Burnside to Greens 400kV Connection

Environmental Appraisal Appendix H: Flood Risk and the Water Environment

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1 Introduction

The 'Proposed Development' referred to in this Appendix is for up to four 400 kilovolt (kV) underground cable circuits, connecting Caledonia Offshore Wind Farm Burnside Onshore Substations to the Scottish and Southern Energy Networks Transmission (SSEN-T) Greens Substation, together with associated works.

This Appendix includes a Flood Risk Assessment (Section 2 of this Appendix) which considers the potential impacts of flooding on the Proposed Development, and the potential impacts of the Proposed Development on flood risk elsewhere. This Appendix also assesses the potential impact of the Proposed Development on water quality within the receiving environment (Section 3 of this Appendix). The assessments are based on the description of the works as noted in Section 4 of the Environmental Appraisal.

2 Flood Risk Assessment

2.1 Legislation and Guidance

Section 13 of the Planning (Scotland) Act 2019 Act ('the 2019 Act') amended Section 24 of the Town and Country Planning (Scotland) Act 1997 ('the 1997 Act') regarding the meaning of the statutory Development Plan, such that for the purposes of the 1997 Act, the Development Plan for an area is taken as consisting of the provisions of:

- The National Planning Framework; and
- Any Local Development Plan (LDP).

Therefore, at the time of writing, the statutory Development Plan covering the site consists of the National Planning Framework 4 (NPF4) and Aberdeenshire Local Development Plan 2023 together with any relevant Supplementary Guidance.

Scotland's Fourth National Planning Framework (NPF4) is a long-term spatial plan for Scotland with an outlook to 2045. It sets out policies and proposals for the development and use of land. NPF4 was adopted in February 2023.

Policy 22 'Flood risk and water management' aims to strengthen resilience to flood risk by promoting avoidance as a first principle and reducing the vulnerability of existing and future development to flooding. Policy 22 states that development proposals at risk of flooding or in a flood risk area will only be supported if they are for:

i. essential infrastructure where the location is required for operational reasons;

ii. water compatible uses;

iii. redevelopment of an existing building or site for an equal or less vulnerable use; or,

iv. redevelopment of previously used sites in built up areas where the LDP has identified a need to bring these into positive use and where proposals demonstrate that long-term safety and resilience can be secured in accordance with relevant SEPA advice.

For planning purposes NPF4 defines a flood risk area as land or built form with an annual probability of being flooded of greater than 0.5% which must include an appropriate allowance for future climate change.

Aberdeenshire Local Development Plan 2023 (ALDP) was adopted just prior to NPF4 and largely aligns with it. Policy C4 'Flooding' states that Flood Risk Assessments will be required for development in the indicative medium to high category of flood risk of 0.5% or greater annual probability (1 in 200 years or more frequent). Assessments should include an allowance for freeboard and climate change. Furthermore, developments are not to increase flood risk vulnerability and should avoid areas of medium to high risk or functional floodplain except where:

- It is a development to alleviate flooding or erosion of riverbanks or the coast;
- It is consistent with the flood storage and conveyance function of a floodplain;
- It would otherwise be less affected by flooding (such as a play area or a car park);

- It is essential infrastructure. The location is essential for operational reasons for example water-based navigation, agriculture, transport or utilities infrastructure and an alternative lower risk location is not available.

2.2 Potential Sources of Flooding

Scottish Environment Protection Agency (SEPA) have published flood maps on their website that show the areas in Scotland which are likely to flood from rivers, the sea and surface water, and these have been used to establish the potential flood risk (maps accessed in October 2025). In accordance with NPF4 and the ALDP, the medium likelihood (0.5%) future flood maps have been used. Due to its inland location, there is no coastal flood risk at the site.

2.2.1 River Flooding

SEPA's flood maps represent rivers with catchment areas greater than 3km^2.

The Burn of Greens flows to the east of the site. This watercourse is included in the SEPA flood maps and an extract from the medium likelihood future river flood map is shown in Figure 2-1 with the red line boundary. The site was specifically designed to avoid the mapped flood extents of the Burn of Greens as a key embedded mitigation.

There are two small tributaries of the Burn of Greens in the north-western part of the site which the cables would be required to cross. Due to their size, these smaller watercourses have not been included in the SEPA river flood mapping.

The Burn of Swanford flows to the southwest of the site. Only a section of this has been included on the SEPA mapping as shown in Figure 2-1. The map shows that the site is located outside of the mapped flood extents of the Burn of Swanford.

The site does not contain any areas of river flood risk as defined by NPF4 and ALDP.

