MWP

Natura Impact Statement

Proposed Quarry Lane Stability Project at Ballysumaghan, Sooey, County Sligo.

October 2022

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Natura Impact Statement (NIS) Summary of Findings

Project Title	Natura Impact Statement – Proposed Quarry Lane Stability Project
Project Proponent	Quarry Lane Stability Ltd.
Project Location	Ballysumaghan, Sooey, Co. Sligo.
Natura Impact Statement	In cases where an Appropriate Assessment is required, a Natura Impact Statement (NIS) is prepared and includes a report of a scientific examination of evidence and data, carried out by competent persons to identify and classify any implications of a project, individually, or in combination with other plans or projects, for Natura 2000 sites in view of the conservation objectives of the site.
Conclusion	This Natura Impact Statement (NIS) has been prepared in order to provide a sufficient level of information to the competent authority, on which to base an Appropriate Assessment of the proposed development at the location specified above. The NIS comprises a scientific examination of evidence and data, carried out by a competent person, that identifies and classifies the implications of the proposed development, independently, or in combination with other plans or projects, for Natura 2000 sites in view of the conservation objectives of those sites. Provided that the mitigation measures, identified in **Section 7** are implemented in full, it is concluded, beyond a reasonable scientific doubt, that the proposal, either individually, or in combination with other plans/projects, will not adversely impact the integrity of the Natura 2000 sites, selected for inclusion in this NIS, in light of the conservation objectives of those sites. These sites are: • Unshin River SAC (001898) • Ballysadare Bay SAC (000622) • Ballysadare Bay SPA (004129)

1. Introduction

Quarry Lane Stability Ltd. ('the Applicant') is submitting a Planning Application for permission to construct grid stabilisation facility at Ballysumaghan, Sooey, Co. Sligo (hereafter referred to as the 'proposed development'). The location of the proposed development is hereafter referred to as 'proposed development site'.

A screening for Appropriate Assessment (AA) Report was produced in order to identify potential impacts on designated Natura 2000 sites present in the 15km radius arising from the proposal to develop a Grid Stabilisation Facility adjacent to the existing ESB Srananagh 220 kV substation. The Screening determined the need for Appropriate Assessment as it was concluded that the potential for significant effects cannot be ruled out in the absence of mitigation, on the following Natura 2000 sites outlined in **Table 1**. Refer to **Appendix 1** for the full Screening for Appropriate Assessment report.

Table 1: Natura 2000 Sites within zone of potential impact influence of the proposal site

No.	Designated Site	Site Code	Proximity of Site to Nearest Point of Proposed Site
1.	Unshin River SAC	(001898)	The SAC is located approximately 4.6 km northwest from the proposed site.
2.	Ballysadare Bay SAC	(000622)	The SAC is located approximately 9.3 km northwest from the proposed site.
3	Ballysadare Bay SPA	(004129)	The SPA is located approximately 9.1 km northwest from the proposed site.

In cases where an AA is required, a Natura Impact Statement (NIS) is prepared and includes a report of the scientific examination of evidence and data, carried out by competent persons to identify and classify any implications for Natura 2000 sites in the view of the conservation objectives of the site. The aim of the assessment is to provide a sufficient level of information to the competent authority on which to base their appropriate assessment of the plan or project. The proposed project is fully described in **Section 3** and mitigation measures designed to avoid or minimise impacts are outlined in **Section 7**.

1.1 Legislative Context

The Habitats Directive (92/43/EEC) seeks to conserve natural habitats and of wild fauna and flora by the designation of Special Areas of Conservation (SACs) and the Birds Directive (79/409/EEC) seeks to protect birds of special importance by the designation of Special Protected Areas (SPAs). It is the responsibility of each member state to designate SPAs and SACs, both of which will form part of Natura 2000, a network of protected sites throughout the European Community.

The requirements for Appropriate Assessment are set out in Article 6 of the Habitats Directive (92/43/EEC) and Part XAB of the Planning and Development Act 2000, as amended. Article 6(3) provides in full:

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

The information presented in this NIS will be used by the competent authority to assist them to complete their AA.

1.2 Competence of the Assessor

Marc Shorten MWP ecologist holds a research MSc in marine animal behaviour and a first class honours BSc in Zoology and Applied Ecology from University College Cork. He has over 15 years of professional experience in consulting ecology, private research science and national regulatory bodies. Marc has expertise and experience in conducting a range of ornithological surveys, including breeding bird surveys as well as species-specific survey techniques (having been a field surveyor with BirdWatch Ireland). In addition, he is experienced in bat surveying from privately contracted environmental consultancy as well as habitat, terrestrial and freshwater consultancy with MWP.

2. Methodology

2.1 Appropriate Assessment Guidance

This NIS has been undertaken in accordance with the European Commission Methodological Guidance on the provision of Article 6(3) and 6(4) of the 'Habitats' Directive 92/43/EEC (EC, 2001) and the European Commission Guidance 'Managing Natura 2000 sites' (EC, 2000) and guidance prepared by the NPWS (DoEHLG, 2009).

2.2 Desk Study

A desk study was carried out to collate available information on the site's natural environment. This comprised a review of the following publications, data and datasets:

- OSI Aerial photography and 1:50000 mapping, and other mapping sources (online)
- National Parks and Wildlife Service (NPWS) (online)
- National Biodiversity Data Centre (NBDC) (online)
- Teagasc soil area maps (NBDC website)
- Geological Survey Ireland (GSI) area maps (online)
- Environmental Protection Agency (EPA)(online)
- BirdWatch Ireland
- Teagasc soil area maps (NBDC website)
- Sligo County Development Plan 2017-2023
- Regional Spatial & Economic Strategy (RSES) for the Northern and Western Region
- Myplan.ie
- Other information sources and reports footnoted or referenced in the course of the report

An EcIA prepared by O'Donnell Environmental for the proposed project was reviewed in the preparation of the NIS (see **Appendix 4**).

2.3 Assessment of Potentially Significant Effects

Following the completion of the screening for AA report, (see Appendix 1) it has been concluded that the project is likely to have a significant effect, or significant effects cannot be ruled out at this stage on Unshin River SAC, Ballysadare Bay SAC and Ballysadare Bay SPA.

Reasons for Conclusion:

- There is potential for impacts to the water quality of Unshin River SAC, Ballysadare Bay SAC, and Ballysadare Bay SPA.

An evaluation was undertaken to determine which of the qualifying interests of the SACs and SPA potentially lie within the zone of influence of the project and required further assessment in the NIS (see Section 6.1.4).

The significance of the potential impacts that might arise from the project was identified through the use of key indicators (see Section 6.2):

- Habitat loss
- Habitat alteration
- Habitat or species fragmentation
- Disturbance and/or displacement of species
- Water quality and resource.

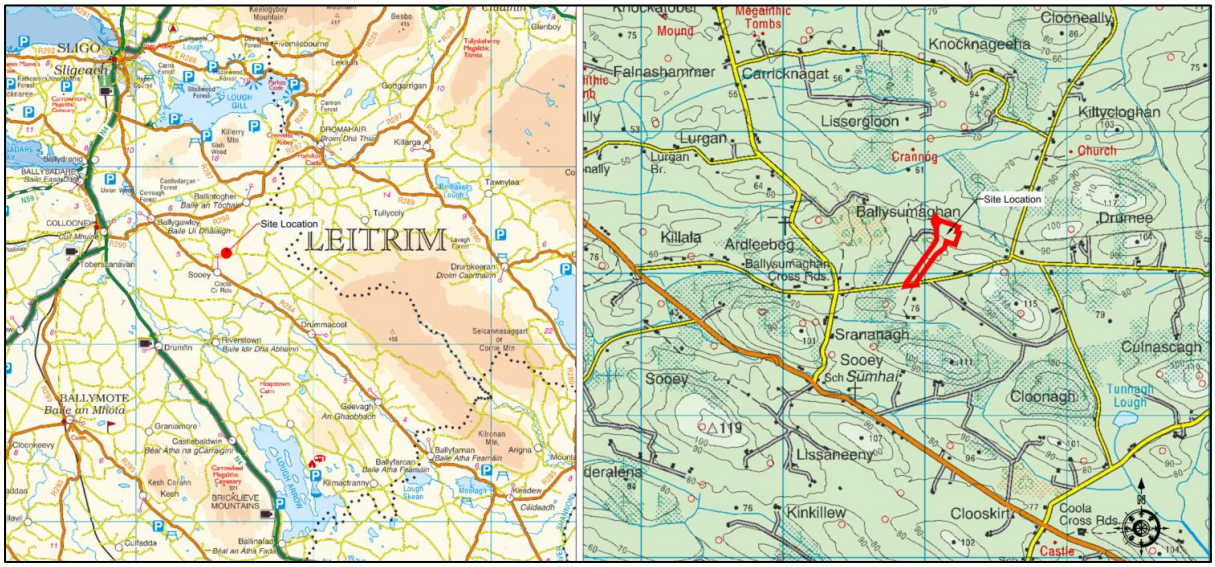
The effects of the project on the qualifying interests of the SACs and SPA, potentially within the zone of influence of the proposed development, were then assessed against the measures designed to achieve the conservation objectives. This was done to determine whether the project was likely to have a significant effect on the conservation objectives, which in turn could have an adverse effect on the integrity of the Natura 2000 sites (see Section 6.2).

3. Description of the Project

3.1 Site Location and Context

The works proposed by Quarry Lane Stability Ltd are located at Ballysumghan, Co. Sligo. The proposed development site is situated approximately 1.5 km north of Sooey, approximately 6.5km east of Collooney, 3.9km southeast of Ballygawely and 2.5km southwest of Ballintogher. Site location of proposed development is presented in Figure 1.

Figure 1: Site Location Maps



3.2 Brief Project Description

Quarry Lane Stability Ltd is proposing to develop a Grid Stabilisation Facility in the townland of Ballysumaghan, Sooey, County Sligo, adjacent to the existing ESB Srananagh 220 kV substation.

The proposed development will consist of the following elements:

a) **A High Inertia Synchronous Compensator (HISC) compound** containing 1 No. HISC unit enclosed within a steel clad framed style structure (12.1m max height) and supported by 7 No. electrical equipment containers (containing ancillary power supply products including a static frequency converts, MV switchgear, exciters, LV distribution, control room); 4 No. external cooler units; main, auxiliary & start-up electrical transformers, generator circuit breakers, switchgear equipment, and 1 No. back up diesel generator and associated diesel storage tank;

b) **A 220kV High Voltage Gas Insulated Switchgear (GIS) compound** containing a GIS building with all control & HV equipment within a single storey building (13.2m max height). The building will be surrounded by a compound road and contained within a 2.6m high galvanised steel palisade fence;

c) **A 220kV underground cable** to the existing adjoining Eirgrid substation boundary;

d) **New access road and entrance** from the L5204;

e) Associated elements comprising all necessary drainage systems, foundations works for the above compounds, various underground cables and ducts, equipment plinths, internal services roads, welfare and office units, 2 No. material storage containers, rainwater harvesting systems, compound lighting and palisade gates and fencing, security lighting, CCTV, hardstanding areas and boundary security fence.

3.3 Purpose of the Project

The proposed development relates to the installation of high inertia synchronous compensator (HISC) technology to provide grid stabilisation services for the national grid. The technology, which will consist of a synchronous compensator and will provide inertia to strengthen the grid and reactive power for voltage control.

Through the addition of a synchronous compensator, grid stability can be provided, without any power being generated, ultimately meaning more renewable power can be used on the network.

3.4 Site Description

The proposed development site is currently agricultural grassland, with some hedgerow and treeline boundary. The land is mainly used for grazing. The topography of the area is slightly hilly with elevation ranging between 76-96mOD. From the public road the terrain gently slopes upwards from 76mOD to a height of 96mOD and thereafter slopes more steeply down towards the north of the proposed main development site with change in elevation from 96-70mOD. Most of the land in the proposed main development site compound is generally a flat terrain.

Lands to the north, east and south are predominantly used as agricultural farmland. The existing ESB Srananagh 220 kV transmission substation and associated compound is located to the west of the proposed site.

According to GSI Mapping (www.gsi.ie) the proposed development site is predominately dominated by poorly drained mineral soils (mainly acidic in nature [AminPD]). Soils in the southern section of the development site in the vicinity of the site access point is classified as cutover/cutaway peat. The site does not include or immediately adjoin any watercourses. Drainage is achieved mostly by overland flow aided by occasional field drains. The nearest watercourse is referred to as the Ballygrania River (IE_WE_35U010500). The Ballygrania river flow joins the Unshin River approximately 4.7km west from the proposed development before converging with the Ballysadare River and ultimately discharges into the sea at Ballysadare which is located approximately 9.8km to the northwest of the proposed development.

3.5 Site Layout

Figure 2 shows the proposed development site boundary. The area within this boundary is approximately 2.42ha.

Figure 3 shows the proposed development footprint and illustrates the positions of the proposed plant and infrastructure within the development boundary. The overall development footprint within the site boundary is approximately 1.81ha.

The project involves the following works:

- Pre-commencement activities including site investigation work and pre-construction surveys
- Site preparation and access
- Construct temporary construction compound
- Permanent site drainage
- Construct base formation, foundations, concrete plinths for HICS compound, transformer compound, GIS compound
- Cable route trenching and cable laying
- Complete facility buildings and install equipment at all compounds,
- Commission and test plant
- Complete site works: security fencing, gates, signage, landscaping
- Demobilise offices tidy up site.

Figure 2: Development Boundary

Figure 3: Proposed Development Layout

3.6 Characteristics of the Project

The project proposal is described in Table 2.

Table 2: Project Proposal

Size, scale, area, land-take	The project is a medium-scale industrial project comprising of a grid stabilisation facility, containing a synchronous compensator compound, GIS building, underground cable, new access road and all associated ancillary equipment on an approximately 1.81 hectare site located within agricultural lands.
Details of physical changes that will take place during the various stages of implementing the proposal	Vegetation clearance will be undertaken. It is estimated that approximately 10,485m^3 of excavated material could potentially be generated. It is estimated however that approximately 9720m^3 of site excavated materials will be suitable for reuse within the site (circa 5070m^3 to be reused as fill and circa 4650m^3 in roadside berms and reinstatement of the attenuation area. Construction of new access road, utilities including drainage, installation of new surface paving, compound buildings and lighting. Two separate drainage networks are proposed to be implemented. One will serve the new access road and the other to collect run-off from the main HISC and GIS compounds.
Description of resource requirements for the construction/operation and decommissioning of the proposal (water resources, construction material, human presence etc)	The proposed development will not require the extensive use of natural resources. Where feasible excavated materials will be reused for backfill and for landscaping. The removal of some mature trees and hedgerows will be required to facilitate the development. It is proposed where feasible to replant hedgerows on the berms that are to be constructed along the new access road. Importation of stone and aggregate material resources (locally sourced) will be required for construction. Water resources are minimal and will be provided by rainwater harvesting systems. Potable water demand will be minimal and will be satisfied by imported bottle supply.
Description of timescale for the various activities that will take place as a result of implementation (including likely start and finish date)	16-18 months.
Description of wastes arising and other residues (including quantities) and their disposal	During construction it is estimated that approximately 10485m^3 of excavated material will be generated. This material will be retained within the development boundary for fill, berms and reinstatement. Other construction phase waste may consist of surplus hardcore, stone, concrete, ducting, shuttering timber and unused oil and diesel. Any excavated materials not suitable for reuse within the proposed development will be brought to a suitable licensed waste facility.

	Wastewater from welfare facilities on site will drain to integrated wastewater holding tanks. The stored effluent will then be collected on a regular basis from site by a permitted waste contractor and removed to a licensed/permitted waste facility for treatment and disposal. All waste to be taken off-site will be collected an approved contractor and recycled or disposed at an approved facility. In the case of heavy siltation, water will be tankered off site for disposal at an authorised waste facility or pumped to a portable onsite settlement tank for treatment.
Identification of wastes arising and other residues (including quantities) that may be of particular concern in the context of the Natura 2000 network	Waste oils will be generated by the proposed development. These waste streams will be appropriately contained for subsequent disposal to appropriate authorities waste facilities for recovery or disposal.
Description of any additional services required to implement the project or plan, their location and means of construction	N/A

4. Identification of Potential Impacts

Potential likely ecological impacts arising from the project are identified in Table 3.

Table 3: Identification of Potential Impacts

Description of elements of the project likely to give rise to potential ecological impacts.	▪ Use of construction equipment, and vehicles. ▪ Use of fuels/oils and cement. ▪ Surface water runoff from the site e.g. increased sedimentation. ▪ Production of waste waters from sanitary facilities etc.
Describe any likely direct, indirect or secondary ecological impacts of the project (either alone or in combination with other plans or projects) by virtue of: *Size and scale;* *Land-take;* *Distance from Natura 2000 Site or key features of the Site;* *Resource requirements;*	The proposed development is on a land take of approximately 1.81 hectares and is within an agriculture environment, which has been significantly used for agriculture farmland. There are 12 Natura 2000 sites within the zone of potential influence of the proposed works: There shall be no habitat loss within Natura 2000 sites. ▪ Resources required include: – Machinery – transport vehicles – hand tools

Emissions; *Excavation requirements;* *Transportation requirements;* *Duration of construction, operation etc.; and* *Other.*	– Imported materials such as cement Potential emissions include: – Fuel/oil or concrete spill – sedimentation of watercourse – fugitive noise and dust – waste The proposed project is in an agriculture area. The primary emissions expected from the proposed development during construction phase are fugitive emissions of noise from the use of machinery and equipment and the increase in human activity for the duration of the works. Excavation works will be required for the new access road, the compound, underground attenuation tank and the grid connection. It is estimated that approximately 10,485m^3 of excavated material could potentially be generated. It is estimated however that approximately 9720m^3 of site excavated materials will be suitable for reuse within the site (circa 5070m^3 to be reused as fill and circa 4650m^3 in roadside berms and reinstatement of the attenuation area. There will be a number of material deliveries to the site during the construction phase of the works. Transport during the operation phase will be minimal. Construction works will be temporary. They are anticipated to take approximately 16-18 months to complete. The operational phase of the project will continue indefinitely. There are no other potential sources of impacts associated with the proposed development.

5. Identification of Other Plans, Projects and Activities

The proposed development was considered in combination with other plans and projects in the area that could result in cumulative impacts on Natura 2000 sites. Other plans considered include:

- Sligo County Council Development Plan 2017-2023
- Local Area Plans

No significant cumulative impacts are predicted with the plans listed above, as each plan has a range of environmental and natural heritage policy safeguards in place.

The proposed development will take place at Ballysumaghan, Sooey, Co. Sligo. Existing developments in the surrounding area are mainly residential and agricultural. There is also an existing 220KV ESB substation adjacent to the proposed site.

A desktop search of proposed and existing planning applications was undertaken on the 10/10/2022. The search flagged planning applications within a period dating back to 2017; any refused, invalid or withdrawn applications were omitted.

The findings show small and medium to large-scale developments within the 1 km radius scope that have been approved or are on-going. The majority of planning applications within 1km of the proposed development are related to development of and alterations to residential properties and are considered to be small in scale. A summary of relevant developments considered in the cumulative assessment is given below:

- Development consisting of the installation of battery arrays, located within container units (18 number units, each 30m^2 by c.2.6m tall), a control building (c.160.5m2 by c.6.4m tall) and transformer (c.5m tall). The development will include for ancillary infrastructure including security fencing, lighting, CCTV, internal access roads and drainage. The overall development site is c.0.64Ha. The application is accompanied by a Natura Impact Statement (NIS). (Planning ref: 2011) (Decision date: 13/8/2020).
- Development consisting of a 10 year permission. The development will consist of the development and operation of a 250 to 300 MVA (electrical rating) synchronous condenser. The development which will be located within a site compound of c. 1 hectare and will consist of the following elements: A Condenser and Control Building to house equipment including the synchronous condenser, flywheel, lube oil skid system, air compressor and pumps. Equipment to be located outside the footprint of the Condenser and Control Building but within the fenced compound will include: Cooling equipment (c. 160 sq m., c.3m high); 6 No. modular containers to house electrical and control equipment (total area of c. 195 sqm., c. 5m high); A step-up transformer, auxillary transformer and electrical plant including an external circuit breaker; 1 No. firefighting water tank; A below ground oil interceptor and attenuation tank in lieu of the originally proposed above ground oil interceptor and collection pit. Underground cabling ducts and cable to the neighbouring ESB substation boundary fencing (c. 500m). Palisade security entrance gate, boundary fencing and CCTV; All other ancillary and miscellaneous site works including site clearance; demolition of an existing agricultural shed, site access, internal roads and development of areas of hard standing including a maintenance lay-down area (Planning ref: 2090) (Decision Date: 18/1/2021).

6. Natura Impact Statement

Appropriate Assessment is the consideration of the impact on the integrity of the Natura 2000 site of the project, either alone or in combination with other plans or projects, with respect to the site's ecological structure and function, and conservation objectives. Additionally, mitigation of these impacts can be considered.

In cases where an Appropriate Assessment is required a Natura Impact Statement (NIS) shall be prepared and shall include a report of a scientific examination of evidence and data, carried out by competent persons to identify and classify any implications for Natura 2000 sites in the view of the conservation objectives of the site. The aim of the assessment is to provide a sufficient level of information to the competent authority on which to base their appropriate assessment of the plan or project. The plan or project should be fully described particularly in relation to the aspects that could interact with the surrounding environment. The proposed Quarry Lane Grid Stabilisation Facility has been fully described in Section 3 above.

The focus of the assessment is to determine whether the proposed Quarry Lane Grid Stabilisation Facility will have a significant negative impact on the features of interest of the Natura 2000 site i.e. habitats and species.

The test of the assessment is whether the plan or project will have 'an adverse effect on the integrity of the site'. Where potentially significant effects are identified proven mitigation measures will be recommended.

When Natura 2000 sites are selected for Stage 2 assessments, then all the qualifying features of conservation interest must be included in that stage of the assessment. However, when assessing impact, qualifying features are only considered relevant where a credible or tangible source-pathway-receptor link exists between the proposed development and a protected species or habitat type. In order for an impact to occur there must be a risk initiated by having a 'source' (e.g. nearby watercourse), a 'receptor' (e.g. a protected species associated aquatic or riparian habitats), and an impact pathway between the source and the receptor (e.g. a watercourse which connects the proposed development site to the site designated for the protection of the aforementioned species).

Identifying a risk that could, in theory, cause an impact does not automatically mean that the risk event will occur, or that it will cause or create an adverse impact. However, identification of the risk does mean that there is a possibility of ecological or environmental damage occurring, with the level and significance of the impact depending upon the nature of the risk, the extent of the exposure to the risk and the characteristics of the receptor. An evaluation based on these factors to determine which species and habitats are the plausible ecological receptors for potential impacts of the unmitigated proposal has been conducted in Sections 6.1.6 and 6.1.7. This evaluation determined that certain habitats and species should be selected for further assessment as plausible ecological receptors.

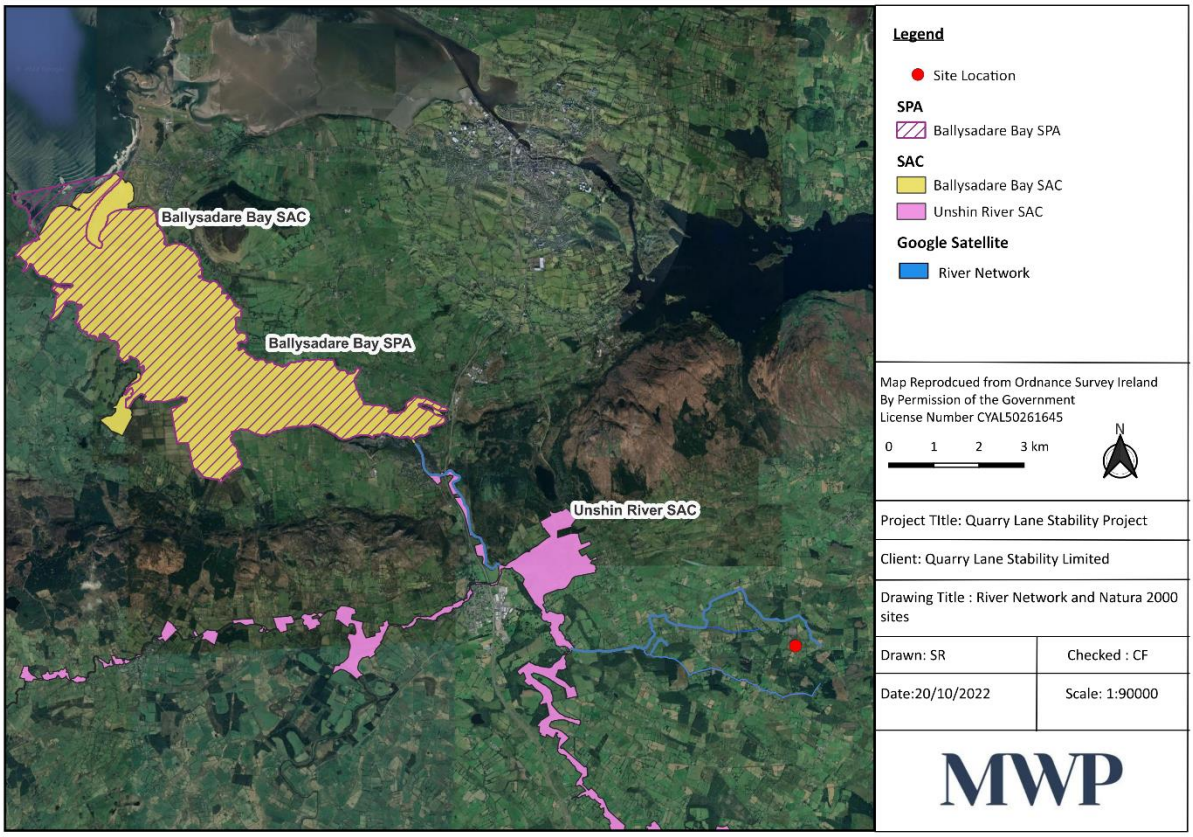
6.1 Natura 2000 Sites

It has been demonstrated at Stage 1 that there is potential as shown in Figure 4 for an indirect hydrological connection between the proposed site and the Unshin River SAC, Ballysadare Bay SAC and Ballysadare Bay SPA as the proposed development is located approximately within 4.6 km of Unshin River SAC, 9.3km of Ballysadare Bay SAC and 9.1km of Ballysadare Bay SPA.

The habitats and species of these SAC and SPA are sensitive to changes in siltation and pollutants. Without the proposed site-specific surface water control measures construction could result in an indirect hydrological connection to water quality downstream of the development.

Consequently, it is objectively concluded that in the absence of mitigation a slightly significant adverse impacts on the Conservation Objectives of the nearby Natura 2000 sites could occur as a result of the proposed development by means of adverse water quality impacts.

Figure 4: Potential Indirect Hydrological Connection



6.1.1 Unshin River SAC (001898)

6.1.1.1 Description of the Natura 2000 Site

The Unshin River runs from Lough Arrow north to Ballysadare Bay, Co. Sligo. The river is largely undrained and unaltered along much of its course. The Unshin River flows across a number of geological boundaries between sandstone, shales and limestone. This results in unusual physico-chemical qualities which in turn are reflected in the rich and varied plant and animal populations. The Unshin River supports an excellent example of floating river vegetation. The diversity of aquatic macrophytes is exceptional, and to a certain extent the unusual combinations and richness of species can be accounted for by the good quality water being discharged from Lough Arrow upstream. There are a number of areas of woodland, many of which flood, included within the site. The Unshin and its tributaries form a very important system for Atlantic Salmon, a species that is listed on Annex II of the E.U. Habitats Directive. The Unshin River SAC supports multiple Annex I habitats (**Table 4**) and Annex II Species (**Table 5**).

6.1.1.2 Qualifying Annex I Habitats for the Unshin River SAC

Table 4: Qualifying Annex 1 Habitats for Unshin River SAC

Qualifying Habitiats (* denotes Priority Habitat)	Code	Site Specific Conservation Objectives
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	3260	Maintain or restore favourable conservation condition
Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	6210	Maintain or restore favourable conservation condition
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	6420	Maintain or restore favourable conservation condition
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	91E0	Maintain or restore favourable conservation condition

6.1.1.3 Qualifying Annex II Species for the Unshin River SAC

Table 5: Qualifying Annex II Species for Unshin River SAC

Species	Species Name	Code
Mammals listed on Annex II of the Habitats Directive	Lutra lutra (Otter)	1355
Fish listed on Annex II of the Habitats Directive	Salmo salar (Atlantic Salmon)	1106

6.1.2 Ballysadare Bay SAC (000622)

6.1.2.1 Description of the Natura 2000 Site

Ballysadare Bay extends for about 10 km westwards from the town of Ballysadare, Co. Sligo, and is the most southerly of three inlets of the larger Sligo Bay. The bay is underlain by sedimentary rocks of limestones, sandstones and shales, which are exposed as low cliffs and small sections of bedrock shore at several locations. Ballysadare Bay contains extensive intertidal sand and mudflats, approximately 1,500 ha in extent overall. The mud provides an abundance of food for wildfowl, in the form of colonising plants such as Eelgrass (*Zostera marina*) and Tasselweed (*Ruppia maritima*), as well as numerous species of invertebrates on which both wildfowl and waders feed.

Ballysadare Bay is important for a range of waterfowl species in autumn and winter and is part of the larger Sligo Bay complex. Brent Goose occur in internationally important numbers.

Well-developed salt marshes occur at several locations around the bay. There is a large sand dune system at Strandhill which has been relatively undisturbed by grazers. The dune system is highly dynamic, with the tip of the peninsula actively growing and displaying a good, though limited, example of embryonic shifting dunes. The largest proportion of the dune system is made up of fixed dunes, a priority habitat listed on Annex I of the E.U. Habitats Directive. Aquaculture is little-developed in this bay compared to nearby Sligo and Drumcliff Bays. Dune systems are sensitive to developments which alter their structure. The Ballysadare Bay SAC supports multiple Annex I habitats (Table 6) and Annex II Species (Table 7).

6.1.2.2 Qualifying Annex I Habitats for the Ballysadare Bay SAC

Table 6: Qualifying Annex I Habitats for Ballysadare Bay SAC

Qualifying Habitiats (* denotes Priority Habitat)	Code	Site Specific Conservation Objectives
Estuaries	1130	Maintain favourable conservation condition
Mudflats and sandflats not covered by seawater at low tide	1140	Maintain favourable conservation condition
Embryonic shifting dunes	2110	Restore favourable conservation condition
Shifting dunes along the shoreline with Ammophila arenaria (white dunes)	2120	Restore favourable conservation condition
Fixed coastal dunes with herbaceous vegetation (grey dunes)*	2130	Restore favourable conservation condition
Humid Dune Slacks	2190	Restore favourable conservation condition

6.1.2.3 Qualifying Annex II Species for the Ballysadare Bay SAC

Table 7: Qualifying Annex II Species for Ballysadare Bay SAC

Species	Species Name	Code
Mammals listed on Annex II of the Habitats Directive	*Phoca vitulina* (Harbour Seal)	1365
Molluscs listed on Annex II of the Habitats Directive	*Vertigo angustior* (Narrow-mouthed Whorl Snail)	1014

6.1.3 Ballysadare Bay SPA (004129)

6.1.3.1 Description of the Natura 2000 Site

Ballysadare Bay extends for approximately 10 km westwards from the town of Ballysadare, County Sligo. It is the most southerly of three inlets that form the eastern part of the larger Sligo Bay complex. The bay contains extensive intertidal sand and mudflats. The flats support good populations of macro-invertebrates which are important food items for wintering waterfowl. The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for its qualifying species of interest. Ballysadare Bay is important for a range of waterfowl species in autumn and winter. Ballysadare Bay SPA is of high ornithological importance - it supports a Light-bellied Brent Goose population of international importance as well as nationally important populations of four other wintering waterfowl species. The presence of Bar-tailed Godwit, Golden Plover and Whooper Swan is of particular note as these species are listed on Annex I of the E.U. Birds Directive. The site forms an important component of the larger Sligo Bay complex. The Ballysadare Bay SPA supports multiple Annex II Species (Table 8).

6.1.3.2 Qualifying Annex II Habitats for the Ballysadare Bay SPA

Table 8: Qualifying Annex II Habitats for Ballysadare Bay SPA

Species Names	Scientific Name	Code
Light-bellied Brent Goose	Branta bernicla hrota	A046
Grey Plover	Pluvialis squatarola	A141
Dunlin	Calidris alpina	A149
Bar-tailed Godwit	Limosa lapponica	A157
Redshank	Tringa totanus	A162
Wetland and Waterbirds		A999

6.1.4 Identification of Potentially Significant Impacts to Qualifying Features

Table 9 lists the qualifying features of Special Conservation Interest for the Natura 2000 sites that lie within the zone of potential impact influence of the subject site. Information pertaining to the Natura 2000 sites is from site synopses, conservation objectives and other information available on www.npws.ie.

Table 9: Natura 2000 Sites with qualifying features of Special Conservation Interest

Natura 2000 Site	Qualifying features of Special Conservation Interest
Unshin River SAC	**Species** • 1355 Otter*(Lutra lutra)* • 1106 Salmon*(Salmo salar)* **Habitats** • 3260 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation • 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) • 6410 Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) • 91E0 Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)*
Ballysadare Bay SAC	**Species** • 1014 Narrow-mouthed Whorl Snail*(Vertigo angustior)* • 1365 Harbour Seal*(Phoca vitulina)* **Habitats** • 1130 Estuaries • 1140 Mudflats and sandflats not covered by seawater at low tide • 2110 Embryonic shifting dunes • 2120 Shifting dunes along the shoreline with Ammophila arenaria (white dunes) • 2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)* • 2190 Humid dune slacks

Natura 2000 Site	Qualifying features of Special Conservation Interest
Ballysadare Bay SPA	**Habitats** • Wetlands **Birds** • A157 Bar-tailed Godwit*(Limosa lapponica)* • A046 Light-bellied Brent Goose*(Branta bernicla hrota)* • A141 Grey Plover*(Pluvialis squatarola)* • A162 Redshank*(Tringa totanus)* • A149 Dunlin*(Calidris alpina)*

6.1.5 Conservation Objectives

According to the Habitats Directive, the *conservation status of a natural habitat* will be taken as 'favourable' within its biogeographic range when:

- Its natural range and areas it covers within that range are stable or increasing;
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and
- The conservation status of its typical species is favourable as defined below.

According to the Habitats Directive, the conservation status of a species means the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations. The conservation status will be taken as 'favourable' within its biogeographic range when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats;
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

The specific conservation objectives for each site are available on www.npws.ie. The site-specific conservation objectives were available for following sites:

- Unshin River SAC
- Ballysadare Bay SAC
- Ballysadare Bay SPA

All conservation objectives together with other designated site information are available on http://www.npws.ie/protectedsites/.

6.1.6 Natura 2000 Sites within the zone of potential impact influence

Table 10 lists the rationale for inclusion in assessment for the Natura 2000 sites that lie within the zone of potential impact influence of the subject site.

Table 10: Natura 2000 Sites rationale for inclusion in assessment

Natura 2000 Site	Proximity of subject site to nearest point of designated site (km)	Rationale for inclusion in assessment
Unshin River SAC	Approximately 4.6 km northwest from the proposed site	The SAC is located approximately 4.6 km northwest of the proposed development site. An indirect hydrological connection to the proposed development site could exist.
Ballysadare Bay SAC	Approximately 9.3 km northwest from the proposed site	The SAC is located approximately 9.3 km northwest from the proposed development site. An indirect hydrological connection to the proposed development site could exist.
Ballysadare Bay SPA	Approximately 9.1 km northwest from the proposed site	The SPA is located approximately 9.1 km northwest from the proposed development site. An indirect hydrological connection to the proposed development site could exist.

Table 11: Selection of qualifying features for impact assessment

Qualifying Features	Potential for Significant Impacts	Rationale
	Unshin River SAC (001898)	
Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260]	Yes	Suitable conditions are likely to exist for this habitat along the Unshin River downstream of the proposed development site. A connection with the flood plain is required for a proper functioning of this habitat. Pressures on this habitat include eutrophication, overgrazing and alien species. Potential for indirect impacts on this habitat include loss or decline of this habitat should a decline in the water quality arise from pollution or run-off from the construction and operation of the proposed project. Any polluted run-off (cement, hydrocarbons, silt) may adversely impact the habitat.
Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210]	No	The proposed development is not in direct proximity to the Unshin River SAC. Due to the distance of 4.6km to the proposed development, no sensitivity to the deterioration to water quality, and lack of impact pathways, it is considered unlikely that there will be a significant effect on this habitat type. It will not be considered further in this report.
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410]	No	The proposed project is not within the direct proximity to Unshin River SAC. Due to the distance of 4.6km to the proposed development, no sensitivity to the deterioration to water quality, and lack of impact pathways, it is considered unlikely that there will be a significant effect on this habitat type. It will not be considered further in this report.
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0]	No	The proposed project is not within the Unshin River SAC. Due to the intervening distance of 4.6km and no sensitivity to the deterioration to water quality, it is considered unlikely that there will be a significant effect on the habitat type. It will not be considered further in this report.
Salmo salar (Salmon) [1106]	Yes	This species is very sensitive to the changes in water quality and depends on clean and unpolluted water. Due to an indirect hydrological connection, any polluted run-off from the site (contaminated with silt, cement, hydrocarbons or other chemicals) could cause a decline in water quality in the Ballygrania Stream and subsequently in the River Unshin SAC which can adversely impact the species and the aquatic habitat.

Qualifying Features	Potential for Significant Impacts	Rationale
Lutra lutra (Otter) [1355]	**Yes**	The existence of this species is linked with the good water quality. Any deterioration in water quality could adversely impact this species. Due to an indirect hydrological connection, polluted run-off from the site (contaminated with silt, cement, hydrocarbons or other chemicals) could cause a decline in water quality in the Ballygrania Stream and subsequently in the River Unshin SAC which can adversely impact the species and the aquatic habitat.
	Ballysadare Bay SAC (000622)	
Estuaries [1130]	**Yes**	Deterioration in water quality could potentially adversely impact this habitat. Due to an indirect hydrological connection, any polluted run-off from the site (contaminated with silt, cement, hydrocarbons or other chemicals) could cause a decline in water quality in the Ballygrania Stream and subsequently in Ballysadare Bay which can adversely impact the aquatic habitat.
Mudflats and sandflats not covered by seawater at low tide [1140]	No	The proposed project is not within the Ballysadare Bay SAC. This SAC is located approximately 9.3km of the proposed site. This qualifying feature is a terrestrial habitat. Water quality is not a focus for the maintenance of this qualifying feature of this SAC. Due to the habitat type, intervening distance and dilution factor, it is considered unlikely that there will be a significant effect on the habitat type. It will not be considered further in this report.
Embryonic shifting dunes [2110]	No	The proposed project is not within the Ballysadare Bay SAC. This SAC is located approximately 9.3km of the proposed site. This qualifying feature is a terrestrial habitat. Water quality is not a focus for the maintenance of this qualifying feature of this SAC. Due to the habitat type, intervening distance and dilution factor, it is considered unlikely that there will be a significant effect on the habitat type. It will not be considered further in this report.
Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2120]	No	The proposed project is not within the Ballysadare Bay SAC. This SAC is located approximately 9.3km of the proposed site. This qualifying feature is a terrestrial habitat. Water quality is not a focus for the maintenance of this qualifying feature of this SAC. Due to the habitat type, intervening distance and dilution factor, it is considered unlikely that there will be a significant effect on the habitat type. It will not be considered further in this report.
Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	No	The proposed project is not within the Ballysadare Bay SAC. This SAC is located approximately 9.3km of the proposed site. This qualifying feature is a terrestrial habitat. Water quality is not a focus for the maintenance of this qualifying feature of this SAC. Due to the habitat type,

Qualifying Features	Potential for Significant Impacts	Rationale
		intervening distance and dilution factor, it is considered unlikely that there will be a significant effect on the habitat type. It will not be considered further in this report.
Humid dune slacks [2190]	No	The proposed project is not within the Ballysadare Bay SAC. This SAC is located approximately 9.3km of the proposed site. This qualifying feature is a terrestrial habitat. Water quality is not a focus for the maintenance of this qualifying feature of this SAC. Due to the habitat type, intervening distance and dilution factor, it is considered unlikely that there will be a significant effect on the habitat type. It will not be considered further in this report.
Vertigo angustior (Narrow-mouthed Whorl Snail) [1014]	**Yes**	Deterioration in water quality could potentially adversely impact this species. Due to an indirect hydrological connection, any polluted run-off from the site (contaminated with silt, cement, hydrocarbons or other chemicals) could cause a decline in water quality in the Ballygrania Stream and subsequently in Ballysadare Bay which can adversely impact this species.
Phoca vitulina (Harbour Seal) [1365]	**Yes**	Deterioration in water quality could potentially adversely impact this species. Due to an indirect hydrological connection, any polluted run-off from the site (contaminated with silt, cement, hydrocarbons or other chemicals) could cause a decline in water quality in the Ballygrania Stream and subsequently in Ballysadare Bay which can adversely impact this species.
Ballysadare Bay SPA (004129)		
Light-bellied Brent Goose (Branta bernicla hrota) [A046]	**Yes**	Deterioration in water quality could potentially adversely impact this species. Due to an indirect hydrological connection, any polluted run-off from the site (contaminated with silt, cement, hydrocarbons or other chemicals) could cause a decline in water quality in the Ballygrania Stream and subsequently in Ballysadare Bay which can adversely impact this species.
Grey Plover (Pluvialis squatarola) [A141]	**Yes**	Deterioration in water quality could potentially adversely impact this species. Due to an indirect hydrological connection, any polluted run-off from the site (contaminated with silt, cement, hydrocarbons or other chemicals) could cause a decline in water quality in the Ballygrania Stream and subsequently in Ballysadare Bay which can adversely impact this species.
Dunlin (Calidris alpina) [A149]	**Yes**	Deterioration in water quality could potentially adversely impact this species. Due to an indirect hydrological connection, any polluted run-off from the site (contaminated with silt, cement, hydrocarbons or other chemicals) could cause a decline in water quality in the Ballygrania Stream and subsequently in Ballysadare Bay which can adversely impact this species.
Bar-tailed Godwit (Limosa lapponica) [A157]	**Yes**	Deterioration in water quality could potentially adversely impact this species. Due to an indirect hydrological connection, any polluted run-off from the site (contaminated with silt, cement,

Qualifying Features	Potential for Significant Impacts	Rationale
		hydrocarbons or other chemicals) could cause a decline in water quality in the Ballygrania Stream and subsequently in Ballysadare Bay which can adversely impact this species.
Redshank (Tringa totanus) [A162]	**Yes**	Deterioration in water quality could potentially adversely impact this species. Due to an indirect hydrological connection, any polluted run-off from the site (contaminated with silt, cement, hydrocarbons or other chemicals) could cause a decline in water quality in the Ballygrania Stream and subsequently in Ballysadare Bay which can adversely impact this species.
Wetland and Waterbirds [A999]	**Yes**	Deterioration in water quality could potentially adversely impact this habitat. Due to an indirect hydrological connection, any polluted run-off from the site (contaminated with silt, cement, hydrocarbons or other chemicals) could cause a decline in water quality in the Ballygrania Stream and subsequently in Ballysadare Bay which can adversely impact aquatic habitat and species.

6.2 Assessment of Potentially Significant Effects

The sub-sections hereunder provide an assessment of potentially significant effects which may arise as a result of the impacts identified in Section 4, on the qualifying features and special conservation interests that have been selected for impact assessment in Section 6.1.4. Following this, a determination is made as to whether the proposal is likely to have significant effects on the integrity of the Natura 2000 sites selected for impact assessment.

The likelihood of adverse effects to a Natura 2000 site from the proposal has been determined based on indicators including:

- Water quality and resource
- Habitat loss and alteration
- Habitat or species fragmentation
- Disturbance and/or displacement of species

The likelihood of significant cumulative effects is assessed in Section 6.3 below.

6.2.1 Water quality and resource

There are some elements of the proposed works which could potentially result in impairment of water quality. In general, where works are conducted within proximity to water bodies, impairment of water quality may potentially occur as a result of run-off of sediment/fines or accidental fuel/oil spills from machinery/equipment. These elements of the proposal could therefore potentially result in pollution of the aquatic environment. All works will take place within the curtilage of the site and all fuels will be stored within secure, bunded and impermeable storage areas. The area of the proposed new development is already developed. There are no watercourses on the site that could act as conduits for pollution. Water management on site during the operational phase will ensure that all stormwater passes through oil water interceptors. Therefore, there will be no additional sources of potential sedimentation from the proposed development during the operation phase and as a result, no impacts on water quality are anticipated. Construction works will be undertaken in accordance with best practice measures.

The proposed development is located approximately within 4.6 km of one SAC, Unshin River SAC. The habitats and species of this SAC are sensitive to changes in siltation loads, pollutants and water levels. The site-specific construction will not result in a significant risk to water quality downstream of the development. The proposal at Ballysumaghan does not directly drain to this SAC. The proposed works will not significantly alter the existing water flow at the site, or in the greater area. The works will continue at the existing footprint of ESB Srananagh 220 kV Substation. Consequently, it is objectively concluded that no significant adverse impacts on the Conservation Objectives of the nearby Natura 2000 sites will occur as a result of the programme of works described at Section 3.5 above, by means of adverse water quality impacts.

The proposed drainage system along the new access road will comprise an overground drainage system as shown in Appendix 2 Drainage Report. It is proposed that run-off from the proposed new access road will be collected by roadside v-drains installed along both sides the roadway to convey run-off to 2 settlement ponds at the site entrance (one on either side of the road) before finally discharging by overland flow to the existing field drain along the southern boundary. Check dams will be installed at regular intervals, based on gradient, along the roadside v-drains to provide flow attenuation, slow down runoff to promote settlement and to reduce scour and erosion of the drains. It is proposed to install clean water cut-off drains to intercept surface water run-off from catchments uphill of the proposed development site. The cut-off drains will and divert the collected runoff around site infrastructure to prevent it entering the site and potentially coming in contact with site runoff containing

suspended solids. The newly constructed drainage will be constructed in accordance with current guidelines and best practice. There will be no additional sources of potential sedimentation from the proposed development during the operation phase and as a result, no impacts on water quality are anticipated.

