV switchgear
- Electrical Installation Phase 2
    - Installation of 400 kV switchgear
- Transformer Delivery & Installation

The scope of this CEMP is to satisfy Planning Condition 11 for Part 1 only, i.e. all civil construction works related to the project.

As can be seen in the Preliminary Development Programme in **Figure 2** and also attached in **Appendix 7 Preliminary Development Programme and Gantt Chart**, apart from the borehole management activity onsite, the main works under Part 1 has been split out into Main civil construction works Phase 1 and Phase 2. These phases are a natural division in the scope of works, where Phase 1 is associated with the site preparation and establishment, installation of settlement ponds and associated drainage features and the excavation and construction of the 110 kV Building. Phase 2 is associated with the excavation and construction of the 400 kV Building and Transformer bunds within the site compound.

Details of activities for each Phase are further split into Stages of work, as seen in **Figure 2** and **Appendix 7.** A Gantt Chart of the Development Programme is also included in Appendix 7, which indicates approximate construction durations that each stage is expected to take. In all, the duration of the entire works for Part 1 is envisaged to take approximately 18 months.

On the completion of Part 1, the electrical installation (Part 2) will commence, on receipt of approval of the Electrical CEMP by LCC. Part 2 also has two main Phases, and transformer delivery and installation. Phase 1 of Part 2 is the installation of the 110 kV switchgear and Phase 2 is the installation of the 400 kV switchgear.

The transformer(s) will be delivered and installed as the last item in the electrical package in Phase 2 (Part 2) after both buildings have been commissioned. Note, transformer delivery and installation are outside the remit of this CEMP and will be addressed in the electrical fit out, transformer installation and commissioning CEMP.

The Earthmoving Plan, associated with the movement of material onsite, contained in **Appendix 3 Earthmoving Plan** aligns with this sequence of construction activity in the development programme.

For clarity, terminology for Pre-commencement phase, construction phase and operational phase are

general terms used for implementing mitigation measures at each high level phase of a development. Pre-commencement means carrying out work activities before the main construction programme beings, as listed in paragraph 2 of **Section 2.4**. For example, **Table 11** in **Section 7** contains a table of all mitigation measures that will be complied with at pre-commencement phase and during the construction phase. Operational phase mitigation measures will be focused in Part 2 documentation outside of this CEMP.

3 HISTORIC & EXISTING BOREHOLE INFORMATION

3.1 Review of Historic Investigations

3.1.1 Introduction

IE Consulting were engaged by ESB Engineering and Major Projects (EMP), on behalf of ESB Networks to support a response to Laois County Council (Discharge of Planning Condition 11 for Laois Kilkenny Electricity Reinforcement Project – ABP Reg. Ref. VA0015 – Unit 1) in relation to hydrogeological information detailed in the Construction and Environmental Management Plan (CEMP), issued on 3rd Jul 2023. A copy of the standalone report, *Summary and Risk Impact Assessment of Historic Ground Investigations* is included in **Appendix 8 Summary and Risk Impact Assessment of Historic Ground Investigations.**

3.1.2 List of Relevant Documentation

Table 2 details the documentation associated with the historic site investigations completed at Coolnabacky. These will be referenced throughout this report. Site Investigation reports referenced in this section are contained in **Appendix 9 Site Investigation Reports.** Borehole Logs can be found in the individual site investigation reports in **Appendix 9**.

Table 2: Documentation associated with hydrogeological assessments and site investigations

	Document Name	Issued Date	Details
Y2012-12A	Factual Report on Ground Investigation (Laois – Kilkenny Reinforcement Project EIS, Appendix 9.1)	Jul 2012	Ground Investigation competed by Soil Mechanics as detailed in **Table 3.** Report available at EirGrid Project. Statutory Documents (**eirgridlaoiskilkenny.ie**)
DB/09/ 4848HR02	Site Investigation and Hydrogeological Assessment, Proposed Coolnabacky 400 / 100 kV GIS Substation, Co. Laois	Jul 2013	Appendix 10.1 to EIA for Laois County Council completed by AWN Consulting Ltd. Report available at EirGrid Project. Statutory Documents (**eirgridlaoiskilkenny.ie**)
10310-01	Report to assess the impact of the unauthorized development on the Aquifer at Coolnabacky Construction site	Sep 2017	Hydrological/Hydrogeological study completed by Tobin Consulting Engineers in response to Enforcement notice dated 31st July 2017. This Report is included in **Appendix 9A**
17-0439	Coolnabacky 400kV GIS Substation Ground Investigations	Jul 2018	Ground Investigation competed by Causeway Geotech as detailed in **Table 3** This Report is included in **Appendix 9B**.
IE2019-4840	Hydrogeological and Hydrological Review	Feb 2021	Assessment completed by IE Consulting This Report is included in **Appendix 9C**.
Addendum to IE2019-4840	Hydrogeological and Hydrological Review	26 Feb 2021	Letter issued to Seamus Boland (CEO, Irish Rural Link) for clarification of impact of proposed enabling works on recommendations of IE independent Hydrogeological and Hydrological review for proposed Coolnabacky

	Document Name	Issued Date	Details
			substation site This Letter is included in **Appendix 9D**.
ie2219-5242	Assessment of Tufa Springs	Mar 2022	Assessment of Tufa Springs adjacent to the proposed ESB substation including the details of boreholes installed by Priority Drilling in 2021 as detailed in **Table 3** This Report is included in **Appendix 9E.**
IE2219-5370	Proposed Water Monitoring Programme	Jun 2022	Context, locations, parameters measured in-situ, analysis, frequency and reporting of monitoring programme This Report is included in **Appendix 14.**
DE2188-RO1a	Petrifying Spring Survey and Assessment Coolnabacky, Co. Laois	Dec 2022	Report produced by Denyer Ecology to detailing mapped petrifying springs at Coolnabacky This Report is included in **Appendix 9F.**
ie2219-5766	Proposal to Decommission 2 No. Boreholes (BH04 & BH05) and installation of 1 No. replacement borehole (BH04b)	17 May 2023	Decommissioning/installation works and associated RAMs This Report is included in **Appendix 9G.**

3.1.3 List of Historic Investigations

A history of Borehole and Trial pits installed on the site are summarised in **Table 3.**

- There are currently 5 No. existing boreholes on the site referred to as; BH01, BH02, BH03, BH04 and BH05.
- Two boreholes currently labelled BH04 and BH05 are legacy boreholes installed during the 2018 works detailed in the Causeway Geotech Report (No.: 17-0439).
- BH01 to BH03 were installed in 2021 (installed by Priority Geotech in 2021, as documented in the IE Consulting in report *Assessment of Tufa Springs* – Report No.: ie2219-5242).
- **Table 3** provides a list of all the installed boreholes and trial pit investigations on the site to date with the aim of providing a chronological history of exploratory works at the site.

The following site investigations have taken place on site:

1. Soil Mechanics (2012) – 10 No. borehole and 15 No. trial pits were installed and decommissioned. These works are documented in Report No.: Y2012-12A; Factual Report on Ground Investigation.
2. AWN investigation (2013) – Hydrogeological Investigation and comprised 4 No. boreholes around the perimeter of the site.
3. Causeway Geotech (2018) – 9 No. boreholes and 16 No. trial pits were installed. 5 No. boreholes were decommissioned, and all 16 No. trials pits were reinstated. See **Section 3.1.3.1** for explanation of the remaining 4 No. boreholes (BH01, BH02, BH03 and BH04) for which a standpipe was installed. Existing boreholes BH04 and BH05 utilised in the quarterly monitoring programme

were adopted as legacy boreholes from these works.

4. Priority Geotech (2021) – 3 No. boreholes were installed which are currently utilised for the quarterly monitoring program; BH01 to BH03. See **Section 3.1.3.2** for further information.

A plan view of the locations is provided in **Figure 3.**

Table 3: History of Boreholes and Trial Pits

Priority, 2021 - Active borehole monitoring wells	Causeway Geotech, 2018 – decommissioned	Causeway Geotech, 2018 – adopted into quarterly monitoring programme	Causeway Geotech, 2018 – decommissioning unknown	AWN Consulting, 2013 - decommissioned	Soil Mechanics, 2012– decommissioned

Name	Coordinates (I.T.M.)		Level (mOD)	Category (BH / TP)	Installation Date	Depth of Exploration Hole (m)	Bedrock Encountered (Yes / No)	Borehole	Trial Pit	Current Status	Reference Report/(s)
	Easting (m)	Northing (m)						Groundwater Strikes (m) / Depth sealed (m)	Groundwater Strikes (m) / Post strike behaviour		
BH-01	653730.67	692898.79	+99.66	BH	14/03/2012	6.50	No	Dry	-	Decommissioned on 14/03/2012	**Y2012-12A** - Factual Report on Ground Investigations by Soil Mechanics (July 2012)
BH-02	653754.75	692921.31	+98.45	BH	15/03/2012	8.50	No	1.20 m / 4.00 m	-	Decommissioned on 15/03/2012	
BH-03	653774.70	692922.08	+98.27	BH	15/03/2012	5.80	No	0.80m / 3.00m	-	Decommissioned on 20/03/2012	
BH-04	653789.81	692940.62	+98.17	BH	13/03/2012	6.44	No	1.10m / 1.20m	-	Decommissioned per Borehole Log, date not specified	
BH-05	653712.52	692938.97	+98.90	BH	21/03/2012	7.40	No	1.20m / 2.00m	-	Decommissioned on 21/03/2012	
BH-06	653734.32	692954.80	+98.58	BH	20/03/2012	5.90	No	1.10m / 1.50m	-	Decommissioned on 20/03/2012	
BH-07	653759.87	692970.81	+98.39	BH	20/03/2012	5.80	No	5.20m / 5.50m	-	Decommissioned on 20/03/2012	
BH-08	653694.68	692966.94	+98.92	BH	12/03/2012	5.47	No	1.50m / N/A	-	No backfill noted on log, end date 12/03/2012	
BH-09	653718.84	692981.19	+98.75	BH	21/03/2012	7.60	No	1.20m /	-	Decommissioned	

Table 3: History of Boreholes and Trial Pits

Priority, 2021 - Active borehole monitoring wells	Causeway Geotech, 2018 – decommissioned	Causeway Geotech, 2018 – adopted into quarterly monitoring programme	Causeway Geotech, 2018 – decommissioning unknown	AWN Consulting, 2013 - decommissioned	Soil Mechanics, 2012– decommissioned

Name	Coordinates (I.T.M.)		Level (mOD)	Category (BH / TP)	Installation Date	Depth of Exploration Hole (m)	Bedrock Encountered (Yes / No)	Borehole	Trial Pit	Current Status	Reference Report/(s)
	Easting (m)	Northing (m)						Groundwater Strikes (m) / Depth sealed (m)	Groundwater Strikes (m) / Post strike behaviour		
								2.00m		on 22/03/2012	
BH-10	653737.73	692998.07	+98.55	BH	12/03/2012	5.50	No	None observed	-	Decommissioned on 12/03/2012	
TP-S1	653735.74	692861.89	+98.85	TP	08/03/2012	1.60	No	-	1.50m / rose 10 1.20m after 20 minutes	Decommissioned on 08/03/2012	
TP-S2	653853.95	692943.02	+97.52	TP	08/03/2012	1.70	No	-	None observed	Decommissioned on 08/03/2012	
TP-S3	653831.91	692775.11	+97.90	TP	08/03/2012	1.60	No	-	1.30m / steady inflow	Decommissioned on 08/03/2012	
TP-01	653664.19	692955.15	+98.13	TP	08/03/2012	3.00	No	-	1.00m / slight seepage	Decommissioned on 08/03/2012	
TP-02	653745.33	693013.31	+98.37	TP	08/03/2012	3.00	No	-	1.00m / steady inflow	Decommissioned on 08/03/2012	
TP-03	653782.00	692963.62	+98.31	TP	08/03/2012	3.00	No	-	None observed	Decommissioned on 08/03/2012	
TP-04	653700.19	692907.17	+99.46	TP	08/03/2012	3.00	No	-	None observed	Decommissioned on 08/03/2012	
TP-05	653736.53	692945.56	+98.53	TP	08/03/2012	3.00	No	-	1.60m / steady inflow	Decommissioned on 08/03/2012	
TP-06	653658.96	692878.73	+99.25	TP	07/03/2012	3.00	No	-	None	Decommissioned	

Table 3: History of Boreholes and Trial Pits

Priority, 2021 - Active borehole monitoring wells	Causeway Geotech, 2018 – decommissioned	Causeway Geotech, 2018 – adopted into quarterly monitoring programme	Causeway Geotech, 2018 – decommissioning unknown	AWN Consulting, 2013 - decommissioned	Soil Mechanics, 2012– decommissioned

Name	Coordinates (I.T.M.)		Level (mOD)	Category (BH / TP)	Installation Date	Depth of Exploration Hole (m)	Bedrock Encountered (Yes / No)	Borehole	Trial Pit	Current Status	Reference Report/(s)
	Easting (m)	Northing (m)						Groundwater Strikes (m) / Depth sealed (m)	Groundwater Strikes (m) / Post strike behaviour		
									observed	on 07/03/2012	
TP-07	653622.65	692851.93	+99.63	TP	07/03/2012	3.00	No	-	2.30m	Decommissioned on 07/03/2012	
TP-08	653591.84	692829.08	+99.74	TP	07/03/2012	3.00	No	-	1.70m	Decommissioned on 07/03/2012	
TP-09	653532.01	692795.09	+100.80	TP	07/03/2012	3.00	No	-	1.80m / slow trickle	Decommissioned on 07/03/2012	
TP-10	653482.02	692759.57	+102.21	TP	07/03/2012	2.80	No	-	2.00m / quick inflow	Decommissioned on 07/03/2012	
TP-11	653444.60	692722.42	+104.21	TP	07/03/2012	3.00	No	-	3.00m / base of pit filled	Decommissioned on 07/03/2012	
TP-12	653171.09	692421.67	+113.44	TP	07/03/2012	3.00	No	-	None observed	Decommissioned on 07/03/2012	
BH-01	653641.4	692866.5	-	BH	29/05/2013	4.00	No	None observed	-	Standpipe installed	DB/09/4848HR02 – AWN Site Investigation Report, 2013
BH-02	653684.5	692989.5	-	BH	30/05/2013	5.00	No	None observed	-	Standpipe installed	
BH-03	653786.6	693050.0	-	BH	30/05/2013	4.00	No	None observed	-	Standpipe installed	
BH-04	653894.8	692974.7	-	BH	28/05/2013 to 29/05/2013	9.00	Driller described "possible	None observed	-	Standpipe installed	

Table 3: History of Boreholes and Trial Pits

Priority, 2021 - Active borehole monitoring wells	Causeway Geotech, 2018 – decommissioned	Causeway Geotech, 2018 – adopted into quarterly monitoring programme	Causeway Geotech, 2018 – decommissioning unknown	AWN Consulting, 2013 - decommissioned	Soil Mechanics, 2012– decommissioned

Name	Coordinates (I.T.M.)		Level (mOD)	Category (BH / TP)	Installation Date	Depth of Exploration Hole (m)	Bedrock Encountered (Yes / No)	Borehole	Trial Pit	Current Status	Reference Report/(s)
	Easting (m)	Northing (m)						Groundwater Strikes (m) / Depth sealed (m)	Groundwater Strikes (m) / Post strike behaviour		
							rock"				
BH-01	653744.29	692847.44	+101.53	BH	22/06/2018	6.50	No	1.30m / N/A	-	Standpipe installed – adopted as BH5 in quarterly monitoring programme	**17-0439** - Coolnabacky - 400kV GIS Substation Ground Investigation by Causeway Geotech (July 2018)
BH-02	653763.55	692855.61	+101.02	BH	21/06/2018	6.50	No	1.60m / N/A	-	Standpipe installed – decommissioning information unknown	
BH-03	653793.75	692877.00	+100.92	BH	20/06/2018	8.50	No	5.70m / N/A	-	Standpipe installed - decommissioning information unknown	
BH-04	653775.62	692876.75	+100.93	BH	22/06/2018	9.50	No	1.80m / N/A	-	Standpipe installed – adopted as BH04 in quarterly monitoring programme	
BH-06	653761.06	692899.36	+101.02	BH	19/06/2018	9.00	No	None observed	-	Decommissioned on 19/03/2012	
BH-07	653739.97	692885.11	+101.70	BH	18/06/2018	6.00	No	None observed	-	Decommissioned on 18/03/2012	
BH-08	653723.11	692880.20	+101.8	BH	15/06/2018	9.00	No	None	-	Decommissioned	

Table 3: History of Boreholes and Trial Pits

Priority, 2021 - Active borehole monitoring wells	Causeway Geotech, 2018 – decommissioned	Causeway Geotech, 2018 – adopted into quarterly monitoring programme	Causeway Geotech, 2018 – decommissioning unknown	AWN Consulting, 2013 - decommissioned	Soil Mechanics, 2012– decommissioned

Name	Coordinates (I.T.M.)		Level (mOD)	Category (BH / TP)	Installation Date	Depth of Exploration Hole (m)	Bedrock Encountered (Yes / No)	Borehole	Trial Pit	Current Status	Reference Report/(s)
	Easting (m)	Northing (m)						Groundwater Strikes (m) / Depth sealed (m)	Groundwater Strikes (m) / Post strike behaviour		
			1					observed		on 15/03/2012	
BH-09	653714.90	692899.34	+102.48	BH	13/06/2018	10.70	No	None observed	-	Decommissioned on 14/06/2018	
BH-10	653768.14	692928.33	+100.77	BH	12/06/2018	9.30	No	None observed	-	Decommissioned on 13/06/2018	
TP-01	652762.54	692473.30	+120.31	TP	13/06/2018	2.10	No	-	None observed	Decommissioned on 13/06/2018	
TP-02	652858.96	692449.29	+119.87	TP	13/06/2018	1.50	No	-	None observed	Decommissioned on 13/06/2018	
TP-03	652957.52	692451.18	+117.37	TP	13/06/2018	2.30	No	-	None observed	Decommissioned on 13/06/2018	
TP-04	653059.67	692459.07	+117.08	TP	13/06/2018	1.50	No	-	None observed	Decommissioned on 13/06/2018	
TP-05	653151.86	692414.82	+116.08	TP	13/06/2018	2.50	No	-	None observed	Decommissioned on 13/06/2018	
TP-06	653233.63	692471.63	+111.55	TP	13/06/2018	2.50	No	-	None observed	Decommissioned on 13/06/2018	
TP-07	653297.01	692547.95	+110.02	TP	12/06/2018	2.50	No	-	None observed	Decommissioned on 12/06/2018	
TP-09	653427.96	692700.83	+106.81	TP	12/06/2018	2.50	No	-	None observed	Decommissioned on 12/06/2018	
TP-10	653504.09	692762.58	+102.6	TP	12/06/2018	2.00	No	-	1.80m /	Decommissioned	

Table 3: History of Boreholes and Trial Pits

Priority, 2021 - Active borehole monitoring wells	Causeway Geotech, 2018 – decommissioned	Causeway Geotech, 2018 – adopted into quarterly monitoring programme	Causeway Geotech, 2018 – decommissioning unknown	AWN Consulting, 2013 - decommissioned	Soil Mechanics, 2012– decommissioned

Name	Coordinates (I.T.M.)		Level (mOD)	Category (BH / TP)	Installation Date	Depth of Exploration Hole (m)	Bedrock Encountered (Yes / No)	Borehole	Trial Pit	Current Status	Reference Report/(s)
	Easting (m)	Northing (m)						Groundwater Strikes (m) / Depth sealed (m)	Groundwater Strikes (m) / Post strike behaviour		
			5						seepage at 1.80m	on 12/06/2018	
TP-11	653587.91	692815.56	+100.21	TP	12/06/2018	1.50	No	-	1.50m / seepage at 1.50m	Decommissioned on 12/06/2018	
TP-12	653685.71	692843.84	+100.91	TP	12/06/2018	2.50	No	-	1.30m / seepage at 1.30m	Decommissioned on 12/06/2018	
TP-13	653844.10	692856.30	+100.63	TP	11/06/2018	2.60	No	-	None observed	Decommissioned on 11/06/2018	
TP-14	653727.14	692828.78	+101.57	TP	12/06/2018	2.50	No	-	2.30m / seepage at 2.30m	Decommissioned on 12/06/2018	
TP-15	653811.99	692890.35	+100.21	TP	11/06/2018	2.00	No	-	None observed	Decommissioned on 11/06/2018	
TP-16	653757.40	693080.19	+98.48	TP	11/06/2018	2.30	No	-	1.00m / rapid inflow at 1.00m	Decommissioned on 11/06/2018	
TP-28	653757.40	693080.19	+98.48	TP	12/06/2018	0.70	No	-	None observed	Decommissioned on 12/06/2018	
BH-01	653762.00	692995.00	+98.905	BH	26/05/2021	3.00	No	None observed	-	Active - quarterly monitoring point	**IE2219-5242** - Appendix C for Borehole Logs from PGI (May
BH-02	653750.00	693080.00	+98.89	BH	26/05/2021	3.00	No	None	-	Active - quarterly	

Table 3: History of Boreholes and Trial Pits

Priority, 2021 - Active borehole monitoring wells	Causeway Geotech, 2018 – decommissioned	Causeway Geotech, 2018 – adopted into quarterly monitoring programme	Causeway Geotech, 2018 – decommissioning unknown	AWN Consulting, 2013 - decommissioned	Soil Mechanics, 2012– decommissioned

Name	Coordinates (I.T.M.)		Level (mOD)	Category (BH / TP)	Installation Date	Depth of Exploration Hole (m)	Bedrock Encountered (Yes / No)	Borehole	Trial Pit	Current Status	Reference Report/(s)
	Easting (m)	Northing (m)						Groundwater Strikes (m) / Depth sealed (m)	Groundwater Strikes (m) / Post strike behaviour		
			9					observed		monitoring point	2021)
BH-03	653833.00	693031.00	+98.484	BH	26/05/2021	3.00	No	None observed	-	Active - quarterly monitoring point	

Note: BH = Borehole TP = Trial Pit

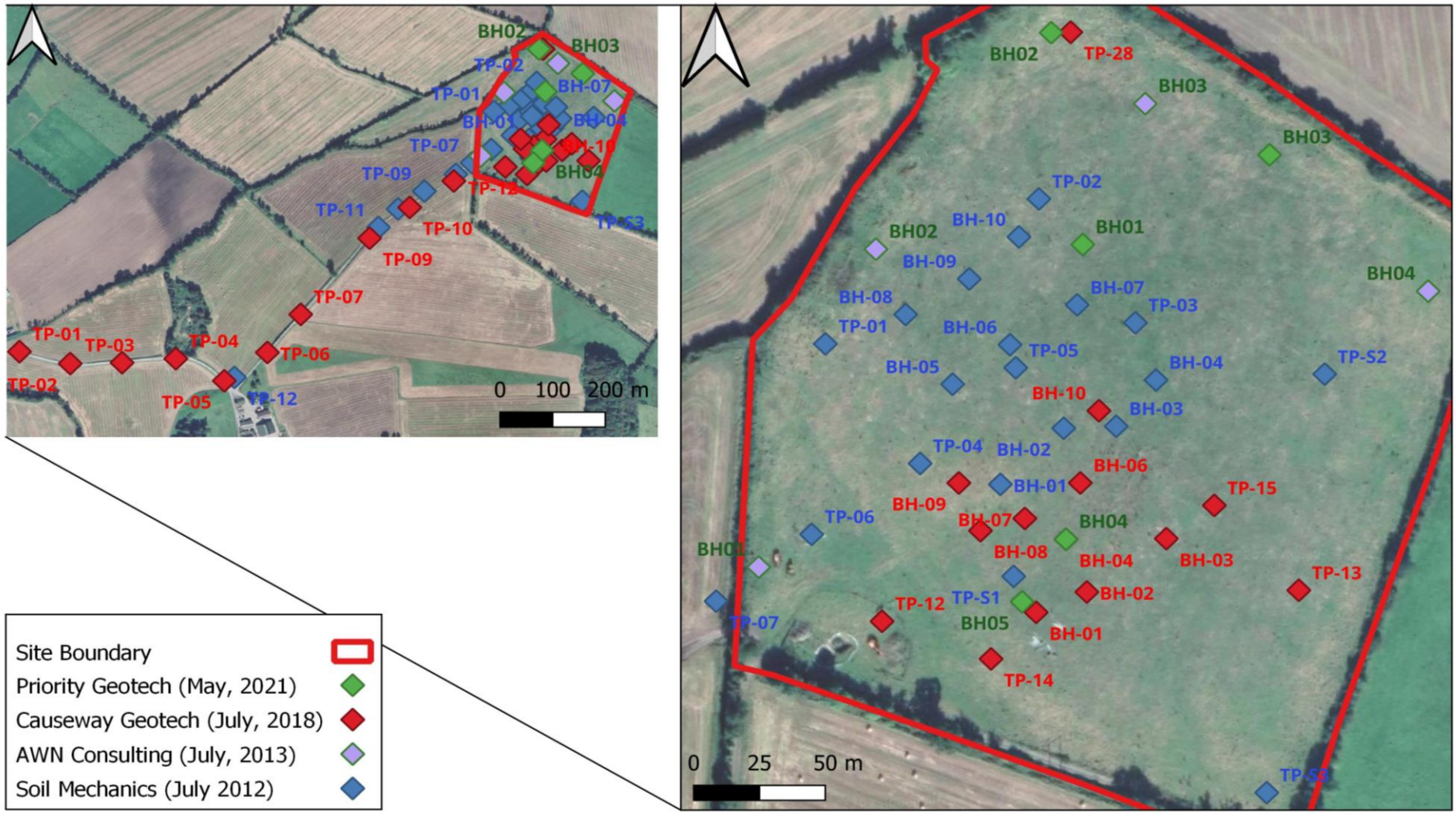


Figure 3: Locations of Historic Investigation Boreholes and Trial Pits across the Site

3.1.3.1 Soil Mechanics Site Investigations, 2012

As detailed in Table 3 all borehole and trial pits were decommissioned post data collection. Standard industry practice following a site investigation is to decommission trial pits and boreholes by backfilling of the excavated material, with the originally extracted soil from that location. This provides a low impact method as the backfilled material is of the same composition and identical to the existing stratigraphic material. There is therefore minimal impact.

The only residual impact is there might be a slight area of weakness as the backfilled material will not be as compacted as the surrounding subsoil. However, this is not an issue in terms of impact to the bedrock aquifer as none of the boreholes in this site investigation or subsequent investigations penetrated the groundwater aquifer, instead they reached the shallow water gravel aquifer (BH02 being the deepest borehole at 8.5 m depth).

The Clay encountered during the site investigations is described as grey stiff to very stiff at depth. The grey colour is significant in that it indicates lack of oxygen, which would normally be introduced by vertical percolation of oxygenated rainwater. This, associated with a typical large fines (Silt and Clay) value of 30% to 50% from PSD analysis confirms the low permeability of the clay. The 2012 Ground Investigation report found clay deposits at all locations and did not indicate the possible presence of bedrock. Laboratory tests were undertaken on samples recovered from boreholes and trial pits

3.1.3.2 AWN supplementary Investigation 2013

This involved the construction of 4 No. boreholes around the perimeter of the site. One borehole was taken to 8.6 m and encountered angular rock fragments, but was not confirmed as rock. All of these boreholes were fitted with standpipes, but it appears that they were decommissioned following the conclusion of the planning phase.

3.1.3.3 Causeway Geotech Site Investigations, 2018

In order to optimise the geotechnical design of the structures and access roads Causeway Geotech were engaged by Killeen Civil Engineering acting on behalf of ESB Networks to undertake a supplementary ground investigation. The boreholes were mainly concentrated within the proposed building footprint to provide location specific ground property values. The deepest borehole drilled during the Causeway Geotech site investigations was BH09, drilled to 10.70 m and did not encounter bedrock. However groundwater strikes ranging from 0.80 m (BH03) to 5.2 m (BH07) were encountered in many of the boreholes indicating that there was a shallow localised perched water table underlying the site. This information forms the basis that the bedrock aquifer is > 10 m depth below the site and that there is the presence of a local perched water table at shallow depths below the site, perched on a low permeability clay layer that is typically 6-7m thick.

From the Causeway Geotech 2018 Report (No.: 17-0439), standpipes were installed for 4 No. boreholes only; BH01, BH02, BH03 and BH04. All other boreholes and trial pits were decommissioned at the time of the works.