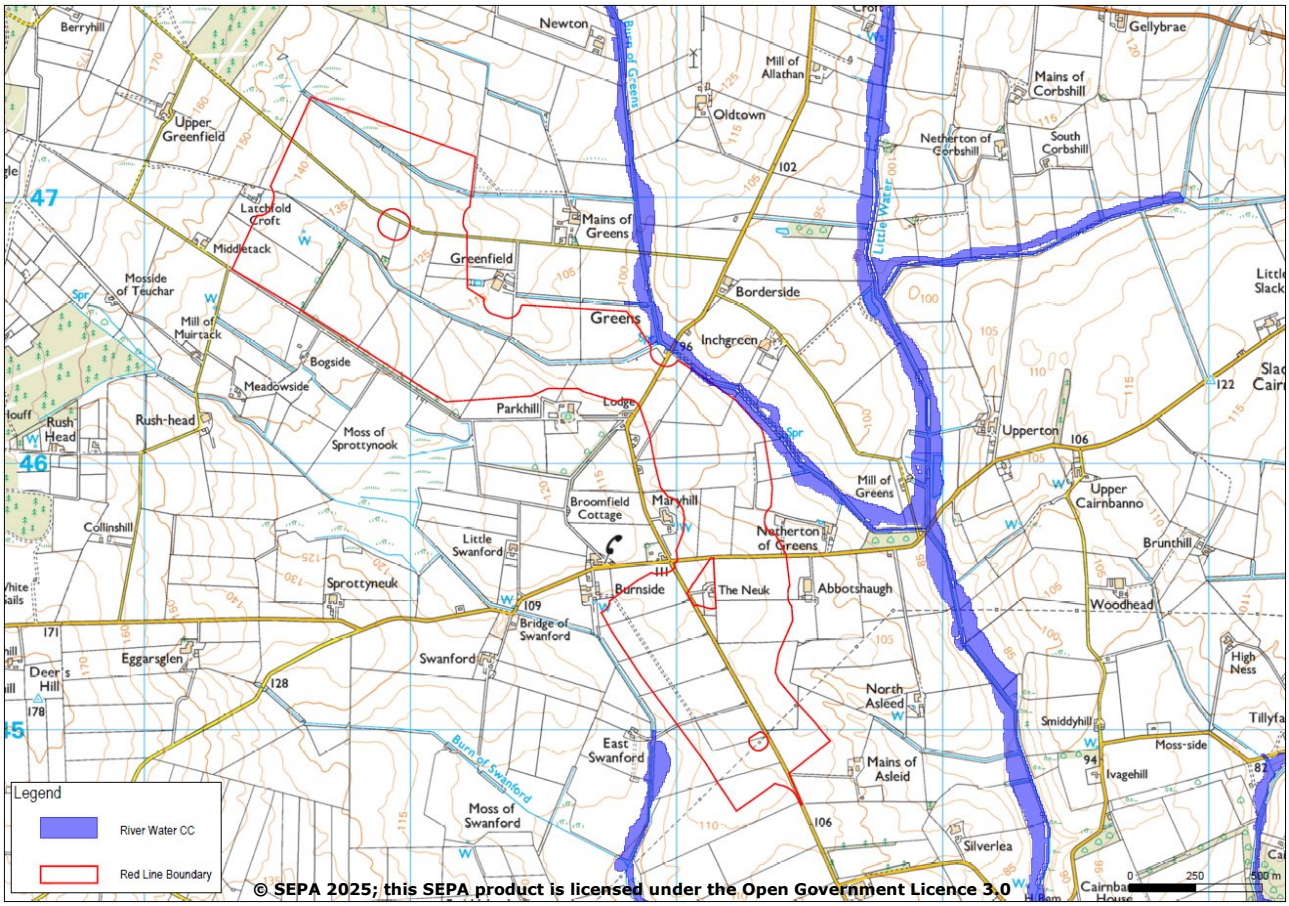

Figure 2-1 Extract from SEPA river flood map (Medium likelihood, Future)

2.2.2 Surface Water & Small Watercourse Flooding

The SEPA surface water and small watercourse map shows flooding from both surface water and watercourses with catchments under 10km^2. Watercourses with catchments between 3km^2 and 10km^2 appear on both the river flood map and the surface water map. An extract from the medium likelihood future surface water and small watercourse flood map is shown in Figure 2-2 with the red line boundary.

The map shows that areas within the site are affected by surface water and small watercourse flooding as defined by NPF4 and ALDP.

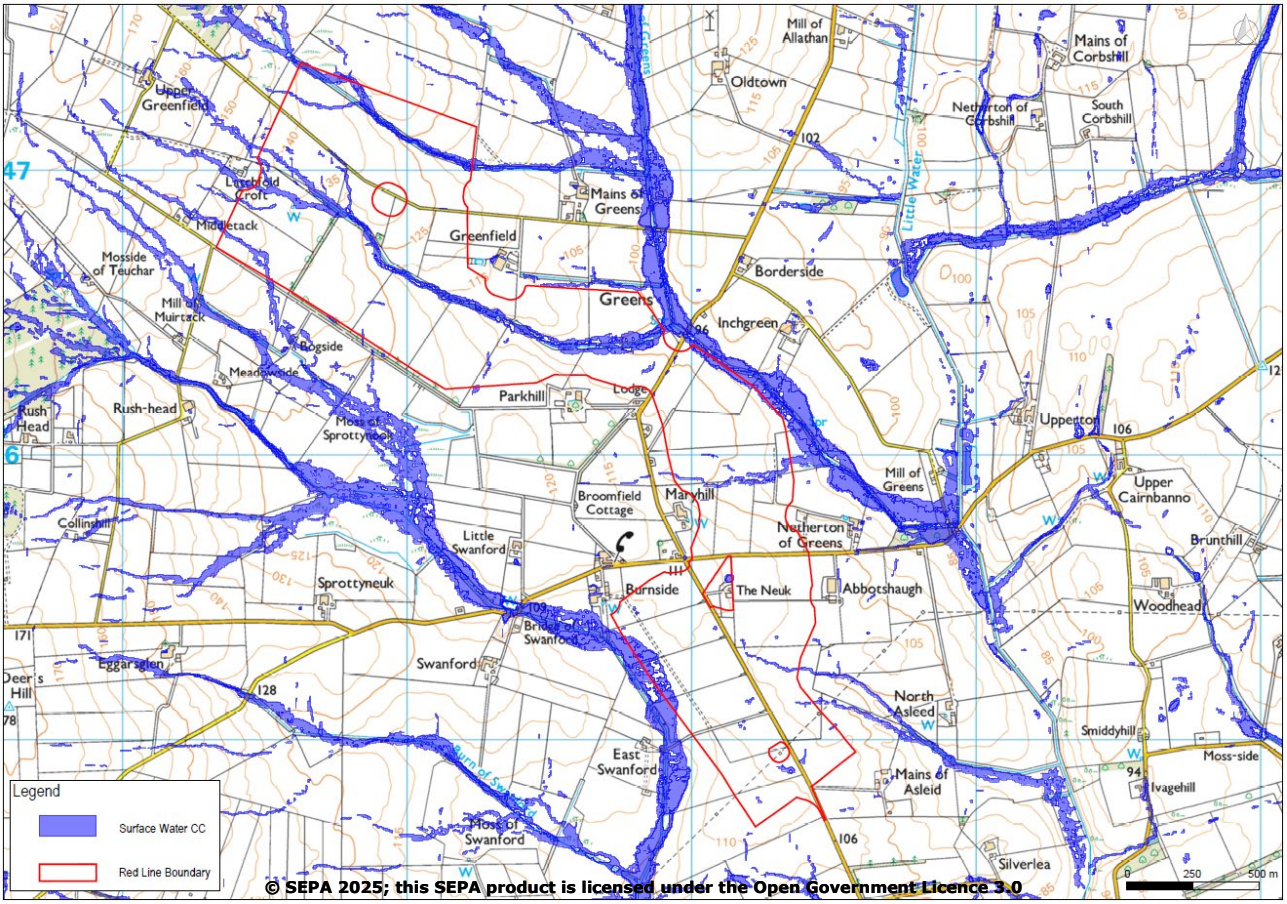

Figure 2-2 Extract from SEPA surface water & small watercourses flood map (Medium likelihood, Future)

2.2.3 Groundwater Flooding

Groundwater flooding is caused by the emergence of water from beneath the ground, either at point or diffuse locations. The occurrence of groundwater flooding is usually local and unlike flooding from rivers, does not generally pose a significant risk to life due to the slow rate at which the water level rises.

The British Geological Survey (BGS) Hydrogeology map shows that the site is in the Southern Highland Group rock unit. This is categorized as a low productivity aquifer-small amounts of groundwater in near surface weathered stone and secondary fractures. The site is underlain by superficial deposits of till. It consists of a heterogenous mixture of clay, sand, gravel, and boulders varying widely in size and shape (diamicton).

The potential for groundwater flooding can be further assessed through the availability of site investigation boreholes in the vicinity of the site from the BGS GeoIndex. There is information available for three boreholes located to the south of the site (see Figure 2-3 for locations). These were up to 45m deep and encountered no groundwater indicative of a low water table. It is highly unlikely that a significant rainfall event would raise the water table above ground, therefore the site is considered not to be at risk of ground water flooding.