With regard to wastes arising, including packaging will be recycled where possible and/or removed to an authorised waste facility. Construction waste will be separated on site, recycled where possible.

Table 11 outlines the Natura 2000 sites for which it is considered that there is potential for impacts to occur from the proposed development. The table considers listed species, habitats and the rationale for either including or excluding them from further assessment.

The evaluation takes into account the scope, scale, nature and size of the project, its location relative to the Natura 2000 sites and the degree of connectedness that exists between the project and each Natura 2000 site's potential ecological receptor.

6.2.2 Habitat Loss and Alteration

There will be no direct habitat loss within the Unshin River SAC, Ballysadare SAC and Ballysadare SPA as a result of the proposed works as there is no spatial overlap with these sites. However, on a precautionary basis, due to the indirect hydrological link and potential for water quality impacts, the works may result in localised habitat alteration.

6.2.3 Habitat or species fragmentation

Habitat fragmentation has been defined as 'reduction and isolation of patches of natural environment' (Hall et al., 1997 cited in Franklin et al., 2002) which results in spatial separation of habitat areas which had previously been in a state of greater continuity. Adverse effects of habitat fragmentation on species include the increased isolation of populations which can detrimentally impact on the resilience or robustness of the populations.

The proposed development would not result in direct habitat or species fragmentation. However, on a precautionary basis, due to the indirect hydrological link and without the relevant mitigation measures there is potential for pollutants to enter the surrounding water pathways during the construction and operational phase which could result in the fragmentation of habitat or species within the Natura 2000 sites.

6.2.4 Disturbance and/or displacement of species

The proposed development would not result in direct disturbance and/or displacement of species. However, on a precautionary basis, due to the indirect hydrological link and without the relevant mitigation measures there is potential for pollutants to enter the surrounding water pathways during the construction and operational phase which could result in the disturbance or displacement of species within the Natura 2000 sites.

6.3 Assessment of Potentially Significant Cumulative Effects

Cumulative effects are defined by EPA Guidance (2017) as; 'the addition of many minor or significant effects, including the effects of other projects, to create larger, more significant effects'. Section 5 identified the other projects, plans and activities considered in combination with the proposed development. The types of pressures impacting on water quality that could act in combination with the proposed development are identified in Section 6.2.5. While it is regarded that significant water quality impacts are not predicted as a result of the proposed development, in combination with other projects a cumulative impact could arise.

The effects of the project on the qualifying interests, potentially within the zone of influence of the project, have been assessed against the measures designed to achieve the conservation objectives. The outcome of the assessment is presented in the following table (Table 12).

Table 12: Assessment of effects on conservation objectives

Attribute	Measure	Target	Assessment of Potentially Significant Effects	Mitigation Required
Unshin River SAC (001898)				
Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation				
Habitat area	Kilometres	Area stable or increasing, subject to natural processes.	The proposed development would not result in the direct loss of any habitat area within the SAC. The habitat could however be potentially impacted indirectly should a decline in water quality occur in the event of any polluted or contaminated run-off arising from the construction and operation of the proposed project which could affect the habitat within the SAC.	**Yes**
Habitat distribution	Occurrence	No decline, subject to natural processes.	The proposed development would not result in the direct loss of any habitat area within the SAC. The habitat could however be potentially impacted indirectly should a decline in water quality occur in the event of any polluted or contaminated run-off arising from the construction and operation of the proposed project which could affect the habitat within the SAC.	**Yes**
Hydrological regime: river flow	Metres per second	Maintain appropriate hydrological regimes.	There would be no change in the river flow as a result of the proposed project as the risk has been avoided by design.	No
Hydrological regime: groundwater discharge	Metres per second	Maintain appropriate hydrological regimes.	There would be no change in the groundwater discharge as there would be no discharge as a result of the proposed project.	No
Substratum composition: particle size range	Millimetres	Maintain appropriate substratum particle size range, quantity and quality, subject to natural processes.	There is no potential for change to substratum composition as a result of the proposed development.	No
Water quality	Various	Maintain/restore appropriate water quality to support the natural structure and functioning of the habitat.	The proposed development would not result in the direct loss of any habitat area within the SAC. The habitat could however be potentially impacted indirectly should a decline in water quality occur in the	**Yes**

Attribute	Measure	Target	Assessment of Potentially Significant Effects	Mitigation Required
			event of any polluted or contaminated run-off arising from the construction and operation of the proposed project which could affect the habitat within the SAC.	
Typical species	Occurrence	Typical species of the relevant habitat sub-type should be present and in good condition.	It is not considered that the proposed project will not have any direct effect on the population trend of the species. However, potential for indirect impacts on this habitat include loss or decline of this habitat should a decline in the water quality arise from pollution or run-off from the construction and operation of the proposed project. Any polluted run-off (cement, hydrocarbons, silt) may adversely impact the habitat and groundwater discharge.	**Yes**
Floodplain connectivity: area	Hectares	Maintain/restore the area of active floodplain at and upstream of the habitat.	There would be no impact to floodplain connectivity as a result of the proposed project.	No
Riparian habitat: area and condition	Hectares	Maintain the area and condition of fringing habitats necessary to support the habitat and its sub-types	There would be no impact to riparian habitat as a result of the proposed project.	No
Otter (*Lutra lutra*)				
Distribution	Percentage positive survey sites	No significant decline.	The proposed project will not have any direct effect on the population trend of the species. The development would not result in the loss of any habitat area within the SAC. The species could however be potentially impacted indirectly should a decline in water quality occur which could affect the distribution of the species within the SAC.	**Yes**
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 124.68ha	The development would not result in the direct loss of any habitat area within the SAC. The habitat could however be potentially impacted indirectly should a decline in water quality occur which could affect the communities within the SAC.	**Yes**

Attribute	Measure	Target	Assessment of Potentially Significant Effects	Mitigation Required
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 66.55km	The development would not result in the direct loss of any habitat area within the SAC. The habitat could however be potentially impacted indirectly should a decline in water quality occur which could affect the communities within the SAC.	**Yes**
Couching sites and holts	Number	No significant decline	The River Unshin River SAC could be potentially impacted indirectly due to a decline in water quality which could affect couching sites and holts if appropriate mitigation measures are not put in place.	**Yes**
Fish biomass available	Kilograms	No significant decline	The River Unshin River SAC could be potentially impacted indirectly due to a decline in water quality which could affect fish biomass if appropriate mitigation measures are not put in place.	**Yes**
Barriers to connectivity	Number	No significant decline	The proposed project would not affect the connectivity therefore no mitigation is required for this aspect.	No
Salmon *(Salmo salar)*				
Distribution: extent of anadromy	Percentage of river accessible	100% of river channels down to second order accessible from estuary.	The proposed project will not have any direct effect on the population trend of the species. The development would not result in the loss of any habitat area within the SAC. The species could however be potentially impacted indirectly should a decline in water quality occur which could affect the distribution of the species within the SAC.	**Yes**
Adult spawning fish	Number	Conservation limit (CL) for each system consistently exceeded.	The proposed project will not have any direct effect on the population trend of the species. The development would not result in the loss of any habitat area within the SAC. The species could however be potentially impacted indirectly should a decline in water quality occur which could affect the distribution of the species within the SAC.	**Yes**
Salmon fry abundance	Number of fry/5 minutes electrofishing	Maintain or exceed 0+ fry mean catchment-wide abundance	It is not considered that the proposed project will have any direct effect on the population trend of the species.	**Yes**

Attribute	Measure	Target	Assessment of Potentially Significant Effects	Mitigation Required
		threshold value. Currently set at 17 salmon fry/5 minutes sampling.	The River Unshin River SAC could be potentially impacted indirectly due to a decline in water quality which could affect the salmon fry abundance if appropriate mitigation measures are not put in place.	
Out-migrating smolt abundance	Number	No significant decline.	The River Unshin River SAC could be potentially impacted indirectly due to a decline in water quality which could affect the out-migrating smolt abundance if appropriate mitigation measures are not put in place.	**Yes**
Number and distribution of redds	Number and occurrence	No decline in number and distribution of spawning redds due to anthropogenic causes.	The River Unshin River SAC could be potentially impacted indirectly due to a decline in water quality which could affect the number and distribution of redds if appropriate mitigation measures are not put in place.	**Yes**
Water quality	EPA Q value	At least Q4 at all sites sampled by EPA.	It is not considered that the proposed project will have any direct effect on the population trend of the species. However, potential for indirect impacts on this habitat include loss or decline of this habitat should a decline in the water quality arise from pollution or run-off from the construction and operation of the proposed project. Any polluted run-off (cement, hydrocarbons, silt) may adversely impact the habitat.	**Yes**
Ballysadare Bay SAC (000622)				
Estuaries				
Habitat Area	Hectares	The permanent habitat is stable or increasing subject to natural processes	The proposed project is not within the Ballysadare Bay SAC. This SAC is located approximately 9.3km of the proposed site. There will be no loss in area of this habitat as a result of the proposed development	No

Attribute	Measure	Target	Assessment of Potentially Significant Effects	Mitigation Required
Community Extent	Hectares	Maintain the extent of the Zostera-dominated community subject to natural processes	The development would not result in the direct loss of any habitat area within the SAC. The habitat could however be potentially impacted indirectly should a decline in water quality occur which could affect the communities within the SAC	**Yes**
Community Structure: Zostera Density	Shoots/m^2	Conserve the high quality of the Zostera dominated community subject to natural processes	The development would not result in the direct loss of any habitat area within the SAC. The habitat could however be potentially impacted indirectly should a decline in water quality occur which could affect the communities within the SAC	**Yes**
Community Distribution	Hectares	Conserve the following community types in a natural condition: Intertidal sand with Angulus tenuis community complex; Muddy sand to sand with Hediste diversicolor, Corophium valuator and Peringia ulvae community complex; Fine sand with polychaetes community complex; Sand with bivaleves, nematodes and crustaceans community complex;Intertidal reef community complex; Subtidal reef community complex	The development would not result in the direct loss of any habitat area within the SAC. The habitat could however be potentially impacted indirectly should a decline in water quality occur which could affect the communities within the SAC	**Yes**
Marsh Snail (*Vertigo angustio*)				
Distribution: occupied sites	Number	No decline. There is one known location for this species in this SAC (which overlaps two 1km squares).	The proposed development would not result in the loss/change of any habitat area used by this species	No
Presence on transect	Occurrence	Adult or sub-adult snails are present in all three of the habitat zones on the transect (minimum four samples).	The proposed development would not result in the loss/change of any habitat area used by this species	No
Presence	Occurrence	Adult or sub-adult snails are present in at least six other places at the site	The proposed development would not result in the loss/change of any habitat area used by this species	No

Attribute	Measure	Target	Assessment of Potentially Significant Effects	Mitigation Required
		with a wide geographical spread (minimum of eight sites sampled).		
Transect habitat quality	Metres	At least 50m of habitat along the transect is classed as optimal and the remainder as at least sub-optimal.	The proposed development would not result in the loss/change of any habitat area used by this species	No
Transect optimal wetness	Metres	Soils, at time of sampling, are damp (optimal wetness) and covered with a layer of humid thatch for at least 50m along the transect.	The proposed development would not result in the loss/change of any habitat area used by this species	No
Habitat extent	Hectares	At least 45ha of the site in at least optimal/suboptimal condition. Optimal habitat is defined as fixed dune, species-rich grassland dominated by red fescue (Festuca rubra) and marram (Ammophila arenaria), with sparse oxeye daisy (Leucanthemum vulgare), dandelion (Taraxacum sp.), ribwort plantain (Plantago lanceolata) and other low growing herbs. Vegetation height 20-50cm. Habitat growing on damp, friable soil covered with a layer of humid, open structured thatch. Sub-optimal habitat is defined as above but either vegetation height is less than 10cm or above 50cm; or the soil is dry and sandy; or the thatch is wetter with a denser structure.	The development would not result in the loss /change of any of habitat area	No
Harbour Seal (*Phoca vitulina*)				
Access to suitable habitat	Number of artificial barriers	Species range within the site should not be restricted by artificial barriers to site use.	The proposed development is not within the Ballysadare Bay SAC and would not cause any restrictions or barrier effect for use by this species.	No

Attribute	Measure	Target	Assessment of Potentially Significant Effects	Mitigation Required
Breeding behaviour	Breeding sites	Conserve the breeding sites in a natural condition.	The proposed development is not within the Ballysadare Bay SAC and would not give rise to any loss/change in the breeding sites of this species.	No
Moulting behaviour	Moult haul-out sites	Conserve the moult haul-out sites in a natural condition.	The proposed development is not within the Ballysadare Bay SAC and would not give rise to any loss/change in moult haul-out sites of this species.	No
Resting behaviour	Resting haul-out sites	Conserve the resting haul-out sites in a natural condition.	The proposed development is not within the Ballysadare Bay SAC and would not give rise to any loss/change in resting haul-out sites of this species.	No
Disturbance	Level of impact	Human activities should occur at levels that do not adversely affect the harbour seal population at this site.	The proposed development is not within the Ballysadare Bay SAC. This SAC is located approximately 9.3km of the proposed site. No potential for the proposal to create disturbance of this species.	No
Ballysadare Bay SPA (004129)				
Light-bellied Brent Goose (Branta berniclahorta) **Grey Plover (Pluvialis squatarola)** **Dunlin (Calidris ariti)** **Bar-tailed Godwit (*Limosa lapponica*)** **Red Shank (Tringa aritim)**				
Population trend	Percentage change	Long term population trend stable or increasing.	The proposed project will not have any direct effect on the population trend of the species. The development would not result in the loss of any habitat area within the SPA. The species could however be potentially impacted indirectly should a decline in water quality occur which could affect the abundance of Prey availability for SCI species within the SPA.	**Yes**
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing and intensity of use of areas by bar-tailed godwit, other than that occurring from natural patterns of variation.	The proposed project will not have any direct effect on the population trend of the species. The development would not result in the loss of any habitat area within the SPA. The species could however be potentially impacted indirectly should a decline in water quality	**Yes**

Attribute	Measure	Target	Assessment of Potentially Significant Effects	Mitigation Required
			occur which could affect the abundance of Prey availability for SCI species within the SPA.	
Wetlands and Waterbirds				
Habitat area	Hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 2130 hectares, other than that occurring from natural patterns of variation.	The proposed development would not result in the loss of any wetland habitat area. The species included in the SCI 'waterbirds' could however be potentially impacted indirectly should a decline in water quality occur which could affect the abundance of prey availability.	**Yes**

7. Mitigation

7.1 Construction Phase

7.1.1 Construction Environmental Management Plan (CEMP)

A Construction Environmental Management Plan (CEMP) has been prepared for the construction phase of the proposed development, see Appendix 3 for more details. Prior to construction works commencing, the appointed contractor will finalise a detailed CEMP. The detailed CEMP will outline construction practices and environmental management measures which will be implemented during the construction phase of the project in order to ensure that the entire project is constructed in accordance with best practice, with minimum impact on the surrounding environment. The CEMP will ensure that the project will be carried out in accordance with any planning conditions applicable and within the agreed schedule.

The construction works will be strictly managed in line with the Contractors CEMP, which will include measures for the management of fuel, concrete, stockpiles, run-off, spills and the provision of emergency procedures. The finalised CEMP will take cognisance of CIRIA technical guidance on water pollution control (Audus *et al*., 2010; Masters-Williams *et al*., 2001; Murnane *et al*., 2006) and National Roads Authority guidance '*The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads*' (NRA, 2010).

The CEMP will include, but is not limited to, the following environmental controls:

- Noise, Vibration, Dust and Air Control
- Contaminated waste
- Management of Construction and Demolition Waste
- Fuel and Oils Management
- Management of Concrete
- Emergency Response Plan

The CEMP will be submitted to the appropriate local authorities for agreement and approval prior to the commencement of any construction activity.

7.1.2 Environmental Officer

Routine inspections of construction activity will be carried out on a daily basis by the contractor staff to ensure all controls to prevent environmental impact, relevant to the construction activities taking place at the time, are in place. Environmental inspections will ensure that the works are undertaken in compliance with the Project CEMP and that the requirements of the Conditions of Planning, the NIS and associated documentation are being adhered to during construction. Only suitably trained staff are to undertake environmental inspections of the construction site.

7.1.3 Management of Fuel/Oil etc

The management of fuel on site will have regard to the following elements:

- Chemicals will be bunded and where applicable, stored within double skinned tanks/containers with the capacity to hold 110% of the volume of chemical contents. Ancillary equipment such as hoses and pipes will be contained within the bund.
- Bunds will be located on flat ground a minimum distance of 50 m from any watercourse or other water conducting features.
- Taps, nozzles and valves will be fitted with a lock system and will be regularly inspected for leaks and signs of damage.
- Where required, refuelling on-site will only be carried out at a designated area, at least 50 m from any river or stream, with the use of a delivery fuel truck, operated by appropriately trained personnel. Only designated trained operators will be authorised to refuel plant on site.
- Only mechanically sound plant will be permitted to gain access to the Site.
- Controls will be regularly inspected and maintained. Regular cleaning and servicing of bunds, gullies, pipe work, oil interceptors will be carried out to ensure this system is operating at its optimum.
- Procedures and contingency plans will be set up to deal with emergency accidents or spills. An emergency spill kit with oil boom and absorbers will be kept on site in the event of an accidental spill. The contents of the spill kit will be replenished if used and they will be checked on a scheduled basis during environmental inspections and audits. All crews will be trained in the use of spill kit equipment.
- All emergency procedures and equipment will be in place prior to the commencement of any works.

7.1.4 Management of Concrete

There shall be the requirement for some concrete works at the site. It is important to prevent concrete from entering surface water drains within and in close proximity to the site. Wet concrete is silty and very alkaline (high pH) and can have a serious effect on watercourses and aquatic life if ingress occurs.

The following measures will be implemented during construction of the development:

- A designated trained operator, experienced in working with concrete, will be employed during the concrete pouring phase. There shall be no pouring of concrete during extreme/prolonged rainfall.
- The use of concrete close to drainage features will be carefully controlled to avoid spillage.
- Any small volumes of incidental wash generated from cleaning hand tools, cement mixers or other plant, as required, will be trapped on-site to allow sediment to settle out and reach neutral pH before clarified water is released to the surface water drains or allowed to percolate to ground. Settled solids will need to be appropriately disposed of off-site.
- Washout of concrete trucks will not occur at the site.

7.1.5 Runoff and Sediment Control

Mitigation measures will be implemented to ensure that pollutants and sediment are not transferred to receiving watercourses.

- Erosion control, where runoff is prevented from flowing across exposed ground and becoming polluted, and sediment control, where runoff is slowed to allow suspended sediment to settle, are important elements in runoff and sediment control. Erosion and sediment controls are to be implemented prior to any site clearance works commencing.
- Clean water runoff will be intercepted and diverted away from construction site runoff to avoid cross-contamination of clean water with soiled water.
- The area of exposed ground will be minimised. Every effort will be made to ensure that the amount of material excavated is kept to a minimum in order to limit the impact on the geological and hydrological aspects of the site. Excavations will only be carried out following installation of appropriate sediment controls measures.
- Excavated material will be deposited in designated material deposition areas. These areas are specifically selected to avoid sediment entering adjacent water courses and minimise water quality impacts on water bodies.
- Implementation of sediment control measures will slow run-off and trap suspended sediment. Appropriate silt control measures such as silt-traps, check dams and sedimentation ponds are to be installed, where required.
- Silt fences or other appropriate silt retention measures will be installed where there is a risk of erosion runoff to watercourses from construction related activity, particularly if working during prolonged wet weather or if working during an intense rainfall event.
- Silt traps, such as geotextile membrane, will be placed in the existing drainage network prior to construction work. These will be inspected weekly by the Environmental Consultant and cleaned regularly as required as directed by the Environmental Consultant.
- Work near drains during or after prolonged rainfall or an intense rainfall event will be avoided and will cease entirely near drains when it is evident that pollution is occurring.
- Significant suspended solids pollution should not be caused by runoff during the construction process. This should be achieved by best practice methodology during construction (CIRIA guidance).
- Controls need to be regularly inspected and maintained in order to avoid build-up or damage, which could lead to pollution of watercourses. Controls must work well throughout the duration of the construction phase. Inspection and maintenance are critical after prolonged or intense rainfall.

7.1.6 Storage of Materials

Materials, containers, any stockpiles and waste, however temporary, will be stored at designated areas. Material stockpiles should be kept to a minimum size and should be stored on an impermeable base.

Storage will be located as follows:

- Away from drains and any watercourses or drains.
- Well away from moving plant, machinery and vehicles.
- Fuel, oils etc. will be stored in a secure area and under cover to prevent damage from the elements.

7.2 Operational Phase

It is not envisaged that the operational phase of the proposal will involve any significant impacts on the conservation interests of nearby designated sites. Therefore, specific mitigation measures for the operational phase will not be required.

The surface water drainage system should be managed and appropriately maintained so as to ensure that the quality of discharge is adequate, and the quantity of run-off is controlled.

7.3 Decommissioning Phase

Mitigation measures for the decommissioning phase will be similar to those of the construction phase; however, decommissioning will be of a significantly lesser scale, as large scale excavations will not be required.

8. Residual Impacts

It is objectively concluded that significant adverse residual impacts on the Conservation Objectives of any of the identified European sites evaluated herein, namely the Unshin River SAC, Ballysadare Bay SAC and Ballysadare Bay SPA, will not occur as a result of the proposal, either independently or in combination with other plans or projects on implementation of the mitigation measures outlined in this report.

9. Conclusion

It has been objectively concluded, following an examination, analysis and evaluation of the relevant information, including in particular the nature of the predicted impacts from the proposed Quarry Lane Stability Project and with the implementation of the mitigation measures proposed, that the proposed development will not adversely affect (either directly or indirectly) the integrity of any European site, either alone or in combination with other plans or projects, and there is no reasonable scientific doubt in relation to this conclusion. These sites are:

- Unshin River SAC (001898)
- Ballysadare Bay SAC (000622)
- Ballysadare Bay SPA (004129)

10. References

Department of the Environment, Heritage and Local Government (DoEHLG) (2009). *Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities.* Department of Environment, Heritage and Local Government.

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AA Screening (MPW – Document No. 23272-6002)

Construction Environmental Management Plan (MWP - Document No. 23272-6006)

Drainage Report (MPW – Document No. 23272-6004)

Environmental Report (MWP - Document No. 23272-6001)

Appendix 1

Appropriate Assessment Screening Report

MWP

APPROPRIATE ASSESSMENT SCREENING REPORT

Proposed Quarry Lane Stability Project at Ballysumaghan, Sooey, County Sligo.

October 2022

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Project No.	Doc. No.	Rev.	Date	Prepared By	Reviewed By	Approved By	Status
23272	6002	A	24/10/2022	ZH	CF	CF	FINAL

MWP, Engineering and Environmental Consultants
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Summary of Findings

Project Title	Appropriate Assessment for Proposed Quarry Lane Stability Project
Project Proponent	Quarry Lane Stability Ltd.
Project Location	Ballysumaghan, Sooey, Co. Sligo
Screening for Appropriate Assessment	The Screening for Appropriate Assessment is undertaken to determine the potential for likely significant effects of the proposed project, individually, or in combination with other plans or projects, in view of the conservation objectives of the site on a Natura 2000 Site.
Conclusion	It has been objectively concluded during the screening process that the following Natura 2000 sites within the zone of influence of the proposed works will not be significantly impacted by the proposed project at Ballysumaghan in County Sligo: • Lough Gill SAC (001976) • Union Wood SAC (000638) • Lough Arrow SAC (001673) • Bricklieve Mountains and Keishcorran SAC (001656) • Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC (000627) • Templehouse and Cloonacleigha Loughs SAC (000636) • Lough Arrow SPA (004050) • Cummeen Strand SPA (004035) • Sligo/Leitrim Uplands SPA (004187) It cannot be objectively concluded at this stage that the proposed stability project will not result in likely significant effects on the following Natura 2000 sites: • Unshin River SAC (001898) • Ballysadare Bay SAC (000622) • Ballysadare Bay SPA (004129) Therefore, an Appropriate Assessment is required and a Natura Impact Statement is to be prepared.

1. Introduction

Quarry Lane Stability Ltd. ('the Applicant') is submitting a Planning Application for permission to construct a grid stabilisation facility at Ballysumaghan, Sooey, Co. Sligo (hereafter referred to as the 'proposed development'). The location of the proposed development is hereafter referred to as 'proposed development site'.

This screening for Appropriate Assessment has been undertaken to determine whether the proposed development is likely to have a significant effect on any Natura 2000 site (i.e., SACs and SPAs), in view of the sites' conservation objectives. This screening for Appropriate Assessment has been undertaken by a staff environmentalist from Malachy Walsh and Partners (MWP).

1.1 Legislative Context

The Habitats Directive (92/43/EEC) seeks to conserve natural habitats and wild fauna and flora by the designation of Special Areas of Conservation (SACs) and the Birds Directive (2009/147/EC)[1] seeks to protect birds of special importance by the designation of Special Protected Areas (SPAs). It is the responsibility of each member state to designate SPAs and SACs, both of which form part of Natura 2000, a network of protected sites throughout the European Community. Further information is available at:

http://ec.europa.eu/environment/nature/legislation/habitatsdirective/

http://www.npws.ie/planning/appropriateassessment/

The current assessment was conducted within this legislative framework and also the DoEHLG (2009) guidelines. As outlined in these, it is the responsibility of the proponent of the project, in this case IE, to provide a comprehensive and objective screening for Appropriate Assessment, which can then be used by the competent authority, in order to conduct the Appropriate Assessment (DoEHLG, 2009).

1.2 Stages of Appropriate Assessment

The Appropriate Assessment process is a four-stage process with issues and tests at each stage. The purpose of the screening assessment is to record in a transparent and reasoned manner the likely effects on Natura 2000 sites of a proposed development. An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required. The stages are set out in Appendix 1.

2. Assessment Methodology

2.1 Appropriate Assessment Guidance

This screening for Appropriate Assessment, or Stage 1, has been undertaken in accordance with the European Commission Methodological Guidance on the provision of Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC (EC, 2001), the European Commission Guidance '*Managing Natura 2000 Sites*' Brussels, 21.11.2018 C (2018) 7621 final (EC, 2000), and *Appropriate Assessment of Plans & Projects - Guidance for Planning Authorities* prepared by the NPWS (DoEHLG, 2009 (rev. 2010) and the *Planning Regulator: - Appropriate Assessment Screening for Development Management , OPR Practice Note PN01* Office of the Planning Regulator, 2021.

[1] This is the codified version of Directive 79/409/EEC as amended (see http://ec.europa.eu/environment/nature/legislation/birdsdirective/index_en.htm)

2.2 Desk Study

In order to complete the screening for Appropriate Assessment certain information on the existing environment is required. A desk study was carried out to collate available information on the subject site's natural environment. This comprised a review of the following publications, data and datasets:

- OSI Aerial photography and 1:50000 mapping
- National Parks and Wildlife Service (NPWS)
- National Biodiversity Data Centre (NBDC) (on-line map-viewer)
- BirdWatch Ireland
- Teagasc soil area maps (NBDC website)
- Sligo County Development Plan (2017-2023)
- Geological Survey Ireland (GSI) area maps
- Environmental Protection Agency (EPA) water quality data
- Other information sources and reports footnoted in the course of the report

3. Screening for Appropriate Assessment

As set out in the NPWS guidance (DoEHLG, 2009), the task of establishing whether a plan or project is likely to have an effect on a Natura 2000 Site is based on a preliminary impact assessment using available information and data, including that outlined above, and other available environmental information, supplemented as necessary by local site information and ecological surveys. This is followed by a determination of whether there is a risk that the effects identified could be significant. The precautionary principle approach is required.

Once the potential impacts that may arise from the proposed project proposal are identified the significance of these is assessed through the use of key indicators:

- Habitat loss
- Habitat alteration
- Habitat or species fragmentation
- Disturbance and/or displacement of species
- Water quality and resource.

Screening for Appropriate Assessment (Stage 1) determines the need for a full Appropriate Assessment (Stage 2) and consists of a number of steps, each of which is addressed in the following sections of this report:

3.1 Establish whether the proposed works are necessary for the management of a Natura 2000 Site

3.2 Description of the proposed works

3.3 Identification of Natura 2000 Sites potentially affected

3.4 Identification and description of potential individual and cumulative impacts of the works

3.5 Assessment of the significance of the impacts on the integrity of Natura 2000 Sites

3.6 Conclusion of screening stage

3.1 Management of Natura 2000 Sites

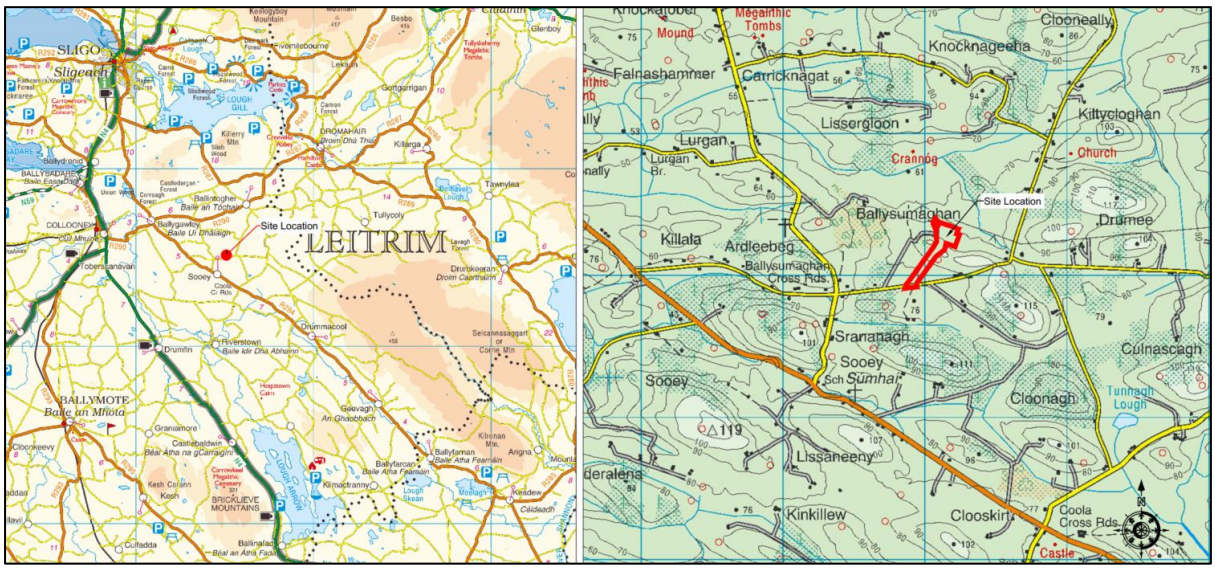
The proposed development is not connected with or necessary to the conservation management of a Natura 2000 Site.

3.2 Description of the Scheme

3.2.1 Subject Site Location

The works proposed by Quarry Lane Stability Ltd, are located at Ballysumghan, Co. Sligo. The proposed development site is situated approximately 1.5km north of Sooey, approximately 6.5km east of Collooney, 3.9km southeast of Ballygawely and 2.5km southwest of Ballintogher. Site location is presented in **Figure 1** below.

Figure 1 Site Location Maps



3.2.2 Description of Subject Site

The proposed development site is located in east Sligo within the townland of Ballysumaghan, Sooey, County Sligo. The site is situated in a rural lightly populated area approximately 6.5km east of Collooney, 3.9km southeast of Ballygawely and 2.5km southwest of Ballintogher. The proposed site is currently greenfield marginal semi improved agricultural lands, principally used for livestock grazing. The project is a medium-scale industrial project comprising of a grid stabilisation facility, containing a synchronous compensator compound, GIS building, underground cable, new access road and all associated ancillary equipment on a circa 1.81hectare site located within agricultural lands.

Lands to the north, east and south are predominantly used as agricultural farmland. The existing ESB Srananagh 220 kV transmission substation and associated compound is located to the west of the proposed site.

According to GSI Mapping (www.gsi.ie) the proposed development site is predominately dominated by poorly drained mineral soils (mainly acidic in nature [AminPD]). Soils in the southern section of the development site in the vicinity of the site access point is classified as cutover/cutaway peat. The nearest watercourse is referred to as the Ballygrania River (IE_WE_35U010500). The Ballygrania river flow joins the Unshin River approximately

4.7km west from the proposed development before converging with the Ballysadare River and ultimately discharges into the sea at Ballysadare which is located approximately 9.8km to the northwest of the proposed development.

3.2.3 Overview of the Project

The proposed development will consist of the following elements:

a) A High Inertia Synchronous Compensator (HISC) compound containing 1 No. HISC unit enclosed within a steel clad framed style structure (12.1m max height) and supported by 7 No. electrical equipment containers (containing ancillary power supply products including a static frequency converts, MV switchgear, exciters, LV distribution, control room); 4 No. external cooler units; main, auxiliary & start-up electrical transformers, generator circuit breakers, switchgear equipment, and 1 No. back up diesel generator and associated diesel storage tank;

b) A 220kV High Voltage Gas Insulated Switchgear (GIS) compound containing a GIS building with all control & HV equipment within a single storey building (13.2m max height). The building will be surrounded by a compound road and contained within a 2.6m high galvanised steel palisade fence;

c) A 220kV underground cable to the existing adjoining Eirgrid substation boundary;

d) New access road and entrance from the L5204;

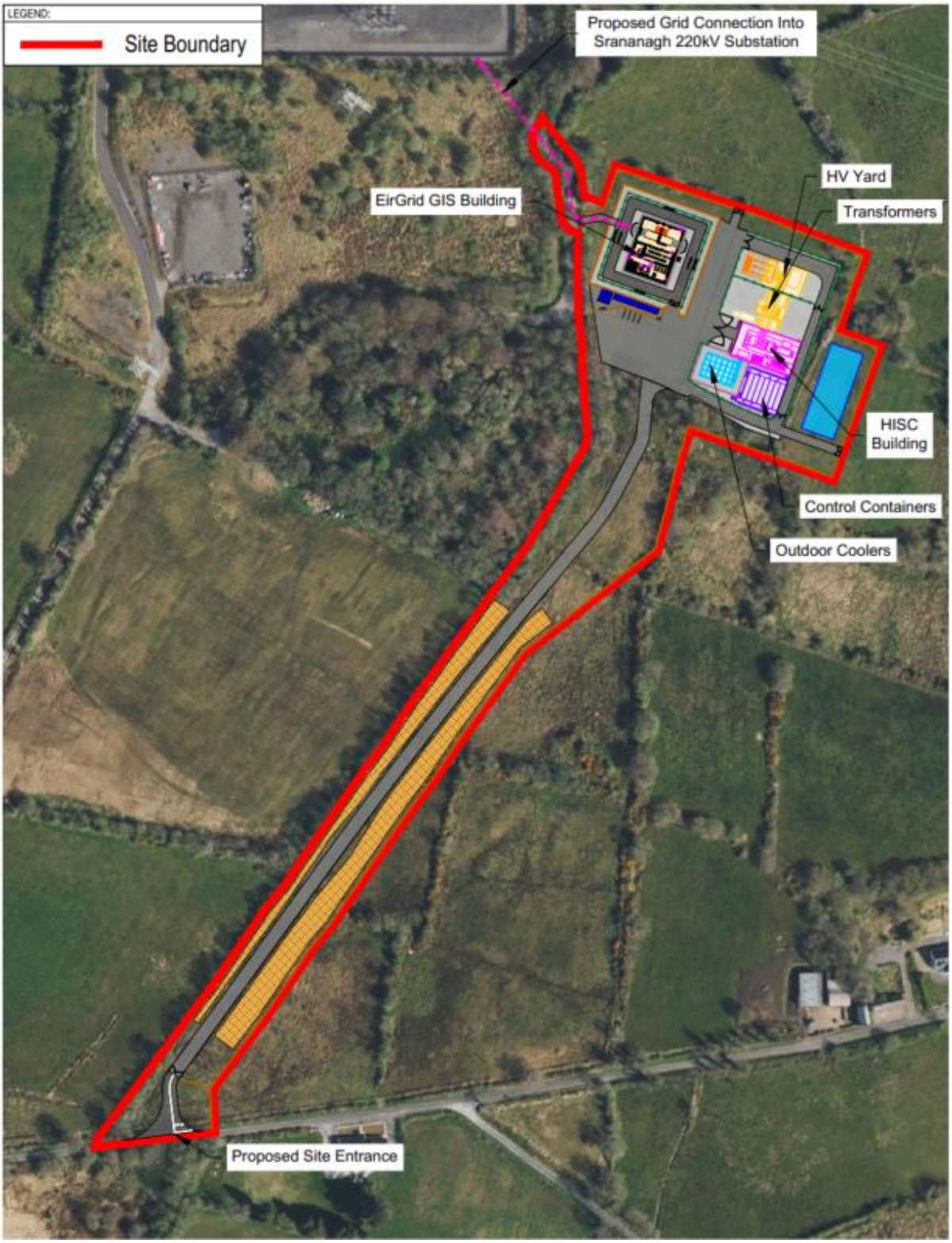
e) Associated elements comprising all necessary drainage systems, foundations works for the above compounds, various underground cables and ducts, equipment plinths, internal services roads, welfare and office units, 2 No. material storage containers, rainwater harvesting systems, compound lighting and palisade gates and fencing, security lighting, CCTV, hardstanding areas and boundary security fence.

3.2.4 Description of works

The project involves the following works:

- Pre-commencement activities including site investigation work and pre-construction surveys
- Site preparation and access
- Construct temporary construction compound
- Permanent site drainage
- Construct base formation, foundations, concrete plinths for HICS compound, transformer compound, GIS compound
- Cable route trenching and cable laying
- Complete facility buildings and install equipment at all compounds
- Complete site works: security fencing, gates, signage, lighting, landscaping
- New access road
- Demobilise offices tidy up site

Figure 2 Proposed Development Layout



3.3 Characteristics of the Project

The project proposal is described in Table 1.

Table 1: Project Proposal

Size, scale, area, land-take	The project is a medium-scale industrial project comprising of a grid stabilisation facility, containing a synchronous compensator compound, GIS building, underground cable, new access road and all associated ancillary equipment on an approximately 1.81 hectare site located within agricultural lands.
Details of physical changes that will take place during the various stages of implementing the proposal	Vegetation clearance will be undertaken. It is estimated that approximately 10,485m^3 of excavated material could potentially be generated. It is estimated however that approximately 9720m^3 of site excavated materials will be suitable for reuse within the site (circa 5070m^3 to be reused as fill and circa 4650m^3 in roadside berms and reinstatement of the attenuation area. Construction of new access road, utilities including drainage, installation of new surface paving, compound buildings and lighting. Two separate drainage networks are proposed to be implemented. One will serve the new access road and the other to collect run-off from the main HISC and GIS compounds.
Description of resource requirements for the construction/operation and decommissioning of the proposal (water resources, construction material, human presence etc)	The proposed development will not require the extensive use of natural resources. Where feasible excavated materials will be reused for backfill and for landscaping. The removal of some mature trees and hedgerows will be required to facilitate the development. It is proposed where feasible to replant hedgerows on the berms that are to be constructed along the new access road. Importation of stone and aggregate material resources (locally sourced) will be required for construction. Water resources are minimal and will be provided by rainwater harvesting systems. Potable water demand will be minimal and will be satisfied by imported bottle supply.
Description of timescale for the various activities that will take place as a result of implementation (including likely start and finish date)	The project duration is estimated at approx. 16-18 months.
Description of wastes arising and other residues (including quantities) and their disposal	During construction it is estimated that approximately 10485m^3 of excavated material will be generated. This material will be retained within the development boundary for fill, berms and reinstatement. Other construction phase waste may consist of surplus hardcore, stone, concrete, ducting, shuttering timber and unused oil and diesel. Any excavated materials not suitable for reuse within the proposed development will be brought to a suitable licensed waste facility.

	Wastewater from welfare facilities on site will drain to integrated wastewater holding tanks. The stored effluent will then be collected on a regular basis from site by a permitted waste contractor and removed to a licensed/permitted waste facility for treatment and disposal. All waste to be taken off-site will be collected an approved contractor and recycled or disposed at an approved facility. In the case of heavy siltation, water will be tankered off site for disposal at an authorised waste facility or pumped to a portable onsite settlement tank for treatment.
Identification of wastes arising and other residues (including quantities) that may be of particular concern in the context of the Natura 2000 network	Waste oils will be generated by the proposed development. These waste streams will be appropriately contained for subsequent disposal to appropriate authorities waste facilities for recovery or disposal.
Description of any additional services required to implement the project or plan, their location and means of construction	N/A

3.4 Identification of Natura 2000 Sites

3.4.1 Zone of Impact Influence

The screening stage of AA involves compiling a 'long list' of Natura 2000 sites within a zone of potential impact influence for later analysis which may or may not be significantly impacted upon by the proposed development.

The "zone of influence" for a project is the area over which ecological features may be subject to significant effects as a result of the proposed project and associated activities (CIEEM, 2018). This is likely to extend beyond the site where there are ecological or hydrological connection(s) beyond the site boundaries.

The subject site and a distance of 15km is recommended as a potential zone of influence (Scott Wilson et al., 2006). However, National Parks and Wildlife Service (NPWS) guidance (NPWS, 2009) advises that this zone of influence be assessed on a case-by-case basis with consideration of the nature, size, and location of the project, the sensitivities of the ecological receptors and the potential for cumulative effects. As such, Natura 2000 sites beyond 15km may also be considered based on the potential for an ecological and/or hydrological to the project site, bearing in mind the precautionary principle and using the Source-Pathway-Receptor framework.

Following this, the potential impacts associated with the proposed development will be identified before an assessment is made of the likely significance of these impacts.

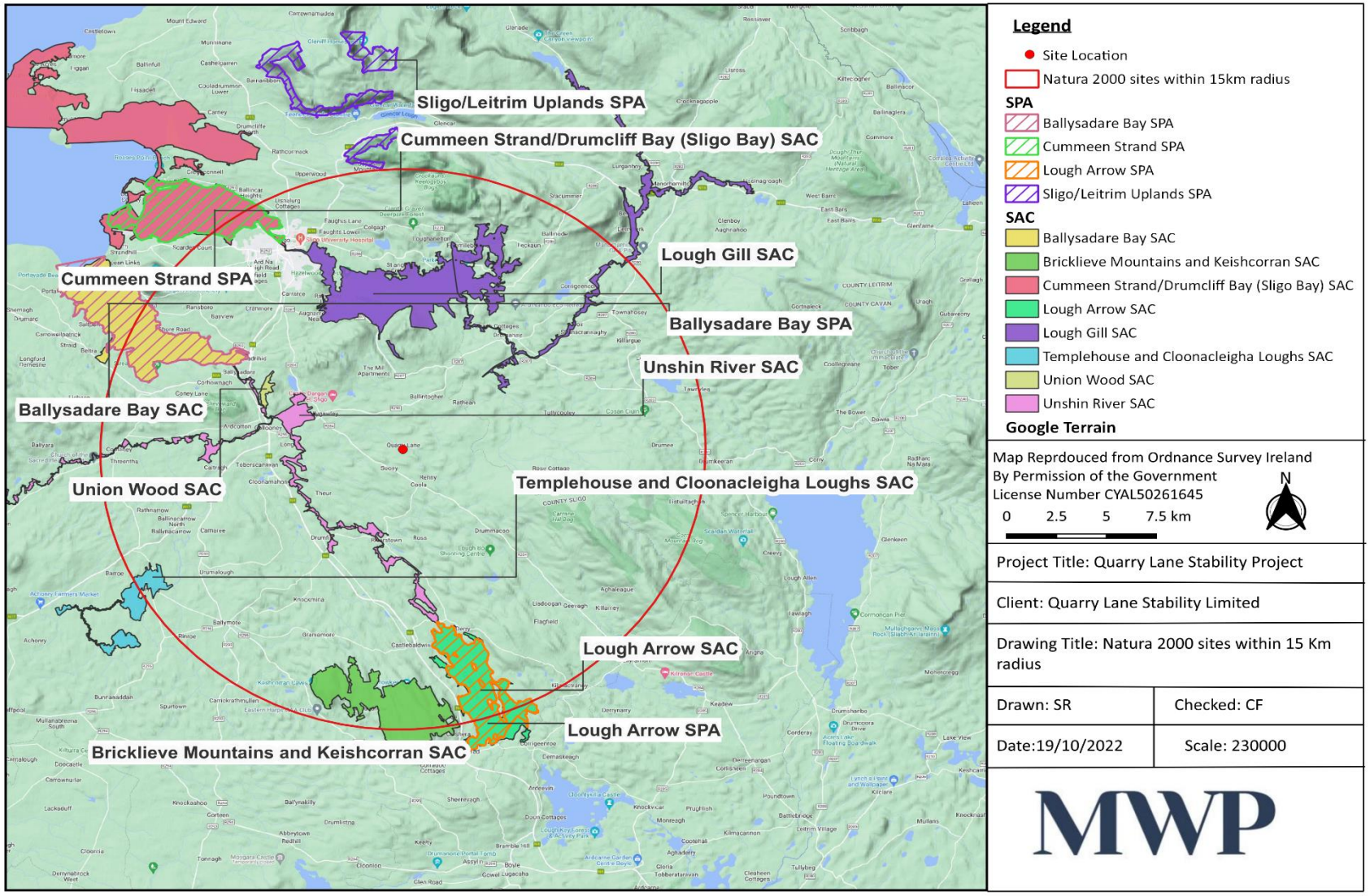
As described above, the test for the screening for Appropriate Assessment is to assess, in view of best scientific knowledge, if the development, individually or in combination with other plans/project is likely to have a significant effect on a Natura 2000 site. If there are any significant, potentially significant, or uncertain effects, it will be necessary to proceed to Appropriate Assessment and submit an NIS.