The coordinates for BH01 which was installed by Causeway Geotech as per the Borehole Log are 653744.29 E, 692847.44 N. It was noted that when this borehole location, was plotted in plan view as per **Figure 3,** lies 7 m south-east of the existing borehole demarked as “BH05” on site. The coordinates of BH05 (653738.95 E, 692851.67 N) were verified by an IE Consulting geologist on the 9th May 2023 (see Report IE2219-5866). This was the only observed borehole in the immediate area. It is therefore surmised that BH01 of the Causeway Geotech study was adopted as “BH05” in the quarterly monitoring programme. It is thought that there may have been an error transcribing the GPS coordinates recorded in the Causeway Geotech 2018 Report (No.: 17-0439), as this is the only explanation to derive the existence of BH05. BH05 has since collapsed so will be decommissioned

and described in further detail in the subsequent sections.

BH02 and BH03 were drilled to depths of 6.5 m and 8.5 m respectively, with standpipes installed , but subsequent decommissioning was not documented in the borehole logs of the report. During the site visit by the IE Consulting geologist on the 9th May 2023 the standpipes associated with these boreholes were not observed. It is likely these were covered over during subsequent activities or that the standpipes were removed at a later date and the boreholes have since collapsed in on themselves. None of these boreholes penetrated the groundwater aquifer, so there is no potential pollution pathway to the bedrock aquifer.

BH04 from the Causeway 2018 investigation was documented at coordinates 653775.62 E, 692876.75 N. However an IE Consulting site visit on the 9th of May 2023 (see Report IE2219-5866) confirmed the monitoring location of BH04 to be 653755.62 E, 692876.75 N. Therefore it was confirmed that BH04 was the borehole adopted from the Causeway 2018 investigation into the quarterly monitoring data as an additional data point. However because it was not originally located as a construction monitoring borehole, it will need to be re-located outside of the footprint area.

Similar to the 2012 investigation, infiltration tests were undertaken to establish percolation rates through the grey CLAY layer. All tests confirmed low infiltration permeability, but an actual value could not be determined, because the percolation rate was too slow. Similarly laboratory tests comprising PSD analysis indicated fines percentages of 30% to 50%, which would be consistent with a low permeability value.

3.1.3.4 BH01 to BH03, (Priority, 2021)

3 No. Boreholes were installed in 2021 by Priority Drilling and documented in Tufa Spring Assessment Report ie2219-5242. These boreholes are referred to BH01, BH02 and BH03 in the Borehole Monitoring Programme. These boreholes were installed to a shallow depths of 3m.

3.1.4 Conclusions

Bedrock was not encountered or confirmed in any of the site investigation locations. The deepest borehole drilled was BH09 of the Causeway Geotech site investigation, drilled to 10.70 m. It can therefore be extrapolated that the bedrock aquifer is considered as typically > 10 m below the site. Consequently, the bedrock aquifer mapped as Rkd (Regionally Important Aquifer – Karstified diffuse) was not compromised by any of the ground investigations. See cross-sections for reference in **Section 3.3.**

The bedrock is overlain by a consistent layer of 6-7m of low permeability Clay.

The low permeability nature of the clay layer was confirmed by the inability to determine an infiltration rate, the grey colour of the clay and the high percentage of fines in samples of the clay tested by PSD analysis

The perched water table can be intercepted at depths of typically 0.80 m but this varies greatly across the site. All existing boreholes are installed within the shallow water aquifer as an effort to understand as a baseline how groundwater hydraulics of the shallow deposits on the site inform the further assessment of the tufa springs.

For boreholes BH02 and BH03 of the Causeway Geotech site investigations where the standpipe was not removed and the decommissioning details are unknown, there is no impact to the bedrock aquifer as these boreholes did not encounter bedrock at depths of 6.5 m and 8.5 m respectively.

3.2 Existing Boreholes onsite and Monitoring Programme Data

3.2.1 Borehole locations and Rationale

Table 4 provides a tabulated summary of the existing boreholes onsite and their associated attributes.

Table 4: Existing Boreholes

Borehole Name	Depth (m)	Installation	Rationale
BH01	3.00	Priority drilling, 2021	Per IE2219-5242; the 3 No. boreholes were selected based on a geophysical survey showing these as locations of higher permeability, having sand and gravel rich lenses. They were installed to understand how the hydraulics of the site interact with the tufa deposits on the stream base in the northern perimeter of the site.
BH02	3.00	Priority drilling, 2021	
BH03	3.00	Priority drilling, 2021	
BH04	9.50	Legacy from Causeway Geotech site investigations in 2018	To collect baseline groundwater level data in the immediate vicinity of the substation building.
BH05	6.50	Legacy from Causeway Geotech site investigations in 2018; referred to as BH01 in Causeway Geotech report; renamed BH05 in the Monitoring Programme	To collect baseline groundwater level data in the immediate vicinity of the substation – note prior to initiation of the monitoring program it was observed that this borehole had collapsed to 2.5m depth and was not a viable monitoring point. It was therefore decided to eliminate this point and utilise the four above listed locations instead.

3.2.1.1 BH01 to BH03

A Hydrogeological and Hydrological Review was performed by IE Consulting documented per IE2219-4840, issued 16th February 2021. Recommendation number two (2) from the report included the following:

"I would recommend that 5 No. shallow groundwater monitoring points are installed around the site at locations away from the proposed footprint"

The purpose of these monitoring boreholes was to help better understand the groundwater hydraulics of the shallow deposits on the site to inform the further assessment of the tufa.

Subsequent to this in April 2021 Minerex performed a geophysical survey producing EM31 Ground Conductivity Contour Maps which were utilised to select borehole monitoring points. Refer to **Appendix 9C** (*Appendix B Geophysical Survey* for the Minerex Report). Subsequently the three

boreholes BH01, BH02 and BH03 were installed in May 2021. On the 24 June 2021 Denyer Ecology undertook a survey of the petrifying springs with tufa formations (**Appendix 9C** (*Appendix E Ecological Assessment of Tufa Spring*)). It was established that the streams surrounding the site were groundwater fed. All these activities are detailed in report IE2219-5242 *Assessment of Tufa Springs*.

Based on the report IE2219-5242 it was established through the geophysical survey that the ground underlying the proposed substation site was relatively homogeneous, mostly underlain by sandy and gravelly clay and silt with slightly gravelly clay, confirming that bedrock was > 6 m depth (the maximum depth of penetration of the geophysical method). This is consistent with borehole depth data.

The three boreholes BH01, BH02 and BH03 which were drilled in sand and gravel rich lenses, encountered stiff boulder clay at 3 m depth Borehole Logs for BH01, BH02 and BH03 are included in **Appendix 9C** (*Appendix C Borehole Logs*). Historic borehole logs can be found in the site investigation reports in **Appendix 9**. Water level monitoring of these boreholes over a six month period showed a fluctuating water table, in response to incident rainfall and a groundwater gradient from southwest to northeast. It was concluded that streams along the northern perimeter of the site were partly fed by groundwater seepage from the site and via a nearby spring as well as from ground to the west of the site.

The tufa streams did not qualify as a clear example of Annex I priority petrifying spring, because of the poor baseline flora population, but have nonetheless been afforded a high level of protection as part of the proposed works, and are annually monitored to ensure that there is no deterioration in their status.

The recommendations from IE2219-5242 included continued groundwater monitoring to ensure no excessive nutrient loading and continued groundwater and surface water monitoring as a strategy to ensure continued protection of the tufa.

3.2.1.2 Decommissioning of BH04 and BH05

BH4 and BH5 were both installed in an area where excavations and concrete pouring will be required. They were both initially located to provide specific geotechnical design data in the immediate footprint of the substation. These boreholes were subsequently incorporated into the baseline monitoring program as legacy data points and to provide baseline groundwater level and quality data in advance of construction.

However because borehole BH04 sits on the footprint of a proposed building it will be required to be decommissioned and a new borehole BH04b (replacement monitoring well) is proposed to be installed further south of the existing monitoring well. BH05 is also in construction footprint of the substation 110kV building so will therefore also need to be decommissioned. As noted in **Table 4** above, this borehole has collapsed at depth, and is no longer viable as a monitoring point.

A method statement Report IE2219-5766 was generated to provide a specification for the decommissioning of 2 No. Boreholes (BH04 & BH05) and the installation of 1 No. replacement borehole (BH04b), together with a site specific environmental and health and safety risk assessment RAMs.

Protection measures will be put in place prior to the main construction works which shall include installation of timber fencing around newly constructed boreholes as well as existing boreholes, plus a silt mesh around the base of the fence to secure well head protection.

BH04b is proposed to be installed as per available guidelines such as Environment Agency, Institute of Geologists of Ireland (IGI) and EPA. BH04b will be drilled to an approximate depth of 6 m. The location is not adjacent to the tufa springs (located to the north of the site), or feeder streams and the target depth is well above the depth of expected bedrock. It will have no connectivity with the

bedrock aquifer and will therefore have no impact on the bedrock groundwater aquifer.

Should any unaccounted boreholes be uncovered during the site development works, ESB will notify the Planning Authority and will also decommission boreholes in accordance with the SEPA document 'Good Practice for Decommissioning Redundant Boreholes and Wells' and in consultation with the Planning Authority.

3.2.2 Monitoring Programme

The monitoring program comprises both groundwater and surface water monitoring. This requirement originated from the EIS Mitigation measures (*Sections 12*) and Schedule of Commitments (*Sections 14*). The proposed sample plan and schedule was submitted to Laois County Council and subsequently approved by Laois County Council (LCC) in June 2022.

Document IE2219-5370 set out the monitoring programme, based on collecting samples from the four (4 No) existing monitoring wells (BH1, BH2, BH3 and BH4). During a quarterly monitoring event, visual inspection of the borehole protection will be performed. Any issues with the borehole protection will be reported and documented in the applicable report.

See **Table 5** for list of monitoring completed to date on the site. All reports and monitoring completed to date comprises part of the baseline study.

None of the baseline data collected per the listed studies indicate that the existing boreholes or decommissioned boreholes serve as a potential pathway receptors to the bedrock aquifer, this is because of their shallow depths and the low permeability of the clay subsoil.

Table 5: Monitoring Programme Documentation to date

Monitoring Period	Issued Report Reference	Monitoring Type	Results
2022 Q1	Baseline Surface Water Sampling 30th Mar 2022	Routine	Refer to **Appendix 10 Groundwater & Surface Water Monitoring Data**
2022 Q2	Surface Water Sampling 18th May 2022	Routine	
2022 Q2	Surface Water Sampling 20th Jun 2022	Routine	
2022 Q3	Surface Water Sampling 6th Sep 2022	Routine	
2022 Q4	IE2219-5555	Routine	
2023 Q1	IE2219-5752	Routine	
2023 Q1	Baseline Groundwater and Surface Water Report for Kilwex Ltd. By Coyle Environmental	Coyle Environmental Ltd. were commissioned by Kilwex Ltd. to undertake Baseline compliance monitoring per Planning Permission	

Monitoring Period	Issued Report Reference	Monitoring Type	Results
		reference VA0015.	
2023 Q2	IE2219-5796	Routine	
2023 Q2	IE2219-5833	Integration and Assessment of Kilwex Baseline Groundwater and Surface water Report with IE Consulting Quarterly Monitoring Data	

3.3 Conceptual Model Review

3.3.1 Evolution of the Conceptual Model

3.3.1.1 AWN Report (Section 10.1)

AWN prepared a conceptual model labelled **Figure 4** for the site. This cross section was produced based on the Soil Mechanics site investigation in 2012. The following points are notable in relation to this schematic:

- BH02 was the deepest borehole drilled during the 2012 site investigations at 8.50 m depth and did not encounter bedrock. BH04 is depicted as being the deepest borehole; however the log shows that BH04 was only drilled to 6.44 m.
- The Clay encountered during the site investigations is described as stiff to very stiff at depth. The 2012 Ground Investigation report found clay deposits at all locations and did not indicate the possible presence of bedrock.
- The shallow water aquifer or perched water in the clayey sand and sandy clay is not depicted even though groundwater strikes were recorded as shallow as depths of 0.80m in BH03.

3.3.1.2 Tobin Report, Sep 2017

The conceptual model presented in the AWN consulting report was utilised and modified in the Tobin Report to include the following:

- Depth to bedrock was presented as 8.5 m below ground level i.e. 2.5 m foundation depth below ground level plus subsoil of >6 m of subsoil underlying this. **See Figure 5.**

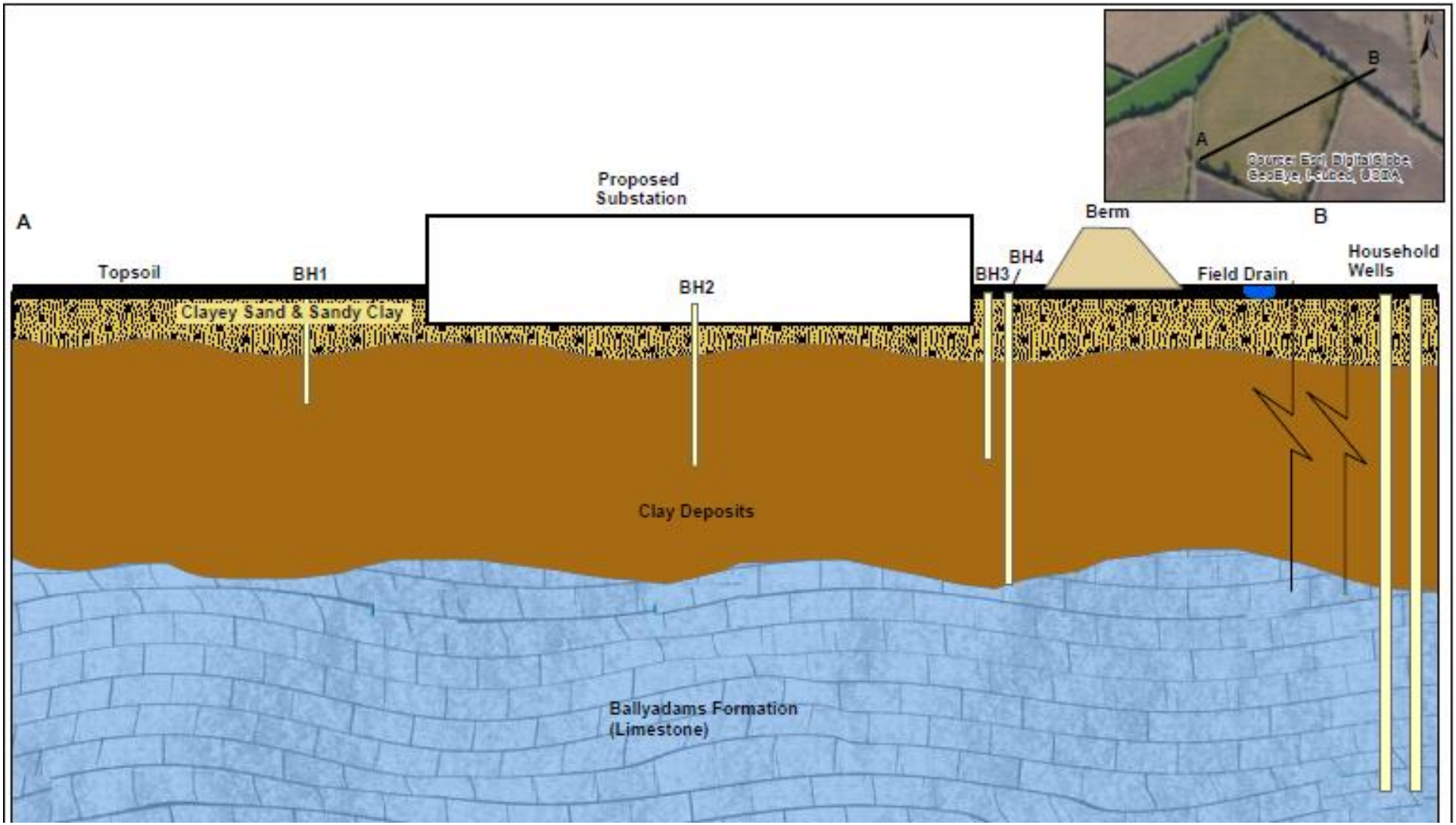


Figure 4: Conceptual Model Presented in AWN Consulting Ltd. Report (DB/09/4848HR02)

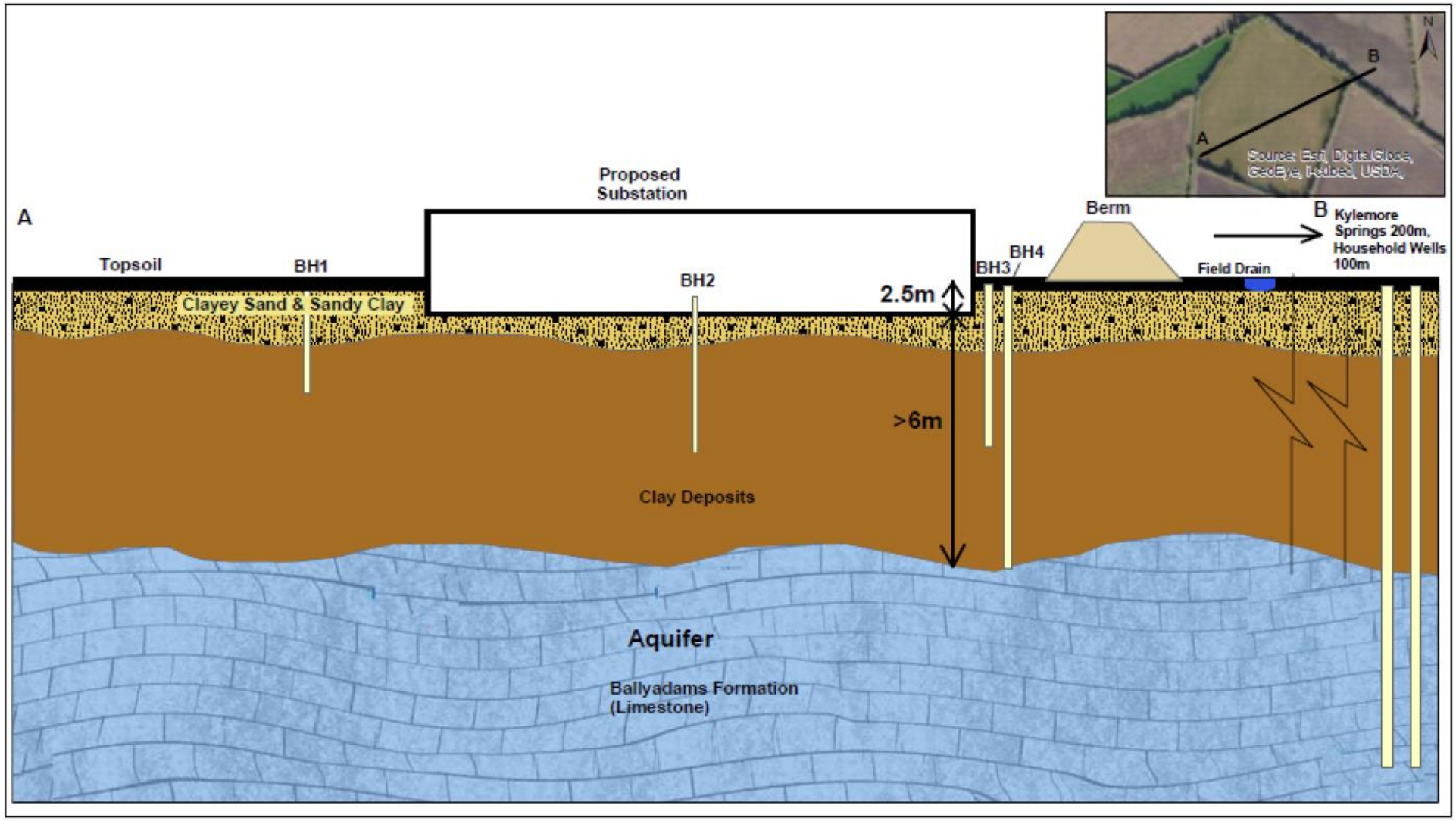


Figure 5: Conceptual Model Presented in Tobin Report (Sep 2017)

3.3.2 Current Conceptual Model refinement

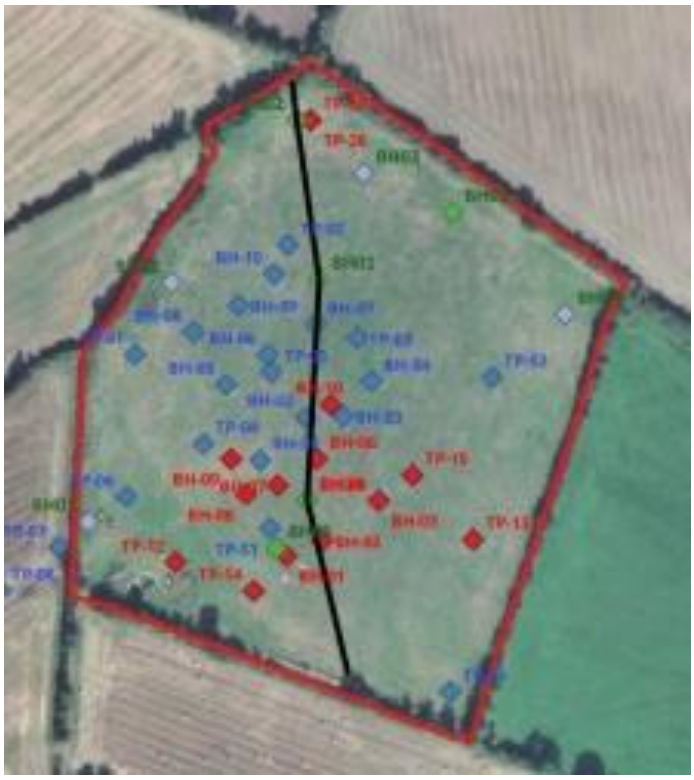
Figures 6, 7 and 8 show the cross sections illustrating the latest understanding of potential interaction between infrastructure units and the shallow aquifer.

The shallow water aquifer is interpreted based on the highest water level recorded during the quarterly monitoring baseline programme at the applicable monitoring borehole point. This is represented by the upper blue dashed line. The lower line is water levels recorded during the Q2 2023 monitoring on the 24/05/2023.

Please note in relation to the labelling of the boreholes:

- P, 2021 = Priority Geotech, boreholes used for quarterly monitoring programme (see Section 1.3.4)
- C, 2018 = Causeway Geotech exploratory boreholes or trial pits (see status in Table 3 and Section 1.3.3 for installation details)
- S, 2012 = Soil Mechanics exploratory borehole or trial pit (see status in Table 3 and Section 1.3.1)

  Note: none of the AWN Consulting boreholes were intersected by the cross section



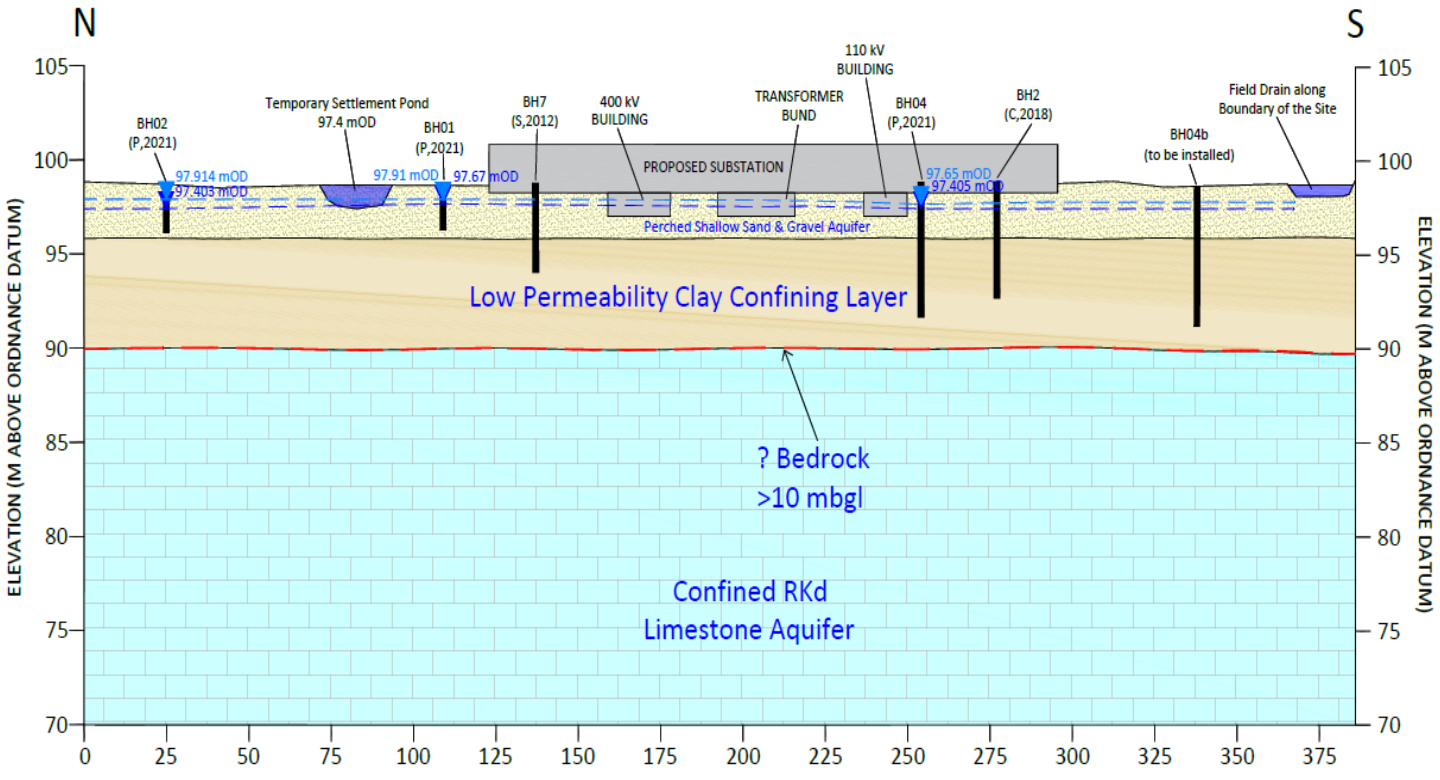
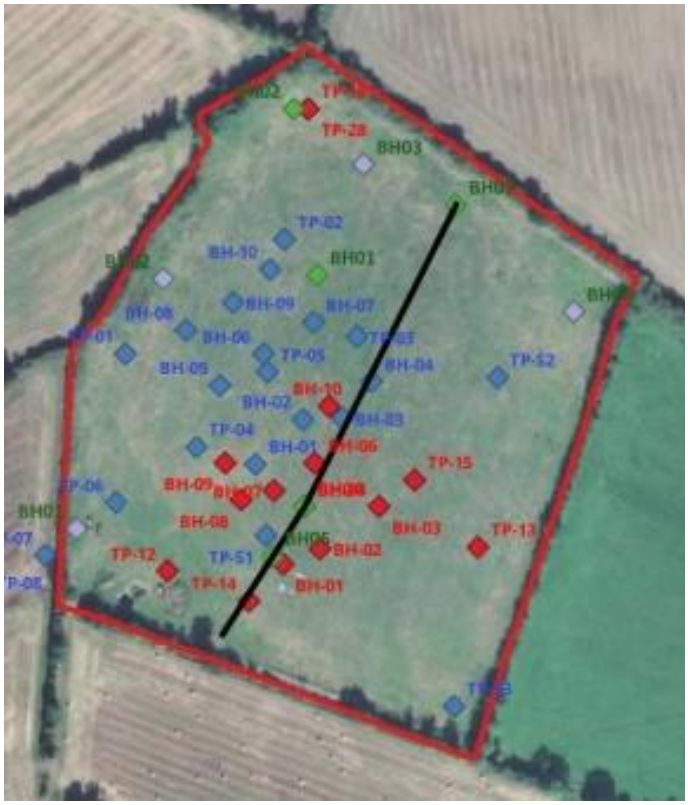