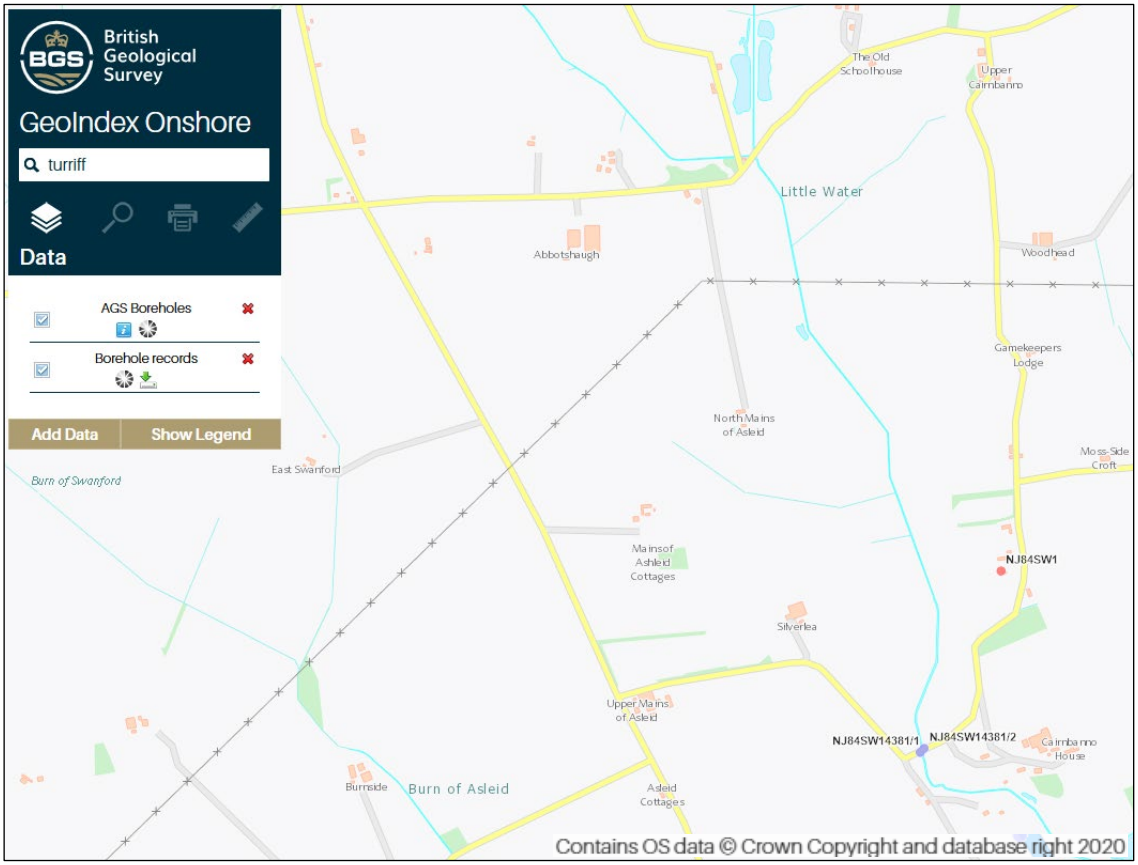

Figure 2-3 Locations of local boreholes (BGS GeoIndex)

2.2.4 Flooding from Infrastructure

Flooding from roads drainage and sewers occurs when the sewerage infrastructure has to deal with loads beyond its design capacity. This occurs most often because of high intensity rainfall events. Scottish Water has a public drainage duty and are responsible for the surface water drainage from roofs and any paved surfaces within property boundaries. Additionally, they protect homes from flooding caused by sewers either overflowing or becoming blocked. Aberdeenshire Council are responsible for the drainage of local roads and public highways and dealing with flooding caused by extreme rainfall. They are also responsible for maintaining watercourses.

The site is not located near a flood defence structure, or within the access strip required for the maintenance of any watercourse or flood defence structure.

The SEPA reservoir inundation map shows the areas of land likely to be flooded in the event of an uncontrolled release of water from a reservoir. There are no controlled reservoirs in the vicinity of the site.

2.3 Impact of Flood Risk

2.3.1 Construction

The detailed engineering design of the Proposed Development will be brought forward at Matters Specified by Condition (MSC) stage.

Some areas of potential surface water and small watercourse flooding as defined through policy have been identified within the site (Figure 2-2). Temporary deposition

of any construction materials will be kept outside of these areas of potential flooding where possible. This can be achieved by ensuring that no storage of soils will be allowed within 10m of any watercourse. Where this is not possible, the timing and duration of any temporary deposition of materials on the floodplain will be carefully managed to minimise any impact on the floodplain.

Two small watercourses will be crossed, and special consideration has been given to the construction methodology to limit the impact on flood risk. The construction of the underground cable at these locations will likely be carried out using an open-cut trenching methodology, creating a dam on the upstream side of the watercourse crossing and over pumping of water to the downstream side of the watercourse crossing, to create a dry area for safe installation of cables. The crossing works would be scheduled in advance of cable installation and these and the reinstatement works would be aimed to be undertaken in dry conditions to reduce the risk of flooding and water pollution events.

Local weather patterns will be monitored during the works and proactive surveillance undertaken by the onsite ECOW. Floodline, operated by SEPA, provides live flooding information 24 hours a day, 7 days a week. The contractor can sign up to the service and get notified when the area is at risk of flooding. The Scottish Flood Forecast is a 3-day flood forecast which is produced daily by the Scottish Flood Forecasting Service (SFFS), a partnership between SEPA and the Met Office. It is available on SEPA's website. The Scottish Flood Forecast complements the existing regional flood alerting and local flood warning services. The use of these services can ensure that the risk of flooding to the construction works is minimised.

2.3.2 Operation

Following reinstatement there will be no above ground infrastructure apart from concrete marker posts, so there will be no impact on flood risk. The Proposed Development is therefore compliant with NPF4 and ALDP.

3 Water Quality

3.1 Legislative Context

3.1.1 Water Environment and Water Services (Scotland) Act 2003

The Water Environment and Water Services (Scotland) Act 2003 is the enabling legislation for the Water Environment Directive (WFD). It identifies SEPA as the competent authority for the implementation of WFD requirements. Part 1 makes provision of the protection of the water environment and Part 2 relates to water and sewerage services.

A key requirement of the WFD is that surface water bodies attain at least good surface water status, requiring both ecological status and chemical status to be at least good, and that there should be no deterioration in existing status. For groundwater, the objective is to achieve good groundwater status, requiring both quantitative status and chemical status to be at least good. Therefore, an assessment must be carried out to ensure that the Proposed Development does not compromise these fundamental requirements of the WFD. The aim of this assessment is to determine if specific components or activities related to the Proposed Development will compromise the attainment of an environmental objective as per Article 4 of the WFD or result in the deterioration in the overall status of any water body. This will determine whether it is possible to proceed with the project or whether amendments or mitigation measures are necessary.