The locations of Natura 2000 sites within the zone of potential significant impact influence of the proposed development site, bearing in mind the precautionary principle. Natura 2000 sites within the zone of potential significant impact influence of the proposed development site, including their proximity are shown in Table 2. The qualifying features of Special Conservation Interest of the Natura 2000 sites are outlined in Table 3.

Table 2: Natura 2000 Sites within zone of potential impact influence of the proposed development site

No.	Designated Site	Site Code	Proximity of Site to Nearest Point of Proposed Development Site
1.	Unshin River SAC	(001898)	The SAC is located approximately 4.6 km northwest from the proposed site
2.	Lough Gill SAC	(001976)	The SAC is located approximately 6.1 north from the proposed site
3.	Union Wood SAC	(000638)	The SAC is situated approximately 7.0 northwest from the proposed site
4.	Ballysadare Bay SAC	(000622)	The SAC is located approximately 9.3 km northwest from the proposed site
5.	Lough Arrow SAC	(001673)	The SAC is located approximately 10.1 km south from the proposed site
6.	Bricklieve Mountains and Keishcorran SAC	(001656)	The SAC is located approximately 12.5 km south from the proposed site
7	Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC	(000627)	The SAC is located approximately 13.0 km northwest from the proposed site
8	Templehouse and Cloonacleigha Loughs SAC	(000636)	The SAC is located approximately 13.9 km southwest from the proposed site
9	Ballysadare Bay SPA	(004129)	The SPA is located approximately 9.1 km northwest from the proposed site
10	Lough Arrow SPA	(004050)	The SPA is located approximately 10.3 km south from the proposed site
11	Cummeen Strand SPA	(004035)	The SPA is located approximately 12.6 km northwest from the site
12	Sligo/Leitrim Uplands SPA	(004187)	The SPA is located approximately 14.9 km north from the site

Figure 3 Natura 2000 Sites within the Zone of potential Influence



3.4.2 Characteristics of Natura 2000 Sites

Table 3 lists the qualifying features of Special Conservation Interest for the Natura 2000 sites that lie within the zone of potential impact influence of the subject site. Information pertaining to the Natura 2000 sites is from site synopses, conservation objectives and other information available on www.npws.ie.

Table 3: Natura 2000 Sites with qualifying features of Special Conservation Interest

Natura 2000 Site	Qualifying features of Special Conservation Interest
Unshin River SAC	**Species** • 1355 Otter*(Lutra lutra)* • 1106 Salmon*(Salmo salar)* **Habitats** • 3260 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation • 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) • 6410 Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) • 91E0 Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)*
Lough Gill SAC	**Species** • 1355 Otter*(Lutra lutra)* • 1099 River Lamprey*(Lampetra fluviatilis)* • 1096 Brook Lamprey*(Lampetra planeri)* • 1095 Sea Lamprey*(Petromyzon marinus)* • 1106 Salmon*(Salmo salar)* • 1092 White-clawed Crayfish*(Austropotamobius pallipes)* **Habitats** • 3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation • 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) • 91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles • 91E0 Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)*
Union Wood SAC	**Habitats** • 91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles
Ballysadare Bay SAC	**Species** • 1014 Narrow-mouthed Whorl Snail*(Vertigo angustior)* • 1365 Harbour Seal*(Phoca vitulina)* **Habitats** • 1130 Estuaries • 1140 Mudflats and sandflats not covered by seawater at low tide • 2110 Embryonic shifting dunes • 2120 Shifting dunes along the shoreline with Ammophila arenaria (white dunes) • 2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)*

Natura 2000 Site	Qualifying features of Special Conservation Interest
	• 2190 Humid dune slacks
Lough Arrow SAC	**Habitats** • 3140 Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
Bricklieve Mountains and Keishcorran SAC	**Species** • 1065 Marsh Fritillary*(Euphydryas aurinia)* • 1092 White-clawed Crayfish*(Austropotamobius pallipes)* **Habitats** • 3180 Turloughs* • 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) • 6510 Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis) • 8120 Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)
Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC	**Species** • 1095 Sea Lamprey*(Petromyzon marinus)* • 1014 Narrow-mouthed Whorl Snail*(Vertigo angustior)* • 1365 Harbour Seal*(Phoca vitulina)* • 1099 River Lamprey*(Lampetra fluviatilis)* **Habitats** • 1130 Estuaries • 1140 Mudflats and sandflats not covered by seawater at low tide • 2110 Embryonic shifting dunes • 2120 Shifting dunes along the shoreline with Ammophila arenaria (white dunes) • 2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)* • 5130 Juniperus communis formations on heaths or calcareous grasslands • 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) • 7220 Petrifying springs with tufa formation (Cratoneurion)*
Templehouse and Cloonacleigha Loughs SAC	**Habitats** • 3140 Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. • 3260 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
Ballysadare Bay SPA	**Habitats** • Wetlands **Birds** • A157 Bar-tailed Godwit*(Limosa lapponica)* • A046 Light-bellied Brent Goose*(Branta bernicla hrota)* • A141 Grey Plover*(Pluvialis squatarola)* • A162 Redshank*(Tringa totanus)* • A149 Dunlin*(Calidris alpina)*
Lough Arrow SPA	**Habitats** • Wetlands **Birds** • A061 Tufted Duck(*Aythya fuligula)* • A004 Little Grebe(*Tachybaptus ruficollis)*

Natura 2000 Site	Qualifying features of Special Conservation Interest
Cummeen Strand SPA	**Habitats** • Wetlands **Birds** • A162 Redshank*(Tringa totanus)* • A130 Oystercatcher*(Haematopus ostralegus)* • A046 Light-bellied Brent Goose*(Branta bernicla hrota)*
Sligo/Leitrim Uplands SPA	**Birds** • A346 Chough*(Pyrrhocorax pyrrhocorax)* • A103 Peregrine*(Falco peregrinus)*

3.4.3 Conservation Objectives

According to the Habitats Directive, the *conservation status of a natural habitat* will be taken as 'favourable' within its biogeographic range when:

- Its natural range and areas it covers within that range are stable or increasing;
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and
- The conservation status of its typical species is favourable as defined below.

According to the Habitats Directive, the conservation status of a species means the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations. The conservation status will be taken as 'favourable' within its biogeographic range when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats;
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

The specific conservation objectives for each site are available on www.npws.ie. The site-specific conservation objectives were available for following sites:

- Unshin River SAC
- Lough Gill SAC
- Union Wood SAC
- Ballysadare Bay SAC
- Lough Arrow SAC
- Bricklieve Mountains and Keishcorran SAC
- Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC
- Templehouse and Cloonacleigha Loughs SAC

- Ballysadare Bay SPA
- Cummeen Strand SPA

These have been accessed for the sites listed in the tables above on the [17/08/2022]. Generic conservation objectives were available for the following sites:

- Lough Arrow SPA
- Sligo/Leitrim Uplands SPA

All conservation objectives together with other designated site information are available on http://www.npws.ie/protectedsites/.

3.5 Identification of Potential Impacts

Potential likely ecological impacts arising from the project are identified in **Table 4**.

Table 4: Potential likely ecological impacts

Description of elements of the project likely to give rise to potential ecological impacts.	▪ Use of construction equipment, and vehicles. ▪ Use of fuels/oils and cement. ▪ Surface water runoff from the site e.g. increased sedimentation. ▪ Production of waste waters from sanitary facilities etc.
Describe any likely direct, indirect or secondary ecological impacts of the project (either alone or in combination with other plans or projects) by virtue of: *Size and scale;* *Land-take;* *Distance from Natura 2000 Site or key features of the Site;* *Resource requirements;* *Emissions;* *Excavation requirements;* *Transportation requirements;* *Duration of construction, operation etc.; and* *Other.*	The proposed development is on a land take of approximately 1.81 hectares and is within an agriculture environment, which has been significantly used for agriculture farmland. There are 12 Natura 2000 sites within the zone of potential influence of the proposed works: There shall be no habitat loss within Natura 2000 sites. ▪ Resources required include: – Machinery – transport vehicles – hand tools – Imported materials such as cement Potential emissions include: – Fuel/oil or concrete spill – sedimentation of watercourse – fugitive noise and dust – waste

	The proposed project is in an agriculture area. The primary emissions expected from the proposed development during construction phase are fugitive emissions of noise from the use of machinery and equipment and the increase in human activity for the duration of the works. Excavation works will be required for the new access road, the compound, underground attenuation tank and the grid connection. It is estimated that approximately 10,485m^3 of excavated material could potentially be generated. It is estimated however that approximately 9720m^3 of site excavated materials will be suitable for reuse within the site (circa 5070m^3 to be reused as fill and circa 4650m^3 in roadside berms and reinstatement of the attenuation area. There will be a number of material deliveries to the site during the construction phase of the works. Transport during the operation phase will be minimal. Construction works will be temporary. They are anticipated to take approximately 16-18 months to complete. The operational phase of the project will continue indefinitely. There are no other potential sources of impacts associated with the proposed development.

3.6 Assessment of Significance of Potential Impacts

This section considers the list of sites identified in Table 2 together with the potential ecological impacts identified in the previous section and determines whether the project is likely to have significant effects on a Natura 2000 site. When assessing impact, Natura 2000 sites are only considered relevant where a credible or tangible source-pathway-receptor link exists between the proposed development and a protected species or habitat type. In order for an impact to occur there must be a risk initiated by having a 'source' (e.g. excavation), and an impact pathway between the source and the receptor (e.g. a waterbody which connects the proposed development site to the protected species or habitats). An evaluation based on these factors to determine which Natura 2000 sites are the plausible ecological receptors for potential impacts of the proposed works will be conducted in sections below. The evaluation takes cognisance of the scope, scale, nature and size of the project, its location relative to the Natura 2000 sites listed in Table 2, and the degree of connectedness that exists between the project and each Natura 2000 site's potential ecological receptors.

3.6.1 Natura 2000 sites outside the zone of potential impact influence

With regards to the proposed project, it is considered that the Natura 2000 sites listed in Table 5 are outside the zone of potential impact influence of the proposed development due to the absence of plausible impact pathways and/or the attenuating effect of the distance intervening. Therefore, it is objectively concluded that significant impacts on these sites are not reasonably foreseeable as a result of the programme of works described at Section 3.2. The sites, which are listed in Table 5, due to their distance and/or the rationale for exclusion, will not be considered further in this document.

Table 5: Natura 2000 Sites excluded from further assessment

Natura 2000 Site	Proximity of subject site to nearest point of designated site (km)	Rationale for exclusion from assessment
Lough Gill SAC	Approximately 6.1 north from the proposed site	This SAC is located approximately 6.1 km from proposed development. With regard to this Natura 2000 sites Conservation Objectives, it is considered that no aspect of the proposed project has the potential to create significant habitat loss or alteration impacts on the habitat in question. This site is not directly connected to surface water runoff associated with the proposed development and it is considered that no potential pollution pathway exists for the transport of nutrients or suspended sediments between the two.
Union Wood SAC	Approximately 7.0 northwest from the proposed site	This designated site is located approximately 7.0 km from the proposed development. The proposed project will not result in any habitat loss within this SAC. The groundwater interactions are not likely to result from the proposed development. No direct pollution pathway occurs between the two sites. It is not considered that the proposed project will have any impact on the habitats and species which are included in the site's key features of interest.
Lough Arrow SAC	Approximately 10.1 km south from the proposed site	This SAC is located approximately 10.1 km from proposed development. With regard to this Natura 2000 sites Conservation Objectives, it is considered that no aspect of the proposed development has the potential to create significant habitat loss or alteration impacts on the habitat in question. This site is not directly connected to surface water runoff associated with the proposed development and it is considered that no potential pollution pathway exists for the transport of nutrients or suspended material between the two sites.
Bricklieve Mountains and Keishcorran SAC	Approximately 12.5 km south from the proposed site	This SAC site is located approximately 12.5 km from the proposed development. The proposed project will not result in any habitat loss within this SPA. It is considered that no aspect of the proposed development has the potential to create significant impact on the habitats and species that this SPA site protects. No direct potential pollution pathway exists for the transport of nutrients or suspended material between the two areas in question. No corridor exists for the passage of species between this protected site and the proposed site.
Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC	Approximately 13.0 km northwest from the proposed site	This SAC is located approximately 13.0 km from proposed development. With regard to this Natura 2000 sites Conservation Objectives, it is considered that no aspect of the proposed development has the potential to create significant habitat loss or alteration impacts on the habitat in question. This site is not directly connected to surface water runoff associated with the proposed development and it is considered that no potential pollution pathway exists for the transport of nutrients or suspended material between the two sites.
Templehouse and Cloonacleigha Loughs SAC	Approximately 13.9 km southwest from the proposed site	This designated site is located approximately 13.9 km from the proposed development. The proposed project will not result in any habitat loss within this SAC. The groundwater interactions are not likely to result from the proposed development. No direct pollution pathway occurs between the two sites. It is not considered that the proposed project will have any impact on the habitats and species which are included in the site's key features of interest.
Lough Arrow SPA	Approximately 10.3 km south from the proposed site	This SPA site is located approximately 10.3 km from the proposed development. The proposed project will not result in any habitat loss within this SPA. It is considered that no aspect of the proposed development has the potential to create significant impact on the habitats and species that this SPA site protects. No direct potential pollution pathway exists for the transport of nutrients or suspended material between the two areas in question. No corridor exists for the passage of species between this protected site and the proposed site.

Natura 2000 Site	Proximity of subject site to nearest point of designated site (km)	Rationale for exclusion from assessment
Cummeen Strand SPA	Approximately 12.6 km northwest from the proposed site	This SPA site is located approximately 12.6 km from the proposed development. The proposed project will not result in any habitat loss within this SPA. It is considered that no aspect of the proposed development has the potential to create significant impact on the habitats and species that this SPA site protects. No direct potential pollution pathway exists for the transport of nutrients or suspended material between the two areas in question. No corridor exists for the passage of species between this protected site and the proposed site.
Sligo/Leitrim Uplands SPA	Approximately 14.9 km north from the proposed site	This SPA site is located approximately 14.9 km from the proposed development. The proposed project will not result in any habitat loss within this SPA. It is considered that no aspect of the proposed development has the potential to create significant impact on the habitats and species that this SPA site protects. No direct potential pollution pathway exists for the transport of nutrients or suspended material between the two areas in question. No corridor exists for the passage of species between this protected site and the proposed site.

3.6.2 Natura 2000 sites within the zone of potential impact influence

Of the Natura 2000 sites listed in Table 2, three are considered to have the potential to be impacted as a result of the proposed development. Construction projects generally pose potential threats to Natura 2000 sites through habitat alteration, species disturbance/displacement and/or water quality impacts. Given the proximity of the proposed development works, there is potential for these impacts to occur within these Natura 2000 sites. Therefore, the assessment of significance of potential impacts that follows focuses on the following Natura 2000 sites as shown in Table 6.

Table 6: Natura 2000 Sites within the zone of potential impact influence

Natura 2000 Site	Proximity of subject site to nearest point of designated site (km)	Rationale for inclusion in assessment
Unshin River SAC	Approximately 4.6 km northwest from the proposed site	The SAC is located approximately 4.6 km northwest of the proposed development site. An indirect hydrological connection to the proposed development site could exist.
Ballysadare Bay SAC	Approximately 9.3 km northwest from the proposed site	The SAC is located approximately 9.3 km northwest from the proposed development site. An indirect hydrological connection to the proposed development site could exist.
Ballysadare Bay SPA	Approximately 9.1 km northwest from the proposed site	The SPA is located approximately 9.1 km northwest from the proposed development site. An indirect hydrological connection to the proposed development site could exist.

The likelihood of significant effects to a Natura 2000 site from the project was determined based on several indicators including:

- Water quality and resource;
- Habitat loss and/or alteration;
- Habitat or species fragmentation; and
- Disturbance and/or displacement of species.

The likelihood of significant cumulative/in-combination effects is assessed in Section 3.6.2.5.

3.6.2.1 Water Quality

There are some elements of the proposed works which could potentially result in impairment of water quality. In general, where works are conducted within proximity to water bodies, impairment of water quality may potentially occur as a result of run-off of sediment/fines or accidental fuel/oil spills from machinery/equipment. These elements of the proposed development could therefore potentially result in pollution of the aquatic environment. All works will take place within the curtilage of the site and all fuels will be stored within secure, bunded and impermeable storage areas. There are no watercourses on the site, however there are field drains that could act as conduits for potential pollution to the Ballygrania river at the northeast of the proposed site which discharges into the Unshin River and ultimately into the sea at Ballysadare. A site-specific drainage system has been designed to replicate predevelopment greenfield surface water runoff conditions at the proposed development lands. Two separate drainage networks are proposed to be implemented. One will serve the new access road and the other to collect run-off from the main HISC and GIS compounds. Appropriate pollution control bunding is proposed including petrol interceptors and attenuation tank.

The proposed development is located approximately within 4.6 km of Unshin River SAC, 9.3km of Ballysadare Bay SAC and 9.1km of Ballysadare Bay SPA. The habitats and species of these SAC and SPA are sensitive to changes in siltation loads, pollutants and water levels. Without the proposed site-specific surface water control measures construction could result in an indirect hydrological impact to water quality downstream of the development.

Consequently, it is objectively concluded that in the absence of mitigation a slightly significant adverse impacts on the Conservation Objectives of the nearby Natura 2000 sites could occur as a result of the programme of works described at Section 3.2 above, by means of adverse water quality impacts.

3.6.2.2 Habitat Loss and Alteration

The proposed development considered in this assessment occurs outside any Natura 2000 site, therefore, no direct habitat loss or alteration impacts within any Natura 2000 site, or to any Natura 2000 habitat type, are reasonably foreseeable. There is potential for indirect habitat alteration due to the indirect hydrological connectivity. Without the proposed site-specific surface water control measures construction could result in an indirect hydrological impact to water quality downstream of the development.

3.6.2.3 Disturbance and/or Displacement of Species

The proposed development is approximately 4.6 km away from Unshin River SAC, approximately 9.3km and approximately 9.1km away from Ballysadare Bay SAC and Ballysadare Bay SPA.

Pathways for direct disturbance are not present at the proposed development. It is considered that the qualifying interests, protected within these European sites will not be subjected to significant impacts from temporary fugitive noise, human activity, and machinery as a result of this proposed development. In conclusion, no significant disturbance or displacement impacts will occur on nearby designated sites as a result of the proposed works at Ballysumaghan, Sooey, Co. Sligo. The only potential for disturbance could be through affects on water quality.

3.6.2.4 Habitat or species fragmentation

The proposed development at Ballysumaghan will not result in any significant direct habitat loss within any designated site and there shall be no significant direct disturbance or displacement of features of interest

protected within nearby designated sites. However, there is potential for indirect habitat and species fragmentation due to the indirect hydrological connectivity. Without the proposed site-specific surface water control measures construction could result in an indirect hydrological impact to water quality downstream of the development.

3.6.2.5 Identification of other plans/activities in the area and Cumulative/In-combination Impacts

The proposed development was considered in combination with other plans and projects in the area that could result in cumulative impacts on Natura 2000 sites. Other plans considered include:

- Sligo County Council Development Plan 2017-2023
- Local Area Plans

No significant cumulative impacts are predicted with the plans listed above, as each plan has a range of environmental and natural heritage policy safeguards in place.

The proposed development will take place at Ballysumaghan, Sooey, Co. Sligo. Existing developments in the surrounding area are mainly residential and agricultural. There is also an existing 220KV ESB substation adjacent to the proposed site.

A desktop search of proposed and existing planning applications was undertaken on the 10/10/2022. The search flagged planning applications within a period dating back to 2017; any refused, invalid or withdrawn applications were omitted.

The findings show small and medium to large-scale developments within the 1 km radius scope that have been approved or are on-going. The majority of planning applications within 1km of the proposed development are related to development of and alterations to residential properties and are considered to be small in scale. A summary of relevant developments considered in the cumulative assessment is given below:

- Development consisting of the installation of battery arrays, located within container units (18 number units, each 30m^2 by c.2.6m tall), a control building (c.160.5m2 by c.6.4m tall) and transformer (c.5m tall). The development will include for ancillary infrastructure including security fencing, lighting, CCTV, internal access roads and drainage. The overall development site is c.0.64Ha. The application is accompanied by a Natura Impact Statement (NIS). (Planning ref: 2011) (Decision date: 13/8/2020).
- Development consisting of a 10 year permission. The development will consist of the development and operation of a 250 to 300 MVA (electrical rating) synchronous condenser. The development which will be located within a site compound of c. 1 hectare and will consist of the following elements: A Condenser and Control Building to house equipment including the synchronous condenser, flywheel, lube oil skid system, air compressor and pumps. Equipment to be located outside the footprint of the Condenser and Control Building but within the fenced compound will include: Cooling equipment (c. 160 sq m., c.3m high); 6 No. modular containers to house electrical and control equipment (total area of c. 195 sqm., c. 5m high); A step-up transformer, auxillary transformer and electrical plant including an external circuit breaker; 1 No. firefighting water tank; A below ground oil interceptor and attenuation tank in lieu of the originally proposed above ground oil interceptor and collection pit. Underground cabling ducts and cable to the neighbouring ESB substation boundary fencing (c. 500m). Palisade security entrance gate, boundary fencing and CCTV; All other ancillary and miscellaneous site works including site clearance; demolition of an existing agricultural shed, site access, internal roads and development of areas of hard standing including a maintenance lay-down area (Planning ref: 2090) (Decision Date: 18/1/2021);

The emissions from the construction phase will be regulated by using construction best practice.

It is considered, bearing in mind the scope, scale, nature, size and location of the project, the proposed development will not give rise to significant direct impacts and are not expected to cause cumulative or in-combination impacts with other projects, on the qualifying interests of the nearby designated sites.

However, the construction of the permitted synchroniser condenser (Planning Ref: 2090) may run concurrently with the proposed development and could give rise to possibility of indirect impacts on water quality in particular with respect to potential for increased siltation in runoff arising from excavations and potential contamination from accidental spills or leaks (concreting / oils, fuels and chemicals). During the construction phase of the proposed development, the project will be compliant with good working practices (Construction Best Practice).

3.7 Conclusion of Screening Stage

This screening for Appropriate Assessment was undertaken to determine the potential for likely significant effects of the proposed works, individually, or in combination with other plans or projects, in view of the conservation objectives of any Natura 2000 site. Twelve Natura 2000 sites with the zone of potential influence were initially considered on the basis of their proximity to the proposed development site being within the 15km (as proposed in Scott Wilson et al., 2006). Following National Parks and Wildlife Service (NPWS) guidance (DoEHLG, 2009) this potential zone of influence was assessed on a case-by-case basis with consideration to the nature, size and location of the project, the sensitivities of the ecological receptors and the potential for cumulative effects on these sites and no further sites were deemed appropriate for consideration. Lough Gill SAC, Union Wood SAC, Lough Arrow SAC, Bricklieve Mountains and Keishcorran SAC, Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC, Templehouse and Cloonacleigha Loughs SAC, Lough Arrow SPA, Cummeen Strand SPA, and Sligo/Leitrim Uplands SPA were screened out for further consideration on the basis of no significant potential for an ecological and/or hydrological impact from the proposed works at the project site, bearing in mind the precautionary principle and using the Source-Pathway-Receptor framework. Of the protected areas initially considered, three were taken forward for further consideration in this report:

- Unshin River SAC
- Ballysadare Bay SAC
- Ballysadare Bay SPA

It has been concluded that significant effects cannot be ruled out at this stage on Unshin River SAC, Ballysadare Bay SAC and Ballysadare Bay SPA.

Further assessment is required to determine whether the project is likely to adversely affect the integrity of these Natura 2000 sites, in view of their conservation objectives. A Natura Impact Statement (NIS) of the project is required to be undertaken.

Reasons for Conclusion:

- In the absence of mitigation there is potential for impacts to the water quality of Unshin River SAC, Ballysadare Bay SAC, and Ballysadare Bay SPA.

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Appendix 1

Stages of Appropriate Assessment

Stage 1 - Screening

This is the first stage of the Appropriate Assessment process and that undertaken to determine the likelihood of significant impacts as a result of a proposed project or plan. It determines need for a full Appropriate Assessment.

If it can be concluded that no significant impacts to Natura 2000 Sites are likely then the assessment can stop here. If not, it must proceed to Stage 2 for furthermore detailed assessment.

Stage 2 - Natura Impact Statement (NIS)

The second stage of the Appropriate Assessment process assesses the impact of the proposal (either alone or in combination with other projects or plans) on the integrity of the Natura 2000 Site with respect to the conservation objectives of the site and its ecological structure and function. This is a much more detailed assessment that Stage 1. A Natura Impact Statement containing a professional scientific examination of the proposal is required and includes any mitigation measure to avoid, reduce or offset negative impacts.

If the outcome of Stage 2 is negative i.e. adverse impacts to the sites cannot be scientifically ruled out, despite mitigation, the plan or project should proceed to Stage 3 or be abandoned.

Stage 3 - Assessment of alternative solutions

A detailed assessment must be undertaken to determine whether alternative ways of achieving the objective of the project/plan exists.

Where no alternatives exist the project/plan must proceed to Stage 4.

Stage 4 - Assessment where no alternative solutions exist and where adverse impacts remain

The final stage is the main derogation process examining whether there are imperative reasons of overriding public interest (IROPI) for allowing a plan or project to adversely affect a Natura 2000 Site where no less damaging solution exists.

Appendix 2

Drainage Report

MWP

Quarry Lane Stability Project

Planning Stage Civil Works Design Report

Quarry Lane Stability Limited

October 2022

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Project No.	Doc. No.	Rev.	Date	Prepared By	Checked By	Approved By	Status
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1. Introduction

Malachy Walsh and Partners (MWP) were commissioned by Quarry Lane Stability Limited to act as Civil and Structural Engineering design consultants for the proposed grid stabilising facility in Quarry Lane, Co. Sligo. This report outlines the engineering design philosophy employed for the proposed civil works serving the development and also outlines the situation with regard to a clean water supply.

1.1 Site Location

The site is located approximately 3 km south of Ballintogher, Co. Sligo and 4.5km east of Ballygalway, Co. Sligo. Access to the site is provided via a local road which connects onto the R284. The site is located within a predominately greenfield area and is approximately 1.81 hectares in area. The proposed development will consist of a grid stabilisation facility, a 220kV GIS facility and associated access roads and site services.

Figure 1: Site Location

2. Project Overview

The proposed grid stability facility will consist of construction of the following:

- A High Inertia Synchronous Compensator (HISC) compound containing 1 No. HISC unit enclosed within a steel clad framed style structure (12.1m max height) and supported by 7 No. electrical equipment containers (containing ancillary power supply products including a static frequency converts, MV switchgear, exciters, LV distribution, control room, welfare and office), main, auxiliary & start-up electrical transformers, No. generator circuit breakers, switchgear equipment, External cooler units and 1 No. back up diesel generator and associated diesel storage tank. The compound will be surrounded by an open graded stone road and bordered by a 2.6m high galvanised steel palisade fence;
- A 220kV High Voltage Gas Insulated Switchgear (GIS) compound containing a GIS building with all control & HV equipment within a single storey building (13.2m max height). The building will be surrounded by a sealed compound road and bordered by a 2.6m high galvanised steel palisade fence;
- 220kv underground cable to the existing adjoining substation;
- New access road and entrance from the L5204;
- Associated elements comprising all necessary drainage systems, foundations works for the above compounds, various underground cables and ducts, equipment plinths, internal services roads, welfare and office units, 2 No. material storage containers, rainwater harvesting systems, compound lighting and palisade gates and fencing, security lighting, CCTV, hardstanding areas and boundary security fence.

Details of the site layout and associated works and structures are provided in planning application drawings submitted as part of this application.

The grid stabilisation compound is proposed to be constructed on an open graded stone platform in the north of the site. Roads within the grid stabilisation compound and access road are proposed to be unsealed open graded stone. The roads surrounding the 220kV GIS compound will be sealed and kerbed in line with EirGrid Requirements. An asphalt apron is proposed to be constructed at the site entrance extending 20m into the site from the L-5204 public road.

The proposed facility will be unmanned. Staff will occasionally visit the site to undertake operation and maintenance. Three parking spaces are proposed for the facility.

3. Watermain Design

It is understood that no watermain connection is required for the proposed facility. Two rainwater harvesting systems including filtration and UV-sterilisation systems are proposed to provide the water required by the site welfare facilities and within the 220kV GIS compound. This system will allow for rainwater to be re-used in toilets/sinks. Potable water demand will be satisfied by an imported bottled water supply.

4. Surface Water Drainage System

Two separate drainage networks are proposed to be implemented at Quarry Lane, due to the presence of a high point approximately 400m from the site entrance location. The existing high point can be seen on contour mapping provided as drawing 23272-MWP-00-00-DR-C-5003. The networks are intended to mimic the pre-development surface water runoff conditions, as required by policy P-SWD-8 of the Sligo County Development Plan 2017-2023.

At present, surface water runoff from north of the high point makes its way to the Ballygrania river (EPA Code 35B81) which runs in a north-westerly direction approximately 150m from the north-eastern site boundary. A vegetated agricultural drain within the existing site conveys runoff from the site to the river. A subsurface drainage system is proposed to cater for surface water runoff from the proposed development within this catchment. Details of the system are presented in Section 4.1 below.

Surface water flows to the south of the high point make their way southwards towards an existing drain running parallel to the public road. A surface level drainage system is considered for this catchment. Details of this drainage system are presented in Section 4.2 below.

It is proposed to install clean water cut-off drains to intercept surface water run-off from catchments uphill of the proposed development site. The cut-off drains will divert the collected runoff around site infrastructure to prevent it entering the site and potentially coming in contact with site runoff containing suspended solids. This reduces the volume of water needing treatment within the development and ensures high quality of discharge to downstream catchments. This is particularly important during construction where traffic on the unsealed access road and stone compounds is highest. The clean water cut-off drains will discharge overland along their natural course downhill of the development site.

4.1 Compound Storm Water Drainage

Due to the nature of the proposed development, the potential for a build-up or ponding of water in the vicinity of high voltage infrastructure is present. As a result, it is proposed to install a robust underground drainage system which will direct surface water away from critical electrical infrastructure.

The subsurface drainage network is proposed to accept water from building roofs, transformer plinths, HV Yard, roadways and surrounding stone hardstanding areas. The compound areas will drain predominantly through lateral movement of rainfall through the compound stone towards filter drains installed around the perimeter of the compound area. This will be facilitated by grading the top of the less permeable subgrade towards the compound edges underneath the compound stone.

A network of roadside v-drains with check dams, filter drains, downpipes and rainwater gullies and road gullies will collect surface water runoff and direct it into the proposed surface water sewer network proposed for the site.

Storm water from the HV Yard and Transformers will pass through a Full Retention Petrol Interceptor (Kingspan Klargester NSFA015 or similar) prior to draining into an on-site attenuation tank. Similarly, stormwater flow from the Substation building and associated compound roadways will pass through a Bypass Interceptor prior to draining into the on-site attenuation tank. The use of two interceptors within the compound drainage as well as sump manholes will ensure no light oils or silt will be discharged to the attenuation tank.

It is proposed to provide an underground attenuation unit on the east side of the compound. The design of the attenuation unit has been undertaken using Microdrainage hydraulic modelling software to prevent flooding of the compound for the 100-year return period storm event with 20% allowance for the effects of climate change. The proposed attenuation system has been designed as a cellular unit (Wavin Aquacell Core R or similar) which

would provide a voids ration of 95%. Based on these characteristics an installed volume of 600m^3 (15m x 40m x 1m) is proposed. Attenuated surface water runoff is proposed to overflow at a controlled rate equal to the greenfield runoff rate to an existing vegetated agricultural drain on the east side of the compound.

The greenfield runoff rate employed in design of the compound drainage system has been obtained using the UK SuDS Greenfield runoff rate estimation tool. Outflow from the onsite attenuation unit will be restricted to Q_{BAR} (13.7l/s) to mimic the predevelopment greenfield runoff conditions. Outputs from the Greenfield run off rate estimation tool are included in Appendix B. Outflows will be restricted to the greenfield runoff rate by placing a flow control device such as a Hydrobrake (Unit Reference: MD-SHE-0168-1370-1000-1370) or similar within the outfall manhole.

4.1.1 Storm Water Drainage – Transformer, Fuel Storage Bunds & Substation Building

Rainwater falling on the proposed building roofs will be conveyed directly to the sewer system via rainwater downpipes and gullies. As outlined in section 4.1, all stormwater runoff from oil/fuel storage tank bunds or electrical infrastructure bunds and other areas where the risk of an oil leak or spill may be present, will be treated using Class 1 full retention interceptor manufactured in accordance with IS EN 858 parts 1 and 2 and a BundGuard pump and sump system (or similar).

Class 1 interceptors are specified where the separator is required to remove very small oil droplets since these are designed to achieve a concentration of less than 5mg/l of oil. As the bund sumps fills with rainwater, any oil or fuel present will float to the top of the top of the water due to its low density. High water levels in the sump will activate the pump and the water level will begin to drop as the sump is emptied. When the oil layer is detected by the units sensors, the pump will stop and no water will discharge. When the next rainfall event occurs, this process is repeated with the oil layer always remaining in the bund. This oil layer will need to be periodically removed from the bunds by a waste disposal contractor who is licensed to handle waste oil.

It is proposed to install a Kingspan Bypass Interceptor (NSBE010) prior to discharge to the attenuation tank. This will cater for potential contaminants from runoff from roofs, stone compound, GIS facility road and other areas. It will also help prevent silt and debris building up in the attenuation unit.

All interceptors are proposed to include high level alarms to notify maintenance personnel when the capacity of the interceptors are approaching full. An emergency shut off valve will also be included at the downstream end of each collection network to prevent discharge during any maintenance.

4.1.2 Hydraulic Design

The surface water sewer network within the compound area was designed using Microdrainage hydraulic modelling software, refer to Figure 2 for the parameters assumed in this design. The pipe network and attenuation structure have been analysed for various return periods (1 Year, 5 Years, 30 Years and 100 Years) and a range of storm durations (15 minutes to 7 days).

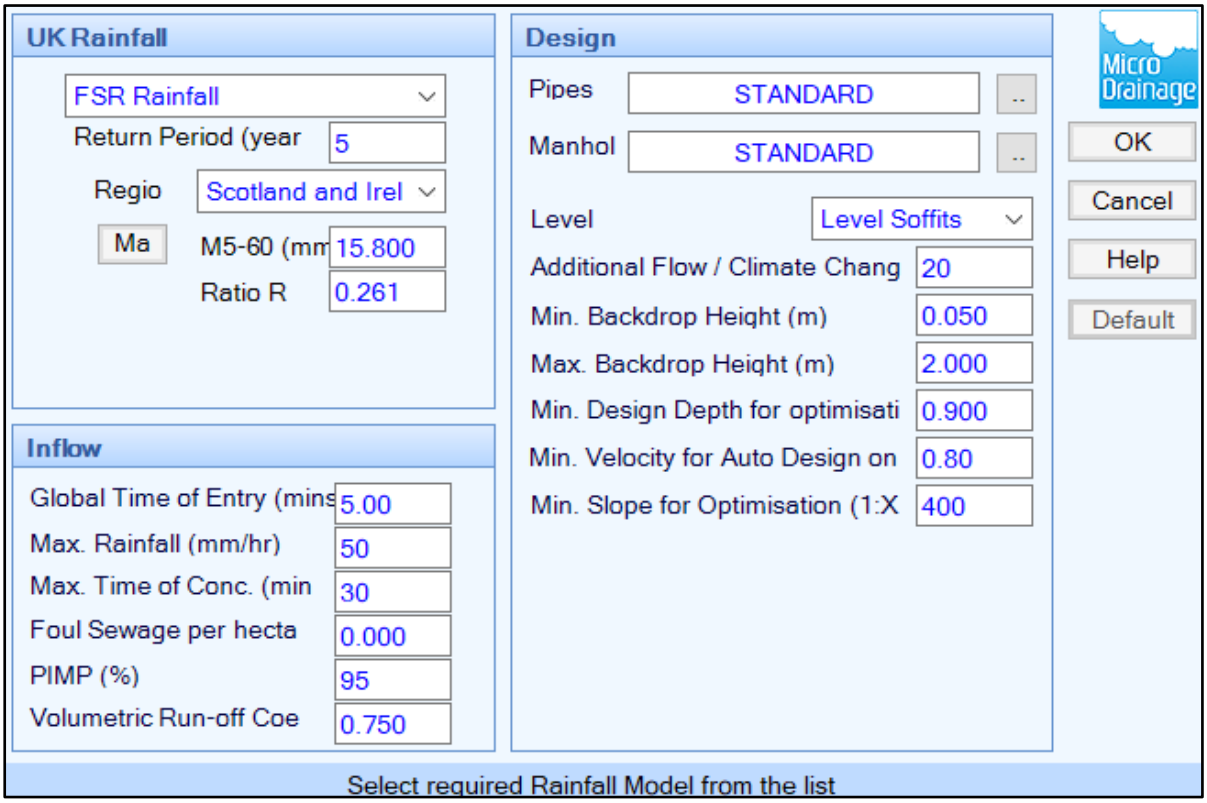

Figure 2: Design Criteria

The design criteria, network details and the results of the Microdrainage hydraulic assessments of the proposed surface water pipe network are presented in Appendix C of this report.

Met Eireann rainfall data for the site which has been employed in the drainage network design are included in Appendix D of this report and is summarized below.

- M5 – 60 = 15.8mm
- M5 – 2D = 60.5mm
- R = M5-60/M-2D= 0.261
- SAAR (Standard Average Annual Rainfall) = 960.4mm

The storm drainage proposals incorporate the following elements:

- Pipes are designed to maintain self-cleansing velocity in the 1 in 5-year event.
- Sewers not surcharging in the 5-year event with 20% Climate Change in line with what is advised for industrial areas within IS EN 752.
- Sewers not flooding in the 100-year event with 20% Climate Change.
- Higher values of impermeability of 85-95% in the GDSDS for run-off have been chosen for the impermeable areas to allow for conservatism in the model.

Details of all storm drainage proposals are included on the drawing showing the proposed site services in Appendix A. Calculations and source for the greenfield run off rates are provided in Appendix B.

4.1.3 Sustainable Urban Drainage Systems (SuDS)

The hard surfaces of the proposed development will result in an increased volume of surface water runoff from the site. Surface water drainage systems incorporating SuDS features are proposed for the site. The design of the SuDS elements was carried out using the general policy guidelines as outlined in the Greater Dublin Strategic Drainage Study (GDSDS) which is regarded as current best practice. The GDSDS sets out that drainage design should try to replicate, in a general way, the same rainfall runoff characteristics for the pre-development condition for the site. SuDS drainage design at the proposed Quarry Lane grid stabilisation facility are to consist of the following:

4.1.3.1 GDSDS Criterion 1

River Quality Protection - Water quality protection is provision of either interception and/or treatment volume. Interception storage takes account of the first 5mm of rainfall and is generally provided by means of source controls using infiltration trenches and filter drains for road runoff. At the Quarry Lane grid stabilisation facility interception is realised for the access road and large areas around the permanent buildings through the use of filter drains and v-drains with check dams where natural filtration through the well-graded washed stone will clean and breakdown contaminants in the runoff. Interception storage is not provided for roof drainage and in lieu is intended to provide treatment storage using a bypass hydrocarbon interceptor. Runoff from areas which pose a risk of oil leak or spill such as the onsite diesel tank will be run through a full retention interceptor. This concept will provide treatment for all storm events.

4.1.3.2 GDSDS Criterion 2

River Regime Protection - River regime protection is achieved by limiting discharge from the onsite drainage network to the Greenfield run-off rate rates to prevent erosion of the downstream waters. This is best evaluated using a simulation model to calculate the required volume by using the estimated Greenfield runoff rates as fixed throttle rates for the 1, 5, 30 and 100-year return period. Calculations are available in appendix C of this document for this site. In practice this is achieved by constructing throttle outlets from the attenuation system which is achieved by a hydrobrake flow control device in this case.

4.1.3.3 GDSDS Criterion 3

River Flood Protection - The volumetric analysis for river flood protection is a comparison of pre and post development runoff volumes and can be described as the long-term storage volume. The objective is to limit runoff discharge to the river after development to the same as that, which occurred prior to development. In order to provide river flood protection for a 100-year storm event, the increased runoff generated by the proposed development must be stored onsite. It is proposed to store this volume in attenuation units as opposed to separate long term flood storage within the site.

No wetlands are proposed for the development site due to the inherent danger of storing water near critical high voltage infrastructure. The implementation of the above SuDS measures is considered to be a balanced approach to mitigating any potential impacts of the proposed development on water quality and quantity while not engaging undue risk.

4.2 Access Road Storm Water Drainage

A separate surface water network will cater for runoff from the proposed site access road from the proposed site entrance location to the high point along the access road. The proposed access road will incorporate a 2.5% camber in order to direct surface water away from the road to the road verges. Roadside v-drains (swales) will be installed at both sides of the access road to capture runoff from the road. It is proposed to install check dams at regular intervals, based on gradient, along all roadside v-drains to provide flow attenuation, slow down runoff to promote settlement and to reduce scour and drain erosion. Check dams are relatively small and constructed with single sized clean washed stone.

Run-off in the v-drains will be directed to two settlement ponds to be located on either side of the road near the site entrance. The settlement ponds will be designed to reduce velocity of the flows to allow suspended solids to settle out of the surface water. Each settlement pond will trap sediment in the runoff. Following treatment in the settlement ponds, clean water will overflow southwards over the existing vegetation for approximately 20m before entering the existing drain which runs parallel to the public road. The sizing of the settlement ponds is detailed in Section 5.2 later in the report.

It is proposed to permanently store excess topsoil in berms adjacent to the proposed access road. It is proposed to seed these to expedite vegetation. Silt fences will be installed on the downhill side of the storage areas, while vegetation is being established, to catch sedimentation run-off before discharging over the site.

5. Water Quality Management

5.1 Treatment Process

Particularly during construction, contaminated runoff could be generated on the site access roads due to movement of delivery vehicles and on-site traffic. Drains carrying construction site runoff will be diverted into settlement ponds that reduce flow velocities, allowing silt to settle and reducing the sediment loading. A modular approach has been adopted for the design of the settlement ponds which have been sized to cater for a 1,200m^2 works area. This is equivalent to a road length of 200 metres. The road width for the purpose of runoff calculations is 6 metres.

The settlement ponds have two chambers arranged in series. The first chamber has a maximum length of three metres and allows rapid settlement of the heavier particles that make up most of the suspended solid mass. The second chamber is the main settlement area where the smaller particles are allowed to settle. This chamber has been designed with a length to width ratio of 6:1 to prevent short-circuiting of the flow through the centre. The two chambers are separated by a mound of drainage stone through which the flow from the first chamber migrates. This allows the flow to enter the second chamber across its full cross-section so that it can operate efficiently in accordance with its design principles.

The settlement ponds have been designed with regard to the following:

- Met Éireann Point Rainfall Frequency data (statistical rainfall intensity / duration table)
- Runoff flow rate for the modular catchment area
- Character of the impermeable areas (runoff coefficients)
- Design particle size and density

The treatment process consists of primary, secondary, and tertiary treatment as follows:

- The primary treatment consists of a two-stage settlement pond. The first chamber will remove most of the sediment load, while the second chamber will remove most of the remaining load.
- Before the water is released onto the existing ground surface, it passes through a secondary treatment system in the form of a graded gravel filter bed.
- The outflow from each interceptor is dispersed across a wide area of vegetation so that the velocity is minimised, and the vegetation can filter out the residual sediment. This is the final or tertiary stage of the treatment process.

The layout of the settlement pond system is detailed in planning drawing 23272-MWP-00-00-DR-C-5412. The hydraulic design of the settlement ponds is outlined in Section 5.2 of this document.

The outflow from each settlement pond will discharge overland to an existing drain which runs parallel to the public road. The outfall will be located more than 20m from the edge of this drain. Settlement ponds will require perimeter fencing to prevent unauthorised access.

5.2 Settlement Pond Design

Generally, high intensity rainfall events have a short duration and lower intensity rainfall events tend to have a longer duration. The Met Éireann Extreme Rainfall Data for the area Table 1 and Table 2) demonstrate that the chance of occurrence of a storm event of a given duration decreases (higher return period) as intensity increases. Table 1 shows the total rainfall for each duration and return period in millimetres. Table 2 shows the same data converted to a rainfall rate in mm/hour. For a given return period the total depth of rainfall increases with storm duration but the actual rainfall rate over that period of time decreases. For the operation of the settlement ponds it is the rate of flow rather than the total rainfall that is relevant.

Storm Duration	Return Period (Years)							
	0.5	1	2	5	10	20	50	100
5 mins	2.7	3.7	4.2	5.9	7.2	8.6	10.8	12.8
10 mins	3.8	5.2	5.9	8.2	10.0	12.0	15.1	17.9
15 mins	4.4	6.1	6.9	9.7	11.8	14.1	17.7	21.0
30 mins	5.9	7.9	9.0	12.4	14.9	17.8	22.1	26.0
60 mins	7.8	10.3	11.6	15.8	18.9	22.3	27.5	32.2
2 hours	10.3	13.5	15.1	20.2	24.0	28.1	34.3	39.8
4 hours	13.6	17.6	19.6	25.9	30.4	35.3	42.7	49.2
6 hours	16.0	20.5	22.8	29.8	34.9	40.4	48.5	55.7
12 hours	21.1	26.8	29.6	38.2	44.3	50.8	60.5	68.8
24 hours	27.9	34.9	38.3	48.8	56.1	63.9	75.3	85.1
48 hours	37.0	45.1	49.0	60.5	68.4	76.6	88.5	98.5

Table 1: Met Eireann Rainfall Frequency Table (mm)

Storm Duration	Return Period (Years)							
	0.5	1	2	5	10	20	50	100
5 mins	32.4	44.4	50.4	70.8	86.4	103.2	129.6	153.6
10 mins	22.8	31.2	35.4	49.2	60.0	72.0	90.6	107.4
15 mins	17.6	24.4	27.6	38.8	47.2	56.4	70.8	84.0
30 mins	11.8	15.8	18.0	24.8	29.8	35.6	44.2	52.0
60 mins	7.8	10.3	11.6	15.8	18.9	22.3	27.5	32.2
2 hours	5.2	6.8	7.6	10.1	12.0	14.1	17.2	19.9
4 hours	3.4	4.4	4.9	6.5	7.6	8.8	10.7	12.3
6 hours	2.7	3.4	3.8	5.0	5.8	6.7	8.1	9.3
12 hours	1.8	2.2	2.5	3.2	3.7	4.2	5.0	5.7
24 hours	1.2	1.5	1.6	2.0	2.3	2.7	3.1	3.5
48 hours	0.8	0.9	1.0	1.3	1.4	1.6	1.8	2.1

Table 2: Met Eireann Rainfall Frequency Table (rainfall rate in mm/hour)

The settlement ponds have been designed to cater for a maximum continuous flow rate associated with a medium-intensity rainfall event. Higher intensity runoff will be attenuated by the open drain collection system which provides temporary storage and limits the rate at which it enters the ponds. This is achieved by the use of check dams in the open drains as described in Section 4. Longer duration storms of 24 hours or more generally have very low intensity and are not critical in terms of the runoff rates that they generate.