Figure 6: North-South Cross Section



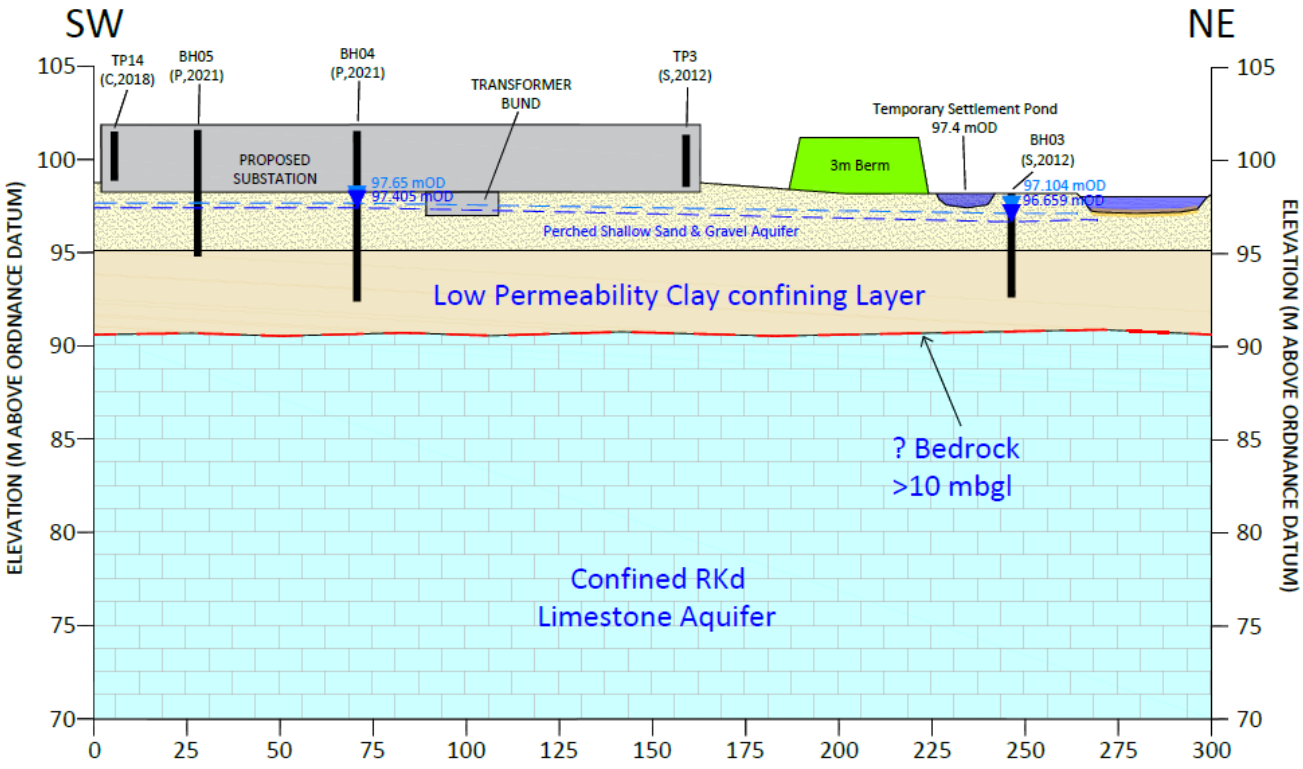


Figure 7: Southwest-Northeast Cross Section

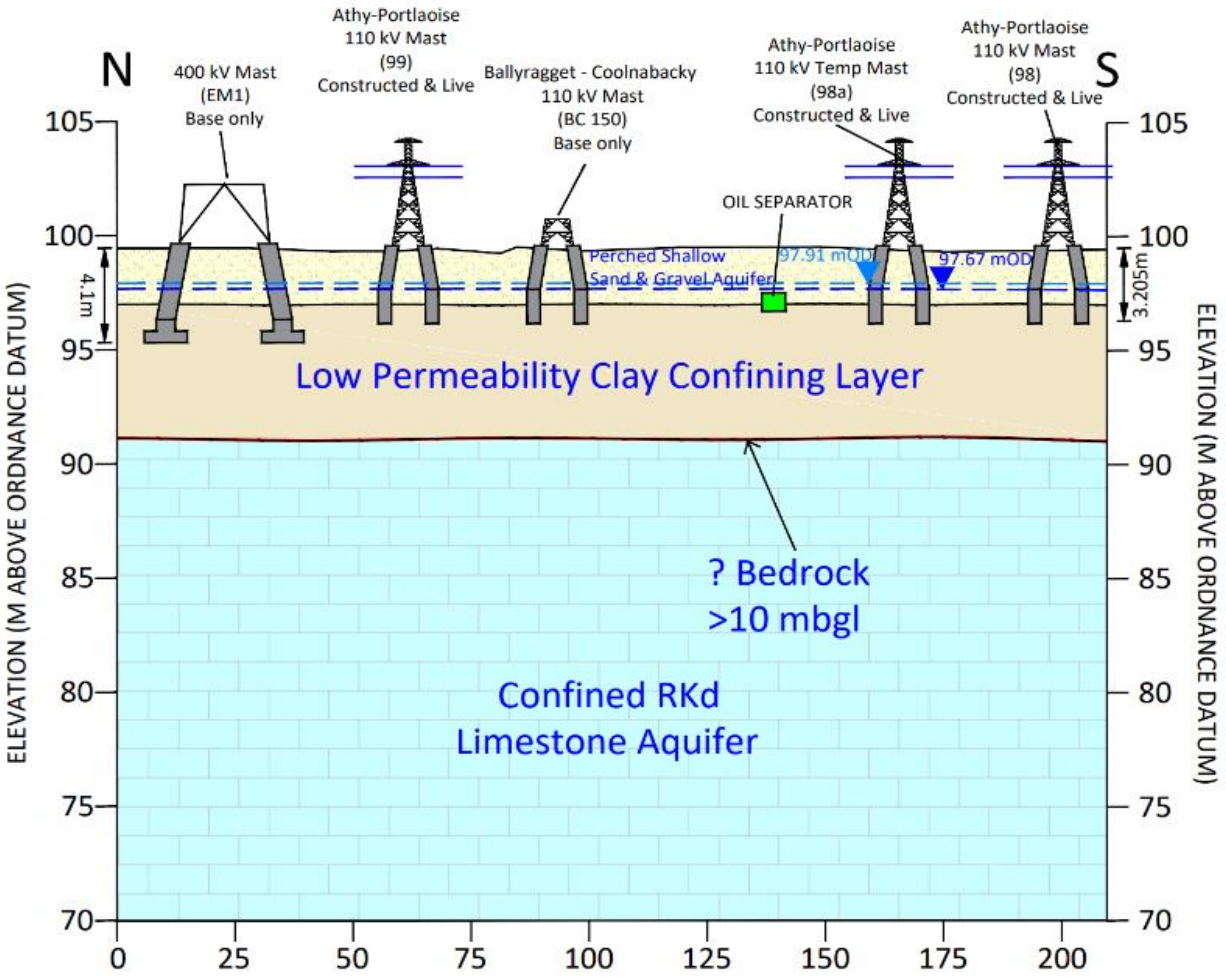


Figure 8: North- South Cross Section detailing existing Structures and Oil Separator

3.3.3 Summary Conceptual Model

- The bedrock aquifer was not encountered in any investigation undertaken on the site.
- The bedrock aquifer is protected by a 6-7m thick low permeability confining clay layer.
- There are no borehole derived water supplies within 500 m of the site. However any abstractions are likely to be from the underlying Limestone bedrock, and because this aquifer was not encountered in any investigations and no dewatering of this aquifer will be required during construction, there will be no impact to the drinking water abstractions in the area.
- A Geophysical survey on the site shows the site is homogeneous with the low permeability clay occurring consistently from approximately 3 m below ground level, and that bedrock is a least 6m deep (the limit of penetration for the geophysical method deployed)
- The Clay layer is grey in colour, which is consistent with low permeability rates, the fines content of the clay determined from laboratory testing is high, ranging from 30% to 50%, which again is consistent with low permeability rates, and infiltration tests undertaken in-situ were unable to

determine a permeability value, because the rate of infiltration was too low. This confirms the important role that the clay has as a consistent protective 7m thick layer over the bedrock aquifer

- Groundwater in the sand and gravel deposits on the site will not be in hydraulic continuity with the bedrock aquifer underlying the site because of the low permeability of the intervening 6m+ of Clay. The groundwater in the sand and gravel deposits will take the easier pathway and move in a horizontal direction rather than vertically.
- The maximum depth of excavation will not be greater than 3m. Based on groundwater level data, this will require some dewatering of the shallow gravel aquifer. "
- There may be some minimal loss of recharge to the tufa, during the construction period, but this will be temporary and minor in nature., Based on the interpreted groundwater flow direction, the recharge area of the tufa springs will be mostly concentrated in the agricultural land to the west of the site, with only approximately 10% recharge from the site area. The impact of any dewatering will therefore be small.
- Recharge from the shallow perched aquifer on the site, will support diffuse baseflow in the adjacent stream, and will be responsible for some of the tufa deposition along this field drain. However any impacts from construction dewatering on the site, will be less significant on this feature, because of the diffuse nature of this baseflow component, as opposed to the concentrated point discharge from the springs.
- The recharge pattern will re-establish after construction and the shallow depth of the structure, will not disrupt shallow groundwater flow patterns to any significant extent.
- Dewatering at the site will have no impact on deep water bedrock aquifer therefore no interference to nearby wells.

3.4 Conclusions

- A review of decommissioned boreholes and trial pits from historic site investigations shows that there was no impact to the deeper aquifer as the bedrock was not encountered in any of the studies. The relatively homogeneous, low permeability clay layer from 3 m depth, and extending for a further 6m across the site further protects the deep aquifer in the unlikely event of the boreholes acting as a contamination pathway.
- In situ observations and testing, supported by laboratory testing, confirms the low permeability nature of this clay layer, and its effectiveness as a protective layer for the underlying bedrock aquifer.
- There is no impact to nearby domestic, farm or public drinking water supply wells as these are served by the deep bedrock aquifer.
- Dewatering at the site may have a slight effect on the shallow aquifer which could subsequently impact the supply of groundwater to the tufa streams. However, this will be short term and of small magnitude, and will be monitored during construction.
- Dewatering at the site will have no impact on deep water bedrock aquifer therefore no interference to nearby wells
- Any excavation deeper than 0.80 m below ground level would expect to encounter groundwater. Where groundwater needs to be controlled to allow construction to proceed, a dewatering procedure will be implemented (Refer to **Section 5.1.1** for the dewatering procedure)

4 CONSTRUCTION WORKS

This section of the CEMP will describe the construction methodologies and various elements of works to be undertaken as part of the permitted development.

Key elements of the civil works and activities associated with the construction phase of the development are as follows.

The Coolnabacky 400/110 kV (Unit 1) Development is comprised of 2 no. Parts:

- **Part 1** includes Main Civil Construction Works - **Phase(s) 1 & 2 –** IE Consulting & Kilwex Civil
- **Part 2** includes the Electrical Installation Works - **Phase(s) 1 & 2 –** To be awarded

The activities contained in **Part 1 - Phase (1 & 2)** are described below**.**

4.1 Phase 1 - Main Civil Construction Works

Details of works included in **Phase 1** - **Main Civil Construction works** are outlined below. A staging sequence will be followed as set out in **Figure 2 Preliminary Development Programme.** The stages set out below describe the sequenced approach of the project.

4.1.1 Stage 1 – Site Preparation

Upon entry to site, preparatory activities will be carried out. The main elements of **Stage 1 - Site Preparation** are outlined below and described in the subsections thereafter.

- Fencing & Security of Site
- Ecological Buffer Zone
- Overhead Cable Avoidance
- Fencing and protection to boreholes

4.1.1.1 Fencing & Security of Site

Once overhead cable avoidance scheme is in place, all other pre-construction works can be undertaken. The entire site will be fenced using a heras fencing system to maintain security and prevent unauthorised access to site. A manned security hut will be located at the site entrance to control deliveries and access of authorised personnel.

4.1.1.2 Ecological Buffer Zone

A buffer zone, in the form of Heras fencing, will be put in place to protect the ecologically sensitive area as outlined in **Appendix 6** – **ESB Drainage Drawings** & **Appendix 2 – Site Logistics Plan**

A buffer zone of 25m will be applied on the concentrated tufa areas in the adjacent streams. A 10m buffer zone will apply to all other field drains where possible.

4.1.1.3 Overhead Cable Avoidance

Installation of ESB overhead cable avoidance scheme. This includes installation of goalposts beneath the main power lines to establish a safe crossing point. The remainder of the overhead lines on the site will be barriered off to ensure no crossing beneath lines occurs outside of the designated crossing points. Barrier and goal posts will be placed in accordance with ESBs '*Code of Practice for Avoiding Danger from Overhead Electricity Lines'*.

Designated pedestrian crossings will also be included in the crossing points to ensure segregation between plant and site personnel

4.1.1.4 Borehole Protection

Protection measures will be put in place prior to the main construction works which shall include installation of timber fencing around newly constructed boreholes as well as existing boreholes. A silt mesh around the base of the fence will be in place to secure well head protection.

4.1.2 Stage 2 - Site Establishment

Once the site preparation activities are complete and prior to active works commencing, the next stage will focus on establishing the compound area and installing the drainage features associated with the permanent berm.

The main elements of **Stage 2 – Site Establishment** are detailed below and described in the subsections thereafter.

- Site Compound Establishment and Layout
- landscaping
- Site Access Route

4.1.2.1 Site Compound Establishment and Layout

A site compound will be established within the site boundary as shown in **Appendix 2 Site Logistic Plan.** The site compound will be constructed as follows:

- The area will be marked out at the corners using ranging rods or timber posts
- Where additional areas of access route and hardstanding are required, a layer of geotextile and compacted layers of crushed imported stone aggregate CL6F2/CL804 will be spread and compacted
- Geotextile will be laid vertically at bounds of additional stoned areas to prevent fines from migrating outside of stoned areas. This will also mitigate run-off of fine sediment
- Areas within the site will be constructed and used as vehicle and material hardstanding
- Upon completion of the project, the compound area will be reinstated to its original condition.

The following describes additional items required to facilitate site establishment.

- ***Clearance of Scrub***

  Prior to any clearance of scrub vegetation, the project ecologist will conduct confirmatory pre-construction surveys. The scrub clearance activity will be carried out with a hand strimmer and in small, localised sections under the supervision of the project ecologist.

- ***Site facilities***

  Offices, meeting rooms, toilet blocks, canteens, drying room, material storage containers and COSHH stores will be established on site for the duration of the works

- ***Water Requirement / Water Supply***

  Water usage will be planned and minimised by utilising systems such as ready mix mortar being delivered to site; concrete trucks being washed down in their respective plants with

their chutes only being washed on site. Dust suppression water shall be supplied from settlement ponds where possible. Potable water will be required for the welfare facilities. Water will be supplied as necessary and will be transported to site and stored in IBC's.

- ***Sealed foul holding tank***

  During the construction phase, a proprietary self-contained toilet system with an integrated waste holding tank will be used on site for toilet facilities.

  This certified tank will be located adjacent to the toilet block and is required for the duration of the project. It will be cleaned and emptied regularly by a licenced waste disposal contractor as per the Resource and Waste Management Plan. Please see **Appendix 5.**

- ***Car parking***

  Carparking will be adjacent to the compound, as shown in the site logistics plan in **Appendix 2 Site Logistics Plan.** A designated walkway from carpark to compound will be established.

- ***Storage***

  Storage containers will be placed within the compound to store fuel powered equipment such as generators, consaws and materials etc. All fuel powered tools will be stored on a drip tray to prevent environmental contamination in the event of spillage. All chemicals and materials that risk environmental contamination will be stored in the COSHH store. A register of these materials will be kept with associated MSDS sheets.

- ***Materials***

  All building materials and aggregates, and in particular those which have a potential to add to potential silt/suspended solids in surface water (e.g. sand, loose aggregates, cement, dusty aggregates and blocks) will be stored in an appropriate manner and at least 10 metres from a designated water course.

4.1.2.2 Permanent Berm Drainage

The following drainage features lining the permanent berm to be applied as per below:

- Install silt fencing to perimeter of proposed permanent berm
- Excavate and install land drain and catchpits to perimeter of permanent berm
- Excavated spoil to be stored with footprint of permanent berm

4.1.2.3 Site Access Route

There is an existing stoned access route to the west of the site with a hardstanding located at the constructed 400kV tower base. This hardstanding will be utilised for the access to the compound area with additional stoning provided to the hardstanding/access route as required.

The compound will be in place for the duration of the construction phase and will be removed when the project is complete.

4.1.3 Stage 3 - Pond Excavation & Associated Drainage

Protection of the hydrological environment is of critical importance in both the construction and operation phase of the development.

One group of 4no. ponds, 3 no. permanent and 1 no. temporary, will be located northwest of the substation .

Another group of 4 no. ponds , 3 no. permanent and 1 no. temporary located to the southeast of the compound.

The northwest permanent ponds will facilitate:

- Construction dewatering of 400kV substation excavation and associated features
- Drainage of catchment area of 400kV substation building and associated features during permanent operations

The southeast permanent ponds will facilitate:

- Construction dewatering of 110kv substation excavation, transformers bunds and associated features
- Drainage of catchment area of 110kv substation building, transformers bund and associated features during permanent operations

The function of both the temporary pond(s) located to the northwest and southeast is detailed below:

- Drainage runoff from permanent site berm
- Drainage will be carried out via French drains from the berm to the pond until the berms are vegetated
- Once drainage of the berm has ceased, the temporary ponds will be plugged and allowed vegetate in-situ

See **Appendix 6 -Drawing no: PE493-D108-125-001-004** for location of ponds

The following includes details of excavation of treatment measures for the development to ensure the highest quality of surface water discharge to existing vegetated drainage ditches.

The main elements of **Stage 3- Pond Excavation & Associated Drainage**, are detailed below and described in the subsections thereafter.

- Surface Water Management Measures
- Construction of Settlement Pond(s)
- Management and Monitoring of Site Drainage

4.1.3.1 Surface Water Management Measures

Typical surface water management features to be in place across the site are described below

Silt Fencing

Drainage of site berms containing the excavated materials will be via French drains until the berms are vegetated. The berms will be surrounded by silt fencing until vegetated and stabilised. **See Appendix 6 – Drawing no: PE493-D108-125-001-004**. See example of silt fencing in **Figure 9** below.

Figure 9: Silt Fencing

French Drains

French drainage channels will collect water runoff from excavated soil stockpiles and will discharge to the dedicated settlement ponds constructed for both the construction phase and permanent works drainage. See French drain cross section **Figure 10** below and refer to **Appendix 6 – Drawing No: PE-493-D108-054-012-003**

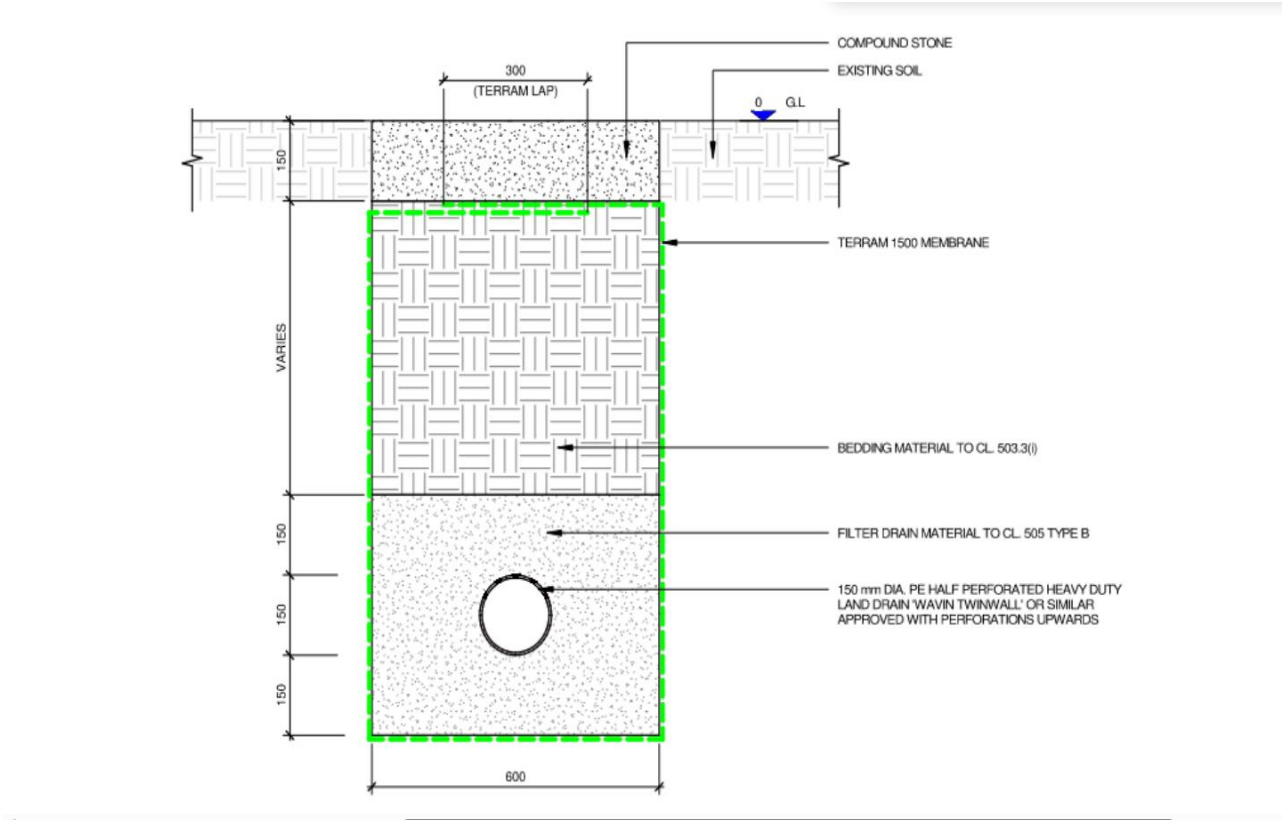


Figure 10: French drain typical Section

Construction of Settlement Pond(s)

Details outlining earthworks and construction of the settlement ponds are illustrated in **Appendix 3 Earthmoving Plan** and also **Appendix 6 - ESB Drainage Drawings, Drawing Ref: PE493-D108-054-010-007**

- Ponds will be installed prior to main earthwork operations commencing
- Pond construction works will be scheduled during a period of dry weather, if possible, to minimise water pumping
- Water will be pumped from a filter sump in the excavated area and undergo treatment through a proprietary temporary settlement tank (Siltbuster or Dirtbox) and percolate through a silt bag over a vegetated buffer (See **Section 5.1.1.1 - Dewatering of Excavations for Settlement Ponds**). For the limited areas where the base of the settlement pond is below the water table, additional 20mm stone will be added to ensure no buoyancy of the HDPE liner.
- Extents of 3 no. permanent Ponds shall be excavated as one dig with extent of 1 no. temporary pond excavated as one dig
- The sides of the excavation shall be maximum 1:3 slope
- Ponds will be used to treat water arising from the development and excavation activities onsite
- Water will flow from pond to pond in series, reducing the quantity of suspended solids present in the water before discharging into the adjacent field drain

See Section 5.1.1.1 - Dewatering Procedures for Settlement Pond Excavations

Pond Design & Attenuation Capacity

- The settlement ponds will have a permanent water depth of 300mm and a combined treatment capacity of 180m3 with a treatment rate of 11 litres per minute
- The ponds will provide suitable attenuation for a 1 in 100-year rainfall event consisting of 20mm rainfall per hour for the entire complex when complete
- The total required attenuation volume is 163 m3 and the combined attenuation volume provided within the settlement ponds is 272 m3
- This attenuation volume is in addition to a permanent water treatment volume of 180m3. The attenuation volume allows for 67% greater capacity than is required that may allow for any siltation in the ponds between maintenance periods or storm events
- It is anticipated that the permanent water volume in the ponds combined with wetland planting will allow for evapotranspiration and further infiltration prior to discharge. This will further reduce the ultimate discharge volumes to the field drain and will further increase the attenuation capacity in the ponds.

Following completion of major earthworks, maintenance and upgrading of the ponds to prepare for operational activities , will commence **See Section 4.2.7.** Details of drainage pond works sequence is provided in **Appendix 6 Settlement Pond Detail PE493-D108-054-010-007.**

4.1.3.2 Management & Monitoring of Site Drainage

The following measures will apply when excavating and developing the surface water management features across the site.

Monitoring of site drainage will be carried out by the Site Manager as outlined below and tabulated in **Section 8 - Monitoring Measures.**

- The ponds and associated works (silt fencing, etc.) shall be checked/inspected daily as part of ongoing monitoring programme. Any required repairs made as soon as practicable
- The frequency of visual inspections may be increased during period of excessive rainfall
- Sediment control infrastructure will be regularly maintained during the construction phase by cleaning of sediment ponds, repair of silt fences and vegetation in drains
- This maintenance regime will ensure operation of settlement ponds maintaining water quality discharge
- Temporary drainage features i.e. silt fencing, french drains, silt traps etc. must be inspected regularly throughout the construction, phases to ensure they are functioning effectively
- Records of inspection and reports shall be maintained on site

Additional information on environmental management and water monitoring measures are included in **Section 8 – Monitoring Measures**

4.1.4 Stage 4 –Drainage Pond Infrastructure

The main elements of **Stage 4- Drainage Pond Infrastructure** are detailed below and described in the subsections thereafter.

- Remaining pond excavations
- Installation of Pond Drainage Features
- Outfall Works

4.1.4.1 Remaining Pond Excavations

- Excavate to formation levels of drainage ponds
- Dispose of excavated material in berm area

4.1.4.2 Installation of Pond Drainage Features

- Install 2 mm HDPE impermeable liner with welded joints wrapped in a geotextile fleece and lay across excavation, with a minimum lap length of 300 mm. This will ensure no connection between the settlement ponds and the underlying subsoil and groundwater.
- The pond cells will be lined with an impermeable 2 mm HDPE geomembrane wrapped in a geotextile fleece beneath a 50 mm thick bed of 20 mm single-size clean stone.
- For the limited areas where the base of the settlement pond is below the water table, additional 20mm stone will be added to ensure no buoyancy of the HDPE liner. This will ensure no connection between the settlement ponds and the underlying subsoil and groundwater.
- A 50 mm deep layer of 20 mm single sized clean stone shall be placed across base of excavation
- Stone check dams shall be constructed with 20 mm single sized clean stone
- Excavate & install pipe work from field drain to hydro brake manhole
- Excavate and install drainage run from hydro brake manhole to final settlement pond
- Excavate and install pipe work to temporary pond

4.1.4.3 Outfall Works

The outfall from the settlement ponds will discharge to their respective field drains as shown on the **Appendix 6 – ESB Drainage Drawings.** Methodology for installing these outfalls is as follows:

- Works to take place during low flow conditions
- Install silt curtains along the existing field drain, downstream of the outfall location
- Hand place 100mm cobbles to a depth of 300mm on the bed of the field drain at the outfall location
- Install precast headwall at the outfall location: Carefully excavate the area in which the precast concrete headwall will be installed using a mechanical excavator, positioned on the bank thus avoiding the need for instream works
- Surface vegetated scragh / surface turves will be carefully cut and removed to a temporary location for prompt reinstatement

- Excavate trench and install outfall pipework
- Backfill trench and reinstate surface vegetated scragh/surface turves
- Outfall works shall only be performed during periods of dry weather, and under the supervision of the Project Ecologist

Refer to **Appendix 6- ESB Drainage Drawings, Ref - PE493-D108-054-010-005**

Dewatering Procedures to be applied as per Section 5.1.1

4.1.5 Stage 5 - 110kV Excavation

Once the pond drainage systems are in place, the main construction shall commence.

The main elements of **Stage 5** are detailed below.

- Strip topsoil and install stone on haul route
- All excavated spoil to be moved to berm
- Excavate to formation 110 kV building footprint and install stone

Dewatering Procedures to be applied as per Section 5.1.1

4.1.6 Stage 6 – Remainder of Civils & Excavation Works

The remaining main construction works will be carried out in **Stage 6**

The main elements of **Stage 6 – Remainder of Civils & Excavation works** are detailed below and described in the subsections thereafter.

- 110kV Building Construction
- Klargester Full Retention Oil Separator Installation
- Installation of Trenches, Ducts and Cables

Dewatering Procedures to be applied as per Section 5.1.1

4.1.6.1 Construction of 110kV substation

The 110kV substation building is the first building to be constructed on site, as part of the Phase 1 works. It will be equipped with 8 bays consisting of 3 no. lines, Athy, Portlaoise and Ballyragget, 2 no. transformers and 3no. spare bays for potential future development. The building is constructed with in-situ concrete and structural steel with a combination of stone and insulated cladding finishes.