Under Article 4(3) of the WFD, Member States can designate surface water bodies as Heavily Modified Water Bodies (HMWB). HMWBs are considered as those which are physically altered by human activity. If the specified use of a water body (e.g. navigation, hydropower, water supply, flood defence) or the "wider environment" would be significantly affected by the restoration measures required to achieve "good" ecological status and if no other better, technically feasible and cost-effective environmental options exist then the environmental objective is "Good Ecological Potential" (GEP). A HMWB is inevitably associated with a profound alteration to the hydromorphological character of a water body.

3.1.2 The Environmental Authorisations (Scotland) Amendment Regulations 2025

The Environmental Authorisations (Scotland) Amendment Regulations 2025 have amended the Environmental Authorisations (Scotland) Regulations 2018 which provide a regulatory framework to bring waste, water, pollution prevention and control (PPC) and landfill authorisation regimes into the integrated authorisation framework provided by those regulations. This will simplify and streamline how the Scottish Environment Protection Agency (SEPA) undertakes its regulatory functions regarding those activities.

3.2 Baseline Environment

A desk-based assessment of the baseline environment and existing condition of receiving surface waters, groundwaters and water dependent protected areas has been undertaken. The findings were used to determine the potential impact of the Proposed Development on the water environment.

The Proposed Development is located in the Little Water River sub-catchment in the headwaters of the Ythan River catchment of the Scotland River basin district. Two minor tributaries of the Burn of Greens flow through the centre of the Site, these tributaries are described as drains by Scotland's Environment Web Map [1](Scottish Government 2025). The route will need to cross these tributaries as they extend the full width of the northern area of the Site. The Burn of Greens has no assigned WFD classification but flows towards and joins the designated WFD watercourse, Little Water/Black Burn River water body (ID: 23237). The primary landuse within the catchment is intensive, lowland agriculture. The Ellon groundwater body (ID: 150676) underlies the Site.

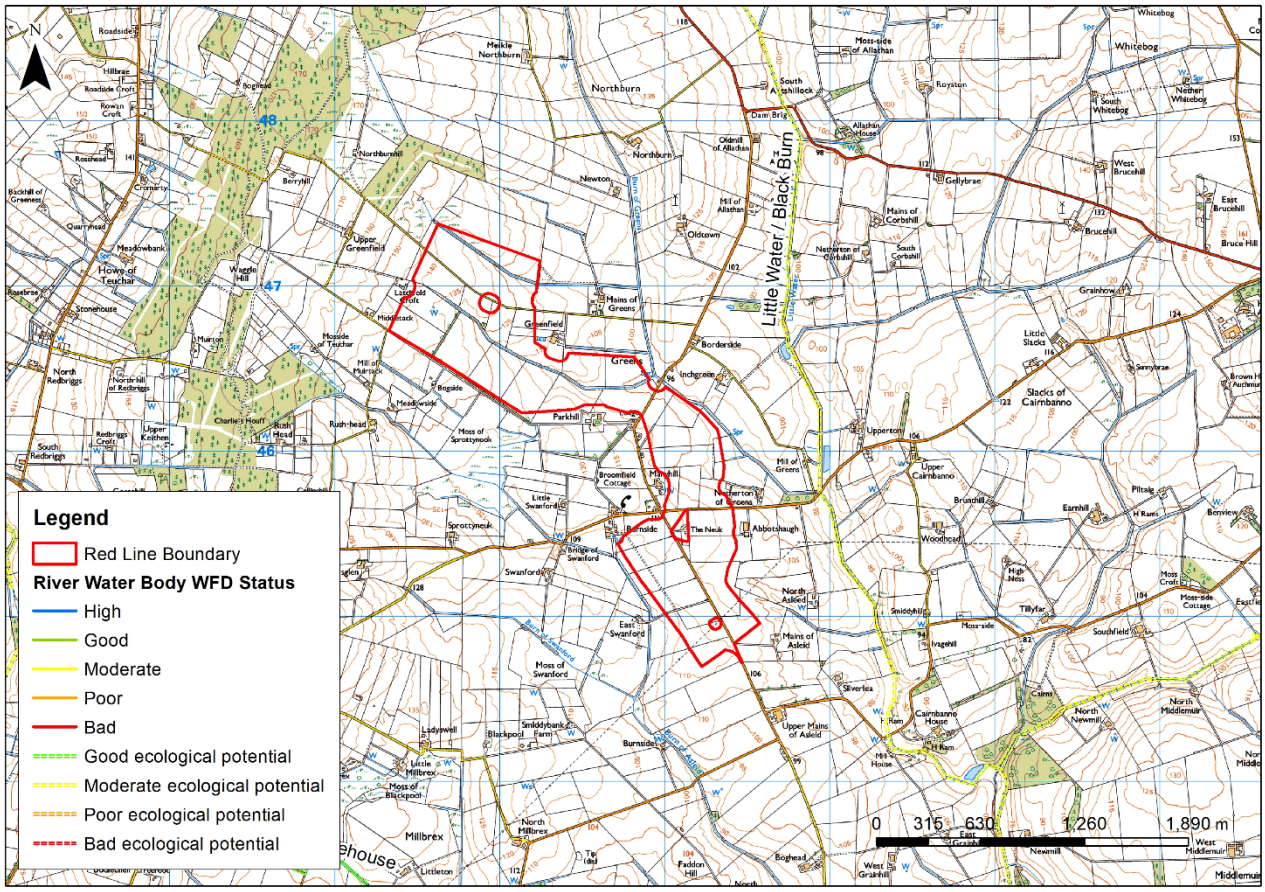

Figure 3-1 Site Location Within the Surface Water Environment and Current WFD Status

3.2.1 WFD Status Classification

The current WFD status for water bodies in Scotland is based on the status reported by SEPA in 2020 as this is the status on which the third River Basin Management Plan for Scotland (2021-2027) is based on. Therefore, no deterioration from this 2020 status is permitted. The Little Water/Black Burn River water body is currently classed as Moderate Ecological Potential and Ellon groundwater body is currently classed as Poor overall status. A further breakdown of the current WFD status is shown in Table 3-1.

[1] Map | Scotland's environment web

Table 3-1 Breakdown of contributing elements to the 2020 WFD Status of potentially impacted waterbodies

WFD 2020 Status Contributing Elements	Little Water/Black Burn River Water Body (ID:23237)	Ellon Groundwater Body (ID:150676)
Overall ecology	**Bad**	n/a
Physico-Chemical elements	**High**	n/a
Temperature	High	n/a
Reactive phosphorus	High	n/a
Dissolved Oxygen	High	n/a
Acidity	High	n/a
pH	High	n/a
Biological elements	**Moderate**	n/a
Fish	High	n/a
Fish barrier	High	n/a
Aquatic plants	Moderate	n/a
Phytobenthos (diatoms)	Moderate	n/a
Specific pollutants	Pass	n/a
Ammonium	Pass	n/a
Hydromorphology	**Bad (HMWB)**	n/a
Morphology	Bad (HMWB)	n/a
Overall hydrology	Good	n/a
Hydrology (medium/high flows)	High	n/a
Hydrology (low flows)	Good	n/a
Chemical Status	n/a	**Poor**
Quantitative Status	n/a	**Good**
Overall 2020 WFD Status	**Moderate Ecological Potential**	**Poor**

The Ellon GWB is of poor chemical status and therefore poor overall status due to nitrate and other substances pollution via surface water interactions. This is likely related to the high intensity agricultural land use which dominates this area.