The modular settlement ponds are designed to operate effectively for the runoff rate associated with a continuous high rainfall rate of 20 mm/hour. This is equivalent to a 60-minute duration storm event with a 10-year return period (M10-60) or a 2-hour duration storm event with a 100-year return (M100-2). These rates are taken from the Met Éireann Point Rainfall Frequency table for the site location.

The design runoff rate is calculated using the equation:

$Q = c\,i\,A$

Where c is the runoff coefficient

i is the rainfall intensity in m/sec

A is the catchment surface area in m^2

A runoff coefficient of 0.70 is assumed for the hardcore surface. For a rainfall intensity of 20 mm/hour and a catchment area of 1,200m^2 the runoff rate is:

$Q = 0.70 \times (0.02/3{,}600) \times 1{,}200 m^3/sec$

$= 0.0047 m^3/sec$ (4.70 litres/sec)

The main design parameter for the settlement pond is the water surface area. The required surface area is the design flow rate in m^3/sec divided by the particle settlement velocity (V_s) in m/sec (Area = Q/V_s m^2).

The particle settlement velocity is determined using the Stokes equation as follows:

$V_s = 2 \times r^2 (D_p - D_f) / (9n)$

Where V_s is the particle settlement velocity (m/sec),

R is the radius of the particle (metres),

D_p is the density of the particles (kg/m^3),

D_f is the density of the fluid (kg/m^3),

n is the viscosity of the fluid (0.000133 kg sec/m^2 @ 10°C).

For a particle density of 2,400kg/m^3, water density of 1,000kg/m^3 and particle diameter of 20 microns (radius 10-5 metres) the settlement velocity, V_s, is:

$Vs = 2 \times (10^{-5})^2 \times (2{,}400 - 1{,}000) / (9 \times 0.000133)$

$= 2 \times 10^{-10} \times 1{,}400 / 0.001197$

$= 0.000234$ m/sec

The required settlement pond surface area is:

$A_p = Q/V_s$

$= 0.0047/0.000234$

$= 19.95 m^2$

Theoretically the pond depth is not relevant but in practice a minimum depth is required to ensure laminar flow and to allow temporary storage of settled silt. The modular settlement pond has been designed with a surface area of 24m^2 and a depth of 1m. This is the area of the second chamber of the pond as described previously in Section 5.1 above. The first chamber is in addition to this and has an approximate area of 6m^2. In practice it has been found that most of the settlement occurs in the first chamber with very low turbidity levels being achieved in the final effluent. The design is conservative, having an area 20% greater than the calculated requirement to allow for climate change, and therefore has sufficient redundancy to cater for occasional higher runoff rates or sediment loads.

6. Foul Water

Two foul water storage tanks are required for the proposed grid stabilisation facility. One to serve the GIS building and a second to serve the HISC compound welfare facilities. Each facility will be served by a single 150mm diameter foul sewer which will discharge into a storage tank. The storage tanks are to be designed for a total of 2 maintenance personnel being present on site approximately 6 to 8 times per month. This usage will require the systems to be emptied approximately eight times annually. For the most part, the facilities will be unmanned. As a result, the industry standard approach for this type of development is to install a foul wastewater folding tank which is emptied on a regular basis. The washroom facilities provided would not generate sufficient volumes of biological loading for the successful operation of any treatment system reliant on bacterial action. As a result, on-site treatment of wastewater generated by the facility is considered inappropriate.

6.1 Sewer Systems

The flow rate assumed for the design is what is advised for an industrial office/factory type setting without a canteen given the nature and usage which is advised within Irish Water's Code of Practice as 50l/person/day. With 2 maintenance personnel on site, this equates to 100l/day for the substation and the compound welfare facilities. As a result, the peak flow will be below 2.5l/s. Therefore, the drains are proposed to be laid at the recommended gradient of 1 in 60 as per Table 6 of Building Regulations Technical Guidance Document, Part H.

6.2 Holding Tank System

The holding tank systems have been designed assuming the upper level of frequency with maintenance visits.

The wastewater holding tanks have been sized to cater for the wastewater generated by 2 staff over 30 days:

Wastewater generated per staff member per day = 50 liters

Number of staff expected to visit facility = 2 persons

Storage capacity required = 30 days

Minimum wastewater storage volume required = 50 x 2 x 30 = 3,000 liters

At 3,000 liters per month, a 5,000 liter wastewater holding is proposed for the facility which provides spare capacity in the event of a leak or delay in the tank being emptied. This would require emptying every 6 weeks. Emptying times of the holding tanks may vary depending on usage on the site but should be emptied every 2 months at a minimum. Wastewater removal will be undertaken by a licenced waste collection service via vacuum tanker and transported and disposed of in a licenced waste facility capable of accepting this septic waste. An alarm should be fitted to the tanks to advise the maintenance management that the system is close to capacity such as 90%. This is so that the system can be emptied to prevent the risk of it overflowing and causing an environmental impact on the local environmental impact. A vent pipe is proposed to serve the tanks to reduce the risk of odor nuisance on the site, caused by the tanks.

Appendix A

Drainage Layout Drawing

NOTES:

1. ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT SPECIFICATIONS, BILLS OF QUANTITIES, ARCHITECTURAL, SERVICES AND ENGINEERING DRAWINGS.
2. ALL LEVELS ARE IN METRES RELATED TO ORDNANCE DATUM MALIN HEAD.
3. ANY DISCREPANCIES BETWEEN THESE DOCUMENTS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER.
4. DRAWINGS ARE NOT TO BE SCALED.
5. ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS NOTED OTHERWISE.

LEGEND:

- Site Boundary
- SW — Proposed Storm Drain Pipe
- Proposed Storm Manhole
- RG — Road Gully
- FW — Proposed Foul Drain Pipe
- Proposed Foul Manhole
- Rainwater Supply Pipe
- Cleanwater Inceptor Drain
- FD — Filter Drain
- Dirty Water Drain
- Dirty Water Settlement Pond
- Temporary Silt Fence
- Existing Field Drain / Ditch
- Ballygrania River

Srananagh 220kV Substation Compound

Proposed Grid Connection Into Srananagh 220kV Substation

Proposed Grid Connection Route In Road

23272-MWP-00-02-DR-C-5005

39m 220kV EirGrid GIS Building and Compound

Post And Wire Fence

44m HISC Facility

EirGrid GIS Building

41m 220kV EirGrid GIS Building and Compound

HV Yard

Transformers

HISC Building

Outdoor Coolers

Control Containers

73m HISC Addition

Post And Wire Fence

Stormwater Attenuation Tank

Excess Topsoil Storage Area. Stored On Top To A Height Of 1.5m

River Ballygrania

Excess Topsoil Storage Area

Excess Topsoil Storage Area

Post And Wire Fence

Baile Uí Shomacháin Ballysumaghan

Excess Topsoil Storage Area

Excess Topsoil Storage Area

Excess Topsoil Storage Area

Post And Wire Fence

Excess Topsoil Storage Area

Post And Wire Fence

Stop Sign (RUS 027)

Proposed Site Entrance

23272-MWP-00-01-DR-C-5005

N

OSI Sheet Number: 1:5,000 - 1194 & 1260

REV	DATE	DESCRIPTION	BY	APP
P01	26.10.22	Issued For Planning	JK	SH

PROJECT:

Quarry Lane Stability Project

TITLE:

Proposed Drainage Layout - Master Sheet

CLIENT:

Quarry Lane Stability Limited

MWP
ENGINEERING AND ENVIRONMENTAL CONSULTANTS
CORK | TRALEE | LONDON | LIMERICK
mwp.ie

DRAWN:	CHECKED:	APPROVED:
JK	SH	SH
PROJECT NUMBER:	DATE:	SCALE @ A1:
23272	October 2022	1 : 1,000
STATUS DESCRIPTION: FOR INFORMATION		STATUS: S2
DRAWING NUMBER: 23272 - MWP - 00 - 00 - DR - C - 5005		REV: P01

Appendix B

UK SuDS Greenfield Runoff Estimation

Print | Close Report

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Roy Gleeson
Site name:	Sligo RS
Site location:	Quarry Lane, Sligo

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	54.17697° N
Longitude:	8.38059° W
Reference:	666941546
Date:	Sep 14 2022 12:56

Runoff estimation approach IH124

Site characteristics

Total site area (ha): 1.156

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics	Default	Edited
SOIL type:	5	5
HOST class:	N/A	N/A
SPR/SPRHOST:	0.53	0.53

Hydrological characteristics	Default	Edited
SAAR (mm):	1209	1209
Hydrological region:	13	13
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	1.65	1.65
Growth curve factor 100 years:	1.95	1.95
Growth curve factor 200 years:	2.15	2.15

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
Q_{BAR} (l/s):	13.73	13.73
1 in 1 year (l/s):	11.67	11.67
1 in 30 years (l/s):	22.65	22.65
1 in 100 year (l/s):	26.77	26.77
1 in 200 years (l/s):	29.52	29.52

Appendix C

Windes Report Storm Drainage

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	5	Foul Sewage (l/s/ha)	0.000	Maximum Backdrop Height (m)	2.000
M5-60 (mm)	15.800	Volumetric Runoff Coeff.	0.750	Min Design Depth for Optimisation (m)	0.900
Ratio R	0.261	PIMP (%)	95	Min Vel for Auto Design only (m/s)	0.80
Maximum Rainfall (mm/hr)	50	Add Flow / Climate Change (%)	20	Min Slope for Optimisation (1:X)	400
Maximum Time of Concentration (mins)	30	Minimum Backdrop Height (m)	0.005		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	45.476	0.227	200.0	0.119	5.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.82	80.625	0.119	0.0	0.0	3.2	0.92	36.6	19.3

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.001	29.555	0.148	200.0	0.048	0.00	0.0	0.600	o	225	Pipe/Conduit	
S2.000	15.981	0.160	100.0	0.031	5.00	0.0	0.600	o	100	Pipe/Conduit	
S2.001	3.618	0.018	200.0	0.061	0.00	0.0	0.600	o	225	Pipe/Conduit	
S2.002	3.636	0.018	200.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	41.417	0.173	239.4	0.020	0.00	0.0	0.600	o	300	Pipe/Conduit	
S3.000	29.485	0.211	139.7	0.040	5.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.001	50.00	6.36	80.398	0.166	0.0	0.0	4.5	0.92	36.6	27.0
S2.000	50.00	5.35	80.750	0.031	0.0	0.0	0.8	0.77	6.0	5.1
S2.001	50.00	5.41	80.465	0.092	0.0	0.0	2.5	0.92	36.6	15.0
S2.002	50.00	5.48	80.447	0.092	0.0	0.0	2.5	0.92	36.6	15.0
S1.002	50.00	7.04	80.175	0.279	0.0	0.0	7.5	1.01	71.5	45.3
S3.000	50.00	5.58	80.700	0.040	0.0	0.0	1.1	0.85	15.0	6.5

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S4.000	16.891	0.169	100.0	0.027	5.00	0.0	0.600	o	150	Pipe/Conduit	
S4.001	34.185	0.228	150.0	0.047	0.00	0.0	0.600	o	150	Pipe/Conduit	
S5.000	16.314	0.109	150.0	0.044	5.00	0.0	0.600	o	150	Pipe/Conduit	
S4.002	13.823	0.077	180.0	0.038	0.00	0.0	0.600	o	225	Pipe/Conduit	
S4.003	25.866	0.144	180.0	0.021	0.00	0.0	0.600	o	225	Pipe/Conduit	
S4.004	32.108	0.201	160.0	0.051	0.00	0.0	0.600	o	225	Pipe/Conduit	
S3.001	49.764	0.311	160.0	0.083	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S4.000	50.00	5.28	80.700	0.027	0.0	0.0	0.7	1.00	17.8	4.3
S4.001	50.00	5.98	80.531	0.074	0.0	0.0	2.0	0.82	14.5	12.0
S5.000	50.00	5.33	80.625	0.044	0.0	0.0	1.2	0.82	14.5	7.1
S4.002	50.00	6.21	80.228	0.155	0.0	0.0	4.2	0.97	38.6	25.3
S4.003	50.00	6.66	80.151	0.176	0.0	0.0	4.8	0.97	38.6	28.6
S4.004	50.00	7.18	80.008	0.227	0.0	0.0	6.1	1.03	41.0	36.9
S3.001	48.25	7.85	79.732	0.350	0.0	0.0	9.1	1.24	87.7	54.9

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.003	8.473	0.056	150.0	0.034	0.00	0.0	0.600	o	375	Pipe/Conduit	
S6.000	12.297	0.082	150.0	0.313	5.00	0.0	0.600	o	300	Pipe/Conduit	
S1.004	5.167	0.141	36.6	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.005	36.369	0.375	97.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.006	12.937	0.129	100.3	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.003	48.00	7.94	79.346	0.663	0.0	0.0	17.2	1.48	163.1	103.4
S6.000	50.00	5.16	80.550	0.313	0.0	0.0	8.5	1.28	90.6	50.8
S1.004	47.93	7.97	79.190	0.976	0.0	0.0	25.3	3.00	331.5	152.0
S1.005	47.10	8.30	79.049	0.976	0.0	0.0	25.3	1.84	203.2	152.0
S1.006	46.80	8.42	78.674	0.976	0.0	0.0	25.3	1.81	199.8	152.0

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S1	81.750	1.125	Open Manhole	1200	S1.000	80.625	225				
S2	81.750	1.352	Open Manhole	1200	S1.001	80.398	225	S1.000	80.398	225	
S3	81.750	1.000	Open Manhole	1200	S2.000	80.750	100				
S4	81.750	1.285	Open Manhole	1200	S2.001	80.465	225	S2.000	80.590	100	
S5	81.750	1.303	Open Manhole	1200	S2.002	80.447	225	S2.001	80.447	225	
S6	81.750	1.575	Open Manhole	1200	S1.002	80.175	300	S1.001	80.250	225	
								S2.002	80.429	225	179
S7	81.750	1.050	Open Manhole	1200	S3.000	80.700	150				
S8	81.750	1.050	Open Manhole	1200	S4.000	80.700	150				
S9	81.750	1.219	Open Manhole	1200	S4.001	80.531	150	S4.000	80.531	150	
S10	81.750	1.125	Open Manhole	1200	S5.000	80.625	150				
S11	81.750	1.522	Open Manhole	1200	S4.002	80.228	225	S4.001	80.303	150	
								S5.000	80.516	150	213
S12	81.750	1.599	Open Manhole	1200	S4.003	80.151	225	S4.002	80.151	225	
S13	81.750	1.742	Open Manhole	1200	S4.004	80.008	225	S4.003	80.008	225	
S14	81.750	2.018	Open Manhole	1200	S3.001	79.732	300	S3.000	80.489	150	607
								S4.004	79.807	225	
S15	81.750	2.404	Open Manhole	1350	S1.003	79.346	375	S1.002	80.002	300	581
								S3.001	79.421	300	

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S18	81.750	1.200	Open Manhole	1200	S6.000	80.550	300				
S19	81.750	2.560	Open Manhole	1350	S1.004	79.190	375	S1.003	79.290	375	100
								S6.000	80.468	300	1203
S18	81.750	2.701	Open Manhole	1350	S1.005	79.049	375	S1.004	79.049	375	
S20	81.750	3.076	Open Manhole	1350	S1.006	78.674	375	S1.005	78.674	375	
S	81.470	2.925	Open Manhole	0		OUTFALL		S1.006	78.545	375	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1	575114.371	825344.405	575114.371	825344.405	Required	
S2	575157.182	825329.066	575157.182	825329.066	Required	
S3	575145.728	825318.765	575145.728	825318.765	Required	

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S4	575140.510	825303.660	575140.510	825303.660	Required	
S5	575143.913	825302.433	575143.913	825302.433	Required	
S6	575147.334	825301.200	575147.334	825301.200	Required	
S7	575097.186	825307.711	575097.186	825307.711	Required	
S8	575085.146	825356.220	575085.146	825356.220	Required	
S9	575069.229	825361.872	575069.229	825361.872	Required	
S10	575073.050	825324.093	575073.050	825324.093	Required	
S11	575057.723	825329.681	575057.723	825329.681	Required	

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S12	575053.085	825316.660	575053.085	825316.660	Required	
S13	575057.179	825291.120	575057.179	825291.120	Required	
S14	575087.278	825279.941	575087.278	825279.941	Required	
S15	575133.727	825262.081	575133.727	825262.081	Required	
S18	575135.050	825248.940	575135.050	825248.940	Required	
S19	575141.720	825259.270	575141.720	825259.270	Required	
S18	575146.576	825257.506	575146.576	825257.506	Required	
S20	575158.327	825291.924	575158.327	825291.924	Required	

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S	575161.595	825304.441			No Entry	

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.006	S	81.470	78.545	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Manhole Headloss Coeff (Global)	0.500	Inlet Coeffiecient	0.800
Areal Reduction Factor	1.000	Foul Sewage per hectare (l/s)	0.000	Flow per Person per Day (l/per/day)	0.000
Hot Start (mins)	0	Additional Flow - % of Total Flow	20.000	Run Time (mins)	60
Hot Start Level (mm)	0	MADD Factor * 10m³/ha Storage	2.000	Output Interval (mins)	1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	15.800	Cv (Summer)	0.750
Return Period (years)	5	Ratio R	0.261	Cv (Winter)	0.840
Region	Scotland and Ireland	Profile Type	Summer	Storm Duration (mins)	30

Online Controls for Storm

Hydro-Brake® Optimum Manhole: S20, DS/PN: S1.006, Volume (m³): 8.3

Unit Reference	MD-SHE-0168-1370-1000-1370	Sump Available	Yes
Design Head (m)	1.000	Diameter (mm)	168
Design Flow (l/s)	13.7	Invert Level (m)	78.674
Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm)	225
Objective	Minimise upstream storage	Suggested Manhole Diameter (mm)	1200
Application	Surface		

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	13.7	Kick-Flo®	0.696	11.5
Flush-Flo™	0.317	13.7	Mean Flow over Head Range	-	11.6

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	6.0	0.600	12.7	1.600	17.1	2.600	21.6	5.000	29.5	7.500	35.9
0.200	13.2	0.800	12.3	1.800	18.1	3.000	23.1	5.500	30.9	8.000	37.0
0.300	13.7	1.000	13.7	2.000	19.0	3.500	24.9	6.000	32.2	8.500	38.1
0.400	13.5	1.200	14.9	2.200	19.9	4.000	26.5	6.500	33.5	9.000	39.2
0.500	13.3	1.400	16.1	2.400	20.8	4.500	28.1	7.000	34.7	9.500	40.3

Storage Structures for Storm

Cellular Storage Manhole: S20, DS/PN: S1.006

Invert Level (m) 78.674 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	600.0	600.0	1.000	600.0	700.0	1.001	0.0	700.0

Manhole Headloss for Storm

PN	US/MH Name	US/MH Headloss
S1.000	S1	0.500
S1.001	S2	0.500
S2.000	S3	0.500
S2.001	S4	0.500
S2.002	S5	1.000
S1.002	S6	0.500
S3.000	S7	0.500
S4.000	S8	0.500
S4.001	S9	0.500
S5.000	S10	0.500
S4.002	S11	0.500
S4.003	S12	0.500
S4.004	S13	0.500
S3.001	S14	0.500
S1.003	S15	0.500
S6.000	S18	0.500
S1.004	S19	1.000
S1.005	S18	0.500
S1.006	S20	0.500

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Manhole Headloss Coeff (Global)	0.500	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Foul Sewage per hectare (l/s)	0.000	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Additional Flow - % of Total Flow	20.000	Flow per Person per Day (l/per/day)	0.000

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	1	Number of Storage Structures	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR M5-60 (mm)	15.800	Cv (Summer)	0.750
Region	Scotland and Ireland	Ratio R	0.261	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	2.5 Second Increment (Extended)	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 5, 30, 100
Climate Change (%)	0, 0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
S1.000	S1	15 Winter	1	+0%	30/15 Winter				80.729	-0.121	0.000	0.41			14.5

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Status	Level Exceeded
S1.000	S1	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S1.001	S2	15 Winter	1	+0%	30/15 Summer				80.519	-0.103	0.000	0.56		
S2.000	S3	15 Winter	1	+0%	30/15 Summer				80.811	-0.039	0.000	0.68		
S2.001	S4	15 Winter	1	+0%	30/15 Summer				80.570	-0.120	0.000	0.40		
S2.002	S5	15 Winter	1	+0%	30/15 Summer				80.560	-0.112	0.000	0.50		
S1.002	S6	15 Winter	1	+0%	100/15 Summer				80.320	-0.155	0.000	0.47		
S3.000	S7	15 Winter	1	+0%					80.762	-0.088	0.000	0.35		
S4.000	S8	15 Winter	1	+0%	30/15 Summer				80.746	-0.104	0.000	0.20		
S4.001	S9	15 Winter	1	+0%	30/15 Summer				80.616	-0.065	0.000	0.59		
S5.000	S10	15 Winter	1	+0%	100/15 Summer				80.692	-0.083	0.000	0.41		
S4.002	S11	15 Winter	1	+0%	30/15 Summer				80.344	-0.109	0.000	0.53		
S4.003	S12	15 Winter	1	+0%	30/15 Summer				80.271	-0.105	0.000	0.55		
S4.004	S13	15 Winter	1	+0%	30/15 Summer				80.139	-0.094	0.000	0.63		
S3.001	S14	15 Winter	1	+0%	30/15 Summer				79.873	-0.159	0.000	0.44		
S1.003	S15	15 Winter	1	+0%	30/15 Summer				79.569	-0.152	0.000	0.66		
S6.000	S18	15 Winter	1	+0%	30/15 Summer				80.711	-0.139	0.000	0.55		
S1.004	S19	15 Winter	1	+0%	30/15 Summer				79.425	-0.140	0.000	0.71		
S1.005	S18	15 Winter	1	+0%	30/15 Summer				79.250	-0.174	0.000	0.57		
S1.006	S20	240 Winter	1	+0%	30/120 Winter				78.865	-0.184	0.000	0.09		138

PN	US/MH Name	Pipe Flow (l/s)	Level Status	Level Exceeded
S1.001	S2	19.1	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S2.000	S3	3.9	OK	
S2.001	S4	10.4	OK	
S2.002	S5	10.4	OK	
S1.002	S6	31.1	OK	
S3.000	S7	5.1	OK	
S4.000	S8	3.3	OK	
S4.001	S9	8.2	OK	
S5.000	S10	5.5	OK	
S4.002	S11	17.7	OK	
S4.003	S12	19.6	OK	
S4.004	S13	24.2	OK	
S3.001	S14	36.1	OK	
S1.003	S15	70.6	OK	
S6.000	S18	39.1	OK	
S1.004	S19	104.0	OK	
S1.005	S18	103.6	OK	
S1.006	S20	13.1	OK	

5 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Manhole Headloss Coeff (Global)	0.500	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Foul Sewage per hectare (l/s)	0.000	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Additional Flow - % of Total Flow	20.000	Flow per Person per Day (l/per/day)	0.000

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	1	Number of Storage Structures	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR M5-60 (mm)	15.800	Cv (Summer)	0.750
Region	Scotland and Ireland	Ratio R	0.261	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	2.5 Second Increment (Extended)	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 5, 30, 100
Climate Change (%)	0, 0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
S1.000	S1	15 Winter	5	+0%	30/15 Winter				80.758	-0.092	0.000	0.63			21.9

5 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Status	Level Exceeded
S1.000	S1	OK	

5 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S1.001	S2	15 Winter	5	+0%	30/15 Summer				80.559	-0.064	0.000	0.84		
S2.000	S3	15 Winter	5	+0%	30/15 Summer				80.838	-0.012	0.000	1.00		
S2.001	S4	15 Winter	5	+0%	30/15 Summer				80.604	-0.087	0.000	0.60		
S2.002	S5	15 Winter	5	+0%	30/15 Summer				80.594	-0.078	0.000	0.75		
S1.002	S6	15 Winter	5	+0%	100/15 Summer				80.362	-0.113	0.000	0.70		
S3.000	S7	15 Winter	5	+0%					80.779	-0.071	0.000	0.53		
S4.000	S8	15 Winter	5	+0%	30/15 Summer				80.757	-0.093	0.000	0.30		
S4.001	S9	15 Winter	5	+0%	30/15 Summer				80.644	-0.037	0.000	0.89		
S5.000	S10	15 Winter	5	+0%	100/15 Summer				80.711	-0.064	0.000	0.61		
S4.002	S11	15 Winter	5	+0%	30/15 Summer				80.380	-0.073	0.000	0.79		
S4.003	S12	15 Winter	5	+0%	30/15 Summer				80.310	-0.067	0.000	0.83		
S4.004	S13	15 Winter	5	+0%	30/15 Summer				80.183	-0.050	0.000	0.95		
S3.001	S14	15 Winter	5	+0%	30/15 Summer				79.913	-0.119	0.000	0.66		
S1.003	S15	15 Winter	5	+0%	30/15 Summer				79.645	-0.076	0.000	0.99		
S6.000	S18	15 Winter	5	+0%	30/15 Summer				80.763	-0.087	0.000	0.82		
S1.004	S19	15 Winter	5	+0%	30/15 Summer				79.565	0.000	0.000	1.05		
S1.005	S18	15 Winter	5	+0%	30/15 Summer				79.313	-0.111	0.000	0.83		
S1.006	S20	240 Winter	5	+0%	30/120 Winter				78.963	-0.086	0.000	0.10		147

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S1.001	S2	28.8	OK	

5 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S2.000	S3	5.8	OK	
S2.001	S4	15.6	OK	
S2.002	S5	15.6	OK	
S1.002	S6	46.8	OK	
S3.000	S7	7.7	OK	
S4.000	S8	5.0	OK	
S4.001	S9	12.4	OK	
S5.000	S10	8.3	OK	
S4.002	S11	26.7	OK	
S4.003	S12	29.6	OK	
S4.004	S13	36.4	OK	
S3.001	S14	54.3	OK	
S1.003	S15	106.3	OK	
S6.000	S18	59.1	OK	
S1.004	S19	154.4	OK	
S1.005	S18	152.5	OK	
S1.006	S20	13.6	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Manhole Headloss Coeff (Global)	0.500	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Foul Sewage per hectare (l/s)	0.000	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Additional Flow - % of Total Flow	20.000	Flow per Person per Day (l/per/day)	0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 15.800 Cv (Summer) 0.750
Region Scotland and Ireland Ratio R 0.261 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep 2.5 Second Increment (Extended) Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 5, 30, 100
Climate Change (%)	0, 0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
S1.000	S1	15 Winter	30	+0%	30/15 Winter				80.853	0.003	0.000	0.87			30.5

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Status	Level Exceeded
S1.000	S1	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S1.001	S2	15 Winter	30	+0%	30/15 Summer				80.676	0.053	0.000	1.18		
S2.000	S3	15 Winter	30	+0%	30/15 Summer				80.988	0.138	0.000	1.35		
S2.001	S4	15 Winter	30	+0%	30/15 Summer				80.693	0.003	0.000	0.97		
S2.002	S5	15 Winter	30	+0%	30/15 Summer				80.673	0.001	0.000	1.18		
S1.002	S6	15 Winter	30	+0%	100/15 Summer				80.427	-0.047	0.000	1.00		
S3.000	S7	15 Winter	30	+0%					80.801	-0.049	0.000	0.78		
S4.000	S8	15 Winter	30	+0%	30/15 Summer				80.939	0.089	0.000	0.37		
S4.001	S9	15 Winter	30	+0%	30/15 Summer				80.915	0.234	0.000	1.14		
S5.000	S10	15 Winter	30	+0%	100/15 Summer				80.738	-0.037	0.000	0.90		
S4.002	S11	15 Winter	30	+0%	30/15 Summer				80.654	0.201	0.000	0.98		
S4.003	S12	15 Winter	30	+0%	30/15 Summer				80.588	0.211	0.000	1.02		
S4.004	S13	15 Winter	30	+0%	30/15 Summer				80.451	0.218	0.000	1.20		
S3.001	S14	15 Winter	30	+0%	30/15 Summer				80.183	0.151	0.000	0.83		
S1.003	S15	15 Winter	30	+0%	30/15 Summer				79.962	0.241	0.000	1.38		
S6.000	S18	15 Winter	30	+0%	30/15 Summer				80.880	0.030	0.000	1.21		
S1.004	S19	15 Winter	30	+0%	30/15 Summer				79.832	0.267	0.000	1.45		
S1.005	S18	15 Winter	30	+0%	30/15 Summer				79.536	0.112	0.000	1.16		
S1.006	S20	360 Winter	30	+0%	30/120 Winter				79.133	0.084	0.000	0.10		223

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S1.001	S2	40.4	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S2.000	S3	7.8	SURCHARGED	
S2.001	S4	24.9	SURCHARGED	
S2.002	S5	24.4	SURCHARGED	
S1.002	S6	66.6	OK	
S3.000	S7	11.3	OK	
S4.000	S8	6.2	SURCHARGED	
S4.001	S9	15.9	SURCHARGED	
S5.000	S10	12.1	OK	
S4.002	S11	33.0	SURCHARGED	
S4.003	S12	36.4	SURCHARGED	
S4.004	S13	46.1	SURCHARGED	
S3.001	S14	68.4	SURCHARGED	
S1.003	S15	148.2	SURCHARGED	
S6.000	S18	86.6	SURCHARGED	
S1.004	S19	212.7	SURCHARGED	
S1.005	S18	212.1	SURCHARGED	
S1.006	S20	13.6	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Manhole Headloss Coeff (Global)	0.500	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Foul Sewage per hectare (l/s)	0.000	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Additional Flow - % of Total Flow	20.000	Flow per Person per Day (l/per/day)	0.000

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	1	Number of Storage Structures	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR M5-60 (mm)	15.800	Cv (Summer)	0.750
Region	Scotland and Ireland	Ratio R	0.261	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	2.5 Second Increment (Extended)	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 5, 30, 100
Climate Change (%)	0, 0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
S1.000	S1	15 Winter	100	+0%	30/15 Winter				81.108	0.258	0.000	1.03			36.1

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Status	Level Exceeded
S1.000	S1	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S1.001	S2	15 Winter	100	+0%	30/15 Summer				80.865	0.242	0.000	1.40		
S2.000	S3	15 Winter	100	+0%	30/15 Summer				81.175	0.325	0.000	1.68		
S2.001	S4	15 Winter	100	+0%	30/15 Summer				80.746	0.055	0.000	1.19		
S2.002	S5	15 Winter	100	+0%	30/15 Summer				80.694	0.022	0.000	1.49		
S1.002	S6	15 Winter	100	+0%	100/15 Summer				80.576	0.101	0.000	1.19		
S3.000	S7	15 Winter	100	+0%					80.830	-0.020	0.000	1.00		
S4.000	S8	15 Winter	100	+0%	30/15 Summer				81.404	0.554	0.000	0.44		
S4.001	S9	15 Winter	100	+0%	30/15 Summer				81.379	0.698	0.000	1.18		
S5.000	S10	15 Winter	100	+0%	100/15 Summer				81.191	0.416	0.000	0.97		
S4.002	S11	15 Winter	100	+0%	30/15 Summer				81.123	0.670	0.000	1.08		
S4.003	S12	15 Winter	100	+0%	30/15 Summer				81.051	0.675	0.000	1.15		
S4.004	S13	15 Winter	100	+0%	30/15 Summer				80.905	0.672	0.000	1.29		
S3.001	S14	15 Winter	100	+0%	30/15 Summer				80.611	0.579	0.000	0.95		
S1.003	S15	15 Winter	100	+0%	30/15 Summer				80.340	0.619	0.000	1.62		
S6.000	S18	15 Winter	100	+0%	30/15 Summer				80.964	0.114	0.000	1.56		
S1.004	S19	15 Winter	100	+0%	30/15 Summer				80.165	0.600	0.000	1.72		
S1.005	S18	15 Winter	100	+0%	30/15 Summer				79.746	0.322	0.000	1.37		
S1.006	S20	360 Winter	100	+0%	30/120 Winter				79.307	0.258	0.000	0.10		291

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S1.001	S2	48.0	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S2.000	S3	9.7	SURCHARGED	
S2.001	S4	30.8	SURCHARGED	
S2.002	S5	30.9	SURCHARGED	
S1.002	S6	79.1	SURCHARGED	
S3.000	S7	14.4	OK	
S4.000	S8	7.2	SURCHARGED	
S4.001	S9	16.5	SURCHARGED	
S5.000	S10	13.1	SURCHARGED	
S4.002	S11	36.2	SURCHARGED	
S4.003	S12	41.0	SURCHARGED	
S4.004	S13	49.7	SURCHARGED	
S3.001	S14	78.8	SURCHARGED	
S1.003	S15	174.1	SURCHARGED	
S6.000	S18	112.2	SURCHARGED	
S1.004	S19	252.4	SURCHARGED	
S1.005	S18	251.7	SURCHARGED	
S1.006	S20	13.6	SURCHARGED	

Appendix D

Met Eireann Rainfall Data

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 175158, Northing: 325320,

	Interval		Years												
DURATION	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,
5 mins	2.7,	3.7,	4.2,	5.0,	5.5,	5.9,	7.2,	8.6,	9.5,	10.8,	12.0,	12.8,	14.2,	15.2,	16.0,	N/A ,
10 mins	3.8,	5.2,	5.9,	7.0,	7.7,	8.2,	10.0,	12.0,	13.3,	15.1,	16.7,	17.9,	19.7,	21.2,	22.4,	N/A ,
15 mins	4.4,	6.1,	6.9,	8.2,	9.0,	9.7,	11.8,	14.1,	15.6,	17.7,	19.6,	21.0,	23.2,	24.9,	26.3,	N/A ,
30 mins	5.9,	7.9,	9.0,	10.5,	11.6,	12.4,	14.9,	17.8,	19.6,	22.1,	24.3,	26.0,	28.6,	30.6,	32.2,	N/A ,
1 hours	7.8,	10.3,	11.6,	13.6,	14.8,	15.8,	18.9,	22.3,	24.5,	27.5,	30.2,	32.2,	35.2,	37.5,	39.4,	N/A ,
2 hours	10.3,	13.5,	15.1,	17.5,	19.0,	20.2,	24.0,	28.1,	30.7,	34.3,	37.4,	39.8,	43.3,	46.1,	48.3,	N/A ,
3 hours	12.1,	15.7,	17.6,	20.3,	22.0,	23.3,	27.6,	32.1,	35.0,	39.0,	42.4,	45.0,	48.9,	51.9,	54.4,	N/A ,
4 hours	13.6,	17.6,	19.6,	22.5,	24.4,	25.9,	30.4,	35.3,	38.4,	42.7,	46.4,	49.2,	53.4,	56.5,	59.1,	N/A ,
6 hours	16.0,	20.5,	22.8,	26.1,	28.2,	29.8,	34.9,	40.4,	43.8,	48.5,	52.6,	55.7,	60.3,	63.7,	66.6,	N/A ,
9 hours	18.8,	24.0,	26.5,	30.2,	32.6,	34.5,	40.1,	46.2,	50.0,	55.2,	59.6,	63.0,	68.0,	71.8,	74.9,	N/A ,
12 hours	21.1,	26.8,	29.6,	33.6,	36.2,	38.2,	44.3,	50.8,	54.9,	60.5,	65.2,	68.8,	74.2,	78.2,	81.5,	N/A ,
18 hours	24.9,	31.3,	34.4,	38.9,	41.8,	44.0,	50.9,	58.1,	62.6,	68.7,	74.0,	77.9,	83.8,	88.2,	91.8,	N/A ,
24 hours	27.9,	34.9,	38.3,	43.2,	46.4,	48.8,	56.1,	63.9,	68.8,	75.3,	80.9,	85.1,	91.3,	96.0,	99.8,	112.6,
2 days	37.0,	45.1,	49.0,	54.4,	57.9,	60.5,	68.4,	76.6,	81.7,	88.5,	94.3,	98.5,	104.9,	109.6,	113.4,	126.1,
3 days	44.9,	53.7,	58.0,	63.9,	67.6,	70.4,	78.8,	87.5,	92.8,	99.9,	105.8,	110.2,	116.7,	121.5,	125.4,	138.2,
4 days	52.0,	61.5,	66.1,	72.4,	76.3,	79.3,	88.2,	97.2,	102.8,	110.1,	116.2,	120.7,	127.4,	132.3,	136.3,	149.3,
6 days	65.1,	75.8,	80.9,	87.8,	92.1,	95.3,	105.0,	114.7,	120.6,	128.4,	134.8,	139.6,	146.5,	151.6,	155.7,	169.1,
8 days	77.2,	88.9,	94.4,	101.9,	106.5,	110.0,	120.2,	130.5,	136.7,	144.8,	151.5,	156.5,	163.7,	169.0,	173.2,	186.9,
10 days	88.7,	101.3,	107.2,	115.1,	120.0,	123.6,	134.4,	145.2,	151.7,	160.1,	167.0,	172.1,	179.5,	185.0,	189.3,	203.4,
12 days	99.8,	113.2,	119.4,	127.7,	132.9,	136.6,	147.9,	159.1,	165.8,	174.5,	181.7,	186.9,	194.5,	200.1,	204.5,	218.8,
16 days	121.2,	135.9,	142.6,	151.7,	157.2,	161.3,	173.3,	185.2,	192.3,	201.5,	209.0,	214.5,	222.4,	228.2,	232.8,	247.6,
20 days	141.8,	157.6,	164.8,	174.5,	180.4,	184.7,	197.4,	209.8,	217.2,	226.8,	234.6,	240.3,	248.4,	254.4,	259.1,	274.3,
25 days	166.9,	183.9,	191.6,	201.9,	208.1,	212.7,	226.0,	239.1,	246.8,	256.7,	264.8,	270.7,	279.1,	285.3,	290.1,	305.7,

NOTES:
N/A Data not available
These values are derived from a Depth Duration Frequency (DDF) Model
For details refer to:
'Fitzgerald D. L. (2007), Estimates of Point Rainfall Frequencies, Technical Note No. 61, Met Eireann, Dublin',
Available for download at www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf

M5-60 = 15.8
M5-2D = 60.5
Ratio R = 0.261

Appendix 3

CEMP

MWP

Construction Environmental Management Plan (CEMP)

Proposed Grid Stabilisation Facility at Quarry Lane Ballysumaghan, Sooey, County Sligo.

October 2022

Project No.	Doc. No.	Rev.	Date	Prepared By	Checked By	Approved By	Status
23272	6006	A	26/10/2022	ZH/MP	SH/AOC	CF	Final

MWP, Engineering and Environmental Consultants
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Contents

1. Introduction

This Construction and Environmental Management Plan (CEMP) has been prepared by Malachy Walsh and Partners (MWP) on behalf of Quarry Lane Stability Ltd. to accompany the submission of a planning application to Sligo County Council for a proposed Grid Stabilisation Facility in the townland of Ballysumaghan, Sooey, County Sligo, adjacent to the existing ESB Srananagh 220 kV substation.

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, in order to ensure that the project is constructed in accordance with best practice, with the minimum impact on the surrounding environment.

Prior to construction, the Appointed Main Contractor will prepare a detailed CEMP taking into account methods/requirements outlined in this report. This CEMP will form the basis of the construction management approach on site, while the works are being completed; ensuring environmental management measures are in place, which will be implemented during the construction phase, in order to ensure that the project is constructed in accordance with best practice, with the minimum impact on the surrounding environment.

1.1 CEMP Purpose and Objectives

The purpose of a Construction Environmental Management Plan is to outline how the Appointed Contractor(s) will implement a Site Construction Management System to meet the specified requirements which include Contractual, Regulatory and Statutory Requirements, Environmental Mitigation Measures and Planning Conditions.

The principal objective of this CEMP is to avoid, minimise and control adverse environmental impacts associated with all aspects of the construction of the proposed development. In essence, this CEMP is intended to provide the Appointed Contractors with a practical guide to ensure compliance by all parties with any Planning and Environmental requirements. The CEMP achieves this by providing the environmental management framework to be adhered to during the construction phase of the proposal. It outlines the work practices, construction management procedures, management responsibilities, mitigation measures and monitoring proposals that are required to be adhered to, in order to complete the proposed development, in an appropriate environmental manner.

All site personnel will be required to be familiar with the plan's requirements as related to their role on site.

There is a requirement on the Appointed Contractor(s), that details of this Project CEMP are updated with progress, including the roles and responsibilities of those appointed on the site for the construction of the project, if their respective roles change during the project.

While this version of the CEMP provides a benchmark for good practice, where avoidance or further minimisation of risks to the environment can be demonstrated through use of alternative methods or improvements to current practices, the Contractor will implement these wherever possible.

2. Project Overview

2.1 The Development Proposal

Quarry Lane Stability Ltd. is applying for planning permission for a proposed Grid Stabilisation Facility. The proposed development relates to the installation of high inertia synchronous compensator (HISC) technology to provide grid stabilisation services for the national grid. The technology, which will consist of a synchronous compensator and will provide inertia to strengthen the grid and reactive power for voltage control.

The proposed development will consist of the following elements:

a) A High Inertia Synchronous Compensator (HISC) compound containing 1 No. HISC unit enclosed within a steel clad framed style structure (12.1m max height) and supported by 7 No. electrical equipment containers (containing ancillary power supply products including a static frequency converts, MV switchgear, exciters, LV distribution, control room); 4 No. external cooler units; main, auxiliary & start-up electrical transformers, generator circuit breakers, switchgear equipment, and 1 No. back up diesel generator and associated diesel storage tank;

b) A 220kV High Voltage Gas Insulated Switchgear (GIS) compound containing a GIS building with all control & HV equipment within a single storey building (13.2m max height). The building will be surrounded by a compound road and contained within a 2.6m high galvanised steel palisade fence;

c) A 220kV underground cable to the existing adjoining Eirgrid substation boundary;

d) New access road and entrance from the L5204;

e) Associated elements comprising all necessary drainage systems, foundations works for the above compounds, various underground cables and ducts, equipment plinths, internal services roads, welfare and office units, 2 No. material storage containers, rainwater harvesting systems, compound lighting and palisade gates and fencing, security lighting, CCTV, hardstanding areas and boundary security fence.

Details of the site layout and associated works and structures are provided in planning application drawings submitted as part of this application.

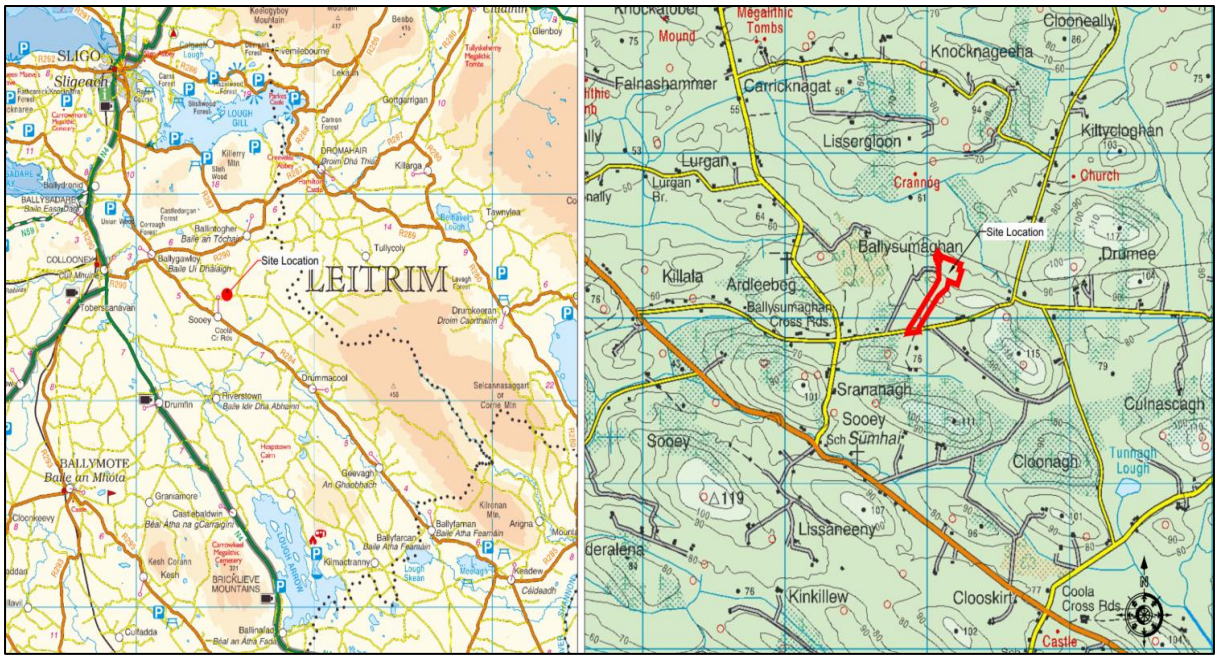
2.2 Site Details

The proposed development site is located in east Sligo within the townland of Ballysumaghan, Sooey, County Sligo. The site is situated in a rural lightly populated area approximately 6.5km east of Collooney, 3.9km southeast of Ballygawely and 2.5km southwest of Ballintogher. Figure 1 illustrates the geographical location of the proposed development.