The following are features included in the building:

- The building substructure is a waterproofed cast in-situ raft foundation
- The structure of the walls is a combination of in-situ concrete and structural steel
- External Walls are constructed from precast insulated concrete sandwich panels with insulated cladding panels above
- The external wall finishes are a combination of stone façade cladding and insulated cladding panels
- The first floor is constructed with a composite floor with additional reinforced structural

screed poured on top

- The roof is constructed of a steel frame covered with insulated cladding panels.
- A gantry crane is being installed in the building.

4.1.6.2 110kV Foundations

The foundation will be constructed using the following methodology

- The GIS Buildings and Transformer Bunds will be built utilising a raft foundation
- The area of the buildings will be marked out using ranging rods or wooden pegs
- The soil will be stripped and removed to the permanent berm
- No excavated material will be removed from site and the stockpile areas will be established with mitigation measures as previous detailed
- Foundation Formation level is proposed at 97.00m OD. The existing site levels vary across site, ranging from approximately 100.00m OD to 97.50m OD.
- Depth of proposed excavations will vary across site depend on existing site levels, but shall be no deeper than 3m in any given location.
- From Foundation Formation level a hardcore build is specified to underside of Slab. The thickness off this layer of hardcore varies between structures but is based on the proposed Finished Floor Level at 99.625m OD
- The foundations will be shuttered and steel reinforcement installed.
- The foundation will be poured with concrete. Refer to **Section 5.4**
- Specific design and installed water bar features will be utilised for the in-situ concrete works for the transformer bunds in accordance with recognised standards of constructing water retaining structures to ensure that the integrity of these bunds is achieved. (This integrity will be tested separately after construction and prior to installation of the transformers**. See Section 4.2.4**

4.1.6.3 Klargester Full Retention Oil Separator

During the operational phase of the substation development, there will be 3 no. full retention oil separators onsite. 2 no. oil separators will be installed within the transformer bund structures and 1 no. Klargester full retention oil separator will be installed underground, outside of the bunded area. The design of the substation layout requires only one oil separator (or sometimes called 'interceptor') to be installed.

All impermeable areas of the substation compound access roads will be linked to an underground drainage network which will drain to the underground Klargester oil separator. Water from the oil separator will discharge to settlement pond no. 2, located to the south of the site as shown in **Appendix 6 – Compound Drawing No. PE493-D108-125-002-005**. The design also includes kerbing around all compound access roads, which will be cambered sufficiently to direct stormwater toward the underground separator drainage gulleys.

Other areas within the substation compound that will not drain to the underground oil separator include the 110 kV and 400 kV buildings, ancillary electrical equipment and surrounding stoned areas. This area contains roof drainage and land drain networks only, therefore does not require an oil separator downgradient as there is no oil-filled equipment or infrastructure within this area.

This Section (**Section 4.1.6.3**) refers to the underground Class 1 full retention oil separator. The oil separator will function during the operational phase of the substation but will be installed during the construction phase. The full retention oil separator is designed to serve the bund dewatering systems from the transformer bunds and the impermeable surface areas of the substation compound access roads.

The oil separator is another measure that will be installed to detect any leakages of oil that may occur from the substation compound. The oil separator is connected to an alarm system which is remotely monitored.

Appendix 6 – **ESB Drainage Drawings** highlights the location of all full retention oil separators on-site. Excavations and installation for the underground oil separator will be completed in Phase 1 of the programme. Separate to the underground full retention oil separator, there are in-bund oil separators included in each transformer, this is described in **Section 4.2.4** and **Section 4.2.5.**

Another common name for an oil separator is an interceptor. For clarity, an interceptor and an oil separator fulfil the same function. In this document and in all associated drawings, ESB refers to the original name of full retention oil separator.

Figure 11 highlights the location of all full retention oil separators on-site.

- The in-bund separators (4 No.) can be seen as the small red boxes in the figure which sit in the corner of each bund.
- An enlarged image in red shows a series of circles and boxes, depicting the oil sensitive sump pump and the oil separator itself. A reference to Note 4 is shown, providing a full description of the separators. The smaller in-bund oil separators discharge at a rate of 1 litre per second (l/s).
- The larger, external, underground Klargester full retention oil separator, depicted by the blue box in the image, discharges at 50 l/s.
- The Klargester separator is outside of the bund area at a distance of approx. 25m away.
- The green line on the image is the drainage network, flowing in a west to east direction below the bunds, then flows south into the Klargester oil separator.
- Water then discharges from the separator through the drainage network and into Settlement Pond No. 2, shown in **Figure 15**.
- The Klargester oil separator serves not only the discharge from the bunds, but a wider area (roads, hardstands) which drains to surface water manholes that also connect into the drainage network.

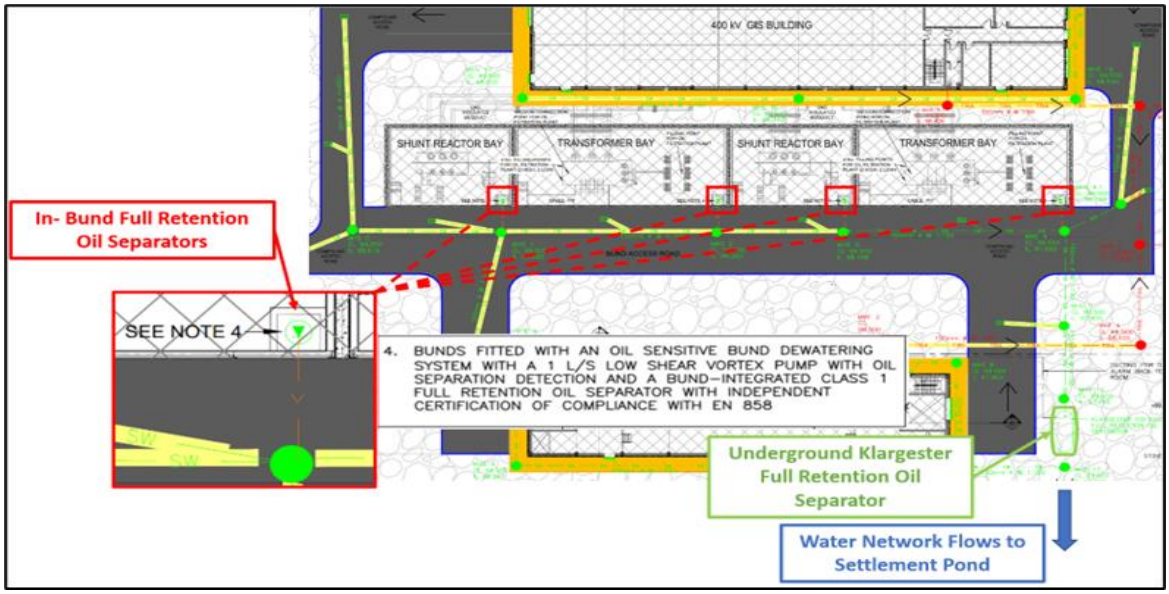


Figure 11: Extract from Compound Drainage Layout PE493-D108-125-002-005 showing all Full Retention Oil Separators within the substation compound
(For clarity, the Shunt Reactors are shown in Figure 11 as per the permitted development, though as described later in this document, they may not be installed as they may not be necessary due to advances in grid infrastructure technology).

The sizing of the Full Retention Oil Separator is based on the following calculations:

- The drained area serving the oil separator is 2,172 m^2 excluding the bunds.
- Full retention separators treat the full flow that can be delivered by the drainage system, which is normally equivalent to the flow generated by a rainfall intensity of 65 mm/hr. This equates to an outflow rate of 39.2 l/s.
- Given that each bund dewatering system will discharge at a maximum rate of 1 l/s to the drainage network in addition to this in extreme rainfall events the total flow to the separator will be 41.2l/s (39.2 + 1.0 +1.0).
- The NSFA050 Separator (highlighted in **Table 6** below), is appropriate according to our preferred supplier's technical specification showing it is capable of handling flow rates of up to 50l/s.

Table 6: Extract from Technical Specification for Klargester Full Retention Oil Separators

Product Code	Flow (l/s)	Drainage Area (m2)	Silt Capacity (ltrs)	Oil Capacity (ltrs)	Length (mm)	Diameter (mm)	Manhole Cover Dimensions (mm)	Base to Inlet Invert (mm)	Base to Outlet invert (mm)	Min. Inlet Invert (mm)	Std Pipework Diameter (mm)
NSFA040	40	2225	4000	400	4750	2010	600	1810	1760	1000	315
NSFA050	50	2780	5000	500	5790	2010	600	1810	1760	1000	315
NSFA065	65	3160	6500	650	7360	2010	600	1810	1760	1000	315

A typical maintenance schedule for an underground oil separator is as follows in **Table 7**:

Table 7: Full Retention Oil Separator Maintenance Schedule

Required Maintenance Action	Frequency
Remove litter and debris and inspect oil separator for sediment and oil accumulation. This maintenance work should be carried out by the product supplier.	Every 6 months
Inspect the filter media in the oil separator. The filter media should be cleaned or changed depending on the level of contamination present. The high oil level alarm probe should be removed and cleaned with water and the high level alarm system should be tested to ensure it is functioning correctly. This maintenance work should be carried out by the product supplier. Note that the weight of the silted filter media and tubing may be approximately 55 kg. A mechanical lifting device should be used if removing the filter media.	Every 6 months
Replacement of filter media in oil separator. This maintenance work should be carried out by the product supplier. Note that the weight of the silted filter media and tubing may be approximately 55 kg. A mechanical lifting device should be used if removing the filter media.	Minimum every 2 years
Removal of sediment, oil and floatables from oil separator. The removal of sediment and retained oil/grease should be carried out by a suitably qualified and competent contractor holding the relevant permits to transport and dispose of such waste. This Contractor should provide a Waste Transfer Form (WTF) following disposal of waste material off site.	As necessary - indicated by the system inspections or immediately following an oil spill

Appendix 6 contains a site drainage drawing for the entire site, including the location of the full retention oil separator.

4.1.6.4 Installation of Trenches, Ducts and Cables

Some of the services to be installed in trenching include:

- Power and Communications ducts between Overhead Line structures and Substation buildings.
- Telecommunications cabling to facilitate communication with control room
- Water supply from site source to substation
- Wastewater holding tanks, chambers and oil separators
- Substation Earth Grid

All underground services are installed using standard trenching methods:

- Survey area for existing services
- Excavation of trenching with mechanical excavator down to the level indicated by the project engineer with excavation depths cognisant of any ground water vulnerability or constraints.
- Installation of services/ducting/ chambers
- Backfill and compaction of excavations.
- Reinstatement of surface to existing condition or new specified surface finish.

Dewatering Procedures to be applied as per **Section 5.1.1**. See **Figure 12** for cable connections between **Unit 5 Works, Ballyragget – Coolnabacky**

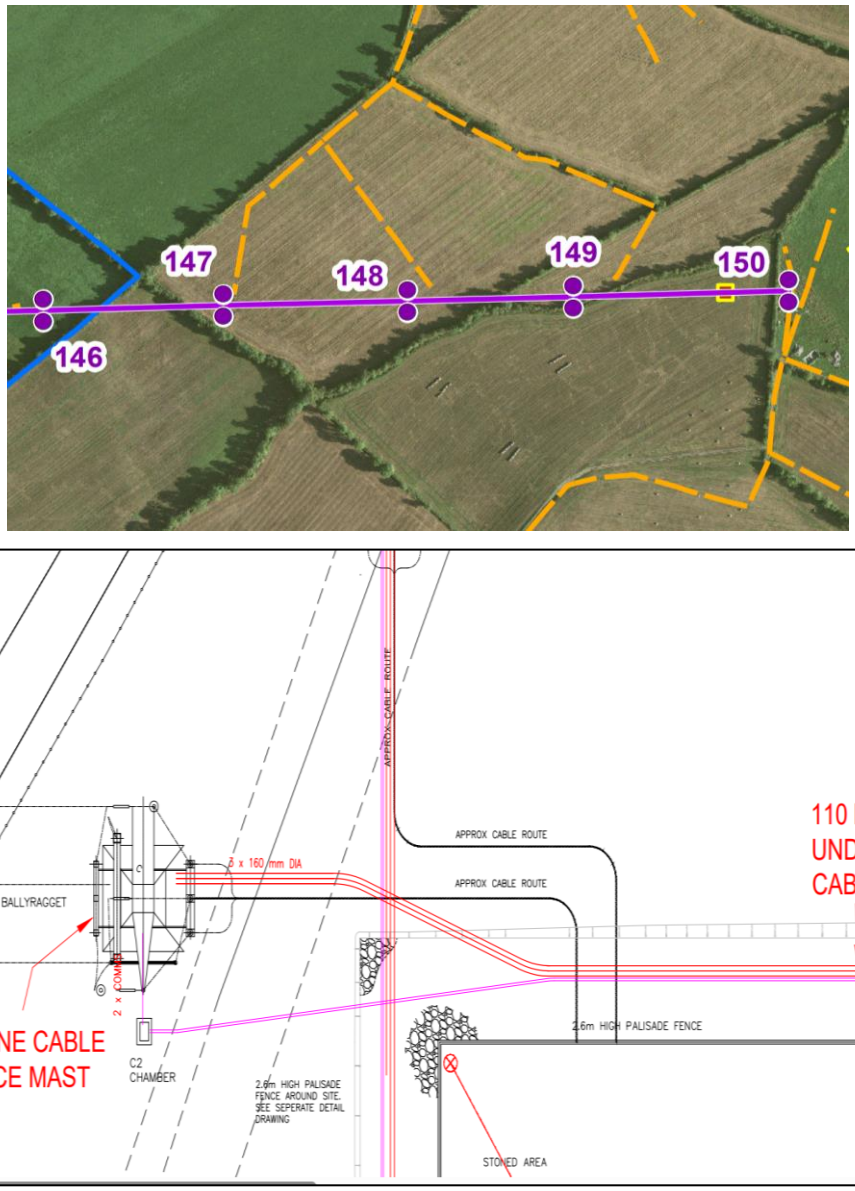


Figure 12: Top: Image above depicts location of OHL mast locations (Unit 5 Ballyragget – Coolnabacky Project) in relation to the Coolnabacky site at BC 150. Yellow markings represent planning access Bottom: Drawing depicts 110kV underground cable interface between Ballyragget and Coolnabacky

4.2 Phase 2 – Main Construction Works

The main elements of **Phase 2- Main Civil Construction Works** are detailed below and described in the subsections thereafter.

- 400kV Excavations
- 400kV Foundations
- Construction of 400kV substation
- Transformer Bunds
- Oil Sensitive Pumps

- Fire Wall
- Landscaping
- Associated compound and all other infrastructure
- Pond Upgrade (s) following major earthworks

There are two transformers and two shunt reactors included in the permitted development. The requirement for shunt reactors is under review due to developments in grid infrastructure technology since permission was first granted for this development in 2014. As such, at this time, it is not anticipated that shunt reactors will be installed at the Coolnabacky site.

Should shunt reactors, as permitted, be deemed necessary, the design, installation, operation, and maintenance measures for this equipment, along with bund management systems, will follow the same principles as shown for the transformers.

Therefore, the pathway to pollution of the environment will be protected and mitigated against in a similar manner as set out for the transformers as described in **Section 4.2.4.**

4.2.1 400kV Excavations

400kV excavations will entail the following:

- Strip topsoil and install stone on haul route
- All excavated spoil to be moved to berm
- Excavate to formation 110 kV building footprint and install stone

Dewatering Procedures to be applied as per **Section 5.1.1**

4.2.2 400kV Foundations

- The GIS Buildings and Transformer Bunds will be built utilising a raft foundation.
- The foundation will be constructed using the following methodology.
    - The area of the buildings will be marked out using ranging rods or wooden pegs and the soil stripped and removed to a temporary placement area for later use in landscaping.
    - No excavated material will be removed from site and the stockpile areas will be established with mitigation measures as previous detailed
    - All drainage measures in the detailed drainage design for the project will be implemented around the work area. See **Appendix 6** – **ESB Drainage Drawings**
    - Any water arising from the excavation will be managed in accordance to dewatering procedure in **Section 5.1.1**;
    - The foundations will be shuttered and steel reinforcement installed.
    - The foundation will be poured with concrete.

Refer to **Section 4.1.6.2** on excavation depth and foundation formation levels

4.2.3 Construction of 400kV substation

The 400kV substation is the second building which will be constructed. It is equipped with 8 bays consisting of 2 cable No. Lines, 1No. from Moneypoint and 1No. Dunstown, 2No. transformers and 4No. spare bays for future proofing the building. The building is constructed with in-situ concrete and structural steel with a combination of stone and insulated cladding finishes.

The following are features included in the building:

- The building substructure will be a waterproofed cast in-situ raft foundation.
- The Structure of the walls will be a combination of in-situ concrete and structural steel
- The external walls will be constructed from in-situ concrete with insulated cladding panels above
- The External wall finishes will be a combination of random rubble stone to concrete walls and insulated cladding panels.
- The first floor will be constructed with a precast concrete slab and concrete screed.
- The roof will be constructed with a precast concrete panel, insulation, concrete screed and roof membrane.
- A gantry crane will be installed in the building.

4.2.4 Transformer Bunds

Bunds are designed taking into account the following documents and Standards:

1. IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities as published by the Environmental Protection Agency. This document provides guidance for design, construction, testing and operation of bunds.
2. IS EN 1992: Eurocode 2, Design of concrete structures, incl. Part 3: Liquid retaining and containing structures. Eurocodes supersede historical design codes such as BS8110 and BS8007.
3. BS EN 61936: Power Installations Exceeding 1 kV A.C, which includes requirements for fire protection and electrical clearances.
4. The Environmental Impact Statement (EIS) submitted as part of the planning application provided for oil and fuel storage tanks to be bunded to a volume of 110% of the capacity of the largest tank/container within the bunded area(s) plus an allowance of 30 mm for rainwater ingress.

For clarity, these bunds that will be constructed onsite are impermeable, water-tight engineered reinforced concrete structures that are specifically designed to retain liquids and are constructed and proven to retain liquids in accordance with the above referenced standards. The use of structures of this nature are typical and tried and tested items of infrastructure for containing any potential oil spills from transformers over the lifetime of the plant and are utilised internationally for this purpose.

The general arrangement of bunds ensures that all parts containing oil, including pipework and radiators are within its footprint and the consideration is given to the plan dimensions to contain leakage should a failure occur from a higher point on the transformer (e.g., the conservator tank). Sizing is based on accommodating a minimum of 110% capacity of the transformer's oil, plus allowances for rainwater and overspill due to wave action. They are designed as reinforced concrete liquid retaining structures under European design codes. Once the bund is constructed a hydrostatic test is carried out to demonstrate its integrity, should a transformer leak occur. Filling and draw-off points will be located entirely within the bunded area(s).

The hydrostatic test is a requirement of the construction process, which is formally agreed with the Contractor and carried out under supervision of ESB Site Inspector/Site Engineer (a competent and

qualified professional). Only after the bund has successfully passed this official hydrostatic test can it be handed over to the electrical team to commence installation and oil filling operations. A copy of ESB's Bund Test Report Template is included in **Appendix 18 ESB Bund Test Report Template & Bund Arrangement Drawings**. This Report contains the bund test procedure and sign off details by Contractor and ESB. Bunds are constructed under the EPA Guidance as listed above in IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities as published by the Environmental Protection Agency.

A representation of the transformer bund is included in **Figure 13** below. A general arrangement drawing is included in **Appendix 18.**

Bund height on the lower side will be 800mm in height with a potential storage capacity in excess of 200,000 litres for each transformer bay.

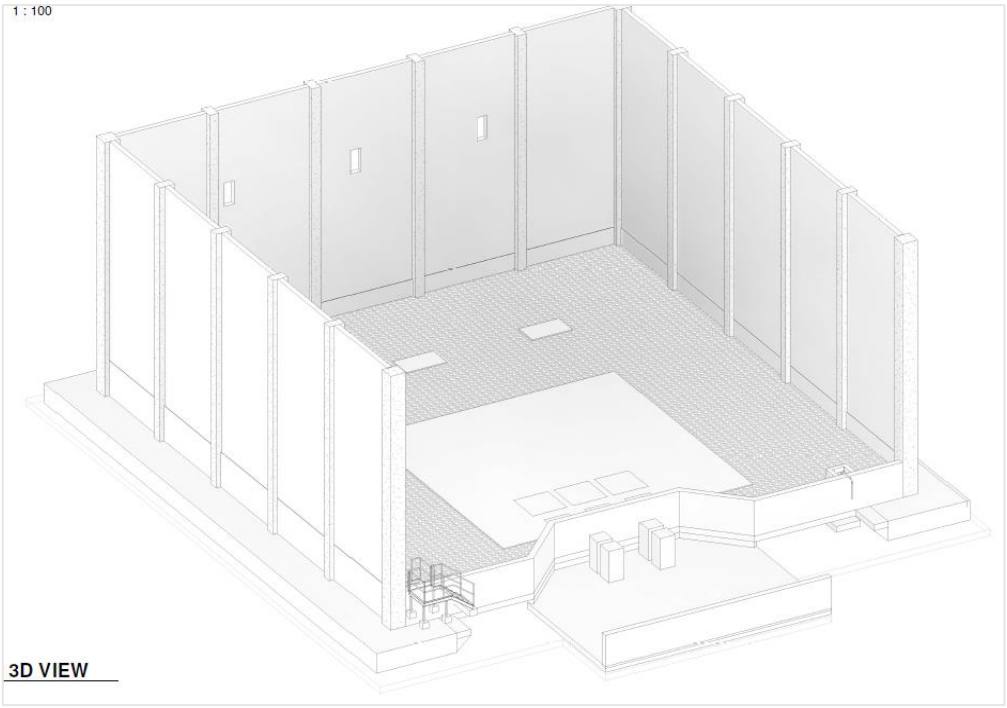


Figure 13: Typical Bund Layout for 400 kV Transformer

Each Transformer will be equipped with dedicated physical containment and management measures.

The bund will be fitted with an oil sensitive automated bund dewatering system connected to an in-bund oil separator of negligible oil storage capacity (approx. 30 litres) is used. If oil is detected in the separator, the bund sump pump supplying the separator is immediately stopped. This prevents any further discharge from the separator, and any oil is retained inside the separator and inside the bund. An alarm is also issued to a remote-control centre to trigger personnel intervention.

4.2.5 Oil Sensitive Pumps

The bund will be fitted with an oil sensitive bund dewatering system with a 1 l/s low shear vortex pump with oil separation detection and a bund integrated Class 1 full retention oil separator with independent certification of compliance with EN 858.

The make and model of the pump intended for use in each bund is the "Entexol Oil Discriminating Automatic Bund Dewatering System SCS 001 (Sump Control System)".

The typical arrangement of this system in the bund is described above and is shown above in **Figure 13**. **Figure 11** clearly outlines the location of the oil sensitive pumps and associated in-bund full retention oil separators and also shows how the drainage networks directs water towards the underground full retention oil separator, located outside of the bund area. **Figure 11** outlines the location of the oil sensitive pumps and associated in-bund full retention oil separators and also shows how the drainage network will direct water towards the underground full retention oil separator, located outside of the bund area.

4.2.6 Fire Walls

The transformer bunds are built on large rafts closed in on 3 sides, full height with a bund built on the remaining side to contain any leaks. The bund walls on 3 sides will be 12m in height, to protect the 400kV build in the event of fire.

Refer to **Section 4.1.6.2** on excavation depth and foundation formation levels.

4.2.7 Pond Upgrades Following Major Earthworks

The following upgrades will be undertaken at the permanent settlement pond(s) following earthworks in order to accommodate operational activities:

- Pond inlet shall be temporarily bunged and ponds drained to permit pond works
- Any pumped water to discharge via a silt bag - no discharge direct to field drain permitted
- Sediment, silt, stone check dams, stone bedding and liner shall be removed and disposed of in a licenced waste facility
- New 2 mm HDPE impermeable liner with welded joints wrapped in a geotextile fleece shall be laid across excavation, with a minimum lap length of 300 mm
- New 250 mm deep layer of 20 mm single sized clean stone shall be placed across base and sides of the excavation
- New stone check dams shall be constructed with 20 mm single sized clean stone
- Wetland planting to be to be planted in 1 m grid arrangement **in secondary settlement pond,** consisting of: yellow iris (40%), red canary grass (40%), purple loosestrife (10%), marsh thistle (5%) and watermint (5%), unless otherwise agreed during construction
- Wetland planting to be to be planted in 1 m grid wetland planting to be to be planted in 1 m grid arrangement in **final settlement pond**, consisting of: great pond sedge (40%), bottle sedge (30%), marsh marigold (10%), common water plainstain (10%) and water-me-not (10%), unless otherwise agreed during construction

4.2.8 Landscaping

- The project, once complete, will be landscaped in accordance with the landscape plan submitted as part of the planning application.
- This will include the vegetation establishment on topsoil berms created by the excavation for the substation works.
- Native Irish Trees and vegetation shall be used for any revegetation/ planting

4.2.9 Associated Compound and all other infrastructure

The remaining works associated with the permanent compound and building finishing works are detailed below:

Permanent Substation compound fencing & gates

- Palisade Fencing will be installed around the substation compound according to the particulars of the planning application.
- Outer compound fencing will be installed around the site perimeter utilising post & rail or similar in accordance with the planning application.
- Fencing will be installed using standard installation methodologies.
- Excavation for fencing shall be carried out as follows:
    - Survey area for existing services prior to excavations.
    - Excavation for fenceposts remaining cognisant of any ground water vulnerability or constraints.
    - Installation of fenceposts and fencing elements.

Building Services installation

There is an extensive installation of mechanical and electrical services on this site, these will be undertaken by specialist subcontractors and completed on a phased basis during the project. The building services will be installed as part of these works.

The Electrical fit out of the GIS switchgear in each building shall be carried out under a separate contract as described in **Figure 2.**

Internal Building finishing works

Internal building wall finishes shall incorporate painted blockwork and concrete walls. GIS hall floor finishes shall comprise two coats of anti-slip paint.

Supply, Installation & Commissioning of Gantry Crane

Gantry cranes which operate on runner beams are required to be installed in both buildings for lifting equipment during the electrical fit out of the building and the ongoing operation of the facility.
These will be designed, manufactured, installed and commissioned by a specialist engineering company.

5 ENVIRONMENTAL MANAGEMENT

This section of the CEMP provides an overview of the Environmental Management proposals which will be implemented during the construction phase of the permitted development.

The following sections give an overview of the water protection and management, earthworks management, dust and noise control measures, refuelling and concrete control and a waste management plan for the site.

5.1 Water Protection and Management

The detailed site drainage design (**Appendix 6** – **ESB Drainage Drawings PE493-D108-125-001-004)** informs on the surface water management requirements to implement the drainage measures effectively. A supporting dewatering procedure will be strictly employed on site (**See Section 5.1.1**).

Equipment will be brought to site in advance of any works commencing. An adequate quantity of all required materials will be kept on site at all times to implement the detailed drainage design & mitigation requirements.

The drainage measures will be installed prior to works commencing. The works programme for the groundworks element of the construction phase of the project will also consider varying weather conditions. Large excavations and movements of overburden or large-scale overburden or soil stripping will be suspended or scaled back if heavy rain is forecast. The extent to which works will be scaled back or suspended will relate directly to the likelihood of inclement weather.

The effectiveness of drainage measures designed to minimise runoff entering works areas and capture and treat silt-laden water from the works areas, will be monitored continuously by the Environmental Manager.

The Environmental Manager will monitor the effectiveness of on-site drainage and identify any measures that may be required due to varying weather and site conditions. In the event of any issues identified, the Environmental Manager will have the necessary authority to instruct the Site Manager to stop related works in the area to determine the root cause and address the issue before works can proceed.

5.1.1 Dewatering Procedures

This section set out how dewatering will take place during excavations for both temporary and permanent settlement ponds on the northwest and southeast of the site as well as main excavation works for the 400/110kV substations, transformer bunds and all associated works. As described in **Section 3.4** any excavation deeper than 0.80m below ground level would expect to encounter groundwater from the shallow gravel aquifer. Where groundwater needs to be controlled to allow construction to proceed the following dewatering procedures will be implemented. is likely to be encounter.

5.1.1.1 Dewatering Procedures for Settlement Pond Excavations

The following sequential steps will be carried out during the dewatering of excavations settlement for settlement ponds.