The Little Water/Black Burn can only achieve at most GEP as this river has been designated as a heavily modified water body (HMWB) on account of physical alterations

which cannot be addressed without a significant impact on the drainage of the agricultural land. Therefore, the environmental objective for the Little Water/Black Burn is to achieve GEP by 2027. The environmental objective for the Ellon groundwater body is to achieve good status by 2027.

The main pressures on the Little Water/Black Burn River water body are its physical condition, specifically modifications to the beds, banks and shores and water quality from diffuse rural sources. The main pressure for the Ellon groundwater body is nitrate pollution, likely from diffuse agricultural sources. This water body is in a Nitrate Vulnerable Zone and actions are planned to address the water quality pressures during the 2021-2027 River Basin Management Plan (RBMP) cycle and are to be completed by 2027, although it is expected that ecological recovery for ground water dependent surface water bodies will take longer.

3.2.2 Protected Areas

Water dependent protected areas and designated sites for environmental protection downstream of the Red Line Boundary are outlined in the sections below.

3.2.2.1 Salmonid Rivers

The Little Water/Black Burn River water body is designated as a salmonid river where the presence of salmon has been confirmed downstream of the Red Line Boundary (Scottish Government, 2022).

3.2.2.2 Drinking Water Protected Areas

The Ellon Groundwater Body is a Drinking Water Protected Area (DWPA) which is currently of Poor quality. This DWPA is located within the Aberdeenshire, Banff, Buchan and Moray Nitrate Vulnerable Zone (NVZ), designated by the Nitrates Directive 91/676/EEC and the Action Programme for Nitrate Vulnerable Zones (Scotland) Regulations 2008 (as amended). As such, Nitrate pollution from agricultural sources is the main water quality pressure for this groundwater body, and it is unlikely that the works associated with the construction or operation of the Proposed Development will contribute to this issue.

3.2.2.3 European Sites

Approximately 25km downstream of the Site, at the outlet of the Ythan River catchment within which the Site is located, there are two water dependent Wildlife Conservation Areas which are designated as Special Protection Areas (SPAs) under the EU Wild Birds Directive (2009/147/EC as codified).

- Ythan Estuary, Sands of Forvie and Meikle Loch SPA (UK9002221)
- Buchan Ness to Collieston Coast SPA (UK9002491)

It is unlikely that the works associated with the construction or operation of the Proposed Development will cause any significant impacts to the water quality dependent qualifying interests of these downstream designated sites as the length of the hydrological connection (approximately 25km) should allow for sufficient dilution of any mobilised pollutants to *De minimis* levels.

3.3 Assessment Methodology

An assessment has been made of the components of the Proposed Development that have the potential to have a significant impact on water quality using criteria for rating significance and magnitude set out in the Design Manual for Roads and Bridges LA104 Environmental Assessment and Monitoring (DMRB, 2020).

The significance of impact on surface water quality likely to occur during the construction and operational phases of the Proposed Development are determined using a predominantly qualitative methodology. The approach to assigning significance of impact relies on reasoned argument, professional judgement and taking on board the advice and views of appropriate organisations. The assessment is a consideration of a combination of receptor sensitivity (Table 3-2) and the potential magnitude of the impact on the water environment (Table 3-3), in order to determine significance (Table 3-4). The approach to assessing the significance of impacts comprising assigning each impact to one of the categories of magnitude as outlined in Table 3-3 enables different components to be assessed based on the same scale.

The table below describes the criteria applied in this Appendix to determine the sensitivity of receptors (Table 3-2).

Table 3-2 Sensitivity Indication (DMRB, 2020)

Value (Sensitivity)	Typical Descriptors
Very High	**Very high importance and rarity, international scale and very limited potential for substitution.** Examples: Water body protected area interests are of international importance and have been designated under the Habitats, Birds, Shellfish, Bathing Water or Freshwater Fish, Drinking Water or Nitrate Directives. High Status Water bodies. "Highly vulnerable" development or groups in relation to flood risk and water quality.
High	**High importance and rarity, national scale, and limited potential for substitution.** Examples: Water body where the current status is good or better and no deterioration is permitted. National designation e.g. Sites of special scientific interest (SSSI). "More vulnerable" development or groups in relation to flood risk and water quality.
Medium	**High or medium importance and rarity, regional scale, limited potential for substitution.** Examples: Moderate Status with an objective of good status by 2027, regionally important resource in terms of ecology or fisheries interest. "Less vulnerable" development or groups in relation to flood risk and water quality.
Low	**Low or medium importance and rarity, local scale.** "Water compatible" features in relation to flood risk and water quality.
Negligible	Very low importance and rarity, local scale.

The magnitude of the impact has also been adapted from the generic methodology for environmental assessment outlined in the DMRB (Table 3-3). Impact may be considered to have no effect or be negligible to high and their magnitude has necessarily been assessed on a qualitative basis.

Table 3-3 Definitions of Magnitude

Magnitude of Impact	Descriptor
High	Major alteration to water body status causing deterioration in either the ecological status including supporting elements, i.e., physico-chemical, specific pollutants and hydromorphology, chemical status or protected area status. Severe damage to key water body characteristics, features or elements (Adverse). Large scale or major improvement to water body status, extensive restoration or enhancement of Water body (Beneficial). Fundamental change to flood characteristics resulting in permanent consequential beneficial or adverse changes.
Medium	Water quality impact but not adversely affecting the integrity or status of the water body, partial loss or damage of certain characteristics or water body attributes (Adverse). Benefit to or addition of key characteristics or features of the water body, improvement in water status (Beneficial). Detectable change to flood characteristics resulting in non-fundamental temporary or permanent consequential beneficial or adverse changes.
Low	Some measurable change in water quality attributes, minor loss or alteration to one (maybe more) key characteristics (Adverse). Minor benefit to one or more key characteristics, features or elements of the water body (Beneficial). Detectable but minor change to flood characteristics.
Negligible	Very minor loss to water body characteristics, features or elements (Adverse). Very minor benefit to or positive addition of one or more water body characteristics, features or elements (Beneficial). Unquantifiable or unqualifiable change in flood characteristics.
No change	No loss or alteration to water quality or water body status or flood risk.

Applying the formula, the greater the environmental sensitivity or value of the receptor or resource and the greater the magnitude of impact, the more significant the effect. The consequences of a highly valued environmental resource suffering a major detrimental impact on would be a very significant adverse effect. Table 3-4 illustrates how the sensitivity of attributes was considered against the magnitude of impacts to determine the significance of potential impacts.