There is no planning history associated with the proposed development site. It is currently greenfield marginal and semi improved agricultural land used principally for livestock grazing. The surrounding landscape predominately comprises agricultural grasslands with some small pockets of woodland/forestry.

Lands to the north, east and south are agricultural farmland. The existing ESB Srananagh 220 kV transmission substation and associated compound is located immediately to the west of the site.
There is planning permission for a battery storage facility (Planning ref no 20/11) on lands approximately 340m to the south west of the proposed development site and for a synchronous condenser on lands approximately 125m to the north of the proposed development site (Planning ref no2 20/90).

Figure 1 Site Location



3. Construction Works

3.1 Overview

Key elements of the civil works and activities associated with the construction phase of the development are as follows and are discussed in the following subsections:

- Pre-commencement activities including site investigation work and pre-construction surveys
- Site preparation earthworks
- Access road construction
- Construct temporary construction compound
- Site drainage
- Construct base formation, foundations, concrete plinths for HICS compound, transformer compound, substation compound
- Complete equipment and electrical installation at all compounds
- Cable route trenching and cable laying
- Commission and test plant
- Complete site works: security fencing, gates, signage, landscaping
- Demobilise construction offices and tidy up site.

3.2 Schedule of Construction Works

The project duration is estimated at approx. 16-18 months. The typical construction works will be completed in phases as outlined in Table 1 below. A number of these phases will run concurrently.

Table 1: Expected Construction Programme

Stage	Activity	Estimated Duration
Phase 1	Pre-construction activities, Site preparation, site entrance	4-6 weeks
Phase 2	Access road construction, drainage, and compound	8-10 weeks
Phase 3	Hardstandings, concrete bases / plinth construction	8 weeks
Phase 4	Facility buildings	14 weeks
Phase 5	Trenching, ducting and cabling	10-12 weeks
Phase 6	Electrical Infrastructure installation and other electrical works	12-14 weeks
Phase 7	Facility commissioning and site demobilisation	6 - 8 weeks
Total		**16-18 months**

Note: Phases are likely to overlap and will not be completed in isolation resulting in estimated total programme duration of approximately 16-18 months.

3.3 Working Hours and Personnel

Likely Construction hours:-
7:00am – 6:00pm* (Monday – Friday inclusive)
7:00am – 4:00pm* (Saturday)
There will be no work on Sunday and Bank Holidays*

*The working day may extend occasionally at times when critical elements of work need to be advanced.

It is expected that the construction works for the Facility will require approximately 30 personnel including during the peak construction phase, to include site contractors, engineers, materials delivery personnel, environmental personnel, health and safety personnel.

3.4 Construction Methodology

3.4.1 Pre-Construction Activities

Before works commences a number of preparatory activities will be carried out. The following key works will be undertaken as part of the site preparation and pre-development activities:

3.4.1.1 Pre-Commencement Surveys

- Prior to any commencement of any physical works, demarcation works and bench marks on site will be established.
- Any detailed ground investigations required to support the site regrading process will be carried out and finalised.
- Pre- commencement ecological survey
- Pre- commencement noise survey

3.4.1.2 Enabling Works

- Any surface water management, bunding, waste management measures etc will be put in place at the outset.
- Part of the pre commencement activities will include:
  - the installation of suitable protection (e.g., temporary drain/ berm/silt curtain) around the site boundaries to control and treat any run-off during the works.
  - the installation of 20m development exclusion zone around the mapped limits of the enclosure monument to the east of the site
  - the erection of signage and information boards for the general public, site employees and trucks transporting materials to/from the site
- A traffic management plan will be completed prior to the works commencing and this will be agreed between the Developer, the Contractor and Sligo County Council to ensure that traffic is managed during the works safely and with least impact.

3.4.1.3 Site Access

There is an existing access road serving the existing substation that runs north from the L5204 local road. This road will not be suitable for access road to the compound due to its alignment and therefore as part of enabling works a new access road will need to be constructed running north from L5204 to the compound.

3.4.1.4 Access Road Construction

There will be a requirement to import aggregate for the construction of the access track. This will be kept to a minimum. A new road will be constructed using stone aggregate imported from a quarry. The stone aggregate will be placed over a layer of geogrid, where required, after all organic and soft subsoil material is excavated to formation level. Geotextile material, used to separate the road building material from the subsoil, will also be laid at formation level. The road will be finished with approx. 100mm crushed stone of Unbound Granular Mixture A (Previously Clause 804), or similar aggregate type material. The quantity will be determined accurately at construction stage and will largely depend on existing ground conditions.

Typically, the sequence of constructing the new access road will comprise the following:

1) The appointed contractor will liaise with the electrical supplier prior to the commencement of the works to ensure that the design of the new road conforms with the loading requirements for electrical equipment delivery.
2) The appointed contractor will survey the area for any unforeseen hazards prior to the commencement of works and set up warning signage as appropriate.
3) Drainage measures will be implemented to ensure that there is separation of overland clean water flow from construction run-off.
   Excavators will first remove any topsoil / vegetative layer which may be present. This material will be transported to an agreed temporary storage area and maintained for re-use during the restoration phase of the construction process. Topsoil / vegetative removal will be kept to a minimum to prevent any runoff of silt during heavy rainfall. It is proposed to store excess topsoil material generated due to the works over the proposed attenuation tank and in berms on either side of the access road. These topsoil storage areas will be seeded to ensure revegetation of the berms is expedited. Excess subsoil is proposed to be reused in accordance with *Transport Infrastructure Ireland 600 Series Earthworks Specification CC-SPW-00600* and *S.R.21 2014 + A1: 2016 Annex E – Aggregates for Use as Hardcore Under Concrete Slabs and Footpaths.* Any surplus or unsuitable topsoil will be transported offsite to a suitably licenced facility.
4) Excavators will continue to strip and excavate the soft subsoil underneath which will be temporarily stored adjacent to the access road in accordance with approved methods with the use of an articulated dumper trucks. Excavated material will only be temporarily stored on slopes under 5° and to a maximum height of under 1.0m until they are transported to the selected deposition areas where they will be permanently stored or transported offsite to a suitably licenced facility.
5) In the area of cutting along the proposed access road, a combination of excavators and rock breakers, where required will be used to carry out the excavation.
6) All excavations to be carried out will be battered back to a safe angle of repose (approx. slope angle of 26.6°) but where excavations are in solid rock the safe angle of repose may be increased to a slope angle of approx. 45°.
7) Once a section of the excavated access road is exposed to suitable formation; a layer of geogrid or geotextile material may be placed along its formation depending on ground conditions. The stone will be delivered to the required work area and spread out locally with the use of excavators and compacted with the use of a roller which will roll the stone aggregate in maximum 225mm layers on top of the geogrid / geotextile material to achieve the required design strength.

8) The material required for the access road is proposed to be imported stone from a nearby quarry. The road will be finished with imported 100mm crushed stone of Unbound Granular Mixture A (Previously Clause 804), or similar aggregate type material.
9) The new access road will be constructed to a finished carriageway width of 6.0m with a maximum crossfall of 2.5% in order that water can flow off the road and reduce the risk of rutting / potholes occurring.
10) Roadside drains will be constructed to manage clean and dirty water runoff along the access road.
11) Excavated topsoil and subsoil will be kept separate at the excavation and storage areas.
12) Where drop offs greater than 1.0m in height occur alongside road edges; physical edge protection will be constructed to reduce the risk of vehicles overturning. Roadside marker posts will also be erected to delineate road edges in poor weather.
13) The appointed contractor will ensure that on site personnel will be aware of environmental constraints / sensitive areas within the site in which works are to be avoided.

3.4.2 Temporary Construction Compound

A temporary site compound will be situated in the compound area of the proposed facility, within the red line planning boundary of the proposed site layout. The compound will be used as a secure storage area for construction materials, waste materials and also contain temporary site accommodation units to provide welfare facilities for site personnel. Facilities will include offices, meeting rooms, a canteen and a drying room.

The compound will be established early in the project in order to provide site offices and accommodation for staff and for the delivery of materials. The compound will be in place for the duration of the construction phase and will be removed once commissioning is complete.

The compound will typically be constructed as follows:

- The area to be used as the compound will be marked out at the corners using ranging rods or timber posts.
- A bunded containment area will be provided within the compound for the storage of lubricants, oils and site generators etc.
- If necessary, the compound will be fenced using temporary fencing and secured with locked gates.
- The compound will include an enclosed wastewater management system (holding tank) capable of handling the demand during the construction phase when as many as 30 people will be working on site. These will be emptied as required by a licensed contractor.
- Upon completion of the project the temporary construction compound will be cleared and permanent accommodation works will be installed on site.

3.4.3 Site Surface Water Drainage System

During the construction phase of the project, there is potential for sedimented surface water run-off from the construction works areas to contaminate any downstream watercourses. Fundamental to any construction project, is the need to keep water clean and manage all other run-off and water from construction in an appropriate manner.

A site-specific drainage system has been designed taking account of the following:

- Knowledge of the ground and hydrological conditions at the site;

- Technical guidance and best management practice manuals.

Two separate drainage networks are proposed to be implemented at Quarry Lane, due to the presence of a high point approximately 400m from the site entrance location. The existing high point can be seen on contour mapping provided as drawing 23272MWP-00-00-DR-C-5003. The networks are intended to mimic the pre-development surface water runoff conditions, as required by policy P-SWD-8 of the Sligo County Development Plan 2017-2023.

At present, surface water runoff from north of the high point makes its way to the Ballygrania river which runs in a north-westerly direction approximately 150m from the north-eastern site boundary. A vegetated agricultural drain within the existing site conveys runoff from the site to the river. A subsurface drainage system is proposed to cater for surface water runoff from the proposed development within this catchment.

Surface water flows to the south of the high point make their way southwards towards an existing drain running parallel to the public road. A surface level drainage system is considered for this catchment.

It is proposed to install clean water cut-off drains to intercept surface water run-off from catchments uphill of the proposed development site. The cut-off drains will divert the collected runoff around site infrastructure to prevent it entering the site and potentially coming in contact with site runoff containing suspended solids. This reduces the volume of water needing treatment within the development and ensures high quality of discharge to downstream catchments. This is particularly important during construction where traffic on the unsealed access road and stone compounds is highest. The clean water cut-off drains will discharge overland along their natural course downhill of the development site.

Please refer to Drainage Report prepared by Malachy Walsh and Partners (MWP Document 23272-6004) for more in-depth information about this section of the project.

3.4.3.1 Compound Storm Water Drainage

Due to the nature of the proposed development, the potential for a build-up or ponding of water in the vicinity of high voltage infrastructure is present. As a result, it is proposed to install a robust underground drainage system which will direct surface water away from critical electrical infrastructure.

The subsurface drainage network is proposed to accept water from building roofs, transformer plinths, HV Yard, roadways and surrounding stone hardstanding areas. The compound areas will drain predominantly through lateral movement of rainfall through the compound stone towards filter drains installed around the perimeter of the compound area. This will be facilitated by grading the top of the less permeable subgrade towards the compound edges underneath the compound stone.

A network of roadside v-drains with check dams, filter drains, downpipes and rainwater gullies and road gullies will collect surface water runoff and direct it into the proposed surface water sewer network proposed for the site.

Storm water from the HV Yard and Transformers will pass through a Full Retention Petrol Interceptor (Kingspan Klargester NSFA015 or similar) prior to draining into an on-site attenuation tank. Similarly, stormwater flow from the Substation building and associated compound roadways will pass through a Bypass Interceptor prior to

draining into the on-site attenuation tank. The use of two interceptors within the compound drainage as well as sump manholes will ensure no light oils or silt will be discharged to the attenuation tank.

It is proposed to provide an underground attenuation unit on the east side of the compound. The design of the attenuation unit has been undertaken using Microdrainage hydraulic modelling software to prevent flooding of the compound for the 100-year return period storm event with 20% allowance for the effects of climate change. The proposed attenuation system has been designed as a cellular unit (Wavin Aquacell Core R or similar) which would provide a voids ration of 95%. Based on these characteristics an installed volume of 600m^3 (15m x 40m x 1m) is proposed. Attenuated surface water runoff is proposed to overflow at a controlled rate equal to the greenfield runoff rate to an existing vegetated agricultural drain on the east side of the compound.

The greenfield runoff rate employed in design of the compound drainage system has been obtained using the UK SuDS Greenfield runoff rate estimation tool. Outflow from the onsite attenuation unit will be restricted to QBAR (13.7l/s) to mimic the predevelopment greenfield runoff conditions. Outflows will be restricted to the greenfield runoff rate by placing a flow control device such as a Hydrobrake (Unit Reference: MD-SHE-0168-1370-1000-1370) or similar within the outfall manhole.

3.4.3.2 Access Road Storm Water Drainage

A separate surface water network will cater for runoff from the proposed site access road from the proposed site entrance location to the high point along the access road. The proposed access road will incorporate a 2.5% camber in order to direct surface water away from the road to the road verges. Roadside v-drains (swales) will be installed at both sides of the access road to capture runoff from the road. It is proposed to install check dams at regular intervals, based on gradient, along all roadside v-drains to provide flow attenuation, slow down runoff to promote settlement and to reduce scour and drain erosion. Check dams are relatively small and constructed with single sized clean washed stone.

Run-off in the v-drains will be directed to two settlement ponds to be located on either side of the road near the site entrance. The settlement ponds will be designed to reduce velocity of the flows to allow suspended solids to settle out of the surface water. Each settlement pond will trap sediment in the runoff. Following treatment in the settlement ponds, clean water will overflow southwards over the existing vegetation for approximately 20m before entering the existing drain which runs parallel to the public road.

3.4.4 Site Clearance Works

The site shall be cleared to the extent as shown in the relevant Planning Drawings. Site clearance will include clearing, grubbing and removing all trees, hedgerows and any surface vegetation (topsoil / sub-soil/ shrubs/ etc) that will be stripped and collected together using an excavator and dump-truck. Topsoil and subsoil stripping will be excavated to depths agreed upon and in conjunction with the site specifications and design drawings issued. This material will be carefully segregated and transported to an agreed deposition points. A dedicated trained banks-man will supervise the operation paying particular attention to the condition of materials and making sure that different materials are separated accordingly to their deposition points.

Material arising from site clearance works will be stored at different locations according to material identification:
Stockpile 1 - Excavated top-soils

Stockpile 2 - Excavated sub-soils suitable for reuse
Stockpile 3 - Excavated materials unsuitable for reuse. Removed topsoil will be kept separate from the general spoil.

Temporary stockpiles of sub-soils will be located in an area away from drainage ditches and will be bunded on the downgradient edges with a silt curtain or other suitable materials to reduce risk of silt run-off.

Surplus topsoil or excavated material unsuitable for reuse in forming the site compound is to be transported to an approved licences waste facility capable of accepting the material.

Due to the topography of the site, there will be significant cut and fill involved to construction the proposed new site access road. To minimize the need for importing the material, the excavated material shall be employed as a fill where appropriate and any surplus material will be transported off site and disposed of at a fully authorised soil recovery site. The anticipated earthworks volumes are listed below in Table 2.

Table 2: Anticipated Earthworks Volumes

Anticipated Earthworks	Quantities (m^3)
Total Cutting and Excavations	**10,485**
Total Fill	**10,410**
Total Imported Fill	**5,340**
Total Site Won Fill from Cutting	**5,070**
Total volume available for onsite storage	**4,650**
Total material to be removed from site to licences facility	**765**

3.4.5 Site Regrading Works

Site formation operations will be achieved through a combination of excavation, fill placement, and compaction to develop the proposed grade levels.

Bulk excavation will commence using a 20t-30t Tracked Excavator with material being loaded into articulated Dump Trucks and transported to fill areas or to a designated temporary stockpile for future use. The occasional use of rock breaker is anticipated. The use of explosives is not permitted. There are no anticipated contaminated materials on site. In the event of suspect materials being found, they will be transported to a designated sealed stockpile area for analysis, sampling and classification.

Suitable excavated material will be reused in the formation of the site compound in accordance with Transport Infrastructure Ireland 600 Series Earthworks Specification CC-SPW-00600 and S.R.21 2014 + A1: 2016 Annex E – Aggregates for Use as Hardcore Under Concrete Slabs and Footpaths.

All fill material shall be either suitable excavated material or suitable imported material. Fill materials will generally be placed in layers and uniformly compacted to the satisfaction of the Engineer before the next layer is applied.

The material should be compacted in accordance with Table 6/4 of with Transport Infrastructure Ireland 600 Series Earthworks Specification CC-SPW-00600.

There is a significant high point located at the approximate halfway point along the proposed access road. This indicates that the majority of cut will happened around this area. In addition, this excavated material will be used as a fill at beginning of access road and at northern end of the compound.

3.4.5.1 Hardstanding

The compound will be brought up to the agreed formation level and approved stone will be imported and graded to the correct level as per the detail design.

The majority of the compound will be finished with crushed rock.

Concrete bases or plinths will be required at specified locations throughout the site to facilitate the installation of the HISC unit, GIS building switchgear, HV equipment, transformers, outdoor coolers and ancillary equipment. Equipment plinths and building bases will be marked out, excavated and constructed using in-situ reinforced concrete or precast concrete. Provision will be made in each plinth for ducting and earth connection.

In addition, there will be asphalt concrete compound road around the EirGrid GIS Building and an asphalt concrete apron at the site entrance.

3.4.5.2 Cable Trenching

The specification for cable trenches will vary slightly depending on cable voltage, location and existing land use. The depth of cable trenches will be typically 1.2m or less. In advance of construction, detailed desk studies and site investigations will be carried out to find the optimal location to place cables. Records of existing underground services will be obtained from the relevant service providers. Cable detection tools, ground penetrating radar and slit trenches will be used by the contractor, as appropriate, to find the exact locations of existing services. The typical method of construction involves the following:

- The contractor initially excavates the trench to the specified depth using a mechanical excavator.
- A bedding of sand or approved CBM (cement bound material) is placed in the bottom of the trench.
- The cable is laid in the trench from a ground or vehicle mounted cable drum reel.
- If specified, the contractor will lay ducting in the trench. If so, a rope will be inserted into the ducts to facilitate cable-pulling later.
- Communication cables and respective ducts will also be laid where required.
- Cable marker strips will be placed at a specified distance above the cables/ducts.
- The trench is back-filled using as-dug material up where possible.

3.4.5.3 Building /Equipment Installation

Following the construction of the equipment plinths, an earth mat will typically be installed in the compound. This will be connected to earth rings around each plinth and foundation and connected to the earth protection system as per the electrical protection design. Earth electrodes will be typically buried at a depth of approximately 0.6m-1m below finished ground level and will be offsite from structures by approximately 1m. In the case of pre-fabricated, steel container construction, the structure will be lifted into place using a suitable crane. Any lifting operations will follow a lifting plan agreed between the crane operator and contractor. A suitable hard standing

area will be provided by the contractor adjacent to the proposed building position to the requirements of the crane operator.

Inverters, transformers and switchgear units will be lifted into place using a suitably sized crane, telehandler or HIAB. Any lifting operations will adhere to a specific lift plan, issued by the contractor responsible for the installation. Switchgear, electrical cabinets and control equipment will be lifted directly onto support plinths and bolted down if necessary. The installation of major electrical equipment such as inverters, transformers, switchgear etc. will typically be followed by small control equipment, LV fit out for light, DC and communications cabling, earth installations, CCTV network cabling. Following installation of electrical equipment, cable jointing and terminations will be carried out followed by testing and commissioning works.

As part of the accommodation works two permanent storage container units, welfare unit (containing canteen, dry room and toilet facilities and office container unit will also be installed on site.

3.4.6 Other Elements of the Construction Phase

3.4.6.1 Water Requirement / Water Supply

Potable water will be required for the construction employees (approx. 30 personnel). The average requirement is estimated at approximately 50 litres per person per day which equates to approx. 1,500 litres per day during peak construction. It is proposed to import all water to the site during the construction phase.

Additional allowance should also be made for water required to wash out concrete truck chutes.

3.4.6.2 Concrete Wash Out Area

Only concrete truck chutes will be allowed to be cleaned on site at a dedicated concrete wash out area. This temporary area will be constructed as part of enabling works. The concrete wash out area will be a concrete slab with a gully in the middle and a suitable storage tank underground. The contractor should empty this tank at regular intervals or when required.

At the end of construction phase this area will be broken out, the storage tank emptied and the removed off site. The area will not be restored to pre-construction condition. It will be part of the operational compound.

3.4.6.3 Wastewater Treatment / Effluent Disposal

During the construction period it is expected that a maximum of approximately 30 workers will be on site. The maximum wastewater production is estimated to be the same as the maximum water consumption (i.e. approximately 1,500 litres per day based on anticipated worker numbers). The project will include an enclosed wastewater management system at the temporary compound capable of handling the demand during the construction phase, which will be emptied as required by an approved and fully licensed contractor.

3.4.6.4 Waste Management

Construction phase waste may consist of hardcore, concrete, spare steel reinforcement, shuttering timber, food waste from the canteen and unused oil, diesel and building materials. This waste will be collected at regular intervals during the construction phase and taken off site to be reused, recycled and disposed of in accordance

with best practice procedures at an approved facility. The holding tank for the temporary enclosed toilets will be emptied on a regular basis by an appropriate permitted/licensed and approved contractor. Plastic waste will be taken for recycling by an approved contractor and disposed or recycled at an approved facility.

3.4.6.5 Fuel Storage and Management

Heavy earthworks plant such as excavators and dumpers will be refuelled at a designated refuelling area within the temporary site compound. All rigid and articulated vehicles including delivery vehicles and cars/vans will be refuelled offsite. At construction stage, a fuel management plan will be developed specific to the site and the particular plant and equipment required for construction. The plan outlined will have regard to the following elements:

- Mobile bowsers, tanks and drums should be stored in a secure, impermeable storage area, away from drains and open water;
- Fuel containers should be stored within a secondary containment system e.g. bund for static tanks or a drip tray for mobile stores;
- Permanent bunds for transformers/diesel storage will be designed to cater for a volume not less than the greater of:
  - -110% of the capacity of the largest tank or drum within the bunded area
  - -25% of the total volume of the substance which could be stored within the bunded area.
- Ancillary equipment such as hoses, pipes must be contained within the bund;
- Taps, nozzles or valves should be fitted with a lock system;
- Fuel and oil stores, including tanks and drums, should be regularly inspected for leaks and signs of damage;
- Only designated trained operators should be authorised to refuel plant on site;
- Procedures and contingency plans should be set up to deal with an emergency accidents or spills; and
- An emergency spill kit with oil boom and absorbers is to be kept on site in the event of an accidental spill.

3.4.7 Method Statements

The appointed Contractor will provide method statements to carry out the works and risk assessments based on the outline method of works, procedures and the environmental requirements set out in this CEMP.

The following will be considered during the detailed planning of the works phase:

- Good practice guidelines on the control of water pollution from construction sites developed by the Construction Industry Research and Information Association (CIRIA) in particular.
- Method statement for management of surface water to prevent run-off of silt or any other pollutant from the site to watercourses.
- C532 Control of water pollution from construction sites: guidance for consultants and contractors (Masters-Williams et al, 2001).
- SP156 Control of water pollution from construction sites – guide to good practice (Murnane et al, 2002).
- Requirements for the protection of fisheries habitat during construction and development works at river sites developed by the ERFB.

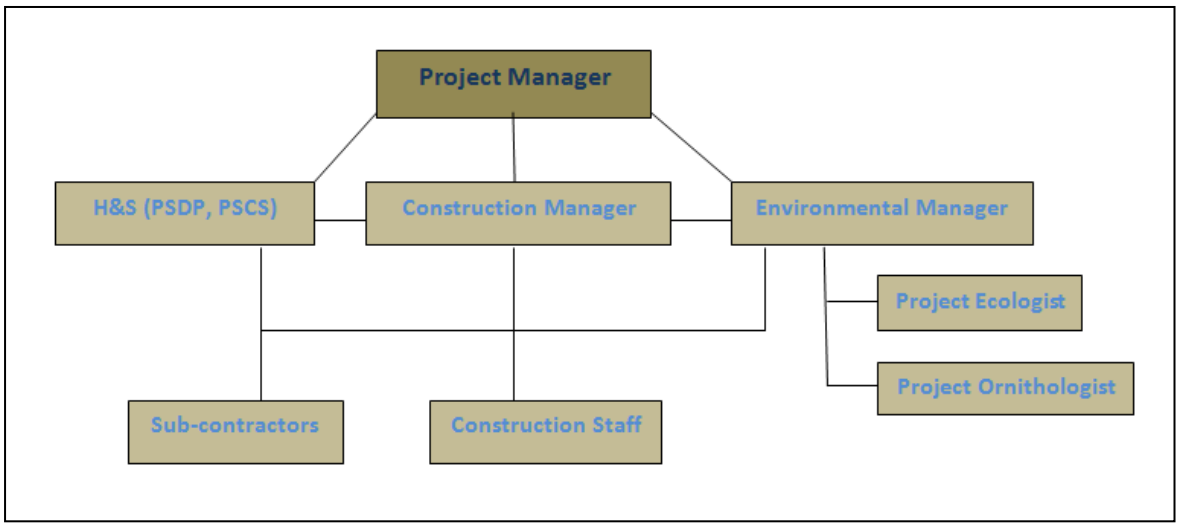
- Proper storage and bunding of any oils/ hydrocarbons.
- Noise management measures.

4. Organisational Structure, Duties and Responsibilities

While the Project Supervisor Construction Stage (PSCS) / Contractor will manage the obligations of the project during construction, Quarry Lane Stability Ltd (client) and the Project Supervisor Design Phase (PSDP) will ensure same is undertaken correctly.

4.1 On Site Organisational Structure and Responsibility

The Organisational Structure for the appointed Contractor's Project Team is included below. This structure will be defined by the Contractor and will include the names of the assigned personnel with the appropriate responsibility and reporting structure reflected.



4.2 Duties and Responsibilities

The general role of key people on site implementing the CEMP will be;

- The Project Manager - liaises with the Project Team in assigning duties and responsibilities in relation to the CEMP to individual members of the main contractor's project team.
- The Construction Manager - liaises with the Environmental Manager when preparing site works where there is a risk of environmental damage and manages the construction personnel and general works.
- The Design Engineer - undertakes and certifies the Design and supervises the standard of works, including geotechnical aspects.
- The Environmental Manager - ensures that the CEMP is developed, implemented and maintained. The Environmental Manager's tasks at the construction site are described below at section 4.2.3.

Other roles are outlined as follows;

- Health and Safety (PSDP and PSCS).
- Project Ecologist (as required by the Environmental Manager)
- Project Archaeologist (as required by the Environmental Manager).
- Geotechnical Engineer (as required by Design Engineer).

The roles and responsibilities outlined below are indicative and will be updated on the appointment of the main contractor (Contractor). Details of the personnel and their responsibilities must be added to the finalised CEMP. An outline of potential roles is provided below but will require revision.

4.2.1 Project Manager

(To be updated upon appointment of Contractor/finalisation of CEMP)

Name: _____

A Project Manager is to be appointed on behalf of the main Contractor to manage and oversee the entire project. The Project Manager is responsible for:

- Implementing of the Construction and Environmental Management Plan (CEMP).
- Implementing the Health and Safety 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.

4.2.2 Construction Manager

(To be updated upon appointment of Contractor/finalisation of CEMP)

Name: _____

The Construction Manager manages all the works to construct the facility, on behalf of the main contractor. The Construction Manager reports to the Project Manager. In relation to the CEMP, the Construction Manager is responsible for:

4.2.2.1 Site-Specific Method Statements

- Liaising with the Environmental Manager in preparing site-specific Method Statements for all Works activities where there is a risk of environmental damage, by incorporating relevant Environmental Control Measures and referring to relevant Environmental Control Measure Sheets.
- Liaising with the Environmental Manager in reviewing and updating site-specific Method Statements for all Works activities where Environmental Control Measure and Environmental Control Sheets have been altered.
- 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.

4.2.2.2 General

- Being aware of all project Environmental Commitments and Requirements.

- Ensuring that all relevant information on project programming, timing, construction methodology, etc., is communicated from the Project Manager 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 the main contractor's project staff.
- Ensuring that the Environmental Manager performs regular and frequent environmental site inspections.

4.2.3 Design Engineer

(To be updated upon appointment of Contractor/finalisation of CEMP)

Name: _____

The Design Engineer is appointed by the Contractor for the works.

The Design Engineer reports to the Project Manager and is responsible for:

- Design of the Works.
- Review and approval of relevant elements of the method statements – assist the Construction Manager with the overall review.
- Oversee geotechnical aspects of the Works (a geotechnical engineer may be used where required).
- Participating in Third Party Consultations.
- Liaising with Third Parties through the Environmental Manager.

4.2.4 Environmental Manager

(To be updated upon appointment of Contractor/finalisation of CEMP)

Name: _____

The Environmental Manager is appointed by the Contractor and reports to the Project Manager.

The Environmental Manager is responsible for:

4.2.4.1 General

- Being familiar with the project environmental commitments and requirements.
- Being familiar with baseline data gathered for the Environmental Impact Assessment and during pre-construction surveys.
- Assisting the Construction Manager in liaising with the Design Engineer and the provision of the 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 the main contractor's project staff.
- Implementing the environmental procedures of the CEMP.

- Liaising with the Construction Manager to ensure that the control measures set out in the Schedule of Environmental Mitigation are implemented.
- Liaising with the client/developer in relation to environmental issues.
- Auditing the construction works from an environmental viewpoint.

4.2.4.2 Site-Specific Method Statements

- Liaising with the Construction Manager in preparing site-specific Method Statements for all Works activities where there is a risk of environmental damage. These site-specific Method statements should incorporate relevant Environmental Control Measures and take account of relevant Environmental Control Measure Sheets.
- Liaising with the Construction Manager in reviewing and updating site-specific Method Statements for all Works activities where Environmental Control Measures and Environmental Control Sheets have been altered.
- Liaising with the Construction Manager where third party agreement is required in relation to site-specific Method Statements, Environmental Control Measures and/or Environmental Control Measure Sheets.

4.2.4.3 Third Party Consultations

- Overseeing, ensuring coordination and playing a lead role in third party consultations required statutorily, contractually and in order to fulfil best practice requirements.
- Ensuring that the minutes of meetings, action lists, formal communications, etc., are well documented and that the consultation certificates are issued to the Design Engineer as required;
- Liaising with all prescribed bodies during site visits, inspections and consultations.
- Where new Environmental Control Measures are agreed as a result of third party consultation, ensuring that the CEMP is amended accordingly.
- Where new Environmental Control Measures are agreed as a result of third party consultation, the Environmental Manager should liaise with the Construction Manager in updating relevant site-specific Method Statements.
- Where required, liaising with the Construction Manager in agreeing site-specific Method Statements with third parties.

4.2.4.4 Licensing

- Ensuring that all relevant works have (and are being carried out in accordance with) the required permits, licences, certificates, planning permissions, etc.
- Liaising with the designated licence holders with respect to licences granted pursuant to the Wildlife Act, 1976, as amended.
- Bringing to the attention of the Project, Design and Construction Team any timing and legal constraints that may be imposed on the carrying out of certain tasks.

4.2.4.5 Waste Management Documentation

- Holding copies of all permits and licences provided by waste contractors.
- Ensuring that any operations or activities that require certificates of registration, waste collection permits, waste permits, waste licences, etc., have appropriate authorisation.
- Gathering and holding documentation with the respect to waste disposal.

4.2.4.6 Legislation

- Keeping up to date with changes in environmental legislation that may affect environmental management during the construction phase.
- Advising the Construction Manager of these changes.
- Reviewing and amending the CEMP in light of these changes and bringing the changes to the attention of the main contractor's senior management and subcontractors.

4.2.4.7 Specialist Environmental Contractors

- Identifying requirements for specialist environmental contractors (including ecologists, waste contractors and spill clean-up specialists) before commencement of the project.
- Procuring the services of specialist environmental contractors and liaising with them with respect to site access and report production.
- Ensuring that the specialist environmental contractors are competent and have sufficient expertise to co-ordinate and manage environmental issues.
- Co-ordinating the activities of all specialist environmental contractors on environmental matters arising out of the contract.

4.2.4.8 Environmental Induction Training and Environmental Tool Box Talks

- Ensuring that Environmental Induction Training is carried out for all the main contractor's site personnel. The induction training may be carried out in conjunction with Safety Induction Training.
- Providing toolbox talks on Environmental Control Measures associated with Site-specific Method Statements to those who will undertake the work.

4.2.4.9 Environmental Incidents/Spillages

- Prepare and be in readiness to implement at all times an Emergency Response Plan.
- Notifying the relevant statutory authority of environmental incidents.
- Carrying out an investigation and producing a report regarding environmental incidents. The report of the incident and details of remedial actions taken should be made available to the relevant authority, the Design Engineer and the Construction Manager.

4.2.4.10 Site Environmental Inspections

- Carrying out regular documented inspections of the site to ensure that work is being carried out in accordance with the Environmental Control Measures and relevant site-specific Method Statements, etc.
- Carrying out a daily inspection of the bunded areas and site drainage system.
- Appending copies of the inspection reports to the CEMP.
- Liaising with the Construction Manager to organise any repairs or maintenance required following the daily inspection of the site.

4.2.5 Other Roles

4.2.5.1 Health and Safety Personnel

(To be updated upon appointment of Contractor/finalisation of CEMP)

The Health and Safety personnel for the construction project are appointed by the Contractor in line with the Construction Regulations:

- Carrying out duty of Project Supervisor Construction Stage.
- Responsible for safety induction of all staff and personnel on site.
- Implementing the Health and Safety Plan.
- Auditing and updating the Health & Safety Plan.
- All other required legal duties.

4.2.5.2 Project Archaeologist

The Archaeologist will be appointed by the Developer or the Contractor and is responsible for:

- ensuring implementation of archaeological mitigation measures
- monitoring of groundworks associated with the development
- liaison with the Environmental Manager/Construction Manager
- liaison with the Project Manager/client/developer

4.2.5.3 Project Ecologist

(To be updated upon appointment of Contractor/finalisation of CEMP)
The Ecologist, may be appointed by the Contractor and is responsible for:

- Ensuring implementation of ecological mitigation measures.
- Advising on re-vegetation onsite.
- Monitoring of success of on re-vegetation.

4.2.5.4 All site personnel

The site personnel appointed by the Contractor are responsible for:

- Adhering to the relevant Environmental Control Measures and relevant site-specific Method Statements.
- Adhering to the Health and Safety Plan.
- Reporting immediately to the Environmental Manager and Construction Manager any incidents where there has been a breach of agreed procedures including:
  - A spillage of a potentially environmentally harmful substance;
  - An unauthorised discharge to ground, water or air, damage to a protected habitat, etc

4.3 Contacts

4.3.1 Main Safety Contacts

Table 3: Main Safety Contacts

Position Title:	Name:	Phone:	Email:
The Client (Project Developer will be the client)			

Project Supervisor Design Stage (PSDP)			
Project Supervisor Construction Stage (PSCS)			

4.3.2 Main Contractor Contacts

Table 4: Main Contractors Contact

Position Title:	Name:	Phone:	Email:
Project Manager			
Construction Manager*			
Environmental Manager*			
Safety (PSCS)*			
Safety Officers*			
Site Emergency Number*			
Project Ecologist			
Project Archaeologist			
Overall Project PSDP			
Project Liaison Officer			

4.3.3 Third Party Contacts

Table 5: Third Party Contacts

Organisation:	Position:	Name:	Phone:	Email Address:
Inland Fisheries Ireland	Senior Environmental Officer			@fisheriesireland.ie
National Parks and Wildlife Service	District Conservation Officer			@ahg.gov.ie
Environmental Protection Agency		EPA Headquarters	053 916 0600	
Local Authority		Sligo County Council		

Organisation:	Position:	Name:	Phone:	Email Address:
Department of Arts, Heritage and the Government	District Conservation Officer			
Health and Safety Authority		Office	1890 289 389	wcu@hsa.ie
Emergency Services			999	
Other, as appropriate.				

5. Environmental Considerations and Potential Effects

The key potential environmental impacts associated with the proposed development preparation and construction works are set out in the following table. Relevant potential sensitive receptors to the works are identified. These potential sensitive receptors, the environmental considerations and potential impacts are to be considered as the basis for a future detailed CEMP.

Table 6: Environmental Considerations and Potential Effects

Environmental Issue	Potential Receptor	Potential Impacts
Protected Sites	Unshin River SAC approximately 4.6km to the NW,	Degradation of water quality
	Ballysodare Bay SAC approximately 9.3km to the NW	
	Ballysodare Bay SPA approximately 9.1km to the NW	
Water	Ballygrania River, Unshin River and Land drains draining the development site	Chemical Pollution of surface waters. Increased runoff and Sediment Pollution of surface waters.
Water	Groundwater	Chemical Pollution of groundwater.
Habitats	Hedgerow /Trees	Accidental damage during construction Excess removal of boundary vegetation
Protected Species	Fish species, Badgers, Bats	Degradation of water quality
Noise	Neighbouring Residential receptors	Nuisance
Archaeology	Monuments present in vicinity	Damage/destruction
Dust	Neighbouring residential receptors Vegetation	Nuisance Soiling/smoothering

6. Environmental Commitments

6.1 Environmental Management Plans (EMP)

A number of environmental management plans (EMP) have been prepared for managing the impacts of Construction Activities associated with the development. See Table 2 below and refer to Appendix 1. These plans are to be implemented by the Project Manager and/or Project Contractor as relevant.

Ref:	Procedure:
EMP-1	Management of Excavations
EMP-2	Surface Water Run-off Control
EMP-3	Fuels and Oils Management
EMP-4	Management of Concrete
EMP-5	Protection of Habitats and Fauna (Ecological Management)
EMP-6	Waste Management
EMP-7	Traffic Management
EMP-8	Management of Archaeology
EMP-9	Construction Noise
EMP-10	Dust Management
EMP-11	Emergency Response Plan
EMP-12	Site Environmental Training and Awareness
EMP-13	Monitoring and Auditing
EMP-14	Environmental Accidents, Incidents and Corrective Actions
EMP-15	Environmental Complaints

6.2 Environmental Monitoring Schedule

A Preliminary Monitoring Schedule is provided below (Table 3) and will be finalised pending appointment of the Contractor. The Contractor's developed daily Site Checklists must have the following information included at a minimum:

Table 7: Preliminary Monitoring Schedule

Aspect	Monitoring Required	Frequency	Note	Responsibility
Water	Sediment & Erosion Controls (Drainage Performance)	Daily during the construction phase as well as during and after significant rainfall events	Refer to Table 4 below	Environmental Manager
Water	Fuel & Oil Storage inspection	Daily	Refer to Table 4 below	Environmental Manager
Ecology	Material and Waste Storage	Daily	Refer to Table 4 below	Environmental Manager
Water	Water quality monitoring	Fortnightly	Minimum parameters: pH, Suspended Solids, metals, nitrates, phosphates	Environmental Manager
Water	Concrete Pours	As required	To be scheduled with pours	Environmental Manager

The Contractor will assign an on-site Environmental Manager to monitor the construction activities on a day to day basis. The duties will include completing the required checklists (sample checklist included below) and coordinating with the relevant personnel (e.g. Project Ecologist, and the Design Engineer as required) ensuring all environmental monitoring is carried out.

The Contractor-developed daily Site Checklists will have the following information included at a minimum:

Table 8: Site Checklist

Area of Inspection	Environmental Hazards
Silt fences and Drainage systems	Damage Silt build-up Blockages in the pipes conveying runoff
Site road	Unacceptable level of sediment/silt on the road surface Presence of waste
Site compound – storage area	Damage Untidiness
Site compound – waste collection area	Damage Untidiness Full skips
Site compound – oil storage area	Damage to containers or ancillary equipment Leakages Unlocked storage container
Wastewater facilities	Holding tank requiring emptying
Site Entrance	Unacceptable level of sediment/silt on the road surface Presence of waste

6.3 Environmental Performance Indicators

The Appointed Project Contractor will outline the key performance indicators for the site in gauging successful site management in the prevention of pollution and the protection of the environment.

Environmental performance indicators will at a minimum include:

- Number of environmental accidents logged.
- Number of environmental incidents logged.
- Breach of procedure and corrective actions.
- Number of environmental complaints received.
- Results of monthly water quality monitoring.
- Results of noise and vibration monitoring.
- Results of site audits.

The performance indicators will be finalised by the Appointed Contractor and communicated to all relevant personnel and sub-contractors. The review periods for analysing site performance indicators must also be specified.

6.4 Response Procedure

In the event of an environmental incident, or breach of procedure, or where a complaint is received, the contributing factors are to be investigated and remedial action taken as necessary. The Contractor will ensure that the following respond actions will take place:

1) The Project Manager, PSDP and Client must be informed of any incident, breach of procedure and/or complaint received and details must be recorded in the incident/complaint register.
2) The Project Manager is to conduct/co-ordinate an investigation to determine the potential influence that could have led to the non-compliance.
3) The Project Manager is to notify and liaise with the appropriate site personnel where required, e.g. Site Environmental Manager, Project Ecologist.
4) If necessary, the Project Manager will inform the appropriate regulatory authority. The appropriate regulatory authority will depend on the nature of the incident.
5) The details of the incident will be recorded on an Incident / Complaints Form which is to record information such as the cause, extent, actions and remedial measures used following the incident/complaint. The form will also include any recommendations made to avoid reoccurrence of the incident.
6) The Project Manager will be responsible for any corrective actions required as a result of the incident e.g. an investigative report, formulation of alternative construction methods or environmental sampling, and will advise the Main Contractor as appropriate.
7) The Project Manager is to ensure that the relevant environmental management plans/procedures are revised and updated as necessary.

6.5 Corrective and Preventative Action

Corrective Action Requests will be issued to ensure that prompt action is agreed and committed to, with a view to the effective resolution of any deviations from the CEMP requirements or any environmental issues.

7. Summary

This CEMP provides the information which will be contained in the final Contractor-developed Plan at the construction stage of the project. The requirement on the Contractor to update these details has been explained, and there is a particular requirement for an update to the roles and responsibilities of those appointed on the site for the construction of the project. The CEMP is a live document and will be improved upon as the project progresses as appropriate.

Appendix 1
Environmental Management Plans

EMP-1	Management of Excavations
EMP-2	Surface Water Run-off Control
EMP-3	Fuels and Oils Management
EMP-4	Management of Concrete
EMP-5	Ecological Management/Protection of Habitats and Fauna
EMP-6	Waste Management
EMP-7	Traffic Management
EMP-8	Management of Archaeology
EMP-9	Construction Noise
EMP-10	Dust Management
EMP-11	Emergency Response Plan
EMP-12	Site Environmental Training and Awareness
EMP-13	Monitoring and Auditing
EMP-14	Environmental Accidents, Incidents and Corrective Actions
EMP-15	Environmental Complaints

EMP 1: Management of Excavation Works

Purpose

To describe measures for the management of all excavations and excavated soil and rock on the site

Procedure

General

- Excavation and construction of the facility and entrance road will be carried out by excavation of the topsoil followed by required cut and fill required at each location and placement of compacted crushed rock. Machinery will not operate directly on excavated/stockpiled soils.
- Drainage will be constructed in parallel with facility 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 or other waterway protection measures.
- Within excavations and around excavations, pore water pressure will be kept low by avoiding loading the soil/subsoil and giving careful attention to the existing drainage and how structures could affect it.
- 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 by the use of field 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 proposed site compounds) and will not be positioned or trafficked in a manner that would surcharge existing or newly-formed slopes.
- All site excavations and construction should be supervised by a suitably experienced engineer. The Contractor's method statements for each element of work should be reviewed and approved by the engineer prior to site operations.
- The existing network of drainage within the site should be utilised whenever possible.
- Excavated topsoil and subsoil will be stored onsite for reuse or removed off site to an appropriate facility.
- Temporary stockpiles of soils will not be permitted within 50m of any watercourse.

Management and Storage of Excavated Materials and Soil Management

Site management should include the checking of equipment, materials storage and transfer areas, drainage structures and their attenuation ability on a regular basis during the construction phase of the project. The purpose of this management control is to ensure that the measures in place are operating effectively, prevent accidental leakages, and identify potential breaches in the protective retention and attenuation network during earthworks operations.

Monitoring

This is to be detailed in the Contractors Final Method Statement

Responsibility

- The Environmental Manager will monitor the excavation areas and associated drainage.
- The Construction Manager will monitor vehicle movements throughout the construction phase
- The Project Manager will oversee the phasing of the excavation and machinery movement across the site.
- Construction personnel will be informed of the measures to prevent pollution of water courses.
- The Design Engineer, Geotechnical Engineer and Sub-contractors will have responsibilities as appropriate.
- All responsibilities will be finalised by the Appointed Contractor.

Details of Excavating Soil and Rock be finalised by Appointed Contractor

EMP 2: Surface Water Run-off Control (Sediment and Erosion Control)

Purpose

To describe measures for the management of all surface water and run-off on the site, for the protection of watercourses and in particular, sediment and erosion control.

Procedure

- Implement erosion control to prevent runoff flowing across exposed ground and become polluted by sediments.
- Intercept and divert clean water runoff away from construction site runoff to avoid cross-contamination of clean water with soiled water.
- Implement sediment control to slow down runoff allowing suspended sediments to settle in situ particularly on roads.
- Implement the erosion and sediment controls before starting site clearance works.
- Minimise area of exposed ground by maintaining existing vegetation that would otherwise be subject to erosion in the vicinity of the compound and keeping excavated areas to a minimum.
- Delay clearing of soil until before construction begins rather than stripping the entire site months in advance particularly during road construction.
- Avoid working near drains during or after prolonged rainfall or an intense rainfall event and cease work entirely near drains when it is evident that pollution is occurring.
- Install a series of silt fences or other appropriate silt retention measure where there is a risk of erosion runoff to watercourses from construction related activity particularly if working during prolonged wet weather period or if working during intense rainfall event.
- Implement sediment control measures that includes for the prevention of runoff from adjacent intact ground that is for the separation of clean and 'dirty' water.
- Install appropriate silt control measures such as check dams and sedimentation ponds.
- Provide recommendations for public road cleaning where needed particularly in the vicinity of drains.
- Controls need to be regularly inspected and maintained otherwise a failure may result, such as a build up of silt or tear in a fence, which will lead to water pollution so controls must work well until the vegetation has re-established; inspection and maintenance is critical after prolonged or intense rainfall.