1. **Clean Stone Sump**

- All excavations will be monitored regularly for ingress of groundwater
- In the event that groundwater ingress may impact the construction works within an excavation a “clean stone sump” will be installed
- A clean stone sump is a temporary pit constructed below the required excavation depth and filled gravel serves to collect water within the excavation
- Stone material installed in the sump to be coarse/aggregate and shall be clean with no adherent material/solids.
- A perforated standpipe will be installed in the centre of the sump to allow the pump to draw the excess water

2. **Discharge pumps**

- A pump will be installed within the standpipe to allow for pumping of water from the excavation.

3. **Proprietary Settlement Tank**

- Water will be pumped via lay flat hose to the settlement tank inlet pipe
- Suspended solids will be attenuated internally by a series of lamella blades / clarifiers
- Solids will fall out of suspension into a base hopper
- Treated water is discharged from the tank outlet

4. **Silt Bag Filtration**

- Water will discharge from the outlet of the settlement tank to a silt bag
- The silt bag comprises a geotextile, permeable fabric (Terrastop brand)
- The silt bag will intercept and filter small solids and fines
- Water will then extend across a vegetated buffer

5. **Vegetated Buffer**

- Water will percolate across the vegetated buffer area as a final polishing step prior to discharge to the field drain

6. **Field Drain**

- Water will flow from the buffer to the adjacent field drain
- Mitigation measures (silt fences and timber weirs) shall be installed in the field drain to capture any residual material prior to discharging downstream

Figure 14 depicts a typical dewatering arrangement to be in place during excavation of settlement ponds

5.1.1.2 Dewatering of Excavations for 400/110kV Substation(s), Transformer Bunds and associated works

The following sequential steps will be carried out during the dewatering of excavations during main construction works.

Steps 1 – 4 from **Section 5.1.1.1** will be in place first **prior** to applying the following measures , **Steps 5 - 7** for the main construction works.

5. **Three - Stage Settlement Pond**

- The settlement pond is comprised of 3 no. containment cells and clean stone check dams/weirs
- The pond is lined with impermeable HDPE liner and geotextile fleece
- Water will be discharged to the first cell of the settlement pond
- Water will be contained in the pond allowing settlement
- Clean stone check dams within the pond serve as weirs
- Water is then discharged via the pond outlet

6. **French Drain**

- Water will discharge from the final pond cell via the pond outlet drain
- The drain will contain a series of clean stone check dams and silt fencing to slow down velocity of water before discharging to the recipient field drain

7. **Field Drain**

- Water will flow from the buffer to the adjacent field drain
- Mitigation measures (silt fences and timber weirs) shall be installed in the field drain to capture any residual material prior to discharging downstream

*Note

- Ground conditions and weather will determine the pumping regime
- The surface water management system will be closely monitored and further measures will be employed, if necessary
- Dewatering procedure to be closely monitored by site management
- Visual inspection

Figure 15 depicts a typical dewatering arrangement to be in place during main excavation works

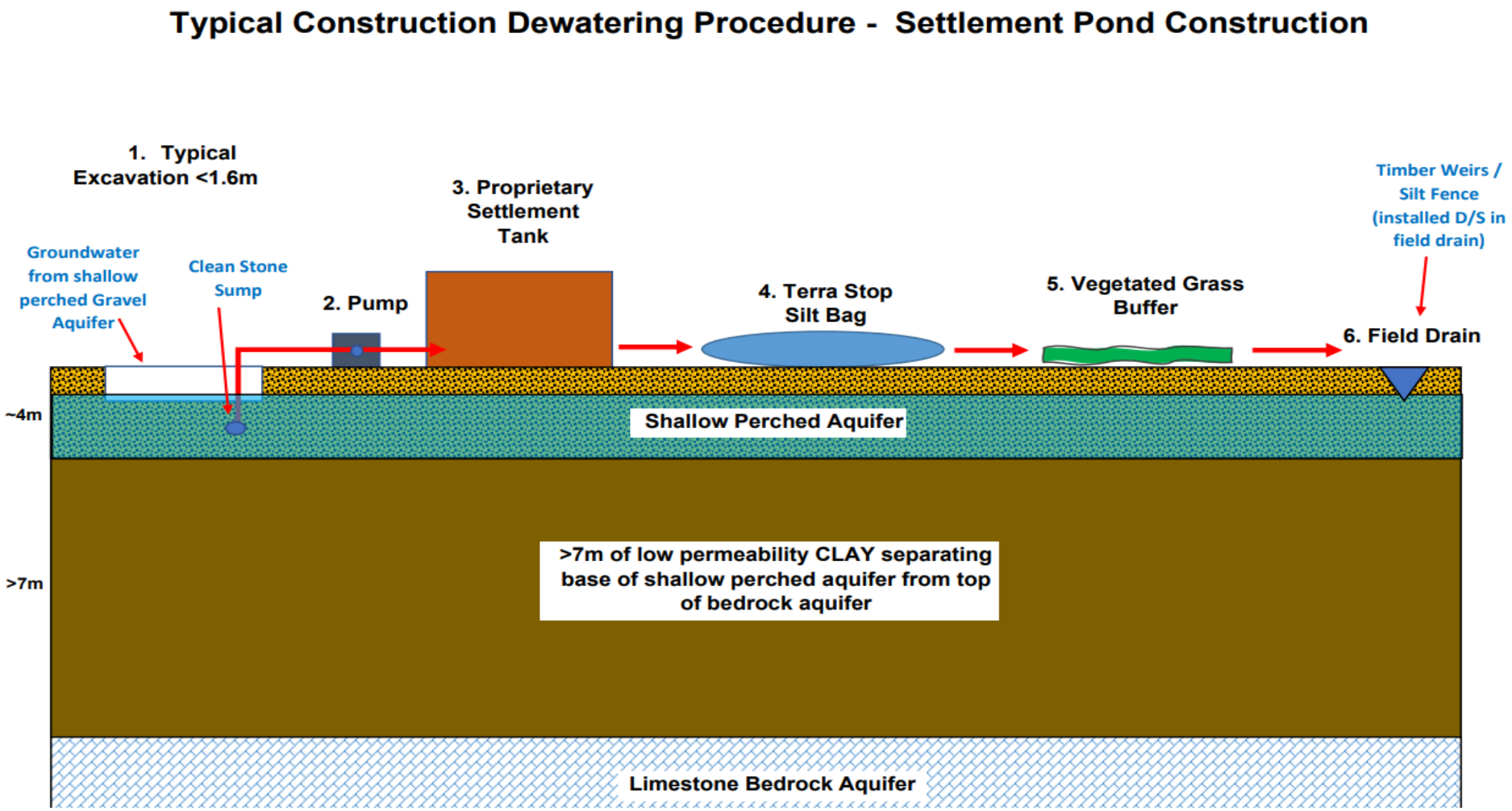


Figure 14: Dewatering Arrangement - Settlement Pond Construction

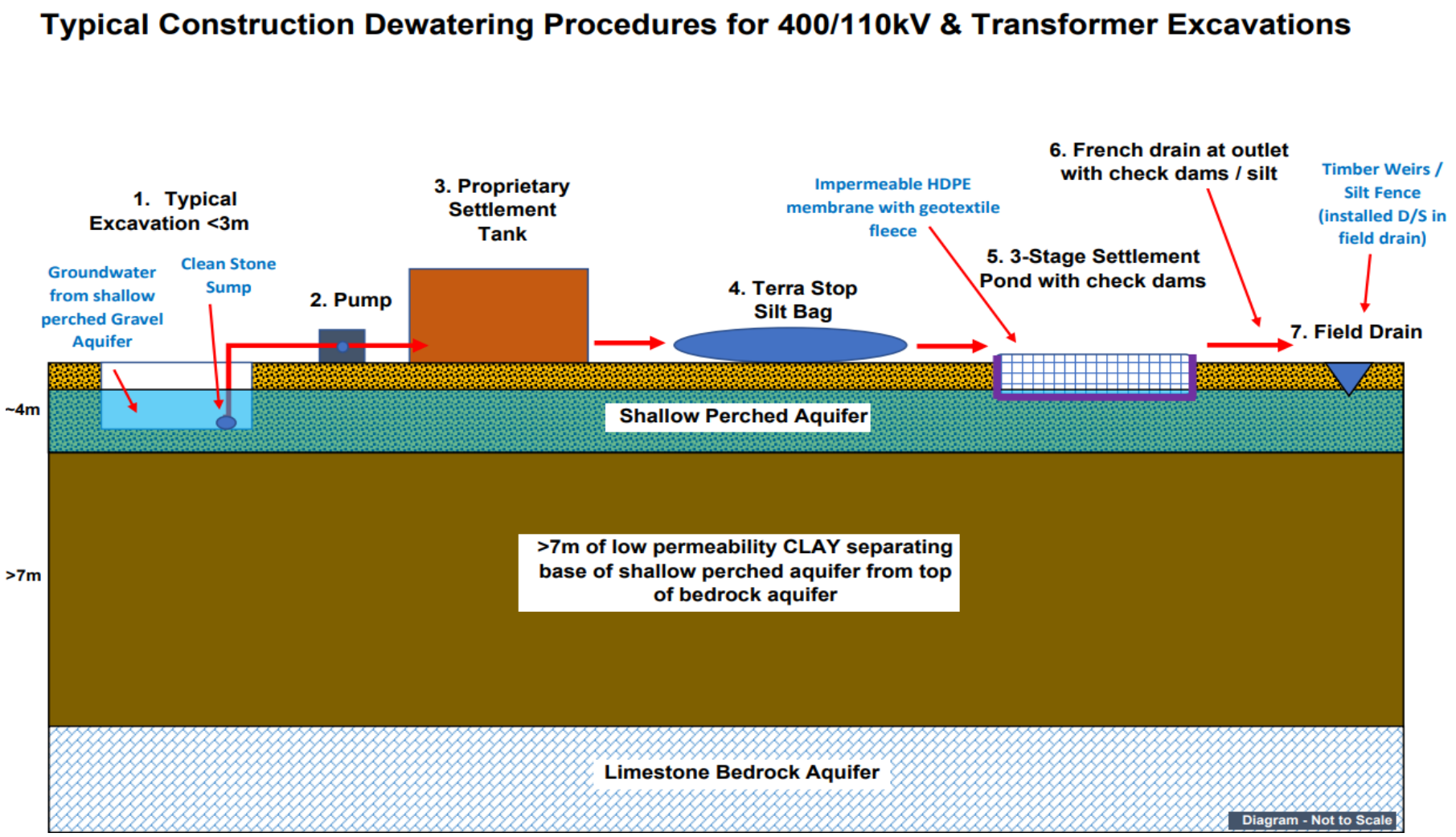


Figure 15: Dewatering Arrangement for Main Construction Works

5.1.2 Equipment Required in the Event of Emergency Contamination

An Emergency Response Plan has been prepared which sets out procedures to be implemented in the event of an accidental discharge to the environment. This is available in **Appendix 11 Emergency Response Plan**. The ERP will be displayed on site and operatives will be briefed on the plan via Induction / Toolbox talks. Equipment required in the event of an environmental emergency will be stored on site.

All personnel will be trained in the use and application of these temporary emergency measures which may involve the following:

- The use of impermeable matting such as plastic sheeting.
- Erection and inspection of silt fencing.
- Installation and inspection of a silt sock system
- All personnel will be trained and made aware of procedures for the actions to be taken in the event of an environmental emergency as part of site induction and routine toolbox talks.

5.2 Earthworks Management

Site excavations will be undertaken during the construction phase to facilitate the construction of the project elements described in **Section 4.** The construction methodologies provide details of the site excavation and earthworks. This section provides further details on the earthworks and spoil management which are outlined as follows:

- Soils excavated during construction will be stockpiled permanently forming berms, not exceeding 3m in height.
- Drainage protection measures such as the drainage ponds and French drains will be constructed prior to substation and road construction. This approach will be used in combination with the installation of other drainage protection measures in advance of construction, such as the installation of silt fencing.
- All temporary cuts/excavations will be carried out such that they are stable or adequately supported. Where appropriate and necessary, cuts and excavations will be protected against ingress of water or erosion using cut off drains around the excavation works. Temporary works will be such that they do not adversely interfere with existing drainage channels/regimes.
- Plant and materials will be stored in approved locations only (such as the site compounds) and will not be positioned or trafficked in a manner that would surcharge existing or newly formed slopes.
- No excavated topsoil and subsoil will leave site, all will be used to form the permanent site berms.

During the construction phase the mitigation measures for soil and geology are presented below:

- In so far as practicable, compaction of any soil or subsoil which is not being altered will be avoided.
- Repeated handling of soil will be avoided and ideally all soil stockpiles will remain undisturbed pending later re-use.
- Construction traffic within the site will be required to follow designated routes.
- Minimising excavation and stockpiling activities during wet weather periods

- Shaping stockpiles of excavated soil and/or subsoil and sealing with the excavator bucket.
- Installation of the appropriate drainage measures prior to the commencement of works where practicable.

5.2.1 Air Quality and Dust Management

In periods of extended dry weather, dust suppression may be necessary within the site compound and access road to minimise the nuisance risk. Dust suppression control measures to be implemented are listed below:

- If required water will be abstracted from settlement ponds in the site construction drainage system and pumped into a bowser to dampen down the internal access road and site compounds to prevent the generation of dust.
- Water bowser movements will be carefully monitored in order to avoid the excessive usage of water which may exceed the requirement.
- A policy of "clean off site" will be implemented, whereby no vehicle will be permitted to leave site with spoil or dirt present on the vehicle. This policy will be enabled in the first instance by having appropriate, designated and clean haul routes around site. All vehicles, when leaving site will be inspected by gateman for cleanliness. If the vehicle cleanliness is deemed unacceptable, the vehicle will pass through the wheel wash area (See **Section 5.9**).
- All roads and access routes will be inspected frequently by the site management - records of inspection shall be kept on site.
- If required, a road sweeper and water bowser will be deployed to clean and spray the local roads with water during dry periods when there is a risk of dust nuisance.
- Weather data will be obtained from the met Eireann station situated at Oak Park, Co, Carlow. Daily conditions are also noted as well as any weather warning in place.

5.3 Refuelling

The construction phase of the permitted development will require the use of plant and equipment which will utilise hydrocarbons. To minimise the potential risk of contamination from refuelling or general fuel management the following controls will be put in place:

- Minimal fuel and oil quantities will be stored on site.
- To reduce the likelihood of leaks, all plant will be inspected prior to entry on site.
- Construction equipment refuelling will be in designated refuelling areas, which will be a minimum of 25m away from adjacent field drains.
- Storing fuels, chemicals, liquid and solid waste on impermeable surfaces in suitable containers.
- Refuelling will only be carried out using double bunded mobile bowsers. Bowsers will be inspected weekly, prior to use. The refuelling bowser will be operated only by designated, trained personnel. Spill kit equipment will accompany the bowser, a drip tray will be used when refuelling.
- Plant, site vehicles and machinery will have a completed daily prestart check list

- Plant observed to have oil leaks will be immediately removed from site.
- Spill kits will be placed in a number of key locations within the site.
- Oil containers will be stored within a secondary containment system e.g. bund for static tanks or a drip tray for mobile stores.
- Site induction will contain actions to be taken in the event of an oil leak and details of who to contact in the event of a spillage will be circulated.
- In the event of contaminated soil being identified all works in the area local to the contamination will be stopped immediately and the procedures set out in the ERP will be followed.

5.4 Concrete Control and Management

Any concrete pours will be planned in advance. Special procedures will be adopted in advance of and during all concrete pours to minimise the risk of pollution. The following to be considered:

- Ensure that excavations are water free before concrete works commence.
- Review of the weather forecast to assist in planning concrete pours
- Avoid large pours where prolonged periods of inclement weather conditions are forecast or persist.
- Ensure that covers are available for freshly placed concrete to avoid runoff to nearby receptors during inclement weather conditions
- There will be no batching of concrete on the site. All concrete will come supplier with appropriate certification and insurance
- No washing out of concrete supply trucks will be allowed on the site with the exception of their chutes being brushed.
- The method for chute wash out is as follows:
    - A 12-yard skip on a suitable area of hardstanding.
    - A layer of sand will be placed on the bottom of the skip.
    - The skip will then be lined with a layer of heavy-duty polythene.
    - Concrete delivery vehicles will then be permitted to reverse up to skip and wash out their chute (only) into the washout skip.
    - Water levels in the skip will be monitored daily.
    - Skip will be covered as required during periods of heavy rainfall.
    - As skip reaches capacity the “Washout water” from will be pumped into an empty concrete delivery vehicle to be returned to the concrete supplier, where this water will be reused in the batching process.

To reduce the potential for cementitious material entering field drains, concrete pours will be supervised by Site Manager. The following mitigation will be adopted:

- The Site Manager will ensure that the area of the pour is completely drained of water prior to pour commencement.
- Pours will not take place during forecasted rainfall.

- Incidental rainfall from light showers during the period of a pour is typically absorbed into the concrete matrix but heavier showers can result in some run off from the top surface of the concrete pour.
- In the event of a spill within the immediate vicinity of drainage ponds or French drains, the pond outfall will be temporarily blocked and the pH levels of the water will be monitored. Any spillage will be cleared immediately and deposited in the chute wash down area.
- During the pouring of concrete, effective containment measures will be implemented to avoid spilling concrete outside construction areas and to prevent concrete entering any drainage system.
- To reduce the potential for cementitious material entering field drains, concrete pours will be supervised by the site manager.
- Wet concrete operations are not envisaged for this site within or adjacent to field drains or aquatic zones. However, if wet concrete operations are required in such locations, a suitable risk assessment will be completed by the environmental manager.
- Clearly visible signs will be placed in prominent locations close to concrete pour areas, stating that washout of concrete lorries is not permitted on the site.
- Temporary storage of cement bound granular mixtures will be on hardcore areas.
- Cement products are hazardous and should always be stored in a COSHH store or similar (shipping container), and only be in the open when in use. If cement products are temporarily located in the open, then they will be located within an impermeable bunded area and covered to prevent contact with rainwater. This will prevent direct drainage of cement storage areas to surface waters. Bunding will be in the form of sandbags or silt fencing.

5.5 Noise and Vibration

The use of mechanical tools, general construction activities, and the movement of vehicles servicing the site has the potential to generate noise and vibration during the construction phase of the permitted development.

The following general mitigation measures are considered appropriate for the permitted development during the construction phase:

- Plant will be used in an appropriate manner with respect to minimising noise emissions.
- All plant used will be modern, well maintained and working properly.
- Low noise emitting plant will be selected where appropriate.
- Avoid idling engines. Engines will be switched off when not in use.
- Plant will be used in an appropriate manner with respect to minimising noise emissions.
- Reduced speed limits will be imposed along the access roads and within the construction site.

5.6 Traffic Management

The access road is approximately 1.5km from the R426 (public road) to the substation compound gates. Appropriate signage will be maintained for the duration of the project with clear warning signage installed along the R426 Local Road on approach to the site entrance.

Construction traffic to site will include:

- Cars and vans associated with on-site construction personnel commuting to work.
- HGVs transporting plant/machinery, construction materials, including concrete, stone, building materials, drainage/ducting materials, structural steel, cabling, site boundary fencing and electrical components, etc.
- All vehicle movements within the site will be controlled.
- No permitted parking of vehicles on the public road.

5.7 Ecology Management

Section 2.3.3 provides details on the existing ecological environment of the site. Some protection measures to maintain ecological biodiversity with regard to natural occurring habitat on site are as follows:

- The project ecologist will be employed during the construction phase of the project. Duties will include the review of all method statements; delivery of toolbox talks and monitoring of construction phase to ensure that all environmental controls and mitigation measures are implemented.
- Spraying of vegetation using pesticides will be strictly prohibited.
- Habitat disturbance e.g. vegetation rutting, will be limited by controlling the movement of maintenance vehicles. Construction vehicles will not encroach onto habitats beyond the permitted footprint.
- In the event that protected mammal/amphibian species, or their active habitats are found during the construction phase, works will cease immediately and the area will be cordoned off until advice is sought from a suitably qualified specialist.
- Where confirmatory pre-construction surveys confirm nesting birds are present, an exclusion zone will be established around the nesting bird (to include the risk of abandonment due to indirect disturbance), and no vegetation clearance will proceed until young are presumed to have fledged, or nesting has failed.

The regular ecology site walkovers will also consider protected volant/non volant mammals, birds and amphibians outlined below:

- Amphibians
- Badger (Meles meles);
- Bats;
- Birds;
- Otter (Lutra lutra);
- Viviparous lizard (Zootoca vivipara); and
- Invasive non-native species (INNS), both plant and animal findings of the above are included within this report.

The following minimum standards will be followed to prevent ecological impacts occurring outside the works area:

- Measures taken to prevent the spread of suspended solids (including vegetative material) into the field drain from the permitted works;
- Measures will be taken to prevent dust and other emissions from construction affecting

land/water beyond the permitted works area;

- Chemicals and fuels should be stored in secure containers located away from field drains or water bodies. Spill kits will be available;
- Noise and vibration will be controlled and kept to the minimum necessary;
- Lighting used for construction will be switched off when not in use and positioned so as not to spill on to adjacent land or retained vegetation within the Site; and
- An area of ecological sensitivity has been identified on site (**Appendix 6 – ESB Drainage Drawings**). This area will be fenced off before construction works commence.

5.7.1 Invasive Species

There were no invasive plant species identified as part of the recent site walkovers. However, to ensure the site remains free of such invasive species, ecological site walkovers will be conducted on a monthly basis and an inspection for invasive species will form part of the environmental audit. If identified, invasive species will be managed as per an Invasive Species Management Plan which will be prepared in the event of such a situation arising.

Some mitigation and preventative measures for the control of invasive species include:

- Invasive species awareness to be included in all personnel site induction which will include training using the Procedures in **Appendix 12 Environmental Management Procedures.**
- All equipment and vehicles will be visually inspected for evidence of attached plant material, mud and debris. This will be undertaken before entering and leaving the site. Any attached or adherent material will be removed before leaving the site.
- If suspected invasive species are encountered, the materials containing these species will be quarantined and disposed of to a fully permitted facility and transported by a licenced contractor. Records of findings will be kept, this will include species identity, location and source. Disposal will be recorded in the Resource and Waste Management Plan.

5.8 Waste Management

A Resource and Waste Management Plan will be in place for the project – see **Appendix 5.** This plan details projected waste streams and avenues for disposal.

The key waste management proposals for the site include:

- The provision of a Waste Storage Area on site that will hold waste skips. Individually labelled skips will be provided for each category of waste and these will be emptied regularly. See **Figure 16** (Extract location from **Appendix 2 – Site Logistics Plan**)
- All project waste will be recorded in the Resource and Waste Management Plan. This document will be made available for all personnel and will be located in the site compound office.
- It is not intended to remove any soils/excavated material from site unless they are found to be contaminated or contain invasive species. In this scenario, the materials will be quarantined in a suitable storage container and transported to a fully permitted facility by a licensed contractor for treatment or disposal.
- All waste removed off site shall be completed by a waste contractor with suitable licences and permits to the approval of the Engineer and the relevant local authority. Permit details will

be included and maintained in the on-site Environmental Management Plan.

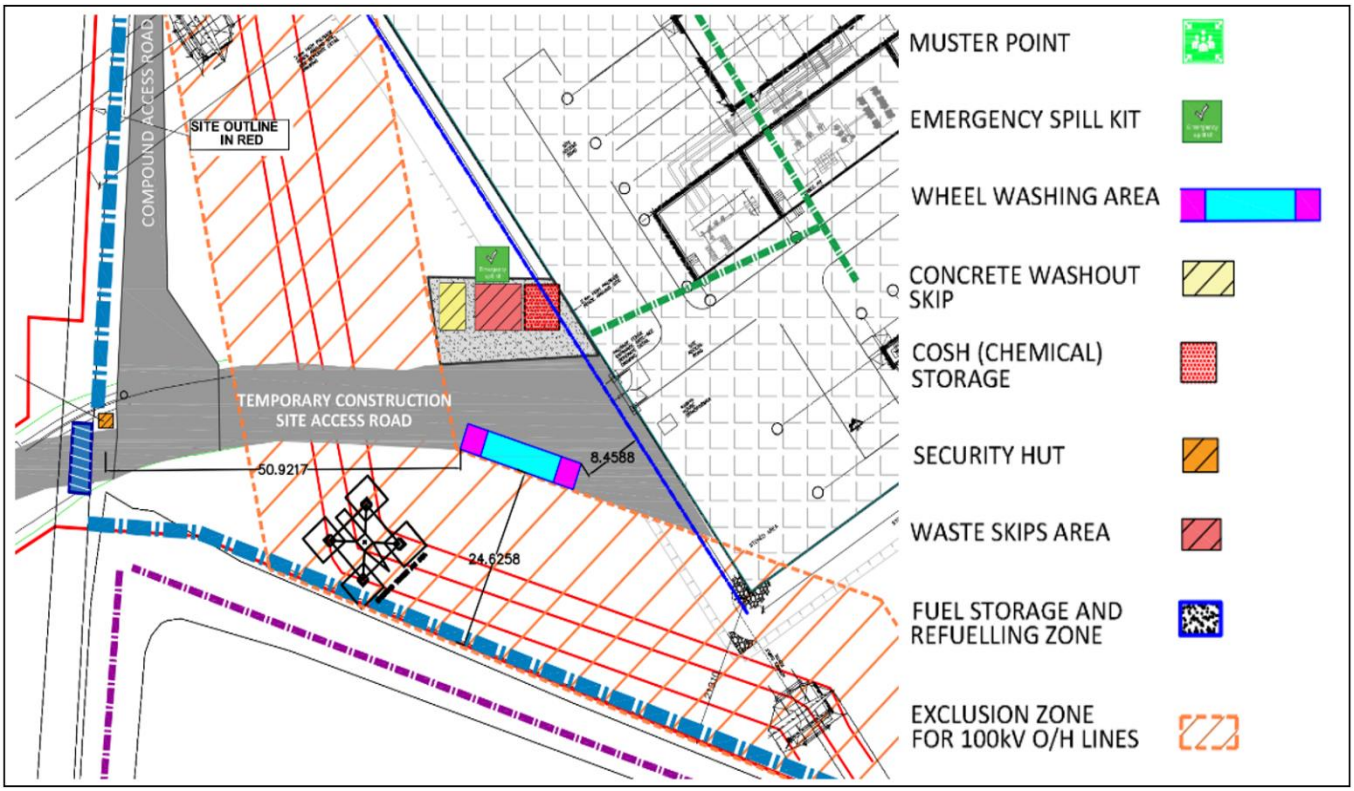


Figure 16: Waste Control Area

5.9 Site Wheel Wash

The Wheel wash area as depicted in **Appendix 2- Site Logistics Plan** maintains a minimum of 5m distance from any adjoining surface water land drain or watercourse and is located outside of the overhead line exclusion zone in the vicinity.

5.9.1 Wheel Wash Design

The proposed wheel wash is an EcoBath system, which is typically used throughout the construction industry**. Appendix 2A** depicts design details of the wheel wash layout. See details below:

- The Eco bath is essentially a large, contained tank of water, which allows a vehicle to drive through, in order to clean its wheels (**Figure 17**);
- A stone ramp shall be constructed at either end of the EcoBath (**Figure 18**). These stone access ramps shall be inspected regularly and upgraded, where necessary;
- Once the EcoBath and ramps are installed, the bath is filled with water to the required levels;
- There is no requirement for any power, services or drainage connection to the EcoBath for the duration of its use and operation;

- There are 2 no. rumble track features within the EcoBath. Once a vehicle drives across the rumble tracks, this triggers the tracks to flex the tyre treads open and vibrate the wheels to agitate and remove any adherent material;
- The rumble tracks are largely submerged in water thus assisting the cleaning process (**Figure 17 & 18**);
- The length of the EcoBath system allows for approximately 3.8-wheel revolutions in the cleaning process. If necessary, a vehicle can pass through the EcoBath several times to ensure wheels are cleaned effectively;
- Prior to leaving site, the condition of all vehicles will be inspected ; and
- All inspection records will be made available on request.