Table 3-4 Matrix used for the Assessment of the Significance of the Effect

Sensitivity	Magnitude of Impact				
	No Change	**Negligible**	**Low**	**Medium**	**High**
Negligible	No change	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	No change	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	No change	Negligible or Minor	Minor	Moderate	Moderate or Major
High	No change	Minor	Minor or Moderate	Moderate or Major	Major or Substantial
Very high	No change	Minor	Moderate or Major	Major or Substantial	Substantial

Following the requirements of the WFD, the water quality impact of the Proposed Development has been assessed based on potential impacts to the WFD status of the downstream receiving Little Water/Black Burn River water body (ID: 23237). This is to ensure that this water body does not deteriorate from its WFD status or is prevented from achieving its WFD objective of good status by 2027 as a result of the Proposed Development. Based on the characteristics of the baseline environment outlined above in Section 3.2, the Little Water/Black Burn water body is currently assigned Moderate sensitivity as described in Table 3-2 above.

3.4 Impact Assessment

3.4.1 Assessment of Construction Effects

3.4.1.1 Sediment Loading

Temporary impacts on surface waters will occur during construction. Pollution from mobilised suspended solids (silt) is generally the prime concern. Suspended sediment due to run off from stripped construction areas and excavations can have a severe negative impact on water quality, water dependant habitats and aquatic ecology. This is particularly true in sloping areas with underlying clay following topsoil stripping. In areas of moderate to high rainfall, the potential problems are clearly exacerbated. If allowed to enter surface watercourses this run off can give rise to high suspended solids and detrimental impacts, in particular to fisheries.

Suspended solids may have an effect on:

- The survival of fish eggs in gravel beds or spawning grounds as a result of deoxygenation caused by silt deposition;
- The survival of plants and algae by smothering;
- The survival of young fish and aquatic invertebrates such as mayfly larvae (Calopteryz sp.) through gill damage from sediment particles.

Once a silt load enters a river it can result in long term changes that cause chronic harm. Silt causes river hydromorphological changes, which in turn change the dynamics of the river into the future. Both bed and suspended materials, and subsequent changes in channel form associated with changes in sediment supply, may affect benthic invertebrates in many ways at various stages in their life cycle. The direct kill is only the first stage in the damage that silt causes to a benthic invertebrate population. Sediment that infiltrates the river bed decreases oxygen supply in interstitial areas and destroys habitat for juvenile stages of the many benthic invertebrate life cycles.

The sediment subsequently provides a medium for macrophyte growth. Macrophytes can smother the river substrate and habitat further and can trap more sediment which exacerbates the problem in the long term. Silt infiltration of river bed gravels can also have a negative effect on fish species.

The works associated with the Proposed Development involve earthworks to lay the underground cables (approximately 3.35km in length, and up to a maximum of 2m in depth) within a 100m width working corridor. There will be a maximum of four cable route trenches within the 100m width working corridor. Potential sources of sediment loadings during the construction phase include:

- Topsoil stripping/ soil and vegetation clearance;
- Trench excavation and backfilling across watercourses (open-cut trenching technique only);
- Installation of temporary crossing structures and associated movement of plant machinery;
- Bank disturbance caused by plant equipment;
- Run-off from storage areas of stockpiled excavated material;
- Construction of dams and over pumping to divert flow and allow excavation of the cable route trench under dry conditions in the channel;
- Water over-pumping and discharge of sediment laden water back to the watercourse;
- Reinstatement of bank soils and vegetation.

Open-cut trenching is anticipated to be the construction methodology for the entire route, including watercourse crossings as no crossings have been identified which would require trenchless techniques i.e., horizontal directional drilling (HDD). However, this method will still be accounted for within this impact statement in the event that this method is utilised.

The HDD method can also generate sediment through the placement of the flume in the channel, if fluming of the channel is also required for plant access. However, this would result in a much lower impact than open cut trenching as open cut involves direct disturbance of the river bed and requires closer proximity of plant machinery to the watercourse.

The HDD method may also result in the escape to the watercourse of pressurised drilling fluids (bentonite/ mud) through break out of drilling fluids from the underlying bed material or from surface run-off caused by drilling fluid returns at tunnel entry and exit points. However, this occurs very infrequently as the drilling process is closely monitored and managed. These drilling fluids may be considered a type of fine sediment with similar general potential impacts to those by general construction activities near watercourses however the source and magnitude of impact is different given the fine particle size and the potential to infiltrate river substrate and sensitive habitats.

Given the **Medium** sensitivity of the receiving water body (Little Water/Black Burn) and the **Medium** level of magnitude of the potential impacts, the significance of effect on the receiving water body (Little Water/Black Burn) is deemed to be **Moderate** in the absence of mitigation measures.

3.4.1.2 Concrete & Cement

The construction works associated with the Proposed Development will involve the use of cement and concrete. Accidental release of highly alkaline contaminants from concrete and cement during the construction of Proposed Development and associated works (temporary haul roads, construction compounds, etc.) has the potential to negatively impact biological elements, resulting in a possible deterioration in ecological status of the receiving water body.

Given the **Medium** sensitivity of the receiving water body (Little Water/Black Burn) and the **Medium** level of magnitude of the potential impacts, the significance of effect on the receiving water body (Little Water/Black Burn) is deemed to be **Moderate** in the absence of mitigation measures.

3.4.1.3 Oils & Chemicals

Construction of the Proposed Development will involve the use of plant and machinery as well as the associated temporary storage of construction materials, oils, fuels and chemicals in designated areas within the route corridor. It is understood there could be a maximum of two satellite compounds located within the 100m cable route corridor where stockpiled earth, plant machinery, oils, fuels and chemicals would be stored. There is the potential for spillage or release of fuel oil and other dangerous substances which could impact on the surface and ground water bodies associated with the working area. It is also possible that small residue amounts left on site may be mobilised by surface run-off and washed into the receiving waterbodies.

Given the **Medium** sensitivity of the receiving water body (Little Water/Black Burn) and the **Medium** level of magnitude of the potential impacts, the significance of effect on the receiving water body (Little Water/Black Burn) is deemed to be **Moderate** in the absence of mitigation measures.

3.4.1.4 Satellite Construction Compounds

As part of the design methodology, it has been assumed that a maximum of two satellite construction compounds would be utilised. These would be within the proposed site and have been accounted for within this assessment (albeit they could be pursued via Class 14 of The Town and Country Planning (General Permitted Development) (Scotland) Order 1992) . It is also anticipated that the Applicant will have access to the main construction compound that will be used in association with the construction of the consented underground cables to Burnside substation under planning application reference APP/2024/1812, which may further reduce any impacts.

The satellite compounds have the potential to result in similar pressures to those outlined above in terms of the suspended solids, oil and fuel storage, and the potential to impact on adjacent water courses. Therefore, given the **Medium** sensitivity of the receiving water body (Little Water/Black Burn) and the **Medium** level of magnitude of the potential impacts, the significance of effect on the receiving water body (Little Water/Black Burn) is deemed to be **Moderate** in the absence of mitigation measures.