Drains

A site-specific drainage system has been designed taking account of the following:

- Maintenance of any existing vegetative land drains in order to keep them vegetated.
- Continuation of flows by natural flow paths via existing drains before entering the watercourse, providing further retention and treatment of discharges.
- Existing land drains will be utilised at the site for drainage. Maintenance of the existing vegetative land drains will ensure they stay vegetated.
- Where necessary, existing pollution prevention measures (vegetation in drains, check dams and silt ponds) will be maintained / upgraded to ensure optimum standard of water running into the Ballygrania River from the land drainage system.
- Where the drains have a gradient greater than 2.5%, check dams will be installed in the drains.
- Where each land drain exits the proposed development a double silt trap will be placed. Each silt trap will be made up of a stone or straw dam combined with a silt fence.
- Additional silt fencing and emergency spill kits will be kept on site for use in emergencies.
- Silt and runoff will be prevented from entering ground water, surface water drains or water courses using appropriate means. These include the temporary installation of silt fences, cut off drains, silt traps and drainage to vegetated areas where appropriate.

Sediment Control

- Prior to any construction activity, the site will be inspected for areas that would be prone to siltation of nearby watercourses. Where necessary, existing pollution prevention measures (check dams and silt ponds) will be maintained / upgraded to ensure optimum standard of water running into streams from the drainage adjacent to access road. Drainage, silt fences and settlement ponds will be installed where new development components are proposed. Additional silt fencing and emergency spill kits will be kept on site for use in emergencies.
- All erosion control and retention facilities will be regularly maintained during the construction phase. The treatment approach described below will reduce significantly any potential increase in surface water run-off as a result of the facility development.
- Prior to and during construction works, operations will be monitored by a competent member of the construction team on a regular basis to check if working appropriately.

Dewatering

Any ground water/surface water that may enter building foundations will be removed and treated and disposed of appropriately, in accordance with best practice. Any dewatering (if/where required) will adhere to the following measures:

- Ground water/surface water will not be pumped directly into roadside drains/watercourses.
- Ground water/surface water which has become silted within the building foundations will be pumped to the surface water drainage system/sediment ponds.
- In the case of heavy siltation, water will be tankered off site for disposal at an authorised waste facility or pumped to a portable onsite settlement tank for treatment.

Monitoring

- The Environmental Manager will walk the site each day and check the cross-drain pipes, dirty water drains and outlets, settlement ponds, interceptor drains and silt fences for any damage or blockages. Any damage or blockages will be repaired or cleared promptly.
- As detailed above, weather forecasts will be monitored during the construction phase. The 24 hour advance meteorological forecasting service from Met Éireann will be used.
- A surface water monitoring schedule, drawn up prior to construction, and agreed with the planning authority will be followed. Suspended solids monitoring will be undertaken on a weekly basis and ad-hoc if required (rainfall event for example), while monthly monitoring of pH, metals, nitrates and phosphates will also take place.

Responsibility

The Environmental Manager is responsible for ensuring that appropriate water pollution prevention measures are put in place and that water sampling is carried out. Where standards are breached and remedial action is taken, an investigation must be carried out in conjunction with the Construction Manager, and further samples must be taken to verify that the situation has returned to normal.

The Environmental Manager is responsible for ensuring spill kits are readily available in vulnerable locations and that booms for watercourses are long enough and have adequate anchorage.

The Construction Manager (or a designate) is responsible for ensuring the spill kits are adequately stocked and should inform the Environmental Manager when items have been used.

Details and Responsibilities for Sediment and Erosion Control to be finalised by Appointed Contractor

EMP 3: Fuel and Oils Management

Purpose

Construction machinery and associated equipment will be the principal sources of pollutants such as oil, lubricants, fuel and hydrocarbons. The purpose of this plan is to describe measures for the management of all fuel and oils on-site for the protection of natural resources (soils and groundwater) from any spills.

Procedure

Construction Machinery and Vehicles

- The potential for hydrocarbons getting into the existing drains and local watercourses will be mitigated by only refuelling construction machinery and vehicles in designated refuelling areas using a prescribed re-fuelling procedure.
- Refuelling will be carried out using 110% capacity double bunded mobile bowsers. The refuelling bowser will be operated by trained personnel. The bowser will have spill containment equipment which the operators will be fully trained in using.
- No servicing or repair of plant, machinery or vehicles should be undertaken on-site and the mechanical soundness of construction machinery will be checked prior to the commencement of construction works.
- To reduce the potential for oil leaks, only vehicles and machinery will be allowed onto the site that are mechanically sound. An up to date service record will be required from the main contractor.
- Contractors supplying concrete and crushed stone to the site will be contractually required to supply their products using roadworthy vehicles.
- Should there be an oil leak or spill, the leak or spill will be contained immediately using oil spill kits; the nearby dirty water drain outlet will be blocked with an oil absorbent boom until the fuel/oil spill has been cleaned up and all oil and any contaminated material removed from the area. This contaminated material will be properly disposed of in a licensed facility.
- The Environmental Manager will be immediately informed of the oil leak/spill and will assess the cause and the management of the clean-up of the leak or spill. They will inspect nearby drains for the presence of oil and initiate the clean-up if necessary.
- Immediate action will be facilitated by easy access to oil spill kits. An oil spill kit that includes absorbing pads and socks will be kept at the site compound and also in site vehicles and machinery.
- Correct action in the event of a leak or spill will be facilitated by training all vehicle/machinery operators in the use of the spill kits and the correct containment and cleaning up of oil spills or leaks. This training will be provided by the Environmental Manager at site induction.
- In the event of a major oil spill, a company who provide a rapid response emergency service for major fuel spills will be immediately called for assistance, their contact details will be kept in the site office and in the spill kits kept in site vehicles and machinery.

Accidental spills / contaminated runoff

- Good site practice [CIRIA 32 (2001)] is applied to ensure no fuels, oils, other substances or contaminated runoff are stored in a manner on site in which they may spill and enter the ground, particularly when the initial top layer is excavated. Dedicated, bunded storage areas will be used for all fuels or hazardous substances. Spill kits will be maintained on site.

Drainage and Sediment Control

- Construction pollutants such as oil or fuel will be stored in secure bunded impermeable containers away from drains and open water and inspected regularly for leaks or signs of damage.
- To help prevent the contamination of the ground and groundwater, contaminated materials (oils, fuels, chemicals etc.) will be used and stored in an appropriate manner as outlined in the relevant guidance, i.e. CIRIA (2001) and DMRB Volume 11 (1994).

Temporary Construction Compound

- Drainage within the temporary site compound will be directed to an oil interceptor to prevent pollution if any spillage occurs;
- Temporary toilet facilities will be managed by the appointed Contractor during the construction phase;

Responsibilities

The Construction Manager and Environmental Manager are responsible for ensuring Fuel and Oils are managed in line with this procedure. The Environmental Manager is responsible for ensuring spill kits are readily available in vulnerable locations.

The Construction Manager is responsible for ensuring the spill kits are adequately stocked and should inform the Environmental Manager when items have been used. The Appointed Contractor, in updating the CEMP, must designate personnel to the tasks relating to Fuels and Oil, as outlined.

References

Best Practice Guidelines BPGCS005 – Oil Storage Guidelines (Enterprise Ireland).

EMP 4: Management of Concrete

Purpose

To reduce the potential for cementitious material entering the sewer / discharge points, concrete pours will be supervised by the Construction Manager, a suitably qualified Engineer and/or the Environmental Manager.
The purpose of this plan is to describe measures for the management of concrete on-site for the protection of natural resources from any spillages.

Procedure

Supervision of Concrete Pours

- To reduce the potential for cementitious material entering watercourses, concrete pours will be supervised by the Construction Manager, a suitably qualified Engineer and/or the Environmental Manager.
- The construction manager will ensure that the area of the pour is completely drained of water before a pour commences.
- Pours will not take place during forecasted heavy 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. If run-off is encountered the supervisor in charge will block the outflow from the drains to retain or treat the run-off until the pH is neutral before discharge to the drainage network.
- In the event of a spillage on site, the Environmental Manager will temporarily block the dirty water drains in the immediate area and monitor the pH levels of the water in the associated settlement ponds and if necessary, will adjust the pH levels. Any spillage will be cleared immediately and deposited in the Chute wash down area.

Concrete Control

- To reduce the volume of cementitious water, washout of concrete trucks will not take place on site. Concrete trucks will be washed out off site. Only Concrete truck chutes will be allowed to be cleaned on site at a central concrete wash out area.
- Wet concrete operations are not envisaged for this site within or adjacent to watercourses or aquatic zones. However, if wet concrete operations are required in such locations, a suitable risk assessment will be completed prior to works being carried out.

Storage

- 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.

Concrete Water

- To reduce the volume of cementitious water, only concrete truck chutes will be washed down on site. The concrete trucks will wash down their chutes at a designated chute wash down area in the site compound. The concrete wash out area will be a concrete slab with a gully in the middle and a suitable storage tank underground. The contractor should empty this tank at regular intervals or when required.

Responsibilities

- The Construction Manager and EHS Manager will supervise all concrete pours.
- The Environmental Manager is responsible for ensuring that appropriate water pollution prevention measures are put in place and that water sampling is carried out. Where standards are breached, he/she should carry out an investigation and in conjunction with the Construction Manager, he/she should ensure remedial action is taken and further samples taken to verify that the situation has returned to normal.

EMP 5: Ecological Management Plan (Protection of Habitats and Fauna)

Purpose

The purpose of this plan is to describe measures for the management and protection of habitats and fauna on the Site.

Procedure

- ensuring implementation of ecological protection measures outlined below.
- advising on re-vegetation onsite.
- monitoring of success of re-vegetation.

Environmental Manager/Ecological Clerk of Works

- Periodic routine inspections of construction activity will be carried out by an Environmental Manager/ Ecological Clerk of Works (ECoW) to be employed by the main contractor to ensure all controls to prevent environmental impact are in place. Only suitably trained staff will undertake environmental inspection at the site. The appointed ECoW will attend for vegetation clearance to ensure ecological/environmental mitigation measures described in the CEMP are implemented in full.
- The project ecologist will be awarded a level of authority and will be allowed to stop construction activity if there is potential for adverse environmental effects other than those predicted and mitigated. For example, if there is a risk of contaminated surface water entering a drain, and measures are not in place to block the pathways to the Ballygrania/Unshin River, then the project ecologist can stop the work until prescribed measures to prevent such a risk have been implemented.
- Spraying of vegetation using pesticides (herbicides, fungicides and insecticides) will not be permitted at any stage of development.

Ecological Protection Measures

General Habitats

- Habitat disturbance to fauna will be limited by controlling the movement of maintenance vehicles. Construction vehicles will not encroach onto habitats beyond the proposed development footprint;
- Construction work will not take place at night unless in exceptional circumstances to reduce potential disturbance to fauna.
- In the unlikely event that protected faunal species are found actively using the site for breeding/roosting during the construction phase, works will cease immediately, and the area will be cordoned off until advice is sought from a suitable qualified specialist; and

Protection of Fauna

- Any lighting introduced to the development site will follow guidance in the documents:
  - Bats and lighting: Overview of current evidence and mitigation guidance (Stone, 2013);
  - Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25 (Kelleher & Marnell, 2006); and
  - Bats & Lighting. Guidance Notes for: Planners, engineers, architects and developers (BCI, 2010).
- Duration of construction activities will be restricted to between 7.00am and 6.00pm, Monday to Friday and between 7am and 4pm on Saturdays. Construction work will not take place at night unless in exceptional circumstances to reduce potential disturbance to fauna.
- Should the resting or breeding places of any protected species be discovered within the site during construction works, the NPWS will be informed. Any mitigations required for badgers will be carried out

under license from NPWS and using NRA Guidelines (2005) (now TII) where applicable; Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes.

Protection of Bats

Works will be undertaken during daylight hours, i.e., no night-time construction works will take place. The mitigation measures for bats will follow:

- *Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes* (NRA, 2005a);
- *Guidelines for the treatment of bats during the construction of National Road Schemes* (NRA, 2005b); and
- *NPWS Irish Wildlife Manuals, No. 28: Bat Mitigation Guidelines for Ireland – V2* (Marnell *et al.*, 2022).

Soft Felling

Felling of mature trees will follow TII (2006) guidance:

- Immediately prior to felling, trees should be inspected for the presence of bats and/or other Bat activity by a suitably qualified Bat ecologist during daylight hours and night-time using a Bat detector. This survey should be carried out from dusk through the night until dawn to ensure Bats do not re-enter the tree;
- Where examination of the tree has shown that Bats have not emerged or returned to tree, felling may proceed the following day. Should a delay in felling be encountered, resurveying is required;
- During felling of trees, the following points will be followed:
    - There are no trees that would be considered as obviously of value as roost habitat. As such, any vegetation and tree removal should be carried out during winter (December to February) to avoid impacts on bats, corresponding to a time when even best bat roost habitat recorded on site would be highly unlikely to be used as winter roosts. Winter hibernation roosts are generally restricted to places that are sheltered from extremes of temperature (Marnell et al., 2022) and trees present on site are deemed unlikely to be mature enough to provide appropriate winter roosting habitat on the basis of the habitat suitability survey carried out on-site undertaken in May 2022; and
    - It is recommended that any trees on site with ivy should be dropped to the ground as gently as possible and left on the ground for a period of 24hrs post felling under the supervision of the ECoW. This soft felling approach will give any bats, if present, the opportunity to vacate.

Lighting during construction

- Potentially lighting associated with the site works could cause disturbance/displacement of bats. During the site works, lighting will follow mitigation measures outlined by Bat Conservation Ireland in Bats & Lighting Guidance Notes for: Planners, engineers, architects and developers (2010); and

The following measures will be applied in relation to site lighting:

- Lighting will be provided with the minimum luminosity sufficient for safety and security purposes. Where practicable, precautions will be taken to avoid shadows cast by the site hoarding on surrounding footpaths, roads and amenity areas;
- Where possible, construction lights will be switched off when not in use;

- Lighting will be positioned and directed so that it does not to unnecessarily intrude on adjacent ecological receptors. There will be no directional lighting focused towards the boundary habitats respectively and cowling and focusing lights downwards will minimise light spillage; and
- Works will primarily take place during hours of daylight to minimise disturbance to any nocturnal mammal species

Responsibility

Periodic routine inspections of construction activity will be carried out by an Environmental Manager/Ecological Clerk of Works (ECoW) to be employed by the main contractor to ensure all controls to prevent environmental impact are in place. Only suitably trained staff will undertake environmental inspection at the site. The appointed ECoW will attend for vegetation clearance to ensure ecological/environmental mitigation measures described in this CEMP are implemented in full.

Details of Ecological Protection to be finalised by Appointed Contractor

EMP 6: Construction Waste Management

Purpose

The purpose of the plan is to describe measures for the management of all wastes associated with the construction works.

Procedure

The appointed contractor(s) will be required to develop a Construction Waste Management Plan (CWMP) which will form part of the overall live Construction Environmental Management Plan. The waste management goal for the construction phase of the project is to manage all waste in accordance with the relevant statutory provisions and the waste hierarchy.

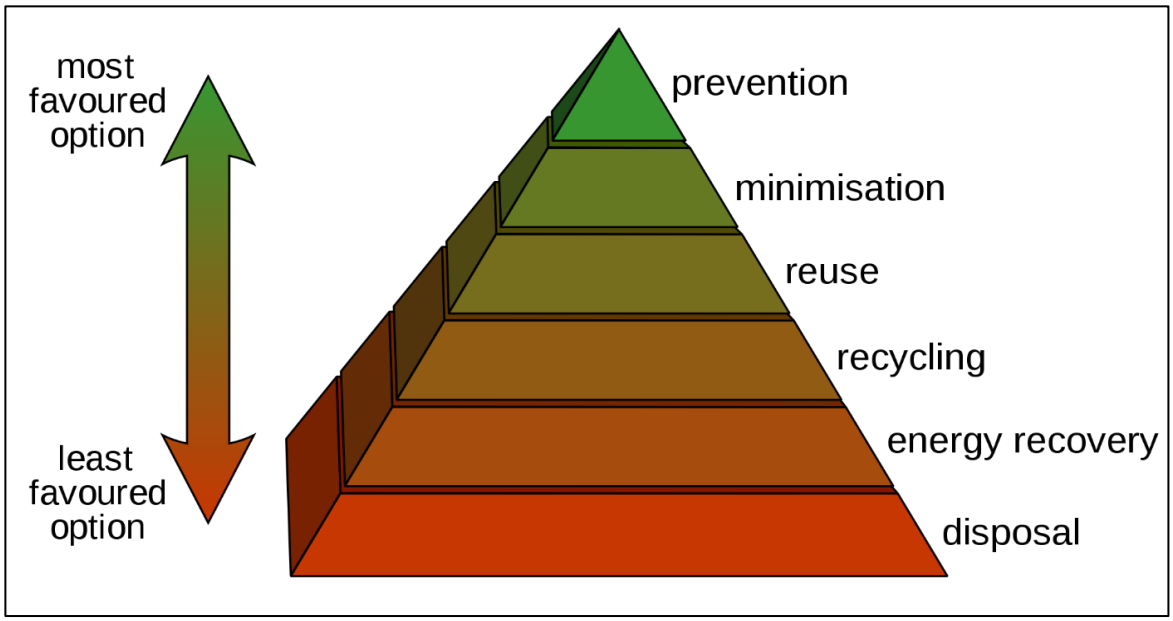
The CWMP will form part of the CEMP:

- Regard should be had to the Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects (DoEHLG, July 2006) in preparing and maintaining this plan.
- National waste management policy is governed primarily by the requirements of European law, particularly the Directive 2008/98 on Waste, also known as the Waste Framework Directive. The Directive was responsible for implementing the Waste Hierarchy as show in Figure 6.1.

The adoption of the CWMP (appointed contractor(s)) and OWMP (facility management team) will abide by the waste hierarchy and will be developed in accordance with Sligo County Development Plan as well as the local and national waste management policies

The Construction Phase Waste Management Plan should address the following aspects of the Project:

- Analysis of the waste arising/material surpluses.
    - Specific waste management objectives for the project.
    - Methods proposed for prevention, reuse and recycling of wastes.
    - Material handling procedures.



Any material deemed unsuitable for re-use in the works will be transported off site in trucks and disposed of under license from Sligo County Council. This will prevent any contaminated run-off to drains adjacent to access road during heavy rainfall.

As part of the record keeping procedures, the Environmental Manager will keep records provided by waste contractors of all waste being removed from site. The Environmental Manager will record waste removed from site on a quarterly basis. This information will be recorded in a standard format.

Waste to be generated during construction

During the construction phase, the following waste will be generated:

Domestic Waste-Water Effluent

- Wastewater from welfare facilities on site will drain to integrated wastewater holding tanks associated with the toilet units. The stored effluent will then be collected when required from site by a permitted waste contractor and removed to an appropriately authorised waste facility for treatment and disposal.

General Waste

- Access to materials will be controlled. A dedicated storage area will be provided in the site compound for building materials such as cables, geotextile matting, blocks, tools and equipment, fence posts and wire, booms, pipes etc.
- This waste will be stored in the construction compound and collected throughout the construction phase and taken off site to be reused, recycled and disposed of in accordance with best practice procedures at an approved facility
- Access to stored materials will be restricted; the site compound will be securely fenced from the outset and will be locked when there are no site personnel present.
- Plastic waste will be taken for recycling by an approved contractor and disposed or recycled at an approved facility; and
- Waste oil and waste oil drums will be collected and stored in containers and on a bunded tray within the storage container.
- Domestic type waste generated by contractors will be collected on site, stored in an enclosed skip at the construction compounds and taken off site to be reused, recycled and disposed of in accordance with best practice procedures at an approved facility.

Responsibility

The Environmental Manager will be responsible for adherence to correct waste management procedures. They will also identify a waste contractor to remove waste that can be recycled or re-used.

The Environmental Manager will keep records provided by waste contractors of all waste being removed from site. The Environmental Manager will record waste removed from site regularly. This information will be recorded in a standard format. It will be the construction manager's responsibility to organise the removal of skips from their area when they are full.

The Environmental Engineer will inspect waste segregation and temporary soil/rock storage stockpiles during his regular site visits.

References

Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects (DoEHLG, July 2006).

Details of Site Waste Management to be finalised by Appointed Contractors.

EMP 7: Construction Traffic Management

Purpose

To describe measures for the management of all traffic, including construction traffic and oversized loads, for the minimisation of disturbance and nuisance to the local community.

Procedure

A detailed Traffic Management Plan (TMP) will be prepared and submitted to the Sligo County Council for approval prior to the commencement of construction. The plan will include the proposed haul routes, vehicle types, anticipated traffic numbers etc, for the construction stage of the development. This Plan will be finalised in agreement with Sligo County Council and An Garda Síochána. The plan will include provision for:

- Communicating with the community, the Gardaí and the Local Authority.
- Details of site access and any site traffic rules, including security, parking, loading and unloading, required speed or other relevant details.
- Programme of maintenance and upkeep of public roads.
- Site operating hours (including delivery) to be outlined.

Public Road

- In order to mitigate from a significant impact during peak traffic hours, the majority of staff will either arrive on-site before or after the peak morning traffic and finish work before or after the evening peak traffic hours.
- The condition of the public road will be monitored on an on-going basis and a road sweeper provided to clean the public road as required.

Site Entrance

- There will be no parking of any vehicles on the public road near the site entrance.
- Adequate parking will be provided on site for both employees and visitors.
- The condition of the site entrance will be monitored on an on-going basis and a road sweeper provided to clean the public road as required.

Responsibility

Management of traffic on site during construction will be done by:

- Project Manager;
- Construction Manager;
- Construction personnel;
- Sub-contractors as appropriate; and
- Delivery personnel

Details of Traffic Management Plan to be finalised by Appointed Contractor

EMP 8: Management of Archaeology

Purpose

There are few recorded archaeological monuments near the proposed development Area. The purpose of this plan is it to describe measures for the management and protection of these archaeological and cultural heritage sites that have been found on the development site.

Procedure

Archaeologically Sensitive Areas

There is a known recorded enclosure within 51m of the proposed new access road. Prior to the commencement of development works a 20m exclusion zone is to be established from the feature. The area of restricted access will be clearly delineated on the site by installing temporary fences and appropriate signs, and it should be shown on all project construction plans. 'No go' instructions will be given to all on site construction personnel, engineers or others involved

Construction Area

Archaeological monitoring of all groundworks is to be undertaken under licence by a qualified Archaeologist

Responsibility

Environmental Manager
Construction Manager
Project Archaeologist

Details of any management and protection of archaeological and cultural heritage on the site to be finalised by Appointed Contractor

EMP 9: Construction Noise Management

Purpose

The construction phase of the Project has the potential to increase noise levels surrounding the proposed site. Potential noise impacts from the construction phase will depend on the number and type of equipment employed during the works. The purpose of this plan is to describe measures for the management of impacts from construction noise.

Procedure

Control of Noise at Source

- Plant will be properly and regularly maintained.
- Compressors, if needed, will be 'sound related' models fitted with properly lined and sealed acoustic covers which will be kept closed whenever machines are in use.
- All vehicles and mechanical plant will be fitted with effective exhaust silencers.

Construction Phase

- Best practice in the form of BS5228 –1&2:2009 + A1 2014, Code of Practice for the Control of Noise and Vibration on Construction and Open Sites will be adopted during the construction phase in order to minimise the noise generated by construction activities and nuisance to neighbours.
- All plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations 1996 (SI 359/1996) and other relevant legislation.
- If construction limits are found to be exceeded, noise screens will be utilised around proposed site and machinery such as generators etc
- All compressors and generators will be "sound reduced" or "super silent" models fitted with properly lined and sealed acoustic covers, which will be kept closed whenever the machines are in use, and all ancillary pneumatic percussive tools will be fitted with mufflers or silencers of the type recommended by the manufacturers;
- Site activities shall be staggered when working in proximity to any receptor. This proposed method of working will provide effective noise management of site activities to ensure that any receptor is not exposed to unacceptably high levels of noise over extended periods;
- A nominated person from the appointed contractor will be appointed to liase with local residents and businesses regarding noise nuisance events

Responsibility

- The Construction Manager will be familiar with the noise sensitive receptors and alert the Environmental Manager in good time prior to work commencing in the areas closest to any noise sensitive receptors.
- The Environmental Manager will review any relevant planning conditions in updating this plan.

References

- BS5228 –1&2:2009, Code of Practice for the Control of Noise and Vibration on Construction and Open Sites
- IOA GPG Supplementary Guidance Note 5: Post Completion Measurements (July 2014).

Details of management of noise on the site to be finalised by Appointed Contractor

EMP 10: Construction Dust Management

Purpose

The purpose of this plan is to describe the measures for the management of nuisance impacts on air quality from construction generated dust.

Procedure

A dust minimisation plan will be formulated for the construction phase of the project as construction activities are likely to generate some dust emissions. The potential for dust to be emitted depends on the type of construction activity being carried out in conjunction with environmental factors including levels of rainfall, wind speeds and wind direction. The potential for impact from dust depends on the distance to potentially sensitive locations and whether the wind can carry the dust to these locations. The majority of any dust produced will be deposited close to the potential source and any impacts from dust deposition will typically be within several hundred metres of the construction area.

Construction phase generated dust can be minimised by the following measures:

- The use of water as a dust suppressant, e.g. a water bowser to spray access road and compound hardcore areas during any extended dry periods when fugitive dust emissions could potentially arise;
- Public roads will be inspected regularly for cleanliness and cleaned as necessary;
- All loads entering and leaving the site will be covered during dry periods if dust becomes a nuisance on site;
- Control of vehicle speeds passing over access road within the site;
- Where necessary, site stockpiling of materials will be designed and laid out to minimise exposure to wind;
- Regular site inspections should take place to examine dust measures and their effectiveness.

Construction Traffic Emissions

Construction traffic emissions can be reduced using the following measures:

- Ensure regular maintenance of plant and equipment. Carry out periodic technical inspection of vehicles to ensure they perform most efficiently;
- Implementation of the Traffic Management Plan to minimise congestion; and
- All site vehicles and machinery to be switched off when not in use - no idling.

In order to ensure that no dust nuisance occurs, a series of measures will be implemented:

- Site road will be regularly cleaned and maintained as appropriate.
- Furthermore, any road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions.
- Speeds will be restricted on roads as site management dictates.
- Public roads in the vicinity of the site will be regularly inspected for cleanliness and cleaned, as necessary.

Site roads and routes

Movement of transportation trucks and plant trucks along haul roads (in particular unpaved roads) can be a significant source of fugitive dust if control measures are not in place. The most effective means of supressing dust emissions from unpaved roads to apply speed restrictions. Studies show that these measures can have a control efficiency ranging from 25 to 80% (UK Office of Deputy Prime Minister, 2002).

- Bowsers or suitable watering equipment will be available during periods of dry weather through the construction period. Research has found that watering can reduce dust emissions by 50% (USEPA, 1997). Watering shall be conducted during sustained periods to ensure that unpaved areas are kept moist. The

required application rate frequency will vary according to soil type, weather conditions and vehicular use; and

- Any hard surface roads will be swept to remove mud and aggregate materials from their surface.

The dust minimisation plan will be reviewed at regular intervals during the construction phase to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practice and procedures.

Monitoring

With respect to monitoring measures temporary dust deposition monitoring will be carried out at the facility during construction phase of the project in order to ensure the boundary levels of deposition and nuisance dust are within recommended limit which are typically less than 350mg/m^2/day.

Responsibility

The Environmental Manager is responsible for developing and reviewing the site Dust Minimisation Plan.
The Construction Manager is responsible for organising dust suppression through use of bowsers and cleaners.

References

- 'Control of Dust from Construction and Demolition Activities', UK British Research Establishment (BRE).
- 'Environmental Good Practice on Site', Construction Industry Research and Information Association (CIRA).
- 'Environmental Management Plans', Institute of Environmental Management and Assessment (IEMA).
- 'Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan' National Roads Authority of Ireland (NRA).

EMP 11: Emergency Response Plan

Purpose

To describe measures for the prevention of an environmental accident or incident and the response required to minimise the impact of such an event.

Procedure

In the event of an environmental emergency, all personnel will react quickly and adhere to this procedure.
All site personnel will be inducted in the provisions of the Emergency Response Plan.
The following outlines some of the information, on the types of emergency, which must be communicated to site staff;

- Release of hazardous substance - Fuel or oil spill
- Concrete spill or release of concrete
- Flood event – extreme rainfall event
- Environmental buffers and exclusion zones breach
- Housekeeping of materials and waste storage areas breach
- Stop works order due to environmental issue or concern (threat to archaeological or ecological feature)
- Fire on site (cross-reference site Safety Emergency Plan as appropriate)

If any of the above situations occur; the Emergency Response Plan is activated. The Environmental Manager will most likely be responsible for overseeing the Emergency Response Plan (to be confirmed upon appointment of Contractor) and will be prepared and ready to implement the plan at all times. The Environmental Manager will be immediately informed and report to the scene. He/she must be aware of the;

- Nature of the situation – brief description of what has happened.
- Location of the incident.
- Whether any spill has been released.
- Whether the situation is under control.

The Emergency Response Plan must be completed by the appointed Contractor.

Oil Spillages

The following list outlines issues likely to be appropriate for inclusion in such a plan:

- Site staff will report the spillage immediately to the Environmental Manager or Construction Manager.
- Where relevant, the Environmental Manager will report the spillage to Inland Fisheries Ireland and Sligo County Council.
- Where possible, the source of pollution will be identified.
- Switch off all sources of ignition.
- Stop the spillage spreading.
- Use absorbent materials from the spill kit to mop up the spill (sand or absorbent materials should be used rather than detergents).
- Place boom across watercourse or in nearby downstream existing drains as a precaution.
- Do not wash spillage into drainage system. Washing will only make the situation worse and extend the pollution to other water bodies/drainage systems.
- If the spill has already reached drains, block the inlet of the dirty water cross pipes in the nearby drainage outflow points on the roadside drains with oil absorbent booms, which will prevent oils flowing into the existing drains.
- Shovel contaminated sand/earth/absorbent granules into sacks or skips.
- A specialist oil removal company should remove pooled oil.

Concrete Spillages

The following list outlines issues likely to be appropriate for inclusion in such a plan:

- Site staff will report the concrete spillage immediately to the Environmental Manager or Construction Manager.
- Where relevant, the Environmental Manager will report the spillage to Inland Fisheries Ireland and Sligo County Council.
- If there is a risk of concrete spreading into the drainage system, the inlet of the dirty water cross pipes in the nearby drainage outflow points on the roadside drains will be blocked using the absorbent booms, which will prevent concrete flowing into the existing drains.
- Do not wash spillage into drainage system. Washing will only make the situation worse and extend the pollution to other water bodies/drainage systems.
- If the spill has already reached drains, acid may be added to the drains by the Environmental Manager to neutralise the alkalinity of the concrete.
- Shovel contaminated concrete granules into sacks or skips for treatment in the Roadside Concrete Wash unit.

Contacts

As an Environmental Control Measure, the Environmental Manager will append the relevant contact details to the Emergency Response Plan document. Examples of such contact details include:

- Environmental Manager.
- Specialist oil removal Company.
- Sligo County Council.
- Inland Fisheries Ireland.
- National Parks and Wildlife Service.

Location of Emergency Spill Kits

- A map indicating the location of all emergency spill kits will be attached to the Emergency Response Plan document.
- Emergency oil spill kits will also be carried in all site vehicles and machinery and in the site office.

Responsibility

- The appointed Contractor/Environmental Manager will prepare and finalise an Emergency Response Plan to be ready to respond to any incident.
- All site personnel will report any spillages of oil or chemicals to the Environmental Manager and Construction Manager immediately.
- As appropriate, the Environmental Manager will report the spillage to the Regional Fisheries Board, local authority and any other relevant authority.

Details of Emergency Response Plans to be finalised by Appointed Contractor

EMP 12: Site Environmental Training and Awareness

Purpose

To describe measures for the training of all site personnel in the protection of the environment and the relevant controls.

Procedure

Site signage will be provided at the entrance to the site to inform the public that access to the site is restricted to those directly involved in the construction works.

An initial site environmental induction and ongoing training will be provided to communicate the main provisions of the CEMP to all site personnel. Two-way communication will be encouraged to promote a culture of environmental protection.

The following outlines some of the information which will be communicated to site staff;

- Environmental procedures of the CEMP.
- Environmental buffers and exclusion zones.
- Housekeeping of materials and waste storage areas.
- Environmental Emergency Response Plan.

Housekeeping and Storage of hazardous materials

- Hazardous materials marked with the following symbols will only be stored in the secure storage container in the site compound.

- Subcontractors will provide a copy of the Material Safety Data Sheets for all hazardous substances brought on site.

All finalised CEMP policies will be adhered to, in the management of fuels and oils, concrete, and installation of sediment and erosion controls and drainage features. All finalised details will be communicated with site personnel. Environmental Training including spill kit training, installation of silt fence training is to be provided by the Appointed Contractor. Environmental training records will be retained in the site office.

Responsibility

Environmental Manager
Construction Manager
All site personnel

Details of Induction and Training to be finalised by Appointed Contractor.

EMP 13: Monitoring and Auditing Procedure

Purpose

To describe measures for environmental monitoring during the construction works and audit of control measures to ensure environmental protection.

Procedure

All mitigation measures, any planning conditions and relevant construction methods will be monitored on site. The Appointed Contractor will nominate an Environmental Manager for the works. The Environmental Manager will provide Audit Checklists to ensure regular checks of the site's control measures for the ongoing protection of the environment.

At a minimum monitoring will be carried to ensure adherence with the following;

EMP-1	Management of Excavations
EMP-2	Surface Water Run-off Control
EMP-3	Fuels and Oils Management
EMP-4	Management of Concrete
EMP-5	Protection of Habitats and Fauna (Ecological Management)
EMP-6	Waste Management
EMP-7	Traffic Management
EMP-8	Management of Archaeology
EMP-9	Construction Noise
EMP-10	Dust Management

Checklists for daily, weekly or monthly site audits will be finalised by the Environmental Manager and the relevant personnel informed of their duties. Checklists will include (but are not limited to) confirmation that fuel is stored appropriately, waste management rules are adhered to, all environmental buffers are maintained, sediment and erosion control measures of the Sediment & Erosion/Storm Water Control Plan are in place and functioning. Checklists will be finalised with the Final Contractor's CEMP.

All environmental records, including completed checklists, will be retained at the site office.

Responsibility

Project Manager
Environmental Manager
Construction Manager
Project Ecologist
Project Archaeologist

Details of Monitoring Procedure and Checklists to be finalised by Appointed Contractor's Environmental Manager

EMP 14: Environmental Accidents, Incidents and Corrective Actions

Purpose

To describe measures for the recording, investigating and close-out of any environmental accidents or incidents on the site

Procedure

- The Environmental Manager or Construction Manager will be contacted as soon as possible where there is any incident that carries the possibility of negative environmental consequences (e.g. minor oil leakage or blockage of drainage pipe).
- The Emergency Response Plan and standard emergency procedures will be applied to get the incident under control and prevent injury or loss of life in the first instance.
- Work in the area will be halted and the Environmental Manager will be called to the scene to assess the situation and to decide on initial responses and remedial measures.
- Once the situation is under control, the environmental accident or incident will be recorded, and the cause investigated.
- Any remedial action required will be taken to mitigate any damage and prevent a reoccurrence.
- Corrective actions will be communicated to personnel and sub-contractors where relevant – particularly where it results to a change in procedure.

Example list of environmental accidents & incidents

- Accidents involving large spill of fuel or concrete from delivery truck (emergency response required).
- Spills of fuel and oil (minor).
- Waste or rubbish left around the site (not in dedicated waste areas).
- Breach of any buffers (ecological, archaeological, watercourse).
- Failure of any control measures (silt fences collapsed in a storm).
- Unplanned vehicle movement off the access road.
- Unplanned vehicle movement within a buffer zone.

Responsibility

- Site staff will contact the Environmental Manager or Construction Manager as soon as possible where there is any incident that carries the possibility of negative environmental consequences.
- The Environmental Manager is responsible for alerting the relevant authorities.

Details of Environmental Accidents, Incidents and Corrective Actions Procedure, including a chain of responsibility, to be finalised by Appointed Contractor and communicated to all personnel and sub-contractors.

EMP 15: Environmental Complaints

Purpose

To describe measures for the recording and resolving complaints by third parties, including local residents or members of the public

Procedure

A complaints procedure will be established for the duration of the construction phase. Any complaints received regarding alleged noise or any other complaint will be investigated immediately. Details of the complainant, the complaint (time of occurrence and nature of noise/vibration/other) and follow up action will be logged in the complaints record. The project manager will develop and implement an appropriate queries/complaints procedure. Records will include full details of the concerns expressed and ensure that a formal assessment is commenced of the reported concern.

The project manager will also discuss complaints with and oversee an initial response to the person who has submitted the complaint/concern confirming its receipt. The project manager will liaise with the environmental manager and an investigation to assess the issue of concern will be carried out and decisions made to see what corrective and/or preventive action, or further investigation is necessary. With overall responsibility for complaints, the project manager will respond within a reasonable timescale and maintain records of all correspondence. If significant corrective action and external stakeholder involvement is required the site manager/project manager will oversee all elements of the process.

Complaints that may be received will be logged, assessed and appropriate action taken as soon as practical. It will be critical to the success of the project that key issues are properly addressed from the outset to create a good working relationship and an integrated team approach to resolving potential issues before they arise.

Responsibility

Project Manager
Environmental Manager
Construction Manager

Details of Environmental Complaints Procedure to be finalised by Appointed Contractor.

Appendix 4

Ecological Impact Assessment (EcIA)

Ecological Impact Assessment

Quarry Lane Stability Project, Co. Sligo

October 2022

Prepared for:

Statkraft

CIEEM REGISTERED PRACTICE 2022-2023

O'DONNELL ENVIRONMENTAL

Summary

Project: Development of a synchronous compensator at Srananagh, Co. Sligo.

Coordinates: 54.1765267, -8.3814028 (WSG84); 575108 825356 (ITM).

Report by: Tom O'Donnell BSc (Hons) MSc CEnv MCIEEM.

Company Profile: O'Donnell Environmental is an independent environmental consultancy established by Tom O'Donnell in 2019. O'Donnell Environmental is a Chartered Institute of Ecology and Environmental Management (CIEEM) 'Registered Practice' which demonstrates our commitment to high professional standards, accountability and the delivery of the best outcomes for biodiversity and our Clients.

Project Reference: 2021/48			
Document Rev. No.	**Status**	**Contributor**	**Date**
A	Draft Issue	TO'D, CO'C	24.10.2022
1	Final Issue	TO'D	26.10.2022

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Appendices

1 Introduction

O'Donnell Environmental was commissioned by Statkraft to undertake an Ecological Impact Assessment (EcIA) in relation to the proposed development of a synchronous compensator at Srananagh, Co. Sligo.

The proposed development will consist of a 'High Inertia Synchronous Compensator' (HISC) facilty and associated infrastructure including a high voltage gas insulated switchgear, a 220kV underground cable connecting to the existing adjoining Eirgrid substation, welfare and office units, access road, drainage infrastructure fencing and security lighting. A detailed description if the proposal is provided in **Section 1.2**.

The purpose of the proposed HISC is to help balance the fluctuating energy supply provided by renewables. Its purpose is to replace the stability services currently provided by traditional thermal plants. Its benefits include eliminating the CO_2 emissions created when traditional plants are used to stabilise supply.

The site boundary encloses an area of 2.42ha. The proposed site is greenfield site located southeast of the Srananagh 220kV Substation, approximately 7km east of Collooney, Co. Sligo. A site location map is presented in **Figure 1.1**.

The site is currently used for livestock grazing, and with the exception of the substation, is situated in a rural landscape which is used predominantly for pasture-based agriculture. The site is underlain with non-calcareous mineral soil which is poorly drained.

This report has been prepared with cognisance of the following best practice guidance:

- Guidelines for Ecological Impact Assessment in the UK and Ireland - Terrestrial, Freshwater, Coastal and Marine' (CIEEM, 2018).
- Guidelines on the Information to be contained in Environmental Impact Assessment Report (EIAR) (EPA, 2022).

This report is informed by the following documents which are submitted as part of the current planning application:

- Environmental Report - Proposed Quarry Lane Stability Project at Ballysumaghan, Sooey, County Sligo. (Malachy Walsh and Partners, October 2022).
- Natura Impact Statement (Malachy Walsh and Partners, October 2022).
- Construction Environmental Management Plan (CEMP) - Proposed Grid Stabilisation Facility at Quarry Lane Ballysumaghan, Sooey, County Sligo. (Malachy Walsh and Partners, October 2022).

1.1 STATEMENT OF AUTHORITY

O'Donnell Environmental is an independent environmental consultancy established by Tom O'Donnell BSc (Hons) MSc CEnv MCIEEM in 2019. Since then, O'Donnell Environmental has established itself as a provider of quality, Client-focused ecological and environmental services to public and private sector Clients nationwide. O'Donnell Environmental is a Chartered Institute of Ecology and Environmental Management (CIEEM) 'Registered Practice' which demonstrates our commitment to high professional standards and accountability. Tom O'Donnell is a Chartered Environmentalist and a full member of the

Chartered Institute of Ecology and Environmental Management. He was awarded a BSc in Environmental and Earth System Science [Applied Ecology] in 2007 and an MSc in Ecological Assessment in 2009, both from UCC. Tom has 15 years professional experience in the environmental industry, including working on projects such as windfarms, overhead power lines, roads, cycleways and residential developments. Tom is licensed by NPWS for roost disturbance (Ref: DER/BAT 2021-128) and to capture bats (C217/2021).

Cian Ó Ceallaigh BSc (Hons), MSc is an Associate member of the Chartered Institute of Ecology and Environmental Management (ACIEEM) who has extensive botanical and habitat knowledge (FISC Level 4, 2018) and has worked as a professional Ecologist in Ireland and Britain since 2017. Cian has experience undertaking AA Screening reports in Ireland as well as Preliminary Ecological Appraisals (PEAs) and other species-specific survey reports in Britain and Ireland.

1.2 DESCRIPTION OF THE PROPOSAL

The proposed development will consist of the following elements:

- A High Inertia Synchronous Compensator (HISC) compound containing 1 No. HISC unit enclosed within a steel clad framed style structure (12.1m max height) and supported by 7 No. electrical equipment containers (containing ancillary power supply products including a static frequency converts, MV switchgear, exciters, LV distribution, control room); 4 No. external cooler units; main, auxiliary & start-up electrical transformers, generator circuit breakers, switchgear equipment, and 1 No. back up diesel generator and associated diesel storage tank (3000L) contained in a bund sized to 110%;
- A 220kV High Voltage Gas Insulated Switchgear (GIS) compound containing a GIS building with all control & HV equipment within a single storey building (13.2m max height). The building will be surrounded by a compound road and contained within a 2.6m high galvanised steel palisade fence;
- A 220kV underground cable to the existing adjoining Eirgrid substation boundary;
- New access road and entrance from the L5204. The new access road will be 404m long and constructed to a carriageway width of 6.0m and will be finished with approx. 150mm crushed stone of Unbound Granular Mixture A (Previously Clause 804), or similar aggregate type material. An asphalt apron is proposed to be constructed at the site entrance extending 20m into the site.
- Associated elements comprising all necessary drainage systems, foundations works for the above compounds, various underground cables and ducts, equipment plinths, internal services roads, welfare and office units, 2 No. material storage containers, rainwater harvesting systems, compound lighting and palisade gates and fencing (2.6m in height), security lighting, CCTV, hardstanding areas (including parking) and boundary security fence.

Elements of the design of particular relevance to the current assessment are explored in greater detail below. **Appendix A** shows the proposed development layout.

1.2.1 Wastewater Management

The proposed development will generate both foul and surface water, these are discussed separately below. Surface water networks are intended to mimic the pre-development surface water runoff conditions in terms of water quality and flow rate.

1.2.1.1 Surface Wastewater from Infrastructural Footprint

A subsurface drainage network is proposed within the developed areas of the project including building roofs, transformer plinths, HV Yard, roadways and surrounding stone hardstanding areas. A network of roadside v-drains with check dams, filter drains, downpipes and rainwater gullies and road gullies will collect surface water runoff and direct it into the proposed surface water sewer network proposed for the site. Storm water from the HV Yard and Transformers will pass through a full retention petrol interceptor prior to draining into a sub-surface attenuation tank, on the east of the proposed development.

Similarly, stormwater flow from the Substation building and associated compound roadways will pass through a bypass interceptor prior to draining into the on-site attenuation tank. The proposed attenuation tank is sized for the 100-year return period storm event with 20% allowance for the effects of climate change.

Outflow from the onsite attenuation unit will be restricted by the use of water-brakes in combination with attenuation capacity to a greenfield rate which mimics the predevelopment greenfield runoff conditions (see Drainage Report (WMP, 2022)).

Surface-water runoff following management measures described above, will be discharged to an existing drainage ditch, on the north of the proposed site.

1.2.1.2 Surface Wastewater from Access Road

A separate surface water network will cater for runoff from the proposed site access road from the proposed site entrance location to the catchment divide. The proposed access road will incorporate a camber in order to direct surface water away from the road to the road verges. Roadside v-drains (swales) will be installed at both sides of the access road to capture runoff from the road. It is proposed to install check dams at regular intervals, based on gradient, along all roadside v-drains to provide flow attenuation, slow down runoff to promote settlement and to reduce scour and drain erosion. Check dams are relatively small and constructed with single sized clean washed stone.