Figure 17: Eco Bath in use. Rumble tracks submerged in water

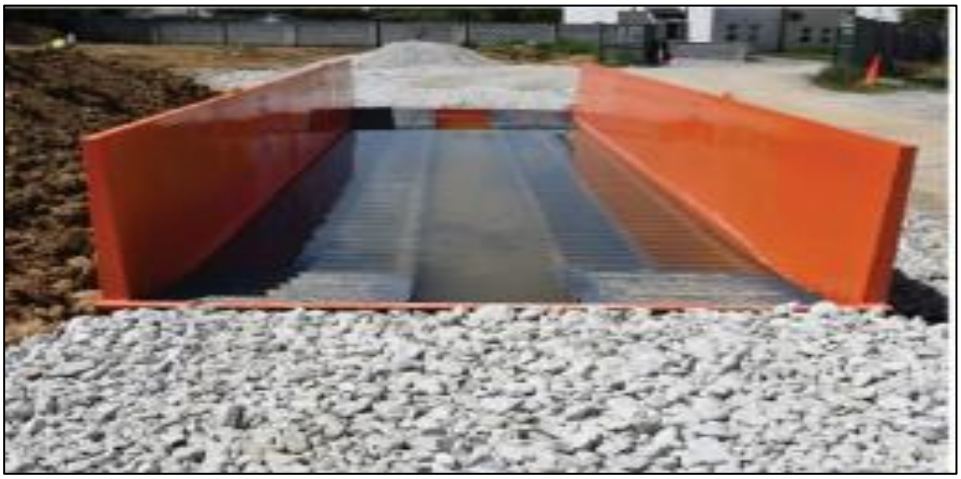


Figure 18: Stone access ramps in place

5.9.2 Monitoring, Treatment & Disposal

- Daily monitoring and inspection of the wheel wash area will include monitoring water levels, water clarity and base sediment levels;
- The inspections will inform the effective maintenance regime of the EcoBath;
- Water will be removed, as required, allowing the removal of settled deposits at the base;
- The frequency of emptying/cleaning may need to be increased depending on factors such as frequency of use, changes to work scopes, seasonal conditions, site conditions, etc. This frequency will be determined by recommendations arising from daily checks/inspections and Site Environmental Monitoring/Auditing processes;
- All water and settled deposits will be removed using a suction pump and/or vacuum system by a licenced waste contractor;
- The waste will then be removed from site to be treated appropriately - this will be at the licenced waste contractor's discretion;
- Similarly, if water levels are too high (e.g. during adverse weather) the waste contractor will remove any surplus water for disposal as outlined above;
- Once all water and sediment has been removed, the EcoBath will be inspected for any adherent residual materials and then replenished with clean water;
- Water will not be disposed of/ treated / reused on site throughout the duration of the project ; and
- A copy of all Waste Collection Permits and Waste Facilities Permit/Licences of all waste suppliers will be kept on site.

6 IMPLEMENTATION OF CEMP

This section of the CEMP provides an overview of the Roles and Responsibilities of the project team and tasks to be undertaken in implementation of the CEMP

6.1 Project Organisational Structure and Responsibilities

The Organisational Structure for the Kilwex Ltd project team is displayed in **Figure 19** below and also contained in **Appendix 13 Kilwex Organisational Structure**.

This organogram defines the positions of the project team with the relevant reporting structures detailed.

The project team will include an overall Project Manager, whose duties will stretch beyond the day-to-day works to budgetary, procurement and scheduling matters. The Site Manager will report to the Project Manager and will have overall responsibility for the managing the construction site personnel carrying out the works.

An Environmental Manager will be employed for the duration of the works and will report to the Project Manager. The Site Manager will communicate on an on-going basis with the Environmental Manager to ensure mitigation measures are applied for specific works.

The roles and responsibilities for key project team members are provided in detail in **Section 6.3**

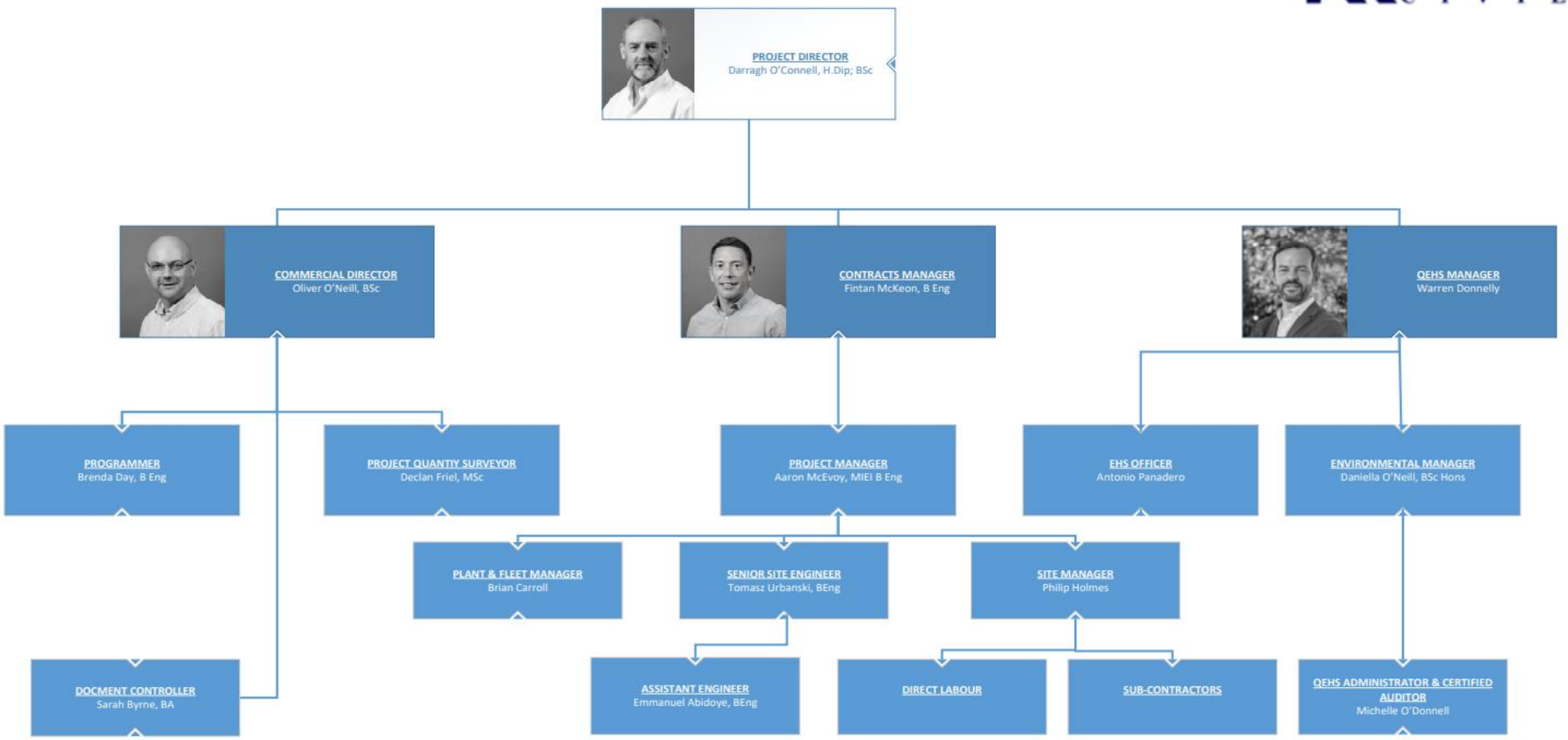


Figure 19: Kilwex Organisational Structure

6.2 Site Induction & Toolbox Talks

Prior to commencement of any works on site, all personnel visiting or working on site shall receive a site induction. The induction process will outline works, the site rules and will ensure that all personnel have the correct information to carry out their work in a safe manner.

The induction will include key environmental management measures to be adhered to, including the following:

- Sensitive ecological areas (buffer zones) where personnel will have no access as it will be a fenced-off area.
- The storage of fuel, oil and other hydrocarbons and refuelling operations.
- Waste management.
- Earthworks – control of dust, use of settlement ponds, etc.
- Noise minimisation.
- Awareness of responsibilities in relation to neighbouring properties.
- Ecology matters, including invasive species.
- Responsibility of the workforce to report any concerns relating to environmental issues.
- Incident notification in the event of an environmental incident, including emergency response, spill management, etc. All personnel will be provided with the necessary familiarisation to understand the actions required in the case of an environmental emergency and how to promptly report and respond to potential environmental emergencies.

The site induction will include this information in a PowerPoint presentation presented by a member of the site management team to inductees prior to any person commencing work on site. The induction will clearly display the plan drawing depicting the buffer zone installed to restrict access to protect the sensitive ecological areas, i.e., the streams to the north of the site.

Toolbox talks on environmental matters using information from the Environmental Management Procedures, shall be used to raise awareness of environmental management for the project. These toolbox talks will be specific to the permitted development and will explain topics such as project-specific mitigation measures, emergency response procedures, waste management, concrete works, environmental awareness relating to the sensitivity of the field drains, ecological exclusion zone, among others.

The relevant Environmental Management Procedures (EMP's) included in **Appendix 12** will provide the necessary information for environmental toolbox talks and site inductions. Information will be utilised from the Environmental Management Procedures to train site personnel to undertake specific ecologically sensitive tasks such as refuelling etc.

6.3 Roles and Responsibilities

The general key personnel on site implementing the CEMP are listed below with roles and responsibilities detailed in the following sections:

- Project Manager
- Site Manager
- Environmental Manager

- Project Ecologist
- Project Archaeologist.

6.3.1 Project Manager

The Project Manager is appointed by the contractor to manage and oversee the entire project. The Project Manager is responsible for:

- Implementing the Construction and Environmental Management Plan (CEMP)
- Implementing the Safety and Health Plan.
- Management of the construction project.
- Liaison with the client/developer.
- Liaison with the project team.
- Assigning duties and responsibilities in relation to the CEMP
- Production of construction schedule.
- Materials procurement.
- Maintaining a site project diary.

6.3.2 Site Manager

The Site Manager manages all the works to construct the project, on behalf of the contractor. The Site Manager reports to the Project Manager. In relation to the environmental management, the Site Manager is responsible for:

- Ensure all operatives/personnel are inducted prior to commencing works on site. The induction process will include requirements of CEMP
- Ensure all works are carried out by operatives with relevant competency.
- Ensure all risk assessment / method statements cover requirements of CEMP where applicable.
- Ensure all actions/requirements of CEMP are put in place
- Supervise and monitor works to ensure compliance with CEMP.
- Ensure all plant and equipment daily checks and inspections are carried out and records are updated and filed on site.
- Issue / complete toolbox talks and training as required.
- Ensure all monitoring is carried out as specified in CEMP. Liaising with the Environmental Manager in preparing site-specific method statements for all works activities where there is a risk of environmental impact, by incorporating relevant mitigation measures.
- Measures and referring to relevant Environmental Control Measure Sheets.
- Liaising with the Environmental Manager where third party agreement is required in relation to site-specific Method Statements, Environmental Control Measures and/or Environmental Control Measure Sheets.

Other general duties will include:

- Awareness of all projects environmental commitments and requirements.
- Ensuring that all relevant information on project programming, timing, construction methodology, etc., is communicated from the Project Manager and to the Environmental Manager in a timely and efficient manner in order to allow pre-emptive actions relating to the environment to be taken where required.
- Programming and planning of excavation works and communicating this schedule to the Environmental Manager.
- Ensuring that adequate resources are provided to design and install any environmental interventions.
- Liaising with the Design Engineer and providing information on environmental management to the Design Engineer during the course of the construction phase.
- Liaising with the project team in assigning duties and responsibilities in relation to the CEMP to individual members of contractor's project staff.
- Ensuring that the Environmental Manager performs regular and frequent environmental site inspections.

6.3.3 Environmental Manager

The Environmental Manager is a critical role on the permitted development to ensure the implementation of environmental best practice. Their duties shall include the following:

- Being familiar with the project environmental requirements and baseline data gathered for the various environmental assessments and during pre-construction surveys.
- Liaising with the project team in assigning duties and responsibilities in relation to the CEMP to the project team.
- Completion of documented environmental audits to ensure that work is being carried out in accordance with environmental mitigation measures and method statements, etc.
- Ensuring that the findings of all audits and inspections are addressed in a timely manner.
- Liaising with the Site Manager to ensure that the control measures set out in the Schedule of Environmental Mitigation are implemented.
- Liaising with the client, Ecological Clerk of Works, specialist consultant etc. in relation to environmental issues.
- Reviewing the surface water management system which will include daily inspections. See Section 7 Monitoring Measures.
- Reviewing the management of waste on site.
- Installation of monitoring equipment and maintenance and management of same.
- Ensuring that site inductions and toolbox talks contain the relevant environmental information and reviewing the effectiveness of the induction process to ensure that site staff have received suitable awareness training.
- Assisting the project team with the review and production of method statements and risk assessments where there is a risk of environmental impact.
- Carrying out an investigation and producing a report regarding all environmental incidents.

The report of the incident and details of remedial actions taken shall be made available to the relevant authority, the project team and to the ESB Environmental support.

- Ensuring that Environmental Emergency Response Plan remains fit for purpose and is communicated with project team. Having emergency arrangements tested via periodic emergency drills.
- Overseeing the review and updating of the CEMP and all project environmental, documentation (e.g. Resource and Waste Management Plan) in light of findings from site audits and inspections, monitoring results, consultation with third parties, legislative changes, etc.
- Ensuring that all relevant works are being carried out in accordance with current environmental legislation, required permits, licences, planning permissions, etc.
- Procuring the services of specialist environmental contractors and coordinating their activities. Ensuring that these contractors are suitably competent and adequately resourced and coordinating all communications between the contractors and relevant project team members.
- Liaising and instructing the site manager to cease works in the event of a potential runoff issue at the field drain.
- Make suggestions in relation to onsite drainage changes to better suit the ecology of the site in agreement with Resident Engineer.

Third Party Consultations

- The Environmental Manager will oversee and coordinate consultations with third parties as required. A list of relevant third party consultations is included in **Section 6.4.3.** This may include Laois County Council, the EPA, and any other relevant statutory body.
- Liaising with all prescribed bodies during site visits, inspections and consultations.

6.3.4 Project Ecologist

The Ecologist will be responsible for:

- The effective implementation of ecological mitigation measures as detailed in the EIS & NIS.
- Undertaking pre-construction walkover surveys (**See Appendix 14 Site Ecological Walkover Report**)
- Liaising with the National Parks & Wildlife and local authority on applicable wildlife licensing procedures as required.
- Carrying out site inspections.
- Liaising with Site Management and personnel as required. Presenting toolbox talks on ecological items (as required).

6.3.5 Project Archaeologist

An Archaeologist will be responsible for:

- Monitoring of earthworks associated with the development.

- Ensuring implementation of archaeological mitigation measures.
- Liaising with the Environmental Manager / Site Manager.
- Liaising with the Project Manager / Client.
- Participating in relevant toolbox talks.
- Supervising all topsoil stripping works onto the surface of the underlying geological-derived subsoils.
- Ensuring that all topsoil will be removed by mechanical excavators fitted with wide, toothless grading buckets.
- Ensuring that in the event that subsurface remains of archaeological interest/potential are uncovered during earthworks, then works in the immediate area will cease, pending investigations by the appointed archaeologist and consultation with the National Monuments Service, Department of Housing, Local Government and Heritage (as required).
- Producing a report describing the results of the programme of Archaeological Monitoring and any other archaeological interventions that might be required.

6.3.6 All Personnel

All site personnel are responsible for:

- Adhering to the relevant Environmental Control Measures and relevant site-specific Method Statements.
- Adhering to the Safety and Health Plan, CEMP, Resource Waste Management Plan and the Environmental Emergency Response Plan
- Reporting immediately to the Environmental Manager and Site Manager any incidents where there has been an environmental incident . This may include a spillage of a potentially environmentally harmful substance, an unauthorised discharge to ground, water or air or damage to a protected habitat, etc.
- Participating in induction and toolbox talks as detailed in **Section 6.2**
- All personnel will participate in toolbox talks in relation to information derived from the Environmental Management Procedures.

6.4 Site Contacts

The following provides contacts of key project personnel and stakeholders.

Table 8: Contact Details for Main Contractor Kilwex Ltd

Position Title:	Name:	Phone:	Email:
Main Contractor	Kilwex Ltd.	045 889 479	civileng@kilwex.ie
Project Manager	Aaron McEvoy	086 103 4052	aaron.mcevoy@kilwex.ie
Site Manager*	Philip Holmes	086 0842195	philip.holmes@kilwex.ie
Environmental Manager	Daniella O'Neill	086 8427748	daniella@coyleenv.ie
Health and Safety Contact (PSCS)*	Aaron McEvoy	086 1034052	aaron.mcevoy@kilwex.ie
SHEQ Manager	Warren Donnelly	086 858 7795	warren.donnelly@kilwex.ie
EHS Advisor*	Antonio Panadero	086 035 5194	antonio.panadero@kilwex.ie
Site Emergency Number*	Aaron McEvoy	086 103 4052	aaron.mcevoy@kilwex.ie
Project Archaeologist	Martin Byrne	087 262 4954	martinbyrne1063@gmail.com
Overall Project PSDP	Patrick Graham	087 418 5317	patrick.graham@esb.ie

*24-hour contact details

Table 9: ESB Contacts

Position:	Name:	Phone:	Email:
ESB Project Manager	Aoife Heneghan	0879822952	aoife.heneghan@esb.ie
ESB Environmental Specialist	Lorna Conway	0879202428	lorna.conway@esb.ie

Table 10: Third Party Contact

Organisation:	Position:	Name:	Phone:	Email:
Inland Fisheries Ireland	Eastern River Basin District	Dublin Regional Office	(01) 2787022	blackrock@fisheriesireland.ie
National Parks and Wildlife Service	NE Region	District Officer	(076) 1002594	nature.conservation@chg.gov.ie
Environmental Protection Agency (EPA)	EPA	EPA Headquarters	(053) 9160600	info@epa.ie
Local Authority	Laois Co Co	Laois County Council HQ	(057) 866 4000	corpaffairs@laoiscoco.ie
Department of Culture,Heritage and the Gaeltacht	National Monuments Service	Custom House, Dublin	(01) 8882000	nationalmonuments@chg.gov.ie
Health and Safety Authority	HSA	Head Office, James Joyce Street, Dublin 1	(01) 6147000	wcu@hsa.ie
Emergency Services	An Garda Síochána	Stradale Garda	(057) 8625222	-
Emergency Services	Ambulance	Ambulance and Fire Service	999 or 112	-

7 MITIGATION MEASURES

This section of the CEMP groups together all of the mitigation measures presented in the Environmental Impact Statement (EIS) and a Natura Impact Statement (NIS) prepared as part of the planning permission application to An Bord Pleanála (**See Table 11**)

By presenting the mitigation proposals in the below format, it is intended to provide an easy-to-audit list that can be reviewed and reported on during the future phases of the project. The tabular format in which the below information is presented, can be further expanded upon during the course of future project phases to provide a reporting template for site compliance audits.

Table 11: Mitigation Measures from the Environmental Impact Statement and Natura Impact Statement

Ref No.	Reference Heading	Sub-Chapter	Mitigation Measures
Pre-Commencement Phase			
MM1	EIS - Chapter 2 Introduction	2.6 Construction Methodology	It should be noted that prior to commencement of works the contractor(s) will prepare a Construction and Environmental Management Plan (CEMP - see Section 2.11) which will include method statements and work programmes that show more detailed phasing of work;
MM2	EIS - Chapter 2 Introduction	2.6 Construction Methodology	The CEMP produced by the contractor(s) will be agreed with the appropriate authorities.
MM3	EIS - Chapter 7 Cultural Heritage	7.5.1 Unit 1	Given the presence of crop marked field systems (both recorded monuments and new sites – see Sections 0 and 7.3.1.2.3) within proximity to the substation site, it is recommended that the proposed substation site be archaeologically tested prior to the commencement of construction. The use of geophysical survey should also be considered at the earliest stage possible in order to detect previously unknown sites of potential. A report outlining the results of the testing will be submitted to the DAHG and the National Museum for consideration. Should archaeological finds or features be uncovered during the testing preservation in situ, preservation by record (excavation) or further monitoring of ground works may be required.
MM4	EIS - Chapter 8 Ecology	8.5.1 Unit 1	Mitigation by remedy Whilst the avoidance of sensitive areas is the primary means of reducing the potential impacts, further measures will aim to address unavoidable or unforeseen impacts. A Construction and Environmental Management Plan (CEMP) will be drawn up and implemented during the course of construction to remediate the potential negative impacts. This plan shall incorporate the mitigation measures indicated in the EIS, and any others deemed necessary, and shall provide details of intended construction practice for the proposed development, including the following which are of relevance to ecology: a) details of site security fencing and hoardings, b) details of on-site car parking facilities for site workers during the course of construction, c) details of the timing and routing of construction traffic to and from the construction site and associated directional signage, to include proposals to facilitate the delivery of abnormal loads to the site, d) measures to obviate queuing of construction traffic on the adjoining road network, e) measures to prevent the spillage or deposit of clay, rubble or other debris on the public road network, f) alternative arrangements to be put in place for pedestrians and vehicles in the case of the closure of any public road during the course of site development works, g) details of appropriate mitigation measures for noise, dust and vibration, and monitoring of such levels, h) Measures adopted during construction to prevent the spread of invasive species (such as Japanese Knotweed) Monitoring of the construction phase shall be carried out by an environmental engineer and an ecologist each of whom shall be appropriately qualified and experienced, to ensure that all mitigation measures contained in the CEMP are implemented.

Ref No.	Reference Heading	Sub-Chapter	Mitigation Measures
MM5	EIS - Chapter 8 Ecology	8.5.1 Unit 1	Ongoing water monitoring at the discharge points and the receiving waters will be a key indicator of the effectiveness of the erosion and settlement control measures and the requirement for corrective action or the deployment of additional measures as outlined above. Methods, frequency and parameters to be monitored will be discussed and agreement sought with Inland Fisheries Ireland and National Parks and Wildlife Service prior to construction commencing.
MM6	EIS - Chapter 10 Water (Hydrology and Hydrogeology)	10.5 Mitigation	A project-specific Construction and Environmental Management Plan (CEMP) will be established and maintained by the contractors during the construction and operational phases of the proposed Project. The Plan will cover all potentially polluting activities and include an emergency response procedure. All personnel working on the site will be trained in the implementation of the procedures. As a minimum, the manual will be formulated in consideration of the standard best international practice including but not limited to: • National Roads Authority (NRA), Guidelines for the Crossing of Watercourses during the Construction of National Road Line routes.[21] • NRA (2008) Guidelines and Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Roads Schemes. Dublin: National Roads Authority.[22] • Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (C650), 2005[23] • BPGCS005, Oil Storage Guidelines.[24] • Eastern Regional Fisheries Board, (2006), Fisheries Protection Guidelines: Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites. [25] • CIRIA 697, The SUDS Manual, 2007.[26] • CIRIA Control of water pollution from linear construction projects. Technical guidance (C648), 2006[27] • CIRIA, (2001), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors[28] • UK Pollution Prevention Guidelines (PPG) UK Environment Agency, 2004[29] • The Forest Service (2000), Forest and Water Quality Guidelines, Department of the Marine and Natural Resources.[30]
MM7	EIS - Chapter 2 Introduction	2.6 Construction Methodology	It is proposed that 8 separate settlement/attenuation ponds (average area 110m²) will be constructed on site. The 6 no. permanent ponds located in the northwest of the substation and to the east of the compound will be constructed in series separated only by check dams. These ponds will treat surface water runoff from the construction area of the compound and be retained to serve the same function in the operational phase. Two of the proposed ponds will be used temporarily to treat runoff from material stockpiled on the site until the berms ultimately re-vegetate.
MM8	EIS - Chapter 10 Water (Hydrology and Hydrogeology)	10.5.1 Unit 1 Construction Phase	In relation to the proposed Coolnabacky 400/110kV Substation, the control of site runoff will be critical to minimising the potential for impact from this site. In particular the site drainage works and settlement ponds proposed will be developed in the first phase of construction activity and all surface water will be directed to the settlement ponds.
MM9	NIS - Section 4.3.1 Coolnabacky substation site	4.3.1.1 Surface Water Protection	Drainage and runoff controls will be installed prior to starting site clearance and earthworks.

Ref No.	Reference Heading	Sub-Chapter	Mitigation Measures
MM10	NIS - Section 4.3.1 Coolnabacky substation site	4.3.1.1 Surface Water Protection	Settlement ponds will be provided adjacent to the areas of the site where the most excavation or earthworks are planned and would be sized to provide an adequate treatment volume for the first flush from the developed station. The stone check dams which divide the pond into primary, secondary and final settlement compartments will further reduce turbulence which will aid settlement and provide filtering of water.
MM11	NIS - Section 4.3.1 Coolnabacky substation site	4.3.1.1 Surface Water Protection	Ongoing water monitoring at the discharge points and the receiving waters will be a key indicator of the effectiveness of the erosion and settlement control measures and the requirement for corrective action or the deployment of additional measures as outlined above. Methods, frequency and parameters to be monitored will be discussed and agreement sought with Inland Fisheries Ireland and National Parks and Wildlife Service prior to construction commencing.
Construction Phase			
MM12	EIS - Chapter 2 Introduction	2.6 Construction Methodology	Excavated material will be stockpiled and stored in the berm areas indicated on the site layout plans. The berms volume will be approximately 11,000m³ over a plan area of 5,000m².
MM13	EIS - Chapter 2 Introduction	2.6 Construction Methodology	Initially the topsoil material will be stripped from the compound area and stored within the dedicated berm areas of the site.
MM14	EIS - Chapter 5 Human Beings & Pop	5.5 Mitigation	During construction, the contractor will ensure that any works which could involve the transport of large loads along the public roads will be managed to avoid any conflicts with festivals and events likely to attract large numbers of people to the region, such as the Electric Picnic festival.
MM15	EIS - Chapter 8 Ecology	8.5.1 Unit 1	It is intended that excavated material will be used on site for landscaping or for re-instatement measures. Other wastes will be removed for disposal at an appropriate licensed waste disposal facility (see Section 11.3). Note that this mitigation measure applies to all units.
MM16	EIS - Chapter 8 Ecology	8.5.1 Unit 1	In relation to potential impact on groundwater fed watercourses it is proposed that continuous monitoring will be employed where the contractor proposes any dewatering during the construction phase and proposals for dewatering and monitoring will be approved by the designers and ecologist for the project.
MM17	EIS - Chapter 8 Ecology	8.5.1 Unit 1	Mitigation by reduction - Impacts will be minimised by limiting the extent of the works to the development footprint.
MM18	EIS - Chapter 8 Ecology	8.5.1 Unit 1	Mitigation by reduction - Potential impacts caused by spillages etc. during the operational phase will be reduced by keeping spill kits and other appropriate equipment on-site.

Ref No.	Reference Heading	Sub-Chapter	Mitigation Measures
MM19	EIS - Chapter 8 Ecology	8.5.1 Unit 1	Specific mitigation relating to birds, bats and mammals Construction: any vegetation clearance that may be required to facilitate construction should be restricted, as much as possible, to time periods outside the bird and bat breeding season (March to September).
MM20	EIS - Chapter 8 Ecology	8.5.1 Unit 1	Surface water Protection Drainage and runoff controls will be installed prior to starting site clearance and earthworks.
MM21	EIS - Chapter 8 Ecology	8.5.1 Unit 1	- Erosion control (preventing runoff) is much more effective than sediment control in preventing water pollution. Erosion control is less subject to failure from high rainfall and requires less maintenance. - Erosion control measures to prevent runoff flowing across exposed or excavated ground and becoming polluted with sediments are provided for in the design. This is primarily the use of existing site drains to channel runoff from up slope portions of a catchment around any construction areas or areas disturbed as a result of construction works. - Other inherent erosion control measures in the design include the design of roadways with minimum falls which do not exceed 15%.
MM22	EIS - Chapter 8 Ecology	8.5.1 Unit 1	Additional erosion control measures will be provided for in the construction management proposals. These measures will include the following: • Minimise the area of exposed ground. Backfilling and construction will occur in conjunction with excavation and excavation will not proceed faster than the rate of construction. Re-vegetating of disturbed area to take place as soon as possible. • Monitoring of the weather forecast prior to planning excavation works. • Providing impermeable mats (plastic sheeting) as covers to mounded excavated material and open excavations during periods of heavy rainfall. Silt fences to be provided at the toe of any significant areas where excavated material is stored.
MM23	EIS - Chapter 8 Ecology	8.5.1 Unit 1	- The Settlement Ponds are an integral part of the sediment control and containment measures on site and the protection of watercourses. Settlement ponds will be provided adjacent to the areas of the site where the most excavation or earthworks are planned. - The settlement ponds on the site have been sized to provide an adequate treatment volume for the first flush from the developed station and the ponds will ultimately have an attenuation volume so that surface water runoff can be limited to Greenfield runoff rates. This attenuation volume can be utilised as additional treatment volume in the construction phase when sediment generation is greatest. - The stone check dams which divide the pond into primary, secondary and final settlement compartments will further reduce turbulence which will aid settlement and provide filtering of water. - Surface water from the site will be discharged to existing vegetated drainage ditches within the site where further settlement of solids and filtering of surface water will occur prior to ultimate discharge to the adjacent watercourse.