3.4.2 Assessment of Operational Effects

3.4.2.1 Changes to Bank Morphology and Hydrological Flow Regimes

Watercourse crossings may over time, change the structure of bank/bed sediments due to scouring and erosion, therefore altering the hydrological dynamics such as flow velocity. This, alongside changes to bank morphology may impact ecological habitats.

The Proposed Development crosses two minor tributaries of the Burn of Greens which drains to the Little Water/ Black Burn WFD protected water body. There will be a maximum of four cable route trenches so these tributaries will require multiple crossings. There may also be additional small watercourses or field drainage ditches which may need to be crossed. It is expected that the open cut trench crossing method will be preferred over horizontal directional drilling (HDD). Morphological impacts are more likely following open cut techniques, however, impacts to bank morphology should be small and localised in nature at each crossing point.

As the water courses to be crossed are identified as drains by Map | Scotland's environment web, have not been assigned a WFD status and the downstream Little Water/ Black Burn is designated as a HMWB, the sensitivity of the receiving environment is assessed as **Medium.** The magnitude of the potential impacts is assessed as **Medium**. Therefore, the significance of effect on the receiving water body is deemed to be **Moderate** in the absence of mitigation measures.

3.4.2.2 Impacts to Existing Drainage Structures

The surrounding catchment is artificially drained for agricultural activities, so much so that WFD water courses in this area are all designated as HMWBs. Impacts to local land drainage structures as a result of the Proposed Development may alter existing drainage patterns within catchments and provide potential pathways for pollution. In this area, private water supplies (PWS) are supplied either by groundwater via abstraction points or surface water via land drains. Private Water Supplies may be impacted indirectly by the Proposed Development, possibly resulting in disruption to water supply through altering drainage patterns or in reduced water quality through pollution.

Given the **Medium** sensitivity of the receiving water body (Little Water/Black Burn) and the **Medium** level of magnitude of the potential impacts, the significance of effect on the receiving water body (Little Water/Black Burn) is deemed to be **Moderate** in the absence of mitigation measures.

3.5 Mitigation Measures

3.5.1 Construction Phase

3.5.1.1 General

All work will be carried out in line with the relevant Net Regs Guidelines for Pollution Prevention (GPP) [2] and relevant Construction Industry Research and Information Association (CIRIA) publications, including but not limited to:

[2] Guidance for Pollution Prevention (GPP) documents | NetRegs | Environmental guidance for your business in Northern Ireland & Scotland

- GPP 1: Understanding your environmental responsibilities - good environmental practices (June 2021)
- GPP 2: Above ground oil storage tanks (June 2021)
- GPP5: Works and Maintenance in or near water (February 2018)
- GPP 6: Working at demolition & construction sites (April 2023)
- GPP 8: Safe storage and disposal of used oils (June 2021)
- GPP 13: Vehicle washing and cleaning (June 2021)
- GPP 21: Pollution incident response planning (June 2021)
- GPP 22: Dealing with spills (October 2018)
- GPP 26: Safe storage - drums and intermediate bulk containers (June 2021)
- Technical Guidance C648: Control of water pollution from linear construction projects (CIRIA, 2006)
- Technical Guidance C532: Control of Water Pollution from Construction Sites: Guidance for Consultants and Contractors (CIRIA, 2001)

Environmental risks will be accounted for within the Outline Construction Environmental Management Plan (OCEMP) as part of this application, but will be developed into a Detailed CEMP through the MSC process, which will outline all specific mitigation measures to be followed by the contractor. Mitigation will also include best practice measures based on the SEPA's Engineering in the water environment: good practice guide – River crossings. 2nd edition (SEPA, 2010). Furthermore, all works will be carried out in accordance with permitting requirements, including the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended). Mitigation measures relevant to the potential water quality impacts outlined in Section 3.4 are discussed in the following sections.

3.5.1.2 Sediment Loading

Sediment, including all soils, mud, clay, silt, sand etc, is the single main pollutant generated at construction sites and largely arises from the erosion of exposed soils by surface water runoff. The adoption of appropriate erosion and sediment controls during construction is essential to prevent sediment pollution.

Mitigation and control measures to address the impact from suspended sediments associated with construction activities will follow good work practices and sound design principals. The Applicant shall establish contact with the relevant authorities, e.g. SEPA and Aberdeenshire Council before works commence, and continue ongoing liaison throughout the construction. Contractors shall be familiar with the requirements of best practice and relevant guidelines as outlined above.

The most effective method of mitigating the potential impacts from suspended solids is to address the issue at source and reduce the volume of water entering the construction site and therefore reduce the volume of silt laden water that could be generated and enter watercourses as runoff. Therefore, the Proposed Development and associated satellite construction compounds will be supported by adequate site surface water drainage during the construction phase. The surface water drainage system will account for potential modifications to existing drainage arrangements (including property land drains), suitability of ground conditions and any potential upstream or downstream impacts and will be designed in consultation with interfacing landowners.

Stockpiled excavated material, exposed ground, site roads and works within the watercourse channels, etc. will be managed as per the guidance documents listed above to reduce the potential for impacts from these activities. Mitigation will include:

- Silt fences or other suitable measures will be installed where the working area encroaches within 10m of a watercourse.
- Minimising the amount of time stripped ground and soil stockpiles are exposed.
- Only removing vegetation from the area that needs to be exposed in the near future.
- Seeding or covering stockpiles of excavated material to prevent mobilisation of sediment.
- Using geotextile silt fencing at the toe of any sloping ground, to reduce the movement of silt; this will be installed before soil stripping has begun and vehicles start tracking over the site.
- Divert clean water away from the area of construction work in order to minimise the volume of contaminated water.
- Carry out plant and wheel washing in a designated area of hard standing at least 10 metres from any watercourse or surface water drain, rock outcrop (hard rock at surface) or karstic sinkhole.
- In-channel works will be avoided during the fish spawning season.
- Dewatering of excavations including the cable trenches but also any launch and receiver pits from trenchless crossings (if used) will be directed to a suitable treatment area within the additional land take at these crossing points. This will ensure adequate treatment of the silt laden water, therefore there will be no direct discharge from any excavations to surface water.

On the condition that the above mitigation measures and those included in the OCEMP (then delivered through the CEMP at MSC) are complied with appropriately, the significance of effect on the receiving water body from sediment loading is deemed to be **Minor.**

3.5.1.3 Concrete & Cement

The use of concrete in close proximity to water bodies requires a great deal of care and careful planning. Fresh concrete and cement are highly alkaline and corrosive and can cause serious pollution in water bodies. It is essential to ensure that the use of wet concrete and cement in or close to any water body is carefully controlled so as to minimise the risk of any material entering the water, particularly from the washing of equipment.

If on-site concrete production is proposed careful initial siting of concrete mixing facilities is vital, this will occur within the proposed construction compounds which will have adequate site drainage and pollution prevention measures. A settlement and recirculation system for water reuse will be considered. This will minimise the risk of pollution and reduce water usage. Washing out and cleaning of concrete ready mix lorries will be carried out in a contained area as far from the water body as practical. Excess material will be left to settle and removed from site after it has set.