Particularly during construction, contaminated runoff could be generated on the site access roads due to movement of delivery vehicles and on-site traffic. Drains carrying site runoff will be diverted into settlement ponds that reduce flow velocities, allowing silt to settle and reducing the sediment loading. Run-off will be directed to two settlement ponds to be located on either side of the road near the proposed site entrance. The settlement ponds will be designed to reduce velocity of the flows to allow suspended solids to settle out of the surface water. Each settlement pond will trap sediment in the runoff. Following treatment in the settlement ponds, clean water will overflow southwards over the existing vegetation for approximately 20m before entering the existing drain which runs parallel to the L5204 public road.

The outflow from each settlement pond will discharge overland to an existing drain which runs parallel to the public road on the south of the proposed site. The outfall will be located more than 20m from the edge of this drain. Settlement ponds will require perimeter fencing to prevent unauthorised access.

Outflow from the onsite attenuation unit will be restricted by the use of water-brakes in combination with attenuation capacity to a greenfield which mimics the predevelopment greenfield runoff conditions (see Drainage Report (WMP, 2022)).

1.2.1.3 Intercepted Clean Surface Water

Clean water cut-off drains will intercept surface water run-off from catchments uphill of the proposed development site. The cut-off drains will divert the collected runoff around site infrastructure to reduces the volume of water needing treatment within the development and ensures high quality of discharge to downstream catchments. The clean water cut-off drains will discharge overland along their natural course downhill of the development site.

During the construction phase (prior to connection to the permanent water management systems), surface water will continue to follow the existing drainage pattern but with the addition of silt fences and other mitigation measures designed to minimise downstream transportation of silt.

1.2.2 Foul Water Management

Two foul water storage tanks are required for the operational phase of the proposed development. One to serve the GIS building and a second to serve the HISC compound welfare facilities. Each storage tank is designed for a total of 2 maintenance personnel being present on site approximately 6 to 8 times per month. Storage times will be emptied, and waste transported off-site for treatment, approximately eight times annually.

1.2.3 Lighting

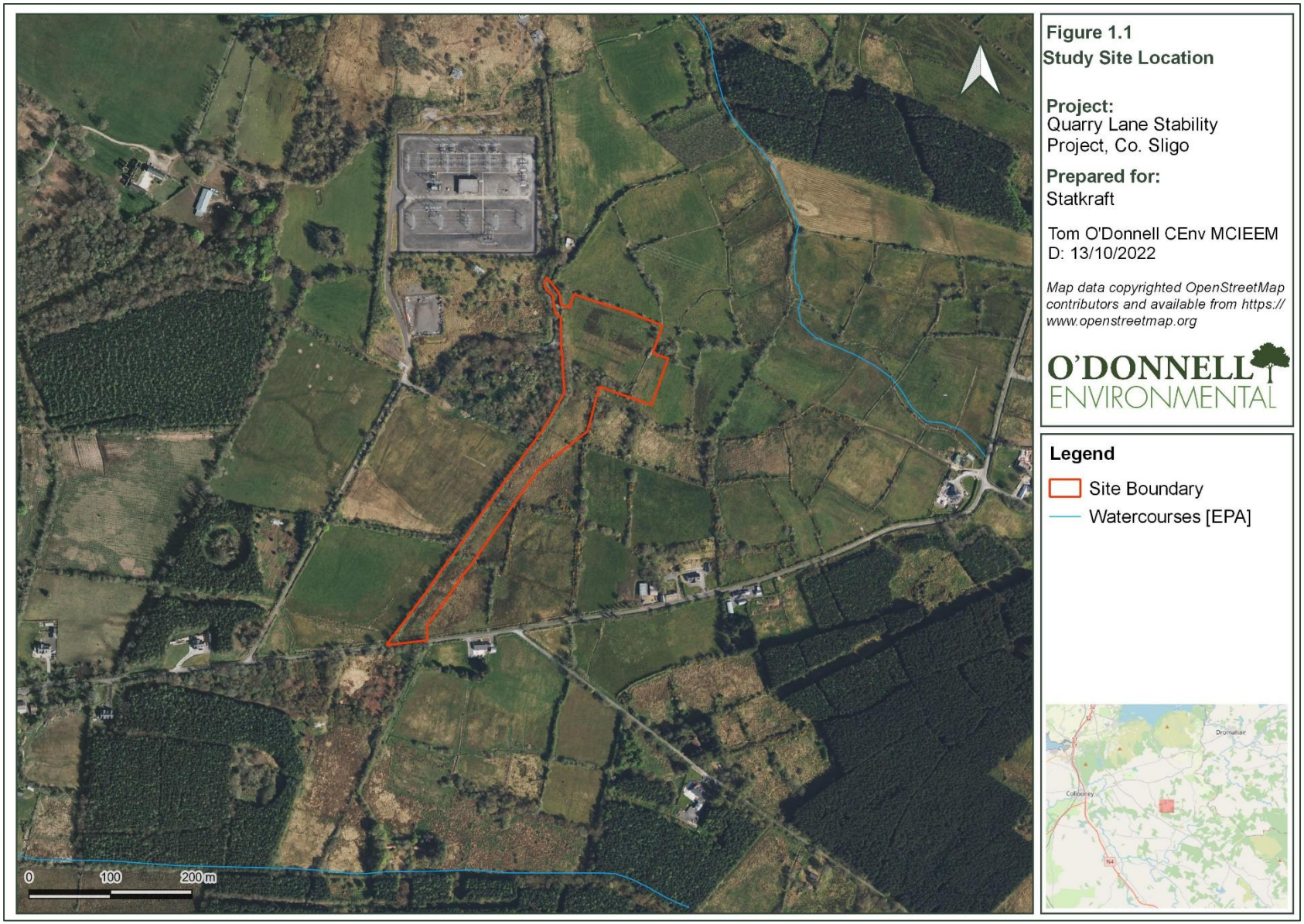
Site lighting will comprise standard, single down lights positioned around the main plant building that will be motion activated by vehicles or personnel that enter the site. The lighting units will be hooded to minimise light impacts/ spillage.

1.2.4 Hedgerow and Treeline Loss

Approximately 292 meters of hedgerow and treelines will be removed as part of the proposed works (see **Figure 4.1**). Hedgerow and treeline removal is required to facilitate the proposed electrical component as well as an access route and roadside access from existing public road.

The existing access road to the site (west of the proposed access road) which currently provides access to the existing substation and agricultural lands, is lined by well-established hedgerows and treelines and includes some mature trees. A previous iteration of the proposed design was assessed, which utilised this existing road but with widening such that it would be suitable for the proposed project. The required widening would result in the removal of most if not all of these hedgerows and treelines. Based on ecological and other technical advice it was considered that this option was not appropriate. The proposed design incorporates 'mitigation by avoidance' and minimises hedgerow and treeline loss.

Details on proposed landscaping and reinstatement of vegetation are provided in the Environmental Report (MWP, 2022) which accompanies the current planning application. No landscaping is proposed around the main facility compounds. Where feasible any suitable existing hedgerows that will be removed to accommodate the development will be replanted (translocated) on the earthen berms to be constructed along the new access road along with new planting using native tree species.


0
100
200 m
Figure 1.1
Study Site Location
Project:
Quarry Lane Stability Project, Co. Sligo
Prepared for:
Statkraft
Tom O'Donnell CEnv MCIEEM
D: 13/10/2022
Map data copyrighted OpenStreetMap contributors and available from https://www.openstreetmap.org
O'DONNELL ENVIRONMENTAL
Legend
Site Boundary
Watercourses [EPA]
Dromahair
Colloney
N4

2 Methodology

This ecological assessment has been prepared for the proposed development following a thorough desktop review of available ecological information and field surveys carried out between August and October 2022.

The aims of this EcIA are to:

- Establish the ecological baseline.
- Determine the ecological value of the relevant ecological features.
- Assess the predicted impact of the proposed development on relevant ecological features.
- Identify avoidance and mitigation measures where available.
- Assess any residual impacts of the development.

The methodology employed in the carrying out of this ecological assessment is outlined below.

2.1 DESKTOP REVIEW

A detailed desktop review of relevant data available for the study area was undertaken. National Parks and Wildlife Service (NPWS) and National Biodiversity Data Centre (NBDC) online databases were consulted on 17th October 2022 to identify any relevant rare or protected species records located within the relevant national grid squares encompassing and surrounding the site. The Environmental Protection Agency (EPA) website was reviewed for relevant hydrological or environmental information.

2.1.1 Designated Conservation Sites

Designated nature conservation sites within the wider hinterland of the proposed redevelopment were identified through a desktop review. Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) form part of a European Conservation network known as Natura 2000 sites. SACs are designated under the EU Habitats Directive[1] while SPAs are designated under the EU Birds Directive[2].

2.2 BOTANICAL & HABITAT ASSESSMENT

An ecological survey of the proposed site was carried out by Cian O'Ceallaigh on the 19th August 2022, in warm (16°C), changeable conditions (showery/sunny) with a light breeze and cloudy conditions (6/8 Otkas). Following a change to the proposed site layout, a further habitat survey was carried out on 2nd October 2022 when conditions were warm (16°C), dry and cloudy (7/8 Otkas) with a gentle breeze.

A Phase I habitat and flora assessment was carried out in accordance with the Heritage Council's guidelines (Smith *et al*. 2011) and habitats were classified to level three using the classification scheme presented in *A Guide to Habitats of Ireland* (Fossitt, 2000). Where

[1] Council Directive 92/43/EEC on the conservation of natural habitats and wild flora and fauna, as amended by Council Directive 97/62/EC.
[2] Directive 2009/147/EC (Birds Directive) on the conservation of wild birds (the codified version of Council Directive 79/409/EEC as amended).

appropriate consideration was given to whether habitats qualify, or could qualify, as corresponding Annex 1 habitats. Relative plant species abundance was estimated using the DAFOR scale[3] . The scientific names for plant species use nomenclature given in An Irish Flora (Parnell, J. & Curtis, T., 2012)

The conservation status of habitats and botanical species was also considered. The conservation status of habitats and botanical species within Ireland and Europe is indicated by inclusion in one or more of the following: Irish Red Data Book for Vascular Plants (Wyse Jackson *et al.,* 2016); Flora (Protection) Order 2015 and the EU Habitats Directive (92/43/EEC).

During the walkover observations of taxonomic groups such as birds, mammals, amphibians, reptiles and other taxonomic groups (where identifiable) whether heard and/or seen, evidence of, etc. were recorded.

2.3 MAMMAL ASSESSMENT

This assessment considers both non-volant and volant mammals, which are addressed separately below.

2.3.1 Non-volant Mammals

Survey for non-volant mammals was undertaken by Tom O'Donnell on 9th September 2022 and involved a walkover of the site to identify any mammal species present or signs of mammal activity such as droppings, tracks, burrows etc. Observations were recorded using field notes and/or handheld GPS units. Techniques used to identify mammal activity followed recognised guidelines (e.g. Bang & Dahlstrom 2004, JNCC 2004 and Muir *et. al,* 2013).

The conservation status of mammal species was considered. The conservation status of mammals within Ireland and Europe is indicated by inclusion in one or more of the following: Irish Wildlife Acts (1976 - 2010); Red List of Terrestrial Mammals (Marnell *et al*. 2009); EU Habitats Directive.

2.3.2 Bats

As part of an initial desk-top review, the model of Bat Landscapes, available on the NBDC website was consulted. This model is based on the relative importance of landscape and habitat associations for bat species in Ireland and the index ranges from 0 to 100, where 100 is the most suitable for bats (Lundy *et al*. 2011). Relevant bat roost records were also consulted, including the publication 'Bridge Usage by Bats in County Leitrim and County Sligo' (Shiel, 1999).

Daytime visual assessments were carried out on 9th September 2022 by Tom O'Donnell to identify any bat roosting potential which may exist within the site boundary and adjoining habitats. The assessment followed guidance set out in Collins (2016), the survey was non-destructive, and relevant Potential Roost Features (PRFs) were visually inspected from ground level to identify any evidence of bat roosting. Where accessible, potential roosting features were

[3] The DAFOR scale has been used to estimate the frequency and cover of the different plant species as follows: Dominant (D) - >75% cover, Abundant (A) – 51-75% cover, Frequent (F) – 26-50% cover, Occasional (O) – 11-25% cover, Rare (R) – 1-10% cover., The term 'Locally' (L) is also used where the frequency and distribution of a species are patchy and 'Edge' (E) is also used where a species only occurs on the edge of a habitat type.

investigated using an endoscope. Signs of bat use include bat droppings, feeding remains, potential bat access points identified by characteristic staining and scratches, noise made by bats etc. Potential Roost Features (PRFs) are described according to the scheme outlined in **Table 2.1**, below. In this instance, PRFs consists of trees, and the remaining stone walls of a derelict cottage.

Table 2.1. Scheme for describing the potential suitability of features for bats.

Suitability	Description
Negligible	Negligible features which are likely to be used by roosting bats.
Low	A feature with one or more potential roost sites that could be used by individual bats opportunistically. Potential roost sites which do not provide appropriate conditions and / or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to characteristics and surrounding habitat but unlikely to support a roost of high conservation status.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

After 'Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition)', Collins (2016).

2.4 BIRD ASSESSMENT

During the course of ecological surveys on 19th August 2022, 9th September 2022 and 2nd October 2022, birds seen and heard were recorded to characterise the general bird community.

In addition, a Wildlife Acoustics Song Meter detector with acoustic microphone was deployed to passively record acoustic sound (e.g. bird calls) for a total of 3 days 19th August to 21st August 2022. The unit was set to activate from 30 minutes after sunrise until 30 minutes before sunset and in the interim to record for five minutes in every 30-minute period. The resulting WAV files were analysed using 'Audacity' and visually and aurally identified by Mr. Mark Shorten. Validation of the identification of a subset of recordings was carried out using https://birdnet.cornell.edu/api/ and was used to confirm identification. An estimation of the number of individual birds in each file was made where possible.

2.5 OTHER TAXA ASSESSMENT

Other taxa encountered during the overall ecology field assessment were casually recorded during walkover surveys.

2.6 LIMITATIONS

The habitat survey was undertaken outside the optimum survey period for botanical and habitat surveys (April to September). However, due to the nature of the habitats recorded within the proposed development site, the timing is habitat survey is not considered to be a limitation in this instance.

2.7 EVALUATION & IMPACT ASSESSMENT

Evaluation of ecological features follows the NRA (now TII) publication 'Guidelines for Assessment of Ecological Impacts of National Roads Schemes' (2009). The following ecological evaluation scheme is utilised:

- International importance
- National importance
- County importance
- Local importance (higher value)
- Local importance (lower value).

Impact assessment follows 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' published by the EPA (2022) (see **Appendix B**).

3 Results

The site is currently a greenfield site and adjoining land uses include agriculture, electrical infrastructure and residential land uses.

3.1 DESKTOP SURVEY

3.1.1 Designated Sites

European sites, Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) have been designated under the EU Habitats Directive (92/43/EEC) and the EU Birds Directive (2009/147/EC) respectively. SACs and SPAs form part of a network of sites designated across Europe in order to protect biodiversity within the community, known as Natura 2000 sites and are legally protected by Irish law.

Information on potential impacts on European Designated site is provided in a Natura Impact Statement prepared by MWP which accompanies the current application.

Nature Reserves and Refuges for Fauna are protected under the Irish Wildlife Acts (1976 - 2010). Designated conservation sites include national sites, Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs). NHAs are designated to protect habitats, flora, fauna and geological sites of national importance. While NHAs are legally protected by the Irish Wildlife Acts (1976 - 2010), pNHAs are not. Many designated sites overlap, e.g. a site can be designated as both a SAC and NHA.

There are no NHAs within the 5km hinterland surrounding the proposed site. The following NHAs are within 15km of the proposed site:

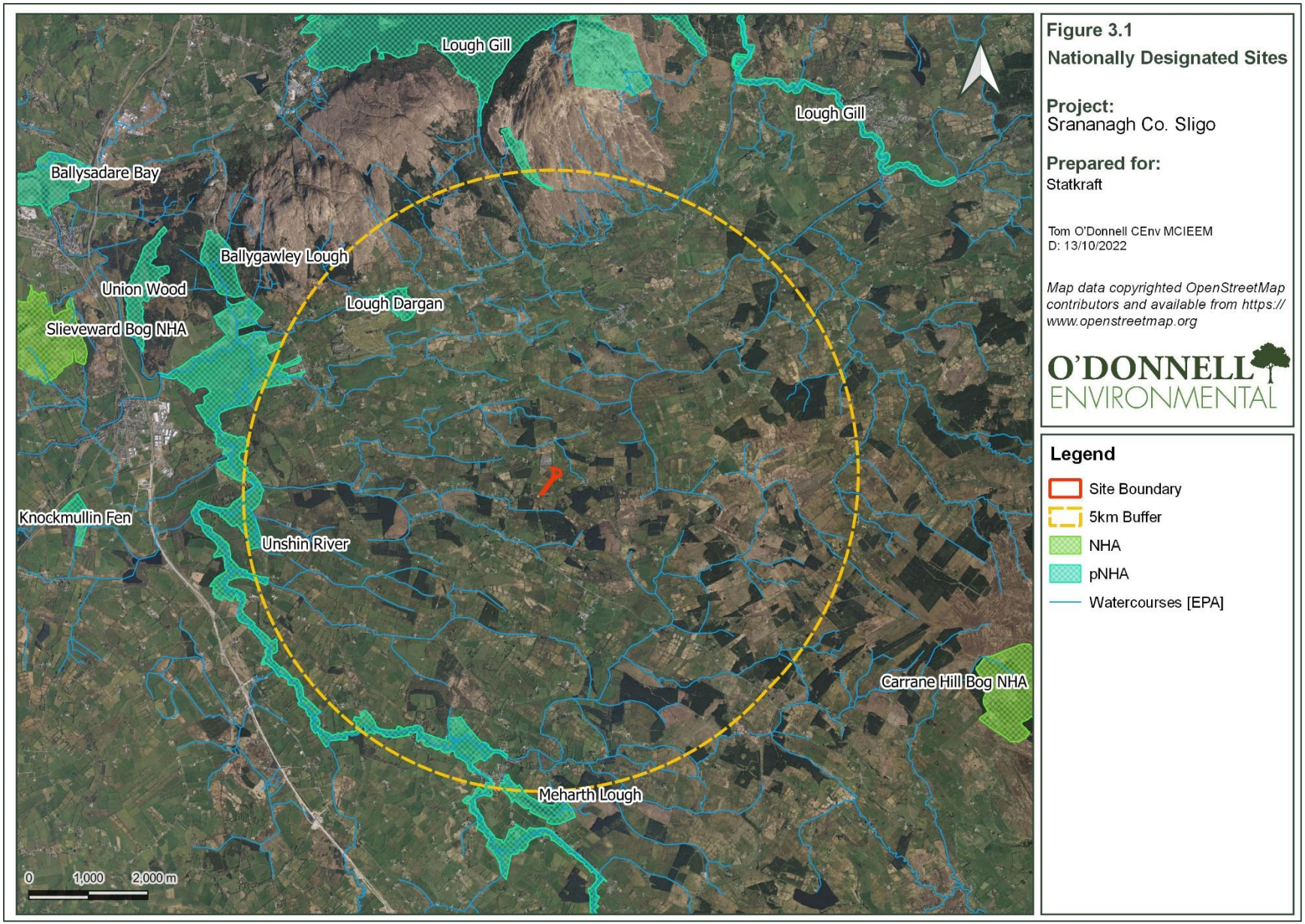
- Slieveward Bog NHA (1902)
- Corry Mountain Bog NHA (2321)
- Carrane Hill Bog NHA (2415)
- Crockauns/Keelogyboy Bogs NHA (2415).

The following pNHAs are within 5km of the proposed site (see Figure 3.1).

- Unshin River (1898)
- Meharth Lough (1900)
- Lough Dargan (1906)
- Lough Gill (1976).

Unshin River and Ballysodare Bay pNHAs are also designated as SACs, and potential impacts on these sites are addressed in the accompanying NIS (MWP, 2022), which concludes that there is no potential for significant impacts on any Natura 2000 sites as a result of the proposed works.

There is no viable source-receptor pathway between the proposed site and any other NHA or pNHA sites. Given the scale and context of the proposed works, distance to nationally designated sites and the lack of significant hydrological connectivity is no likelihood of a significant negative impact occurring on any nationally designated site.


Lough Gill
Lough Gill
Ballysadare Bay
Ballygawley Lough
Union Wood
Lough Dargan
Slieveward Bog NHA
Knockmullin Fen
Unshin River
Carrane Hill Bog NHA
Meharth Lough
0
1,000
2,000 m
Figure 3.1
Nationally Designated Sites
Project:
Srananagh Co. Sligo
Prepared for:
Statkraft
Tom O'Donnell CEnv MCIEEM
D: 13/10/2022
Map data copyrighted OpenStreetMap contributors and available from https://www.openstreetmap.org
O'DONNELL ENVIRONMENTAL
Legend
Site Boundary
5km Buffer
NHA
pNHA
Watercourses [EPA]

3.2 HYDROLOGICAL CONTEXT

The site does not include or immediately adjoin any watercourses. Drainage is achieved mostly by overland flow aided by occasional field drains. The proposed site is located in the Sligo Bay Catchment (Catchment ID 35), sub-catchment Owenmore[Sligo]_SC_030 and the Unsin_040 WFD River Sub-basin. The proposed site spans a catchment divide. The northerly parts of the site draining to the Ballygrania River which joins the Unshin River before converging with the Ballysodare River and ultimately discharging into the sea at Ballysodare which is located approximately 9.8km to the northwest of the proposed development site. The southerly part of the site drains to the Ardlee Stream, which also drains to the Ballygrania River.

The EPA undertakes survey of the water quality on the River Unsin at Ballygrania Bridge (station code: RS35U010500), approximately 6.1km downstream of the proposed site and downstream of the confluences of both the Ballygrania River and Ardlee Steam. Based on monitoring in 2021, the river achieved a 'Q-Value' score of 4-5, and therefore water quality is considered to be 'high' here (https://gis.epa.ie/EPAMaps/). The EPA has classed the WFD waterbodies risk of the Unshin_040 as 'not at risk'.

3.3 HABITATS & BOTANICAL

Relevant habitats and botanical information is provided below.

3.3.1 Desk Study

No legally protected plant species have been previously recorded in the NBDC[4] database for the 1km grid squares (G7525) within which the proposed development is located. No existing records for species classified as threatened (Critical, Endangered or Vulnerable) and so included on the Ireland red list of vascular plants (Wyse Jackson *et al*, 2016) have been recorded in the 1 km grid square in which the proposed development is located.

One 'vulnerable' flowering plant species has previously been recorded in the 10km in which the site is located (NBDC - G72), namely Swamp Meadow-grass (*Poa palustris*). A number of species of endangered mosses and liverworts were also previously recorded in the relevant 10km grid square. The Flora (Protection) Order, 2022 (S.I. No. 235 of 2022) gives legal protection to 65 species of bryophytes in the Republic of Ireland (25 liverworts and 40 mosses) and no records for such bryophytes exist with the proposed site or proximal. Endangered plant species were not found to be present on the proposed site during surveys carried out for this report.

No invasive alien plant species have been previously recorded within the 1km grid-square in which the proposed site is located, but the following species have been recorded in the relevant 10km grid square (NBDC - G72): Canadian Waterweed (*Elodea canadensis*), Cherry Laurel (*Prunus laurocerasus*), Giant Knotweed (*Fallopia sachalinensis*), Giant-rhubarb (*Gunnera tinctoria*), Japanese Knotweed (*Fallopia japonica*), Rhododendron (*Rhododendron ponticum*). No alien invasive plant species was noted to be present on the proposed site during surveys carried out for this report.

[4] https://maps.biodiversityireland.ie/Map (accessed 21/10/2022)

3.3.2 Habitat Survey

No Annex I habitats listed under the EU Habitats Directive are present within the study site and the dominant habitats present are of low ecological value. No botanical species protected under the Flora (Protection) Order 2015, listed in Annex II or IV of the EU Habitats Directive (92/43/EEC), or Red listed in Ireland were recorded. All species recorded during the botanical survey are considered common for similar habitats.

Botanical species protected under the Flora (Protection) Order 2015, listed in Annex II or IV of the EU Habitats Directive (92/43/EEC), or Red listed in Ireland (Wyse Jackson *et al*, 2016) were not recorded during the site visits.

The habitats present within the boundary of the proposed site are described below, following Fossitt (2002). A Habitat Map is provided in **Figure 3.2**. An overview of the site is presented in **Plate 3.1** to **Plate 3.8** below.

3.3.2.1 GS4 - Wet grassland

Wet grassland was the dominant habitat within the site. Cattle grazing was ongoing in the site, and areas had been 'topped' during the survey period likely to suppress growth of rushes. Grasslands along the proposed access route were cut for silage/hay in September 2022.

At the proposed infrastructure site, graminoids (grasses and grass-like species) for the habitat comprise dominant soft rush *Juncus effuses,* frequent Yorkshire fog *Holcus effuses,* occasional creeping bent *Agrostis stolonifera* and crested dogs' tail *Cynosurus cristatus* with perennial rye-grass *Lolium perenne* occurring rarely. Forb diversity was generally poor with the following species recorded – frequent white clover *Trifolium repens*, common ragwort *Senecio jacobaea,* creeping buttercup *Ranunculus repens* and broadleaved dock *Rumex obtusifolius*, occasional birds foot trefoil *Lotus corniculatus* and ribwort plantain *Plantago lanceolata*. Common ragwort was frequent. The bryophytes *Kindbergia praelonga*, *Rhytidiadelphus squarrosus* and *Calliergonella cuspidata* and the liverwort *Blasia pusilla* were occasional within the habitat.

Habitats along the proposed access route were also classified as wet grassland. Species descriptions are similar to that described above. Additional species such as devils bit scabious *Succisa pratensis*, yellow iris *Iris pseudacorus*, and wild angelica *Angelica sylvestris* were locally occasional. One small area, too small to be considered a discrete habitat patch was noted along the north of the proposed access route which had some acid grassland flora. In this area locally frequent brown bent *Agrostis canina* and tormentil *Potentilla erecta*, locally occasional jointed rush *Juncus articulatus* and carnation sedge *Carex panicea*, and rare tufted hairgrass *Deschampsia cespitosa* and sweet vernal grass *Anthoxanthum odoratum*, were recorded.

Plate 3.1 - Wet Grassland.

3.3.2.2 BL1 – Stone walls and other stonework

A stone wall was present along the eastern boundary. It no longer functions as a field boundary since it was mostly defunct and collapsing. Stones appeared to be a siliceous type of rock. A microflora was associated with this habitat and comprised mainly mosses including abundant *Hypnum cupressiforme*, frequent *Thuidium thamariscanum* and *Hylocomium splendens*, and an unidentified acrocarpous moss, which was occasional. Vascular plants were not common within this microflora however germander speedwell *Veronica chaemaedrys* and mouse-ear chickweed *Cerastium fontanum* were occasional.

Plate 3.2 - Example of defunct stone wall on site.

A ruined building is present outside the site boundary but adjoining the eastern boundary of the site. It had an associated microflora of mosses and ferns similar to the defunct walls described above. Mosses included *occasional Hypnum cupressiforme*, *Thamnobryum alopecurum*, common polypody *Polypodium commune*, black spleenwort *Asplenium trichomanes*, and rare *Lophocolea bidentata*. Ivy *Hedera helix* was abundant on the structure. The bat potential of this structure is discussed further below.

Plate 3.3 - Ruin building adjoining eastern half of site.

3.3.2.3 FW4 - Drainage ditch

One drainage ditch was recorded within the proposed site, at the most southerly point of the proposed access route running adjacent to the public road. It was shaded by tall grasses and common nettle *Urtica dioica* with no obvious associated aquatic vegetation but access to the location was limited.

Shallow linear depressions occur in areas on site such as field boundaries which likely convey water during heavy rain. These depressions did not contain water at the time of survey and there was no evidence of wetland plants, therefore they are not considered to be 'drainage ditches' as described in Fossitt (2000).

3.3.2.4 WL1 - Hedgerows

The site contained a number of hedgerows. Species composition was relatively species poor with dominant common hawthorn *Crataegus monogyna* and in one instance a blackthorn *Prunus spinosa* dominated hedgerow.

A hedgerow measuring 122m adjoins the northern part of the site and would be removed to facilitate the proposed development. The hedgerow is dominated by Hawthorne, with Ash (*Fraxinus excelsior*), Willow (*Salix sp*.) and Blackthorn also present. The hedgerow becomes more dense and transitions to treeline at the western end (see **Figure 3.2**). For much of its length the hedgerow is 'derelict' and has become 'gappy' and is no longer stock-proof.

A hedgerow adjoins the public road, at the proposed site entrance. The hedgerow appears to have generated in recent years (likely self-seeded) and consists of Alder, Hawthorne (occasional) with Ash and Sycamore occurring occasionally. The western side of this hedgerow transitions to treeline.

Plate 3.4 - Hedgerow located on northern boundary of proposed site.

Plate 3.5 - Proposed roadside access point.

3.3.2.5 WL2 - Treelines

Treelines, linear field boundaries with woody species greater than 5m, were present within the site. They varied in composition and were up to 20m tall in some areas where mature trees were present. Dry ditches and tall ruderal margins were often associated with this habitat on site. Tree species included frequent Ash and Beech *Fagus sylvatica* and occasional Sycamore and Sessile Oak *Quercus petraea*. Smaller trees/shrub species included frequent Hawthorn, occasional Willow species, Alder *Alnus glutinosa* and Holly *Ilex aquifolium*. Species recorded within the field layer of the treeline/dry ditch included frequent Ivy and Broadleaved Willowherb *Epilobium montanum*, and Male Fern *Dryopteris* sp. Yew *Taxus baccata* was recorded in two locations, both proximal to but outside the proposed site. A large mature Yew tree was located in a treeline south of the proposed attenuation pond, outside the site boundary.

Plate 3.6 - Treeline adjoining Immature Woodland, bordering the proposed access route.

3.3.2.6 WS1 – Scrub

An area of scrub vegetation dominated by bramble was present in the north-western part of the along the proposed cable route to the existing 220kV substation. No grazing was evident within the habitat and vegetation here was dense. Willow *Salix* sp. and Bramble (*Rubus fruticosus*) were co-dominant within the habitat. Juvenile trees including Ash and Alder occur occasionally.

Plate 3.7 - Scrub habitat.

3.3.2.7 WS2 - Immature woodland

Immature woodland is present along the proposed access route, and adjoining the existing substation, north of the proposed cable route. The habitat is comprised of young trees typically less than 5m tall. Alder is abundant with occasional grey willow *Salix cinerea* and has a grassy field layer which is subject to grazing.

Plate 3.8 - Alder dominated Immature woodland.

3.3.2.8 Non-native Invasive Species

Snowberry *Symphoricarpos albus* was noted in roadside hedge opposite proposed access point. This species has not been risk assessed in Kelly, J. *et al*. (2013), but has the potential to spread into and prevent the regeneration of native vegetation as they smother seedlings. It is a relatively low significance non-native alien invasive plant species.

3.3.2.9 Habitat and Botanical Evaluation

The majority of the site is semi-natural habitat comprising the habitats GS4, WL1, WL2 and WS1. Although semi-natural, none of them are considered to correspond with any Annex I habitats of the EU Habitats Directive. Areas of woodland, scrub, hedgerow, treelines and grassland within the site have the potential to support a range of protected species including Badgers, bats, birds, reptiles and amphibians.

Although the proposed site contains semi-natural habitat, this is not of significance in a local context, and the habitats present are considered to be of **Local Importance (Lower Value).**

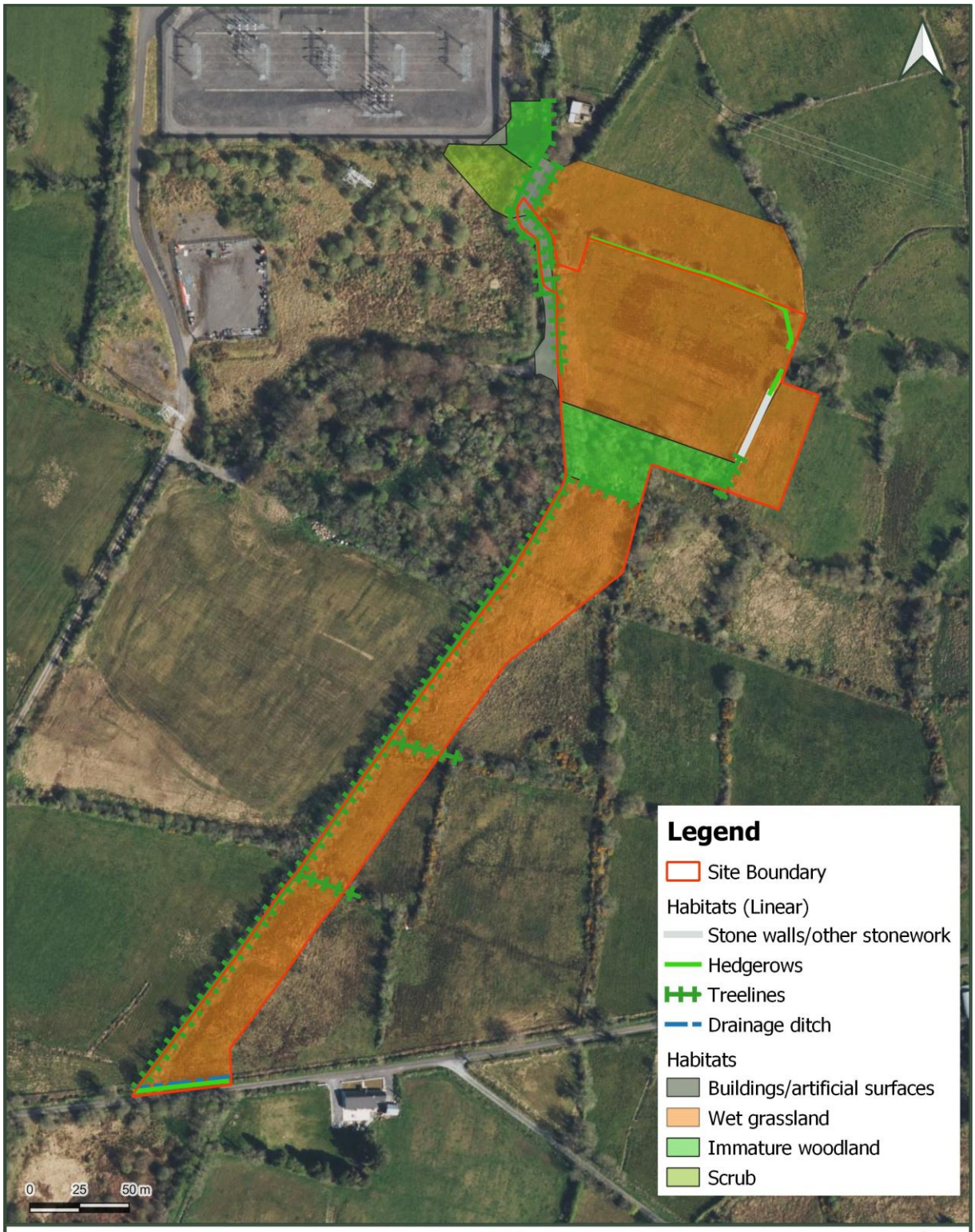


Figure 3.2 - Habitat Map

Project:
Quarry Lane Stability Project,
Co. Sligo

Prepared for:
Statkraft

Tom O'Donnell CEnv MCIEEM
D: 21/10/2022

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3.4 MAMMAL ASSESSMENT

The results of surveys carried out for non-volant mammals and bats are outlined below.

3.4.1 Non-volant Mammals

Within the 10km grid square in which the proposed development site is located (G72; NBDC) there are historic records for a total of 15 non-volant mammal species (see **Table 3.1**). Only Pine Marten have previously been recorded in the 1km grid square in which the proposed development site is located (G7525; NBDC).

Table 3.1 - Mammal species previously recorded within the 10km grid square (V93) in which the site is located (NBDC).

Common name	Species name	Legal Protection*	Conservation Status*
Brown Rat	*Rattus norvegicus*	-	AIS
Eurasian Badger	*Meles meles*	WA	LC
Eurasian Pygmy Shrew	*Sorex minutus*	WA	
Eurasian Red Squirrel	*Sciurus vulgaris*	WA	LC
European Otter	*Lutra lutra*	Annex II/IV, WA	LC
European Rabbit	*Oryctolagus cuniculus*	-	LC
Fallow Deer	*Dama dama*	WA	IAS
House Mouse	*Mus musculus*	-	LC
Irish Hare	*Lepus timidus* subsp. *hibernicus*	Annex V, WA	LC
Irish Stoat	*Mustela erminea* subsp. *hibernica*	WA	LC
Pine Marten	*Martes martes*	WA	LC
Red Fox	*Vulpes vulpes*	-	LC
Sika Deer	*Cervus nippon*	-	AIS
European Hedgehog	*Erinaceus europaeus*	WA	LC
Wood Mouse	*Apodemus sylvaticus*	-	LC

Source: https://maps.biodiversityireland.ie/Map. Accessed 01/12/2021.
* Annex status (EU Habitats Directive), WA (Protected under Wildlife Acts 1976 and 2000).
** LC – Least Concern (Marnell *et al*., 2019); AIS - Alien Invasive Species.

No burrows or other underground dwellings were found to be present within the site boundary.

Signs of non-volant mammals were sought during walkover surveys and evidence of Badger foraging (snuffle Holes) and Red Fox presence (scat) were found within the proposed site. Domestic cat and dog prints were also observed during the survey. Though not recorded during the survey, it is likely that other mammal species are occasionally present in the area. The Annex II listed species Otter were not recorded on the site and is unlikely to occur due to remoteness to watercourses.

One sett was located outside but proximal to the site boundary, north of the currently proposed grid route. Four entrances were visible, but only one appeared to be in regular use. Two entrances were accessible and these are shown on **Figure 3.4**, two further entrances (possibly

disused) were visible but not accessible and were located on an earth bank in dense vegetation proximal to the eastern accessible entrance. This primary entrance was the most easterly of the accessible entrances shown on **Figure 3.4**). The entrance was located at the base of an earthbank.

A trail camera was deployed at the primary entrance from 9th September to 2nd October 2022 and regular (almost nightly) use by multiple badgers was evident (see **Plate 3.9** and **Plate 3.10**). It was not possible to visually differentiate the badgers, and therefore it is not possible to state with certainly the number of badgers which used the sett during the monitoring period. Well established tracks leading to and from the sett were evidence. The sett did not appear characteristic of a main sett, which generally has several active entrances, shows evidence of significant excavation and bedding is often present at sett entrances. A search of the wider area was carried out and a main sett located within a ring fort approximately 260m west of the identified sett. A well-used trail crossed the proposed grid connection, in the direction of this main sett. Based on the available evidence, the identified sett is considered to be an 'annex' sett, associated with a main sett nearby (Harris et al., 1989).

A second sett entrance was also monitored (western entrance, see **Figure 3.2**), and no evidence of use by badgers were recorded. Several instances of Badger commuting past the entrance were recorded. Pine Marten, Deer (likely Sika) and Mink were also recorded here (**Plate 3.11** to **Plate 3.14**).

Plate 3.9 – Active sett entrance, trail camera mounted on right.

Plate 3.10 – Badgers grooming at active sett entrance.

Plates 3.11 & 3.12 - Badger passing, and Deer present at, second monitored sett entrance.

Plates 3.13 & 3.14 Mink (left) and likely Pine Marten (right) recorded at second monitored sett entrance.

The site is used for foraging by a variety of mammal species, including Badgers. Based upon the results of non-volant mammal assessment and considering the scale and local context of the proposed site, the study site is considered to be of **Local Importance (Lower Value)** for non-volant mammals.

3.4.2 Bats

All Irish bat species are protected under the Wildlife Act (1976) and Wildlife Amendment Act (2000). All Irish bats are listed in Annex IV of the Habitats Directive and the Lesser horseshoe bat is further listed under Annex II.

3.4.2.1 Data Search

The following five bat species have previously been recorded in the 10km grid square (G72) in which the site is located:

- Brown Long-eared Bat (*Plecotus auritus*)
- Leisler's Bat (*Nyctalus leisleri*)
- Daubenton's Bat (Myotis daubentonii)
- Natterer's Bat (*Myotis nattereri*)
- Soprano Pipistrelle (*Pipistrellus pygmaeus*).

The overall bat suitability index value (20.22) according to 'Model of Bat Landscapes for Ireland' (Lundy *et at.* 2011) suggests the landscape in which the proposed site is located is of low suitability for bats in general. Species specific scores are provided in **Table 3.2**. The Annex II (EU Habitats Directive) listed bat species, Lesser Horseshoe Bat, is assigned a score of 5.

Table 3.2 - Suitability of the study area for the bat species according to 'Model of Bat Landscapes for Ireland' (Lundy *et al.* 2011).

Common name	Scientific name	Suitability index
All bats		*32.56*
Soprano pipistrelle	*Pipistrellus pygmaeus*	46
Brown long-eared bat	*Plecotus auritus*	44
Common pipistrelle	*Pipistrellus pipistrellus*	43
Lesser horseshoe bat	*Rhinolophus hipposideros*	3
Leisler's bat	*Nyctalus leisleri*	42
Whiskered bat	*Myotis mystacinus*	15
Daubenton's bat	*Myotis daubentonii*	46
Nathusiius pipistrelle	*Pipistrellus nauthusii*	3
Natterer's bat	*Myotis nattererii*	51

3.4.2.2 Visual Roost Survey

The proposed project will involve works affecting or in close proximity potential roosting features (trees and a derelict structure) such that disturbance to roosting bats would be caused should they be present. Ground level roost inspections were carried out and Potential Roosting Features (PRFs) are categorised according to their potential suitability for roosting bats following Collins (2016) (see **Table 2.2**).

No roosting bats were encountered during the current survey, and no unoccupied roosts which contained signs of bats were encountered. No features of above 'negligible' potential are located within the site boundary. Seven trees were located within the wider area (outside the site boundary) which had features which are considered to have 'low' potential to support roosting bats; some of these features were assessed in relation to a previous iteration of the project design. The results of the assessment are detailed in **Table 3.3** below and the locations of relevant trees is shown in **Figure 3.4**. No direct impacts on these trees will occur, and following Collins (2016), no further survey of trees is considered warranted.

A derelict structure / ruin adjoins the proposed site to the east and consists of remnant stone built walls. A detailed visual assessment was carried out by Tom O'Donnell, and no evidence of current or historic bat roosting was available. Gaps present between stones present 'low' suitability roosting opportunities for occasional roosting by individuals or small numbers of bats. This structure is outside the proposed site boundary, and no direct impacts will occur. No further survey was considered warranted.

No 'moderate' or 'high' suitability PRFs were identified. Maternity roosts are of considerable conservation importance to bats and there is no potential for a maternity roost of any bat species to occur at the proposed site.

Plate 3.7 – 'Bat_6' is a Beech tree with 'low' suitability for roosting bats.

A number of potential roosting features (described in **Table 3.3**) were identified, and these were considered to be of sub-optimal quality in general and not suitable for large numbers of bats or maternity roosts.

Table 3.3 - Assessment of bat roosting potential of relevant features within and proximal to site boundary.

Ref.	Type	Tree Species	Comment	Suitability
Bat_1	Tree	Ash	Moderate Ivy cover may restrict view of PRFs. Evidence of Ash dieback.	Low
Bat_2	Tree	Ash	Dense Ivy cover may restrict view of PRFs. Evidence of Ash dieback.	Low
Bat_3	Tree	Ash	Dead tree. Dense Ivy cover may restrict view of PRFs	Low
Bat_4	Tree	Ash	Thick interweaving ivy stems. Moderate Ivy cover may restrict view of PRFs.	Low
Bat_5	Tree	Beech	Large multi-stem specimen. View of PRFs at height is restricted.	Low
Bat_6	Tree	Beech	Mature multi-stem tree, welds provide possible PRF.	Low
Bat_7	Structure	-	Crevices between stones may provide PRFs for individuals / small numbers.	Low

Potential roosting features may be present but not visible during a ground level survey, particularly in Ivy covered trees and larger specimens. It is possible that some of these features will be used at least occasionally by day-roosting bats. Most of Irelands bat species are known to exploit a wide variety of roosting opportunities with some being used infrequently. Over time, the value of many of these roosting features to bats may increase.

3.4.2.3 Passive Bat Detector Survey

A passive bat detector was located as shown in **Figure 3.4** to record bat activity from the 19th August 2022 to the 22nd August 2022, which resulted in over three full nights recording. A total of 5034 registrations were recorded during the passive recording session. Species recorded were: Common Pipistrelle (40.4%) Soprano Pipistrelle (58.2%), Whiskered Bat (0.7%). Daubenton's Bat (0.5%), Leisler's Bat (0.1%) and Natterer's Bat (0.1%).

Taking the three full nights of recording (i.e. omitting the night of 22nd August 2022 when the detector stopped recording at 22:47) a total of 4659 registrations were recorded and the distribution of these registrations by night and species is shown in **Table 3.4**. A high level of Pipistrelle activity was recorded, with a low level of Daubenton's Bat, Leisler's Bat, Natterer's Bat and Whiskered Bat activity recorded. Six species represents a moderate to high diversity of species, and it is likely that Brown Long-eared Bat occur on site also, at least occasionally. The Annex I (EU Habitats Directive) Lesser Horseshoe Bat was not recorded, and the site is not within the known range of this species.

Table 3.4 - Bat registrations recorded on three full nights of recording.

Date (night of…)	19/08/2022	20/08/2022	21/08/2022	Grand Total
Common Pipistrelle	440	602	700	*1742*
Daubenton's Bat	5	6	7	*18*
Leisler's Bat	0	4	3	*7*
Natterer's Bat	0	2	2	*4*
Soprano Pipistrelle	1008	1329	517	*2854*
Whiskered Bat	5	17	12	*34*
Grand Total	*1458*	*1960*	*1241*	*4659*

Analysis of the data recorded over three full nights (the nights of 19th August 2022 to 21st August 2022 inclusive) according to 10-minute time intervals does not show any evidence of bat roosting proximal to the recorder location (see **Figure 3.3**, below).