Ref No.	Reference Heading	Sub-Chapter	Mitigation Measures
MM24	EIS - Chapter 8 Ecology	8.5.1 Unit 1	The best way to manage pollution incidents is to prevent them. The contractor will identify and quantify risks associated with erosion and sediment for each work practice. Risks such as an unplanned bank collapse, mud slide and unforeseen rainfall event can be constantly assessed through geotechnical risk management and monitoring of weather forecasts.
MM25	EIS - Chapter 8 Ecology	8.5.1 Unit 1	The contractor will prepare an emergency response plan and set of procedures for events likely to cause pollution including the pollution of watercourses with silt or sediment. There will be a contingency plan in place during construction which will be displayed at appropriate locations.
MM26	EIS - Chapter 8 Ecology	8.5.1 Unit 1	Equipment required in responding to an emergency event with the capability of generating additional erosion and sediment laden runoff will be stored on site. Staff will be trained in the use and application of these temporary emergency measures which may involve the following: • Impermeable matting (plastic sheeting); • Silt fences (posts & geotextile material); • Mulching capability (organic materials, straw, wood chip, bark or other wood fibres and gravel) to stabilise or protect cleared areas; • Settlement Tanks (portable propriety settlement tanks that can be transported to required areas). Staff will be trained and made aware of procedures for notification of emergency events with the potential for pollution of watercourses.
MM27	EIS - Chapter 8 Ecology	8.5.1 Unit 1	- The contractor will store all chemicals, hydrocarbon based fuels and oil filled equipment when not in use in bunded areas of the site.
MM28	EIS - Chapter 8 Ecology	8.5.1 Unit 1	- The contractor will have emergency spill kits comprising oil absorbent materials on site and staff trained in the use of these. Emergency response measures to oil/ fuel leaks will be displayed prominently on the site.
MM29	EIS - Chapter 8 Ecology	8.5.1 Unit 1	- Sustainable Drainage Systems (SuDS) in the drainage network design will be put in place early in the construction phase to filter and biodegrade hydrocarbons in the unlikely event that any enter the water on the site.
MM30	EIS - Chapter 8 Ecology	8.5.1 Unit 1	- There will be no large scale batching of concrete on the site. All concrete will come from a licensed supplier with environmental certification. No washing out of concrete supply trucks will be allowed on the site. No cementitious material will be allowed enter the water or groundwater on the site. Monitoring and emergency response measures for any escape of cementitious material will be put in place by the contractor.
MM31	EIS - Chapter 8 Ecology	8.5.1 Unit 1	- Any foul waste generated in the construction and operational phase of the project will be collected and disposed off site by a licensed contractor. No contamination of groundwater will occur from foul waste.

Ref No.	Reference Heading	Sub-Chapter	Mitigation Measures
MM32	EIS - Chapter 9 Soils & Geology	9.5 Mitigation	A project-specific Construction and Environmental Management Plan (CEMP) will be established and maintained by the contractors during the construction and operational phases. The CEMP will cover all potentially polluting activities and include an emergency response procedure. All personnel working on the site will be trained in the implementation of the procedures. In consideration of soils and geology the Plan will, as a minimum, consider the following sources: • Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA)19 • Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (C650), 200520 • CIRIA Control of water pollution from linear construction projects. Technical guidance (C648), 200621
MM33	EIS - Chapter 9 Soils & Geology	9.5.1 Unit 1 Construction Phase	During the construction phase the mitigation measures on soil and geology are associated with the following: • Degradation of soils and/or subsoils • Excavation of soils and/or subsoils • Contamination of soils and/or subsoils • Management of excavated materials at off-site locations • Waste Management • Proximity to Site of Geological Interest
MM34	EIS - Chapter 9 Soils & Geology	9.5.1 Unit 1 Construction Phase	Planned construction works will be carried out in such a manner as to ensure the least feasible disturbance of soils. It is envisaged that all topsoil will be retained on site where possible and reused as fill material (if suitable). ~~An additional 3,500m3 of soil will be imported from the Ballyragget substation site (Unit 4) to supplement the berms.~~
MM35	EIS - Chapter 9 Soils & Geology	9.5.1 Unit 1 Construction Phase	Contractors will be required to submit and adhere to a method statement indicating the extent of areas likely to be affected and demonstrating that this is the minimum disturbance necessary to achieve the required works. Where soil stripping occurs the resulting excavated soil fractions will be separated into topsoil/fill and subsoil stockpiles.
MM36	EIS - Chapter 9 Soils & Geology	9.5.1 Unit 1 Construction Phase	Compaction of areas will be avoided where possible. Where compaction has occurred due to truck movements and other construction activities, restoration will be undertaken with areas reinstated to their original condition, where possible.
MM37	EIS - Chapter 9 Soils & Geology	9.5.1 Unit 1 Construction Phase	Temporary storage of spoil will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment and the material will be stored away from any ditches or surface water drains.

Ref No.	Reference Heading	Sub-Chapter	Mitigation Measures
MM38	EIS - Chapter 9 Soils & Geology	9.5.1 Unit 1 Construction Phase	In order to minimise potential degradation of in situ soil as a result of construction activities, the following measures will be implemented during the construction phase of the proposed line route: • In so far as practicable, compaction of any soil or subsoil which remains in situ along the proposed line route will be avoided • Stockpiles of soil/subsoil will be restricted to less than 3m in height • Repeated handling of soil will be avoided and ideally all soil stockpiles will remain undisturbed pending later re-use and re-establishment along the proposed line route • Construction traffic within the site will be required to follow dedicated routes
MM39	EIS - Chapter 9 Soils & Geology	9.5.1 Unit 1 Construction Phase	In order to reduce potential erosion of in situ and excavated soils/subsoil and minimise sediment discharge during the construction phase, the following measures will be implemented: • Leaving soil and/or subsoil undisturbed in situ for as long as possible prior to excavation • Minimising excavation and stockpiling activities during wet weather periods • Shaping stockpiles of excavated soil and/or subsoil so as to shed water • Construction of silt traps at an early stage in the construction programme • Interception and channelling of surface water runoff over exposed soil/subsoil surfaces to sumps, silt traps or settlement ponds where practicable, prior to discharge to existing drains or outfalls • Interception and diversion of surface water runoff away from open excavations where practicable
MM40	EIS - Chapter 9 Soils & Geology	9.5.1 Unit 1 Construction Phase	To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within specially constructed dedicated temporary bunded areas. Oil and fuel storage tanks will be stored within designated areas with an impervious base. These areas will be bunded to a volume of 110% of the capacity of the largest tank/container within the bunded area(s) (plus an allowance of 30 mm for rainwater ingress). Filling and draw-off points will be located entirely within the bunded area(s). Drainage from the bunded area(s) will be diverted for collection and safe disposal.
MM41	EIS - Chapter 9 Soils & Geology	9.5.1 Unit 1 Construction Phase	In order to reduce the risk of contamination arising as a result of spills or leakages mitigation measures will include, but will not be limited to, the following: • Storing fuels, chemicals, liquid and solid waste on impermeable surfaces • Undertaking refuelling of plant, equipment and vehicles on impermeable surfaces • Ensuring all tanks and drums are bunded in accordance with established best practice guidelines • Provision of spill kits and hydrocarbon absorbent packs in all construction vehicles.

Ref No.	Reference Heading	Sub-Chapter	Mitigation Measures
MM42	EIS - Chapter 9 Soils & Geology	9.5.1 Unit 1 Construction Phase	No concrete batching facility will be required at the site. 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 the following measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. • The contractor will be required to make provision for removal of any concrete wash waters, most likely by means of tankering off-site. • Only the chute of the concrete delivery truck will be cleaned on site, using the smallest volume of water necessary. • Concrete trucks will be directed back to their batching plant for washout. • The arrangements for concrete deliveries to the site will be discussed with suppliers before commencement of work, agreeing routes, prohibiting onsite washout and discussing emergency procedures. • Clearly visible signs will be placed in prominent locations close to concrete pour areas, stating that washout of concrete Lorries are not permitted on the site. • Wash down water from exposed aggregate surfaces and cast-in-place concrete, and from washing of delivery truck chutes will be trapped on site to allow sediment to settle out and reach neutral pH before clarified water is released to a stream or drain system or allowed to percolate into the ground.
MM43	EIS - Chapter 9 Soils & Geology	9.5.1 Unit 1 Construction Phase	Re-fuelling of construction equipment and the addition of hydraulic oil or lubricants to vehicles/ equipment will take place in designated bunded areas, where possible, and not on-site. If it is not possible to bring machinery to the refuelling point, fuel will be delivered in a double-skinned mobile fuel bowser. Any refuelling on site will take place at a designated distance away from watercourses (>10m) in accordance with the buffer zone guidelines highlighted in Section 10 Water (Interaction). A drip tray will be used beneath the fill point during refuelling operations in order to contain any spillages that may occur. Spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment.
MM44	EIS - Chapter 9 Soils & Geology	9.5.1 Unit 1 Construction Phase	All associated hazardous waste residuals will also be appropriately stored within temporary bunded storage areas prior to removal by a licensed waste management contractor for off-site treatment/recycling/disposal.
MM45	EIS - Chapter 9 Soils & Geology	9.5.1 Unit 1 Construction Phase	If it is not feasible to immediately incorporate excess soil/subsoil into the permanent works, the appointed contractor will be required to dispose of, re-use the material off-site or store any excess earthworks materials at an appropriately permitted or licensed waste management facility, in accordance with the requirements of the Waste Management Act of 1996 (as amended) and associated Regulations. This restriction will ensure that potential indirect impacts on soil and geology at off-site locations will be subject to adequate environmental control and monitoring.
MM46	EIS - Chapter 9 Soils & Geology	9.5.1 Unit 1 Construction Phase	Where practicable, excess earthworks materials will be temporarily stored at appropriately permitted or licensed waste management facilities, pending processing or re-use on future public works and/or private development projects.

Ref No.	Reference Heading	Sub-Chapter	Mitigation Measures
MM47	EIS - Chapter 9 Soils & Geology	9.5.1 Unit 1 Construction Phase	Implementation of these mitigation measures during the construction phase will ensure that excavated materials generated by site construction activities will be directed, where necessary, to waste recovery or disposal facilities, where the existing baseline rating of soil and/or subsoil is typically low or very low and the level of protection provided to the environment is appropriate to the risks involved.
MM48	EIS - Chapter 9 Soils & Geology	9.5.1 Unit 1 Construction Phase	In the event of soils being taken off site they will be removed and disposed of by contractors licensed under the Waste Management Act of 1996 (as amended), the Waste Management (Facility Permit & Registration) Regulations of 2007 (as amended) and the Waste Management (Collection Permit) Regulations of 2007 (as amended). The issuing of such a permit to contractors allows them to use such material for landscaping and land reclamation, subject to conditions defined in the permit if the material has been classified as suitable for this use. Otherwise, the material will be classified for disposal at a suitably licensed landfill and removed off-site by a licensed waste contractor. In terms of surplus soil, any residuals will be stored within appropriate storage areas of sufficient capacity prior to removal by a suitably licensed waste management contractor for off-site treatment/recycling/disposal.
MM49	EIS - Chapter 9 Soils & Geology	9.5.1 Unit 1 Construction Phase	A construction and demolition waste management plan will be developed by the appointed contractor in accordance with the Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects (DoEHLG, 2006) to ensure that all construction waste is stored, managed, moved, reused or disposed of in an appropriate manner by appropriate contractors in accordance with all relevant waste legislation. See Section 11.3 Waste (Interaction) for more detailed information.
MM50	EIS - Chapter 9 Soils & Geology	9.5.1 Unit 1 Construction Phase	The GSI have stated that the only direct impact on any CGS would be from locating substations, structures or similar, at those locations[17]. The construction activities associated with the substation will not take place within the outline of the Timahoe Esker extents as issued by the GSI.17

Ref No.	Reference Heading	Sub-Chapter	Mitigation Measures
MM51	EIS - Chapter 10 Water (Hydrology and Hydrogeology)	10.5.1 Unit 1 Construction Phase	It is proposed to provide a clean water cut off drain to stop water running across construction areas and to discharge this to an adjacent stream. Drainage channels will collect runoff from the construction and development areas. These drainage channels will discharge to 2 no. dedicated Settlement Ponds constructed on site. 2 no. settlement ponds will be constructed at the site. Pond 1, located to the North of the substation will have a capacity to treat approx. the first 20mm of rainfall on the 400kV substation building and the stone area of the site. Pond 2 will have capacity to treat the first 33mm of rainfall generated from the transformers bund and the 110kV Substation building. These will be installed before site clearance and earthworks. The settlement ponds will be comprised of a system of check dams which will further divide the ponds into primary, secondary and tertiary pond. The settlement ponds will be lined with geotextile material on a bed of 200mm of single size clean stone. The settlement ponds will have a permanent water depth of 300mm and a combined treatment volume of 180m3. The pond will provide suitable attenuation for the 100 year rainfall return period. The permanent water depth and treatment volume can be increased during the construction phase when silt generation is at its highest. Temporary drainage from the site berms will be provided via French Drains until the berms are vegetated. The berms will be surrounded by silt fences until vegetated.
MM52	EIS - Chapter 10 Water (Hydrology and Hydrogeology)	10.5.1 Unit 1 Construction Phase	During the construction phase the mitigation measures have been applied for the following potential impacts: • Increased Runoff and Sediment Loading • Contamination of local water courses and groundwater • Dewatering • Flood Risk • Localised alteration of groundwater flow, rate and direction The mitigation measures will ensure that no sediment contamination, contaminated runoff or untreated wastewater will enter any watercourses during the construction of the proposed substation.

Ref No.	Reference Heading	Sub-Chapter	Mitigation Measures
MM53	EIS - Chapter 10 Water (Hydrology and Hydrogeology)	10.5.1 Unit 1 Construction Phase	During the construction phase any drains carrying a high sediment load will be diverted through the settlement ponds. The settlement ponds will be located between the area of construction and the nearest field drain. Surface water runoff will not be discharged directly to local watercourses.
MM54	EIS - Chapter 10 Water (Hydrology and Hydrogeology)	10.5.1 Unit 1 Construction Phase	The following mitigation measures will be adopted: • A drainage plan has been drawn up and submitted. The drainage system and settlement ponds will be constructed as a first step before major site clearance activities occur. • Excavations will remain open for as little time as possible before the placement of fill. This will help to minimise potential for groundwater ingress into excavations. • Silt traps, such as geotextile membrane, will be placed in the existing drainage network around the substation site and along the proposed access road prior to the establishment of the settlement ponds and access road construction to minimise silt loss. These should be inspected and cleaned regularly. • Swales will be located along the access road. • Weather conditions will be taken into account when planning construction activities to minimise risk of run off from the site.
MM55	EIS - Chapter 10 Water (Hydrology and Hydrogeology)	10.5.1 Unit 1 Construction Phase	To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents, paints and fuels used during construction will be stored within temporary bunded areas and each of these areas will be bunded to a volume of 110% of the capacity of the largest tank/container within it (plus an allowance of 30 mm for rainwater ingress). Filling and draw-off points will be located entirely within the bunded area(s). Drainage from the bunded area(s) will be diverted for collection and safe disposal.

Ref No.	Reference Heading	Sub-Chapter	Mitigation Measures
MM56	EIS - Chapter 10 Water (Hydrology and Hydrogeology)	10.5.1 Unit 1 Construction Phase	No concrete batching facility will be required at the site. 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 the following measures to prevent discharge of alkaline wastewaters or contaminated storm water to groundwater: • The contractor will be required to make provision for removal of any concrete wash waters, most likely by means of tankering off-site. • Only the chute of the concrete delivery truck will be cleaned on site, using the smallest volume of water necessary. • Concrete trucks will be directed back to their batching plant for washout. • The arrangements for concrete deliveries to the site will be discussed with suppliers before commencement of work, agreeing routes, prohibiting onsite washout and discussing emergency procedures. • Clearly visible signs will be placed in prominent locations close to concrete pour areas, stating that washout of concrete Lorries are not permitted on the site. • Wash down water from exposed aggregate surfaces and cast-in-place concrete, and from washing of delivery truck chutes will be trapped on site to allow sediment to settle out and reach neutral pH before clarified water is released to a stream or drain system or allowed to percolate into the ground.
MM57	EIS - Chapter 10 Water (Hydrology and Hydrogeology)	10.5.1 Unit 1 Construction Phase	Any effluent generated by temporary onsite sanitary facilities will be taken off-site for appropriate treatment.
MM58	EIS - Chapter 10 Water (Hydrology and Hydrogeology)	10.5.1 Unit 1 Construction Phase	To minimise the vulnerability of groundwater during the removal of the soil and/or subsoil during construction of the proposed substation, all ground works will be completed in an appropriately managed manner. A procedure for managing this activity will be included as part of the Construction & Demolition Waste Management Plan, for the proposed substation. See Section 11.3 Material Assets – Waste (Interaction).

<table>
<tr><th>Ref No.</th><th>Reference Heading</th><th>Sub-Chapter</th><th>Mitigation Measures</th></tr>
<tr><td>MM59</td><td>EIS - Chapter 10 Water (Hydrology and Hydrogeology)</td><td>10.5.1
Unit 1
Construction Phase</td><td>Some construction works on site may take place in the vicinity of watercourses in the riparian zone. The riparian zone is the land immediately adjoining the aquatic zone and influenced by it. A buffer area will be established to protect the riparian and aquatic zones from disturbance. The buffer area generally extends beyond the riparian zone. The width of a buffer area will be determined by the guidance set out by the Department of the Marine and Natural Resources [30], which are shown in Table 10.18:

<table><tr><th>Average slope leading to aquatic zone</th><th>Buffer zone width on each side of the aquatic zone</th><th>Buffer zone width for highly erodable soils</th></tr><tr><td>Moderate (even to 1 in 7 / 0-15%)</td><td>10 m</td><td>15 m</td></tr><tr><td>Steep (1 in 7 to 1 in 3 / 15-30%)</td><td>15 m</td><td>20 m</td></tr><tr><td>Very steep (1 in 3 / >30%)</td><td>20 m</td><td>25 m</td></tr></table>Table 10.18 Buffer Zone Guidelines</td></tr>
<tr><td>MM60</td><td>EIS - Chapter 10 Water (Hydrology and Hydrogeology)</td><td>10.5.1
Unit 1
Construction Phase</td><td>Re-fuelling of construction equipment and the addition of hydraulic oil or lubricants to vehicles/ equipment will take place in designated bunded areas where possible. Re-fuelling will be avoided in so far as possible at the other work sites but where necessary will take place within appropriately bunded areas at a designated distance away from watercourses (>10m). This is in accordance with the buffer zone guidelines in Table 10.18.</td></tr>
<tr><td>MM61</td><td>EIS - Chapter 10 Water (Hydrology and Hydrogeology)</td><td>10.5.1
Unit 1
Construction Phase</td><td>If it is not possible to bring a machine to the refuelling point, fuel will be delivered in a double-skinned mobile fuel bowser. A drip tray will be used beneath the fill point during refuelling operations in order to contain any spillages that may occur. The vehicles and equipment will not be left unattended during refuelling. Spill kits and hydrocarbon absorbent packs will be stored in the cab of each vehicle and operators will be fully trained in the use of this equipment.</td></tr>
<tr><td>MM62</td><td>EIS - Chapter 10 Water (Hydrology and Hydrogeology)</td><td>10.5.1
Unit 1
Construction Phase</td><td>The generation of runoff from stockpiles of soils, excavated during construction, will be prevented from entering watercourses by diverting runoff to the settlement ponds on site, and removing the material offsite as soon as possible to designated storage areas.</td></tr>
<tr><td>MM63</td><td>EIS - Chapter 10 Water (Hydrology and Hydrogeology)</td><td>10.5.1
Unit 1
Construction Phase</td><td>It is recommended that a 25m buffer zone is applied around the tufa deposits to ensure protection of the deposits. No works during construction and operation will occur within this area, including re-fuelling, batching of concrete or storage of fuels and soil stockpiles. See Appendix 10.1.</td></tr>
</table>

Ref No.	Reference Heading	Sub-Chapter	Mitigation Measures
MM64	EIS - Chapter 10 Water (Hydrology and Hydrogeology)	10.5.1 Unit 1 Construction Phase	Guidelines stated at the beginning of this section will be adhered to, thus ensuring that the impact on the water environment during the construction phase of the proposed substation is minimised. In particular, the ESB CEMP, which sets out methods for minimising the environmental risks associated with construction works, will be referred to in the planning of any construction works in the vicinity of watercourses.
MM65	EIS - Chapter 10 Water (Hydrology and Hydrogeology)	10.5.1 Unit 1 Construction Phase	In order to ensure that on-going works are being carried out in accordance with the CEMP, water monitoring will be undertaken our during the construction phase. Sampling points will be located at the following designated locations: • Upstream of the construction site discharge points (surface water) • Outlet from the proposed settlement ponds (surface water) • Downstream of the construction site discharge points (surface water) • Up gradient of the construction site (BH1 – ground water) • Down gradient of the construction site (BH4 – ground water)
MM66	EIS - Chapter 10 Water (Hydrology and Hydrogeology)	10.5.1 Unit 1 Construction Phase	The Site Investigations[13],[18] indicates that the sand and gravel deposits are not saturated and groundwater flow into the excavation during construction is expected to be limited. However, should ongoing dewatering be required during excavations it is recommended that a low-permeability barrier be installed around the excavation walls. This will ensure that any potential for drawdown that could affect the water environment is minimised.
MM67	EIS - Chapter 10 Water (Hydrology and Hydrogeology)	10.5.1 Unit 1 Construction Phase	Measures to prevent localised flooding will be implemented by proper design of the construction works and maintenance of existing drainage within the proposed substation. The surface water drainage system proposed ensures that there is no increase in surface water runoff from the proposed substation, as Greenfield run-off rates will be maintained during operation. See the Drainage and Infrastructure Report (ESBI Report Ref: PE687-F0261-R261-016) for details.
MM68	EIS - Chapter 10 Water (Hydrology and Hydrogeology)	10.5.1 Unit 1 Construction Phase	The construction of the proposed substation will temporarily change the groundwater regime should excavations extend below the water table and should pumping be required to enable the pouring of concrete. The following mitigation measures will be adopted: • Time for excavations being open will be minimised as far as possible. • Lowering of groundwater table, if required, will be mitigated by avoiding unnecessary pumping and dewatering of excavations. Where possible, groundwater exclusion techniques will be used such as drainage or sheet piling which will reduce the need for dewatering and will avoid unnecessary drawdown of the water table outside of the excavations. • Locally excavated material will be reinstated surrounding the foundation base immediately following construction to allow recovery of any potential groundwater level change as quickly as possible. • Aggregate will be imported rather than quarried on site

Ref No.	Reference Heading	Sub-Chapter	Mitigation Measures
MM69	EIS - Chapter 11 Material Assets	11.2.6 Traffic Mitigation	ESB will liaise with both Laois County Council and Kilkenny County Council in regard to traffic management during construction and adhere to all their requirements.
MM70	EIS - Chapter 11 Material Assets	11.2.6 Traffic Mitigation	A Traffic Management Plan will be prepared and included as part of the CEMP. It will include, but not limited to the following specific mitigation measures: • Construction and delivery vehicles will be instructed to use only the approved and agreed means of access and movement of construction vehicles will be restricted to these designated routes. • Appropriate vehicles will be used to minimise environmental impacts from transporting construction material, for example the use of dust covers on trucks carrying dust producing material. • Warning signs will be installed at appropriate locations. • Temporary traffic lights and/or road or lane closures will be provided as required to ensure traffic safety. • Parking of site vehicles on the public roads will not be permitted. • Wheel washing facilities including judder bars will be utilised within site prior to joining the stone surfaced access roadway, to remove any spoil or other deposits prior to leaving the substation work sites. • A road sweeper will be employed at the substation work sites to clean the public roads of any residual spoil debris that may be deposited on the public roads leading away from each site. • All vehicles will be properly serviced and maintained to avoid any leaks or spillage of oil, petrol or diesel. All scheduled maintenance will be carried out off site. • The appropriate authorities will be notified of the movement of abnormal loads and traffic management measure agreed in advance such as: o Placing warning notices to advise other road users of the presence of slow moving vehicles o Using lead warning vehicles and using Garda escorts where required o Undertaking deliveries at times that minimise the impact on other road users and resting in safe lay-bys to reduce any traffic congestion. o Closing up of extendable transport vehicles on return journeys.
MM71	EIS - Chapter 11 Material Assets	11.2.6 Traffic Mitigation	During construction, liaison will be maintained with the residents along the line routes and in the vicinity of the stations. They will be advised of any particularly busy periods and, where practical, their suggestions and comments will be taken on board.
MM72	EIS - Chapter 11 Material Assets	11.2.6 Traffic Mitigation	A condition assessment of county and regional roads which are to be used for construction traffic haul routes will be undertaken prior to commencement, with regular inspections during the works period. In the event of damage to the road pavement or remedial work to reinstate the road will be carried out at the developer's expense.

Ref No.	Reference Heading	Sub-Chapter	Mitigation Measures
MM73	EIS - Chapter 11 Material Assets	11.3.3 Waste Mitigation Measures	Waste management will be carried out in accordance with "Best Practice Guidelines on the Preparation of Waste Management Plans for Construction & Demolition Projects" produced by the Department of Environment, Community and Local Government. Regulations in relation to waste management will be adhered to. Disposal of construction waste will be to licensed disposal facilities. On-site segregation of waste will be provided by the contractor using skips for timber, steel, general waste, and recyclables.
MM74	EIS - Chapter 11 Material Assets	11.3.3 Waste Mitigation Measures	A Construction Waste Management Plan will be prepared and implemented by the contractor to minimise waste generation. The key principles underlying the plan will be to minimise waste generation and to segregate waste at source.
MM75	EIS - Chapter 11 Material Assets	11.3.3 Waste Mitigation Measures	Approximately 12,000 m3 (24,000 tonnes) of excavated material will be re-used as landscaping material at Coolnabacky. A Certificate of Registration will be sought from the Local Authority for the reuse of excavated soil at Coolnabacky.
MM76	EIS - Chapter 11 Material Assets	11.3.3 Waste Mitigation Measures	Other waste generated will be removed off site by licensed contractors for appropriate treatment/disposal or recycling at licensed facilities.
MM77	EIS - Chapter 11 Material Assets	11.3.3 Waste Mitigation Measures	Facilities for segregation of waste will be made available to optimise reuse and recycling of construction waste and correct disposal of domestic waste.
MM78	EIS - Chapter 11 Material Assets	11.3.3 Waste Mitigation Measures	Soil material will be tested regularly by a competent company prior to removal to ensure material is inert.
MM79	EIS - Chapter 11 Material Assets	11.3.3 Waste Mitigation Measures	Where applicable, temporary site sanitary facilities will be connected to a holding tank which will be pumped out as required and disposed of in an appropriate manner to a licensed disposal facility.
MM80	EIS - Chapter 11 Material Assets	11.3.3 Waste Mitigation Measures	Fuels or chemicals stored on site will be stored in an enclosed, bunded unit and located a safe distance from mobile generators or electrical equipment.
MM81	EIS - Chapter 11 Material Assets	11.3.3 Waste Mitigation Measures	Spill kit bags/bins will be made available at sites and in relevant vehicles should a spill occur.