Works involving concrete and cement will be managed as per the guidance documents listed above to reduce the potential for impacts from these activities. On the condition that the above mitigation measures and those included in the OCEMP (then delivered through the CEMP at MSC) are complied with appropriately, the significance of effect on the receiving water body from concrete and cement is deemed to be **Minor.**

3.5.1.4 Oils & Chemicals

The use of oils and chemicals on-site requires significant care and attention. It is important to ensure that the following procedures are followed to reduce the potential risk from oils and chemicals.

All relevant measures outlined in the guidance documents listed above, particularly GPP 2: Above ground oil storage tanks (June 2021) will be followed during the construction phase to reduce the risks of oils and chemical pollution to the aquatic environment. These measures will include:

- All valves and trigger guns will be protected from vandalism and unauthorised interference and will be turned off and securely locked when not in use.
- Any tanks or drums will be stored in a secure container or compound, which will be kept locked when not in use.
- Bowsers will be stored within satellite compounds when not in operation.
- The risk of spilling fuel is at its greatest during refuelling of plant. A toolbox talk on refuelling vehicles and plant will be carried out to ensure the appropriately trained people and equipment are used during refuelling activities.
- A spill kit will be available at all times and a bowser with secondary containment will be used.
- Vehicles will not be left unattended during refuelling.
- Hoses and valves will be regularly checked for wear and turned off and securely locked when not in use.
- Diesel pumps and similar equipment will be placed on drip trays or similar to collect minor spillages or leaks. These will be checked regularly and any accumulated oil removed for appropriate disposal.

On the condition that the above mitigation measures and those included in the OCEMP (then delivered through the CEMP at MSC) are complied with appropriately, the significance of effect on the receiving water body (Little Water/Black Burn) from oils and chemicals is deemed to be **Minor.**

3.5.1.5 Satellite Construction Compounds

Provided the control measures identified above in terms of sediment, concrete & cement and oils & chemicals are fully implemented, this mitigation will be adequate to address the impacts from the two proposed satellite compounds which are to be located within the Site.

On the condition that the above mitigation measures and those included in the OCEMP (then delivered through the CEMP at MSC) are complied with appropriately, the significance of effect on the receiving water body (Little Water/Black Burn) from the satellite construction compounds is deemed to be **Minor.**

3.5.2 Operational Phase

3.5.2.1 Changes to Bank Morphology and Hydrological Flow Regimes

To prevent morphological impacts to the bank and bed sediments from erosion and scouring following installation and reinstatement, the watercourse crossings will be installed at sufficient depth below the channel bed. SEPA's Engineering in the water

environment: good practice guide – River crossings. 2nd edition (SEPA, 2010) recommends that cables should be buried below natural bed level and that banks should be reinstated to their natural width following installation to include allowance for scour during high flows.

Installation of the water course crossings will alter the bank morphology at the crossing points (four trenches are proposed and the number of crossings is unknown at this stage) if banks are not reinstated following the completion of the construction works. A Reinstatement Management Plan will be devised to advise best practice techniques for re-establishing ground conditions conducive to natural generation, to be employed post-construction to ensure the riparian zone and banks of watercourses are stabilised as soon as is practicable. This plan will include measures such as:

- Commence stream bank reinstatement as soon as in-stream construction work is completed, where practicable.
- Where practical, stabilise cleared banks to facilitate reinstatement
- When reinstating watercourses, replace stockpiled stream bed rocks, pebbles and/or coarse gravel and reinstate watercourse banks to stabilize and facilitate bio-restoration.
- Where appropriate, undertake active works to re-establish vegetation in areas that may be slow or difficult to regenerate naturally, difficult to stabilise or prone to erosion.

Watercourse crossings will be inspected throughout the operation phase to check for signs of scour or erosion, this will ensure channel morphology is monitored and corrective action is taken to protect the supporting hydromorphological conditions whilst also ensuring the cable itself is not exposed and/or damaged.

On the condition that the above mitigation measures are complied with appropriately, the significance of effect on the receiving water body (Little Water/Black Burn) from changes to bank morphology and hydrological flow regimes is deemed to be **Minor.**

3.5.2.2 Impacts to Existing Drainage Structures

A qualitative study is currently ongoing to identify and locate existing field drains and abstraction points within 250m of the Site which serve PWS and works shall be planned accordingly following the findings of this study to minimise impacts to these features. Mitigation measures to avoid, prevent or reduce potential impacts to surrounding PWS from groundwater interference or pollution as a result of the works have been further outlined in the OCEMP.

On the condition that existing drainage features are accounted for within the final cable route design and mitigation measures which are included in the OCEMP are implemented, the significance of effect on to existing drainage structures is deemed to be **Minor.**

3.6 Summary and Conclusions

The Water assessment has considered the water quality impacts associated with the Proposed Development and the associated infrastructure such as satellite construction compounds.

An assessment of the impacts had identified that in the absence of mitigation there was the potential for **Moderate** impacts during the construction phase of the project. A mitigation strategy has been proposed based on best practice, industry standards and sound design principals particularly in relation to watercourse crossing construction methodologies. The proposed strategy will ensure that the proposed works will have a **Negligible to Minor** impact on the water environment.

The operation stages of the development will have a **Minor** impact on water quality and channel hydromorphology due to the design of the watercourse crossings which will be in accordance with the SEPA guidance. This will ensure that the environmental objectives of the WFD surface water body to which these tributaries drain, the Little Water/Black Burn River, will not be compromised. The proposed development can therefore be confirmed to comply with all relevant Policy, Guidance and Regulation.

4 References

Flood Risk

Aberdeenshire Local Development Plan 2023 (Aberdeenshire Council), Policy C4 'Flooding'.

BGS GeoIndex https://www.bgs.ac.uk/map-viewers/geoindex-onshore/

Floodline operated by SEPA https://myfloodline.sepa.scot/register

National Planning Framework 4 (Scottish Government), Policy 22 'Flood risk and water management'.

Scottish Flood Forecast https://scottishfloodforecast.sepa.org.uk/

SEPA Flood Maps https://map.sepa.org.uk/floodmaps

Water Quality

The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended), Available at: https://www.legislation.gov.uk/ssi/2011/209/contents/made

Scottish Environmental Protection Agency (2021) Water Environment Hub, Available at: https://informatics.sepa.org.uk/RBMP3/

The Scottish Government (2022), Scotland's Environment Map, Available at: https://www.environment.gov.scot/maps/scotlands-environment-map/

The Scottish Government (2022), Atlantic salmon distribution in Scotland, Available at: Atlantic salmon distribution in Scotland | marine.gov.scot

Standards for Highways (2020), Design Manual for Roads and Bridges, LA 113 Road Drainage and the Water Environment

Scottish Environmental Protection Agency (2010), Engineering in the water environment: good practice guide - River crossings 2nd Edition. Available at: River crossings - good practice guide

CIRIA (2006), Technical Guidance C648: Control of water pollution from linear construction projects.

CIRIA (2006), Technical Guidance C532: Control of water pollution from construction sites. Guidance for consultants and contractors