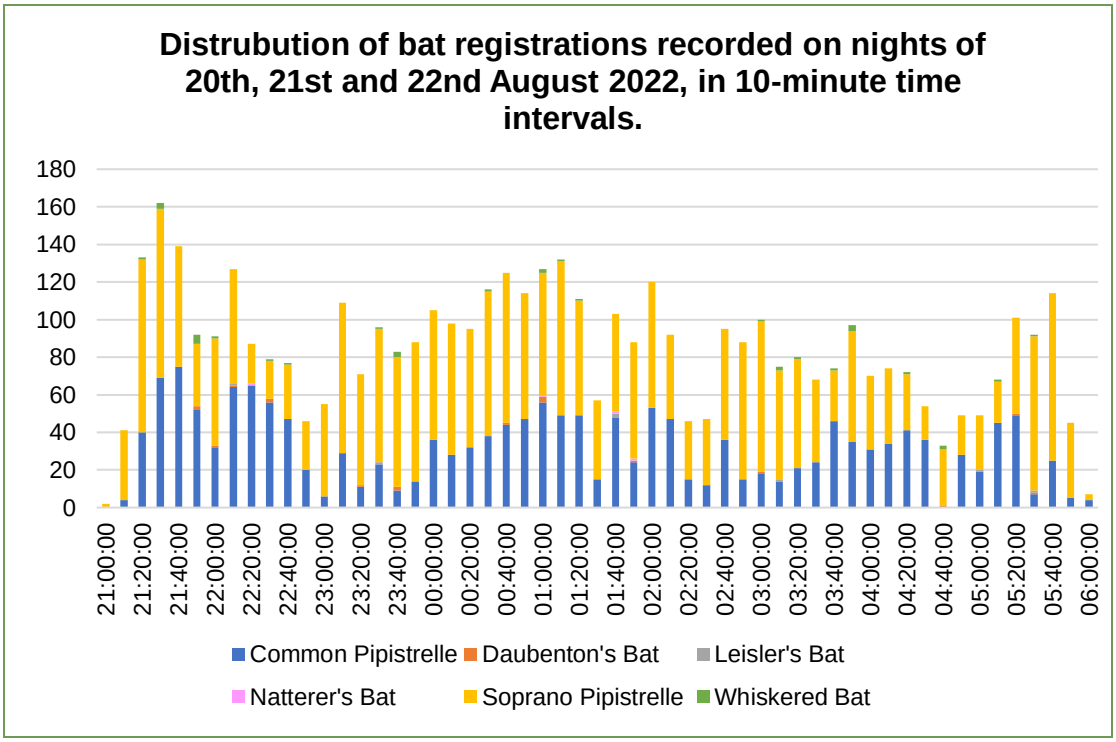

Figure 3.3 - Distribution of 'Bat_1' Bat Registrations by Ten Minute Time Interval.

Hedgerows and treelines on site will be used as commuting and foraging habitats for bats. Areas of immature woodland and scrub will also be favoured foraging habitat. Wet grassland habitats which are grazed by cattle are likely to be productive habitats for many insect species which bat rely on to feed.

3.4.2.4 Mammal Evaluation

Based upon the results of desktop and on-site surveys, and considering the local context of the proposed site, the study site is considered to be of **Local Importance (Lower Value)** for mammals.

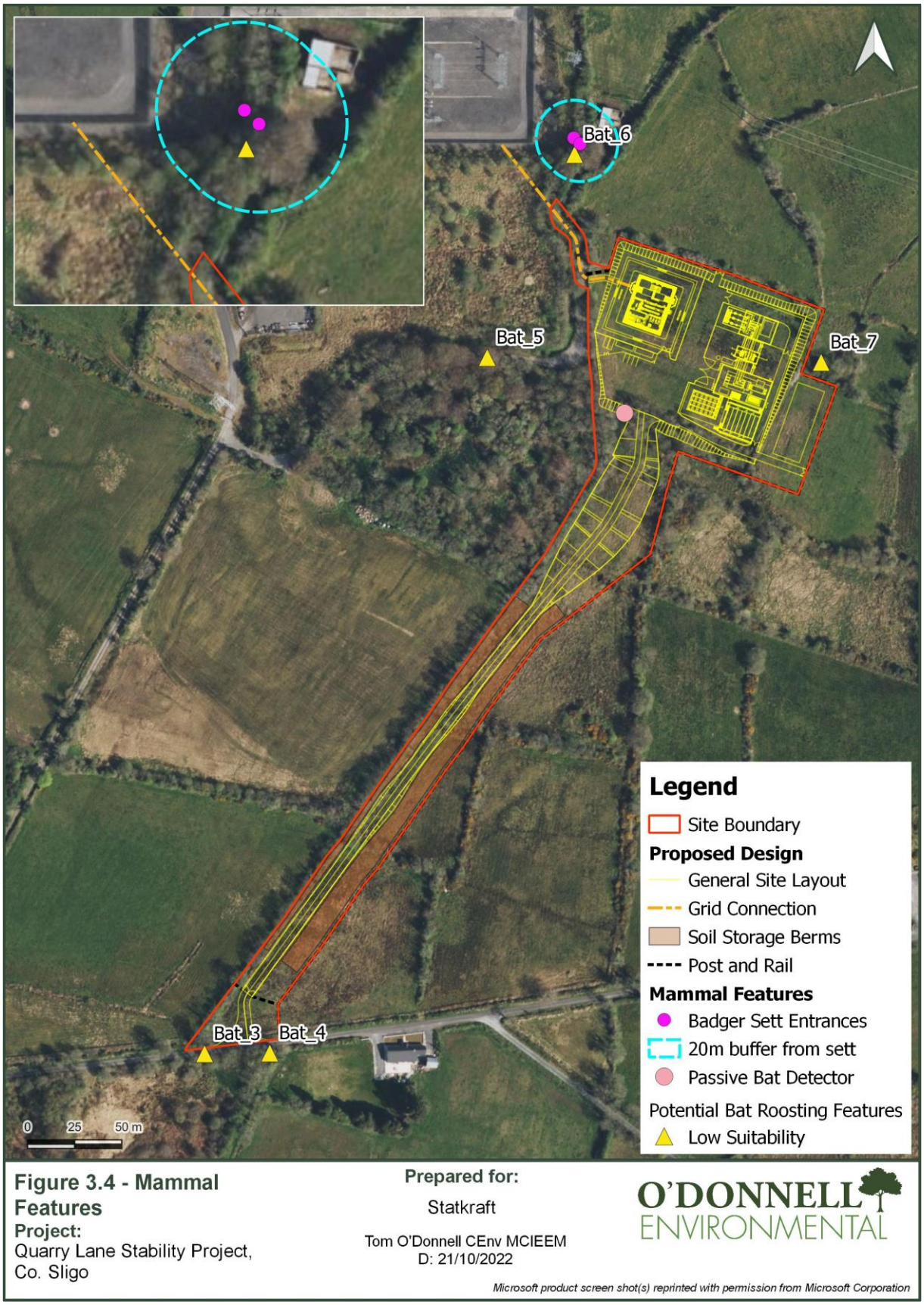

Figure 3.4 - Mammal Features
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Quarry Lane Stability Project, Co. Sligo

Prepared for:
Statkraft

Tom O'Donnell CEnv MCIEEM
D: 21/10/2022

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3.5 BIRD ASSESSMENT

3.5.1 Data Search

NBDC holds records for bird species previously recorded in the 10km grid square (G72) in which the proposed site is located. These records are shown in **Table 3.5**.

Table 3.5 - Relevant bird species records in the 10km grid square (G72)

Common Name	Species Name	Conservation Status
Barn Owl	*Tyto alba*	WA, Red
Barn Swallow	*Hirundo rustica*	WA, Amber
Black-billed Magpie	*Pica pica*	
Blackcap	*Sylvia atricapilla*	
Black-tailed Godwit	*Limosa limosa*	WA, Red
Blue Tit	*Cyanistes caeruleus*	
Bohemian Waxwing	*Bombycilla garrulus*	
Brambling	*Fringilla montifringilla*	
Chaffinch	*Fringilla coelebs*	
Coal Tit	*Periparus ater*	
Common Blackbird	*Turdus merula*	
Common Bullfinch	*Pyrrhula pyrrhula*	
Common Buzzard	*Buteo buteo*	
Common Chiffchaff	*Phylloscopus collybita*	
Common Coot	*Fulica atra*	WA, A. II, III, Amber
Common Cuckoo	*Cuculus canorus*	
Common Grasshopper Warbler	*Locustella naevia*	
Common Greenshank	*Tringa nebularia*	WA
Common Kestrel	*Falco tinnunculus*	WA, Red
Common Kingfisher	*Alcedo atthis*	WA, A. I, Amber
Common Linnet	*Carduelis cannabina*	WA, Amber
Common Moorhen	*Gallinula chloropus*	
Common Pheasant	*Phasianus colchicus*	WA, A. II, III
Common Pochard	*Aythya ferina*	WA, A. II, III, Amber
Common Raven	*Corvus corax*	
Common Sandpiper	*Actitis hypoleucos*	Amber
Common Shelduck	*Tadorna tadorna*	WA, Amber
Common Snipe	*Gallinago gallinago*	WA, A. II, III, Red
Common Starling	*Sturnus vulgaris*	WA, Amber
Common Swift	*Apus apus*	WA, Red
Common Whitethroat	*Sylvia communis*	
Common Wood Pigeon	*Columba palumbus*	WA, A. II,III
Corn Crake	*Crex crex*	A. I, Red
Eurasian Collared Dove	*Streptopelia decaocto*	
Eurasian Curlew	*Numenius arquata*	WA A. II, , Red List
Eurasian Jackdaw	*Corvus monedula*	
Eurasian Jay	*Garrulus glandarius*	
Eurasian Siskin	*Carduelis spinus*	
Eurasian Sparrowhawk	*Accipiter nisus*	
Eurasian Teal	*Anas crecca*	WA, A. II,III, Amber
Eurasian Treecreeper	*Certhia familiaris*	
Eurasian Woodcock	*Scolopax rusticola*	WA, A. II,III, Red
European Goldfinch	*Carduelis carduelis*	
European Greenfinch	*Carduelis chloris*	WA, Amber
European Robin	*Erithacus rubecula*	
Fieldfare	*Turdus pilaris*	
Goldcrest	*Regulus regulus*	Amber
Great Spotted Woodpecker	*Dendrocopos major*	
Great Tit	*Parus major*	WA, Amber
Grey Heron	*Ardea cinerea*	

Grey Wagtail	*Motacilla cinerea*	
Hedge Accentor	*Prunella modularis*	
Hen Harrier	*Circus cyaneus*	WA, A. I, Amber
Herring Gull	*Larus argentatus*	WA, Amber
Hooded Crow	*Corvus cornix*	
House Martin	*Delichon urbicum*	WA, Amber
House Sparrow	*Passer domesticus*	WA, Amber
Jack Snipe	*Lymnocryptes minimus*	
Lesser Black-backed Gull	*Larus fuscus*	WA, Amber
Lesser Redpoll	*Carduelis cabaret*	
Little Egret	*Egretta garzetta*	WA, A. I
Little Grebe	*Tachybaptus ruficollis*	WA
Little Plover	*Charadrius dubius*	
Long-billed Dowitcher	*Limnodromus scolopaceus*	
Long-eared Owl	*Asio otus*	
Long-tailed Tit	*Aegithalos caudatus*	
Mallard	*Anas platyrhynchos*	WA, A. II, III, Amber
Meadow Pipit	*Anthus pratensis*	
Merlin	*Falco columbarius*	WA, A.I, Amber
Mew Gull	*Larus canus*	WA, Amber
Mistle Thrush	*Turdus viscivorus*	
Mute Swan	*Cygnus olor*	WA, Amber
Northern Lapwing	*Vanellus vanellus*	WA, A.II, Red
Northern Shoveler	*Anas clypeata*	WA, A. II, III, Red
Northern Wheatear	*Oenanthe oenanthe*	Amber
Peregrine Falcon	*Falco peregrinus*	WA, A. I
Redwing	*Turdus iliacus*	
Reed Bunting	*Emberiza schoeniclus*	
Rook	*Corvus frugilegus*	WA, Amber
Sand Martin	*Riparia riparia*	WA, Amber
Sedge Warbler	*Acrocephalus schoenobaenus*	
Semipalmated Sandpiper	*Calidris pusilla*	
Skylark	*Alauda arvensis*	WA, Amber
Song Thrush	*Turdus philomelos*	
Spotted Flycatcher	*Muscicapa striata*	WA, Amber
Stock Pigeon	*Columba oenas*	WA, Amber
Stonechat	*Saxicola torquata*	
Tufted Duck	*Aythya fuligula*	WA, A. II,III, Amber
Whinchat	*Saxicola rubetra*	Red
White Wagtail	*Motacilla alba*	
White-throated Dipper	*Cinclus cinclus)*	
Whooper Swan	*Cygnus cygnus*	WA, A. I, Amber
Willow Warbler	*Phylloscopus trochilus*	
Wren	*Troglodytes troglodytes*	
Yellowhammer	*Emberiza citrinella*	WA, Red

Note: WA: Wildlife Acts; A. denotes relevant Annex of EU Birds Directive; Red/Amber denotes relevant conservation status according to BoCCI(4) status. IAS denotes an invasive alien species.

3.5.2 Field Survey

Note was made of birds seen and heard during ecological walkover surveys and many of these were recorded from adjacent habitats or overflying the site. 10 species of birds were noted as follows:

- Robin (*Erithacus rubecula*)
- Woodpigeon (*Columba palumbus*)
- Rook (*Corvus frugilegus*)
- Blue Tit (*Cyanistes caeruleus*)
- Blackbird (*Turdus merula)*
- Chaffinch (*Fringilla coelebs*)
- Jackdaw (*Corvus monedula*)
- Dunnock (*Prunella modularis*)
- Magpie (*Pica pica*)
- Wren (*Troglodytes troglodytes*)

An acoustic recorder was deployed to passively record acoustic sound (e.g. bird calls) for a total of 3 days 19th August to 21st August 2022. The bird species recorded during this survey represent a typical assemblage of pasture and hedgerow / woodland edge habitats in Ireland.

The species recorded included some which are red-listed in *Birds of Conservation Concern in Ireland 2020-2026* (BoCCI; Gilbert *et al.*, 2021), as follows:

- Red listed species- Grey Wagtail, recorded twice, Meadow Pipit, recorded once.
- Amber listed species - Barn Swallow, Goldcrest, Spotted Flycatcher (group), Willow Warbler, Swallow, House Martin.

Other species recorded included Pheasant, Blue Tit, Coal Tit, Great Tit, Dunnock, Treecreeper, Robin, Rook, Hooded Crow, Raven, Jackdaw, Jay, Magpie, Chiffchaff, Blackcap, Goldfinch and Sisken.

While the surveys were limited to the autumn period, the nature of the habitats contained within the site and the species recorded during the survey do not indicate that the site is of high value for its bird assemblage.

3.5.2.1 Ornithological Evaluation

Based upon the results of desktop and on-site surveys, and considering the local context of the proposed site, the study site is considered to be of **Local Importance (Lower Value)** for birds.

3.5.3 Overall Site Evaluation

The proposed site contains semi-natural habitats and is used at least occasionally by protected species. The site does not exhibit a high degree of naturalness or high biodiversity value in a local context, and it does not form part of an important connecting habitat locally.

The proposed development site is considered to be of **Low Value, Local Importance** (following NRA, 2009).

4 Potential Impacts

Potential ecological impacts which could arise as a result of the proposed development are discussed below. Avoidance and mitigation measures in respect of identified potential impacts are discussed in Chapter 5 - Avoidance and Mitigation Measures. The predicted residual impact of identified potential impacts following application of avoidance and mitigation measures are discussed in Chapter 6 - Residual Impacts.

4.1 DO NOTHING IMPACT

If the proposed development does not proceed, the 'do nothing' scenario is that the existing environment within the site boundary is likely to remain as described herein in the short term at least, as vegetation continues to grow and be manged as currently occurs. Existing surface water drainage patterns would continue as occurs currently.

4.2 POTENTIAL EFFECTS ON SURFACE WATER

The below sections discuss the potential effects of the proposed development on surface water in both the construction and operational phases.

Surface water runoff from the proposed site currently discharges to drainage ditches on the north and south of the site. EPA monitoring shows that the downstream water quality in the receiving environment is of a high standard. The potential for negative impacts on surface water is explored below.

The current assessment is limited to assessment of potential impacts within the proposed site. The potential for negative impacts on downstream watercourses and the potential for negative impacts on the qualifying interests of the relevant Natura 2000 sites as a result of the proposed works is addressed in the accompanying Natura Impact Statement (MWP, 2022).

4.2.1 Construction Phase

Habitat loss or deterioration of the ecological status of surface water can occur from the indirect effects of contaminated run-off or discharge into the aquatic environment, through siltation, nutrient release and/or contamination.

The construction phase of the development will involve site preparation (e.g. earthworks, excavation etc.). In the absence of mitigation, the proposed construction phase works have the potential to result in sediment run-off during prolonged heavy rain where excavated areas and spoil heaps are unprotected. Similarly, the operation and refuelling of machinery during construction has the potential to result in leaks of hydrocarbons in the absence of mitigation.

Measures intended to manage and protect local surface water during the construction phase are detailed in the outline CEMP and discussed in Chapter 5 - Mitigation measures.

4.2.1.1 Foul Water

The sources of foul drainage associated with the temporary welfare facilities in the construction phase include toilets and hand wash basins. In the absence of appropriate measures,

mismanagement of wastewater at the proposed site would result in the discharge of pollutants from the site.

As outlined in the CEMP, wastewater will be stored appropriately on-site and disposed of by removal from site to an appropriately licensed treatment facility. These standard measures avoid the potential for impacts associated with foul water during the construction phase.

4.2.2 Operational Phase

The operational phase of the proposed development will generate both surface runoff and foul wastewater.

In the absence of appropriate measures, this water has the potential to result in negative environmental impacts on downstream receptors.

Appropriate measures have been incorporated into the proposed design to i) divert clean water away from working areas where possible, ii) treat water from areas where hydrocarbon contamination could potentially occur using hydrocarbon interceptors iii) manage and treat other surface water using a networks of channels, swales, check dames and attenuation ponds and iv) release treated water at an appropriate greenfield rate.

4.3 POTENTIAL EFFECTS ON HABITATS AND FLORA

The below sections discuss the potential effects of the proposed development on habitats and flora in both the construction and operational phases.

4.3.1 Construction Phase Impacts

No Annex I habitats listed under the EU Habitats Directive are present within the study site. No high-impact alien invasive plant species (e.g. Japanese Knotweed) are present on the proposed site. Elements of the project involve the loss of semi-natural habitats such as hedgerows and treelines, which are of limited ecological value at a local level. All species recorded during the botanical survey are considered common for similar habitats in the general area.

Habitats lost will largely be replaced with 'Buildings and Artificial Surfaces' (BL3) (see **Figure 4.1**). The construction compound will be located within the permanent footprint, and therefore no additional areas are required on a temporary basis to facilitate construction.

The overall impact on local habitats and flora as a result of the operation of the proposed development is considered to be a temporary, moderate, negative impact (following EPA, 2022).

4.3.2 Operational Phase Impacts

There will be no additional removal of existing habitat during the operational phase of the proposed development. Any trees or hedgerows which may be planted (or translocated) at construction stage will continue to mature and would increase in ecological value over time.

The overall impact on habitats and flora as a result of the construction and operation of the proposed development is considered to be a slight, negative effect (following EPA, 2022).

4.4 POTENTIAL EFFECTS ON MAMMALS

Impacts on non-volant and volant mammals are discussed separately below.

4.4.1 Non-Volant Mammals

The below sections discuss the potential effects of the proposed development on non-volant mammals in both the construction and operational phases.

4.4.1.1 Construction Phase

Although there was no evidence of underground dwellings within the proposed site boundary, the site is likely to be used regularly by mammals including Badger, Fox, Hedgehog etc. as well as a range of bat species. The Annex II listed species Otter were not recorded on the site and is unlikely to occur due to remoteness to watercourses.

Construction works will cause some local displacement of and disturbance to terrestrial mammals (Badger) during site clearance and construction as a result of noise and human presence. An earlier iteration of the proposed design showed a grid route running close to the identified badger 'annex' sett, and to a mature tree with 'low' suitability for roosting bats. This route was modified on ecological advice and the currently proposed route offers a buffer of over 20 meters to the existing sett, and avoids any loss of mature trees.

In the absence of avoidance measures, should Badgers access through to the existing annex sett be blocked, or the sett directly impacted in any way, a significant level of disturbance to the local Badger population would occur.

Deep excavations can potentially entrap mammals commuting across the site. Should there be pooled water in these excavations there is potential for drowning. Inappropriate or excessive lighting during the construction phase can cause disturbance to mammals at night. The inappropriate disposal of food wastes during the construction phase can encourage scavenging by mammals (and birds) at the site.

Localised increases in noise and dust levels are likely to occur during the construction phase. In the absence of mitigation, these impacts could give rise to indirect negative impacts on some bat and bird species present in the local environment. Noise will occur through the operation of machinery (excavation etc.). Dust may arise during construction works if dry soil or other material is allowed to become windborne.

The CEMP outlines measures which will avoid or reduce the potential for negative effects on non-volant mammals during the construction stage. Proposed avoidance and mitigation measures are discussed further in Section 5, and the residual impact is discussed in Section 6.

4.4.1.2 Operational Phase

No additional habitat loss will occur during the operational phase. The site is likely to be visited by foraging local mammals by night when the site is unlit and vacant.

Relative to the condition of the site prior to vegetation clearance, the proposed site will lead to a reduction in foraging opportunities for mammals such as Badger. Alternative foraging

opportunities for these species are widely available locally. The proposed development will result in increased anthropogenic disturbance relative to the current situation.

External lighting is proposed as discussed in **Section 1.2.3**. Predicted light spill associated with this motion sensor operated lighting is not known. The disturbance due to light spill associated with external lighting is predicted to be highly localised and of minimal significance.

The overall effect on non-volant mammals at the site and surrounding locality during the construction and operational phases is considered to be a permanent, slight, negative effect.

4.4.2 Bats

The below sections discuss the potential effects of the proposed development on bats in both the construction and operational phases.

4.4.2.1 Construction Phase

No trees of above 'negligible' suitability for bats will be lost as a result of the proposed works. The construction phase will result in the loss of hedgerow and treeline which is used for commuting and foraging by a relatively high diversity of species. An ecological assessment of those features (trees) which will be removed as a result of the proposed development was carried out, and no evidence was recorded of the use of the trees by bats.

Should bat(s) be roosting within trees during tree felling (i.e. in the absence of appropriate mitigation measures) a slight negative impact on local bat populations is likely to occur. Additionally, this may result in an offence under the Wildlife Act 1976 (as amended).

Vegetation removal and illumination of retained vegetation will impact foraging and commuting bats that use treelines, hedgerows and other similar features. Treelines/hedgerows maintain landscape connectivity and provide commuting bats with waypoints and corridors through which they commute to and from roosts/foraging areas. The loss of these treeline and hedgerow features on site will reduce landscape connectivity for bats.

Construction can result in noise and air emissions through the use of heavy machinery for example. Of particular relevance to bats is the use of generators which create noise and vibration and are often left running at night. The CEMP provides for the enclosure of generators to minimise noise impacts. Generators will not be used proximal to sensitive ecological receptors.

Inappropriate or excessive illumination of treelines or hedgerow areas at night can cause disturbance to roosting, commuting and foraging bats. Artificial lighting is thought to increase the chances of bats being predated upon by avian predators (e.g. owls), and therefore bats may modify their behaviour to avoid illuminated areas.

The use of heavy machinery in the root zone of trees can cause damage, resulting in increased tree morbidity and mortality. Equally, the use of machinery in proximity to trees can result in accidental damage to the trunk and branches of trees. In the medium and long terms this could result in the death of trees which provide bat roosting opportunities.

Construction of the grid connection route will involve the permanent loss of former scrub habitat which will not be offset by proposed landscaping works, and a three-meter buffer corridor either side of the buried cable will be maintained to prevent tree growth during the operational phase.

The CEMP sets out measures in relation to noise, dust and lighting and during construction works which will avoid or reduce adverse ecological impacts.

4.4.2.2 Operational Phase

Relative to the construction stage, no additional habitat loss will occur during the operational phase. The establishment and planted or translocated tree or hedgerow species may offset to some extent by landscaping works depending on the design and location of such works. The overall value of the site to foraging and commuting bats will be diminished when comparing the pre-construction and operational phases.

As discussed above, the construction of the grid connection route will involve the permanent loss of former scrub habitat which will be maintained to prevent tree growth (and root damage to the buried cable) during the operational phase.

Artificial illumination can cause disturbance to roosting, commuting and foraging bats. While all bat species have a low tolerance for light levels, the following bat species are particularly sensitive to elevated light levels: Brown Long-eared Bat, Whiskered Bat, Natterer's Bat, Daubenton's Bat and Lesser Horse-shoe Bat (BCI, 2010). Leisler's Bat and Pipistrelles can be attracted to sources of light to feed on the insects which congregate there, and this could have the effect of disturbing existing foraging patterns can introduce competitive advantages to the detriment of more light sensitive species.

Slight disturbance is likely to occur to bats foraging and commuting within the proposed site and its immediate environs when the operation lighting is illuminated.

The overall effect on bats at the site and surrounding locality during the construction and operational phases is considered to be a permanent, slight, negative effect.

4.5 POTENTIAL EFFECTS ON BIRDS

The below sections discuss the potential effects of the proposed development on birds in both the construction and operational phases.

4.5.1 Construction Phase

The assemblage of bird species recorded at the proposed site is typical of hedgerow / woodland edge habitats in Ireland. The nature of the habitats present at the site, and the species recorded during the survey, do not indicate that the site is of high value for its bird assemblage.

Site clearance will see the permanent loss of a small area of foraging and nesting habitat for birds. Construction activity is likely to cause localised disturbance to the birds present in or close to the development footprint. Should works be carried out in spring or summer there is potential to indirectly impact upon nesting birds occurring at the site through noise and light disturbance.

If edible wastes are not disposed of appropriately during construction this has the potential to attract avian scavengers to the site.

Avoidance and mitigation measures are outlined below to address the potential for disturbance to breeding birds during the site clearance and construction phases.

4.5.2 Operational Phase

The operational phase of the proposed works will not result in any additional habitat loss relative to the construction phase.

Relative to the current situation the operational phase of the proposed development will result in increased disturbance effects due to human activity and lighting.

It is likely that light spillage will reduce the value of boundary habitats to nesting and roosting birds, particularly in winter when the screening effect of trees is reduced, and artificial lighting is in use more frequently.

The overall impact on birds as a result of the construction and operational phases of the proposed development is considered to be a permanent, slight negative effect.

4.6 CUMULATIVE IMPACTS

A review was undertaken of significant planning applications proximal to the study area and two planning applications which are of relevance to the assessment of in-combination effects were found.

4.6.1 Ref. 20/90 - Synchronous Condenser

Application reference 20/90 was granted 10-year conditional approval by Sligo County Council and relates to the construction of a synchronous condenser facility within a c. 1ha site which occurs approximately 20m north of the current site boundary, at the closest point.

A Natura Impact Statement which was prepared by Noreen McLoughlin (Whitehill Environmental) on behalf of Rowan Engineering Consultants Ltd. was reviewed and any relevant ecological information was considered in the current assessment. The site is relatively small in scale and lacks any key ecological receptors.

4.6.2 Ref. 20/11 - Battery Storage

Application reference 20/11 was granted conditional approval by Sligo County Council and relates to the construction of a battery storage facility within a c. 0.6ha site which occurs approximately 200m south-west of the proposed electrical compound.

An Ecological Impact Assessment Report was prepared by MORCE on behalf of Brookfield Renewable (the developer) in 2020. During surveys carried out for the report no protected species of flora or fauna were identified, and the EcIA concluded that the site was of "low/local ecological value".

4.6.3 Summary of Cumulative Impacts

The permitted projects involve the loss of c. 1.6ha of improved agricultural grassland (GA1) and although this and similar grassland habitats are well represented locally, they are likely to be used at least occasionally for foraging by a range of species including Badger.

Assuming the above detailed developments proceed, they will also give rise to disturbance impacts and reduction in habitat connectivity for a range of species including bats.

4.6.4 Overall Ecological Impact

The overall impact on ecological receptors with the proposes site and its environs as a result of the construction and operational phases of the proposed development, considering the potential for cumulative effects also, is considered to be a permanent, slight, negative effect at a local level (following EPA, 2022).

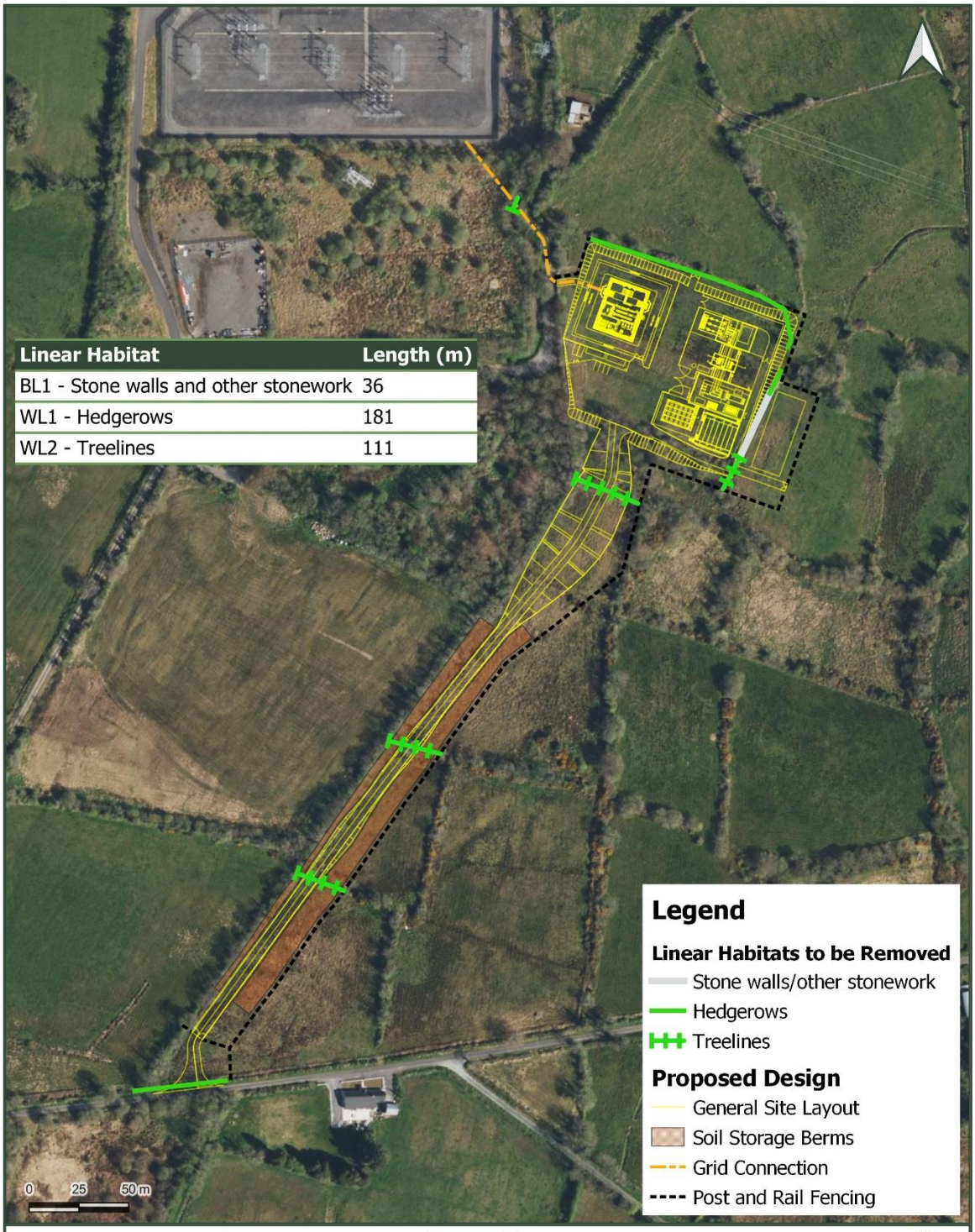

Figure 4.1 - Linear Habitats Proposed for Removal

Project:
Quarry Lane Stability Project, Co. Sligo

Prepared for:
Statkraft

Tom O'Donnell CEnv MCIEEM
D: 21/10/2022

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5 Avoidance and Mitigation Measures

Avoidance and mitigation measures in relation to potential impacts identified above are discussed below.

5.1 MEASURES FOR LOCAL SURFACE WATER

Proposals to manage and protect local surface water during the construction and operational phases are detailed in **Section 1.2.1**.

Additional measures for the protection of local surface water during the construction and operational phases are detailed in the CEMP (MWP, 2022).

No further measures are considered warranted.

An accompanying Natura Impact Statement (MWP, 2022) considers the potential for impacts of the proposed development in terms of downstream Natura 2000 sites and concludes that there is no potential for significant impacts on any Natura 2000 sites as a result of the proposed works.

5.2 MEASURES FOR HABITATS AND FLORA

Avoidance and mitigation measures to address identified potential negative effects on habitats and flora during the construction and operational phase of the proposed development are detailed below.

5.2.1 Construction Phase

Boundary habitats which are to be retained will be fenced off prior to the commencement of works and measures put in place to protect these habitats from accidental ingress. Arborocultural advice will be sought, and specific measures in relation to tree root protection will be implemented to safeguard for those trees intended to be retained. No works should be undertaken within the 'drip-zone' of trees intended to be retained.

Reinstatement of hedgerows and treelines will take place where possible, such as along the permanent soil berms which line the proposed access route. Native species will be used, and stock of local provenance will be used where possible. Landscape design input will be sought in relation to planting and ongoing maintenance.

5.2.2 Operational Phase

The use of fertilisers, herbicides and pesticides will be avoided where possible during the operational phase. If required, such products will be used in accordance with manufacturer's instructions.

5.3 MEASURES FOR MAMMALS

Measures for non-volant and volant mammals are discussed separately below.

5.3.1 Non-Volant Mammals

Avoidance and mitigation measures to address identified potential negative effects on non-volant mammals during the construction and operational phase of the proposed development are detailed below.

5.3.1.1 Construction Phase

A pre-construction mammal survey will be carried out by a suitably qualified Ecologist immediately before the commencement of vegetation clearance. This will identify any change in the usage of the site, particularly regarding the presence of any protected breeding or resting sites, in the period between the submission of the planning application and the commencement of associated site works. The Ecologist will advise on the need for any additional requirements in the event the ecological context of the site has changed.

Suitable noise barrier / screening will be erected along the proposed grid cable route, as close to the proposed works as possible and at minimum 20m from the most proximal sett entrance. Continued passage by Badger will be provide for, and the barrier will allow space beneath for Badgers and other mammals to pass at night. The site will be reinstated at night to a safe condition and within the working area suitable fencing will be used when required to exclude mammals from hazardous areas including deep excavations.

Suitable fencing will be used if relevant to exclude mammals from hazardous areas including deep excavations on the site generally.

Some lighting may be required during the construction phase for security and safety reasons. The CEMP sets out measures in relation to artificial light and which are considered sufficient to minimise any adverse ecological impacts on non-volant mammals. The following measures will be applied:

- Lighting will be provided with the minimum luminosity sufficient for safety and security purposes. Where practicable, precautions will be taken to avoid shadows cast by the site hoarding on surrounding footpaths, roads and amenity areas.
- Where possible, construction lights will be switched off when not in use.
- Lighting will be positioned and directed so that it does not to unnecessarily intrude on adjacent ecological receptors. There will be no directional lighting focused towards the boundary habitats respectively and cowling and focusing lights downwards will minimise light spillage.
- Works will primarily take place during hours of daylight to minimise disturbance to any nocturnal mammal species.

The CEMP sets out measures in relation to housekeeping and which are considered sufficient to prevent any significant adverse ecological impacts related to attraction of scavengers. These measures include the proper use and daily emptying of bins.

5.3.1.2 Operational Phase

N/A

5.3.2 Bats

Avoidance and mitigation measures to address identified potential negative effects on bats during the construction and operational phase of the proposed development are detailed below.

5.3.2.1 Construction Phase

As outlined in the CEMP, trees will be subject to survey by an Ecologist prior to felling. The survey will confirm that no bats are present prior to felling of the tree. If bats are found a derogation license will be secured from NPWS prior to works.

The CEMP sets out other measures in relation to noise and dust and which are considered sufficient to avoid any significant adverse ecological impacts.

During construction, works will generally take place during daylight hours only, and the site will not be lit during the hours of darkness. If some lighting is required for health, safety or security reasons, lighting shall be directed away from sensitive ecological features. The CEMP sets out further measures in relation to artificial light and these are summarised in **Section 5.3.1.1.** These measures are considered sufficient to prevent any adverse impacts on roosting, commuting and foraging bats.

5.3.2.2 Operational Phase

Boundary vegetation (treelines and hedgerows) that are to be retained or are reinstated will be allowed to develop naturally and shall be preserved during the operational phase of the proposed project. Any arboricultural or horticultural intervention shall be the minimised as much as possible to preserve the botanical communities present.

The lighting design process seeks to minimise light pollution on nearby trees and semi-natural habitats, however light spillage will occur onto these features. In order to reduce the ecological disturbance of light spillage the proposed design complies with the following Bat Conservation Trust (2018) recommendations:

- LEDs will be used, as these emit minimal ultra-violet light.
- White and blue wavelengths will be avoided; wavelength will be <2,700 kelvin.
- Lights will peak higher than 550nm.

Subsequent replacements will comply with the above specifications also.

5.3.3 Potential Effects on Birds

The below sections discuss the potential effects of the proposed development on birds in both the construction and operational phases.

5.3.4 Construction Phase

Due to the overriding priority of commencing works in dry conditions, it may not be possible to avoid tree clearance during the bird breeding season (March to August inclusive). Section 40 of the Wildlife Act 1976 (as amended) makes provision for the clearance of vegetation (e.g. hedgerows) within the bird breeding season (defined as 1st March to 31st August inclusive) where the works are required to facilitate permitted construction activity.

It is an offence under Section 22 of the Wildlife Act 1976 (as amended) to wilfully destroy, injure, or mutilate the eggs or nest of a wild bird or to wilfully disturb a wild bird on or near a nest containing eggs or un-flown young birds at any time of the year. Where felling or habitat clearance works are required during the bird breeding season, these features will be inspected in advance by a suitably experienced Ecologist to identify if active bird nests are present. If a nest is discovered an exclusion zone will be installed at a distance appropriate to the species concerned. The Environmental Manager (see CEMP) will ensure that no active nests are removed until the conclusion of the particular nesting attempt.

5.3.5 Operational Phase

N/A

5.4 MEASURES FOR OTHER TAXA

Any ponding water will be inspected regularly by the Environmental Manager or Ecological Clerk of Works for the presence of frogspawn during the relevant season. If found to be present it will be removed to a suitable location locally.

6 Residual Impacts and Conclusion

The significance of the potential impacts identified in Chapter 4, considering the avoidance and mitigation measures outlined in Chapter 5, is considered below. The description of effects follows EPA (2022). Effects are judged relative to the current or 'do-nothing' scenario (see **Section 4.1**).

6.1 RESIDUAL IMPACTS ON SURFACE WATER

It is considered that with the implementation of measures outlined herein there will be a minor localised impact on surface water quality during the construction phase and a neutral impact during the operation phase.

6.2 RESIDUAL IMPACTS ON HABITATS AND FLORA

There will be a minor localised impact on habitats as well as localised impacts on the diversity of flora during the construction and operational phases. The overall residual effect of the proposed development on habitats and flora will be a slight, negative effect at a local level.

6.3 RESIDUAL IMPACTS ON MAMMALS

Considering the application of the proposed mitigation measures the overall residual effect of the proposed development on mammals will be slight negative at a local level.

6.4 RESIDUAL IMPACTS ON BIRDS

Considering the application of the proposed mitigation measures the overall residual effect of the proposed development on birds will be a slight, negative effect at a local level.

6.5 MEASURES FOR OTHER TAXA

Considering the application of the proposed mitigation measures the overall residual effect of the proposed development on other taxa will be neutral at a local level.

6.6 CONCLUSION

A comprehensive ecological impact assessment has been carried out and the proposed site is considered to be '**Low Value (Locally Important)**' from an ecological perspective as it has limited areas of semi-natural habitat and is not of special importance for any high conservation priority species or habitats.

Habitat loss and disturbance impacts will occur during the construction and operation phases which cannot be avoided or fully mitigated, and these will have a slight, negative effect on the relevant receptors at a local level.

With the implementation of the avoidance and mitigation measures outlined herein, the overall ecological impact of the proposed project (relative to the 'do-nothing' scenario) is considered to be a permanent, slight, negative effect at a local level.

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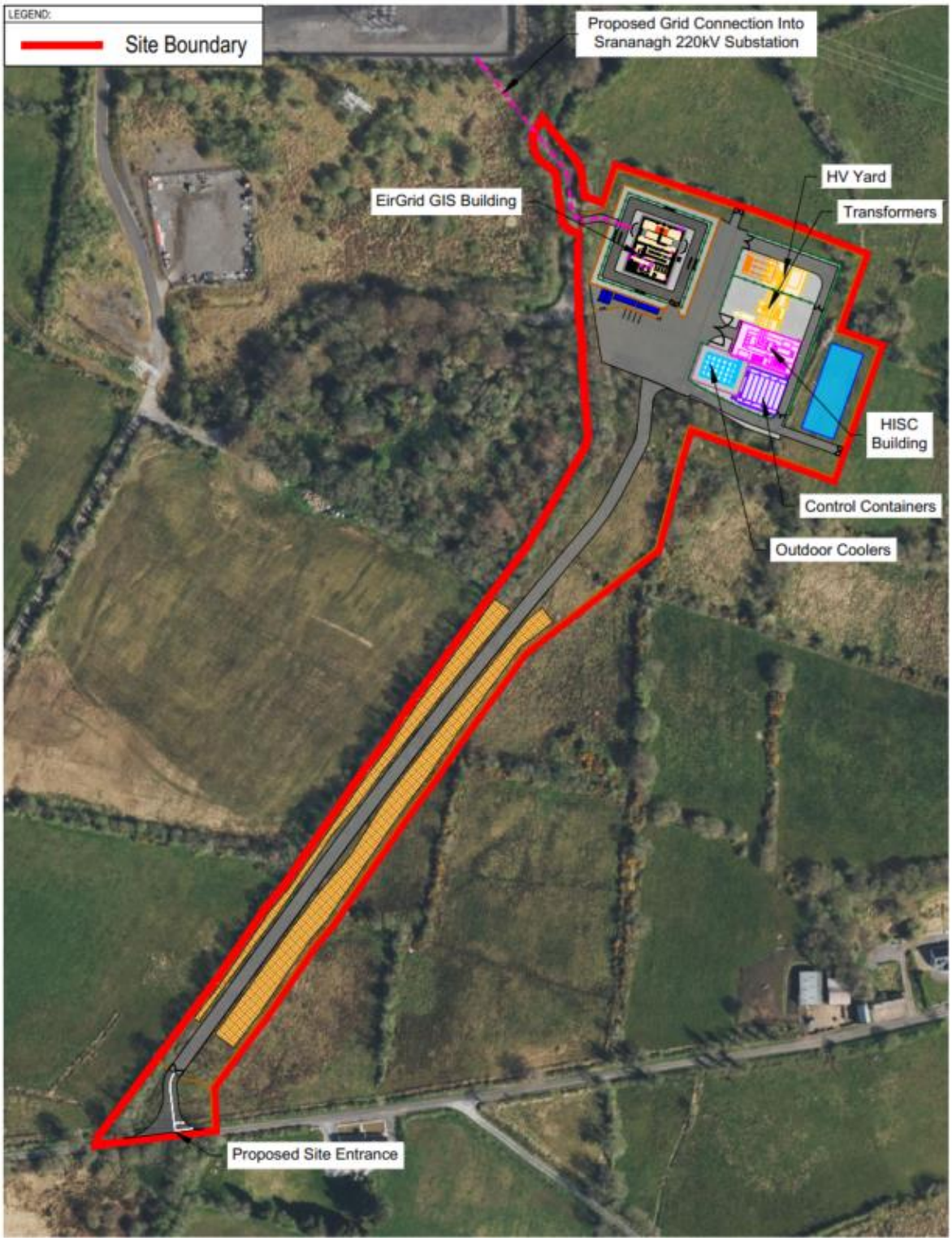
Appendix A - Proposed Layout


LEGEND:
Site Boundary
Proposed Grid Connection Into Srananagh 220kV Substation
HV Yard
Transformers
EirGrid GIS Building
HISC Building
Control Containers
Outdoor Coolers
Proposed Site Entrance

Appendix B -

Descriptions of Ecological Effects

Table F1.1 - Descriptions of Ecological Effects

Quality of Effects	Positive Effects: A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities). Neutral Effects: No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error. Negative Effects: A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Describing the Significance of Effects	Imperceptible: An effect capable of measurement but without significant consequences. Not significant: An effect which causes noticeable changes in the character of the environment but without significant consequences. Slight Effects: An effect which causes noticeable changes in the character of the environment without affecting its sensitivities. Moderate Effects: An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends. Significant Effects: An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment. Very Significant: An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment. Profound Effects: An effect which obliterates sensitive characteristics.
Describing the Extent and Context of Effects	Extent: Describe the size of the area, the number of sites, and the proportion of a population affected by an effect. Context: Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?).
Describing the Probability of Effects	Likely Effects: The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented. Unlikely Effects: The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.

Describing the Duration of Effects	Momentary Effects: Effects lasting from seconds to minutes. Brief Effects: Effects lasting less than a day. Temporary Effects: Effects lasting less than a year. Short-term Effects: Effects lasting one to seven years. Medium-term Effects: Effects lasting seven to fifteen years. Long-term Effects: Effects lasting fifteen to sixty years. Permanent Effects: Effects lasting over sixty years. Reversible Effects: Effects that can be undone, for example through remediation or restoration

Adapted from 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' EPA (2022).

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