Ref No.	Reference Heading	Sub-Chapter	Mitigation Measures
MM82	EIS - Chapter 11 Material Assets	11.3.3 Waste Mitigation Measures	Portable bunds will be used when refuelling to avoid fuel spills.
MM83	EIS - Chapter 11 Material Assets	11.4.1 Gas Mitigation Measures	A pre-construction audit will be undertaken to confirm the preliminary conclusions as to the presence or absence of gas infrastructure in the construction area.
MM84	EIS - Chapter 11 Material Assets	11.4.2 Television and Communication Signals Mitigation Measures	A site specific risk assessment will be carried out where any telecom services are present. Consultation will take place with service provider prior to any construction works in the proximity of existing telecom services likely to be impacted, as required.
MM85	EIS - Chapter 11 Material Assets	11.4.2 Television and Communication Signals Mitigation Measures	In the unlikely event of interference arising to communication networks, adjustments to the orientation of the aerial of the radio or television/internet connection will be rectified.
MM86	EIS - Chapter 11 Material Assets	11.4.3 Water Supply	Water will be imported by tanker for construction works at Coolnabacky substation. It is proposed to meet the long term water demand for the substation from the local groundwater resource through a bored well. The expected demand will be less than that of a domestic supply as it will be used for sanitary services and canteen purposes. The substation will be unmanned and the water demand will be intermittent.
MM87	EIS - Chapter 11 Material Assets	11.4.4 Wastewater Treatment Mitigation Measures	All sewage at Coolnabacky will be collected via a holding tank and disposed of by licensed waste contractor.
MM88	EIS - Chapter 11 Material Assets	11.5.3 Air Navigation Mitigation Measures	The proposed substation at Coolnabacky (Unit 1) and proposed overhead lines (Unit 2, 3, 5 and 8) will not have an impact on safety of aviation activities at the Midlands Heliport/Midlands Microlight centre site as referenced in correspondence from the Irish Aviation Authority on 16th April 2012.
MM89	EIS - Chapter 11 Material Assets	11.6.5 Agricultural Impact Assessment	Protocols are in place for taking precautions in identification of any current disease issues (e.g. TB) on farm and awareness of implications.

Ref No.	Reference Heading	Sub-Chapter	Mitigation Measures
		Mitigation Measures	
MM90	EIS - Chapter 11 Material Assets	11.6.5 Agricultural Impact Assessment Mitigation Measures	Consideration to be given to minimise disruption to all farming activity.
MM91	EIS - Chapter 12 Air and Climate	12.5 Mitigation Measures Construction Phase	Traffic-related effects, site excavation works and material storage are the principal potential sources of airborne dust and these can be managed through a comprehensive construction management plan for the sites, setting out the mitigation measures set out below and detailing how they will be enforced: • Transport of materials to and from the sites will take place in normal working hours and along routes agreed with the local authority. • Vehicle speeds will be restricted on haul roads. • Vehicles will be routinely maintained to minimise emissions. • Site haul roads will be dampened down with water during prolonged dry periods if necessary. • Dusty materials such as excavated materials will be stored and handled appropriately (for example, by covering where necessary and minimising the drop heights of materials). • Wheel-wash facilities of vehicles leaving site will be provided. • Materials likely to be a source of dust will be transported in an appropriate manner (for example, by covering the load). • Suitable hoardings will be used at the construction site to prevent dispersal of materials by wind. • Site management practices will incorporate appropriate dust monitoring. • All construction will be completed in a timely fashion. • Bare areas will be re-vegetated on contractor's completion. • Maintain plant and equipment to minimise fuel consumption.
MM92	EIS - Chapter 12 Air and Climate	12.5 Mitigation Measures Construction Phase	Any impacts of construction on air quality will be of short duration and will be rendered negligible by implementation of these mitigation measures through the construction management plan.
MM93	EIS - Chapter 12 Air and Climate	12. 7.5 Mitigation Measures Construction Phase Substations	Noise during the construction stage will be limited by the scale of the project. The noise levels will be maintained within the limits set in National Roads Authority guidelines (the only 'official' construction noise guideline in Ireland). The construction stage contract will include provision for independent noise monitoring to ensure that noise limits are being adhered to.

Ref No.	Reference Heading	Sub-Chapter	Mitigation Measures
MM94	NIS - Section 4.3.1 Coolnabacky substation site	4.3.1.1 Surface Water Protection	Erosion control measures to prevent runoff flowing across exposed or excavated ground and becoming polluted with sediments are provided for in the design. Other inherent erosion control measures with minimum falls which do not exceed 15%. Additional erosion control measures include: • Minimise the area of exposed ground. • Monitoring of the weather forecast prior to planning excavation works. • Providing impermeable mats as covers to mounded excavated material and open excavations during periods of heavy rainfall. Silt fences to be provided at the toe of any significant areas where excavated material is stored.
MM95	NIS - Section 4.3.1 Coolnabacky substation site	4.3.1.1 Surface Water Protection	The contractor will identify and quantify risks associated with erosion and sediment for each work practice. Risks such as an unplanned bank collapse, mud slide and unforeseen rainfall event can be constantly assessed through geotechnical risk management and monitoring of weather forecasts.
MM96	NIS - Section 4.3.1 Coolnabacky substation site	4.3.1.1 Surface Water Protection	The emergency response plan and procedures for events likely to cause pollution will be prepared by contractors, and would be displayed at appropriate locations.
MM97	NIS - Section 4.3.1 Coolnabacky substation site	4.3.1.1 Surface Water Protection	Equipment with the capability of generating additional erosion and sediment laden runoff will be stored on site. Staff will be made aware of procedures for notification of emergency events with the potential for watercourses pollution and trained in the use and application of the emergency equipment, which may involve: • Impermeable matting (plastic sheeting); • Silt fences (posts & geotextile material); • Mulching capability (organic materials, straw, wood chip, bark or other wood fibres and gravel) to stabilise or protect cleared areas; • Settlement Tanks (portable propriety settlement tanks that can be transported to required areas).
MM98	NIS - Section 4.3.1 Coolnabacky substation site	4.3.1.2 Water Table and Groundwater Protection	Deep excavations below the water table encountered in the Site Investigation will be kept to a minimum level. The project does not expect any excavation that may cause a material difference in the local groundwater table level. Continuous monitoring will be employed where the dewatering is required, and the proposals will be approved by the designers and ecologist. Therefore, there would be no expected impact on the spring fed watercourses in the area.

Ref No.	Reference Heading	Sub-Chapter	Mitigation Measures
MM99	NIS - Section 4.3.1 Coolnabacky substation site	4.3.1.2 Water Table and Groundwater Protection	The contractor will store all chemicals, hydrocarbon based fuels and oil filled equipment when not in use in bunded areas of the site. The contractor will have emergency spill kits comprising oil absorbent materials on site and staff trained in the use of these. Emergency response measures to oil/ fuel leaks will be displayed prominently on the site.
MM100	NIS - Section 4.3.1 Coolnabacky substation site	4.3.1.2 Water Table and Groundwater Protection	Sustainable Drainage Systems (SuDS) in the drainage network design will be put in place early in the construction phase to filter and biodegrade hydrocarbons in the unlikely event that any enter the water on the site.
MM101	NIS - Section 4.3.1 Coolnabacky substation site	4.3.1.2 Water Table and Groundwater Protection	There will be no large scale batching of concrete on the site. All concrete will come from a licensed supplier with environmental certification. No washing out of concrete supply trucks will be allowed on the site. No cementitious material will be allowed enter the water or groundwater on the site. Monitoring and emergency response measures for any escape of cementitious material will be put in place by the contractor.
MM102	NIS - Section 4.3.1 Coolnabacky substation site	4.3.1.2 Water Table and Groundwater Protection	Any foul waste generated in the construction and operational phase of the project will be collected and disposed off site by a licensed contractor. No contamination of groundwater will occur from foul waste.

8 MONITORING MEASURES

This section of the CEMP focuses on monitoring requirements contained within the Environmental Impact Statement (EIS) and Natura Impact Statement (NIS) prepared as part of the planning permission application to An Bord Pleanála.

Table 12 outlines the monitoring measures that will be undertaken on the project by Kilwex and IE Consulting. This table can be further expanded during the course of the project, to provide a comprehensive report of site environmental compliance audits.

Environmental Monitoring results will be incorporated into a monthly environmental report which will be submitted to ESB. This will provide an progressive insight into site conditions and environmental responses to site activities as well as waste outputs, seasonal variations etc.

The main environmental monitoring items undertaken on site are described below.

8.1 Ground and Surface Water Quality Monitoring

The water quality monitoring regime has been informed by a collaborative document produced by IE Consulting. **See Appendix 15** ***Proposed Water Monitoring Programme - June 2022 Coolnabacky, Timahoe, Co. Laois***. This programme has set out the context, proposed monitoring locations, suitable parameters and the frequency and reporting of monitoring.

Appendix 16- Hydrological Mitigation and Monitoring During Construction depicts ground surface water monitoring locations as well as mitigation measures at downstream locations.

Appendix 10 - Groundwater and Surface Water Monitoring Measures provides all the water quality monitoring undertaken on site by IE Consulting.

Note - Both IE Consulting and Kilwex will expand their sampling regime to include Suspended Solids (mg/l) as part of a suite of parameters to be tested (**See Table 12– Environmental Monitoring Measures**)

8.2 Noise & Vibration Monitoring

- Noise and vibration monitoring will be undertaken on an ongoing basis at the nearest sensitive receptor (approx. 800m) from site.
- The noise monitoring will utilise a Larson Davis LXT Precision integrating Sound Level Analyser, wind shield and microphone stand set up at the agreed Nearest Sensitive Location. The monitoring will comprise:
    - Measurement of ambient noise levels measured during good weather conditions using instruments of Class 1 specification.
    - Weather variables including rainfall and wind speed will be recorded for the duration of the survey.
    - The apparatus will be left in place and data collated and reviewed periodically.

- The vibration monitoring will utilise a Micromate vibration monitor and protection case which will be installed at the agreed Nearest Sensitive Location.
    - Ground conditions will be analysed and a ground level check will be carried out before measurement commences.
    - The vibration monitor will be fitted with an alarm which will alert personnel if vibration thresholds are exceeded.
    - The apparatus will be left in place and data collated and reviewed periodically.

See Appendix 17 - Baseline Monitoring Noise, Vibration and Water Monitoring

Figure 20 below depicts location of Dust Monitoring Station

8.3 Dust Monitoring

Dust monitoring will be set up at neighbouring residence (approx. 800m from site) and monitored on a continuous basis. Dust levels will be measured against current EPA Licence threshold limits (350 mg/m^2/day) using the Bergerhoff Method. Dust results are reported in the Monthly Environmental Monitoring Report. **Figure 20** below depicts location of Dust Monitoring Station.

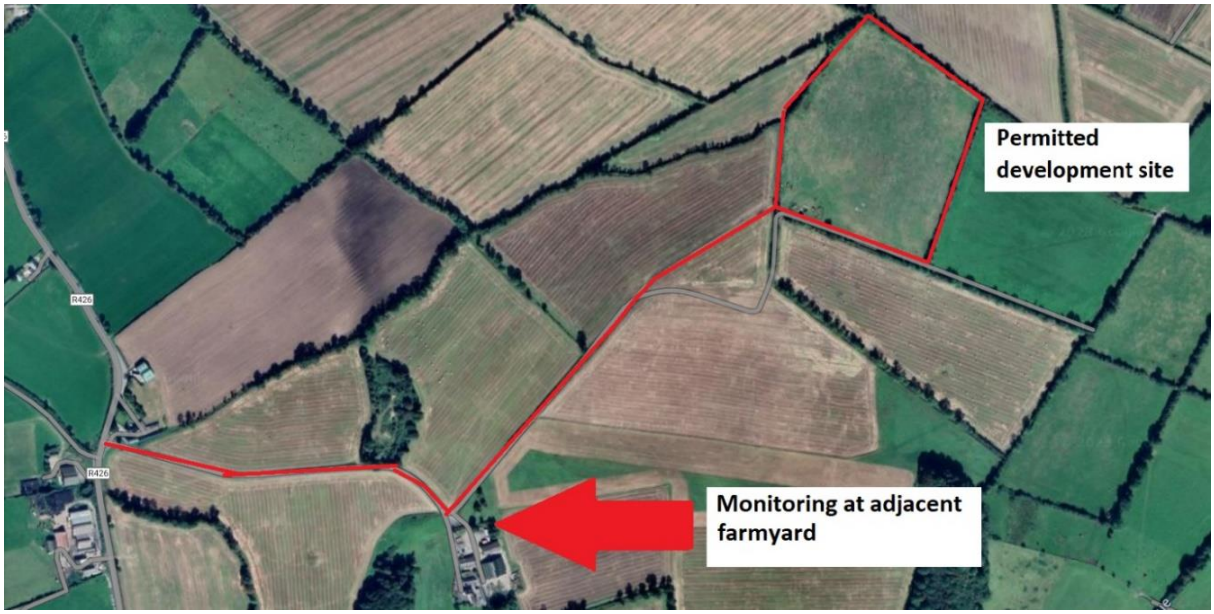


Figure 20: Monitoring Location of Noise, Dust and Vibration Equipment

Table 12: Environmental Monitoring Measures

RECEPTORS	FREQUENCY	PARAMETERS/MONITORING REQUIREMENTS	LOCATION	CONDUCTED BY	REPORTED IN
NOISE	**CONTINUOUS MONITORING** Monthly download	Hourly LAeq dB LpA	Neighbouring farmyard property appx. 800m away	Coyle Environmental	Environmental Monthly Report
DUST	**CONTINUOUS MONITORING** 30 day dust deposition sample analysed using the BergHoff method	EPA threshold of 350 mg/m2 /day			
SURFACE WATER	**DAILY**	**Visual Inspections** Turbidity, discoloration, fuel/oil slick on water surface Checks for breaches/maintenance issues	SW03 & SW05 & along boundary field drain & Surface water mitigation measures i.e. ponds , french drains, silt bags	Kilwex Site Management	Daily Site Inspection Records
	WEEKLY	**In-situ Field Measurements** Parameters: pH, Dissolved Oxygen, Turbidity, Temperature, Electrical conductivity (EC)	SW01 – SW05 (**See Appendix 16**)	Coyle Environmental	Weekly Audit & Environmental Monthly Report
	MONTHLY	**Water Sampling & Lab Analysis** Parameters: pH, Conductivity, Suspended Solids, Chloride, Sodium, Sulphates, Calcium, Magnesium, Potassium, Ammoniacal NH4, Nitrate, Alkalinity, Phosphorus, Total TPH			Environmental Monthly Report

RECEPTORS	FREQUENCY	PARAMETERS/MONITORING REQUIREMENTS	LOCATION	CONDUCTED BY	REPORTED IN
	QUARTERLY	**Water Sampling & Lab Analysis** Parameters: pH, Conductivity, Suspended Solids, Chloride, Sodium, Sulphates, Calcium, Magnesium, Potassium, Ammoniacal NH4, Nitrate, Alkalinity, Phosphorus, Total TPH		IE Consulting	IE Consulting Quarterly Surface & Groundwater Report
GROUND WATER	**WEEKLY**	Groundwater level measurement (Dipping Level Measure) & Visual Inspection(s)	BH1-BH4 (**See Appendix 16**)	Coyle Environmental	Weekly Audit & Environmental Monthly Report
	MONTHLY	**Water Sampling & Lab Analysis** Parameters: pH, Conductivity, Suspended Solids, Chloride, Sodium, Sulphates, Calcium, Magnesium, Potassium, Ammoniacal NH4, Nitrate, Alkalinity, Phosphorus, Total TPH			Environmental Monthly Report
	QUARTERLY	**Water Sampling & Lab Analysis** Parameters: pH, Conductivity, Suspended Solids, Chloride, Sodium, Sulphates, Calcium, Magnesium, Potassium, Ammoniacal NH4, Nitrate, Alkalinity, Phosphorus, Total TPH		IE Consulting	IE Consulting Quarterly Surface & Groundwater Report
ARCHAEOLOGY	**DAILY/AS ADVISED BY CONSULTANT**	Monitoring Required for all Topsoil Removal (500mm Depth)	Required at all work fronts actively removing topsoil (500mm Depth)	Martin Byrne - Project Archaeologist	Environmental Monthly Report & Archaeology Report updates

RECEPTORS	FREQUENCY	PARAMETERS/MONITORING REQUIREMENTS	LOCATION	CONDUCTED BY	REPORTED IN
ECOLOGY	DAILY	Site personnel to monitor and be vigilant for indications of volant and non-volant mammal movements, established habitats and potential nesting areas within or near works areas. Tufa deposits will also be inspected along the north boundary field drain	Site Environs	Coyle Environmental Ecologist	Daily Site Inspection Records
	MONTHLY	Ecological site walkovers will take place within the site boundary and peripheral areas. Invasive species will also be considered	Site Environs		Environmental Monthly Report
ROADS	PRE-COMMENCEMENT	Preconstruction Road Condition Survey	Local Road Network area between intersection of R426/Pike Rd in Timahoe village to the crossroads	Kilwex Site Management	Road Condition Survey Report
	DAILY	Checking road condition for any damage or project related degradation.			Daily Site Inspection Records
	WEEKLY	Checking road condition for any damage or project related degradation.			Weekly Audit
	MONTHLY	Checking road condition for any damage or project related degradation.			Environmental Monthly Report

RECEPTORS	FREQUENCY	PARAMETERS/MONITORING REQUIREMENTS	LOCATION	CONDUCTED BY	REPORTED IN
	POST CONDITION SURVEY	Post construction Road Condition Survey			Road Condition Survey Report
VIBRATION	**CONTINUOUS MONITORING** Monthly download	Peak Particle Velocity (ppv) mm/s	Neighbouring farmyard property appx. 800m away	Acoustic Consultant/ Coyle Environmental	Environmental Monthly Report

**Note:*

- ***Surface Water monitoring results will be measured against current EQS standards for water quality - SI272/2009 as amended by SI372/2012; SI386/2015; SI77/2019; SI659/2021***

- ***Groundwater monitoring results will be measured against current European standards for groundwater quality SI366/2016 Groundwater Regulations***

9 AUDITING MEASURES

This section of the CEMP provides details of the mechanisms for assessing the compliance of the construction phase of the development through a series of site audit and inspections against the mitigation set out in **Section 7: Mitigation Measures** and **Section 8: Monitoring Measures.**

Environmental control measures are reviewed and monitored on site via audits, inspections, surface water visual inspections, water monitoring through sampling, noise and vibration monitoring, dust monitoring & waste management monitoring.

Site inspections shall be carried out daily by the Site Management team, to check that all works being carried out are in compliance with this CEMP. Daily site inspections shall also monitor all site environmental control measures, as discussed in **Section 8 Monitoring Measures**. Formal site audits will be carried out monthly by Environmental Management Personnel.

All inspections and audits will be recorded and stored on site.

Environmental non-conformances are defined as actions or outcomes that are not in compliance with environmental limits, standards, permits, licences or legislation. In the event that works are being carried out on site, that do not comply with the requirements of the CEMP, a Non-Conformance Report will be raised to the project Manager for their immediate attention.

Site management and SHEQ Department shall complete the environmental audits and inspections as outlined in **Table 13** below:

Table 13: Audit & Inspection Schedule

Audit & Inspection	Responsible	Frequency
Environmental Site Inspection	Site Management	Daily Checks
Waste Management Audit	SHEQ Department	Periodically
SHEQ Inspection	SHEQ Department	Weekly
Site Manager SHEQ Checklist	Site Management	Weekly
Environmental Site Inspection	Environmental Manager	Monthly

9.1 Site Inspections and Environmental Audits

Routine inspections of construction activities will be carried out on a daily and weekly basis by the Environmental Manager to ensure all controls are in place to prevent environmental impact.

Environmental inspections will ensure that the works are undertaken in compliance with the CEMP and all other planning application documents. Only suitably trained staff will undertake environmental site inspections. The following is a list of monitoring that will be undertaken as part of monitoring measures being employed by the contractor outside of the site:

- Noise
- Dust
- Vibration
- Roads

The following is a list of monitoring that will be undertaken as part of monitoring measures being employed by the contractor on the site:

- Waste
- Surface Water
- Groundwater
- Archaeology
- Ecology

9.1.1 ESB Supervision

The site supervision during construction and implementation of the CEMP will be carried out by the construction contractor as set out in the CEMP. To supplement this, ESB EMP will provide a site team who will liaise with the contractor and oversee the project. During the course of construction, supervision of the works by ESB will include:

- Routine inspections at work fronts ensuring the contractor is compliant with particulars of the CEMP
- Review of method statements ensuring works are adhering to the environmental and safety measures outlined
- Monitoring effectiveness of environmental management systems and mitigation measures throughout the construction phases
- Ensuring contractor routinely undertakes site inspections and audits as outlined in the CEMP

9.2 Auditing

Environmental audits will be carried out during the construction phase of the project. Environmental audits will be carried out by the Environmental Manager or a member of the Contractor's Management Team. Environmental audits will be conducted at planned intervals to determine whether the CEMP is being properly implemented and maintained. The results of environmental audits will be provided to the Project Developer and the Site Manager.

9.3 Environmental Compliance

The following definitions shall apply in relation to the classification of Environmental Occurrences during construction:

- **Environmental Near Miss**

  An occurrence which if not controlled or due to its nature could lead to an Environmental Incident.

- **Environmental Incident**

  Any occurrence which has potential, due to its scale and nature, to migrate from source and have an environmental impact beyond the site boundary.

- **Environmental Exceedance Event**

An environmental exceedance event occurs when monitoring results indicate that limits for a particular environmental parameter (as indicated in the Environmental Monitoring Programme) has been exceeded.

- **Environmental Non-Compliance**

  Non-fulfilment of a requirement and includes any deviations from established procedures, programs and other arrangements related to the CEMP.

An exceedance will immediately trigger an investigation into the reason for the exceedance occurring and the application of suitable mitigation where necessary.

Exceedance events can be closed out on achieving a monitoring result below the assigned limit for a particular environmental parameter.

9.4 Corrective Action Procedure

A corrective action is implemented to rectify an environmental problem on-site. Corrective actions will be implemented by the Construction Manager, as advised by the Environmental Manager. Corrective actions may be required as a result of the following;

- Environmental Audits.
- Environmental Inspections and Reviews.
- Environmental Monitoring.
- Environmental Incidents.
- Environmental Complaints.

A Corrective Action Notice will be used to communicate the details of the action required to the main contractor. A Corrective Action Notice is a form that describes the cause and effect of an environmental problem on site and the recommended corrective action that is required. The Corrective Action Notice, when completed, will include details of close out and follow up actions.

If an environmental problem occurs on site that requires immediate attention, there will be direct communications between the Construction Manager and the Environmental Manager. This in turn will be passed down to the site staff involved. A Corrective Action Notice will be completed at a later date.

9.5 Construction Phase Plan Review

The CEMP will be the subject of continuous review by the Environmental Manager on behalf of the Site Manager with revised versions of the CEMP is presented as required.

10 SUMMARY & CONCLUSIONS

Information herein, addressed the mitigation measures and construction and environmental methodologies of the Coolnabacky 400/110 kV (Unit 1) substation development.

Section 1 introduces the project and outlines the requirement of the CEMP in Planning Condition No. 11. The project is explained and *Units* within County Kilkenny and County Laois described. The scope of the CEMP is outlined, explaining work associated with the main civil construction works, described herein as *Part 1*.

Section 2 describes the Unit 1 development itself, consisting of a 110kV GIS building, a 400 kV GIS Building, 2 Nos. transformers positioned in bunds and associated compound infrastructure. Section 2 also itemises requirements of Planning Condition 11 and provides information and references on how each item is complied with. Section 2 also provides information on the existing environment at the Coolnabacky site. It is noted here that there are two aquifers beneath the site – 1) a regionally important karstified (diffuse) bedrock aquifer (>10m below the site) which is a source of drinking water for the region and 2) a shallow, perched locally important sand/gravel aquifer which is not hydraulically connected to the bedrock aquifer below, due to the presence of a >6m layer of impermeable clay in between both aquifers. Section 2 also introduces the presence of petrifying springs with Tufa Formation at the site.

Section 3 of the CEMP covers extensive historic site investigations from 2012 to 2021 and identifies the depth of drilling in those campaigns. It states that of the deepest boreholes drilled, none of these boreholes penetrated the groundwater aquifer, so there was no potential pollution pathway to the bedrock aquifer. It describes the current boreholes onsite and the future management of the decommissioning of 2 no. boreholes and the installation of 1 no. borehole. It was concluded that from all five rounds of site investigations, bedrock was not encountered or confirmed, extrapolating that the bedrock aquifer is considered as typically > 10 m below the site. It is noted that the bedrock is overlain by a consistent layer of 6-7m of low permeability Clay. This layer limits any interconnectivity between surface/near surface activities and the bedrock aquifer and protects the deep aquifer in the unlikely event of the boreholes acting as a contamination pathway. The site investigation campaign also suggests that the perched water table (from the shallow aquifer) may be intercepted at typical depths of 0.80m, therefore dewatering will be required as maximum depth of excavations are up to 3m below ground.

Section 4 describes how construction will be carried out at the site. It lists the chronological order of civil activities within each stage of the development for Phase 1 and Phase 2. Section 4 is ultimately the core scope of works for the Main Civil Contractor.

Section 5 of the CEMP describes the environmental management that will govern, support and protect the activities listed in Section 4 during the civil construction works. It contains detailed dewatering procedures, in strict alignment with the findings of Section 3 and preparedness for activities in Section 4. It detailed the environmental management of surface waters, drainage requirements, refuelling activities, invasive species and many more. This section demonstrates that mitigation measures and environmental practices implemented during construction will ensure no potential pollution pathway will exist to the bedrock aquifer, downstream environment or surrounding lands.

Section 6 states how the CEMP will be implemented and provides the roles and responsibilities of Kilwex contractors in fulfilling these roles. As well as main construction roles, the project will be supported by an Environmental Manager and Project Ecologist.

Section 7 contains a table of all mitigation measures connected to Pre commencement activities and construction activities. These measures were included in the environmental documentation submitted as part of the permitted development.

Section 8 provides details of the extensive environmental monitoring that has taken place and will

take place at the site in advance of and during construction. The measures listed here align with requirements of mitigation measures and environmental methodologies throughout the CEMP. This section also highlights the Water Monitoring Programme, as agreed with LCC in June 2022. **Table 12** categorises the monitoring and listed the frequency of reportable information that will take place. Environmental monitoring results will provide understanding of site conditions and can inform on further development of site management systems and controls.

Section 9 provides details of the mechanisms for assessing the compliance of the construction works. It describes the auditing measures that will take place from the beginning of construction and continue throughout *Part 1* of the development. Careful site management will be achieved through dedicated site supervision, routine inspections and daily, weekly and monthly audits.

It can be concluded that with careful design, mitigation measures proposed and the implementation of environmental practices during Part 1 of the development, the Contractor, through the implementation of this CEMP will ensure no potential pollution pathway exists to the bedrock aquifer, surface water, groundwater or adjacent lands, either during the construction phase or going forward into *Part 2* of the development or the operational phase.

APPENDICES

Appendix 1 - Relevant Legislation List to the Project

Appendix 2 - Site Logistics Plan

Appendix 2A – Wheel Wash Details

Appendix 3 - Earthmoving Plan

Appendix 4 - Traffic Management Plan

Appendix 5 – Resource & Waste Management Plan

Appendix 6 – ESB Drainage Drawings & Details

Appendix 7 - Preliminary Development Programme and Gantt Chart

Appendix 8 - Summary & Risk Impact Assessment of Historic Ground Investigations 2023

Appendix 9 – Site investigation Reports

- **Appendix 9A - Tobin- Assessment of Unauthorised Development on Aquifer 2017**
- **Appendix 9B - Causeway – Coolnabacky 400 kV GIS Substation Ground Investigation 2018**
- **Appendix 9C - IE Consulting – Hydrological & Hydrogeological Review 2021**
- **Appendix 9D - Coolnabacky Addendum Report 2021**
- **Appendix 9E - Assessment of Tufa Springs March 2022**
- **Appendix 9F - Coolnabacky Petrifying Springs & Assessment December 2022**
- **Appendix 9G - Draft RAMS for Decommissioning and Installation of Boreholes 2023**

Appendix 10 - Groundwater and Surface Water Monitoring Results

Appendix 11 - Emergency Response Plan

Appendix 12 - Environmental Management Procedures

Appendix 13 - Kilwex Project Organisational Structure

Appendix 14 - Site Ecological Walkover Report

Appendix 15 - Proposed Water Monitoring Report

Appendix 16 - Hydrological Mitigation and Monitoring During Construction Map

Appendix 17 - Baseline Monitoring Report – Noise & Vibration, Dust and Water Monitoring

Appendix 18 - ESB Bund Test Report Template & Bund Arrangement Drawings